Assessing and Responding to Maternal Stress (ARMS):
Antenatal Psychosocial Assessment in Research and Practice

A thesis submitted to The University of Manchester for the
Degree of Doctor of Philosophy
in the Faculty of Medical and Human Sciences

2012

ZOE DARWIN

School of Medicine
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Abstract
Assessing and Responding to Maternal Stress (ARMS):
Antenatal Psychosocial Assessment in Research and Practice
Zoe Darwin - Degree of Doctor of Philosophy 2012
The University of Manchester

Background: Antenatal Psychosocial Assessment (APA) has recently been introduced into routine antenatal care, but the ways in which maternity service providers assess and respond to maternal stress are subject of debate. There is a lack of consensus on the instrument(s) of choice and lack of evidence regarding appropriate interventions. Further, national guidelines have not kept apace with the conceptual shift from ‘postnatal depression’ to ‘perinatal anxiety and depression’. Adopting the Medical Research Council Complex Interventions Framework, the ARMS research aimed to inform the development of interventions that support women who are experiencing, or at risk of, mild-moderate mental health disorder in pregnancy.

Methods: A mixed methods approach was adopted. In the quantitative element (Study Part 1) participants (n=191) completed a questionnaire when attending for their first formal antenatal appointment, using a procedure and materials that had been previously tested in a pilot study. Details including mental health assessment and referrals were obtained from their health records, following delivery. In the qualitative element (Study Part 2) a sub-sample of women (n=22) experiencing high levels of maternal stress took part in up to three serial in-depth interviews during pregnancy and the early postnatal period.

Findings: Maternal stress was found to be common. Using the Edinburgh Postnatal Depression Scale (EPDS) threshold of ≥10, approximately 1 in 4 women were classed as high depression (halving to 1 in 8 at the more conservative threshold of ≥13). Almost 1 in 3 women were classed as high anxiety, using the state scale of the State-Trait Anxiety Inventory (STAI-S, threshold ≥41), compared with 1 in 5 using the two-item GAD (threshold ≥3). Fewer than half of the women identified as high anxiety were identified by both measures. Factor analyses of the symptom measures were consistent with wider literature suggesting a three-item anxiety component of the EPDS; however, concurrent validation using regression analyses did not indicate that the EPDS could be used as an anxiety case finding instrument.

Women reported that maternal stress had significant impact on their lives that may not be captured with existing clinical approaches. Women commonly found it difficult to self-assess severity of maternal stress and the assessment process could itself act as an intervention.

The research provided the first validation of the depression case finding questions in UK clinical practice. The Whooley items completed in clinical practice identified only half of the possible cases identified by the EPDS, at both commonly adopted EPDS thresholds. Inclusion of the Arroll ‘help’ question as a criterion improved specificity of the assessment completed in clinical practice but substantially compromised sensitivity, missing 9 in 10 possible cases. Women’s mental health history and treatment history were similarly under-reported, particularly concerning anxiety.

APA was introduced into routine clinical practice without attention to topics of relevance to women, context of disclosure or to provision of adequate resources for consistently responding to identified need. Women experiencing, or at risk of, mild-moderate disorder were thus usually ineligible for further support.

Implications: Care pathways are needed that encompass both assessing and responding to maternal stress, where communication with health professionals, subsequent referral and management are addressed. The development, implementation and evaluation of low-cost resources embedded in such pathways are a priority and the research presented in the thesis offers a foundation on which to build.
Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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Contributions to the research

The PhD supervisory team initially comprised Dr Leroy Edozien (Consultant Obstetrician and Gynaecologist, and Honorary Senior Lecturer) and Professor Helen Lester (Professor of Primary Care). In the second year of the research, Dr Linda McGowan (Senior Lecturer in Women's Health) joined the team, following Helen's departure for health reasons. The supervisory team provided feedback and guidance on all aspects of the research.

Academic review of the pilot study and main study was provided by, amongst others, Professor Adrian Wells (PhD Advisor and Professor of Clinical and Experimental Psychology), Professor Alison Wearden (Health Psychologist) and Karen Clarke (Senior Lecturer in Social Policy). Before Dr Linda McGowan became involved in the research, advice on qualitative research was kindly given by Dr Christine Furber (Midwifery Lecturer) and Dr Debbie Smith (Health Psychology Lecturer).

The administrative staff at St Mary's Hospital enclosed the research information with appointment letters. The antenatal clinic coordinator (Rachel Coppock) facilitated access, advised on systems, including the referral system required for the research, and offered a contact point concerning the antenatal clinic. Antenatal clinic midwives and the ward clerk provided first approach, wherever feasible.

Research midwives at St Mary's Hospital (including Suzanne Thomas, Sarah Lee and Sue Woods) advised on maternity systems and helped to resolve apparent inconsistencies in the data available on different systems. The Maternity Applications Systems Manager at St Mary's Hospital, Sarah Jane Morris, provided the comparison reference data for women booking at the hospital in the study timeframe.

Richard Atherton in the University's Graphic Support Workshop helped to create the ARMS project logo. An external transcription agency conducted the majority of transcription work concerning the interviews.

Alongside other aspects of the supervision role, Dr Leroy Edozien shared with the author the task of extracting data from the health records and proposed a coding system for health-related variables, including medical history, obstetric history and obstetric complications.

Barbara Tomenson (Medical Statistician) was consulted on the choice of statistical analyses and decisions taken regarding the distribution of the data. Barbara also performed the power calculation on which the sample size for the main study was based. All other analyses and elements of the research were undertaken by the author.
DEDICATION

For Family D.

ACKNOWLEDGEMENTS

This PhD was funded by a Strategic Studentship Award, receiving funding from the Medical Research Council and Tommy’s Baby Charity.

I wish to thank my supervisory team; firstly, Leroy and all those hours we spent accessing health records together, and secondly, Linda who supported me across many domains. I have valued your individual contributions and your complementary ways of working together.

For many of the other resources required in this process, I thank my significant others – my parental figures, my big brother, and, above all, my loving wife who keeps me grounded in the realities of women’s lives.

I acknowledge everyone who I encountered when searching for a research community; including, the University of Manchester’s Midwifery and Women’s Health Research Group, the University of Manchester’s Health Psychology Research Network, and the international Society for Reproductive and Infant Psychology.

The research involved the contribution of clinical staff in the antenatal clinic and administrative staff throughout the hospital; their help, particularly when faced with so many other tasks, was always appreciated. Thank you to all of the research midwives who formed part of my “midwife hotline” and were kind enough to give the impression that I was not asking “stupid questions”. Foremost, I wish to thank Suzanne Thomas who not only helped me with knowledge of systems but also embodied patient-centredness.

My greatest acknowledgement is to all of the women who took part, whose experiences it has been a privilege to share and without whom this research could not have happened.
List of abbreviations

ANC  antenatal clinic
anypreg  stresses coded as pregnancy-specific (e.g. perinatal loss, threat to current pregnancy, previous traumatic delivery or comment about timing of pregnancy)
APA  antenatal psychosocial assessment
ANRQ  Antenatal Risk Questionnaire
ANRQ 23/24  denotes ANRQ threshold of ‘24 or more’, also written ≥24
ANRQ1  ANRQ item 1 (risk factor 1; emotionally supported by mother in childhood)
ANRQ2a  ANRQ item 2a (risk factor 2; history of anxiety or depression symptoms for at least two weeks)
ANRQ2b  ANRQ item 2b (risk factor 3; extent to which mood impaired functioning)
ANRQ2c  ANRQ item 2c (risk factor 4; sought professional help (and type sought))
ANRQ2d  ANRQ item 2d (not scored as a risk factor; took tablets or herbal medicine)
ANRQ3  ANRQ item 3 (risk factor 5; emotionally supportive relationship with partner)
ANRQ4a  ANRQ item 4a (risk factor 6; stresses, changes or losses in previous 12 months (and description))
ANRQ4b  ANRQ item 4b (risk factor 7; impact of stresses, changes or losses)
ANRQ5  ANRQ item 5 (risk factor 8; tendency to worry)
ANRQ6  ANRQ item 6 (risk factor 9; need for order)
ANRQ7  ANRQ item 7 (risk factor 10; people to depend on for support with baby)
ANRQ8a  ANRQ item 8a (risk factor 11; history of emotional abuse)
ANRQ8bc  ANRQ items 8b and 8c (risk factor 12; history of physical and/or sexual abuse)
ARMS  Assessing and Responding to Maternal Stress
BMI  Body Mass Index
CG  clinical guideline
CIF  Complex Interventions Framework (MRC)
CBT  cognitive behavioural therapy
EPDS  Edinburgh Postnatal Depression Scale
EPDS 9/10  denotes EPDS threshold of ‘10 or more’, also written ≥10
EPDS 12/13  denotes EPDS threshold of ‘13 or more’, also written ≥13
EPDS 14/15  denotes EPDS threshold of ‘15 or more’, also written ≥15
EPDS-3A  three-item anxiety subscale of the EPDS (comprising items, 3, 4 and 5)
EPDS-3A 5/6  denotes EPDS-3A threshold of ‘6 or more’, also written ≥6
ES  effect size
FA  factor analysis
GAD-2  two-item GAD instrument
GAD-2 1/2 denotes GAD-2 threshold of '2 or more', also written ≥2
GAD-2 2/3 denotes GAD-2 threshold of '3 or more', also written ≥3
GP  General Practitioner
HADS  Hospital Anxiety and Depression Scale
HHN  handheld notes (Personal Maternity Record, or Pregnancy Notes)
high  PRI classification: high on risk and high on at least one symptom measure
high^A  PRI classification: high anxiety and high risk
high^D  PRI classification: high depression and high risk
high^AD  PRI classification: high anxiety and high depression and high risk
HPA axis  hypothalamic-pituitary-adrenal axis
IMD  Index of Multiple Deprivation
low  PRI classification: low on risk and low on symptom
med^S  PRI classification: low risk and high on at least one symptom measure
('medium symptom')
med^SA  PRI classification: high anxiety, low depression, low risk ('medium symptom')
med^SAD  PRI classification: high anxiety, high depression, low risk ('medium symptom')
med^SD  PRI classification: low anxiety, high depression, low risk ('medium symptom')
MFR  maternal-fetal relationship
MLC  midwifery-led care (contrasted with shared care and consultant-led care, which is provided to women with high-risk pregnancies)
MMR  mixed methods research
MRC  Medical Research Council
MSSS  Maternity Social Support Scale
n/a  not applicable
n/r  not reported
NHS  National Health Service
NICE  National Institute of Health and Clinical Excellence
non-anypreg  stresses coded as not pregnancy-specific (e.g. not perinatal loss, threat to current pregnancy, previous traumatic delivery or comment about timing of pregnancy)
non-periloss  stresses coded as not concerning perinatal loss
PAD  perinatal anxiety and depression
PCA  principal components analysis
periloss stresses coded as concerning perinatal loss
PHQ Patient Health Questionnaire
PIS Participant Information Sheet
PMH perinatal mental health
PND postnatal depression
PRI Psychosocial Risk Index
PRQ Pregnancy Risk Questionnaire
REC Research Ethics Committee
rf risk factor
RQ Relationship Questionnaire
SCF special circumstances form (referral form used locally to document psychosocial issues)
SMI severe mental illness
SNS sympathetic nervous system
STAI-S State-Trait Anxiety Inventory state scale
STAI-S 40/41 denotes STAI-S threshold of ‘41 or more’, also written ≥41
STAI-S 44/45 denotes STAI-S threshold of ‘45 or more’, also written ≥45
UK United Kingdom
### Glossary of terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Antenatal</td>
<td>during pregnancy, before labour; sometimes known as ‘prenatal’</td>
</tr>
<tr>
<td>Booking visit</td>
<td>first formal antenatal appointment (usually undertaken by a midwife, ideally by the end of the first trimester)</td>
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<tr>
<td>Gravidity</td>
<td>the number of times a woman has been pregnant, regardless of pregnancy outcome</td>
</tr>
<tr>
<td>Handheld Notes (HHN)</td>
<td>a woman’s personal set of notes concerning her pregnancy; expected to be taken to all antenatal appointments and when attending for intrapartum care; also known as Pregnancy Notes, Maternity Notes, or Personal Maternity Record</td>
</tr>
<tr>
<td>Intrapartum</td>
<td>during the period of labour and delivery</td>
</tr>
<tr>
<td>Multipara</td>
<td>a woman who has given birth before</td>
</tr>
<tr>
<td>Parity</td>
<td>the number of times a woman has given birth to a fetus with a gestational age of 24 weeks or more, regardless of outcome</td>
</tr>
<tr>
<td>Perinatal</td>
<td>during the period from conception to one year following birth</td>
</tr>
<tr>
<td>Perinatal loss</td>
<td>loss of the pregnancy, fetus or infant in pregnancy or the first 28 days of life</td>
</tr>
<tr>
<td>Postnatal</td>
<td>after birth; sometimes known as ‘postpartum’</td>
</tr>
<tr>
<td>Primigravida</td>
<td>a woman who has not been pregnant before</td>
</tr>
<tr>
<td>Primipara</td>
<td>a woman who has not given birth before; also known as ‘nullipara’</td>
</tr>
<tr>
<td>Singleton pregnancy</td>
<td>a pregnancy involving one fetus</td>
</tr>
<tr>
<td>Trimester</td>
<td>one of the three divisions of pregnancy (first is 13 weeks or fewer; second is 14-26 weeks, third is 27 weeks until birth)</td>
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The Author

After my BSc in Psychology at the University of York, I continued there as a Research Assistant. In those years, I worked on a Department of Health-funded systematic review of interventions for substance-using offenders, followed by a Home Office-funded Randomised Controlled Trial evaluating a cognitive skills programme in male prisoners.

Next, I gained my MSc in Health Psychology at the University of Teesside. I learnt so much in just one year; it exposed me to qualitative research and critical perspectives – and a personal paradigm shift. My research dissertation on social constructions of cervical screening in sexual minority women was published in Feminism and Psychology.

I currently work as a Research Fellow with the Mother and Infant Research Unit (University of York) on a mixed methods study funded by the National Institute for Health Research, evaluating a volunteer doula scheme that provides support to socially disadvantaged women in the perinatal period.
Chapter 1. Introduction

Research and clinical groups in a number of countries have proposed introducing routine antenatal psychosocial assessment (APA) and facilitating management of ‘maternal stress’ as part of integrated and holistic antenatal care (American College of Obstetricians and Gynecologists, 2006; Austin, 2003; Carroll, et al., 2005; National Collaborating Centre for Women’s and Children’s Health, 2008). The research reported in this thesis contributes to the ongoing debate surrounding its introduction, with emphasis on maternity services in England and Wales.

In the context of this thesis, the term ‘psychosocial’ refers to psychological processes (including cognitive, emotional, and behavioural factors), the wider social processes (concerned with interpersonal, familial, social and cultural factors), and their inter-relationships.¹ The term reflects language adopted in the literature and increasingly in clinical practice (e.g. “antenatal psychosocial assessment” and “psychosocial risk factors”) and offers clarity in an applied health services setting, where a biomedical perspective is assumed unless stated otherwise (e.g. where “risk” is primarily used to describe biomedical risk).

APA involves two closely linked topics: psychosocial stress in pregnancy and perinatal mental health (PMH; that is, mental health in the period spanning from conception to one year postnatal (Austin, 2004; Matthey, 2004)). Together, these are described as ‘maternal stress’.

To conceptualise and operationalise maternal stress, the following literature review begins with a general introduction to psychosocial stress theory and measurement, before discussing the possible effects of psychosocial stress in pregnancy and the associated area of PMH.

The theoretical background concerning possible interventions for women experiencing maternal stress is considered, then findings from previous studies are examined and possible limitations of previous development, implementation and evaluation of social support interventions are identified, drawing on the Medical Research Council (MRC) Complex Interventions Framework (Medical Research Council, 2000, 2008).

Next, alternative risk-based and symptom-based approaches to APA that have been used in research and clinical practice are described, and current national clinical

¹ The term is consistent with the original coinage of psychosocial in theorising personality development (Erikson, 1950).
The literature review began with a broad approach, reading text books, clinical guidelines and review articles to identify key concepts, topics and debates. Searches using key words and key authors were performed using electronic databases (e.g. PsycINFO, PubMed) and the Journal of Reproductive and Infant Psychology was hand-searched. Sources were not restricted by date, study design or country, but were restricted to those written in English language. Where available, recent systematic reviews were identified (e.g. using the Cochrane library) and the reviews, together with the primary sources, were obtained. Reference lists were used to identify further literature that was relevant to the review. Other sources included websites, conference proceedings, personal communications and unpublished theses. The literature review was regularly updated to ensure that recent research informed decisions about the research (e.g. concerning choice of measures) and implications of the research. Details of the references were managed using EndNote software.

1.1 Psychosocial stress theory

1.1.1 Stress frameworks
Traditional stress research adopted a stimulus-response paradigm, premising an automated cause-effect relationship between the source (i.e. stressor) and manifestation of stress (i.e. stress response, or strain), with the individual viewed as passive (Cannon, 1932; Selye, 1976).

This provided an adequate framework for physiological response to physical (or biomedical) threat but failed to account for experimental findings of individual variability in psychological response (e.g. emotional distress) to psychological threat (Spielberger, 1972). In contrast, the “stress as process” paradigm characteristic of contemporary stress research premises the role of mediators of the stressor-response relationship, accounting for variability and suggesting scope for intervention (Pearlin, Menaghan, Lieberman, & Mullan, 1981).

Although several stress models have been proposed (Hobfoll, 1989; House, 1981; Lazarus & Folkman, 1984), they share commonalities (shown in Figure 1.1). For simplicity, the process may therefore be illustrated using the transactional model.
(Lazarus & Folkman, 1984), which has been the most influential and has been used previously in conceptualising stress in pregnancy (Lobel, 1994).

1.1.2 The “transactional” model of stress and coping

The crux of the transactional model (Lazarus & Folkman, 1984) is that stress (i.e. strain, including physiological strain and emotional distress) arises where there is a poor “person-environment fit” between environmental demands and resources available to meet these demands, the process of which is mediated by cognitive appraisal and coping.

**Cognitive appraisal**

Cognitive appraisal comprises primary appraisal of stimulus demands and secondary appraisal of the resources available (Lazarus & Folkman, 1984). Shaped by stressor characteristics and psychological disposition, primary appraisal positions the stressor as: i) irrelevant; ii) benign and positive; or iii) a stressor posing threat, harm/loss, or challenge.

Available resources may be distinguished as internal (personal; including personality differences, e.g. self-efficacy, the belief in one’s ability to achieve a goal) or external (social; including material resources and social support) (Lazarus & Folkman, 1984). However, as indicated by the bidirectional arrow between resource types in Figure 1.1, the categories are unlikely to be independent. For example, external resources are unlikely to be solely environmental (Taylor & Aspinwall, 1996), as illustrated in the later discussion of determinants of social support. Additionally, biological factors may constitute resources.

Secondary appraisal of resources is accompanied by assessment of available coping options, which informs coping efforts (described below), resulting in coping outcomes and informing reappraisal (Lazarus & Folkman, 1984).

**Coping**

Coping efforts (or strategies) are cognitive and behavioural attempts to manage the perceived discrepancy between demands and resources (Lazarus & Folkman, 1984). The transactional model positions these coping efforts as primarily situational coping strategies, which are specific to the situation (Lazarus, 1993). However, others argue that coping is primarily dispositional, displayed by relatively stable individual coping styles (Moos & Holahan, 2003).

Within the transactional model, coping may be “problem-focused” or “emotion-focused”; respectively either targeting the underlying stressor, or the emotional response to the
stressor (the distress, which may have become a more salient stressor than the initial stimulus) (Lazarus & Folkman, 1984).

The model logically predicts that coping may alternatively be “perception-focused” (or “meaning-focused”, or “appraisal-focused”), i.e. directed at the internal meaning of the stressor (Pearlin, et al., 1981; Pearlin & Schooler, 1978); although this could be subsumed within cognitive problem-focused coping (Thoits, 1986).

The common omission of perception-focused coping from typology of coping efforts reflects the circularity of the transactional model, such that secondary appraisal is interrelated with both primary appraisal and coping efforts, limiting empirical testability and presenting challenges in intervention evaluation (Hobfoll, 1988, 1989).

Dispositional views of coping more commonly distinguish approach and avoidance coping, with individuals considered to predominantly favour one or other, whereas problem-focused and emotion-focused may be likely to co-occur (Tennen, Affleck, Armeli, & Carney, 2000).

One avoidant coping style, characterised by avoiding negative feelings is the repressive coping style (Roth & Cohen, 1986), which presents potential challenges for stress questionnaires and the transactional model of stress and coping. Although appraisal is positioned as a precursor of the stress response, ‘repressors’ show physiological stress responses in the absence of cognitive and emotional stress responses (Roth & Cohen, 1986). Another avoidant style is proposed, called blunting, whereby ‘blunters’ and ‘monitors’ respectively avoid or seek information (i.e. avoid or approach) when faced with threat (Miller & Mangan, 1983).

Not only may coping efforts be inadequate to effectively manage the person-environment misfit, they may also create further stressors. For example, health-related behaviours such as smoking or alcohol consumption may constitute behavioural emotion-focused coping, attempting to alter the emotional stress response, either physiologically or via attentional mechanisms (Ingledew, Hardy, & Cooper, 1996). Of note, although avoidant coping is often considered maladaptive, this is likely to depend on the situation and may be adaptive where stressors are objectively uncontrollable (Roth & Cohen, 1986).

Although the transactional model has been influential in the stress and coping research, it has been criticised for its circularity, its prioritising of a situational approach to coping, and for placing too much emphasis on psychological processes, elaborated below.
1.1.3 Is the transactional model truly psychosocial or primarily psychological?

Resource-based stress models such as the “conservation of resources” model (Hobfoll, 1988, 1989) acknowledge a role of appraisal but ultimately attribute stress (strain) to threatened or actual loss of internal and external resources. Proponents have criticised the transactional model for: i) focusing on appraisal rather than quantifiable resources, and ii) positioning appraisal as largely idiographic rather than influenced by social and cultural context (Hobfoll, 2001).

However, the central role of appraisal need not underestimate the existence of objectively “real” stressors as appraisal is conceived as shaped by social context (Lazarus, 2001). Indeed, appraisal of major stressors is likely to be relatively normative (Lazarus & Folkman, 1984). It is therefore arguable that although the application and empirical testing of the transactional model has been primarily psychological (due to focusing on individual processes and largely neglecting social context), the theoretical underpinning is psychosocial. The conservation of resources and transactional models’ differences may therefore be viewed as primarily semantic (Lazarus, 2001), placing different weighting on appraisal and resources, with neither specifying a possible role of biological factors influencing variability. Ultimately, both are consistent with the stress as process paradigm (outlined in Figure 1.1), which is adopted here using a psychosocial stress framework.

The term “psychosocial stress” is increasingly used interchangeably with “stress” and without justification or definition. Having considered the extent to which contemporary stress theory adopts a psychosocial perspective, all subsequent discussion of stress, unless stated otherwise, refers to psychosocial stress.
Figure 1.1 The stress as process paradigm (adapted from existing models (Cohen, Kessler, & Underwood Gordon, 1997; House, 1974; Lazarus & Folkman, 1984) for the current research). Stressors may influence health directly, for example via physical stress; indicated by the lowest arrow. Emphasis of the current review is on the central horizontal pathway. Here, the relationship between stressors and outcomes is mediated by appraisal and coping. Internal and external resources may exert main effects on stressors and outcomes or they may exert buffering effects by moderating the relationship between stressors and outcomes, by influencing processes of appraisal and/or coping (illustrated by blue dashed arrows). Additional pathways may also exist; for example, stressors may deplete or mobilise resources (Wheaton, 1996).

1.2 Pathways between psychosocial stress and health

Stressor exposure may influence health via three main pathways. Firstly, stressors may impact directly on health, for example, the effects of physical violence in the case of domestic abuse, or the effects of temperature and malnourishment in the case of homelessness. Additionally, stress may impact health via psychosocial processes: psychophysiological pathways (i.e. arousal of physiological stress responses) or cognitive-behavioural pathways (i.e. health behaviours) (Steptoe, 1991).
In addition to these pathways, exposure to stressors may activate an underlying predisposition to psychopathology, where vulnerability (predisposition) may be biological (e.g. genetics), or psychosocial (e.g. social isolation, previous stressors, and personality factors); as described by vulnerability-stress (or diathesis-stress) models of psychopathology (Monroe & Simons, 1991).

This thesis focuses on psychosocial processes and the vulnerability-stress model of mental health, rather than the direct effects of physical stress or material deprivation.

1.3 Measurement of psychosocial stress
Measurement is classified here according to the components of the stress process described previously, i.e. with attention to stressors, appraisal, and stress responses.

1.3.1 Stressors (sources of stress)
The current review adopts the most common classification of environmental stressors: acute life events (discrete observable changes), chronic stressors (persistent conditions), and daily hassles (everyday minor demands); however, other typologies exist (Elliott & Eisdorfer, 1982; Wheaton, 1996).

(Acute) life events
Life events (e.g. bereavement or separation) remain the dominant approach to stress research. Simple occurrence may be measured; however events are commonly weighted in recognition that stressors elicit cumulative effects and negative events are more predictive of health status than are positive events (Taylor, 1991). Impact weighting may be “objective” (based on aggregate data, e.g. the Social Readjustment Rating Scale where “life change units” are assigned to different events (Holmes & Rahe, 1967)) or “subjective” (based on individual impact, e.g. the Life Experiences Survey (Sarason, Johnson, & Siegel, 1978)). The latter assesses both stress exposure and stress appraisal (Turner & Wheaton, 1997) although this need not be a criticism. Indeed, seemingly objective reporting of occurrence (particularly of less major events) may be subjective and influenced by affect, personality differences or retrospective “searching for meaning” (Brown, 1974, cited in (Jones & Bright, 2001)). Data triangulation is advisable where objectivity is prioritised, e.g. assessment by a significant other or interview, in addition to the common self-report checklist method. Personal interview provides the flexibility to consider rare events, timing, context and interdependence of events (Wethington, Brown, & Kessler, 1997).
Research traditionally concerned the effects of stress in pregnancy; a subtle distinction from the increasing focus on the effects of pregnancy-related stress. The latter recognises pregnancy itself comprises a life event that may elicit stress and compound existing stress relating to role change (particularly for first-time mothers), relationships, parenting, finance, employment, housing, physical symptoms, and bodily changes (Affonso, Liu-Chiang, & Mayberry, 1999; Levin, 1991; Yali & Lobel, 2002). Pregnancy-specific measures reflect this distinction and a recent review considers the measures available (Alderdice, Lynn, & Lobel, 2012).

**Chronic Stress**

Chronic stressors (e.g. concerning relationships, abuse, housing, finance, employment, and chronic illness) have been less commonly researched in relation to pregnancy, partly reflecting measurement challenges (Hoffman & Hatch, 1996; Turner, Wheaton, & Lloyd, 1995). One approach is to categorise chronic psychosocial stress according to status strain (concerned with social systems, e.g. socioeconomic status, ethnicity, gender, and age), role strain (e.g. family role, occupational role, and possible role conflict), and contextual strain (environmental issues, e.g. housing and neighbourhood) (Pearlin, et al., 1981). Using objective measurement based on proxy markers (e.g. socioeconomic status) captures extraneous variables reflecting material conditions, and negates the existence of chronic stress across social groups. Stressor exposure may alternatively be assessed by naturalistic or informant-based observation although this is clearly more resource-intensive than the common self-report method (Lepore, 1997).

**Combining life events and chronic stress**

Chronic stress measurement is predominantly combined with life event measurement, recognising transition from acute life event to chronic stress. Several checklists (Orr, James, & Casper, 1992; Turner, et al., 1995) have been developed in relation to pregnancy; albeit with limited application to date. In contrast, the Contextual Assessment of Maternal Experience (CAME) (Bernazzani, et al., 2005) is a variant of the most widely used interview method in stress research, the Life Events and Difficulty Schedule (LEDS), which draws on vulnerability-stress models of psychopathology (Brown & Harris, 1978). This semi-structured approach probes topics to create a narrative, exploring the “long-term contextual threat” of life events in different life domains (e.g. family, work) and the “severity” of chronic conditions (known as long-standing difficulties). There is initial evidence of internal consistency and validity for the Contextual Assessment of Maternal Experience; however the instrument requires further psychometric assessment and is time-intensive for both participant and researcher (Bernazzani, et al., 2005).
**Daily hassles**

Difficulties may also arise through the cumulative impact of seemingly more minor daily hassles (Brown, Adler, & Bifulco, 1988). Daily hassles appear better predictors of both subjective and objective measures of health than do life events (Chamberlain & Zika, 1990; DeLongis, Folkman, & Lazarus, 1988; Kanner, Coyne, Schaefer, & Lazarus, 1981). However, daily hassles are inherently subjective and inseparable from appraisal and responses, rather than constituting “stressors” per se (Dohrenwend, Dohrenwend, Dodson, & Shrout, 1984). Pregnancy-specific instruments have been designed, recognising the role change and practical considerations specific to pregnancy (DiPietro, Ghera, Costigan, & Hawkins, 2004). Critically, applicability with pregnant populations experiencing chronic psychosocial stress remains untested.

**1.3.2 Appraisal of stress**

Appraisal is distinguished conceptually from stimulus- and response-based measures (Roesch, Dunkel-Schetter, Woo, & Hobel, 2004). However, items from the most commonly employed tool, the Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermestein, 1983) (e.g. “How often have you been upset because of something that happened unexpectedly?”, “How often have you found that you could not cope with all the things that you had to do?”) highlight that appraisal is confounded with antecedents of appraisal (e.g. personality), coping, and distress (Monroe & Kelley, 1997), highlighting challenges in accessing cognitive representations of stress.

**1.3.3 Stress responses**

As outlined in Figure 1.1, stress responses may be emotional (termed here, psychological distress), physiological, or behavioural.

**Emotional stress response (psychological distress)**

Occupying a critical position in stress research, distress may impact on physical health via psychophysiological processes but itself constitutes a psychological health outcome (Stone, 1997).

Furthermore, distress may be symptomatic of a short-term stress response, constituting a risk factor for further health outcomes, or may be characteristic of an enduring health outcome. As such, distress measurement may be used for different purposes, including as predictor variables (or criterion variables), or to determine eligibility for an intervention or care pathway.
In a clinical setting, it may be applied to screening for prediction (i.e. identifying those who are at-risk, in order to offer prevention); or for identification (i.e. identifying possible cases requiring further mental health review with a trained professional to determine diagnosis of an existing condition and offer treatment). Application of these measures to symptom-based dimensions of antenatal psychosocial assessment will be returned to later.

Distress is predominantly measured by self-report Likert scales, based on rating the presence of frequency of symptoms of distress, although visual analogue scales may alternatively be used and have been suggested to avoid bias associated with Likert ratings (Stone, 1997). Although sometimes employed as a global construct (e.g. “having difficulty concentrating” (General Health Questionnaire) (Goldberg & Hillier, 1979)), specific emotions (e.g. anxiety, depression, hostility) may offer greater insight (Lazarus, 1993); the focus in this thesis is on anxiety and depression.

Anxiety measures may be generic (e.g. the State-Trait Anxiety Inventory (Spielberger, 1972)), or pregnancy-specific, including concerns about labour, weight gain, altered relationship with partner, and parenting (e.g. the Pregnancy Anxiety Scale and Pregnancy Distress Questionnaire (Levin, 1991; Yali & Lobel, 1999)). In contrast, depression measures developed for pregnant populations generally ensure exclusion of somatic symptoms attributable to pregnancy (e.g. lethargy, altered appetite, altered sleeping), rather than including pregnancy-specific items per se (e.g. the Edinburgh Postnatal Depression Scale, EPDS) (Cox, Holden, & Sagovsky, 1987; Murray & Cox, 1990).

Of note, although measuring mental health and well-being, none of these measures of emotional stress responses are diagnostic of mental disorder; instead identifying possible cases (based on scoring above a recommended threshold).

**Physiological stress response**

“Allostasis” describes the body’s adaptation to stress, which involves: the sympathetic nervous system (SNS); the neuroendocrine system (specifically, the hypothalamic-pituitary-adrenal (HPA) axis); and the immune system (McEwen & Stellar, 1993; Sterling & Eyer, 1981). Physiological stress response may be measured via biomarkers of these processes. HPA axis activation (usually indexed by the glucocorticoid, cortisol) is most commonly studied as it is presumed to best reflect the physiological stress response, being less reactive than SNS activation to general arousal and having slower initiation and longer-lasting effects (Clow, 2001). Indices of SNS activity (including cardiovascular reactivity and the catecholamines, adrenaline and noradrenaline) are also used, particularly in acute stress research.
Such measurement offers insight into mechanisms of action but may be influenced by factors beyond the magnitude of stress exposure or appraisal. For example, gestational age is relevant because the physiological stress response becomes dampened as pregnancy progresses, potentially serving a protective function, although it should be noted that the response is still present and with sufficient “inter-individual variability” to be employed in studies (De Weerth & Buitelaar, 2005). Response may also be influenced by inter- and intra-individual variability of “stress reactivity” and “stress recovery”, possible indicators of “allostatic load” (the theorised “wear and tear” on the body due to repeated stress exposure that renders an individual less able to adapt to future stressors due to altered physiological stress response (McEwen & Stellar, 1993)). Allostatic load may also be implicated in stress-vulnerability modes of mental health (McEwen, 2003); however this remains untested.

**Behavioural stress response**
This category of stress indices is not routinely employed. Observing physical manifestations is labour-intensive and unlikely to be naturalistic, unless provided by significant others. Additionally, certain behavioural stress responses such as health behaviours (e.g. smoking) are heavily confounded due to having numerous determinants (Connor & Norman, 2005; Rutter & Quine, 2003).

### 1.3.4 Multidimensional approaches to stress measurement
In recognition of the transactional nature of the stress process, Lobel and colleagues advocate multiple measurement, encompassing stimulus-based (life events), appraisal-based (perceived stress) and response-based (anxiety) measures, subjected to analysis by structural equation modelling to enable separation of the latent factor (i.e. the common component of variables) from the measurement error of variables (Lobel, et al., 2008; Lobel & Dunkel-Schetter, 1990; Lobel, Dunkel-Schetter, & Scrimshaw, 1992). Such an approach is suited to theory testing rather than theory development because it constitutes confirmatory not explanatory testing of a model, requiring specification of a model (or models).

Having provided the necessary background to stress theory and measurement, the possible effects of psychosocial stress in pregnancy across different areas of impact is explored, with consideration of possible mechanisms. Together with discussion of PMH, this provides the background to current clinical guidelines on assessing maternal stress (section 1.9).
1.4 Maternal stress and its association with adverse outcomes

1.4.1 Pregnancy as a unique area of stress research
Investigating the effects of stress in pregnancy largely relies on observational research due to clear practical and ethical issues with an experimental paradigm, i.e. where conditions are determined by the researcher. Restriction to observational research creates challenges in disentangling the effects of stress from (known and unknown) confounding variables. However, pregnancy stress research has practical appeal for naturalistic stress research: gestation is a discrete period marked by routinely collected objective end-points that are clinically significant.

Traditionally, “the effects of being exposed to taxing situations of person A (the mother) on the well-being of person B (the developing child), rather than the mother herself is studied” (p.564) (Paarlberg, Vingerhoets, Passchier, Dekker, & Van Geijn, 1995); however the direction of research has since evolved to encompass several outcome domains.

1.4.2 Effects of maternal stress across outcome domains: fetal/neonatal, infant and maternal
In the absence of a transparent typology, outcomes are classified here using contemporary terminology (fetal/neonatal, infant, and maternal) (American College of Obstetricians and Gynecologists, 2006; Department of Health, 2004). Nonetheless, it is recognised that the classification is somewhat artificial and does not acknowledge the interactions between domains or that all of the outcomes have potential impact for the woman. Indeed, concerns have been raised from an ethical perspective about such distinction between risk to fetus and risk to mother (Queniart, 1992, cited in (Saxell, 2000)), highlighting the need for explicit agendas in this area of research and intervention. The typology adopted here is chosen as facilitating discussion of the wider psychosocial effects of stress, the possible mechanisms underlying effects, and potential for intervention; including, beyond the antenatal period.

Fetal/neonatal outcomes
A relationship between maternal stress and fetal characteristics (including heart rate, blood circulation and fetal motor activity) has been demonstrated in utero through observational and experimental studies (DiPietro, Costigan, & Gurewitsch, 2003; DiPietro, Hilton, Hawkins, Costigan, & Pressman, 2002; Monk, Fifer, Sloan, Trien, & Hurtado, 2000; Sjöström, Valentin, Thelin, & Marsál, 1997). Research on fetal/neonatal outcomes predominantly centres on birth weight and gestation length, which are
routinely collected data and therefore readily available. These outcomes are commonly
dichotomised to reflect clinical diagnoses: low birth weight (<2500g), and preterm birth
(<37 weeks). Low birth weight is the single strongest predictor of neonatal morbidity and
mortality in developed nations yet encompasses conditions with different etiologies:
prematurity and intrauterine growth restriction (Kramer, 1987). Attempts to explore the
different etiologies of low birth weight have proposed that prematurity likely occurs via
neuroendocrine or immune pathways (Leung, et al., 1999; Lockwood, 1994; Mancuso,
Dunkel-Schetter, Rini, Roesch, & Hobel, 2004; Wadhwa, Culhane, Rauh, & Barve, 2001)
whereas growth restriction may occur via the SNS system and HPA axis (Lobel, et al.,

While reviews have largely reached consensus that “stress” is associated with untoward
fetal outcomes, attributing inconsistencies to variability in design and measurement
(Hobel, Goldstein, & Barrett, 2008; Paarlberg, et al., 1995), several issues remain
contentious; including timing of stress, the predictive ability of stress and the relative
contribution of health behaviours.

**Timing**

Temporality should be considered relative to outcomes (Cohen, et al., 1997). In
pregnancy, seemingly acute stress may have relatively long exposure (e.g. duration of
event exposure, perceived threat, or stress response) (Baum, Cohen, & Hall, 1993).
However, timing effects have been limited to stressor exposure and distress at specific
timepoints, producing inconsistent results (Glynn, Wadhwa, Dunkel-Schetter, Chicz-
DeMet, & Sandman, 2001; Hedegaard, Henriksen, Sabroe, & Secher, 1993; Hedegaard,
Henrikson, Secher, Hatch, & Sabroe, 1996; Khashan, et al., 2009; Khashan, et al.,
2008). Timing is fundamental to the potential for antenatal intervention. Research
recruitment is usually in the second trimester (14-26 weeks) yet the effects of stress on
fetal/neonatal outcomes may already be entrenched, with evidence of allostatic load
impacting reproductive function (Lu & Halfon, 2003).

**Comparing the predictive ability of stress measures**

Birth weight and preterm labour seem better predicted by impact than occurrence of life
events (Dole, et al., 2003; Hedegaard, et al., 1996). Similarly, statistical analysis using
structural equation modelling has suggested a latent factor of stress (comprising impact
of life events, perceived stress and anxiety) and a distinct variable of life event
occurrence (which did not contribute to these outcomes) (Lobel, et al., 1992). Modelling
also suggests pregnancy-related anxiety may be a more powerful predictor of gestation
length (but not birth weight) (Lobel, et al., 2008), although this could be confounded by
knowledge of pregnancy progression despite controlling for obstetric risk. To date,
multidimensional approaches have omitted chronic stress.
Relative contribution of health behaviours

As acknowledged earlier, stress may impact indirectly health via cognitive-behavioural pathways (i.e. health behaviours) as well as more direct psychophysiological pathways.


Health behaviours require measurement in evaluating any intervention to target stress in pregnancy, both as a covariate and a potential outcome. The stress-health behaviour relationship is complex and health behaviours have multiple determinants (including cultural and social norms, personal beliefs, self-efficacy and physical addiction) (Connor & Norman, 2005; Rutter & Quine, 2003). Behaviour change likely demands targeted intervention beyond stress management, requiring specialist intervention and a structured care plan in instances of alcohol and substance use (Day & George, 2005). However, pregnancy may present a “window of opportunity” for lifestyle modification in terms of motivational differences accompanying role change (Mayer & Liebschutz, 1998) and contact with health services (Orleans, Barker, Kaufman, & Marx, 2000).

Infant outcomes

An infant’s cognitive, behavioural, emotional and social development can be influenced, both directly via in utero effects of maternal stress, and postnatally via parenting and the mother-infant relationship (attachment).

There is evidence that maternal stress in pregnancy may increase risk of developmental problems (including language delay, memory deficits, attentional deficits, hyperactivity, and anxiety) by fetal programming effects, possibly involving altered HPA activity in the infant (due to hormones passing across the placenta) and structural differences in infant brain development (Talge, Neal, & Glover, 2007; Van den Bergh, Mulder, Mennes, &
Glover, 2005). Effects have been demonstrated with different stress measures (including anxiety, depression, pregnancy-related anxiety, perceived stress, and occurrence and impact of life events and daily hassles) and persist after controlling for key confounders (e.g. postnatal mood and rater bias, i.e. whether behaviour ratings of the infant are maternal or objective) (Van den Bergh, et al., 2005). Further research is necessary to explore the relative contribution of psychophysiological and cognitive-behavioural processes, effects of genetic predisposition, maternal personality, chronic stress and the maternal-partner relationship (Talge, et al., 2007; Van den Bergh, et al., 2005).

Attachment theory describes how the mother-infant attachment provides a foundation for relationships developed throughout the life course (Bowlby, 1969; Howe, 2005; Rutter, 1990). Children who show secure attachments generally have better developmental outcomes than those with insecure attachments (Howe, 2005). Longitudinal research has found that maternal stress, as measured by amniotic fluid cortisol levels and stressful life events, respectively predict cognitive development and fearfulness in the infant (measured between 14 and 20 months) and that these relationships may be moderated by attachment type (Bergman, Sarkar, Glover, & O’Connor, 2008, 2010).

Such findings highlight the potential for attachment-based interventions; however it may be possible to provide earlier intervention given that the processes of bonding and attachment begin before birth (Cranley, 1981). Part of the woman’s “psychological adjustment” in pregnancy involves key ‘developmental tasks’, including “the development of maternal representations of the self as mother and a relationship with fetus” (p.329) (Hart & McMahon, 2006). This developing relationship with the unborn child is referred to as ‘maternal-fetal attachment’ or the maternal-fetal relationship (MFR) and has been associated with postnatal mother-infant attachment (Van den Bergh & Simons, 2009). Targeting MFR has been proposed as a possible intervention to improve health-related behaviours and optimise bonding, attachment and parenting (Van den Bergh & Simons, 2009; Yarcheski, Mahon, Yarcheski, Hanks, & Cannella, 2008). However, little is known about MFR and its relationships with other variables in the first trimester, which is when the majority of antenatal psychosocial assessment would be conducted and recommendations made for additional interventions.

**Maternal outcomes**

Distress and work-related stress are associated with gestational complications (e.g. hypertensive disorders and gestational diabetes), which may be due to both psychophysiological pathways and health-related behaviours (e.g. smoking) (Klonoff-Cohen, Cross, & Pieper, 1996; Kurki, Hiilesmaa, Raitasalo, Mattila, & Ylikorkala, 2000; Landbergis & Hatch, 1996; Leeners, Neumaier-Wagner, Kuse, Stiller, & Rath, 2007; Marcoux, Berube, Brisson, & Mondor, 1999).
Additionally, a detailed review found that there is some evidence for an association between antenatal stress (as measured by the presence of psychosocial stressors and elevated anxiety symptoms) and delivery outcomes (e.g. mode of delivery, progress of labour but not need for analgesia); however, evaluation has been limited by methodological issues including measurement of stress, measurement of outcomes (e.g. using composite scores, rather than exploring individual complications) and failing to control for confounding variables (Johnson & Slade, 2003). The most likely pathway between maternal stress and these delivery outcomes is a psychophysiological one, given the role of hormones in the progress of labour, with catecholamines (e.g. adrenaline) inhibiting oxytocin, a hormone involved in the initiation of uterine contractions (Hodnett, Gates, Hofmeyr, Sakala, & Weston, 2011; Slade, Heke, Fletcher, & Stewart, 1998).

The most marked effects for maternal outcomes concern the relationship between psychosocial stress and maternal mental health morbidity, i.e. perinatal mental health (PMH). PMH is an area of growing importance for healthcare professionals and service commissioners, and an area of rapidly changing clinical practice (National Collaborating Centre for Mental Health, 2007). Before introducing the current clinical context, further background is necessary to illustrate inconsistencies in guidelines and areas requiring further investigation.

1.4.3 Perinatal mental health (PMH)
PMH encompasses the range of symptoms (affective states) and mental disorders (i.e. psychopathology) that occur in the period spanning pregnancy, childbirth, and the first postnatal year. “Pure” perinatal conditions are difficult to disentangle from other mental health (National Collaborating Centre for Mental Health, 2007). The term PMH is therefore used here to include both pre-existing mental health that continues or recurs in the perinatal period and mental health with new onset in the perinatal period, although different sub-types are likely to differ in etiology (Church, Brechman-Toussaint, & Hine, 2005; Kammerer, Taylor, & Glover, 2006).

Severe mental illness (SMI) and mild-moderate disorder
An important distinction within PMH (and mental health more generally) is between severe mental illness (SMI, e.g. severe depression, schizophrenia, bipolar disorder, psychosis in the postnatal period) and mild-moderate disorder (including anxiety and depression) (National Collaborating Centre for Mental Health, 2007). The distinction reflects different etiology and impact, requiring different identification and management.
There is generally reduced vulnerability for SMI in pregnancy, with women facing an increased risk after childbirth – both in terms of prevalence and severity (Confidential Enquiry into Maternal and Child Health, 2007). Postnatal depression (PND) has received the greatest attention, reflecting its prevalence, which is estimated at 10-15% (Robertson, Grace, Wallington, & Stewart, 2004) and its established negative impact on the mother-infant attachment, infant development and relationship with the partner (Buist, 1998; Murray & Cooper, 1997; Rutter, 1990). Additionally, puerperal psychosis (also known as postpartum psychosis) has had considerable coverage in the media, often in connection with incidents involving infanticide and/or maternal suicide (Oates, 2003; Spinelli, 2004). Although relatively rare, SMI conditions such as puerperal psychosis (which affects 0.1-0.2% of women (Oates, 1994; Valdimarsdóttir, Hultman, Harlow, Cnattingius, & Sparén, 2009)) have contributed to ‘psychiatric causes’ consistently being one of the most common indirect causes of maternal death in the UK (i.e. death during pregnancy or within six weeks of delivery due to pre-existing or new conditions aggravated by pregnancy) (Centre for Maternal and Child Enquiries, 2011; Confidential Enquiry into Maternal and Child Health, 2001, 2004, 2007)³.

Given such concerns, SMI understandably attracts a high profile. However, its apparent dominance in PMH training for health professionals (Ross-Davie, Elliott, & Green, 2007) neglects that that those working with women in the perinatal period (e.g. those in maternity services, including midwives and obstetricians, and General Practitioners (GPs) in primary care) are likely to encounter mild-moderate disorder on a regular basis and, furthermore, may have a greater role compared with SMI, which attracts specialist resources (including psychiatric services) and multi-agency working. For example, anxiety and depression may be as common in pregnancy as at any other time and women may have increased risk of first presentation or relapse with obsessive-compulsive disorder, and eating disorders in pregnancy (Cox & Holden, 2003; National Collaborating Centre for Mental Health, 2007). Additionally, risk for the full range of disorders may increase in women with existing conditions who reduce or cease taking mental health-related medication due to fears of the effects on the fetus.

The focus of the research presented in this thesis is mild-moderate disorder and subclinical psychological distress. Central to this is the shift from postnatal depression (PND) to perinatal anxiety and depression (PAD), the evidence base for this shift and

³ For example, the 2007 Confidential Enquiries into Maternal Deaths (concerning deaths in 2003-2005) found that 37 deaths in pregnancy or the first year following delivery were due to maternal suicide, including 12 in pregnancy or the first six weeks postnatal; the majority was due to perinatal mental health but a minority included longstanding mental health problems (Confidential Enquiry into Maternal and Child Health, 2007). Reports in 2001 and 2004 found mental health was the leading indirect cause, replaced by cardiac causes in 2007 and 2010 (Centre for Maternal and Child Enquiries, 2011; Confidential Enquiry into Maternal and Child Health, 2001, 2004, 2007).
the extent to which current national clinical guidelines, and the tools available for their implementation, are consistent with the shift.

**Shifting from postnatal depression (PND) to perinatal anxiety and depression (PAD)**

Demands for a shift from PND to PAD recognise that apparent PND may be neither truly ‘postnatal’ nor exclusively ‘depression’, with many cases beginning antenatally and/or presenting features of anxiety (Green, 1998). Evidence suggests that: i) postnatal anxiety may be as common as postnatal depression (measured by clinical diagnosis); ii) antenatal distress may be more common than postnatal distress (measured by established cut-offs for anxiety and depression symptomatology); and, iii) antenatal distress (measured by clinical diagnosis and by continuous measures of anxiety and depression symptomatology) is the strongest predictor of postnatal mental illness (both by disorder and symptomatology), as well as iv) being an immediate health outcome (Austin, 2004; Evans, Heron, Francomb, Oke, & Golding, 2001; Gavin, Gaynes, Meltzer-Brody, & Gartlehner, 2005; Grant, McMahon, & Austin, 2008; Heron, O’Connor, Evans, Golding, & Glover, 2004; National Collaborating Centre for Mental Health, 2007; Parker, et al., 1999).

Thus, there are concerns that, while the breadth of research and public health campaigns have provided a high profile for PND that may have facilitated de-stigmatisation of mental ill-health, preoccupation with PND will ultimately limit clinical practice and research by failing to inform etiology and treatment (Brockington, MacDonald, & Wainscott, 2006).

**The prevalence of perinatal anxiety and depression (PAD)**

Reported prevalence of antenatal depression varies greatly due to heterogeneous population characteristics (e.g. gestational age and psychiatric history) and use of different assessment methods and instruments. In particular, rates based on diagnosis by clinical interview are likely to be lower than those based on symptom-based screening methods where potential cases are identified using established thresholds (Gavin, et al., 2005), although this has not always been found (Bennett, Einarson, Taddio, Gideon, & Einarson, 2004). Indeed, systematic reviews based on diagnostic interview (Gavin, et al., 2005) and diagnostic interview or self-report (Bennett, et al., 2004) have both reported prevalence of antenatal depression as ranging between 7% and 13% (with Bennett and colleagues reporting 7.4% in the first trimester, 12.8% in the second and 12.0% in the third).

Less is known about the prevalence of anxiety. Estimating anxiety prevalence is complicated by heterogeneity of disorders (e.g. generalised anxiety disorder), panic
disorder, obsessive-compulsive disorder, and post-traumatic stress disorder), diagnostic criteria that render an antenatal diagnosis unlikely where onset is antenatal (e.g. generalised anxiety disorder requires symptoms lasting at least six months), and the lack of validated perinatal screening instruments (Matthey, Barnett, Howie, & Kavanagh, 2003; Ross & McLean, 2006). Recently, the prevalence of generalised anxiety disorder during pregnancy has been estimated in a USA cohort (n=2,793) using a revised criterion of one month (instead of six months), finding that 9.5% showed GAD at some stage in the pregnancy (7% in the first trimester, 2% in the second and 3% in the third) (Buist, Gotman, & Yonkers, 2011).

Perhaps the biggest reason for sparse data on antenatal anxiety is its relationship with depression. Indeed their co-occurrence, both for symptoms and clinical disorders across populations, is so common that it is debated whether anxiety and depression are the same underlying disorder with different pathways, or represent distinct conditions with a shared (and possibly, higher order) dimension (i.e. general distress, or negative affect) and distinct features (respectively, hyperarousal and low positive affect) (Clark & Watson, 1991; Himmelhoch, Levine, & Gershon, 2001; Parker, et al., 1999; Watson, 2005). Such concerns have been raised specifically in the context the perinatal period, suggesting that adoption of PAD as an umbrella term would recognise that it is unknown whether variations in onset and features represent sub-types of one disorder, or distinct conditions (Matthey, 2004). Critically, in the event of co-occurrence, the nature of current diagnostic systems (across populations) is such that “depression…trumps anxiety”, leading to lack of awareness and under-reporting of the latter (Matthey, et al., 2003).

Where both sets of symptoms have been measured, anxiety and depression have been found to be more common antenatally than postnatally, and anxiety has been found to be more common than depression during pregnancy (Brockington, 1996; Heron, et al., 2004). Comparisons based on diagnosed disorder are unavailable antenatally but it has been suggested that postnatally anxiety may be as common as depression, and the disorders often co-occur (Muzik, et al., 2000; Rowe, Fisher, & Loh, 2008).

**Etiology of perinatal anxiety and depression (PAD)**

While biological factors are probably more important than psychosocial factors in the etiology of SMI (including puerperal psychosis, bipolar disorder, and schizo-affective disorders), the reverse is found for non-psychotic conditions such as depressive and anxiety disorders, even after acknowledging the influence of hormonal factors specific to the perinatal period (Oates, 1994). Thus, while different types of interventions are not restricted to different types of disorder, SMI is commonly the remit of psychiatric services, involving pharmacological treatments that are used with or without other intervention types.
Extensive evidence supports vulnerability-stress models and the role of psychosocial factors in the etiology of affective disorders in women (Brown & Harris, 1978). This has also been demonstrated in the perinatal period, with comprehensive reviews synthesising the findings concerning depression; for the postnatal period (both for diagnosed depression as a condition and for depressive symptoms) and for the antenatal period (for symptoms) (Beck, 2001; Lancaster, et al., 2010; O’Hara & Swain, 1996; Robertson, et al., 2004). Less is known concerning the etiology of perinatal anxiety, requiring further investigation.

Consistent with diathesis-stress models, experiences such as history of childhood abuse and neglect\(^4\) and history of domestic abuse (at any age) can influence vulnerability to mental health (and in particular, PMH) by shaping subsequent social and emotional relationships, appraisal and coping (Brown & Harris, 1978; Buist, 2002; Lang, Rodgers, & Lebeck, 2006; McMahon, Barnett, Kowalenko, & Tennant, 2005). For women who have experienced such trauma and early adversity, unresolved issues may be triggered by pregnancy and its associated role changes, creating vulnerability to PMH problems, and risk of transgenerational patterns of abuse and neglect (Buist, 1998).

In addition to pre-existing psychosocial stressors that may be compounded by pregnancy (e.g. relationship issues and domains such as finance, employment and housing), the pregnancy may itself be a stressor. For example, the pregnancy may be unintended (i.e. mistimed or unwanted), which is associated with psychological distress and poor healthcare access (American College of Obstetricians and Gynecologists, 2006; Bernazzani, et al., 2005; Messer, Dole, Kaufman, & Savitz, 2005).

Pregnancy may also trigger unresolved issues concerning previous pregnancies, including traumatic deliveries (Beck & Watson, 2010) and perinatal loss (i.e. miscarriage, abortion, stillbirth and neonatal death) (O’Leary, 2004). Increased risk of postnatal anxiety and depression symptoms has been demonstrated following miscarriage (Geller, Kerns, & Klier, 2004; Klier, Geller, & Ritsher, 2002), yet there may be different components of grief with different types of loss (Brownlee & Oikonen, 2004). It is largely unknown how previous perinatal loss may impact antenatal psychological distress in subsequent pregnancy, although there is initial evidence of higher anxiety following miscarriage (Ferti, Bergner, Beyer, Klapp, & Rauchfuss, 2009).

Consistent with the psychosocial stress framework described previously, additional risk factors for PMH may concern the resources that influence appraisal and coping. Social

\(^4\) It has been suggested that risk factors such as these may be more accurately described as trauma or early adversity, rather than subsumed in life events or chronic stress (Wheaton, 1996).
support has repeatedly been implicated (Beck, 2001; Lancaster, et al., 2010; O’Hara & Swain, 1996; Robertson, et al., 2004) and is discussed further in section 1.6. Additionally, certain personality characteristics have been identified as risk factors for PND, including neuroticism (i.e. tendency to overreact to stressors), obsessionality and perfectionistic traits (i.e. need for routine and order), dysfunctional cognitive style (i.e. distorted and extreme thinking), and interpersonal sensitivity (traits concerning sensitivity to others’ behaviours and feelings) (Boyce, 1994; Jones, et al., 2010). The inclusion of anxiety has been debated given its potential status as a symptom, rather than an enduring characteristic (Boyce, 1994). A self-report instrument has been developed to measure these personality characteristics (the Vulnerable Personality Style Questionnaire, VPSQ), but to date has only been used postnatally and with respect to depression (Boyce, Hickey, Gilchrist, & Talley, 2001; Dennis & Boyce, 2004).

Having considered the evidence base for the possible pathways of maternal stress, this provides the conceptual basis for considering possible interventions for women experiencing maternal stress.  

1.5 Types of interventions for women experiencing maternal stress

Following the psychosocial stress framework and the diathesis-stress (i.e. vulnerability-stress) models presented previously, interventions for women experiencing maternal stress can essentially be viewed as protecting against vulnerability.

Types of interventions can be largely grouped as pharmacological (i.e. medication), psychological (e.g. cognitive-behavioural therapy, interpersonal therapy), and social (explored in detail below). These distinctions are consistent with current clinical guidelines (National Collaborating Centre for Mental Health, 2007), which are presented following discussion of social support theory and evidence.

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5 In this thesis, the phrase ‘women experiencing maternal stress’ is used to reflect all aspect of the psychosocial stress process and PMH, rather than being limited to those women who report emotional distress.
1.6 Social support

1.6.1 The relationship between stress, health and social support: The conceptual basis of social support interventions

As illustrated by pathways in Figure 1.1, interventions may be developed to manipulate resources that a) independently influence stressors and/or health outcomes (i.e. main-or direct-effects), and/or b) moderate the stressor-response relationship, via their impact on appraisal and coping (i.e. buffering-effects). Along with stressors, these resources may also be considered psychosocial risk factors. One such resource is social support; that is, support provided by others. Seminal reviews of the importance of social relationships for physical and psychological health (Cassel, 1976; Cobb, 1976) popularised social support as a candidate for intervention; moreover they cited its buffering potential in relation to pregnancy outcome, although main effects may occur alongside.

**Main effects of social support**

There is compelling evidence for the direct-effects (or main-effects) model of social support: social support enhances health regardless of level of stress. Social support may impact directly on stressor exposure (particularly as social isolation is a chronic stressor), or on health outcomes. Physical health may benefit via cognitive-behavioural pathways (e.g. accessing health services, and engaging in physical activity) and psychophysiological pathways (e.g. cardiovascular, endocrine and immune systems; benefits that do not appear solely attributable to health behaviours) (Uchino, Cacioppo, & Kiecolt-Glaser, 1996). The benefits of social support for psychological health are well-established (Turner, 1981), although the mechanisms are debated (Cohen & Wills, 1985; Lakey, et al., 2002) and negative support may occur where conflict or relational strain exists (Due, Holstein, Lund, Modvig, & Avlund, 1999).

**Buffering effects of social support**

Given the safety concerns surrounding pharmacological interventions in pregnancy (Hostetter, Stowe, Strader, Mclaughlin, & Llewellyn, 2000; National Collaborating Centre for Mental Health, 2007), social support has intrinsic appeal for pregnant women already experiencing psychosocial stress, for whom social support may “buffer” against the adverse effects of high stress. Empirically, this would be demonstrated by an interaction between stress and social support in predicting health, whereby adverse stress-health relationship is reduced in conditions of high support.

The buffering effects model is consistent with the transactional approach (Figure 1.1) as social support may moderate the stressor-health relationship either via impact on
cognitive appraisal or coping response. Therefore interventions may be developed to reduce susceptibility to adverse physical and psychological health outcomes by facilitating coping efforts deemed “adaptive” for the individual in the context of the target stressors. This highlights two implicit assumptions: existing social support is inadequate and existing coping is inadequate.

Focus on individual-level intervention has been criticised for contributing to a political agenda encouraging victim-blaming (Lynch, Smith, Kaplan, & House, 2000); however it may encompass the structural determinants of health by placing the individual within their social context and proposing that socioeconomic structure and relative deprivation have not only material and physical health effects, but also psychosocial effects (Marmot & Wilkinson, 2001). Notably, both stressors and vulnerability may vary with sociodemographic characteristics, with evidence of not only differential material, but also social support, resources (Aneshensel, 1992; Baum, Garofalo, & Yali, 1999; Taylor & Seeman, 1999; Turner, et al., 1995).

1.6.2 The meta-construct of social support
In common with stress research, social support research has been limited by variability in conceptualisation and operationalisation. Consensus has been reached by several research groups (Barrera, 1986; Cohen, 1992; Sarason, Sarason, & Pierce, 1990; Vaux, Riedel, & Stewart, 1987) that the “meta-construct” of social support may be viewed as comprising three constructs: 1) social network (existence and quantity of relationships), 2) support behaviours (or “received” or “enacted” support, i.e. objective, observable actions or behaviours performed by others, reflecting intended support functions), and 3) subjective appraisals of support (or “perceived support”, reflecting perceptions of support availability and/or satisfaction with support provided).

**Structural and functional dimensions of social support**
Focus on social network reflects a sociological commitment to “structural” processes whereas support behaviours and support appraisals may be subsumed by a “functional” approach focusing on “qualities and characteristics of social transactions”, reflecting a psychological perspective (Lieberman, 1986). Critically, buffering effects appear to rely on functional aspects of social support whereas main effects are found with structural dimensions (Cohen & Wills, 1985). Functional aspects are therefore focused on here.

**Support behaviours**
Multiple typologies of support behaviours exist, although these are largely variants of House’s typology: “instrumental support (aid in kind, money, labor, time, modifying environment)”; “emotional support (esteem, affect, trust, concern, listening)”;
“informational support (advice, suggestion, directives, information); and “appraisal support (affirmation, feedback, social comparison)” (p.23) (House, 1981). Behaviours are most commonly assessed via self-report checklists, such as the Inventory of Socially Supportive Behaviors (Barrera, Sandler, & Ramsey, 1981). Adopting a “stress and coping” perspective of social support, enacted behaviours may i) promote problem-, emotion-, and perception-focused coping efforts (Thoits, 1986) and, ii) facilitate appraisal by influencing perceived support (Lakey & Cohen, 2000).

**Perceived support and its determinants**

Emphasis on support behaviours fails to recognise: i) the correlation between perceived and received support is consistently weak, and ii) health outcomes are more consistently predicted by perceived support (Haber, Cohen, Lucas, & Baltes, 2007).

These findings may reflect measurement issues. Perceived support may refer to satisfaction with general support availability (Sarason, et al., 1990), rather than the enacted support behaviours specific to that situation (Lakey, McCabe, Fisicaro, & Drew, 1996). Findings may accurately portray a weak relationship, attributable to lack of matching between received behaviours and the needs elicited by stressors (Cohen, 1992; Cutrona, 1990; Cutrona & Suhr, 1992). Alternatively, perceived support may be partly (or largely) dispositional, reflecting enduring beliefs rather than enacted support behaviours (Lakey & Cassady, 1990; Lakey & Cohen, 2000).

There is growing support for an interactional perspective, recognising the contribution of environment, personality, and match between the provider and recipient (Lakey, et al., 1996). Thus, perceived support (i.e. appraisals of received support) is likely determined by a combination of: affect (or current distress); enduring dispositional factors (e.g. interpersonal schemas concerning meanings and expectancies of relationships, and personality characteristics such as social competence and trait anxiety); and situational contextual factors (Cohen, 1992). Such a perspective highlights the possible interdependency of internal and external resources portrayed in the transactional stress-as-process paradigm.

**Implications of perceived support for developing and evaluating interventions**

The findings described above indicate that prescribing standardised social support interventions to any at-risk person would not necessarily be effective because social support is not a quantifiable external resource (Lakey, et al., 1996).

Rather, development and evaluation of social support interventions needs to recognise the possible determinants of perceived support. Key to this is considering provider-recipient transactions, e.g. provider and recipient perceptions of support needed and
support provided, and costs of support acceptance (Cohen & Syme, 1985; Cutrona, 1990). Of central significance is the meaning of the relationship. Particular stressors may warrant particular supporters; if the necessary supporter is unavailable, or does not provide help then “a condition may be created where other sources of support become meaningless” (p.463 (Lieberman, 1986)). This appears particularly pronounced in relation to pregnancy (Hobfoll & Lieberman, 1987; Lieberman, 1986). Thus, in the context of pregnancy, attempts to facilitate social support within existing relationships may be a priority (Glazier, Elgar, Goel, & Holzapfel, 2004) and more effective than providing social support by an external agent (Feldman, Dunkel-Schetter, Sandman, & Wadhwa, 2000). With notable exceptions (Norbeck, Dejoseph, & Smith, 1996; Villar, et al., 1992) such issues have largely been ignored in development and evaluation of social support interventions during pregnancy.

While numerous tools exist for measuring received and perceived support (most commonly using self-report checklists) (Lindsey & Yates, 2003; Wills & Shinar, 2000), measurement of provider-recipient transactions presents methodological and epistemological challenges that require consideration. Questionnaire measures clearly struggle to capture dynamic relationships and attention to meaning, highlighting the need for qualitative enquiry. However, this still carries the assumption that individuals are able to describe support needs and transactions (Lieberman, 1986). This may be particularly problematic when exploring anticipated future availability rather than transactions that have already occurred. Furthermore, social support may be more beneficial when it appears “invisible” to the recipient (e.g. due to being such a smooth transaction that it occurs outside awareness, or is not coded as support) (Bolger, Zuckerman, & Kessler, 2000); again presenting measurement challenges.

Critically, the transactions research base is primarily informed by naturally occurring support. Attempting to translate such findings based on naturally occurring support into interventions premises that social support is fundamentally a quantifiable external resource; however, individual differences in support mobilisation and appraisal suggest otherwise.

Having discussed the conceptual basis of social support intervention, it is necessary to consider empirical findings relating to the benefits of social support in pregnancy.

### 1.6.3 The role of naturally occurring social support in pregnancy

Findings concerning the relationship between social support and fetal outcomes are inconsistent. Some studies report no association (Brooke, et al., 1989; Williamson,
LeFevre, & Hector, 1989) yet others report associations even after controlling for obstetric risk factors (Feldman, et al., 2000) and health behaviours (Pagel, Smilkstein, Regen, & Montano, 1990). This may reflect the complexity of support appraisals and frequent employment of tools that do not have demonstrated psychometric properties.

Evidence for buffering effects has been similarly contested. One of the most widely cited papers (Nuckolls, Cassel, & Kaplan, 1972) in the social support literature demonstrated buffering effects of “psychosocial assets” and therefore cannot be considered evidence of social support per se (Cohen & Wills, 1985). Similarly, another key paper illustrating buffering effects concerned “pregnancy complications” and “delivery complications”, aggregating conditions with different etiologies (Norbeck & Tilden, 1983). Nonetheless, buffering effects have been demonstrated for social support quality and fetal growth, and social support quantity and postnatal depressed mood (Collins, Dunkel-Schetter, Lobel, & Scrimshaw, 1993). Furthermore failure to find buffering effects may be attributable to the lack of distinct high and low stress conditions, for example where the entire population is socially disadvantaged (Ritter, Hobfoll, Cameron, Lavin, & Hulsizer, 2000), or distinction is based on median split (Turner, Grindstaff, & Phillips, 1990).

Maternal outcomes show more consistent findings, with an (inverse) association between quality of social support and postnatal depressed mood, the former’s status as a risk factor for PND being clearly established (Collins, et al., 1993; Norbeck & Tilden, 1983; O’Hara & Swain, 1996; Robertson, et al., 2004; Stemp, Turner, & Nob, 1986). Moreover, the centrality of key relationships has been demonstrated. Infant emotional and behavioural problems have been linked with the maternal-partner relationship (Talge, et al., 2007). Key relationships may vary according to populations, warranting further research. For example, quality of support from the baby’s father has been found to have a unique relationship with postnatal depressed mood, beyond the association found with support quality from other sources (Collins, et al., 1993). In contrast in a teenage population, family support was the strongest predictor of postnatal depressed mood (and the only predictor of fetal growth), compared with support from friends and from the baby’s father (Turner, et al., 1990).

Stronger and more consistent relationships between social support and maternal outcomes could however reflect confounding given the potential role of current mood and personality factors in support mobilisation, receipt and appraisal. Despite several well-designed studies these non-experimental findings cannot determine causality or the utility of social support provided as an intervention.
1.6.4 Social support interventions in pregnancy

Non-experimental findings largely recognise that naturally occurring social support in pregnancy is beneficial, particularly where functional dimensions are highlighted and the outcomes concern maternal emotional well-being. Despite repeated attempts, this has not consistently been translated into "effective" interventions. Indeed a recent Cochrane review concluded that, while there is some evidence of social support interventions being associated with reduced likelihood of Caesarean section and improved short-term maternal psychosocial outcomes, these interventions are ineffective in improving clinical outcomes of birth weight or gestation length (Hodnett, Fredericks, & Weston, 2010).

However, the value of the review and the applicability of its conclusions are questionable for several reasons.

Firstly, it must be questioned whether it is appropriate to synthesise findings from such heterogeneous studies. Support has predominantly been provided by professionals (e.g. midwives, nurses or social workers) although there have been examples of lay support (Spencer, Thomas, & Morris, 1989) and attempts to mobilise existing support networks (Blondel, Breart, Llado, & Chartier, 1990; Villar, et al., 1992). Interventions have also varied according to setting (e.g. home visits, antenatal clinics, community centres, telephone support and combinations of these). Heterogeneity is further apparent in considering the support behaviours employed. Some interventions have included a strong emotional component (Bryce, Stanley, & Garner, 1991; Bullock, Wells, Duff, & Hornblow, 1995; Norbeck, et al., 1996; Oakley, Rajan, & Grant, 1990; Rothberg & Lits, 1991; Spencer, et al., 1989; Villar, et al., 1992). However it is common for interventions to include an educational or lifestyle management component (Brooten, et al., 2001; Heins, Nance, McCarthy, & Efrid, 1990; Klerman, et al., 2001; McLaughlin, et al., 1992; Oakley, et al., 1990; Olds, Henderson, Tatelbaum, & Chamberlin, 1986; Villar, et al., 1992). Others have involved referrals to health, social and community services (Brooten, et al., 2001; Oakley, et al., 1990) or tangible attempts to help overcome barriers to care (Klerman, et al., 2001; Olds, et al., 1986). Indeed there have even been explicit medical components, for example in relation to risk of prematurity (Blondel, et al., 1990; Dawson, Middlemiss, Coles, Gough, & Jones, 1989; Moore, et al., 1998).

Secondly, evaluation of individual studies has failed to recognise that social support constitutes a meta-construct. As discussed previously, provision of support does not translate into perception of support. Perceived support is likely to be determined by both personality and environmental factors, rather than simply reflecting an external resource. Interventions should attempt to match provision to needs, in addition to considering provider-recipient transactions, key relationships and personality factors. Negation of these issues reflects the common shortcoming that research has predominantly lacked a
theoretical basis (although there are exceptions (Klerman, et al., 2001; Norbeck, et al., 1996; Rothberg & Lits, 1991; Villar, et al., 1992)).

Thirdly, eligibility for social support interventions to target biomedical outcomes, such as birth weight, has commonly focused on medical risk factors, despite the intervention being psychosocial (Hodnett, et al., 2010). However, there are exceptions where eligibility has been based on sociodemographic characteristics including low-income and ethnic minority status (McLaughlin, et al., 1992; Olds, et al., 1986), sometimes accompanied by recognition of the psychosocial stress commonly faced in these populations (Klerman, et al., 2001; Oakley, et al., 1990). Occasionally, eligibility has been determined by adequacy of social support from key relationships (partner and/or mother (Bullock, et al., 1995; Norbeck, et al., 1996)) and exposure to stress (based on life events (Rothberg & Lits, 1991)); however this has not been accompanied by outcome measures in these domains. Indeed, outcomes rarely concern measures of social support or stress (although see (Blondel, et al., 1990; Bullock, et al., 1995)).

Future research therefore needs to acknowledge social support and/or psychosocial stress in the eligibility criteria, thereby targeting interventions to populations believed to mostly likely to benefit, and in the process\(^6\) and outcome measures.

Without adopting such an approach, it is not possible to determine whether apparent lack of effect was due to inherent ineffectiveness, inappropriate context, or design and measurement issues, as recognised by the Medical Research Council (MRC) Complex Interventions Framework (Campbell, et al., 2000; Campbell, et al., 2007).

1.7 Assessing maternal stress in a clinical context: Symptom-based and risk-based approaches to Antenatal Psychosocial Assessment (APA)

As described previously (1.3), assessment of maternal stress may involve measuring any elements presented in the psychosocial stress framework. In a clinical context, antenatal psychosocial assessment of maternal stress, or APA, may be best understood as including symptom-based and risk-based dimensions (Priest, Austin, Barnett, & Buist, 2008).

\(^6\) Process measures concern how the intervention is implemented (Craig, et al., 2008).
**Symptom-based approaches**

Symptom-based approaches assess symptoms of psychological distress (e.g. anxiety and depression symptoms) which are emotional stress responses (i.e. manifestations of maternal stress) and health concerns in their own right, as well as potentially indicating current mental disorder and/or risk for future mental disorder.

Current focus is on anxiety and depression symptoms because studying distinct emotions rather than undifferentiated distress (or stress appraisal) is more likely to facilitate theory development and modelling (Lazarus, 1993). The Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983) comprises two, 7-item subscales and has been used extensively with different populations (Herrmann, 1997). However, its usual psychometric integrity may not apply in pregnancy (Karimova & Martin, 2003).

The State-Trait Anxiety Inventory (Spielberger, Gorusch, & Lushene, 1987) and the EPDS (Cox, et al., 1987) are respectively the most commonly used measures of anxiety and depression symptoms in pregnancy (Buist, et al., 2002; Newham, Westwood, Aplin, & Wittkowski, 2012). Neither tool is limited to pregnant populations but both have been validated for antenatal use using clinical diagnostic interviews (Grant, et al., 2008; Murray & Cox, 1990).

Factor analysis of the EPDS suggests both anxiety and depression components (Brouwers, Van Baar, & Pop, 2001; Green, 1998; Jomeen & Martin, 2005a; Ross, Gilbert Evans, Sellers, & Romach, 2003; Stuart, Couser, Schilder, O’Hara, & Gorman, 1998). It has therefore been argued that the EPDS may be used to screen for both anxiety and depression in the perinatal period (Matthey, 2008). The State-Trait Anxiety Inventory comprises two scales: state anxiety measuring current symptoms, and trait anxiety measuring dispositional tendency. The trait scale has been found to have a depression component (Bieling, Antony, & Swinson, 1998) whereas less is known about the state scale (STAI-S). The underlying factor structures of both the EPDS and STAI-S therefore warrant further investigation.

**Risk-based approaches**

Risk-based approaches assess the presence of psychosocial risk factors, e.g. early adversity, life events, living conditions, domestic abuse, social support, mental health history, alcohol and substance use, and attitudes towards pregnancy. These are potential sources of stress (‘stressors’) as well as being resources that influence the stress process, or factors that predispose individuals to vulnerability to further stress. Such psychosocial risk factors have been used in APA to identify increased risk for PMH, infant development and family functioning, including abuse (American College of

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7 This is discussed in Chapter 4.
Obstetricians and Gynecologists, 2006; Buist, et al., 2007; Midmer, Carroll, Bryanton, & Stewart, 2002; National Collaborating Centre for Women's and Children's Health, 2008; Reid, et al., 1998). Risk factors for psychological distress and mental disorders may also include personality factors (e.g. coping style and attachment style) but this remains an under-researched area (Austin & Lumley, 2003).

Together, these dimensions may be viewed as a multidimensional approach to stress measurement. Symptom-based and risk-based APA have previously been used in conjunction to shape care pathways (Priest, 2006; Priest, et al., 2008); however, assessment of symptom has been limited to antenatal depression, neglecting anxiety.

1.8 APA measures used in a clinical context outside the UK

APA measures are increasingly being used as part of routine practice in developed countries. Examples from the United States, Canada and Australia are described next.

**American College of Obstetricians and Gynaecologists Obstetric Medical History form**
The nationally recommended tool in the United States (American College of Obstetricians and Gynecologists, 2006) was designed by the Florida Healthy Start programme’s expert panel to improve fetal and infant outcomes (Gueorguieva, et al., 2003). It includes barriers to engaging with health services, health behaviours (including nutrition, smoking, alcohol and substance use), housing conditions, safety of residence, unintended pregnancy, current domestic abuse, history of sexual abuse, and a single-item rating of ‘current stress’ (American College of Obstetricians and Gynecologists, 2006). Guidelines recommend use at booking and monitoring at subsequent appointments. However, data has not been reported on its effectiveness in shaping care pathways or tackling outcomes.

**Antenatal Psychosocial Health Assessment (ALPHA)**
The ALPHA tool was developed using a comprehensive systematic review of psychosocial risk factors for family (dys)functioning and postnatal depression (Wilson, et al., 1996) and refined using focus groups with different professionals and extensive piloting work with attention to acceptability (Reid, et al., 1998). The tool is used by clinicians in Canada and there is initial evidence that the ALPHA may increase detection of psychosocial risk factors (Carroll, et al., 2005). Although a self-report version has been developed (Carroll, et al., 2005) and reported by women as being preferred to
clinician assessment (Midmer, et al., 2002), the version and data remain unpublished. Therefore an appropriate version was unavailable for the current project.

**The Integrated Perinatal Care (IPC) programme**

Australia’s national ‘Beyond Blue’ initiative has introduced APA as part of routine care, and published findings from regional datasets (with cohorts usually comprising over 2000 women) (Austin, Hadzi-Pavlovic, Saint, & Parker, 2005; Buist, et al., 2007; Matthey, et al., 2004b). The most influential in the initiative has been the Pregnancy Risk Questionnaire (PRQ); a self-report measure based on a cornerstone review of risk factors for PND (O’Hara & Swain, 1996), expert panel and piloting with women for acceptability and administration in a clinic setting (Austin, et al., 2005). The tool has been validated against diagnostic interview for PND (Austin, Colton, Priest, Reilly, & Hadzi-Pavlovic, 2011), and is used in some Australian clinics (Edwards et al., 2008a,b; Matthey et al., 2004).

The PRQ has been used as a parent measure for the shorter Antenatal Risk Questionnaire (ANRQ) (Austin, 2003); developed for clinical practice to identify “psychosocially vulnerable women” (p.316) (Austin, et al., 2005) and shape integrated care pathways (Priest, 2006). The ANRQ is routinely used at the Royal Hospital for Women in Sydney, Australia, where it is completed at the booking visit (12-18 weeks gestation) by self-report or in consultation with the health professional. The ANRQ has been validated for predicting PND (Austin, et al., 2011).

The ANRQ has been used in conjunction with assessing depression symptoms using the Edinburgh Postnatal Depression Scale (EPDS) (Cox, et al., 1987) to derive a Psychosocial Risk Index (PRI), based on combinations of high and low risk and symptom levels (Priest, 2006; Priest, et al., 2008). These combinations, together with information on current domestic abuse and substance use, are then used to shape care pathways, framed within a wider Psychosocial Risk Assessment Model (PRAM) (Priest, 2006; Priest, et al., 2008). Such application of risk-based and symptom-based approaches is consistent with the conceptual psychosocial stress framework presented in the current research, facilitating theory and modelling.
1.9 Current clinical guidelines and practice in the UK concerning APA

1.9.1 The context of antenatal care in the UK

In the UK, antenatal care in the National Health Service (NHS) is primarily provided by maternity services. The majority of routine maternity care is provided by midwives (based in community and hospital teams), with obstetricians (based in hospitals) offering consultations where pregnancies are considered complicated. A woman with an uncomplicated (or ‘low-risk’) pregnancy will be eligible for midwifery-led care, whereas a woman with a complicated (or ‘high-risk’) pregnancy may receive shared care and management at specialist clinics or support from specialist midwives. Depending on local service provision, specialism may include medical conditions (such as diabetes and hypertension) or issues at the health-social care interface that may be considered psychosocial stressors (including mental health, substance and alcohol use, child protection, domestic abuse, homelessness, and asylum seeker and refugee status).

Here, the first formal antenatal appointment (known as the booking visit) ideally takes place by 12 weeks’ gestation and is usually conducted by a midwife.

Booking involves giving advice and gathering information relevant to the woman’s antenatal care, largely based on her: medical and obstetric history; height, weight and blood pressure measurements; and urine and blood samples. Commonly within NHS maternity services, information gathering uses the NHS ‘Pregnancy Notes’ (Perinatal Institute, 2009a), also known at the handheld notes, or Personal Maternity Record), as the basis for discussion, although some units use locally developed records. The Pregnancy Notes focuses on biomedical factors but includes social circumstances (e.g. housing, marital status, entitlement to benefits, social services involvement), health-related behaviours (e.g. smoking, alcohol and substance use), and mental health (which was expanded in this project’s lifetime to include mental health history and current depression symptoms) (Perinatal Institute, 2009a).

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8 Women may additionally be seen by their primary care health professionals (General Practitioners, GPs) during pregnancy. Women routinely are seen by sonographers (who perform two routine ultrasound scans to assess the gestational age (‘dating scan’) and fetal anatomy (‘anomaly scan’), and any additional scans required, for example to assess fetal anomalies and fetal growth). Other health professionals that may be involved include physiotherapists and, related to the delivery, anaesthetists.

9 Booking in this timeframe has been proposed to facilitate accurate dating of gestational age by ultrasound scan (although this may not take place at the same appointment) and attempting to tackle health inequalities and obstetric risks associated with later booking (Confidential Enquiry into Maternal and Child Health, 2009; National Collaborating Centre for Women’s and Children’s Health, 2008).
The booking visit has been viewed as the ideal opportunity for APA (American College of Obstetricians and Gynecologists, 2006; Matthey, et al., 2005; National Collaborating Centre for Women's and Children's Health, 2008; Priest, et al., 2008). A minority has proposed delaying APA until later gestational age, once rapport has been established with the health professional (Reid, et al., 1998); however, this assumes continuity of care by the same professional, which is not commonplace in the UK. Additionally, in the UK, the booking visit informs the maternity care pathway and is therefore a logical time to conduct detailed APA.

1.9.2 Clinical guidelines concerning APA

In England and Wales, current national health policy concerning maternity services promotes a vision of holistic antenatal care striving for “the best possible health, psychological and social outcomes for the mother, baby and family” (p.47) (Department of Health, 2007b). Acknowledging the significance of non-biomedical determinants of these outcomes (Department of Health, 2004, 2007b), APA is viewed as playing a central role in providing such holistic care and is described in two clinical guidelines published by NICE (the National Institute of Health and Clinical Excellence):


These contain recommendations for both assessing and responding to maternal stress.

1.9.2.1 Current clinical recommendations for assessing maternal stress

Clinical Guideline 62: ‘Antenatal care: Routine care for the healthy pregnant woman’

CG 62 recognises the need for APA. NICE commissioned a systematic review of APA\textsuperscript{10}, which identified five studies examining its utility but none evaluating its effectiveness in relation to maternal, fetal or infant outcomes (National Collaborating Centre for Women's and Children's Health, 2008; Priest, et al., 2008). Nonetheless, APA arguably contains an element of screening, in the form of the Whooley questions (Whooley, Avins, & Miranda, 1997), described in detail later.

\textsuperscript{10}The review used the term, psychosocial screening. In this thesis, the term antenatal psychosocial assessment (APA) is favoured over screening, given the emphasis on detecting the presence of current risk and/or symptom to shape care pathways, rather than predicting particular outcomes (Buist, et al., 2007; Matthey, et al., 2004b; National Collaborating Centre for Women's and Children's Health, 2008; Priest, et al., 2008).
The review was followed by development of an APA tool on behalf of the Department of Health using a modified Delphi technique to achieve consensus on obstetric and psychosocial risk factors; however, details of the resulting tool remain unpublished. The tool is yet to be validated or used in a clinical setting (Mellows, 2010; National Collaborating Centre for Women's and Children's Health, 2008); being in an earlier stage of development than its North American and Australian counterparts (American College of Obstetricians and Gynecologists, 2006; Austin, 2003; Buist, et al., 2007; Carroll, et al., 2005; National Collaborating Centre for Women's and Children's Health, 2008).

Clinical Guideline 45: ‘Antenatal and postnatal mental health’

CG 45 recommends routine mental health assessment, including mental health history and assessment of current mood (National Collaborating Centre for Mental Health, 2007).

Assessing mental health history is important to identify women who may be at-risk of PMH, particularly SMI. Guidelines recommend ascertaining: history of past or present SMI (schizophrenia, bipolar disorder, psychosis in the postnatal period, and severe depression), history of treatment (by a psychiatrist or specialist mental health team including inpatient treatment), and family history of PMH (National Collaborating Centre for Mental Health, 2007).

In addition to early identification of women at risk of SMI, there has been great interest in introducing a national programme for the detection or prediction of PND (given its reported prevalence and potential impact); however, no instruments have yet satisfied the stringent criteria for a screening programme (National Collaborating Centre for Mental Health, 2007). Antenatal screening instruments have failed to predict postnatal disorder with adequate accuracy, despite consensus concerning key risk factors (i.e. antenatal depression, antenatal anxiety, previous depression/anxiety disorder, familial perinatal mental illness, life events, social support, and relationship with partner) (Robertson, et al., 2004). Prediction may be improved by including additional variables (e.g. personality factors, interpersonal trauma, and birth and postnatal events), and using multivariate modelling (Austin & Lumley, 2003; Matthey, et al., 2004a). Realistically, such approaches would not suit the demands of routine clinical practice.

Current guidelines recommend a tool for depression case finding (the ‘Whooley questions’ (Whooley, et al., 1997)) to be used at the booking visit and postnatally. The Whooley questions are: 1. During the past month, have you often been bothered by feeling down, depressed or hopeless? 2. During the past month, have you often been bothered by having little interest or pleasure in doing things? If the answer to either of
these is ‘yes’, the guidelines recommend that the woman should be asked a third question (the Arroll ‘help’ question): ‘Is this something you feel you need or want help with?’ (Arroll, Khin, & Kerse, 2003). For possible cases of depression identified through this approach (i.e. women responding yes to the help question), it is recommended that there is further assessment using tools such as the EPDS (Cox, et al., 1987), HADS (Zigmond & Snaith, 1983), and PHQ-9 (Kroenke, Spitzer, & Williams, 2001).

1.9.2.2 Current clinical recommendations for responding to maternal stress

Clinical Guideline 62: ‘Antenatal care: Routine care for the healthy pregnant woman’
CG 62 describes the purpose of APA as identifying women who “may need social support and/or medical care for a variety of socially complex reasons” (p.289) (National Collaborating Centre for Women’s and Children’s Health, 2008). No further details are specified.

Clinical Guideline 45: ‘Antenatal and postnatal mental health’
The guideline contains recommendations for women with past or current SMI, which includes the involvement of specialist mental health services (including psychiatric services). In contrast, prevention and treatment of mild-moderate disorder is managed mostly within primary care and is the focus of the thesis.

Recommendations vary according to past and current disorder and current symptoms; with details summarised in Figure 1.2.

For women meeting criteria for current diagnosis of mild-moderate disorder, recommended interventions include self-help, listening visits, or brief psychological treatment (e.g. between four and six sessions of cognitive-behavioural therapy or interpersonal therapy). For those currently taking mental health medication, it is recommended that there is gradual withdrawal, or that the medication is switched to a drug with fewer potentially harmful effects (either effects on the developing fetus that may occur in utero, or effects on the infant that may occur postnatally via breast feeding). Psychological therapies are promoted wherever appropriate given the changing risk-benefit ratio. It is recommended that psychological interventions should commence within one month of initial assessment due to there being a “lower threshold for access to psychological therapies during pregnancy” given the potential risks of medication (p.9) (National Collaborating Centre for Mental Health, 2007).

For women with current depression or anxiety symptoms who do not meet criteria for diagnosis, it is recommended that those with a previous episode of depression and/or anxiety receive brief psychological treatment, whereas those without such history
receive social support-based interventions (either informal individual or group support) (National Collaborating Centre for Mental Health, 2007).

![Diagram of guidelines for prevention and treatment of mild-moderate disorder](image)

**Figure 1.2 Guidelines for prevention and treatment of mild-moderate disorder (adapted from Clinical Guideline 45) (National Collaborating Centre for Mental Health, 2007)**

1.9.2.3 **Critique of the guidelines on assessing and responding to maternal stress**

1) **Assessing risk**

CG 62 acknowledges the need for APA but does not recommend any instruments to implement this recommendation. Mental health history taking (recommended in CG 45) identifies the need for assessment of SMI history (specifying severe depression, schizophrenia, bipolar disorder, and psychosis in the postnatal period), failing to include assessment of past anxiety or depression episodes, despite recommended interventions for prevention and treatment of mild-moderate disorder varying according to such history.

2) **Assessing symptom**

In order to implement the current PMH guidelines, maternity services require guidance on which instruments to use for detecting both women with anxiety and depression.
disorders, and those with subthreshold anxiety and/or depression symptoms that impact functioning. Unfortunately, the guidelines fall short in this respect.

a) Neglect of anxiety

CG 45 consistently refers to women with antenatal symptoms of “depression and/or anxiety” yet only recommends the introduction of an instrument limited to antenatal depression (the Whooley questions).

Such preoccupation with depression could compromise care pathways: women that are uniquely high on anxiety may be ‘undetected’, and women that have co-occurrence of depression and anxiety may be ‘misclassified’ as high on depression. However, research has been limited by the lack of established validated tools for assessing perinatal anxiety (Ross & McLean, 2006).

To provide adequate tools for implementing guidelines, existing anxiety measures could be validated for the perinatal period, or new measures could be developed specifically for this population. For example, an equivalent measure to the Whooley questions exists for anxiety: the two-item GAD-2 (Kroenke, Spitzer, Williams, Monahan, & Lowe, 2007) and current guidelines for common mental health disorder recommend the use of both in the general population (National Collaborating Centre for Mental Health, 2011). An alternative suggestion may be offered by the EPDS (Cox, et al., 1987); given its potential application to both depression and anxiety (Jomeen & Martin, 2005a; Matthey, 2008).

b) Use of an unvalidated depression case finding instrument (the Whooley questions)

The only tool with enough evidence to assess its performance as a screening instrument for perinatal depression is the EPDS (National Collaborating Centre for Mental Health, 2007). The EPDS is recommended in North America and Australia for current clinical care (Bick & Howard, 2010). It has also been recommended in the UK for postnatal use by Health Visitors, although its administration varies (Gibson, McKenzie-McHarg, Shakespeare, Price, & Gray, 2009). In contrast, the EPDS is not recommended by NICE due to its sub-optimal positive predictive value and the lack of high-quality randomised controlled trials demonstrating reduction in morbidity accompanying introduction of routine screening. Paradoxically, the guidelines recommend the Whooley questions acknowledging that the instrument “probably would not meet the criteria either” (p.117) (National Collaborating Centre for Mental Health, 2007).

The Whooley questions have not been validated against diagnostic interview in the antenatal or postnatal period. NICE has recommended undertaking a validation study to compare the Whooley questions with psychiatric diagnostic interview postnatally.
Antenatal evidence is currently limited to one recent study that reported high agreement between the Whooley questions and the EPDS (Bennett et al., 2008). The instrument has not been validated for use with the Arroll ‘help’ question in the perinatal period (Mann & Gilbody, 2011). It should also be noted that the Whooley and Arroll questions are presented together in the handheld maternity notes, which may elicit different responses to presenting the questions sequentially.

There is no published research on the acceptability of introducing the Whooley questions, either for women or the healthcare professionals concerned. Additionally, the instrument does not provide a continuous format that would facilitate serial assessment or monitoring, another requirement of the guidelines.

c) Further assessment
The Whooley questions and Arroll question are only intended as an ultra-brief (or, “pre-screen”) instrument and are not diagnostic. Healthcare professionals are therefore advised to use additional self-report tools for assessment or monitoring symptomatology. The EPDS (Cox, et al., 1987), HADS (Zigmond & Snaith, 1983), and PHQ-9 (Kroenke, et al., 2001) are all recommended by CG 62 but without guidance on their relative merits.

There are issues concerning the lack of validation of the HADS and PHQ-9 against diagnostic interview with antenatal women, particularly given potential overlap between symptoms of depression and physical aspects of pregnancy. Furthermore, the factor structure of the HADS may be unstable during pregnancy (Jomeen & Martin, 2004; Karimova & Martin, 2003). Since the guidelines were developed, the PHQ-8 (containing 8/9 items from the PHQ-9) has been validated against diagnostic interview in pregnancy and highlighted the large number of false positives and need for subsequent evaluation and clinical judgement (Smith et al., 2010).

A paradoxical element is that the guidelines explicitly advise against using the EPDS for routine use (i.e. as an initial “pre-screen”) yet recommend it for detailed assessment (Martin & Redshaw, 2009).

In terms of practical implementation of the guidelines, there is a lack of guidance on who would undertake further assessment, and how the resultant scores map onto eligibility for interventions.
3) Responding - threshold for intervention
Symptom eligibility for social support interventions is described as “symptoms of depression and/or anxiety that do not meet diagnostic criteria but significantly interfere with personal and social functioning” (p.14), and referred to elsewhere in the guidance as “chronic subthreshold symptoms” (p.27) (National Collaborating Centre for Mental Health, 2007).

It is unclear how the Whooley questions or recommended tools for further assessment or monitoring map onto these descriptions. This is particularly relevant because emotional stress responses are to be expected as part of the psychological adjustment required in pregnancy (Hart & McMahon, 2006) and not all anxiety and depression symptoms are problematic; some may represent a 'normal', transient response to the current situation (Matthey, 2010).

4) Responding - nature of intervention
Access to psychological therapies is notoriously difficult with long waiting lists (Department of Health, 2007a). It is therefore questionable how realistic the recommended timeframe is of seeing women within one month of initial assessment, and whether this refers to the initial pre-screen or more detailed assessment.

Social support-based interventions are recommended; both for women with “socially complex” circumstances (p.289) (National Collaborating Centre for Women’s and Children’s Health, 2008) (i.e. psychosocial risk factors) and those without a previous mental health diagnosis but presenting symptoms of depression and/or anxiety (i.e. psychological distress) (National Collaborating Centre for Mental Health, 2007). However, no description of such interventions is offered.

Clinical guidelines are intended to represent a synthesis of best available evidence and to reduce clinical uncertainty by spelling out best practice. A good guideline also clearly defines the population that it is intended to benefit. In the case of current guidelines for APA, however, the evidence base is thin, there is a conflation of depression and anxiety, and clinical uncertainty prevails regarding both the use of APA tools and the further management of identified women.
1.10 Summary of Introduction

The literature review identified the lack of consensus for APA instruments against a clinical context where limited APA has been recently introduced and more detailed APA is planned in future.

Despite an apparent shift from PND to PAD, there are some inconsistencies in the current clinical guidelines and, against the background described above, the recent introduction of the Whooley questions is contentious.

Such issues reflect a lack of instruments for perinatal anxiety and wider debates surrounding the classification of anxiety and depression, and whether they represent distinct pathologies (Clark & Watson, 1991; Himmelhoch, et al., 2001; Parker, et al., 1999; Watson, 2005). Further work is necessary concerning the measurement of anxiety and depression, and their respective relationships with psychosocial risk factors, personality factors, and outcomes.

Introduction of psychosocial assessment must be accompanied by care pathways (Buist, et al., 2002). The provision of such interventions, as is recommended for prevention and treatment of mild-moderate disorder, requires considerable resources that could overwhelm healthcare systems, particularly given the current economic climate. There is no published literature exploring the implementation of these guidelines in clinical practice, either concerning assessing or responding to maternal stress.

In the absence of recommended APA instruments or established social support intervention guidelines to meet women’s psychosocial needs, the onus is placed on National Health Service maternity care providers and Primary Care Trusts (and successor Commissioning Boards) to develop services and care pathways locally (Department of Health, 2004).

Social support interventions are appealing, due to potentially being low-cost and low-risk (for example, avoiding the resources required for psychological interventions and the possible harmful effects associated with pharmacological interventions). However, the recognised protective effects of naturally occurring social support in pregnancy have not consistently translated into effective interventions.

Evaluation of previous interventions has been limited by measurement issues, varied content and intensity of interventions, and eligibility on the basis of biomedical rather than psychosocial criteria. Commonly, social support has been positioned as an external (environmental) resource that can be provided to the recipient. However, seeking and
perception of support may also be influenced by personality factors (including coping style and attachment style) and current psychological distress. These limitations highlight that such complex interventions require development, evaluation and implementation that enables consideration of possible mechanisms of action to identify how an intervention is (in)effective, and how it may be reproduced or applied to a different context.

1.11 Medical Research Council (MRC) Complex Interventions Framework (CIF)

The MRC Complex Interventions Framework (Medical Research Council, 2000, 2008) offers a way to structure the observations made in this Introduction. The framework describes a process for intervention development, evaluation and implementation (Medical Research Council, 2008). As shown in Figure 1.3, these phases are iterative, rather than sequential, and involve processes of piloting (e.g. to test procedures and estimate participant flow and sample size).

The current research concerns intervention development. Of central importance is “problem definition”, which includes the iterative phases of “theory” (i.e. why it should work) and “modelling” (i.e. how it should or does work) (Campbell, et al., 2000; Campbell, et al., 2007; Medical Research Council, 2000).

The theory phase involves reviewing literature to explore relevant theory and consider major confounders related to the target problem (i.e. maternal stress) and possible intervention (e.g. social support). Modelling considers the relationships between probable constitute components and proposed mechanisms of actions, potential confounders, and whether pathways are amenable to change (Craig, et al., 2008; Medical Research Council, 2000, 2008).

Problem definition also concerns the nature and size of the target problem, which may require primary research (Campbell, et al., 2007). Related, is the need to identify the population most at risk and most likely to benefit from an intervention. These elements contribute to understanding context, which is critical to complex intervention development, implementation and evaluation (Campbell, et al., 2007; Craig, et al., 2008). Indeed, tailoring to local context (e.g. socio-cultural assumptions, health service systems, policy and guidelines at the national level, and the needs of local populations at the regional level) may be more appropriate than attempting to standardise interventions (Campbell, et al., 2007; Craig, et al., 2008). Contextual issues may be informed by gathering views of the “stakeholders”, i.e. women targeted by the
intervention, and those involved in its commissioning and delivery (Medical Research Council, 2008). Such primary research also informs feasibility and acceptability before embarking on intervention implementation and evaluation.

Figure 1.3 The process of developing, implementing and evaluating complex interventions (taken from p.8, Medical Research Council (2008))

Understanding evaluation of previous social support interventions within the MRC Complex Interventions Framework

The literature review has informed problem definition (Campbell, et al., 2007) by considering the theoretical basis for interventions, including the role of social support in relation to psychosocial stress and health. Attempts were made to conceptualise and operationalise maternal stress and social support. The initial review of the effectiveness for social support interventions is inconclusive but suggests maternal psychosocial outcomes may be most amenable to change. However, this may reflect confounding of variables.

Further research is necessary to “identify and quantify the population most affected, most at risk, or most likely to benefit from the intervention” (p.456) (Campbell, et al., 2007). There are some estimates of maternal stress, mostly in relation to psychological distress and mental disorder. Less is known about the prevalence of psychosocial stressors. The nature and prevalence of maternal stress in pregnancy in the UK population requires investigation, and could be estimated using existing risk- and symptom-based measures with a local population. There is debate on the instruments that should be used to assess this.
Qualitative research may inform process measures and consider whether “pathways are amenable to change and, if so, at which points” (p. 456) (Campbell, et al., 2007) through exploration of key relationships, issues of acceptability and provider-recipient transactions with the targeted population. Such work additionally recognises the centrality of context, as complex interventions may be suited to tailoring to local context (including social, political and geographical elements), rather than aiming for complete standardization (Craig, et al., 2008; Medical Research Council, 2008). Qualitative research may also explore women’s views on APA, experiences of the implementation of recent guidelines, and views on possible interventions.

The need for development studies on APA is established and well-recognised. In the absence of a universally accepted tool for assessing maternal stress or established intervention guidelines to respond to maternal stress (i.e. meet women’s psychosocial needs), this thesis seeks to address a number of research questions through the empirical research project titled Assessing and Responding to Maternal Stress (ARMS).

While it is recognised that few interventions are ever “simple” (Petticrew, 2011), the theory and evidence presented above highlight the considerable complexity of the subject matter of the thesis, and interventions to address maternal stress meet the definition of “complex” interventions: comprising “a number of components, which may act both independently and inter-dependently” with the “active ingredients” difficult to define (p. 2) (Medical Research Council, 2000). These components consist of multiple behaviours with varying parameters (e.g. timing and frequency) that involve both the provider and recipient of the intervention (Craig, et al., 2008). Without acknowledging these different components (both for the intervention and any control condition), it is difficult to identify how an intervention is (in)effective and how an effective intervention may be reproduced or applied to a different context (Medical Research Council, 2000). Accordingly, the MRC framework for complex interventions was adopted for this research.
1.12 Thesis outline

Following consideration of the background literature in Chapter 1 (Introduction), Chapter 2 discusses the methodology of the research presented in the thesis; that is, the underlying theory of the methods adopted. This is followed by Chapter 3, presenting the pilot work that informed the main study. The main study comprises two sub-studies, set out across Chapters 4 to 8 inclusive; Study Part 1 (which is primarily quantitative) and Study Part 2 (which is qualitative and concerns a sub-sample of participants in Part 1). The methods for both sub-studies are presented first, describing the techniques used for data collection, procedural aspects and ethical considerations. The final chapter of the thesis (Chapter 9) discusses the findings of the research in relation to the wider literature and clinical practice. The limitations of the research are discussed and implications for research and practice are considered.
Chapter 2. Methodology

Before discussing the underlying theory of the methods adopted, the research questions are presented. As described below (2.2), under ‘mixed methods research’, the research questions informed the methods adopted and therefore offer a logical starting point.

2.1 Research Questions

The research questions were responsive to the gaps in the literature and the changing clinical context during the research timeframe; i.e. the introduction of routine mental health assessment\(^\text{11}\). The main research study involved two sub-studies, Study Part 1 and Study Part 2, which were designed to answer different research questions, requiring different methods (discussed further in ‘Mixed methods research’ below).

Study Part 1 (quantitative research) was primarily concerned with the nature and size of the target problem (i.e. maternal stress), the lack of consensus for instrument choice in antenatal psychosocial assessment (APA) and observations of current clinical practice.

The primary research questions of Study Part 1 are:

- What are the adopted measures of anxiety and depression measuring? (Research Question A3)
- To what extent relative to each other are social support, other psychosocial risk factors (e.g. history of abuse, perinatal loss, current unintended pregnancy, occurrence and impact of recent stresses) and intrinsic psychological factors (e.g. trait anxiety) associated with antenatal symptoms of anxiety and depression? (Research Question A11)
- How consistent are the diagnostic classifications of the depression screening questions recently introduced to practice (the Whooley questions) and a previously validated depression screening tool (the EPDS)? (Research Question C2)

Study Part 2 (qualitative research) was also concerned with the nature of the target problem, in addition to issues of acceptability pertaining to APA, and the absence of established social support interventions for pregnant women experiencing maternal stress. Collectively, these are described by the title of the main study, Assessing and Responding to Maternal Stress (ARMS).

\(^{11}\) The Whooley questions were introduced after the pilot study was planned.
The research questions of the main study are all presented below, with the primary questions listed in bold text.

Research Questions: Study Part 1 (ARMS questionnaire pack and health records)

A: Prevalence and correlates of maternal stress in the local sample (Chapter 5)

1. How common are symptoms of antenatal psychological distress in the local sample?
2. How consistent are the two adopted measures of anxiety symptoms (the two-item Generalised Anxiety Disorder measure (GAD-2) and the state subscale of the State Trait Anxiety Inventory (STAI-S)) at identifying ‘high anxiety’ women?
3. What are the adopted measures of anxiety and depression measuring?
   a. What are the underlying factor structures of the adopted measures of anxiety and depression?
   b. Is there evidence, using factor analytic approaches, to support the existence of an anxiety subscale of the Edinburgh Postnatal Depression Scale (EPDS-3A)?
   c. Using correlational approaches to explore construct validity, is there evidence to support the existence of an anxiety subscale of the EPDS (EPDS-3A)?
4. How common are psychosocial risk factors, as measured by the Antenatal Risk Questionnaire (ANRQ), and how does this compare with findings reported elsewhere?
5. What proportion of women in the local sample are classified as ‘high risk’ at the time of booking, based on recommended thresholds for the ANRQ total score?
6. What types of psychosocial stresses are reported by women?
7. Using the Psychosocial Risk Index (PRI) classification system proposed by Priest (2006), is there a significant difference in the proportions of women assigned to symptom- and risk-based classifications in the current local sample, as compared with the proportions reported in a previous Australian study (Priest, 2006)?
8. How are classifications using the Psychosocial Risk Index (PRI) classification system influenced by the introduction of anxiety in assessing ‘symptom’ (using two different measures of anxiety)?
9. How consistent is the classification of need based on the [adapted] Psychosocial Risk Index (PRI) and self-identified need or want for additional support?
10. What is the relationship between social support and personality?
11. To what extent relative to each other are social support, other psychosocial risk factors (e.g. history of abuse, perinatal loss, current unintended pregnancy, occurrence and impact of recent stresses) and intrinsic psychological factors (e.g. trait anxiety) associated with antenatal symptoms of anxiety and depression?
B: Current practice in the assessment and management of maternal stress (Chapter 6)

1. How is mental health assessment (including the depression screening questions) being completed in practice?
2. How consistent is documentation of mental health history taking?
3. What is documented when women endorse the depression case finding questions?
4. What factors (apparently) influence mental health referrals being raised?
5. What happens (locally) for women as a result of mental health referrals?

C: Comparing approaches: clinical practice and the ARMS questionnaire (Chapter 7)

1. How consistent are the mental health and treatment histories documented in health records and reported using the ANRQ questionnaire?
2. How consistent are the diagnostic classifications of the depression screening questions recently introduced to practice (the Whooley questions) and a previously validated depression screening tool (the EPDS)?
   a) What is the specificity and sensitivity of the two Whooley symptom items when the EPDS is treated as the ‘gold standard’?
   b) Does the additional ‘help’ question (Arroll question) improve specificity and sensitivity?
3. How consistent is classification of identified need based on using the PRI, self-identified need in the questionnaire and self-identified need in the HHN (Arroll ‘help’ question)?

Research Questions: Study Part 2 (Serial interviews)

A) Origins, nature and impact of maternal stress (Chapter 8)
1. What are the origins, nature and impact of maternal stress experienced by women?
2. How does this change during pregnancy?

B) Assessing maternal stress (Chapter 8)
1. What are women’s views on APA, including its timing?
2. What are women’s views on the questions asked in the ARMS questionnaire?
3. What are women’s views and experiences of the current APA used in clinical practice?

C) Responding to maternal stress (Chapter 8)
1. What are women’s experiences of social support that they have received during pregnancy?
2. What additional social support would women like to receive?
3. How do these types of social support help women to cope with maternal stress?
The research contained additional aspects that are not reported in the thesis due to space constraints.¹²

### 2.2 Mixed methods research (MMR)

Mixed methods research (MMR) describes research that uses both quantitative and qualitative methods. Quantitative research commonly involves measuring variables (numerically) and is often deductive in nature, i.e. testing hypotheses about relationships between variables. Qualitative research tends to be more inductive and concerned with meaning and questions about processes.

**Strengths and limitations of mixed methods research (MMR)**

The key reason for using MMR is to capitalise on the potential of each method, rather than restrict the research to one method. It was adopted here due to its ability to answer different research questions (e.g. quantitative methods to measure frequencies or agreement between instruments and qualitative methods to explore women’s experiences of maternal stress); to explore different aspects of broader, overarching research questions and provide a more complete picture of the subject (e.g. provide alternative perspectives on current referral systems, comparing health records and women’s accounts); to increase the confidence in the findings (i.e. by exploring synthesis across methods); and, to facilitate sampling for the qualitative research (i.e. based on scores in the quantitative element).

Nonetheless, MMR is not without limitations. As described by Johnson and Onwuegbuzie (2004), some of the key limitations and criticisms concern practical aspects, such as resources (e.g. researcher training, concurrent data collection and the task of analysis, in terms of volume of data and knowledge, skills and software required) and methodological aspects that reflect the relative infancy of MMR, such as lack of guidance on how and when to mix (e.g. in analysis and findings) and challenges in

---

¹²Assessment of the maternal-fetal relationship (MFR) spanned both sub-studies. This included two MFR measures (one verbal and one non-verbal) in the ARMS questionnaire (Study Part 1), postnatal health behaviours documented from the health records (Study Part 1), women’s interpretations of the non-verbal MFR measure and women’s views and experiences of MFR assessment (Study Part 2). Study Part 1 additionally included a longitudinal component comparing APA at booking with clinical outcomes. Due to the sample size and sample’s heterogeneity concerning obstetric history, statistical analyses were only possible for predicting infant feeding, with the study under-powered for other analyses (pregnancy and delivery outcomes and smoking at discharge).
interpreting conflicting findings. A more fundamental criticism, however, concerns the compatibility of methods.

**Are quantitative and qualitative approaches compatible?**

It has been argued that quantitative and qualitative approaches reflect different paradigms (i.e. underlying belief systems that guide research) whose opposing philosophical assumptions render the two approaches incompatible (Guba & Lincoln, 1994). For example, the positivist paradigm (that guides quantitative research) premises that there is a single underlying reality and that the researcher is independent of the phenomenon being investigated (Lincoln & Guba, 1985). Here, logic is deductive and there is an emphasis on testing *a priori* hypotheses through objectively measuring observable facts (Patton, 1990). In contrast, the constructivist (or naturalist) paradigm (that guides qualitative research) asserts that there are multiple, constructed realities. These realities are interpreted (rather than objectively measured) and the researcher's role is inseparable from this process. Here, the emphasis is on inductive logic and uncovering meanings and theories through the process of investigation (Patton, 1990).

While in their more 'pure' forms, these approaches appear incompatible, the paradigm of pragmatism argues that the fundamental values are similar enough for quantitative and qualitative methods to be deemed compatible (Howe, 1988; Reichardt & Rallis, 1994). For example, pragmatism assumes that there are multiple, constructed realities and that the same data may be explained by different theories; thus allowing for methods to be mixed.

**How do quantitative and qualitative elements relate to each other?**

While using both quantitative and qualitative methods is a key feature of MMR, definitions vary concerning how the elements relate to each other (Tashakkori & Creswell, 2007). Proposed typologies have shared discussion of the elements' relative weighting (e.g. quantitative or qualitative dominant), timing (e.g. concurrent or sequential) and the point from which they are mixed (e.g. design, analysis, or interpretation) (Creswell & Plano Clark, 2007; Johnson, Onwuegbuzie, & Turner, 2007; Leech & Onwuegbuzie, 2009). Methods may be further classed as *integrated* or *combined*, depending on whether the end research product is greater than the sum of the constituent quantitative and qualitative parts, or primarily addresses different research questions (Bryman, 2007; Moran-Ellis, et al., 2006).

**Perspective adopted in the current research**

Pragmatic perspectives are increasingly common in applied research, where the method (and traditionally associated philosophical assumptions) is considered secondary to the research questions. The current research adopts a critical pragmatist position: mixed
methods were chosen for practical consequences (primarily to answer different research questions) but philosophical assumptions were also considered (Cherryholmes, 1992; Johnson & Onwuegbuzie, 2004; Morgan, 2007). Here, it is assumed that knowledge is based on the underlying realities of the external world, but shaped through socio-cultural and historico-political context (Johnson & Onwuegbuzie, 2004; Morgan, 2007). For example, it is assumed that women’s expressed views relate to their cognitions, although other possible influencing factors are also considered, as is the researcher’s role in choice of questionnaire items, choice of interview questions and overall interpretation of data; an approach sharing common features with a social constructionist version of grounded theory (Charmaz, 1995; Willig, 2001).

At its inception, the project’s focus concerned qualitative needs analysis with women experiencing maternal stress. A quantitative element was proposed largely to inform the qualitative element by providing a sampling framework. However, consultation of the literature highlighted a research gap concerning problem definition (Campbell, et al., 2007) and a clinical context where introduction of routine mental health assessment was imminent and used depression case finding questions that had not been previously validated in the perinatal period. Recognising that the quantitative inquiry offered potential beyond providing a sampling framework, the project changed from qualitative dominant to a more balanced weighting of quantitative and qualitative methods.

2.3 Rigour and research paradigms

All research is subject to quality appraisal; however, it is not necessarily appropriate to assess quantitative and qualitative research with the same criteria, given their different philosophical assumptions. To address this, Lincoln and Guba (1981) proposed that quality of qualitative research be appraised in terms of attempts to build trustworthiness. This offers a parallel to criteria for rigour in quantitative research, favouring credibility, transferability, dependability, and confirmability instead of their respective (traditional quantitative) counterparts: internal validity, external validity, reliability, and objectivity (Lincoln & Guba, 1985). The authors also suggest several strategies for achieving and demonstrating these aspects of rigour, described next.

**Credibility**

Arguably the most important aspect of trustworthiness, credibility, establishes whether the findings are consistent with participant perceptions, demonstrate ‘truth’ and are believable (Guba & Lincoln, 1985).
Credibility may be achieved through prolonged engagement, member checking (also known as respondent validation), use of quotations representing all participants, searching for alternative explanations, investigator triangulation and peer debriefing (Guba & Lincoln, 1985; Robson, 1993). Credibility can also be demonstrated through the research audit trail and associated reflexivity (continuous critical reflection), showing the processes used, assumptions made, and potential influences of the researcher (Sandelowski, 1986).

**Transferability**
Transferability describes the ability to comment on whether findings are likely to transfer (i.e. be applicable) to another context.

Transferability is best demonstrated by providing ‘thick description’ of the local context, research participants, and sampling (Guba & Lincoln, 1985); however, this needs to be balanced with issues of confidentiality. Thick description can also include reflexivity and the assumptions that were central to the research, e.g. reporting conceptual developments during interpretation, or issues challenging preconceptions and enriching analysis.

**Dependability**
Although qualitative findings would not necessarily be replicated *per se* on repeated occasions (i.e. the traditional criterion of reliability), dependability describes the ability to comment on whether findings would be consistent in similar circumstances (Lincoln & Guba, 1985).

Dependability is demonstrated by contextual research and an audit trail providing a transparent decision-making process, enabling the reader to evaluate the analysis and conclusions, or carry out similar research; for example, providing the topic guide and rationale for topics.

**Confirmability**
Confirmability explores bias in findings by considering the extent to which they are shaped by the researcher’s perspective (either intentionally, e.g. due to personal motivation, or unintentionally, e.g. due to personal assumptions and values).

Alongside an audit trail, demonstrating confirmability requires reflexivity, recognising the researcher’s active role through personal response to participants, and role in both data collection and all aspects of analysis and interpretation. Acknowledging the researcher’s role is considered more credible than attempting to set aside these possible influences (Bryman, 2001), i.e. rather than aiming for the traditional criterion of objectivity.
Additional strategies include searching for negative cases, investigator triangulation, and peer debriefing.

**Additional aspects of quality**

Whereas trustworthiness criteria offer a parallel to the aspects of rigour in quantitative research, additional aspects of quality have been recommended beyond those pertaining to methodological rigour. This has included the need for authenticity (Guba and Lincoln, 1989) with attention to some of the ethical issues pertaining to the research, including representing participants' views, empowerment of participants, contribution to meaningful change, and generating action. Research should also be examined for originality and importance (Seale, 1999).

### 2.4 Study design

The study adopted a mixed methods prospective design where, the methods were largely *combined*, i.e. chosen to address different research questions. As shown in Figure 2.1, all participants took part in the quantitative element (Study Part 1) with women recruited at booking, aiming to achieve a representative sample, although naturally requiring a convenience sample (discussed further in Chapter 4). Sequential mixed methods sampling was used (Teddlie & Yu, 2007) whereby purposive sampling within the first sample derived the second (qualitative) sample (Study Part 2). Purposive sampling was used to identify cases where the most could be learnt in relation to the research (Ritchie, Lewis, & Elam, 2003), i.e. by interviewing women experiencing maternal stress to inform the nature of the target problem and unmet need. Although purposive, the qualitative sample was not stratified by classification of symptom and risk because the aim was not to *integrate* in analysis and interpretation by, for example, exploring trends in social support needs across quantitative variables (Moran-Ellis, et al., 2006). There was, however, some opportunity for integration (for example where women's mental health histories and disclosures were accessed through the different methods) and synthesis is presented with the qualitative findings wherever relevant.

APA (Study Part 1) was cross-sectional with all measures (both in the questionnaire and health records) completed at a single session (or shortly afterwards in the case of postal return/completion). Pregnancy and delivery outcomes were recorded postnataally using health records. A longitudinal aspect of depression case finding using the health records had been planned but was not possible because care providers did not complete the relevant records in the second and third trimesters of pregnancy (discussed further in
Chapter 6). The qualitative research (Study Part 2) was longitudinal with women participating in up to three serial interviews antenatally and postnatally (see Figure 2.1).

Further details of sample size considerations for Study Part 1 and Study Part 2 are presented in the methods chapter (Chapter 4). The sample size for Study Part 1 was informed by the pilot study (described in Chapter 3), which piloted the cross-sectional component of the quantitative research.

![Study design of the ARMS study (depicting sequential mixed methods sampling)](image)

Figure 2.1 Study design of the ARMS study (depicting sequential mixed methods sampling)
2.5 Theoretically-driven rationale for chosen methods of data collection

The rationale is presented here, with details of data collection instruments and procedural aspects reported in Chapter 4.

2.5.1 Self-report measures
As discussed in the previous chapter (Chapter 1, Introduction), stress may be measured in several ways. APA measures developed for applied practice predominantly adopt brief questionnaires that can either be completed by self-report or with the assistance of the care provider; at least for initial ‘screening’ (i.e. case finding), which may then be followed up by diagnostic interview. Such instruments are feasible in a clinical environment as self-report instruments, particularly those containing closed questions, are quick to complete, quick to score and enable direct comparisons between individuals and time points. Given the need for the findings of the research to be transferable to practice, self-report measures were used. These included the State-Trait Anxiety Inventory (state scale, STAI-S) (Spielberger, et al., 1987); GAD-2 (Kroenke, et al., 2007); Edinburgh Postnatal Depression Scale (EPDS) (Murray & Cox, 1990); Antenatal Risk Questionnaire (ANRQ) (Austin, 2003); Maternity Social Support Scale (MSSS) (Webster, et al., 2000); Relationship Questionnaire (RQ) (Bartholomew & Horowitz, 1991); and Brief COPE (Carver, 1997). Full details are provided in Chapter 4.

A traditional empiricist quantitative approach would use strategies such as counterbalancing the order of presentation of the measures across participants and ensuring consistent test conditions (e.g. completing measures in a relatively controlled environment) to maximise internal validity. For pragmatic reasons, the current research presented only one version of the questionnaire pack. This was completed in the same setting as the health records (i.e. in the antenatal clinic) or was returned by post. Although less desirable from an internal validity perspective, this had potential benefit for external validity.

2.5.2 Health records
Health records were accessed postnatally for background characteristics, obstetric history, health history, pregnancy and delivery outcomes, and women’s documented APA, together with information regarding any mental health referrals made. Observational methods would have offered greater insight into clinical APA and decision-making but would have required additional resources and presented further ethical considerations.
2.5.3 Interviews

The research questions concerning women’s views and experiences were clearly amenable to qualitative enquiry, requiring rich contextual research that was partly inductive in nature. Interviews were favoured above focus groups for several reasons: because of the emphasis on detailed views and experiences (including a longitudinal approach); because of the potentially sensitive nature of the topic that participants may not feel comfortable sharing with others; and because of practical aspects (e.g. increased flexibility offered to women in terms of times and locations).

In-depth, semi-structured interviews

The research used semi-structured interviews whereby all participants were asked about the same main topics (to ensure that all research questions were addressed) but the interview design retained the flexibility to change the sequence and phrasing of questions (to explore the participants’ responses in further detail and tailor questions to the individual) (Flick, 2005; Kvale, 1996)\textsuperscript{13}.

Serial interviews

Longitudinal studies are those “involving more than one episode of data collection” (p.54) (Lewis, 2003). Such approaches are relatively new in qualitative research (although have a longer history in ethnographic qualitative research) (Lewis, 2003). Here, the longitudinal design involved participants taking part in up to three serial interviews (two antenatal and one postnatal) to explore experiences, views and needs and how, notably, they may change in pregnancy.

The use of serial interviews allowed contemporaneous assessment alongside the transition of pregnancy, rather than using retrospective recall. It has been reported elsewhere that, “The resulting continuous and changing account would be difficult, if not impossible, to construct from a series of snapshot interviews.” (p. 959) (Murray, et al., 2009). Serial interviews also enabled revisiting of topics, including any referrals or actions taken by care providers.

The research methods were informed by both theoretical and pragmatic perspectives, with the latter the focus of the next chapter, the pilot study.

\textsuperscript{13}Details of the topic guide are presented in the Methods chapter.
Chapter 3. Pilot study

3.1 The use of a pilot study in applied research
There are two types of pilot study: feasibility studies that may be considered small scale versions of the main study and those that pre-test research instruments (Van Teijlingen & Hundley, 2001). While the current pilot study served both purposes, the priority was feasibility of recruitment methods and safeguarding procedures, given the applied nature of the research. The only component of the main study that was piloted was Study Part 1 and, in relation to the adopted methods of data collection, this was limited to questionnaires that were self-completed in the antenatal clinic.

3.2 Objectives of the pilot study
The aim of the pilot study was to inform the research protocol for the main study, with specific objectives outlined below.

A) Feasibility of methods and estimation of participant flow
A.1) Estimate participant flow for Study Part 1
A.2) Pilot the recruitment procedure
A.3) Pilot the referral procedure
A.4) Estimate participant flow for Study Part 2 and design accessible research

B) Pilot the proposed questionnaires with attention to practical and ethical issues
B.1) Investigate distress arising from the questionnaires and acceptability of the questionnaires
B.2) Determine clarity of items

C) Reference data to inform sample size and hypotheses
C.1) Explore distributions of measures and using the tools in combination to create risk classifications
C.2) Explore correlates of psychological distress symptoms
C.3) Inform sample size calculations (based on correlates of psychological distress symptoms)
3.3 Consultation process
The pilot study protocol was developed through extensive consultation with clinical staff (including the antenatal matron and the antenatal clinic (ANC) manager), administrative staff, and research midwives. Clinical staff facilitated a shadowing opportunity to observe the ANC booking processes, including sonography (for ultrasound scan), midwifery (for the ‘booking appointment’) and phlebotomy (for blood tests). This also enabled informal discussion of possible recruitment procedures with the clinic coordinator, ward clerk, a booking midwife and two patients. Administrative staff helped to determine the information-giving procedure and research midwives offered advice on all aspects of recruitment.

Consultation continued throughout the pilot study, both through formal activities (e.g. attending an ANC team meeting to present the research and gathering one-to-one staff feedback at the end of the recruitment period) and informal activities (i.e. ongoing discussions with staff). Informal consultation was particularly important due to rotation of staff and the ability to be responsive to concerns as they arose.

3.4 Methods of the pilot study

3.4.1 Design
The pilot study used an observational cross-sectional study of women without a control group.

3.4.2 Setting
The pilot study and main study were conducted at the same hospital (described further in the main methods). Of note, the hospital relocated to an adjacent site during the pilot study, necessitating that recruitment be run as two blocks (rather than a continuous four-week period).

3.4.3 Materials
Two versions of the Participant Information Sheet (PIS) were developed: the Postal PIS (sent in advance) and the Booking PIS (provided during recruitment). The research pack comprised the Booking PIS, the consent form (three copies) and the questionnaire, which included four established tools and two forms developed for the current study: a participant background information form and a participant feedback form.
**Background information form**

Due to the researcher not accessing health records, the form (Appendix 3.1) borrowed heavily from the NHS Pregnancy Notes (version 7.1) (Perinatal Institute, 2007) (also known as the ‘handheld notes’ (HHN) or Personal Maternity Record), which is completed at booking. Any new items were developed in consultation with research midwives to ensure clear and appropriate language (Coolican, 2004). In addition to sociodemographic, obstetric, and health behaviour (smoking, alcohol, substance use) variables, the form contained single-item psychosocial risk factors of late attendance for antenatal care (Q.13, where a woman is classified as a ‘late booker’ if she is ≥20 weeks pregnant, in line with local Trust guidelines), and unintended pregnancy (Q.14, taken from the antenatal assessment guidelines in the USA (American College of Obstetricians and Gynecologists, 2006)). Perinatal loss was estimated by recording the participant’s number of previous pregnancies and number of children; this was considered more appropriate than requesting a comprehensive obstetric history.

**Feedback form**

A single-item concerning distress arising from the questions (Q.1, Appendix 3.2) was taken from previous research involving the ANRQ (Priest, 2006). The remaining questions were developed to inform the main study, including assessing interest in, and barriers to, interview participation.

**Measures**

The four measures were:

1) state scale of the State-Trait Anxiety Inventory (Spielberger, et al., 1987)
2) Edinburgh Postnatal Depression Scale (Murray & Cox, 1990)
3) Antenatal Risk Questionnaire (ANRQ) (Austin, 2003)
4) Maternity Social Support Scale (MSSS) (Webster, et al., 2000)

Full details are presented in Chapter 4.

**3.4.4 Data management and analysis**

The data management plan is available as an appendix of the main methods chapter (Appendix 4.12) with descriptions of statistical tests presented with the analyses.

**3.4.5 Procedure for the pilot study**

The stages of the procedure are illustrated in the procedure flowchart (Figure 3.1).

Consenting participants completed the questionnaires before being seen by the midwife, while waiting for blood tests, after booking, or a combination of these.
Figure 3.1 Procedure for the pilot study

1. Woman referred by GP for a booking visit
   - Arranged via letter, Postal PIS added by NHS staff
   - Arranged without letter (e.g. via telephone)

2. Woman reports to antenatal reception and is sent for an ultrasound scan
3. Woman reports to reception or midwives’ desk and is asked to complete HHN in waiting area
4. Woman approached by researcher to ask if Postal PIS received before summarising research summarised and offering Booking PIS if interested
   - Not attend (e.g. miscarriage)
   - Scan finds pregnancy not viable
   - Not approached (e.g. seen immediately by the booking midwife; approached at booking for other research; woman’s circumstances; non-English speaker)

5. Woman returns HHN to midwives’ desk and is asked to wait for midwife consultation (booking)

6. Woman approached by researcher for consent
   - Not interested in taking part

7. Consenting woman completes questionnaires (while waiting to see the midwife or waiting for blood tests)
8. Woman returns completed questionnaires (retains PIS and one consent form).

9. Researcher makes referral to clinical care team if abuse or thoughts of self-harm disclosed (documented in health records and for research audit)

10. Woman has booking visit consultation with the midwife before being sent for blood tests (and seeing the doctor, if applicable)
3.4.6 Eligibility criteria
Potential participants were any women ‘booking’ for antenatal care at the local hospital in the study timeframe, irrespective of obstetric or other health factors, or whether they had received the Postal PIS in advance. Inclusion was restricted to women aged 16 years or over (for consent purposes) and women capable of providing written informed consent in English and completing the questionnaires unassisted (as indicated by unassisted completion of the HHN).

3.4.7 Ethical approval and considerations for the pilot study
The research was carried out within the guidelines of the British Psychological Society’s code of conduct for research (British Psychological Society, 2009) and in accordance with Good Clinical Practice (GCP) (Department of Health, 2005). The application received favourable ethical opinion from the Oldham Research Ethics Committee (REC; application number 09/H1011/39) and approval by the Trust. All key ethical considerations are detailed below and were presented to the REC.

First approach
Women are routinely approached at the booking visit for research due to the hospital having a research department. Ideally, first approach is made by the clinical care team. The following alternatives (shown in Figure 3.1) were considered: i) antenatal reception staff upon arrival; ii) staff at the midwives’ desk or reception following ultrasound scan; or, iii) the booking midwife.

The initial consultation process identified that first approach by reception staff was deemed unsuitable as a woman may subsequently learn that her pregnancy is not viable (by ultrasound scan). Discussion with women when shadowing identified preference to participate while waiting (due to the booking process already requiring two hours), eliminating approach by the booking midwife. Thus, the pilot study explored first approach by staff at the midwives’ desk and first approach by the researcher in light of these considerations and recognising that the Postal PIS may offer a first approach.

Interval between providing research information and seeking consent
An interval exceeding 24 hours is considered ideal between receiving information about research and consent being sought; however the decision-making for one-off participation in a questionnaire study is likely to be considerably less complicated than, for example, a pharmacological trial. Arrangements were made with administrative staff to enclose the Postal PIS with the appointment letter for all women booking on the study dates (two periods of two weeks). This procedure had not been used locally before so required identification of staff and establishing links with those involved (including the
main call-centre, the medical secretaries, and the referral coordinator). A key objective of the pilot study was to explore recruitment methods; therefore women were invited to take part irrespective of whether they had received and read the Postal PIS, provided they felt they had sufficient time to decide whether or not to participate.

**Phrasing of questions**

As discussed in relation to questionnaire design, phrasing required appropriate, non-judgemental language. Some items on the background information form were queried by the REC (including ‘Is your partner the baby’s father?’ and items concerning substance use) but permitted to remain, having been adopted from the Pregnancy Notes (version 7.1) (Perinatal Institute, 2007), or adapted in consultation with research midwives.

**Psychological distress**

Some of the questionnaire items are routinely asked in other countries when women book for antenatal care. One of the aims of the pilot study was to explore women’s acceptability given shifts towards routine antenatal psychosocial assessment in routine clinical practice. The PIS specified potentially distressing questionnaire topics (e.g. abuse) and women were encouraged to contact a midwife or doctor in the event of further assistance being required. Women retained the right to withdraw without providing a reason and without this affecting their antenatal care. The instruction that participants did not have to answer any question they did not wish to answer was written in bold at the request of the REC.

**Disclosure of abuse**

Routine enquiry concerning current domestic abuse was introduced to the booking visit (Department of Health, 2000) due to one-third of domestic abuse beginning or intensifying during pregnancy (Department of Health, 2004). Midwives perform ‘routine enquiry’ in the partner’s absence, rather than using the HHN. The research was restricted to questionnaire self-report, potentially in the partner’s presence. The PIS listed example topics including abuse and asked about any history of abuse without specifying timeframes.

**Clinical safeguards**

As stated in the PIS and consent form, the researcher checked all participants’ responses to ensure that any suggestion of possible risk was relayed to the clinical care team for them to explore this with the woman. As requested by the matron and clinic manager in the initial consultation process, where a woman disclosed abuse (on the ANRQ) or any thoughts of self-harm (on the EPDS), the researcher notified the clinical care team by discussion with the clinic co-ordinator based on the midwifery desk in the
antenatal clinic. A memo (Appendix 3.3) was completed to document this conversation with one copy provided to clinical staff and one retained by the researcher.

**Confidentiality**

Questionnaire responses were stored on secure electronic databases, using unique study numbers to identify participants, with the participant log stored separately. Postcodes were not recorded electronically, instead using the Index of Multiple Deprivation (Nobel, McLennan, Whitworth, Barnes, & Dibben, 2008). The final two digits of the postcodes were blocked out on the paper copies to ensure anonymity. Documentation concerning referrals to the clinical care team was stored securely with the consent forms for research audit.

**Dissemination of findings**

Recognising the possible range of pregnancy outcomes that women may have experienced, the summary of the findings sent to interested participants was worded with the assistance of research midwives.

### 3.5 Methods for staff participation

The term participant is used throughout this thesis to refer to maternity services users. A second group of participants comprised the ANC staff who provided feedback on the pilot study. Clinical staff feedback was planned as a focus group linked to an ANC team meeting; however, due to staffing constraints, the clinic manager requested that the meeting be cancelled with feedback instead provided on an individual basis. Due to the unanticipated format, discussions were documented in the researcher’s notes, rather than being audio-recorded and transcribed. Staff feedback is presented in the associated sections of the pilot study results to avoid repetition across sections.

#### 3.5.1 Ethical approval and considerations for staff

This aspect of the research was included in the pilot study ethical application (09/H1011/39). At the request of the REC the process was formalised, with staff receiving a PIS and being asked to provide written consent.

#### 3.5.2 Staff sample characteristics

A total of 17 staff consented to provide feedback: eight ANC staff (including the ward clerk, clinic manager, four senior ‘core’ staff (permanently based in ANC), and two junior ‘rotational’ staff) and nine administrative staff who were responsible for distributing the appointment letters and also involved in filing consent forms in the health records.
(including the administrative manager, the call-centre manager, the referral co-ordinator and six medical secretaries).

3.6 Pilot study results

The results are presented together with implications for the main study (including revisions to the procedure and revisions to the materials, including the questionnaire pack). Additional revisions for the main study were made following peer review; these are detailed in the next chapter.

Sample characteristics

Descriptive statistics are reported in Table 3.1. No information was available for non-participants.

<table>
<thead>
<tr>
<th>Variable</th>
<th>n for which data available</th>
<th>n (%) (categorical data); mean (s.d.) or median (IQR) (continuous data)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
<td>64</td>
<td>Mean 30.4 (5.8), range 19-43</td>
</tr>
<tr>
<td>Marital status</td>
<td>64</td>
<td>Married/Civil Partnered 42 (65.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Partner 14 (21.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Single 6 (9.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Separated 2 (3.1)</td>
</tr>
<tr>
<td>Resides with partner</td>
<td>64</td>
<td>Yes 53 (82.8)</td>
</tr>
<tr>
<td>British born</td>
<td>64</td>
<td>Yes 52 (81.3)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>63</td>
<td>European White 44 (69.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>White British 1 (1.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>White Irish 6 (9.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mixed/multiple ethnic groups 2 (3.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other 1 (1.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Asian or Asian British 1 (1.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indian 1 (1.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pakistani 6 (9.5)</td>
</tr>
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<td></td>
<td></td>
<td>Chinese 1 (1.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other 1 (1.6)</td>
</tr>
<tr>
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<td></td>
<td>Black or Black British 1 (1.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Black African 1 (1.6)</td>
</tr>
</tbody>
</table>
Index of Multiple Deprivation (centile) & 51 & Median 32.0 (36.0), range 0-94.0 \\
Employment & 64 & Full-time mother 6 (9.4)  \\
 &  & Employed full-time 32 (50.0)  \\
 &  & Employed part-time 14 (21.9)  \\
 &  & Student 3 (4.7)  \\
 &  & Unemployed 7 (10.9)  \\
Gestation in weeks & 64 & Median 12.0 (4), range 8-32  \\
Late booking (≥20 weeks) & 64 & Yes 8 (12.5)  \\
Preferred pregnancy timing & 63 & Earlier 7 (11.1)  \\
 &  & Later 6 (9.5)  \\
 &  & Not at all 9 (14.3)  \\
 &  & No change 41 (65.1)  \\
Primigravida (no previous pregnancies) & 63 & Yes 21 (33.3)  \\
Number of previous pregnancies & 63 & Median 1.0 (2), range 0-10  \\
Primipara (no previous deliveries) & 63 & Yes 31 (49.2)  \\
Number of children & 64 & Median 1.0 (1), range 0-8  \\
Perinatal loss (fewer children than pregnancies) & 63 & Yes 24 (38.1)  \\
Any smoking - past & 64 & Yes 17 (26.6)  \\
Any smoking - current & 64 & Yes 6 (9.4)  \\
Any alcohol consumption - past & 64 & Yes 50 (78.1)  \\
Any alcohol consumption - current & 64 & Yes 7 (10.9)  \\
Any substance use & 64 & Yes 1 (1.6)  \\

Note: IQR = inter-quartile range

3.6.A) Feasibility of methods and estimation of participant flow

A.1) Estimating participant flow for Study Part 1

The pilot study found it was feasible to conduct research involving self-report antenatal psychosocial assessment when women attended for booking in the local hospital setting.
As shown in Figure 3.2, approximately half of the eligible women approached consented to take part (64/125), representing approximately one-third of the total women booked in the study period (64/203). Participants indicated the high consent rate was due to participation being one-off (rather than continued involvement) that coincided with a routine appointment (and therefore did not require additional time, travel or childcare) and period of waiting in the clinic.

Implications for the main study:
- Recruitment in the pilot study averaged 16 women per week. Project planning was based on 12 women per week (40-50 per month) for Study Part 1, due to running concurrently with Study Part 2 (interviews).

A. 2) Piloting the recruitment procedure (information-giving and consent)
Identifying and approaching potential participants
The pilot study identified that recruitment at the routine booking clinic did not encompass bookings with specialist midwives (e.g. teenage pregnancy, diabetes) who had separate systems. Recruitment across all clinics was considered but rejected to ensure that the researcher was available to participants and their care providers.

First approach by the clinical care team was possible in one-quarter of cases (34/125: ward clerk, n=9; clinic coordinator, n=15; midwives, n=10) due to the busy nature of the clinic, with patient enquiries being fielded by any staff, including those on rotational duties; thus, other research projects primarily involved approach by research staff, rather than the clinical care team.

Interval between information and providing research seeking informed consent
Only 39.1% of women receiving an appointment letter (45/97) reported receiving a Postal PIS. Of note, a similar proportion of participants (26/64; 40.6%) reported receiving a Postal PIS, suggesting that receiving information in advance did not influence participation. Possible reasons for the sub-optimal inclusion rates were explored with staff and identified the hospital’s relocation (which affected all post and required temporary staff who were unfamiliar with the processes) and difficulty caused by inclusion being based on appointment date, rather than blanket inclusion. Ways to maximise postal inclusion for the main study were discussed with staff given that this offered a written first approach.

14 This was only documented for 115 women (of whom 97 received appointment letters) because the remaining 10 women were approached by staff and not interested in taking part.
Timing of participation
Participants completed questionnaires before the midwife consultation, while waiting for blood tests, after booking, or a combination of these; highlighting flexibility on the part of the participants. Completion while waiting to see the midwife was convenient for women, facilitated clinical safeguards (see below), and was more desirable from a psychometrics viewpoint (offering a more standardised method). However, staff feedback (both informal and formal) identified that such an approach could not be guaranteed without disrupting the clinic.

Implications for the main study:
- Limiting recruitment to the routine booking clinic (and thereby excluding young parents) avoided the need to establish maternal age before approach.
- Flexibility was required for either the researcher or the clinical care team to make the first approach, increasing the need to maximise receipt of the Postal PIS. Planned strategies were: blanket inclusion of the Postal PIS with booking appointment letters (with the information revised to include introductory information on all local research) and frequent contact with administrative staff to replenish supplies and document the numbers sent out.
- Timing of completion required flexibility to prioritise avoiding disruptions to clinical care over completion before the midwifery consultation.

A.3) Piloting the referral procedure (clinical safeguards)
Seven women were referred for disclosing abuse (n=4), thoughts of self-harm (n=1), or both (n=2). Wherever possible, the referral was dealt with by the booking midwife within the consultation because staff could otherwise be in further consultations or no longer on shift (as illustrated in Appendix 3.4). Piloting identified that, despite being checked in the initial consultation process, staff were sometimes unclear about the purpose of the memo, or the action required. The only information relayed was the disclosure of thoughts of self-harm in the past week or the disclosure of a history of physical and/or sexual abuse. Two midwives raised the need to explore abuse disclosures in the partner’s absence (consistent with ‘routine enquiry’) and potential safety concerns about self-completion in the partner’s presence. All of the abuse disclosures were found to be historical with some staff unsure of the appropriate response because the local policy and procedures concerned routine enquiry for current abuse only.

Midwives expressed major concerns over the “depression questions” (Whooley questions) that had “just appeared” (having been introduced in the month before the pilot study began) without staff training and without the provision of appropriate resources.
Implications for the main study:

- Recognising that referrals could not always be raised before the consultation, it was agreed that the clinic coordinator would be notified and would determine the most appropriate action on a case-by-case basis. The referral memo was revised to state that the information had been passed on verbally to the clinical care team who would then use existing clinical procedures, with sections required for signing and dating by the researcher, booking midwife and clinic coordinator.

- The ANRQ items were revised to enquire solely about historical abuse 'growing up' with referral systems restricted to thoughts of self-harm.

- Staff feedback concerning mental health assessment highlighted the need for further exploration in the interviews of women's experiences of these questions and care providers’ responses.

A.4) Estimating participant flow for Study Part 2 and designing accessible research

Interest in interview
As shown in Figure 3.2, 28 of the 64 consenting women scored above threshold on at least one of the maternal stress measures, meeting sampling criteria for interviews. Approximately one-third of these women (10/28) expressed interest in being interviewed, with questionnaire scores indicating that views would be accessible across a range of types of maternal stress (one was high on risk only, two on symptom only and seven were high on both).

Facilitating interviews
The key facilitator was that the interview be convenient and fit around home and work commitments, both in terms of time of day and location (n=11). Equal preference was expressed for home (n=12) and hospital (n=11). Providing monetary or consumable incentives was suggested by three women whereas another two indicated their incentive would be if the woman thought the research would benefit future practice or future users of maternity services. Personal relevance was also acknowledged, with one woman stating she would not take part because she was not stressed. Of note, the potentially sensitive nature of such interviews (and associated barriers) was highlighted by one participant’s comment that her decision would be influenced by having “an understanding interviewer, someone friendly and approachable”.

Implications for the main study:

- Project planning was based on 1-2 women per week.

- A choice of interview times and locations were offered.
Figure 3.2 Pilot study participant flow
3.6.B) Piloting the proposed questionnaires with attention to practical and ethical issues

B.1) Distress arising from the questionnaires and acceptability of the questionnaires

Unanswered items
The majority of datasets were complete (95.3%). The item with most data missing was the postcode (missing = 20.3%), used to derive the Index of Multiple Deprivation (Nobel, et al., 2008). This was the only identifiable data in the questionnaires and may therefore have reflected concerns over use of data. The questionnaire with most data missing was the ANRQ. Three women declined to answer questions on history of physical or sexual abuse, with one of these women also declining to answer the question on emotional abuse. Overall ANRQ classification would not have been altered for those participants disclosing abuse or choosing not to answer had their responses been different. There were a further three cases where ANRQ data was incomplete due to multiple items.

Finding the questionnaires ‘distressing’
Four of the 64 women (6.3%) reported finding the questionnaires distressing (indicated by a score of at least 3, ‘somewhat’). This proportion is greater than previously reported where using the same item in relation to the ANRQ, where 1.8% of women in a sample of 2,142 reported some distress (Priest, et al., 2008). One of the women cited the need to complete three copies of the consent form whereas the remaining three referred to the ANRQ questions, and two explicitly to items concerning abuse. A further five women rated distress as 2 out of 5 (i.e. between ‘not at all’ and ‘somewhat’ distressing).

Reasons were provided by two women who cited disclosure of history of mental health and medication, and disclosure of childhood history. Reporting distress need not imply unacceptability of the research or questionnaires, as two of the four scoring at least ‘somewhat’ expressed interest in interview.

Implications for main study:
- No items were excluded on the basis of acceptability; however, the PIS was revised to provide further detail on the questionnaire topics to minimise women being exposed to unexpected topics that may cause distress.
- Potentially sensitive topics are inherent to psychosocial assessment and cannot simply be avoided; therefore acceptability was added to the interview topic guide for Study Part 2.
B.2) Clarity of items

The layout but not the phrasing of items on established measures could be altered. One midwife requested that the EPDS layout be revised to highlight ‘in the past 7 days’ on the self-harm item, having needed to telephone a referred women who ultimately reported this was historical, not recent. Additionally, the ANRQ layout lacked clarity for those items that were contingent on previous responses (e.g. impact ratings that only apply where there is a history, such as mental health or recent stress) and was therefore revised.

The majority of items on the background information form were not retained for the main study, due to accessing health records containing the relevant information. The only item being retained that was found to lack clarity was the item concerning unintended pregnancy, which was adopted from clinical care (American College of Obstetricians and Gynecologists, 2006). The format (‘If you could change the timing of the pregnancy, would you want it…?’) may have caused confusion between ‘not at all’ and ‘no change’. Two participants initially selected the former before choosing the latter, indicating possible misinterpretation. Additionally, the category ‘earlier’ did not appear consistent with ‘unintended’ pregnancy, which is generally associated with delayed antenatal care access (American College of Obstetricians and Gynecologists, 2006). In contrast, the women responding ‘earlier’ commonly accessed care early (based on their gestational age at booking). Indeed, preferring earlier timing could indicate previous difficulties in conceiving or maintaining a pregnancy, rather than the pregnancy not being intended per se. Therefore, the responses were rephrased for the main study to: ‘earlier pregnancy’, ‘later pregnancy’, ‘no pregnancy at all’, ‘no change to timing’ (from ‘earlier’, ‘later’, ‘not at all’, ‘no change’). Additionally, history of subfertility was extracted in the main study and an additional item was added to explore maternity experience.

3.6.C) Reference data to inform sample size and hypotheses

C.1 Distributions of measures and using the tools in combination to create risk classifications

As shown in Table 3.2, using established thresholds for the EPDS (Cox & Holden, 2003; Murray & Cox, 1990), 17 women (26.6%) displayed possible depression (9/10 threshold) of which seven were classed probable depression (12/13 threshold). Using the STAI-S, 13 women (20.6%) met the recommended threshold for anxiety (40/41 threshold) previously validated against clinical diagnostic interview (Grant, et al., 2008), of which seven were comorbid for possible depression and four for probable depression.
Using the ANRQ, 17 women (27.9%) were classified as ‘high risk’ (Priest, 2006). Based on the Psychosocial Risk Index developed elsewhere (Priest, 2006), almost half of these women were high on both risk and symptom (n=9 at EPDS 9/10; n=7 at 12/13). This increased to two-thirds when anxiety was introduced as an additional criterion (n=12 at EPDS 9/10; n=11 at 12/13).

*Implications for main study:*

- Introducing anxiety identified additional women as ‘high’ on maternal stress, requiring further exploration.

<p>| Table 3.2 Distribution of scores on the four measures used in the pilot study (n=64) |
|---------------------------------|---------------------------------|---------------------------------|</p>
<table>
<thead>
<tr>
<th>Measure</th>
<th>Median (IQR), range</th>
<th>Threshold</th>
<th>Proportion above threshold, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAI-S^ (n=63)</td>
<td>31.0 (13.0), 20-70</td>
<td>40/41 (high anxiety)</td>
<td>13 (20.6)</td>
</tr>
<tr>
<td>EPDS^ (n=64)</td>
<td>6.5 (8.0), 0-24</td>
<td>9/10 (minor/possible depression)</td>
<td>17 (26.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12/13 (major/probable depression)</td>
<td>7 (10.9)</td>
</tr>
<tr>
<td>ANRQ^ (n=61)</td>
<td>18.0 (15.0), 5-56</td>
<td>23/24 (high risk)</td>
<td>17 (27.9)</td>
</tr>
<tr>
<td>MSSS* (n=63)</td>
<td>29.0 (3.0), 4-30</td>
<td>24/25 (adequate support)</td>
<td>52 (82.5)</td>
</tr>
</tbody>
</table>

Notes:

IQR = inter-quartile range

^ A high score on the STAI-S, EPDS and ANRQ indicates higher levels of symptoms of psychological distress or psychosocial risk factors

* A high score on the MSSS indicates higher (adequate) levels of social support; therefore, scoring below threshold indicates adverse conditions
C.2 Exploring correlates of psychological distress symptoms

Correlates of psychological distress (anxiety, measured by the STAI-S and depression, measured by the EPDS) were investigated by performing bivariate correlations for potential predictors that were continuous (e.g. Index of Multiple Deprivation, maternal age, gestational age) and Mann-Whitney U analyses for dichotomous predictors (e.g. ANRQ risk factors). Non-parametric tests were used because neither continuous criterion variable (STAI-S and EPDS) was normally distributed. Effect sizes (ES) were calculated using the formula, $r = \frac{z}{\sqrt{n}}$ (Rosenthal, 1991, p.19, cited by Field, 2005), with magnitude based on established guidelines (Cohen, 1998) where .1, .3 and .5 respectively represent small, medium and large ES. A significance level of .05 was adopted despite conducting multiple tests because of the exploratory nature of the work and small sample size. Results are shown in Table 3.3-3.7.

Table 3.3 Correlation between distress symptoms and other continuous variables in the pilot study (n=64)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Anxiety (STAI-S)</th>
<th>Depression (EPDS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$r_s$ $n$ $p$</td>
<td>$r_s$ $n$ $p$</td>
</tr>
<tr>
<td>Index of Multiple Deprivation</td>
<td>-.13 50 .374</td>
<td>-.27 51 .054</td>
</tr>
<tr>
<td>(centiles)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal age (in years)</td>
<td>-.03 63 .845</td>
<td>-.12 64 .338</td>
</tr>
<tr>
<td>Gestational age (in weeks)</td>
<td>.29 63 .019</td>
<td>.05 64 .681</td>
</tr>
</tbody>
</table>

Notes: $r_s$ = Spearman’s correlation coefficient; shading indicates statistical significance ($p<.05$)
Table 3.4 Mann-Whitney U analyses comparing median distress symptoms across background characteristics (n=64)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Anxiety (STAI-S)</th>
<th></th>
<th></th>
<th></th>
<th>Depression (EPDS)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no</td>
<td>yes</td>
<td>n</td>
<td>Md</td>
<td>U</td>
<td>Z</td>
<td>ES</td>
<td>p</td>
</tr>
<tr>
<td>Born in the UK</td>
<td>32.5</td>
<td>12</td>
<td>31.0</td>
<td>51</td>
<td>294.0</td>
<td>0.210</td>
<td>.027</td>
<td>.833</td>
</tr>
<tr>
<td>White British ethnicity</td>
<td>32.5</td>
<td>20</td>
<td>31.0</td>
<td>43</td>
<td>398.0</td>
<td>0.473</td>
<td>.060</td>
<td>.636</td>
</tr>
<tr>
<td>Reside with partner</td>
<td>42.0</td>
<td>11</td>
<td>31.0</td>
<td>52</td>
<td>129.5</td>
<td>2.838</td>
<td>.358</td>
<td>.005</td>
</tr>
<tr>
<td>In a relationship(^{15})</td>
<td>50.2</td>
<td>8</td>
<td>31.0</td>
<td>55</td>
<td>89.0</td>
<td>2.709</td>
<td>.341</td>
<td>.007</td>
</tr>
<tr>
<td>Primigravida</td>
<td>31.0</td>
<td>41</td>
<td>31.0</td>
<td>21</td>
<td>370.0</td>
<td>-0.901</td>
<td>-.114</td>
<td>.367</td>
</tr>
<tr>
<td>Primipara</td>
<td>29.5</td>
<td>32</td>
<td>32.0</td>
<td>31</td>
<td>374.5</td>
<td>-1.673</td>
<td>-.211</td>
<td>.094</td>
</tr>
<tr>
<td>Any previous perinatal loss</td>
<td>31.0</td>
<td>40</td>
<td>35.5</td>
<td>22</td>
<td>316.5</td>
<td>-1.820</td>
<td>-.231</td>
<td>.069</td>
</tr>
<tr>
<td>Smoker</td>
<td>41.2</td>
<td>6</td>
<td>31.0</td>
<td>57</td>
<td>35.5</td>
<td>0.950</td>
<td>.120</td>
<td>.342</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>36.0</td>
<td>7</td>
<td>31.0</td>
<td>56</td>
<td>161.5</td>
<td>0.756</td>
<td>.095</td>
<td>.450</td>
</tr>
</tbody>
</table>

Notes: Md = median; ES = effect size; shading indicates statistical significance (p<.05); primigravida = no previous pregnancies; primipara = no previous deliveries

\(^{15}\) Based on legal status where current relationship was based on ‘partner’ or ‘married/civil partnered’ (rather than ‘single’ or ‘separated’).
Table 3.5 Mann-Whitney U analyses comparing median distress symptoms across ANRQ risk factors and social support (n=64)

<table>
<thead>
<tr>
<th>Variable (ANRQ risk factor)</th>
<th>Anxiety (STAI-S)</th>
<th>Depression (EPDS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>low risk</td>
<td>high risk</td>
</tr>
<tr>
<td></td>
<td>Md</td>
<td>n</td>
</tr>
<tr>
<td>Supportive mother (rf1)</td>
<td>31.0</td>
<td>57</td>
</tr>
<tr>
<td>History of altered mood or mental illness (rf2)</td>
<td>31.0</td>
<td>39</td>
</tr>
<tr>
<td>Impact of mood (rf3)</td>
<td>31.0</td>
<td>55</td>
</tr>
<tr>
<td>Sought professional help (rf4)</td>
<td>31.0</td>
<td>48</td>
</tr>
<tr>
<td>Supportive partner (rf5)</td>
<td>31.0</td>
<td>56</td>
</tr>
<tr>
<td>Any stresses in last year (rf6)</td>
<td>31.0</td>
<td>33</td>
</tr>
<tr>
<td>Impact of recent stresses (rf7)</td>
<td>31.0</td>
<td>38</td>
</tr>
<tr>
<td>Tendency to worry (rf8)</td>
<td>31.0</td>
<td>51</td>
</tr>
<tr>
<td>Need for order (rf9)</td>
<td>32.0</td>
<td>51</td>
</tr>
<tr>
<td>Support with baby (rf10)</td>
<td>31.0</td>
<td>59</td>
</tr>
<tr>
<td>Emotional abuse (rf11)</td>
<td>31.0</td>
<td>55</td>
</tr>
<tr>
<td>Physical/sexual abuse (rf12)</td>
<td>31.0</td>
<td>54</td>
</tr>
<tr>
<td>ANRQ classification (23/24)</td>
<td>31.0</td>
<td>44</td>
</tr>
<tr>
<td>MSSS classification (24/25)</td>
<td>31.0</td>
<td>51</td>
</tr>
</tbody>
</table>

Notes: Md = median; ES = effect size; shading indicates statistical significance (p<.05)
Sociodemographic and socioeconomic characteristics

The only characteristics that were statistically significantly associated with distress were marital status (with significantly higher anxiety and depression symptoms in women who were single or separated) and residing with partner (with significantly lower anxiety symptoms in those residing with their partner). Analyses for employment status were not conducted due to being under-powered for the number of categories (see Table 3.6 for median scores).

Table 3.6 Median distress symptoms across employment status (n=64)

<table>
<thead>
<tr>
<th>Employment status</th>
<th>Anxiety (STAI-S)</th>
<th>Depression (EPDS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Median</td>
</tr>
<tr>
<td>Full-time mother</td>
<td>6</td>
<td>29.5</td>
</tr>
<tr>
<td>Unemployed</td>
<td>7</td>
<td>34.7</td>
</tr>
<tr>
<td>Employed full-time</td>
<td>32</td>
<td>31.0</td>
</tr>
<tr>
<td>Employed part-time</td>
<td>14</td>
<td>30.0</td>
</tr>
<tr>
<td>Student</td>
<td>3</td>
<td>32.0</td>
</tr>
<tr>
<td>Self-employed</td>
<td>1</td>
<td>25.0</td>
</tr>
<tr>
<td>Total</td>
<td>63</td>
<td>31.0</td>
</tr>
</tbody>
</table>

Note: IQR = inter-quartile range

Obstetric factors

There was no statistically significant difference in psychological distress for comparisons by gravidity whereas depression symptoms were significantly higher in primiparas and a similar trend (although non-significant) was observed for anxiety. A significant positive correlation was observed for anxiety and gestational age.

Median anxiety and depression scores for attitude to pregnancy timing suggested lower levels of distress in those indicating ‘not at all’ (Table 3.7), which is designed to assess unwanted pregnancy. These results further indicate misinterpretation of the question concerning ‘not at all’ and ‘no change’, as discussed previously. A Kruskal-Wallis test was not conducted given the lack of clarity concerning the item.
Table 3.7 Median distress symptoms across attitude to pregnancy timing (n=64)

<table>
<thead>
<tr>
<th>Preferred timing</th>
<th>Anxiety (STAI-S)</th>
<th>Depression (EPDS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Median</td>
</tr>
<tr>
<td>Earlier</td>
<td>7</td>
<td>36.0</td>
</tr>
<tr>
<td>Later</td>
<td>6</td>
<td>49.2</td>
</tr>
<tr>
<td>Not at all</td>
<td>9</td>
<td>25.0</td>
</tr>
<tr>
<td>No change</td>
<td>40</td>
<td>31.0</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>31.0</td>
</tr>
</tbody>
</table>

Note: IQR = inter-quartile range

Health behaviours
As shown in Table 3.4, women reporting current alcohol consumption reported statistically significant higher depression levels but not anxiety levels. There was no statistically significant difference by smoker status.

Psychosocial risk (ANRQ risk factors and social support)
A statistically significant difference in depression symptoms was found for the majority of the ANRQ risk factors (see Table 3.5). The only difference that did not approach statistical significance was support with the baby, which is likely due to there being only three participants in the at-risk group (risk factor present: $Md = 19.0$, $n = 3$; absent: $Md = 6.5$, $n = 60$; $U = 48.5$, $p = .179$, $r = -.169$). In contrast, a statistically significant difference in anxiety symptoms was only found for the following risk factors: 5 (emotionally supportive partner), 7 (impact of stresses), 8 (tendency to worry), 12 (history of physical and/or sexual abuse), with a further two approaching significance (recent stresses, rf6, $p=.065$; history of emotional abuse, rf 11, $p=.071$). Women classified as ‘high’ on the ANRQ and ‘low’ on the MSSS (i.e. inadequate support) had statistically significant higher anxiety and depression symptoms than those considered low-risk.

C.3 Sample size calculations based on correlates of distress symptoms
The univariate analyses reported in the previous section were used to inform the sample size calculation of the main study, by providing an estimate of the sub-set of variables that would be entered into multivariate analyses to address the research question (presented in Chapter 5, section E): To what extent relative to each other are social support, other psychosocial risk factors (e.g. history of abuse, perinatal loss, current unintended pregnancy, occurrence and impact of recent stresses) and intrinsic psychological factors (e.g. trait anxiety) associated with antenatal symptoms of anxiety and depression?
The pilot study indicated that approximately 15 predictor variables would be eligible for regression analyses using anxiety (measured by the STAI-S) as the criterion variable, and approximately 20 predictor variables would be eligible for regression analyses using depression (measured by the EPDS) as the criterion. This was based on it being likely that those variables approaching statistical significance with a relatively small sample size (n=64) would reach significance with a larger sample size. Given the additional measures added for the main study, it was estimated that the main multiple regression analyses could involve entering between 20 and 25 predictor variables. Based on statistical guidelines (Tabachnick & Fidell, 2007), this required a sample size of 210 to 250 (based on the requirement of n = 50+ (8 x the number of predictor variables)).

A sample size of 250 was considered feasible in the study timeframe, based on the pilot study findings. Recognising the applied nature of the research and variability in numbers of participants recruited each week, further power calculations were performed that found that a sample size of 200 would also provide adequate power for the majority of the planned analyses. Calculations in respect of the univariate analyses for the main objective were performed by a statistician and are available in Appendix 3.5.

### 3.7 Key revisions to the main study

Key changes, following the pilot study and academic review are described below.

**Accessing health records**

Study Part 1 was revised to include accessing health records; the main purpose being to obtain information on current antenatal psychosocial assessment in clinical practice following the introduction of the Whooley questions after ethical approval for the pilot study. The need to explore current practice (including referral processes) was highlighted by staff feedback and by discussion at local research groups. Health records also offered a longitudinal component to the research by accessing information on depression case finding (through the Whooley questions) throughout pregnancy and enabling data collection of pregnancy and delivery outcome data. Further advantages of access were the ability to obtain comprehensive background information (e.g. postcode for deriving social deprivation and detailed obstetric history) while avoiding the need for the detailed background information sheet.
**Changes to items used in the pilot study**

As described previously, the question concerning preferred pregnancy timing was rephrased for clarity, as was the ANRQ layout. Due to ethical considerations, ANRQ abuse items were rephrased to adopt the phrasing used in the parent measure, the Pregnancy Risk Questionnaire (PRQ) (Austin, et al., 2005). Personal communication with the tools’ author confirmed that this was appropriate because that they had used the ANRQ abuse items interchangeably with the PRQ abuse items and used both in combined analyses despite different reference timeframes. Additionally, the ANRQ item considering history of ‘any other mental health’ was removed, instead completing this based on the history documented in the health records. This was done following peer review to avoid repetition with the HHN, recognising women’s comments about distress due to documenting history.

**Additional questionnaires**

Following observations concerning pregnancy intendedness in the pilot study, an additional item was added concerning maternity experience, which was taken from the PRQ (Austin, et al., 2005). Additionally, a second anxiety measure, two items pertaining to needing or wanting support, one measure of coping style, one concerning adult attachment style and two concerning the maternal-fetal relationship were added following ongoing theory and modelling work and academic review. Details of all the measures used in Study Part 1 are provided in the next chapter. Accessing health records additionally offset some of the time that would have been required to complete these added measures.

**Interview topics**

The pilot study informed interview topics, leading to the inclusion of acceptability of antenatal psychosocial assessment and experiences of assessment and referral pathways in clinical practice.
Summary of Chapter 3

The pilot study:

- Met all of its objectives
- Confirmed that research of this nature in this setting would be feasible
- Informed sample size calculations and estimates of necessary resources to assist in planning the main study
- Informed the procedure for the main study
- Identified items and questionnaire layouts that required further clarity
- Identified areas for improvement, including some not raised through the extensive initial consultation process (e.g. ways to maximise inclusion of the Postal PIS)
- Helped to provide a strong rationale for methodological decisions that warranted considerable ethical consideration, including information-giving and consent procedures
- Provided initial data indicating that the inclusion of anxiety as part of antenatal psychosocial assessment warranted further investigation
- Identified that existing local policies provide for current abuse, with staffing lacking confidence, training or resources to respond to historical abuse
- Identified areas for further research (including the need for greater attention to acceptability in the main study and issues surrounding the introduction of the Whooley questions)
- Demonstrated the value of a pilot study, particularly in applied research and an area likely to involve clinical safeguarding procedures
- Facilitated collaboration with staff and service users in the early stages of the research

The contribution and limitations of the pilot study are revisited in Chapter 4.
Chapter 4. ARMS main study: Methods

This chapter presents the methods for the main study; including exploration of the sample characteristics for both the full sample (Study Part 1) and the sub-sample who took part in the qualitative research (Study Part 2). The methods were informed both by theory (described in Chapter 2, Methodology) and by experience with the pilot study. As described in the previous chapter, the pilot study assessed the feasibility of one aspect of Study Part 1, the completion of questionnaires at the booking visit. Alongside including some further questionnaire measures, Study Part 1 additionally involved data collection using health records. The pilot study informed the interview arrangements for Study Part 2 and identified further interview topics; the method itself was not piloted.

4.1 Design
The main study adopted a mixed methods prospective design. Study Part 1 adopted an observational prospective cohort study design and additionally provided a sampling framework for Study Part 2. All participants completed baseline antenatal psychosocial assessment (APA) questionnaires at one time point (the ‘booking visit’ or shortly afterwards) and their health records were accessed postnatally to collect pregnancy and delivery outcomes and documentation on mental health referrals. Study Part 2 participants took part in serial interviews across the perinatal period.

4.2 Setting and overview of local context, including structure of care
The research was conducted in a large, inner-city hospital. At the time of the pilot study the hospital had approximately 5,000 births per year, increasing to approximately 6,000 at the time of the main study due to reconfiguration of maternity services across local hospitals. As a teaching hospital with a thriving research environment, it has leaflets, stands and notice boards which advertise various projects, and research staff are invited to the clinical area.

The unit cares for women who are covered by different geographically-defined community midwifery teams. While all women attend for their ultrasound scans and (hospital) deliveries at the hospital, the team responsible for the booking appointment depends on i) the woman’s postcode and ii) the known need for specialist antenatal clinics.

16 The majority of statistical analyses were cross-sectional because the planned longitudinal analyses predicting distress (measured by the Whooley questions) were not possible (due to not being recorded by care providers, as described in Chapter 5) and those predicting pregnancy and delivery outcomes were not possible (due to the study lacking adequate statistical power).
Women who live centrally (determined by a postcode catchment area) are booked in the community with those attending the booking clinic coming from a wider geographical area. Some of these women have chosen the unit for their maternity care instead of a maternity unit local to where they live.

As a tertiary unit, care is also provided for women with high-risk pregnancies. Women with low-risk pregnancies are assigned to midwifery-led care whereas those with high-risk pregnancies receive either consultant-led shared care or consultant-led specialist care. Choice of pathway is often assigned at the booking visit; however, this can change (in either direction) during the pregnancy. Where the need for specialist care is known in advance of booking, the booking may be undertaken in specialist midwife clinics (e.g. serving young women (aged 19 or under at the due date), or those with a clinical need such as haematology, diabetes, cardiology) that provide antenatal care throughout the pregnancy. Recruitment was limited to women attending the routine booking clinic at the hospital, i.e. recruitment was not sought via bookings made at specialist clinics or in the community.

The current research also concerns local care pathways for women with mental health issues. Locally, a system is in place to refer women using a Special Circumstances Form (SCF) to a team of specialist midwives that specialise in care for women with additional psychosocial concerns, e.g. mental health, substance use, child protection and asylum seeker or refugee status. Depending on the speciality, these midwives may not provide the clinical care but rather facilitate access to additional services or be involved with wider tasks concerning Safeguarding. This is the case for the mental health role which, at the time of the study, reported receiving approximately 200 referrals each year, staffed by one midwife.

4.3 Materials
Administrative staff included the Postal Participant Information Sheet (Postal PIS) (Appendix 4.1) with appointment letters for the booking visit; a system established for the purpose of this study. Interested potential participants were provided at booking with the Booking Participant Information Sheet (Booking PIS) (Appendix 4.2), the contact details of relevant support organisations (Appendix 4.3), three copies of the consent form (Appendix 4.4), an optional form for providing their contact details (for the summary of findings and/or to express an interest in Study Part 2; Appendix 4.5), and a questionnaire pack (Appendix 4.6, described below under ‘Measures’). The two versions of the PIS for Study Part 1 (‘Postal PIS’ and ‘Booking PIS’) both contained the relevant study information, with minor variation to text tailored to the stage at which they were being used (i.e. postal or booking).
Materials for Study Part 2 included the original Participant Information Sheet (Interview PIS), one to accommodate the inclusion of postnatal interviews (Postnatal Interview PIS) and the two associated consent forms (Appendices 4.7-4.10).

4.4 Data collection instruments: Overview

As shown in Figure 4.1, whereas the pilot study was limited to the questionnaire pack, Study Part 1 used two main data sources: the questionnaire pack and the health records; both of which are described in detail below. A topic guide was developed for Study Part 2.

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**ARMS questionnaire**
- Symptom
  - EPDS*
  - STAI-S*
  - GAD-2*
- Risk
  - ANRQ*
- Current social support
  - MSSS*
- Desired social support
  - ‘help’ emotional
  - ‘help’ practical
- Coping style
  - Brief COPE*
- Adult attachment style
  - RQ*
- Attitude to pregnancy
  - Timing
  - Positive experience
- Maternal-fetal relationship
  - PAI* PRAM*
- Feedback form

*Validated measures

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**Health records**
- Handheld notes (HHN)
  - Whooley questions
  - Arroll ‘help’ question
  - Mental health history (including treatment)
  - Background characteristics
  - Obstetric history
  - Health history
  - Brief notes on appointments
  - Care plan
  - Birth plan
- Main (hospital) notes
- Antenatal notes
- Appointments
- Admissions
- Intrapartum notes
- Birth summary
- Correspondence (including GP)
- Referral forms (for mental health or psychosocial circumstances)
- Electronic systems (maternity, ultrasound, hospital appointments)

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Figure 4.1 Data sources informing Study Part 1
4.5 Data collection instruments: The health records proforma

As shown in Figure 4.1, which depicts the data sources informing Study Part 1, the health records comprised the handheld notes (HHN, also known as the Personal Maternity Record, or Pregnancy Notes) (Perinatal Institute, 2009a), the main (hospital) notes and the hospital electronic information systems. The proforma (Appendix 4.11) was primarily based on the nationally available HHN and the information reported in the birth summary.

Proforma items included demographic characteristics, obstetric history, health history, health-related behaviours (e.g. smoking, alcohol consumption), antenatal psychosocial assessment at booking (including depression case finding using the Whooley questions), referrals made, and outcomes concerning the pregnancy (e.g. live birth), delivery (e.g. mode of delivery), baby (e.g. Apgar scores describing the baby’s condition), and postnatal health behaviours (e.g. infant feeding and maternal smoking at discharge). As described in the data management plan (Appendix 4.12), the proforma was revised following initial inter-rater reliability checks and this revision was approved as a substantial ethics amendment. Of note, the proforma contained one instrument: the Whooley questions.

Whooley questions

The Whooley questions (Whooley, et al., 1997) ask about the same symptoms as does the PHQ-2 (Kroneke et al., 2003); i.e. ‘feeling down, depressed, or hopeless’ and ‘having little interest or pleasure in doing things’. The PHQ-2 offers an ultra-short version of the nine-item PHQ-9, which is based on the DSM-IV clinical interview (Kroenke, et al., 2001). The PHQ-9 was previously validated in an obstetrics-gynaecology sample in the USA (n=3000); however, while 37% of the total sample were pregnant or in the early postnatal period, demographics were not reported for the 149 women taking part in diagnostic interview, instead pooling the findings and simply reporting that the Receiver Operating Characteristics (ROC; i.e. performance of the PHQ-2 against interview) was ‘similar’ to that found in a larger primary care sample.

Data concerning perinatal samples is limited. A recent antenatal study (defined as less than 17 weeks gestation) conducted in the USA validated the PHQ-2 and PHQ-8 against diagnostic interview in a home-based setting and highlighted the large number of false positives and need for subsequent evaluation and clinical judgement (Smith, Gotman, Lin, & Yonkers, 2010).

Although containing the same symptoms, the Whooley questions differ from the PHQ-2 regarding timescale (past four weeks instead of past two weeks) and response format (dichotomous instead of ordinal four-point Likert scale). One study, also conducted in the USA, validated a ‘modified’ version of the PHQ-2 (which adopted a dichotomous format and a four-week timeframe, thus being consistent with the Whooley questions) against the
Edinburgh Postnatal Depression Scale (EPDS) (Murray & Cox, 1990) at 15 weeks gestation (n=414), 30 weeks gestation (n=334) and 6 to 16 weeks postnatal (n=193) (Bennett, et al., 2008). Both measures were self-completed. At 15 weeks gestation using the 12/13 EPDS threshold, and a positive response to either Whooley item, the study found sensitivity of 93.1% and specificity of 75.1% (positive predictive values = 44%, negative predictive value = 98%). Agreement between measures was comparable across timepoints (Bennett, et al., 2008). The addition of history of depression in conjunction with the Whooley items improved sensitivity (97.2%) but at the expense of specificity (61.1%), leading to more false positives.

To date, there is no published literature concerning the validation of the Whooley questions in combination with the Arroll ‘help’ question (Arroll, et al., 2003), and no studies concerning validation as part of routine antenatal assessment in the UK.

4.6 Data collection instruments: The questionnaire pack

The questionnaire contained eight pages of questions, presented in full in Appendix 4.6 and outlined in Figure 4.1 (data sources informing Study Part 1). It included the cover sheet (Appendix 4.6a), nine validated measures, three sets of items taken from existing questionnaires, or generated for the study, and a feedback form; described below. The pack was substantially revised following the pilot study as described in the previous chapter (‘Key revisions to the main study’).

Validated measures

All questionnaire items were chosen as being suitable for unassisted self-completion; consistent with the way in which the mental health assessment is completed locally using the handheld notes (HHN). Where possible, measures were chosen that had previously been used in a clinical setting and had been validated for use in the perinatal period; ideally, antenatally. None of the symptom measures offer clinical diagnosis, instead identifying possible caseness that would require further assessment using a full diagnostic clinical interview.

1. **State-Trait Anxiety Inventory** (Spielberger, et al., 1987) (see Appendix 4.6c).

The inventory is one of the most widely used measures of anxiety and has established psychometric properties. It comprises two subscales; the state subscale, used to assess current anxiety symptoms and the trait subscale, used to assess dispositional tendency. Each subscale comprises a 20-item self-report questionnaire, using a 4-point Likert scale (1-4) to elicit scores from 20-80. This research used the state subscale, rating symptoms ‘at this moment’ (e.g. ‘I feel calm’); hereafter referred to as the STAI-S. Higher scores indicate greater anxiety symptomatology.
The STAI-S was chosen in this study to enable comparison with the wider literature and because it has previously been validated against clinical diagnostic interview in the perinatal period. Antenatal validation is limited to the third trimester of pregnancy where a study with a sample size of 100 found that a score greater than 40 provided optimal prediction of correct clinical diagnosis of anxiety and therefore ‘41 or more’ (written 40/41) was recommended as a threshold for anxiety screening (Grant, et al., 2008). At this threshold, the researchers found that: “Of the 33 women who scored high in state anxiety, 17 (51.5%) met criteria for antenatal anxiety disorder, while 63 of the 67 (94.0%) women who scored low were non-cases.” (p.106, Grant et al., 2008). Although not validated, a cut-off of ‘45 or more’ (44/45) has also been used in previous pregnancy research, using the Portuguese version of the instrument (Teixeira, Figueiredo, Conde, Pacheco, & Costa, 2009).

2. GAD-2 (Kroenke, et al., 2007) (see Appendix 4.6d).

The GAD-2 is a two-item self-report measure rating frequency of anxiety symptoms in the last two weeks (score range 0-6) (Kroenke, et al., 2007). Both the GAD-2 and its seven-item parent tool (GAD-7) have been validated in a primary care population (n=965) as screening tools for anxiety disorders (including generalised anxiety disorder, panic disorder, social anxiety disorder, and posttraumatic stress disorder) (Kroenke, et al., 2007). Suggested thresholds for the GAD-2 were ‘2 or more’ (i.e. 1/2) and ‘3 or more’ (i.e. 2/3), with respective sensitivity and specificity for ‘any anxiety disorder’ being 86% and 70% for 1/2 compared with 65% and 88% for 2/3. The authors favour the latter threshold to reduce the number of false positives; a recommendation echoed in a recent systematic review (Kroenke, Spitzer, Williams, & Lowe, 2010; Kroenke, et al., 2007). Neither tool (GAD-2 or GAD-7) has been validated for the perinatal population.

The GAD-2 is considered the anxiety equivalent of the PHQ-2 (from which the Whooley questions were adapted) and it has been suggested that both the GAD-2 and PHQ-2 be asked together, described as the PHQ-4 (Löwe, et al., 2009), to screen for both anxiety and depression. The GAD-2 was included in Study Part 1 given the move towards such ultra-short instruments (Mitchell & Coyne, 2007), recognising that longer instruments (such as the STAI-S) are less suited to routine clinical practice.

3. Edinburgh Postnatal Depression Scale (EPDS) (Murray & Cox, 1990) (see Appendix 4.6e).

The EPDS is used by Health Visitors in several areas of the UK to detect symptoms suggestive of postnatal depression. The items were developed to avoid confounding with aspects of the postnatal period that were not indicators of mental health; for example by asking about sleeping difficulties related to emotional distress, rather than sleeping difficulties in general that could be attributable to caring for a newborn. The phrasing does
not however explicitly relate to the postnatal period and also has established psychometric integrity for the antenatal period (Adewuya, Ola, Dada, & Fasoto, 2006; Adouard, Glangeaud-Freudenthal, & Golse, 2005; Bunevicius, Kusminskas, Pop, Pedersen, & Bunevicius, 2009; Felice, Saliba, Grech, & Cox, 2006; Murray & Cox, 1990; Su, et al., 2007), although exact characteristics vary across settings and contexts (Gibson, et al., 2009).

The tool is a 10-item self-report measure rating depressive symptoms in the last seven days (e.g. 'I have felt sad or miserable') using a 4-point Likert scale (0-3). Higher scores indicate greater depression symptomatology (range 0-30). Thresholds of 12/13 and 9/10 respectively offer cut-offs for 'probable' depression (i.e. optimal prediction of major depression) and 'possible' depression (i.e. optimal prediction of minor or major depression), with the latter recommended for screening use in primary care; although it has been argued that a higher threshold (14/15) may be more appropriate in the antenatal (Cox & Holden, 2003). Recent research has presented findings for multiple thresholds to enable comparison with wider literature (Jomeen & Martin, 2004) given that the heterogeneity of validation studies has precluded a definitive threshold being adopted (Matthey, Henshaw, Elliott, & Barnett, 2006).

Consistent with combining symptom and risk-based assessment, the EPDS has been used in conjunction with different psychosocial risk tools by research and clinical groups (Edwards, Galletly, Semmler-Booth, & Dekker, 2008a, 2008b; Ingram & Taylor, 2007; Matthey, et al., 2004b; Priest, et al., 2008). In addition to being a recognised screening tool for perinatal depression, indicating the need for further assessment using a diagnostic clinical interview, it has been proposed that the EPDS may contain a three-item anxiety subscale (EPDS-3A; comprising items 3, 4 and 5 of the EPDS) (Brouwers, et al., 2001; Jomeen & Martin, 2005a; Pop, Komproe, & van Son, 1992; Ross, et al., 2003; Swalm, Brooks, Doherty, Nathan, & Jacques, 2010; Tuohy & McVey, 2008). The three items are: 'I have blamed myself unnecessarily when things went wrong' (item 3), 'I have been anxious or worried for no good reason' (item 4) and 'I have felt scared or panicky for no very good reason' (item 5).

**Previous findings on concurrent validation of the EPDS-3A**

Concurrent validation of the EPDS-3A has been studied through its relationship with i) clinical diagnosis of anxiety disorders, and ii) established self-report anxiety measures.

The former approach was adopted by two research groups in Australia. One study (n=238) treated the EPDS-3A as a case finding instrument, generating Receiving Operating Characteristics by comparing women with and without anxiety disorders at six weeks after birth (Matthey, 2008). A cut-off of 5/6 (i.e. six or more) provided optimal sensitivity (66.7%) and specificity (88.2%) with 13.4% mis-classified, leading the author to argue that the EPDS-3A may be used to detect (and thus screen for) anxiety disorders. However, despite the
women having been assessed for both anxiety and depressive disorders, and six of the 18 women with anxiety disorders also having depressive disorders, the author did not report data across different diagnostic classifications. In contrast, the other study (n=138), conducted up to one year after birth, compared mean EPDS-3A scores across different diagnoses and argued that the sub-scale may distinguish those with and without anxiety disorders, but fail to differentiate between anxiety and either depression, or co-morbidity (Rowe, et al., 2008). Critically, the EPDS-3A has not been validated against clinical diagnosis antenatally.

Validation against clinical diagnosis is the “gold standard” for establishing the sub-scale’s potential application as a case finding tool. Validation against existing self-report anxiety measures is also important because, in the absence of a validated perinatal anxiety tool, these are more likely than diagnostic interview to be the alternative to using the EPDS-3A. Validation of the continuous format is also important to inform the sub-scale’s potential for routine clinical monitoring of mental health.

Concurrent validation using anxiety measures has to date lacked comparability with mental health assessment at the booking visit, which is commonly in the first trimester. Additionally, validation has concerned non-English language versions of the measures. One antenatal study conducted in the Netherlands (n=197) found that the correlation between EPDS-3A and the STAI-S was weaker than the correlation between the original EPDS and the STAI-S (Brouwers, et al., 2001). Another study, conducted in Greece, concerned the postnatal period (n=235) and found that the strength of association between the STAI-S and original EPDS persisted after removing the three EPDS-3A items (i.e. correlating the remaining seven EPDS items) (Giakoumaki, Vasilaki, Lili, Skouroliakou, & Liosis, 2009).

As the only measure with enough evidence to comment on its suitability for a depression screening programme and recommended for further assessment and monitoring, the EPDS was chosen for this study to offer validation against the Whooley questions, to investigate the proposed anxiety subscale, and as part of the Psychosocial Risk Index (i.e. offering the ‘symptom-based’ measure to be used in conjunction with a ‘risk-based’ measure).

4. Antenatal Risk Questionnaire (ANRQ) (Austin, 2003) (see Appendix 4.6f).
The ANRQ is routinely used at the Royal Hospital for Women in Sydney, Australia, in conjunction with the EPDS to identify women exposed to psychosocial stressors and/or experiencing current psychological distress. Women's care pathways are then shaped according to their risk and symptom using the Psychosocial Risk Index (PRI) classifications: low, medR (high risk-low depression), medS (high depression-low risk), high (high on both). There, the ANRQ is completed at the initial antenatal appointment (12-18 weeks gestation) by self-report, clinician interview, or with an interpreter.
The ANRQ concerns psychosocial risk factors including early adversity (history of abuse and relationship with mother), mental health history, recent occurrence and impact of stresses, social support (current emotional support from partner and anticipated general support with baby), and personality factors (anxiety and obsessionality traits; taken from the Vulnerable Personality Style Questionnaire (Boyce et al., 2001)). The measure may be scored as underlying risk factors or a total score (ranging from 5-62) that may be further classified as low or high risk (based on a threshold of ‘24 or more’ (23/24) or ‘23 or more’ (Austin, 2006; Austin et al., 2008; Austin et al., 2011)). Its scoring is discussed further in Chapter 5.

The ANRQ is a shortened version of its parent measure, the Pregnancy Risk Questionnaire (PRQ) (Austin, et al., 2005). Validation studies of the ANRQ (n>2000) found similar properties to the PRQ in predicting postnatal depression (ANRQ: sensitivity = 62%; specificity = 64%; PPV = 30%) (Austin, personal communication in 2009; Austin et al., 2011).

Previous acceptability work (n=2,142) found that 1.8% of women reported feeling some distress with some questions (Priest, et al., 2008). The pilot study (Chapter 3) found that three women (4.7%) reported feeling some distress in relation to the ANRQ, citing that the abuse questions had ‘brought things back’. A further three women that disclosed physical or sexual abuse and two women that chose not to answer the question reported that they did not find the questionnaires distressing.

The ANRQ was modified for Study Part 1 in line with the PRQ to specify physical and sexual abuse ‘growing up’ (rather than ‘ever’). This was in response to the pilot study finding that local policy and procedures concerned routine enquiry for current abuse, rather than historical abuse; thus asking about any history of abuse, without specifying timescales, presented challenges for midwives responding to referrals in the clinic setting.

The ANRQ has previously been used in conjunction with the EPDS, combining risk and symptom based approaches in clinical practice and was therefore chosen in the current study as being consistent with the conceptualisation of maternal stress presented in the Introduction.

5. Maternity Social Support Scale (MSSS) (Webster, et al., 2000) (see Appendix 4.6g). The Maternity Social Support Scale is a 6-item self-report measure, which is routinely used as part of the initial antenatal appointment at the Royal Women’s Hospital in Brisbane, Australia. It was therefore chosen as a measure of current (perceived) support that is viewed as appropriate for clinical use.
Four items refer to partner support with one item each referring to family and friends. A five-point Likert scale is used (1-5); however items referring to partner support are scored 0 in the absence of a partner. The tool has previously been used to identify women that may benefit from additional social support, using a score of ≤24; scores <19 may be classed as very low support (Webster et al., 2000). In contrast to the other tools described above, it is lower scores that indicate ‘risk’.

6. Relationship Questionnaire (RQ) (Bartholomew & Horowitz, 1991) (see Appendix 4.6i).

The RQ is a widely used self-report measure of adult attachment style, which involves rating one’s own degree of correspondence with each of four descriptions of prototypical relationship styles on a 7-point scale. The RQ was chosen for the study because it has been used clinically in a mood disorders unit in recognition that adult attachment style may be of relevance to determining which interventions may work best with individual adult attachment styles (Wilhelm, 2009).

The four attachment styles are: secure (positive view of self and other), dismissing (positive self, negative other), fearful (negative self, negative other), and preoccupied (negative self, positive other). Responses can be used to classify according to four attachment styles (based on the highest assigned score, or respondent’s overall choice of style with which they most identify) or used to generate classification on two underlying dimensions; model of self and model of other (where model of self is calculated by ((secure plus dismissing) minus (fearful plus preoccupied)) and model of other is calculated by ((secure plus preoccupied) minus (fearful plus dismissing)) with higher scores representing more positive models of self and other).

7. Brief COPE (Carver, 1997) (see Appendix 4.6m).

The Brief COPE is a widely used measure of coping and has previously been used with pregnant populations. This 28-item tool (using a 4-point Likert rating, 1-4) contains 14 underlying subscales of different types of coping. Rather than generating a global coping score, the subscales (produced by summing the two subscale items) are compared in relation to other variables.

The Brief COPE may be used to measure dispositional coping style (i.e. trait) or situational coping strategy (i.e. state). Dispositional style was chosen in the current study to investigate personality characteristics that may influence support seeking and support acceptance in general, and because women were not being asked about a single specified stressor.

Measures of coping have generally been developed for research rather than clinical purposes, usually containing in excess of 40 items (Endler & Parker, 1990; Folkman & Lazarus, 1988). Such long instruments are potentially burdensome for participants and may
jeopardise participation. The Brief COPE was primarily chosen due to its relative brevity (despite containing 28 items), its inclusion of social support subscales (considered relevant to the research questions), and its previous use in pregnancy (De Tychey, et al., 2005; Honey, Morgan, & Bennett, 2003).

8. Measures of the Maternal-Fetal Relationship (MFR)
Two measures were used, the Prenatal Attachment Inventory (PAI, Appendix 4.6l) (Muller, 1993) and the Pictorial Representation of Attachment Measure (PRAM, Appendix 4.6k) (Van Bakel, Vreeswijk, & Maas, 2009) to explore MFR assessment in early pregnancy through the use of both verbal and non-verbal measures. Interpretation of the non-verbal measure was also explored in Study Part 2. Due to the considerable amount of data collected in the research and associated space constraints within the thesis, analysis of the MFR measures is not presented here.

Additional items

**Social support**
The questionnaire pack contained three additional social support items which were developed for the purpose of the study, in recognition that the validated social support measure (the MSSS) was limited to current (perceived) support. One support network question was added concerning household composition (‘Who you have around you’, see Appendix 4.6b). Two Arroll-style questions were added to investigate self-identified need for emotional support and practical support (i.e. desired support) (‘Social support’, see Appendix 4.6h).

**Attitude to pregnancy**
The remaining additional items (‘About your pregnancy’, see Appendix 4.6j) concerned gestational age (for use in the analyses pertaining to the maternal-fetal relationship) and attitude towards pregnancy.

In comparing the psychosocial risk measures, it was observed that one possible limitation of the chosen ANRQ was its omission of items concerning attitudes towards pregnancy, which were included in the ANRQ’s parent measure (the PRQ) due to the established relationship between attitude and postnatal depression (Beck, 2001; Robertson et al., 2004). Two items were therefore added which were taken from existing psychosocial stress measures.

The first was assessment of pregnancy intendedness, taken from the American College of Obstetricians and Gynecologists’ guidelines on screening for psychosocial stress (American College of Obstetricians and Gynecologists, 2006); the wording of which was altered.
following the pilot study (from ‘not at all’ to ‘no pregnancy at all’) due to lack of clarity. The second item involved rating the extent to which the pregnancy had been a positive experience (using a 5-point scale from ‘not at all’, to ‘very much’) taken from the PRQ (Austin, et al., 2005).

Feedback form
In light of the pilot study findings, the main study continued to monitor the acceptability (to the participants) of the research, using the feedback form (see Appendix 4.6n), the outcome of which is presented with the qualitative findings concerning acceptability. This form additionally monitored the information-giving procedures and provided the participants the opportunity to make any further comments.

4.7 Interview topic guide
The topic guide was developed through discussion with the supervisory team and an additional Health Psychologist, before being peer reviewed by an experienced social policy researcher.

The topic guide (Appendix 4.13) was designed to address the research questions presented in Chapter 2 (Methodology). The same guide was used across the different timepoints to revisit topics and explore how experiences, views and needs may change in pregnancy. The later interviews began with a recap of the previous discussion(s).

During the course of the interviews it was noted that when discussing the acceptability of APA, women drew on their experiences in the current pregnancy and previous perinatal episodes, and in discussing stress and mental health, women frequently relayed past mental health experiences. Additionally, themes raised by participants in earlier interviews were explored with different participants in later interviews; for example, support resources (including online resources, various classes and groups). The semi-structured approach enabled such flexibility concerning sequence of topics and unanticipated topics.

4.8 Data management and analysis
The data management plan for Study Part 1 is presented in Appendix 4.12 and quantitative data analysis is described in each corresponding section of the findings (Chapters 5 to 7).

The qualitative data were managed using a combination of NVivo and Excel software and analysed using Framework Analysis (Ritchie & Spencer, 1994; Ritchie, Spencer and O’Connor, 2003). Framework Analysis offers a systematic approach to qualitative analysis.
that facilitates demonstration of rigour. It is considered ideally suited to research that aims to generate recommendations of relevance to policy and practice; as such, it is increasingly used in applied research (Pope, Ziebland, & Mays, 2000). Framework Analysis was also considered consistent with the critical pragmatist approach and therefore amenable to synthesis with the quantitative findings. For these reasons, Framework Analysis was adopted here. Details of the stages involved and practical details of the analysis process are presented with the findings (Chapter 8).

4.9 Procedure

Participation in Study Part 1 involved completing the questionnaire pack whereas participation in Study Part 2 involved taking part in up to three interviews. The procedure for both sub-studies is illustrated in the study schema flowchart (Figure 4.2).

Approach

Administrative staff included the Postal PIS, containing written information outlining the aims, purpose, and nature of the study, with appointment letters for booking visits. The researcher had regular contact with the administrative staff throughout the research to replenish supplies and ensure that any new staff were fully briefed on the process.

The researcher (or a member of the clinical care team) approached women that were attending for booking visits either before or after the actual booking consultation to fit with the running of the antenatal clinic; increasingly occurring after the consultation following changes to clinical systems (discussed further under ‘Ethical considerations’). Before approach, the researcher checked with the midwives if they knew of any reason why it would not be appropriate to approach a woman (e.g. personal circumstances). Women were asked if they had received and read the Postal PIS and were interested in discussing the research study. The voluntary nature of the research was emphasised and that participation did not influence clinical care. Interested potential participants were given the Booking PIS and invited to take part; as described under ‘Ethical considerations’, this was restricted in the first 11 weeks to those having received the Postal PIS, after which point the option of postal participation was provided to ensure that all women could be approached while ensuring sufficient time to decide about taking part.

Study Part 1 participants were provided with information on Study Part 2 in the research pack and those interested in taking part provided their contact details to discuss further with the researcher.

Completion of questionnaires

Completion of the questionnaire pack took approximately 20-25 minutes. While most participants were observed to begin the questionnaire in the antenatal clinic, only 70.2% of
the women (134/191) finished and returned the questionnaire at this stage; with the remainder using the facility for postal return. The researcher checked participants’ responses and notified the clinical care team at the earliest opportunity where women disclosed any thoughts of self-harm in relation to the final question on the EPDS. This involved discussion with the clinic co-ordinator based on the midwifery desk in the antenatal clinic and completion of two copies of a memo (Appendix 4.14); one filed with the health records and one retained by the researcher and stored securely with the consent form.

All participants were given the opportunity to discuss any aspect of the research or raise any questions both before and after participation, either face-to-face in the clinic, or using the telephone and email contact details provided in the PIS and consent form. Participants were provided with a copy of the consent form, Booking PIS, and contact details of relevant support organisations to keep. The researcher filed one copy of the consent form with the health records (as is routinely done by research staff in the hospital) and another in the research department.

**Monitoring systems**

The researcher completed two logs: an anonymised monitoring log (Appendix 4.15) and an enrolment log (Appendix 4.16). The monitoring log was completed for all booking appointments, detailing approach, reasons for non-approach and whether a research pack had been taken. This served two purposes: facilitating the recruitment process (by documenting, for example, times when women had been approached, appointment times), and forming the basis of the Participant Flow diagram (Figure 4.3). The second log (enrolment log) contained details of all women consenting to take part. Separate monitoring and enrolment logs were completed for the qualitative element of the research (Appendix 4.17-4.18).

**Accessing health records**

Access was required approximately six weeks after delivery to allow time for the HHN (containing clinical records on APA) to be filed with the main hospital records, at which point pregnancy and delivery outcome data were also accessed. Although access occurred up to nine months following questionnaire completion, the participants were not required to take any action, with active participation limited to the questionnaire.

**Timing and location of interviews**

Interviews were planned for: i) within three weeks of booking (usually the early stage of the second trimester, between the dating and anomaly scans), ii) the late antenatal period (approximately 30-38 weeks gestation, although the early postnatal period was also included where necessary), iii) the early postnatal period (approximately six to eight weeks after delivery). Part 2 participants took part in up to three serial interviews and were in the study for up to nine months.
Consistent with women’s feedback in the pilot study, flexibility was prioritised and the lone worker policy designed to accommodate this. Flexibility extended to timing of interview (with respect to gestational age), appointment time and day, interview location, and method of communication for arranging the interview (e.g. telephone, text message, email). Stage of pregnancy and location of interviews is presented with the sample characteristics for Part 2).

**Arranging the interviews**
The researcher telephoned potential participants approximately 2-5 days after their participation in Study Part 1 to allow an interval between reading the Interview PIS and being approached to take part. The information presented in the Interview PIS was discussed and each woman was offered the opportunity to discuss any aspect of the research. A convenient time and location for the first interview was then arranged, held either in the woman’s home or the research suite at the hospital (or in one case, a private office at the woman’s workplace). Where interviews were arranged some time in advance (e.g. one week), a confirmation telephone call or text message was used 1-2 days before the scheduled interview to confirm that the woman would still like to take part and that the time and location remained convenient.

**Conducting the interviews**
Following informal introduction, consent procedures were followed before beginning the audio-recorded in-depth interview. Most interviews lasted approximately one hour (range 30 minutes to two hours)\(^1\).

After the interview, the participant was thanked and given the opportunity to discuss any aspect of the research or raise any questions. The participant was given a copy of the consent form and Interview PIS to keep, including contact details. Another copy of the consent form was filed with the health records and one retained in the research department. Any public transport or parking costs were reimbursed; however, no financial incentives were used for any element of the research.

**Subsequent interviews**
Participants were contacted at around 30 weeks to arrange time 2 interviews. Although interest had been established at time 1, women were reminded of the voluntary nature of participation. Procedures for time 1 and time 2 were similar, with the exception that verbal ongoing consent was sought at time 2. Participants were informed about the introduction of postnatal interviews and possibility of taking part, again emphasising the voluntary nature. All participants were interested and were contacted approximately six to eight weeks.

\(^{17}\) Further reflections on the interviews are presented in Chapter 8 (Study Part 2: Interview findings).
Postnatally and given the Postnatal Interview PIS. Postnatal interviews were conducted using the same procedure as before (and providing written consent using a postnatal form).

**Preparation and field notes**

Preparation for each interview involved checking the ARMS questionnaire responses, with particular attention to open-ended text comments (e.g. the ANRQ question on recent stresses and the feedback section). Preparation for time 2 and time 3 additionally involved reading the previous transcripts and the associated field notes (made following each interview). An example of the field notes is available in Appendix 4.19.
Figure 4.2 Study schema
4.10 Eligibility criteria

Study Part 1
Recruitment was limited to women attending the routine booking clinic at the hospital. Recruitment was not restricted by obstetric factors (e.g. nulliparity, singleton pregnancy) or type of care (e.g. midwifery-led care). Due to issues surrounding consent, the stipulated minimum age of participants was 16; however, due to not recruiting from bookings occurring at specialist clinics (including those for teenage pregnancy), all participants were aged over 19 at the time of delivery.

Participation was limited to those women able to provide written informed consent and complete English-language questionnaires unassisted, as indicated by unassisted completion of the Pregnancy Notes (handheld notes, HHN). This requirement of English literacy and comprehension excluded certain groups, explored further in the sample characteristics. Unfortunately this was unavoidable due to the research involving the use of questionnaire tools with established psychometric properties. Such properties do not apply when items are translated into other languages as there are also issues of meaning that are shaped by cultural and social factors. The requirement to be able to complete questionnaires unassisted also reflected the research setting. The antenatal clinic would not provide adequate privacy to complete the questionnaires by having the researcher read out the questions and the participant provide spoken answers (where English literacy concerned written English, rather than English language generally).

For the first 11 weeks of recruitment, participation was limited to those women who had received a Postal PIS in advance of the booking appointment. Following the approval of a substantial ethical amendment (described below), this was changed from week 12 to enable women to participate irrespective of whether a Postal PIS had been received in advance.

Study Part 2
As described in Chapter 2 (Methodology), Study Part 1 provided the sampling framework for Study Part 2. Women were only contacted if a) they provided telephone contact details to discuss participating in Study Part 2, and b) they scored above threshold on at least one of the following maternal stress measures used in the adapted PRI (Psychosocial Risk Index): anxiety (measured by the STAI-S or the GAD-2), depression (measured by the EPDS), or psychosocial risk (measured by the ANRQ). As acknowledged in Chapter 2 (Methodology), the aim was not to systematically explore trends across PRI classification but rather to
include participants that were likely to provide rich information about the research topic (Ritchie, Spencer, & O'Connor, 2003).

Not all of the 49 eligible women were approached as it was not possible or necessary to undertake this number of interviews (discussed below). As shown in Figure 4.3, approach was influenced by different factors, including researcher availability and attempting to access a range of views (e.g. by approaching women with different types of stresses listed on the ANRQ).

4.11 Sample size and saturation
Sample size for Study Part 1 was discussed in Chapter 3 (Pilot Study). It is common across many types of qualitative research for sample size to be guided by data saturation, that is, the point where additional data does not add any new insights (Glaser & Strauss, 1967). Determination of sample size using principles of data saturation is similarly recommended with Framework Analysis, advising that analysis is conducted alongside data collection to determine when no new information or themes are identified (Ritchie, Lewis, et al., 2003).

While it was not possible to predict how many interviews would be required before saturation occurred, a sample size of 20-25 was planned based on recommendations in the research methods literature (Charmaz, 2006; Green & Thorogood, 2009) and discussion with two experienced qualitative researchers who had undertaken Framework Analysis on a related topic (Furber, Garrod, Maloney, Lovell, & McGowan, 2009). Reflections on data saturation in the current study are returned to in Chapter 8.

4.12 Ethical approval and considerations
The research adhered to the same ethical principles as used in the pilot study (British Psychological Society, 2009; Department of Health, 2005). The Research Ethics Committee (REC) used in the pilot study no longer existed at the time of the main study, following reconfiguration of local committees. Instead, ethical approval was sought and obtained from the Greater Manchester East REC (REC reference: 10/H1013/12), and permissions granted from the Research and Development office at the hospital’s NHS Trust before data collection began. All subsequent ethical amendments followed this process. Five substantial ethical amendments were submitted and approved; four in relation to Study Part 1 and one in relation to Study Part 2. Details are available in Appendix 4.20.
Ethical considerations were fully explored in the pilot study (see Chapter 3). To avoid repetition, the considerations reported here concern the two fundamental differences between the pilot study and Study Part 1 and the considerations unique to Study Part 2.

**Study Part 1**

1. **First approach**
   The REC for the main study stipulated that women only be invited to take part if they had previously received the Postal PIS. In contrast, the REC for the pilot study had permitted that women may take part irrespective of whether they had previously received information about the research with their appointment letter provided that they had read the information at the appointment and were happy to take part. Postal participation was introduced in week 12 of recruitment, following a substantial ethical amendment (described below), enabling all women to be invited to participate.

2. **Use of health records**
   Questionnaire data was linked with health records, naturally requiring consent. Only one woman expressed concerns and decided not to participate on these grounds. Due to linking with health records, hospital numbers were required in Study Part 1; these were recorded, together with participant names, in the enrolment log and stored separately to all other data. All databases were encrypted and access restricted as for the pilot study. Data storage and retention adhered to local policies.

**Study Part 2**

In the absence of a qualitative supervisor (due to staff sickness of the initial supervisor before the current supervisor became involved), these considerations were informed by consultation with research midwives and two experienced qualitative researchers with backgrounds in Midwifery and Health Psychology, respectively offering valuable experience in Framework Analysis and provision of maternity care for vulnerable groups.

1. **Possible pregnancy outcomes: implications for arranging interviews and longitudinal participation**
   Using the details provided in Study Part 1, the researcher checked the electronic maternity system before contacting prospective Study Part 2 participants. No women were found to have experienced a perinatal loss (or other pregnancy complication) in this period (in which case the researcher would not have made contact); however one woman did experience a miscarriage between arranging the time1 interview and the planned interview date. The woman texted to inform of this and the researcher replied to express her condolences and to thank her for participating in the research.
The maternity information system was checked before initiating contact to arrange subsequent interviews; however, it was recognised that systems may not always be updated immediately. All contacts began with introduction and sensitively enquiring of the woman’s well-being before pursuing the conversation further.

The Interview PIS detailed that women were free to withdraw at any time without providing any reason and that in the event of a loss or complication, the woman would naturally not be expected to continue to take part, but would be welcome to continue if she wished. This was not ultimately applicable to any Part 2 participants but this approach was adopted in recognition that some women may welcome this opportunity rather than being treated differently to women who have experienced a healthy pregnancy.

2. Confidentiality with interviews
Audio recordings were password-protected and sent securely to the external transcription agency which was bound by a confidentiality agreement developed for use with the University of Manchester. Original recordings were destroyed following transcription. Transcriptions contained pseudonyms instead of names and places; however, the extent to which qualitative research can ensure anonymity is debatable. Participants were informed that they naturally would be likely to recognise themselves in descriptions or quotations; however others would not be able to identify them. Permission was obtained to use some occupation details (e.g. health professional, self-employed) where relevant to women’s expressed views.

3. Confidentiality and risk
Interview details were not discussed with the clinical care team; however, the researcher was obliged to disclose any information suggesting risk of harm to the woman or someone else (e.g. recent thoughts of self-harm, or current abuse; as stated in the Interview PIS and Postnatal Interview PIS). This action was necessary with one participant (Grace).

4. Risks to the participant and researcher
Discussing potentially sensitive topics inherently carries the possibility of distress, and may raise the individual’s self-awareness or salience of maternal stress. Participants were informed that they may choose to not answer any question or withdraw from the research at any time.

The researcher was also alert to visual, auditory and other cues indicating distress. No cues indicated the participant’s desire or need to stop interviewing; for example, there were no signs of excessive distress (e.g. uncontrolled crying or shaking). Furthermore, it was recognised that some participants may (and indeed did) exhibit signs of distress (e.g. Ruth, Hannah) that were reflective of their current mood, with empathic responses considered
more appropriate than stopping interviewing. In addition to being alert for cues indicating distress, the researcher was alert to instances where certain lines of conversation appeared less comfortable for participants, in which case the researcher changed the topic or direction of conversation where appropriate (e.g. Louise, Sarah).

The researcher did not provide any advice or information beyond her capabilities, instead encouraging the participant to contact a midwife or doctor (necessary twice, Hannah and Ruth) or making a clinical referral (necessary once, Grace). Contact details of health and social care organisations were routinely provided to all participants. The longitudinal element of the research also offered further opportunities for the participants to be debriefed.

The study setting carried potential risks with interviews taking place outside regular working hours and beyond the hospital premises, requiring a lone worker policy. The researcher had the facility to debrief with the academic supervisory team and the midwifery research coordinator.

4.13 Participant flow (Study Part 1)
The local unit scheduled approximately 70-80 booking appointments per week across nine routine booking clinics. Recruitment lasted six months (27 weeks), in which time the researcher attended 63.4% (154/243) routine booking clinics, involving 1161 booking appointments.

As shown in Figure 4.3, 72.0% (n=836) of women booked were approached to take part. There were five reasons for non-approach: lack of English literacy (9.3% of women booked); women being called for consultation before approach occurred, including instances where midwives forgot to explore approach (8.1%), the researcher being occupied with other participants (6.6%); approach not being appropriate due to women’s circumstances as determined by clinical staff, (2.2%), or to avoid over-burden by approach for multiple research studies (1.8%).

Active participation was limited to completion of the questionnaire. No information was recorded for women who did not return packs (n=269), which included women that may be considered ‘withdrawals’. Two women began questionnaire completion in clinic and then informed the researcher that they no longer wished to continue with the research. It is possible that some of the other women not returning the pack may have felt similarly.

Loss to follow-up (attrition) did not refer to participants dropping out of the study, but to their transferring their care elsewhere. Outcome data and HHN were unavailable for participants
that did not deliver at the hospital research site (19/191), which was either due to pregnancy loss (n=4), or transferring their care elsewhere (n=15). Of the women delivering at the research site (172/191), only four did not return their HHN. The ethics application did not include other sites and therefore information could not be obtained for women transferring their care.
Figure 4.3 Participant flow for Study Part 1

Due to book (n=1326)

- Not booked - non-attendance, scan result, or uncertainty about continuing pregnancy (n=165)

Booked (n=1161)

- Ineligible – not literate in English (n=108)
- Not approached - direct to midwife (n=94)
- Not approached - researcher time (n=77)
- Not approached – woman’s circumstances (n=25)
- Not approached - recruitment for other research (n=21)

Approached (n=836) (72.0% of women booked)

- Not invited due to no Postal Participant Information Sheet (wks 1-11) (n=148)
- Declined (not interested / not have time) (n=228)

Took pack (n=460) (39.6% of women booked)

- Did not return pack (n=269)

Returned pack (n=191) (16.5% of women booked)

- Referrals to clinical care team due to disclosure of thoughts of self-harm (n=6)
4.14 Sample characteristics (Study Part 1)

Descriptive statistics are reported for demographic (Table 4.1), obstetric (Table 4.2) and health characteristics (Table 4.3). Outcome data (e.g. mode of delivery) were not used in any analyses reported in the thesis but are available in Appendix 4.21.

Table 4.1 Demographic characteristics (n=191)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Variable</th>
<th>n for which data available</th>
<th>n (%) (for categorical data); mean (s.d.) or median (IQR) (for continuous data)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-demographic</td>
<td>Age in years</td>
<td>191</td>
<td>Mean 31.1 (5.3), range 19.8-46.9</td>
</tr>
<tr>
<td></td>
<td>Marital status</td>
<td>191</td>
<td>Married/Civil Partnered 116 (60.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Partner 58 (30.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Single 15 (7.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Separated 2 (1.0)</td>
</tr>
<tr>
<td></td>
<td>Resides with partner</td>
<td>171</td>
<td>Yes 159 (93.0)</td>
</tr>
<tr>
<td>Socio-cultural</td>
<td>British born</td>
<td>191</td>
<td>Yes 141 (73.8)</td>
</tr>
<tr>
<td></td>
<td>Ethnicity</td>
<td>190</td>
<td>European White 129 (67.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>White British 5 (2.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other 15 (7.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mixed/multiple ethnic groups</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>White Black Caribbean 3 (1.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other 2 (1.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Asian or Asian British</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Indian 9 (4.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pakistani 8 (4.2)</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>Bangladesh 1 (0.5)</td>
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<td></td>
<td></td>
<td></td>
<td>Chinese 4 (2.1)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Other 1 (0.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Black or Black British</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Black Caribbean 1 (0.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Black African 7 (3.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Any Other 5 (2.6)</td>
</tr>
<tr>
<td>Socio-economic</td>
<td>Index of Multiple Deprivation (centile)</td>
<td>191</td>
<td>Median 24.3 (26.9), range 2.9-81.6</td>
</tr>
<tr>
<td></td>
<td>Quintiles</td>
<td></td>
<td>1 (least deprived) 80 (41.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 59 (30.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 29 (15.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4 22 (11.5)</td>
</tr>
<tr>
<td>Domain</td>
<td>Variable</td>
<td>n for which data available</td>
<td>n (%) (for categorical data); mean (s.d.) or median (IQR) (for continuous data)</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------</td>
<td>-----------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Current pregnancy</td>
<td>Gestation in weeks (self-report)</td>
<td>185</td>
<td>Median 12.0 (4), range 7-38</td>
</tr>
<tr>
<td></td>
<td>Gestation in weeks (scan-based)</td>
<td>191</td>
<td>Median 12.0 (3), range 7-38</td>
</tr>
<tr>
<td></td>
<td>Trimester at booking</td>
<td>191</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; 144 (75.4) 2&lt;sup&gt;nd&lt;/sup&gt; 39 (20.4) 3&lt;sup&gt;rd&lt;/sup&gt; 8 (4.2)</td>
</tr>
<tr>
<td></td>
<td>Late booking (≥ 20 weeks)</td>
<td>191</td>
<td>Yes 14 (7.3)</td>
</tr>
<tr>
<td></td>
<td>Preferred pregnancy timing</td>
<td>184</td>
<td>Earlier 10 (5.4) Later 31 (16.8) No pregnancy 3 (1.6) No change 140 (76.1)</td>
</tr>
<tr>
<td></td>
<td>Assisted conception (current)</td>
<td>186</td>
<td>Yes 13 (7.0)</td>
</tr>
</tbody>
</table>

Note: IQR = inter-quartile range
| Type of antenatal care                           | 191 | Midwifery-led | 121 (63.4) |
|                                               |     | Consultant-led | 62 (32.5) |
|                                               |     | Consultant-led specialist | 8 (4.2) |

| Historical                                     | 191 | Median 1.0 (2), range 0-10 |
| Number of previous pregnancies                 |     | None | 71 (37.2) |
|                                               |     | One  | 55 (28.8) |
|                                               |     | Two  | 35 (18.3) |
|                                               |     | Three | 18 (9.4) |
|                                               |     | More than three | 12 (6.3) |

| Number of previous deliveries                  | 191 | Median 0.0 (1), range 0-8 |
|                                               |     | None | 111 (58.1) |
|                                               |     | One  | 53 (27.7) |
|                                               |     | Two  | 20 (10.5) |
|                                               |     | Three | 4 (2.1) |
|                                               |     | More than three | 3 (1.6) |

| Perinatal loss                                 | 191 | Median 0.0 (1), range 0-5 |
|                                               |     | None | 110 (57.6) |
|                                               |     | One  | 58 (30.4) |
|                                               |     | Two  | 13 (6.8) |
|                                               |     | Three | 5 (2.6) |
|                                               |     | More than three | 5 (2.6) |

| Loss in past year                             | 187 | Yes | 37 (18.8) |

| Previous CS                                   | 191 | Yes | 17 (8.9) |

| Previous 3rd or 4th degree perineum tear       | 191 | Yes | 7 (3.7) |

| Previous PPH                                   | 191 | Yes | 5 (2.6) |

| Previous baby below 10th birthweight centile   | 191 | Yes | 7 (3.7) |

| Previous preterm delivery                      | 191 | Yes | 6 (3.1) |

| Previous hypertension in pregnancy             | 191 | Yes | 10 (5.2) |

| Previous obstetric complication (other)        | 191 | Yes | 12 (6.3) |

Notes: IQR = inter-quartile range; CS = caesarean section; PPH = postpartum haemorrhage (blood loss exceeding 2500ml)
Table 4.3 Health characteristics (n=191)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Variable</th>
<th>n for which data available</th>
<th>n (%) (for categorical data); mean (s.d.) or median (IQR) (for continuous data)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health history (non-obstetric)</td>
<td>Neurological</td>
<td>191</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Musculoskeletal</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Endocrine metabolic</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Cardiovascular</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Respiratory</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Gastrointestinal</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Significant viral infection</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Haematological</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Dermatological</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Genitourinary(^{18})</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Gynaecology (excl. loss-related)</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Number of the above domains involved in health history</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>One</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Two</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Three</td>
</tr>
</tbody>
</table>

| Health behaviours              | Smoking                       | 179 | Smoked in past year | 44 (24.6) |
|                                |                               |     | Currently smokes    | 12        |
|                                |                               |     | Stopped before booking (post-conception) | 21 |
|                                |                               |     | Stopped before conception | 6 |
|                                |                               |     | Date stopped and current status not reported | 5 |

|                                | Any pre-pregnancy alcohol consumption | 160 | Yes | 83 (51.9) |
|                                | Any current alcohol consumption     | 184 | Yes | 12 (6.5)  |
|                                | BMI (kg/m\(^2\))                   | 188 | Median 24.2 (5.7), range 16.7-55.2 | 3 (1.6) |

\(^{18}\) One of the women with a gynaecological history also had genitourinary history, giving a total of 36 women having either reproductive or urinary complications. This excluded gynaecological procedures performed in relation to perinatal loss (e.g. following miscarriage).
<table>
<thead>
<tr>
<th>BMI in kg/m² (sub-sample 1st trimester, &lt;14 weeks)</th>
<th>Normal weight</th>
<th>Overweight</th>
<th>Obese</th>
</tr>
</thead>
<tbody>
<tr>
<td>143</td>
<td>105 (55.9)</td>
<td>48 (25.5)</td>
<td>32 (17.0)</td>
</tr>
</tbody>
</table>

Notes: IQR = inter-quartile range; BMI = Body Mass Index (classified using an international taxonomy) (World Health Organization, 2000)

**Socio-demographic and socio-cultural characteristics**

As reported in Table 4.1, the sample comprised 191 women, aged between 19 and 46 at booking, with a mean of 31.1 years (SD=5.3). The majority of women were British born (73.8%) and White British (67.9%). Most women described themselves as married, civil partnered, or partnered (91.1%). Of the 171 women who reported their household composition, 12 (7.0%) reported not living with a partner; including seven who were single, three who were partnered and two who were separated. A further four women reported being single but living with their partner, highlighting the difference between legal marital status and the nature of relationship.

**Socio-economic status**

Several measures were used as markers of socio-economic status, as shown in the proforma (Appendix 4.11). Postcodes were used to derive the Index of Multiple Deprivation (IMD) (Nobel, et al., 2008) using the Office of National Statistics census data and found that most women (72.8%) lived in the two least deprived quintiles in England.

The remaining indices were taken from the HHN: highest qualification (coded using the National Qualifications Framework) (Ofqual, 2009), maternal occupation and partner occupation (coded using the Standard Occupational Classification 2000) (Office for National Statistics, 2009), employment status, housing and entitlement to benefits.

Women often did not complete the measures concerning socio-economic factors, with the following rates of missing data: eligibility for benefits 67.5%, highest qualification 38.2%, employment 16.8%, and housing 15.2%.

The occupation data (not reported here) was found to contain too many categories for synthesis. The majority of those reporting employment status (n=159) was in paid
employment, either full-time (52.4%) or part-time (14.7%), with only 7.3% being full-time mothers. There was no apparent relationship between employment status and other socioeconomic indices.

Of those reporting housing (n=162), a one-way between-group ANOVA confirmed the expected IMD trend (F(2,158)=14.2, p<.001), whereby those renting (M=35.9, SD=20.2) or living with family or friends (M=44.7, SD=18.4) lived in significantly more deprived areas than those owning their own property (M=23.4, SD=15.9).

While less than one-third completed the item concerning entitlement to benefits, IMD scores found that those reporting entitlement lived in significantly more deprived areas (M=35.6, SD=19.9) than those that not entitled (M=25.4, SD=16.3; t(60)=2.22, p=.03). The magnitude of the difference in means was 10.2 centiles (95% CI: -19.41, -1.01).

Given that rates of further education (i.e. beyond secondary school) and higher education (i.e. university) were respectively 92.4% and 72.0% for the valid responses for highest qualification, non-completion is unlikely to have been random, suggesting biased results.

Those with higher education lived in significantly less deprived areas (M=23.3, SD=15.5) than those without (M=35.0, SD=17.6; t(116)=3.54, p=.001). The magnitude of the difference in means was 11.7 centiles (95% CI: 5.16, 18.27). Despite a similar trend (further education M=25.9, SD=17.0 vs. no further education M=34.2, SD=14.2), a statistically significant difference was not observed for further education (t(116)=0.16, p=.160).

In light of these comparisons for socio-economic indices, it was decided to use IMD for subsequent analyses.

**Health behaviours and associated characteristics**

Of the 179 women for whom smoking data was available, approximately one-quarter had smoked in the past year (n=44), including five who did not report current smoking status or a date of cessation. The majority of those stopping in the last year (21/33) had stopped during the pregnancy, before booking. Of the 12 women known to be current smokers, six reported 10 cigarettes per day, with the remainder reporting fewer. No women reported consuming more than two units of alcohol per week in pregnancy, with 12 (6.5%) reporting two or fewer.

Body Mass Index (BMI) was calculated for all participants and, in the absence of a formula for calculating BMI controlling for gestational age, also explored for the sub-sample of women in their first trimester (taken as a more accurate reflection of pre-pregnancy weight). Findings were comparable for the full sample and sub-sample, with over 40% of women being considered overweight or obese.
Obstetric factors and health histories

The sample comprised both nulliparas (58.1%) and multiparas (41.9%). Perinatal loss had been experienced by 42.4% of women who had previously been pregnant (including 36.0% of nulliparous women and 51.3% of multiparas). In total, 12.0% had experienced two or more losses and almost one-fifth of women had experienced a loss in the past year (18.8%).

Attitude to pregnancy timing was reported by 184 women, of which 41 women reported mistimed pregnancies (‘earlier’ or ‘later’, 22.3%). It was uncommon for women to reported unwanted pregnancies using the revised phrasing (‘no pregnancy at all’, 1.6%). Of the 13 women having assisted conception in the current pregnancy, three reported wanting earlier pregnancies, with 10 reporting no change. Of the 36 experiencing perinatal loss in the past year, one reported earlier, four later, and 31 no change. In contrast, of the 78 experiencing any perinatal loss, seven reported earlier, 14 later, 55 reported no change and two reported unwanted pregnancies.

Current gestational age ranged from 7 to 38 weeks with 60.7% booking at 12 weeks or earlier. Of the 14 women (7.3%) classified as ‘late’ bookers (defined in local guidelines as booking at 20 weeks or later), the majority (n=11) were late due to transferring their care from a different unit.

Type of care was recorded at booking only, at which point 63.4% of women were assigned to midwifery-led care (MLC). Women with a history of the following were not assigned to MLC: caesarean section, third or fourth degree tear of the perineum, major postpartum haemorrhage (>2500 ml blood loss), preterm delivery, or baby weighing below 10th centile for gestational age. Those with previous hypertension in pregnancy or other obstetric complications (e.g. gestational diabetes, admission of mother or baby to intensive care following delivery) could be assigned to any care pathway.

Health histories were coded by systems affected, under the guidance of a Consultant Obstetrician and Gynaecologist. The majority of women reported a health history affecting at least one domain (53.4%); histories were not coded for severity or potential risk to pregnancy.

4.14.1 Extent to which the sample was representative of the local population

No data was available for non-participants (due to ethical considerations) therefore it was not possible to estimate selection bias. To explore the extent to which the main study sample may be representative of the local population, two other data sources were considered: local maternity data and the pilot study sample.
1) Local maternity data

Local maternity data was obtained for all women booking at the local unit between June and December 2010, coinciding with the recruitment period (n=3892), with ARMS participants representing approximately five per cent of all bookings. As described previously, recruitment was limited to those women booked at the local unit, with inner-city women instead being booked in the community. Local maternity data was only available in a pooled format, combining the central women (booked in the community) and the non-central women (booked in the unit). The central population is a more typical inner-city population, known to contain greater levels of deprivation and higher rates of ethnic minority women; therefore, the pooled maternity data is likely to underestimate the extent to which the research sample represented the population booked at the hospital. Additionally, the pooled data included bookings taking place at specialist clinics, including the teenage pregnancy clinic; therefore analyses were also conducted where women aged below 20 at the time of delivery were excluded from the local maternity data.

Statistically significant differences were found for ethnicity, age and BMI. The most marked difference concerned ethnicity with approximately two-thirds of women in the ARMS sample being White British compared with only one-third in the local population, based on available data ($\chi^2(1, n=190) = 82.64, p<.001$). The lower BMI in the local maternity data appeared attributable to the lower BMI found in young women, with the difference no longer found when teenage pregnancies were excluded ($t(3823) = 1.20, p=.230$). In contrast, the lower age remained once teenage pregnancies were excluded ($t(3825) = 4.63, p<.001$). The difference in age was not attributable to ethnicity or teenage pregnancies, with a sub-group analysis restricted to White British women and excluding teenage pregnancies finding that ARMS participants were significantly older ($M=31.5, SD=5.1, n=129$) than the local population ($M=29.3, SD=5.5, n=999; t(169.7) = 4.56, p<.001$). Further details are available in Appendix 4.22.

2) Pilot sample data

The results comparing the pilot sample characteristics and main sample characteristics are available in Appendix 4.23.

There were no statistically significant differences found for the majority of sociodemographic, socioeconomic, and obstetric factors, with two exceptions. First, significantly fewer women resided with a partner in the pilot study (82.8%) than Study Part 1 (93.0%) ($\chi^2(1, n=235) = 4.36, p=.037$). Second, pre-pregnancy alcohol consumption was statistically significantly more common in the pilot study (78.1%) than Study Part 1 (51.9%) ($\chi^2(1, n=224) = 11.99, p=.001$), possibly reflecting different sources of data (respectively the research questionnaire and the clinical records). It was not possible to statistically compare the attitude to
pregnancy timing (due to there being too few cases in each category); however, following re-phrasing from ‘not at all’ to ‘no pregnancy at all’, the main study found that only 1.6% (n=3) reported unwanted pregnancies, compared with 14.3% (n=9) in the pilot study; supporting the interpretation in the pilot study that the original wording (‘not at all’) lacked clarity.

The two samples were also compared on measures of maternal stress, i.e. symptoms of psychological distress (measured by the EPDS and STAI-S) and psychosocial risk measures (measured by the ANRQ), with no statistically significant differences found.

4.15 Sample characteristics (Study Part 2)

As shown in Figure 4.4, of the 34 women approached, 22 took part in interviews, which represented approximately one in five (21.8%) of the women scoring high on at least one measure of maternal stress in Study Part 1. Participant characteristics are shown in Table 4.4. The only characteristics consistently known in advance of the interview were those contained in the questionnaire pack, i.e. recent stresses reported on the ANRQ and the PRI classification. The sample comprised five women who were high on risk only (Hannah, Eliza (by risk factors rather than score), Rebecca, Louise, Amanda), five high on symptom only (Abbie, Charlotte, Stephanie, Lauren, Natalie), and 12 high on both risk and symptom (the majority of which were high on both anxiety and depression). Two of the 15 women reporting recent stresses (ANRQ4) did not describe its nature; 7 reported pregnancy-specific stresses and 6 were non pregnancy-specific. Reference to obstetric history in the ANRQ provided the only information consistently known in advance of the interviews. Women’s current and past mental health were discussed in the interviews and are therefore presented with the qualitative findings (Chapter 8).

Gestational age ranged between 10 and 22 weeks at time 1 (median = 15) and between 28 and 36 weeks at time 2 (median = 33). Postnatal interviews took place between 7 and 13 weeks following delivery (median = 10) and were usually conducted in women’s homes (17/20) whereas antenatal interviews were equally balanced across home and hospital. Only 10 women chose the same location for all interviews.
Figure 4.4 Participant flow for Study Part 2

Participated in Study Part 1 (n=191)

High on ≥1 risk or symptom measure (n=101)

Interview interest:
Yes (n=49)
No (n=52)

Low on all risk and symptom measures (n=90)

Interview interest:
Yes (n=24)
No (n=66)

Eligible for approach for Part 2 (interviews) (n=49)

Not approached due to researcher time constraints (n=7)

Not approached due to similar characteristics to existing Part 2 participants (n=5)

Not approached due to participation after end of Part 2 enrolment (n=3)

Approached to take part (n=34)

No reply (n=3)

Woman declined (n=5)

Interview arranged but did not proceed (n=4)
(1 cancelled due to miscarriage; 3 did not attend, including 2 where forgot but not rearranged due to woman’s other commitments and 1 where no reply)

Interviewed (n=22)

time 1 only (n=1): time 2 declined due to participant's other commitments; time 3 arranged but did not proceed (participant did not attend and no reply to attempts at contact)

time 1 and time 3 (n=1): time 2 declined due to participant's other commitments

time 1 and time 2 (n=1): time 3 declined due to participant's other commitments

Interviewed at all three timepoints (n=19)
Table 4.4 Participant characteristics for Part 2 (n=22)

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Age</th>
<th>White</th>
<th>Employment</th>
<th>PRI</th>
<th>ANRQ stresses</th>
<th>Gravidity (n)</th>
<th>Parity (n)</th>
<th>Perinatal losses (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hannah</td>
<td>31</td>
<td>Yes</td>
<td>home</td>
<td>medR</td>
<td>&quot;mother attempted suicide and hospitalised since; house move and purchase&quot;</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Eliza</td>
<td>27</td>
<td>Yes</td>
<td>F/T (S-E)</td>
<td>low *</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rebecca</td>
<td>39</td>
<td>Yes</td>
<td>F/T</td>
<td>med**</td>
<td>&quot;miscarriage&quot;</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Louise</td>
<td>26</td>
<td>Yes</td>
<td>F/T (S-E)</td>
<td>med**</td>
<td>n/a</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Ruth</td>
<td>27</td>
<td>Yes</td>
<td>F/T</td>
<td>highAD</td>
<td>not reported (wrote &quot;ask me&quot; next to partner item)</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Abbie</td>
<td>34</td>
<td>Yes</td>
<td>sick</td>
<td>medSA</td>
<td>&quot;Pregnancy itself. Brought up lots of fears having had bad birth experience with first baby.&quot;</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Lena</td>
<td>32</td>
<td>No</td>
<td>F/T</td>
<td>highAD</td>
<td>&quot;house renovation; changes in job description&quot;</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Charlotte</td>
<td>31</td>
<td>Yes</td>
<td>F/T</td>
<td>med**</td>
<td>&quot;miscarriage&quot;</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Anne</td>
<td>36</td>
<td>Yes</td>
<td>F/T</td>
<td>highAD</td>
<td>&quot;work changes - have been off for 8 weeks with anxiety&quot;</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sarah</td>
<td>26</td>
<td>Yes</td>
<td>F/T</td>
<td>highAD</td>
<td>&quot;godmother and grandmother died&quot;</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Stephanie</td>
<td>37</td>
<td>Yes</td>
<td>P/T</td>
<td>medSA</td>
<td>&quot;miscarriage&quot;</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Lauren</td>
<td>26</td>
<td>Yes</td>
<td>F/T</td>
<td>med**</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Emily</td>
<td>31</td>
<td>Yes</td>
<td>F/T</td>
<td>highAD</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Name</td>
<td>Age</td>
<td>Employment</td>
<td>Hours</td>
<td>Risk</td>
<td>Comment</td>
<td>ANRQ</td>
<td>GAD</td>
<td>EPDS</td>
</tr>
<tr>
<td>--------</td>
<td>-----</td>
<td>------------</td>
<td>-------</td>
<td>------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------</td>
<td>-----</td>
<td>------</td>
</tr>
<tr>
<td>Rania</td>
<td>30</td>
<td>No</td>
<td>P/T</td>
<td>high</td>
<td>&quot;previous pregnancy had complications which led to us interrupting the pregnancy hence previous stress [i.e. ANRQ2](^2)&quot;</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Amanda</td>
<td>37</td>
<td>Yes</td>
<td>F/T</td>
<td>med</td>
<td>&quot;miscarriage&quot;</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Natalie</td>
<td>30</td>
<td>Yes</td>
<td>F/T</td>
<td>med</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Michelle</td>
<td>31</td>
<td>Yes</td>
<td>carer</td>
<td>high</td>
<td>&quot;domestic violence from children's father&quot;</td>
<td>7</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Katie</td>
<td>35</td>
<td>No</td>
<td>F/T</td>
<td>high</td>
<td>&quot;miscarriage at 16 weeks&quot;</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Helen</td>
<td>37</td>
<td>Yes</td>
<td>P/T</td>
<td>high</td>
<td>n/a</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Dorothy</td>
<td>31</td>
<td>No</td>
<td>home</td>
<td>high</td>
<td>&quot;my partner left me with the kids&quot;</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Grace</td>
<td>37</td>
<td>No</td>
<td>P/T</td>
<td>high</td>
<td>&quot;will discuss it&quot;</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Jessica</td>
<td>28</td>
<td>Yes</td>
<td>sick</td>
<td>high</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes: F/T = full-time; P/T = part-time; S-E = self-employed; n/a = not applicable; * 'low' but near threshold on all measures (STAI-S 37, GAD-2 2, EPDS 9, ANRQ 22) and reported four ANRO risk factors (i.e. considered medR\(^{AD}\) if using the risk factor based classification); ** high\(^{A}\) but did not complete the EPDS; n = number; one participant also had a confidential termination of pregnancy documented in the notes but this was not discussed in interview and is therefore not shown.
4.16 Revisiting the contribution and limitations of the pilot study
As described in Chapter 3, the pilot study met all of its objectives. However, it was unable to pilot all aspects of Study Part 1, partly due to using different data collection sources and instruments in the main study and partly due to changes concerning the different ethics committees and changes to clinical systems. Thus, the pilot's contribution was limited with respect to participant flow and the research questions; described next.

A) Participant flow
Study Part 1 did not achieve the flow predicted by the pilot study. The pilot study (lasting four weeks and attending 26 clinics) averaged 16 participants per week (range of 7-22). Acknowledging the need to attend fewer clinics each week in the main study (e.g. due to qualitative research commitments), the main study was based on achieving 10-12 participants each week for 20 weeks. In contrast, the main study was found to recruit an average of seven participants per week (range 2-17, median = 6), despite attending an average of 6 clinics per week (range 2-9, median = 5).

Factors potentially compromising recruitment

1) First approach
The ethics committee for the main study made different stipulations concerning first approach (with 148/344 of the women approached in the first 11 weeks of recruitment unable to be invited due to reporting that they had not received the study information by post).

2) Change to clinical systems
The greatest change to clinical systems occurred at the start of week 12, from which point the appointment no longer routinely involved attending for the ultrasound dating scan followed by the booking consultation with the midwife; instead returning for the scan at a later date. This reduced waiting times at the booking clinic; the period where the majority of approach and participation occurred previously.

The clinical system also changed in more subtle ways that also had implications for recruitment. The pilot study spanned four weeks and included time at both the original and new hospital site (due to the hospital's relocation in the study period). By the time of the main study the following year, the facilities at the new site were being used differently; for example, women were asked to wait in different areas (which were larger and more open plan) and women were invited to use multiple exit routes for leaving the clinical area. This
was less manageable for one lone researcher, being one of the reasons for the increased rate of non-approach due to the researcher’s time (3/183 (1.6%) in the pilot study vs. 77/1161 (6.6%) in the main study). It also increased the need for a strong profile of the research, which was facilitated by a sustained presence in the clinic and partly reflected by the low rate of non-approach due to women going directly to the midwife (42/183 (23.0%) in the pilot study vs. 94/1161 (8.1%) in the main study).

3) Changes to the questionnaire pack
It is possible that the changes to the questionnaire pack may have deterred participation, both by being longer (requiring an additional five to 10 minutes) and containing potentially more abstract items that may have appeared to have less direct clinical application (e.g. adult attachment style and coping style). These potential barriers to participation were identified in advance and the length was partly off-set by accessing several sample characteristics from the health records.

Actions taken in response to the observed differences in participant flow

1) Introduction of postal completion
Firstly, postal completion was introduced (approved as a substantial ethics amendment) to provide an alternative to participation in clinic. In the first 11 weeks (before introducing postal completion alongside changes to the clinical systems), almost half of women approached could not be invited to take part due to reporting not having received the Postal PIS (148/344). If postal return had not been introduced, a similar proportion would have been affected in the remaining 16 weeks of recruitment (227/493). Almost one-third of the total sample returned questionnaires by post (57/191), which represented more than half of the sample recruited following introduction of postal completion (57/105).

Postal completion enabled women to be informed of the research and invited to participate despite not having received and read the postal information in advance (relevant to 227/493 of the women approached in weeks 12-27). This also enabled approach at the end of the consultation because women could take the pack away to consider taking part (another reason for the low rate of non-approach due to going directly to the midwife) and avoided the need for women to stay beyond their consultation to take part (given the reduced waiting times). Postal return occurred in 57 instances and non-returns were not followed up. The flexibility of postal return was observed to influence the participation of additional women who had not wished to commit to clinic completion and potential need to stay beyond their appointment but ultimately were able to complete at the clinic (e.g. due to the waiting time). The inclusion of postal completion was critical to obtaining the sample size but had resource implications, significantly increasing the administrative tasks of the researcher.
2) Increased duration and intensity of recruitment

The duration and intensity of recruitment was increased, attending a total of 154 clinics across 27 weeks, rather than the planned 80-100 across 20 weeks.

Although the ability of the pilot study to predict participant flow for the main study was therefore limited due to the reasons described above, its provision of a comparison dataset enabled the possible impact of these issues to be explored. Notably, the lack of differences between the sample characteristics for the pilot and Study Part 1 (described above) suggested that the changes to the questionnaire content and changes to participation (i.e. including postal completion) did not lead to sampling bias. Additionally, the similarity of the maternal stress measures indicated good reliability for observations concerning prevalence of maternal stress in the women taking part in research (although this may not extend to the wider population, as returned to in the discussion).

B) Research questions

Data collection using the health records was not originally planned when first designing the research project and therefore was not piloted. Its introduction responded to changing clinical practice, i.e. the introduction of the depression case finding Whooley questions as part of routine mental health assessment, combined with a lack of research in this area.

Including health records offered a longitudinal design within Study Part 1, which was highlighted as necessary following the academic review process. The longitudinal design was planned for the ability of the antenatal psychosocial assessment at booking (obtained via questionnaires) to predict the Whooley questions (completed across three timepoints) and the pregnancy and delivery outcomes (subject to sample size). Additional benefits included the ability to reduce the length of the questionnaire by instead obtaining several sample characteristics from the health records, the ability to obtain more detailed obstetric histories and the reduced burden of filing consent forms for administrative staff.

As discussed in the next chapter, the handheld notes (HHN) were ultimately found not to contain Whooley data across multiple timepoints, meaning that the planned longitudinal analyses could not be performed; an important finding in itself but one that could not be identified in advance due to this data source not being piloted. Additionally, the lack of piloting meant that the proforma and associated database contained some variables that ultimately were not used and required further revision.
4.17 Overview of the chapters presenting the findings

The methods having been described, the next chapters present the analyses, performed to answer the research questions presented in Chapter 2 (Methodology).

The findings from Study Part 1 are presented as three chapters (Chapters 5-7), reflecting the data sources on which they are based: i) the ARMS questionnaire pack, ii) the health records, and iii) comparisons across both. The health records included the handheld notes (HHN), hospital records and electronic information systems. Both the questionnaire pack and HHN mental health assessment were completed by participants at booking; however, the HHN were accessed postnatally once returned to the health records. The findings from Study Part 2 are presented in Chapter 8 together with synthesis across both studies.

Summary of Chapter 4

- Study Part 1 adopted similar methods to the pilot study, with the addition of some further measures and inclusion of an additional data source, i.e. the health records.
- Participation rates were lower than anticipated, for reasons not predicted by the pilot study.
- The applied nature of the research necessitated a continually responsive approach, requiring ethical amendments to revise the planned methods.
- Comparison with local maternity data indicated the research sample may not have been representative of the local population, reflecting inherent bias in research methods that require unassisted English language completion; however, this bias may have been inflated by lacking a dataset offering direct comparison with those attending the hospital-based routine booking clinics.
- Despite the introduction of postal completion, the sample characteristics for the pilot study and Study Part 1 were comparable; indicating good reliability.
Chapter 5. Antenatal Psychosocial Assessment using the ARMS questionnaire pack

Overview of chapter
The chapter is presented as five sections. 5.A begins with describing the distributions of the symptom-based measures adopted in the questionnaire and explores how common ‘high’ levels of maternal stress are in the sample, as measured by symptom. Next, the underlying constructs of the distress symptoms are explored using factor analytical techniques.

Section 5.B explores how common ‘high’ levels of maternal stress are in the sample, as measured by risk. Next, in 5.C, the Psychosocial Risk Index (PRI) is applied to highlight potential resource implications of adopting such an approach to antenatal psychosocial assessment (APA) - i.e. using symptom and risk in combination - with the local population. These findings are then compared with data reported elsewhere at a hospital where the PRI is used to shape care pathways for preventing postnatal depression. Finally, the potential implications of introducing anxiety within an adapted PRI are considered.

Potential implications for resources are considered further in 5.D by comparing women’s self-identified need or desire for additional support with PRI-identified. Personality attributes (specifically adult attachment style and coping style) that may influence potential uptake of social support interventions are also investigated.

Finally, in 5.E, the wider sociodemographic, obstetric and psychosocial risk correlates of symptoms are explored, initially using univariate analyses and then multivariate regression analyses.
5.A Assessing symptom

Symptoms of distress were assessed using one measure of depression (the Edinburgh Postnatal Depression Scale, EPDS) and two measures of anxiety (the State Trait Anxiety Inventory, STAI-S, and the 2-item Generalised Anxiety Disorder measure, GAD-2).

5.A.1 Classification of 'high depression' and 'high anxiety'

| Research Question A1: How common are symptoms of antenatal psychological distress in the local sample? |

Distributions of scores on each measure are presented in Table 5.1, summarising both the total scores and classification of 'high' depression or anxiety, which were based on recommended thresholds and tertile splits (i.e. the top third of women within the sample). A summary is available in Appendix 5.1 of the preliminary analyses that were conducted to inform the suitability of further statistical tests using the total scores.

Using the EPDS, approximately one in four women (28.0%) displayed possible depression, of which approximately half (13.2%) were classed probable depression, using established thresholds of 9/10 (i.e. ‘10 or more’) and 12/13 respectively (Cox & Holden, 2003; Murray & Cox, 1990). At the highest suggested threshold (14/15; Cox & Holden, 2003), ‘high depression’ reduced to just 7.9%. All recommended thresholds were more conservative than the tertile split (8/9; 33.3%).

For STAI-S, the upper tertile for this sample (39/40) was comparable with the recommended threshold (40/41; Grant et al., 2008) with 32.1% and 29.9% respectively classified as ‘high anxiety’. This reduced from one in three women to one in five women using the higher recommended threshold (44/45; Teixeira et al., 2009).

Due to the limited range of possible GAD-2 scores, the proportion of women classified as ‘high’ approximately halved with each increasing point on the threshold (threshold 1/2: 45.5%; 2/3 20.3%; 3/4 10.7%; 4/5 5.3%). Additionally, the upper tertile (which was consistent with the 2/3 threshold) represented the ‘top fifth’ rather than the ‘top third’ of women. A threshold of 1/2 has been criticised for identifying too many false positives, favouring 2/3 in the general population (Kroenke, et al., 2010). Classifying half of the sample is unlikely to be informative in identifying ‘high anxiety’; therefore further analyses used the 2/3 threshold, which classified approximately one in five women as ‘high’. 
Comorbidity of high symptoms

Of the 54\textsuperscript{19} classified as ‘high’ anxiety based on the 40/41 STAI-S threshold, 37 (68.5\%) had co-occurring ‘high’ depression at the EPDS 9/10 threshold, reducing to 20 (37.0\%) at the EPDS 12/13 threshold. At the higher STAI-S threshold (44/45), 33 of the 39 women (84.6\%) classified as ‘high’ anxiety had co-occurring ‘high’ depression at the EPDS 9/10 threshold, compared with 19 (48.7\%) at the EPDS 12/13 threshold. Of the 37 classified as ‘high’ anxiety based on the 2/3 GAD-2 threshold, 28 (75.7\%) had co-occurring ‘high’ depression at the EPDS 9/10 threshold, reducing to 16 (43.4\%) at the EPDS 12/13 threshold.

\textsuperscript{19} EPDS data was missing for one participant therefore prevalence of comorbidity concerns one fewer participant than reported for anxiety data alone.
Table 5.1 Distribution of scores for symptom measures (questionnaire data) (n=191)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean (s.d.)</th>
<th>Median (IQR), range</th>
<th>Threshold</th>
<th>Proportion above threshold, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPDS</td>
<td>6.5 (5.1)</td>
<td>5.0 (8.0), 0-24</td>
<td>9/10 (minor/possible depression)</td>
<td>53 (28.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12/13 (major/probable depression)</td>
<td>25 (13.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14/15 (major/probable depression, higher threshold)</td>
<td>15 (7.9)</td>
</tr>
<tr>
<td>STAI-S</td>
<td>35.5 (10.9)</td>
<td>34.0 (16.0), 20-73</td>
<td>40/41</td>
<td>55 (29.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>44/45</td>
<td>40 (21.7)</td>
</tr>
<tr>
<td>GAD-2</td>
<td>1.6 (1.5)</td>
<td>1.0 (2.0), 0-6</td>
<td>1/2</td>
<td>85 (45.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2/3</td>
<td>38 (20.3)</td>
</tr>
</tbody>
</table>

Notes: IQR = inter-quartile range; threshold are written in the format 9/10 to denote, for example, ‘10 or more’
5.A.2 Comparing anxiety measures

Research Question A2: How consistent are the two adopted measures of anxiety symptoms (the STAI-S and the GAD-2) at identifying ‘high anxiety’ women?

The STAI-S and GAD-2 are designed to measure the same underlying construct, i.e. anxiety symptoms. Assessment of convergent validity (i.e. agreement between the two measures) using overall classification at the adopted thresholds (STAI-S 40/41 and GAD-2 2/3) showed that the women identified as high on both measures (n=26) represented approximately one-half of those identified using the STAI-S and approximately two-thirds of those using the GAD-2 (see Table 5.2), with disagreement in 22.0% of the sample.

Even with reduced disagreement (18.7%) at the higher STAI-S threshold (44/45) (see Table 5.2), one in five women were identified as ‘high anxiety’ on only one measure; therefore both measures were used in subsequent analyses. The relationship between STAI-S and GAD-2 were explored further factor analytic approaches, described next.

Table 5.2 Agreement between classification of ‘high anxiety’ using the STAI-S and GAD-2 at the recommended thresholds (n=182)

<table>
<thead>
<tr>
<th>Threshold</th>
<th>GAD-2 2/3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than 3 (n=144)</td>
</tr>
<tr>
<td>STAI-S</td>
<td>Less than 41 (n=128)</td>
</tr>
<tr>
<td>40/41</td>
<td>41 or more (n=54)</td>
</tr>
<tr>
<td>STAI-S</td>
<td>Less than 45 (n=142)</td>
</tr>
<tr>
<td>44/45</td>
<td>45 or more (n=40)</td>
</tr>
</tbody>
</table>
5.A.3 Underlying (latent) constructs of symptoms of antenatal psychological distress

Constructs are underlying psychological processes or characteristics; construct validity concerns whether tools measure what theory says they measure, and is therefore useful for considering theoretical and conceptual aspects of the research. The overarching research question of section 5.A.3 is one of the primary research questions:

Research Question A3: What are the adopted measures of anxiety and depression measuring (i.e. what are the underlying constructs)?

This section comprises sub-research questions that explore the underlying dimensions (i.e. ‘factors’) of the adopted symptom measures (EPDS, STAI-S, GAD-2; with particular emphasis on the proposed three-item anxiety subscale of the EPDS, ‘EPDS-3A’) and ways of validating these factors.

5.A.3.1 Underlying factor structures

Although high internal consistency was found for all symptom measures (as reported in Appendix 5.1, preliminary analyses), in itself this does not provide evidence of a unidimensional underlying construct (Grayson, 2004, cited in Field, 2005). Investigation of underlying dimensions instead requires factor analytic techniques.

Factor analysis: An introduction

Two different techniques are commonly referred to as factor analysis: Principal Components Analysis (PCA) and Factor Analysis (FA). PCA concerns data reduction and can be used to reduce a set of variables to fewer ‘components’ (confusingly, often also referred to as ‘factors’) that aim to represent the same data in a more manageable way; as such, it is an empirically-based approach. FA is more concerned with underlying factors that are viewed as representing constructs and, as such, is more concerned with theory (Tabachnick & Fidell, 2001).

The difference between PCA and FA theoretically is that, in PCA, the variables are viewed as “causing” (i.e. producing) the components which are simply aggregates of correlated variables, whereas in FA, the factors are viewed as “causing” the variables, i.e. “the underlying construct (the factor) is what produces scores on the variables” (p.585) (Tabachnick & Fidell, 2001). To illustrate using the example of EPDS-3A, with PCA, the anxiety component describes the collection of variables; whereas with FA, the anxiety
component is viewed as representing an underlying construct (e.g. anxiety) that produces the scores on the EPDS-3A items.

The difference mathematically between PCA and FA is in the variance that is analysed whereby, for PCA, all variance is analysed, but for FA, only shared variance is analysed (i.e. variance common to the variables) to attempt to estimate variance due to error and variance due to the variable (for further explanation, see Tabachnick and Fidell, 2001).

Both PCA and FA have the same steps, as described by Tabachnick and Fidell (p.583, 2001):

1) ‘selecting and measuring a set of variables’ (e.g. 10 EPDS items);
2) ‘preparing the correlation matrix’ (e.g. perform preliminary checks using the matrix prepared in the statistical software to confirm adequate inter-correlations);
3) ‘extracting a set of factors from the correlation matrix’ (this is performed by the statistical software);
4) ‘determining the number of factors’ (the challenge is to avoid underextraction of components (i.e. loss of information) or overextraction (i.e. inclusion of spurious components); this involves judgement, but is most commonly informed by two approaches: i) extracting the number of factors with Eigenvalues > 1\(^20\), or ii) extracting the number of factors above the point of inflexion (i.e. the ‘elbow’) in the scree plot\(^21\). Alternatively, the number may be based on previous literature.);
5) ‘(probably) rotating the factors to increase interpretability’ (using oblique or orthogonal rotation, depending on the assumed independence of the underlying constructs, whereby oblique assumes independence);
6) ‘interpreting the results’ (i.e. interpreting factors based on the combination of variables that correlate highly (i.e. have high factor loadings) with that factor).

PCA and FA are seen as employing a relatively subjective and iterative process; for example, interpretability is considered alongside deciding the number of factors to extract. The derived factors cannot be tested per se, but can be explored through construct validity (returned to in 5.A.3.2).

Research Question A3 a): What are the underlying factor structures of the adopted measures of anxiety and depression?

\(^{20}\)Kaiser’s criterion (Kaiser 1960, cited in Field, 2005) recommends this cut-off as indicating that a factor explains more variance in the data than does a single variable.

\(^{21}\)The scree plot shows the variance explained by each factor. Extracting the number of factors above the ‘elbow’ identifies those before a substantial decrease in Eigenvalue, i.e. those factors explaining the greatest proportion of variance (Cattell 1966b, cited in Field, 2005).
Within this, a key research sub-question was:

Research Question A3 b): Is there evidence, using factor analytic approaches, to support the existence of an anxiety subscale of the EPDS (EPDS-3A)?

**Analyses performed**

Several factor analyses (both PCA and FA\(^{22}\)) were performed. These analyses examined: the anxiety measures (STAI-S only, then STAI-S and GAD-2; Table 5.3), the depression measure (EPDS only; Table 5.4), and, both anxiety and depression (EPDS and STAI-S, followed by EPDS and GAD-2; Table 5.5).

**Summary of findings**

1) FA of STAI-S
   - There was no evidence for a depression component of the STAI-S.
   - Irrespective of whether two or four factors were extracted, items loaded according to their scoring (i.e. whether or not they were reverse scored), suggesting that the factors reflect the valence of the items (Goodchild, Platts, Treharne, & Booth, 2005).

2) FA of STAI-S and GAD-2
   - The STAI-S may include different dimensions of the underlying construct (suggested by alternative factor structures); however, one of these (characterised by worry) may be common with the GAD-2.
   - Extracting two factors (as indicated by the scree plot) reflected the original factors found with FA of STAI-S only (i.e. the 10 reverse items loaded separately), with both GAD-2 items cross-loading on these two factors.
   - For the four-factor structure (indicated by the EigenValue criterion), both GAD-2 items loaded in a separate factor with four of the STAI-S items concerned with worry, nervousness and fear (I am presently worrying over possible misfortunes (item 7); I feel nervous (item 12); I am worried (item 17); I feel frightened (item 9)), where the highest loading STAI-S items were the two concerned with worry (items 7 and 17). The remaining STAI-S items loaded onto one factor comprising the reverse items, one factor indicative of tension and somatic aspects load together (I feel strained (item 4); I am tense (item 3); I am jittery (item 13)) and one factor whose

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\(^{22}\) Within FA, there is Exploratory FA (EFA), which involves similar procedures to PCA, but is about theory development and there is Confirmatory FA (CFA) (which is about theory testing and is more similar to structural equation modelling; for further discussion, see Tabachnick & Fidell, 2001). All FA analyses performed here used EFA.
items were not commonly endorsed (I feel confused (item 18); I feel indecisive (item 14); I feel content (item 6)).

3) FA of EPDS
- There was consistent evidence for the EPDS-3A subscale, based on factor analytic approaches.
- EPDS items 3,4,5 (EPDS-3A) consistently loaded together, regardless of the factor analytic technique, rotation method, or choice of number of factors to extract.\(^{23}\)
- Secondary analyses were performed excluding item 10 on the basis of its low communality\(^{24}\) and approaches used elsewhere, based on concerns that item 10 may be measuring something different (Brouwers, et al., 2001). This consistently produced a simpler two-factor model, indicated by both the EigenValue criterion and scree plot.
- As with STAI-S, positive valence items loaded together (EPDS items 1 and 2).

4) FA of EPDS and anxiety measures

a) FA of EPDS and STAI-S
- STAI-S and EPDS items did not load together, irrespective of the number of factors extracted.

b) FA of EPDS and GAD-2
- Items 3,4,5 (EPDS-3A) loaded with the GAD-2 items when extraction of factors adopted the EigenValue criterion, extracting two factors. When the scree plot informed extraction, the solution did not converge when all 10 EPDS items were included (extracting four factors), and GAD-2 loaded separately when EPDS item 10 was excluded (extracting three factors).
- In summary, the factor analyses suggested that, while there was no evidence of the STAI-S containing an underlying depression component, there was consistent evidence to support the EPDS-3A (based on the loading together of EPDS items 3,4,5); this was further supported by the relationship with GAD-2 items. Testing whether the chosen EPDS-3A solution provides evidence of an ‘anxiety’ component \textit{per se} requires further investigation of construct validity; presented next.

\(^{23}\) Multiple analyses were performed for EPDS (e.g. PCA and FA; oblique and orthogonal rotation) to allow comparison with existing literature, where multiple approaches have been used (as discussed by Jomeen & Martin, 2005). All oblique rotation used Oblimin and all orthogonal used Varimax.

\(^{24}\) The communality for item 10 was considerably lower than for the other items, i.e. the amount of variance in the item accounted for by the factors was much smaller (approximately 30%), indicating that item 10 may be ‘measuring something different from the scale as a whole’ (p.98) (Pallant, 2007).
Table 5.3 Summary of Factor Analyses performed for combinations of anxiety measures (STAI-S and GAD-2)

<table>
<thead>
<tr>
<th>Measures</th>
<th>Number of factors extracted</th>
<th>Reason for number of factors</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAI-S (n=168)</td>
<td>4</td>
<td>EigenValue</td>
<td>No indication of ‘depression’ subscale. Reverse items (n=10) load together. Remaining 10 items spread across three factors.</td>
</tr>
<tr>
<td>STAI-S (n=168)</td>
<td>2</td>
<td>scree plot</td>
<td>No indication of ‘depression’ subscale. Reverse items load together. Others load together.</td>
</tr>
<tr>
<td>STAI-S and GAD-2 (n=165)</td>
<td>4</td>
<td>EigenValue</td>
<td>Both GAD-2 items load with four STAI-S items: I am presently worrying over possible misfortunes (item 7); I feel nervous (item 12); I am worried (item 17); I feel frightened (item 9). Three STAI-S items concerning tension and somatic aspects load together: I feel strained (item 4); I am tense (item 3); I am jittery (item 13). Three STAI-S items that are not commonly endorsed load together: I feel confused (item 18); I feel indecisive (item 14); I feel content (item 6). Reverse STAI-S items load together.</td>
</tr>
<tr>
<td>STAI-S and GAD-2 (n=165)</td>
<td>2 (or 4, reported above)</td>
<td>scree plot</td>
<td>2-factor: Reverse STAI-S items load together. Other STAI-S items load together. GAD-2 items crossload on both factors.</td>
</tr>
</tbody>
</table>

Notes: All factor analyses used oblique rotation
Table 5.4 Summary of Principal Components Analyses and Factor Analyses performed for the depression measure (EPDS; 10 items, then 9 items) (n=188)

<table>
<thead>
<tr>
<th>EPDS items</th>
<th>PCA or EFA</th>
<th>Rotation</th>
<th>Number of factors extracted</th>
<th>Reason for number of factors</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>PCA</td>
<td>Oblique</td>
<td>2</td>
<td>EigenValue</td>
<td>3,4,5,6,7</td>
<td>1,2,10</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>PCA</td>
<td>Orthogonal</td>
<td>2</td>
<td>EigenValue</td>
<td>3,4,5</td>
<td>1,2,10</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>PCA</td>
<td>Oblique</td>
<td>1 or 3</td>
<td>scree plot</td>
<td>3,4,5</td>
<td>1,2</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>PCA</td>
<td>Orthogonal</td>
<td>1 or 3</td>
<td>scree plot</td>
<td>3,4,5</td>
<td>2 (1 low crossload on F3)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>EFA</td>
<td>Oblique</td>
<td>2</td>
<td>EigenValue</td>
<td>1,2,9 (10 loading &lt;.4)</td>
<td>3,4,5</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>EFA</td>
<td>Orthogonal</td>
<td>2</td>
<td>EigenValue</td>
<td>3,4,5</td>
<td>1,2 (10 loading &lt;.4)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>EFA</td>
<td>Oblique</td>
<td>1 or 3</td>
<td>scree plot</td>
<td>3,4,5</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>EFA</td>
<td>Orthogonal</td>
<td>1 or 3</td>
<td>scree plot</td>
<td>3,4,5</td>
<td>2</td>
<td>10*</td>
</tr>
<tr>
<td>9</td>
<td>PCA</td>
<td>Oblique</td>
<td>2</td>
<td>both</td>
<td>3,4,5</td>
<td>1,2</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>PCA</td>
<td>Orthogonal</td>
<td>2</td>
<td>both</td>
<td>3,4,5</td>
<td>1,2</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>EFA</td>
<td>Oblique</td>
<td>2</td>
<td>both</td>
<td>3,4,5</td>
<td>1,2,9</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>EFA</td>
<td>Orthogonal</td>
<td>2</td>
<td>both</td>
<td>3,4,5</td>
<td>1,2</td>
<td>-</td>
</tr>
</tbody>
</table>

Notes: different rotations were used to enable comparison with the literature; * item 3 cross-loaded on factor 3 (i.e. loading with item 10) when deletion was pairwise (excluding the missing items only) rather than listwise (excluding any participant with missing data) – for all other analyses, the same structures were found for listwise and pairwise deletion; PCA = Principal Components Analysis; EFA = Exploratory Factor Analysis
Table 5.5 Summary of Factor Analyses for the depression measure (EPDS) in combination with anxiety measures (STAI-S and GAD-2)

<table>
<thead>
<tr>
<th>Measures</th>
<th>Number of factors extracted</th>
<th>Reason for number of factors</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPDS and STAI-S (n=167)</td>
<td>6</td>
<td>EigenValue</td>
<td>EPDS and STAI-S items do not load together.</td>
</tr>
<tr>
<td>EPDS and STAI-S (n=167)</td>
<td>3</td>
<td>scree plot</td>
<td>EPDS and STAI-S items do not load together.</td>
</tr>
<tr>
<td>EPDS and GAD-2 (n=186)</td>
<td>2</td>
<td>EigenValue</td>
<td>Both GAD-2 items load with EPDS items 3,4,5.</td>
</tr>
<tr>
<td>EPDS and GAD-2 (n=186)</td>
<td>1 or 4</td>
<td>scree plot</td>
<td>Solution does not converge for 4 factors.</td>
</tr>
<tr>
<td>EPDS and GAD-2 (excl. EPDS item 10) (n=186)</td>
<td>2</td>
<td>EigenValue</td>
<td>Both GAD-2 items load with EPDS items 3,4,5.</td>
</tr>
<tr>
<td>EPDS and GAD-2 (excl. EPDS item 10) (n=186)</td>
<td>1 or 3</td>
<td>scree plot</td>
<td>Both GAD-2 items load separately. EPDS items load as two factors (3,4,5 and 1,2).</td>
</tr>
</tbody>
</table>

Notes: All factor analyses used oblique rotation
Exploring construct validity of the chosen factors following FA (in this case, EPDS-3A) “seeks to demonstrate that scores on the latent variables (factors) covary with scores on other variables, or that scores on latent variables change with experimental conditions as predicted by theory.” (Tabachnick & Fidell, 2001). The authors further note that it is usually adequate to use the “quick and dirty” approach of “summing scores on variables that load highly on each factor” (p.626) (Tabachnick & Fidell, 2001), rather than calculating factor scores.

To this end, assessment of convergent validity tested the extent to which the EPDS-3A (calculated by summing the scores for items 3,4,5) correlated with the anxiety measures (STAI-S and GAD-2). Additionally, content validity was investigated by examining whether the relationships between EPDS-3A scores and other constructs were consistent with the theory of EPDS-3A scores being a product of anxiety rather than, for example, self-esteem or self-criticism (as suggested elsewhere, in noting that the three items seem to concern “subjective, negative judgement about the feeling” (p. 662) (Brouwers, et al., 2001)). For this, the ANRQ item concerning trait anxiety (tendency to worry, ANRQ5) was used, together with two items likely to be related to self-criticism (the BriefCOPE self-blame subscale, and the RQ adult attachment style of model of self).

**Convergent validity of EPDS-3A**

EPDS-3A was found to have high internal consistency (Cronbach’s alpha = .785, inter-item correlation = .549). Scatterplots indicated strongly positive bivariate correlations between all measures, which bivariate correlation coefficients confirmed as large effect sizes (Cohen, 1992) (details are available in Appendix 5.2). However, EPDS-3A was less strongly correlated than the total EPDS scores with anxiety measures (EPDS-3A: STAI-S r(183)=.600, p<.001; GAD-2 r(185)=.625, p<.001; EPDS total: STAI-S r(183)= .689, p<.001; GAD-2 r(185)=.686, p<.001). Moreover, EPDS total scores were more strongly correlated with anxiety measures than the relationship between the two measures (STAI-S and GAD-2: r(182)=.608, p <.001).

**Content validity of EPDS-3A**

As shown in Table 5.6, EPDS-3A scores were less strongly correlated than the EPDS total scores with any of the measures investigated. Thus, bivariate correlations concerning
content validity did not provide support for EPDS-3A scores being reflective of either an anxiety component (investigated by relationship with ANRQ5) or a self-criticism dimension (investigated by relationship with Brief COPE self-blame and RQ model of self).

The findings presented previously did not present evidence to support the generation of factor scores for underlying constructs (e.g. of ‘pure’ anxiety symptoms and ‘pure’ depression symptoms that may underpin all three measures). Therefore, later exploration of the correlates of these symptoms (presented in 5.E) retained the measures in their original formats (i.e. EPDS, STAI-S, GAD-2) and included the EPDS-3A for further comparison.

Table 5.6 Bivariate correlations between total distress scores and variables identified as conceptually relevant for content validity (n=191)

<table>
<thead>
<tr>
<th></th>
<th>ANRQ5 tendency to worry</th>
<th>Brief COPE self-blame</th>
<th>RQ model of self</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPDS total</td>
<td>Pearson’s r</td>
<td>.542***</td>
<td>.473***</td>
</tr>
<tr>
<td>N</td>
<td>187</td>
<td>180</td>
<td>179</td>
</tr>
<tr>
<td>STAI-S total</td>
<td>Pearson’s r</td>
<td>.443***</td>
<td>.412***</td>
</tr>
<tr>
<td>N</td>
<td>182</td>
<td>176</td>
<td>175</td>
</tr>
<tr>
<td>GAD-2 total</td>
<td>Pearson’s r</td>
<td>.470***</td>
<td>.381***</td>
</tr>
<tr>
<td>N</td>
<td>184</td>
<td>177</td>
<td>176</td>
</tr>
<tr>
<td>EPDS-3A (items 3,4,5)</td>
<td>Pearson’s r</td>
<td>.493***</td>
<td>.401***</td>
</tr>
<tr>
<td>N</td>
<td>186</td>
<td>179</td>
<td>178</td>
</tr>
</tbody>
</table>

Notes: *** all p values <.001 (two-tailed)
5.B Assessing risk – underlying risk factors, overall classification and content analysis of stressors

As described under Measures (Chapter 4), the ANRQ comprises 12 underlying risk factors that may be considered individually or used to derive a total score of psychosocial risk, which may be further classified as ‘high risk’ or ‘low risk’ based on recommended thresholds. The ANRQ additionally asks women to describe recent stresses, changes, or losses (risk factor 6, item ANRQ4a) and collects information on mental health treatment history. Treatment history includes the nature of professional help sought (i.e. psychological or ‘talking’ interventions; ANRQ2c) and previous use of pharmacological treatment or herbal medicine (ANRQ2d). Details concerning mental health treatment history are reported in Chapter 7 when comparing the data from the ARMS questionnaire and health records on this topic.

Summary of Section 5.A Assessing symptom

- Approximately 1 in 4 women were classed as high depression at the lower EPDS threshold, halving to approximately 1 in 8 at the higher threshold.
- Almost 1 in 3 women were classed as high anxiety at the lower STAI-S threshold, reducing to 1 in 5 at the higher threshold.
- Approximately 1 in 5 women were above the threshold recommended for the two-item GAD-2 in the general population.
- Fewer than half of the women identified as high anxiety were identified on both anxiety measures (i.e. STAI-S and GAD-2).
- Factor analytic techniques found that STAI-S and GAD-2 may both be tapping a dimension of anxiety, characterised by worry, and STAI may be tapping some additional aspects concerned with tension and somatic aspects.
- There was evidence that items 3,4,5 of the EPDS (EPDS-3A) loaded together; however investigation of convergent and content validity of the EPDS-3A did not provide evidence for these items representing an anxiety component per se, or the suggested alternative of self-criticism.
- In light of the findings, all of the measures were retained in their original formats for further analyses (5.E), rather than producing factor scores for underlying anxiety and depression components.
This section provides a description of the prevalence of underlying risk factors and overall ‘high risk’ classification for this sample, followed by content analysis of the recent stresses risk factor (ANRQ4a); the coding of which is relevant to subsequent analyses (5.E).

5.B.1 Underlying risk factors

Presence of the 12 underlying risk factors was determined using existing criteria (Priest, 2006), as reported in Table 5.7, and proportions compared with hypothesised values from the Australian sample (Priest, 2006; Priest, et al., 2008) using the chi-square goodness-of-fit test. There was no statistically significant difference between proportions for the majority of risk factors (n=8), with the remaining (n=4) all being more common in the ARMS sample.

The least common risk factors in both samples concerned social support (risk factors 5 and 10), with only approximately 1 in 20 women scoring above-threshold (both samples). Anxiety (risk factor 8, n=49) and obsessionality traits (risk factor 9, n=49) co-occurred in 22 women (11.7%) in the ARMS sample. Of note, these ‘personality’ risk factors were significantly more common in the ARMS sample (risk factor 8: \( \chi^2 (1, n= 188) = 9.82, p= .002 \); risk factor 9: \( \chi^2 (1, n= 189) = 33.24, p< .001 \)), possibly reflecting cultural differences.

Early adversity (risk factors 1, 11, 12) was similar in both populations. The majority of women disclosing either emotional abuse (n=13) or physical and/or sexual abuse (n=12) reported both risk factors (n=7).25

The most common risk factors in both samples were history of anxiety or depression symptoms lasting at least two weeks (risk factor 2) and stresses, losses, or changes (risk factor 6, item ANRQ4a) with each reported by approximately 2 in 5 women. Markedly fewer participants reported above-threshold impact (risk factor 3: approximately 1 in 5; risk factor 7: approximately 1 in 3) yet, unlike the occurrence factors, the impact factors were both significantly more common in the ARMS sample than the Australian sample (risk factor 3: \( \chi^2 (1, n= 185) = 9.82, p= .002 \); risk factor 7: \( \chi^2 (1, n= 185) = 28.57, p< .001 \)).

25 Of note, 12 women who filled out the ANRQ did not provide complete responses for the abuse items. Issues of acceptability are returned to with the qualitative findings (Chapter 8).
<table>
<thead>
<tr>
<th>Risk factor</th>
<th>ANRQ Item</th>
<th>Content of item</th>
<th>Criterion for risk factor (Priest, 2006)</th>
<th>N (%) scoring as risk factor presence [ARMS study]</th>
<th>N (%) scoring as risk factor presence [Priest, 2006]</th>
<th>Chi-square (goodness-of-fit) comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Emotionally supported by mother in childhood</td>
<td>≥4</td>
<td>21 (11.2)</td>
<td>248 (11.7)</td>
<td>0.05</td>
</tr>
<tr>
<td>2a</td>
<td>2a</td>
<td>History of anxiety or depression symptoms for at least two weeks</td>
<td>Yes</td>
<td>84 (45.4)</td>
<td>821 (38.5)</td>
<td>3.73</td>
</tr>
<tr>
<td>2b</td>
<td>2b</td>
<td>Extent to which mood impaired functioning</td>
<td>≥4</td>
<td>40 (21.6)</td>
<td>294 (13.7)</td>
<td>9.82</td>
</tr>
<tr>
<td>2c</td>
<td>2c</td>
<td>Sought professional help (and type)</td>
<td>Yes</td>
<td>44 (23.8)</td>
<td>430 (20.1)</td>
<td>1.56</td>
</tr>
<tr>
<td>n/a</td>
<td>2d</td>
<td>Took tablets or herbal medicine</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Emotionally supportive relationship with partner</td>
<td>≥4</td>
<td>12 (6.5)</td>
<td>82 (3.9)</td>
<td>3.23</td>
</tr>
<tr>
<td>4a</td>
<td>4a</td>
<td>Stresses, changes or losses in previous 12 months (and description)</td>
<td>Yes</td>
<td>77 (41.4)</td>
<td>857 (40.2)</td>
<td>0.11</td>
</tr>
<tr>
<td>4b</td>
<td>4b</td>
<td>Impact of stresses</td>
<td>≥4</td>
<td>56 (30.3)</td>
<td>336 (15.9)</td>
<td>28.57</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Tendency to worry</td>
<td>≥4</td>
<td>49 (26.1)</td>
<td>371 (17.4)</td>
<td>9.82</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Need for order</td>
<td>≥4</td>
<td>49 (25.9)</td>
<td>261 (12.2)</td>
<td>33.24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>People to depend on for support with baby</td>
<td>≥4</td>
<td>7 (3.8)</td>
<td>88 (4.1)</td>
<td>0.08</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>------------------------------------------</td>
<td>----</td>
<td>---------</td>
<td>----------</td>
<td>------</td>
</tr>
<tr>
<td>10</td>
<td>7</td>
<td>History of emotional abuse</td>
<td>Yes</td>
<td>12 (6.6)</td>
<td>216 (10.1)</td>
<td>2.47</td>
</tr>
<tr>
<td>11</td>
<td>8a</td>
<td>History of physical and/or sexual abuse</td>
<td>Yes</td>
<td>13 (7.1)</td>
<td>236 (11.1)</td>
<td>2.89</td>
</tr>
</tbody>
</table>

Notes: p<.05*, p<.01**, p<.001***; n/a = not applicable; *risk factor 2 may be scored based on both ANRQ2a and additional mental health history documented in health records. The table reports presence based on ANRQ2a only (n=84) to offer comparison with the data available for the Australian sample; however, the total score was adjusted to include any additional women (n=4) with mental health histories documented in the notes (although this did influence not overall classification).
5.B.2 Classification of ‘high risk’

The upper tertile for this sample (24/25, i.e. ‘25 or more’) was near to the recommended threshold (23/24; Austin et al., 2008) with 33.5% and 35.1% respectively classified as ‘high risk’. On average, women reported two risk factors (range 0-12), with 31.4% (58/185) reporting more than three risk factors; the majority of which (n=53) were classified as ‘high risk’ based on the threshold. Further analyses are available in Appendix 5.3, exploring the changing guidelines for scoring the ANRQ.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean (s.d.)</th>
<th>Median (IQR), range</th>
<th>Threshold</th>
<th>Proportion above threshold, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANRQ (score) (n=185)</td>
<td>19.9 (10.8)</td>
<td>19.0 (18.0), 5-60</td>
<td>23/24</td>
<td>65 (35.1)</td>
</tr>
<tr>
<td>ANRQ (risk factors) (n=185)</td>
<td>2.5 (2.3)</td>
<td>2.0 (4.0), 0-12</td>
<td>3/4</td>
<td>58 (31.4)</td>
</tr>
</tbody>
</table>

Notes: IQR = inter-quartile range; thresholds are written in the format 23/24 to denote, for example, ‘24 or more’

5.B.3 Content analysis of recent stresses (ANRQ4a) and the decision to re-code occurrence and impact of recent stresses (ANRQ4a and ANRQ4b)

The coding of ANRQ4a is particularly important as it is the only question in the questionnaire pack that directly addresses sources of stress. Microsoft Excel was used to record responses to open-ended questions concerning recent stresses and feedback, summarised using basic content analysis. Although using textual data, content analysis was used as a quantitatively inclined analytical approach (Barry, 1998; MacMillan & McLachlan, 1999).

26 Women’s feedback is presented with the qualitative findings.
As shown in Table 5.7 (presence of risk factors), 77 out of 186 women responded ‘yes’ to ANRQ4a. (Of the five not responding, one recorded ‘prefer not to answer’, a further two completed all of the ANRQ except ANRQ4 and another two did not complete any of the ANRQ.) Due to one participant not rating the impact (ANRQ4b), instead writing “very much under control despite major changes”, both ANRQ4a and ANRQ4b risk factors were available for 185 women. However, a further three did not provide information on the nature of the stress, including two interview participants (one who wrote ‘will discuss it’ and another who wrote ‘ask me’ next to the partner risk factor). Multiple stresses were listed by 20 out of the 74 women who provided both ratings and descriptions (16 reporting two stresses; two reporting three; one each reporting four and five stresses).

Women provided a range of life events and forms of chronic stress (i.e. difficulties). Stresses were coded using a basic framework, shown in Table 5.9, which was devised in consultation with the academic supervisors and other local researchers. Of note, no participants listed stresses in both pregnancy-specific and other domains. The most common stresses were those concerning perinatal loss and those concerning ‘any household stress’, which encompassed domains of employment, finance or housing (partly because these were often mentioned together or difficult to disentangle, e.g. ‘redundancy’).

Of the 22 descriptions of perinatal loss, the majority stated miscarriage (n=15), multiple miscarriage (n=1), or ectopic pregnancy (n=1), sometimes stating need for gynaecological procedure. None of these included reference to gestational age. In contrast, three women experiencing mid-trimester losses (due to anomalies, either resulting in miscarriage or termination of pregnancy) all reported the number of weeks gestation. One woman reported ‘death of daughter’ (identified by notes as a neonatal death) with one other writing ‘lost baby’ (identified as miscarriage at 6 weeks).

Stresses that were not related directly to perinatal loss but were apparently pregnancy-specific were coded together. Although eight women reported such stresses, one woman reporting ‘threatened miscarriage’ in the current pregnancy had also listed a previous miscarriage and was therefore only coded as perinatal loss to avoid double coding, which would have implications for further analyses. The remaining seven included: infertility diagnosis, current high risk pregnancy, fears following a previous traumatic birth experience, previous postnatal depression and struggling to cope with the child, the prospect of ‘having a baby in the future’ (interpreted as meaning the prospect of motherhood, rather than delivery), and two women reporting a short birth gap with an older child (including one explicitly stating the current pregnancy was unplanned). Of these, the last four were considered to include aspects pertaining to stress concerning ‘parenting’.
Table 5.9 Summary of domains of stress reported

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency (n)</td>
<td>22</td>
<td>7</td>
<td>25</td>
<td>7</td>
<td>11</td>
<td>9</td>
</tr>
</tbody>
</table>

Research Sub-Question: Could the psychosocial stresses be rescored to investigate relationships between distress and different types of stresses?

In conducting the content analysis, a further sub-question was developed. It was recognised that, unless ANRQ4a is recoded by type of stress, there is confounding of ANRQ-based recent stresses (ANRQ4a and ANRQ4b) and ‘pregnancy/obstetric factors’ (e.g. perinatal loss) and some stresses would, in effect, be counted twice in multivariate analyses. Content analysis of ANRQ4a therefore offered both description of women’s psychosocial circumstances and creation of variables for use in statistical analyses (as reported in the subsequent regression analyses, section 5.E).

A scoring system was developed for scoring 4a as sub-types of stressors by grouping as pregnancy-specific or not pregnancy-specific, using either i) ‘periloss’ (any perinatal loss, i.e. column 1 in Table 5.9), or ii) ‘anypreg’ (i.e. columns 1 and 2 combined). From a statistical point, the frequencies of these risk factors after recoding still offered an adequate sample size for the planned analyses and exploring possible relationships with different types of stress.

The pregnancy-specific stresses were more commonly found to have had significant impact (i.e. scored >3 on ANRQ4b) than were the non pregnancy-specific stresses (34/51 vs. 20/22 for classification by perinatal loss, or 30/44 vs. 24/29 for classification by any pregnancy-specific stress).
5.C Using the tools in combination to create risk classifications: The original and the adapted Psychosocial Risk Index (PRI)

Having presented the distributions of the underpinning measures, findings using the PRI are presented, both in the original PRI format (and in comparison with the Australian sample) and the adapted format (exploring the introduction of anxiety with attention to differences found with different anxiety measures).

5.C.1 The Original PRI

Research Question A7: Using the Psychosocial Risk Index (PRI) classification system proposed by Priest (2006), is there a significant difference in the proportions of women assigned to symptom- and risk-based classifications in the current Manchester sample, as compared with the proportions reported in a previous Australian study (Priest, 2006)?

Summary of Section 5.B Assessing risk

- Proportions of women with the underlying risk factors in the ARMS study were comparable with those reported elsewhere; however, factors concerning personality, impact of previous altered mood, and impact of recent stress were more common in the ARMS study.
- Approximately 1 in 3 women were classified as ‘high’ on the ANRQ, consistent with previous research.
- Women reported a range of life events and chronic difficulties. Perinatal loss was the single most reported stress; however women reported stresses across many different domains.
- A basic coding framework for non pregnancy-specific stress and pregnancy-specific stress was used to inform further statistical analyses (5.E).
As shown in Table 5.10, PRI classification was generated using contingency tables of dichotomised (high-low) measures of depression symptoms (both for EPDS threshold of 9/10 and 12/13) and psychosocial risk factors. A pictorial description of how the PRI was derived is presented below in section 5.C.2, in discussion of the adapted PRI.

5.C.1.1 Comparison with the Australian sample
Comparison with the Australian sample required the 12/13 EPDS threshold. Table 5.10 shows that both samples shared the same trend whereby the most common categories were low, medR, high; medS was the least common. This highlighted that it was uncommon to present with high depression symptoms in the absence of high risk.

Although sharing the same overall trend, chi-square goodness-of-fit indicated there was a statistically significant difference in the proportion of participants assigned to each PRI category in the current sample as compared with the proportions obtained in the Australian study reported by Priest (2006), \( \chi^2 (3, n=185) = 13.0, p=.005 \). The difference was due to the ARMS study having a smaller proportion of women classified as ‘low’ (60.8% vs. 70.6%) and a higher proportion classified as ‘medR’ (25.3% vs. 20.6%) and ‘high’ (9.7% vs. 5.3%), whereas proportions for ‘medS’ were similar (3.8% vs. 3.5%).

The reasons for these differences were that a higher proportion of women scored above threshold in the ARMS study for both risk (ANRQ) and symptom (EPDS). By summing the high and medR categories, it is apparent that the total proportion of ‘high’ ANRQ women in the ARMS study is more than one-third (35.5%) in contrast to only approximately one-quarter (25.9%) of the Australian sample (despite the latter being described as the ‘top third’ (Priest, 2006)). The higher ARMS proportion is consistent with the earlier observation that the only differences in proportions of individual risk factors, concerned four where the ARMS sample was significantly greater (as described previously, section 5.B.1). By summing the high and medS categories, it is observed that the total proportion of ‘high’ EPDS women (at the 12/13 threshold) is 13.5% in the ARMS sample compared with 8.8% in the Australian sample.

5.C.1.2 Comparison with the pilot (ARMS) sample
As described in Chapter 4, sample characteristics were similar for the pilot study and Study Part 1. The original PRI classifications for the main ARMS study (i.e. Study Part 1) and pilot study were compared to inform the extent to which these proportions may be representative of the local population and therefore generalisable.
Unlike the analysis involving the Australian sample, this analysis used the classification for the 9/10 EPDS threshold due to the pilot sample lacking adequate cell frequency at the 12/13 threshold (i.e. because no women were classified as medS in the pilot study at 12/13). A chi-square goodness-of-fit indicated there was no statistically significant difference in the proportion of participants assigned to each PRI category in the main ARMS sample as compared with the proportions obtained in the pilot ARMS sample, regardless of whether or not the classification was based on including the notes-based history of mental health in addition to the ANRO (excluding notes-based mental health: \( \chi^2 \) (3, n=186) = 5.5, p=.140; including: \( \chi^2 \) (3, n=186) = 5.8, p=.121).

5.C.2 The Adapted PRI

**Deriving the adapted PRI**

The adapted PRI was generated by introducing anxiety as a third criterion in conjunction with the ANRQ and EPDS. Anxiety was classified in three ways: i) using the STAI-S, ii) using the GAD-2, iii) using both the STAI-S and GAD-2 (i.e. where high constituted high on either or both measures).\(^{27}\)

Introducing anxiety meant that, rather than having four categories, there were eight possible combinations of low and high risk and symptom (presented in Table 5.10), which either could be considered separately or collapsed across the four original categories; the main difference being that the eight-category approach additionally illustrated the distribution of cases between anxiety and depression, revealing that high anxiety in the absence of high risk was more common than high depression in absence of high risk.

A graphical illustration of the PRI scoring is shown in Figure 5.1, using STAI-S as the example anxiety measure. The quadrants depict the original PRI classification, assigning classification based on low-high risk (ANRQ) and symptom (using the EPDS). The key illustrates how low-high scoring of anxiety (here, the STAI-S) was used to derived the adapted PRI.

The overall four-category classification changed for women to the left of the vertical reference line (low on EPDS) if they were high on anxiety (depicted by the green circles); they were re-classified either from: a) low to medSA (if below the horizontal reference line) or b) medR to highA (if above the line). Those who were low on anxiety (depicted by the blue

\(^{27}\)These three alternatives are respectively shown in the Adapted PRI section of Table 5.8 by the first two, middle two, and final two columns.
circles) and to the left of the vertical line (low on EPDS) remained in their original categories (low and med$^R$).

The overall four-category classification did not alter for women to the right of the vertical reference line (high on EPDS); however they were renamed, with ‘high’ and ‘med$^S$’ each being sub-divided into three categories, denoted by the following superscripts: A (high anxiety), D (high depression), AD (high anxiety and depression, shown by green circles to the right of the vertical line).

Figure 5.1 Illustration of how the Psychosocial Risk Index (PRI) is derived
Table 5.10 Proportion of women classified according to psychosocial risk, depression and anxiety (n=185)

<table>
<thead>
<tr>
<th>Original PRI classification (Priest, 2006)</th>
<th>Adapted PRI (ARMS, including anxiety, measured by STAI-S and/or GAD-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>Risk (ANRQ)</td>
</tr>
<tr>
<td>high</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>medR</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>low</td>
<td>X X</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

✓ scoring above threshold ('high' on measure)
X scoring below threshold ('low' on measure)

high (high on risk and ≥1 symptom measure)
highAD high anxiety and depression (high on all three measures)
highD high depression
highA high anxiety

medR medium risk (high on risk and low on symptom)
medG medium symptom (low on risk and high on ≥1 symptom measure)
medGAD medium symptom anxiety and depression
medGD medium symptom depression
medGA medium symptom anxiety

low (low on risk and symptom)
Findings using the adapted PRI

Research Question A8: How are classifications using the Psychosocial Risk Index (PRI) classification system influenced by the introduction of anxiety in assessing ‘symptom’ (using two different measures of anxiety)?

Introducing anxiety identified additional women (Table 5.10) that would otherwise be ‘undetected’ or ‘misclassified’ using the original PRI.

Women otherwise ‘undetected’ were originally classified as low for both symptom and risk, but reclassified as med^SA due to being uniquely high on symptoms of anxiety. In the Study Part 1 sample, this applied to approximately one in 10 ‘low’ women (11/99^28), identified by the adapted PRI as potentially in need of additional support.

Women otherwise ‘misclassified’ women included three groups:

- i) those considered high on risk only (med^R), reclassified as high on risk and symptom (high^A); applicable in approximately one in four med^R women (8/33);
- ii) those considered high on depression only (med^S), reclassified as high on both types of symptom (med^AD); applicable in approximately three-quarters of med^S women (15/21);
- iii) those considered high on both risk and depression (high^D), reclassified as high on risk and both types of symptom (high^AD); observed in more than 90% of high^D women (29/32), highlighting that co-occurrence of anxiety and depression symptoms was more common in the presence of high risk (i.e. high^AD compared with med^SAD).

Although the adapted PRI ‘detected’ only an additional one in 10 otherwise low women, using either the original or adapted PRI identified approximately half of the sample as potentially in need of additional support (at the adopted thresholds). Recognising the potential resource implications (including the need to deploy limited resources appropriately), the next section compares the PRI-identified need with women’s self-identified need or desire for additional support.

^28 Figures reported here reflect the adapted PRI classification based on using both the STAI and GAD at the EPDS threshold of 9/10 (i.e. the penultimate column of Table 5.7).
5.D Self-identified need for additional support

This section compares self-identified need for additional support with the (adapted) PRI classification, before considering other factors that may influence self-identified need.

5.D.1 Comparing self-identified need and PRI-identified need

Research Question A9: How consistent is the classification of need based on the [adapted] Psychosocial Risk Index (PRI) and self-identified need or want for additional support?

Due to the exploratory element of this section, self-identified need was compared with the PRI scoring that identified the greatest proportion of women as being at-need, i.e. the
adapted PRI using the lower EPDS threshold (9/10) and anxiety based on both the STAI-S and GAD-2 (see Table 5.11).  

Women were asked the following questions in the ARMS questionnaire pack:

Do you feel you need or want more emotional support than you have? Yes No
Do you feel you need or want more practical support than you have? Yes No

Of the women for whom all measures were available (n=172), a total of 33 women reported ‘wanting or needing’ emotional support (n=17) or practical support (n=29), of which 39.4% (13/33) reported both. This was considerably fewer women reporting self-identified need (33/172) than the prevalence of need indicated by the adapted PRI (95/172). A chi-square goodness-of-fit test confirmed that the proportion of women identified as being at-need using the adapted PRI was statistically significantly greater than the proportion reporting self-identified need ($\chi^2 (1, n= 172) = 46.01, p< .001$).

Nearly three quarters (24/33) of the women with self-identified need were classified as ‘at-need’ using the PRI (i.e. not ‘low’). This represented approximately one in three of the women who were high on both risk and symptom (high), and approximately one in three of the women who were high on risk only (med$^R$), but only approximately one in eight of those who were high on symptom only (med$^S$).

Unfortunately, the small sample sizes across each category do not enable further comparison of proportions with self-identified need (i.e. wanting or needing emotional or practical support) across individual categories of PRI-identified need.

---

29 Other comparisons are available in Appendix 5.5.
Table 5.11 Comparing self-identified need and PRI-identified need (using the adapted PRI with EPDS 9/10 threshold and anxiety classified by either measure) (n=172)

<table>
<thead>
<tr>
<th>Original PRI category</th>
<th>Adapted PRI category</th>
<th>Adapted PRI sub-category</th>
<th>Risk (ANRO)</th>
<th>Depression (EPDS)</th>
<th>Anxiety (STAI-S/GAD-2)</th>
<th>total n</th>
<th>Type of support wanted or needed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Neither</td>
</tr>
<tr>
<td>high</td>
<td>high</td>
<td>high</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>28</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>high</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>high</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>med</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>25</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>med</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>low</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>low</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>low</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>77</td>
<td>68</td>
</tr>
<tr>
<td>total n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>172</td>
<td>139</td>
</tr>
</tbody>
</table>

Notes: PRI = Psychosocial Risk Index; proportions of each self-identified need category within each PRI-identified need category are not reported due to the small number in each
This section has considered comparison between PRI-identified need and self-identified. An alternative is to consider individual psychological (i.e. personality) factors that may be related to self-identified need; presented next.

5.D.2 Correlates of self-identified need: adult attachment style, coping style, and perceived social support

Research Question A10: What is the relationship between social support and personality?

Mann-Whitney U analyses were performed to compare median scores for adult attachment style, coping style and current perceived social support, for women who did and did not self-identify as needing or wanting emotional or practical support. A summary of the findings is presented in Table 5.12 (with full details available in Appendix 5.5).

**Adult attachment style (measured by the Relationship Questionnaire)**

Adult attachment style was found to be related to self-identified need for emotional, but not practical, support. Women who reported needing more emotional support had significantly lower scores for model of self (need: $Md = 2.0$, $n = 18$; do not need: $Md = 5.0$, $n = 159$; $U = 856.5$, $p = .005$) and model of other (need: $Md = -1.0$, $n = 18$; do not need: $Md = 2.0$, $n = 159$; $U = 894.5$, $p = .009$); both were small-medium effect sizes.

**Coping style (measured by the Brief COPE)**

The type of support (i.e. emotional or practical) that women identified needing was associated with less use of that type of support. Use of emotional support (as measured by the Brief COPE) was significantly lower in women reporting needing additional emotional support ($Md = 6.0$, $n = 18$) than those not needing additional emotional support ($Md = 7.0$, $n = 163$), $U = 877.0$, $p = .004$, $r = .22$ (indicating a small-medium effect size). In contrast, there was no statistically significant difference for use of practical support (as measured by the Brief COPE) ($p = .053$). Similarly, use of emotional support was no different for women reporting needing additional practical support ($Md = 6.0$, $n = 32$) than those not needing additional practical support ($Md = 6.0$, $n = 146$), $U = 1714.5$, $p = .016$, $r = .18$ (indicating a small-medium effect size).
**Perceived social support (measured by the ANRQ and Maternity Social Support Scale, MSSS)**

Women reporting self-identified need for more support (emotional or practical) reported statistically significant lower levels of current support, with medium effect sizes found across all support items (i.e. emotionally supportive partner, support with baby, supportive friends and supportive family), as shown in Table 5.12.

**Comparison of effect sizes with those of symptom and risk**

Relationships with symptom and risk measures were also calculated (see Table 5.12). Statistically significant higher levels of psychological distress symptoms and psychosocial risk were found for women reporting self-identified need for emotional support and for practical support, with one exception: GAD-2 scores were not significantly different for women needing practical support. Of note, despite measures of symptom and risk being the suggested ways for identifying support needs, the effect sizes (although small-medium) were comparable with those found for adult attachment style and coping style, and smaller than those found for the measures of current (perceived) support; this was particularly pronounced for self-identified practical support.
Table 5.12 Summary of comparisons for women who do and do not self-identify needing or wanting emotional or practical support, showing effect sizes for statistically significant differences

<table>
<thead>
<tr>
<th>Self-identified need</th>
<th>Adult Attachment Style</th>
<th>Coping style: tendency to use support</th>
<th>Current (perceived) social support</th>
<th>Psychological distress symptoms</th>
<th>Psychosocial risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Relationship Questionnaire (RQ) model of self</td>
<td>Brief COPE tendency to use emotional support</td>
<td>ANRO3 (emotionally supportive partner)</td>
<td>ANRC7 (support with baby)</td>
<td>Maternity Social Support Scale (MSSS) (supportive family)</td>
</tr>
<tr>
<td>Want/need emotional support</td>
<td>n 177 177 181 179 182 185 186 186 167 163 164 163</td>
<td>ES .21** .20** .22** n.s. (p=.053) .31*** .35*** .29*** .40*** .29*** .25** .24** .27***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Want/need practical support</td>
<td>n 16 176 180 178 181 184 185 185 184 188 181 180</td>
<td>ES n.s. (p=.052) n.s. (p=.233) n.s. (p=.172) .18* .27*** .33*** .36*** .27*** .21** .24** n.s. (p=.077) .19**</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: shading indicates statistical significance; n.s. = non-significant; p<.05*, p<.01**, p<.001***; effect sizes were calculated using the formula, r=z/√n. Guidelines consider .1 a small effect, .3 a medium effect and .5 a large effect (Cohen, 1988)
5.E Wider correlates of antenatal psychological distress symptoms

There is an abundance of literature on predictors of postnatal depression as a disorder (Beck, 2001; O’Hara & Swain, 1996; Robertson, et al., 2004) and a growing evidence base on predictors (often technically correlates) of antenatal depression symptoms (Lancaster, et al., 2010). In contrast, literature concerning anxiety in the perinatal period is largely limited to a recent reviewing concerning correlates of anxiety symptoms (Littleton, Breitkopf, & Berenson, 2007). Using a conceptual framework informed by previous research, section 5.E explores the wider correlates of both anxiety and depression symptoms, to inform possible pathways to maternal stress, as well as informing the relationship between anxiety and depression symptoms. Understanding maternal stress pathways could inform what interventions may be offered and the extent to which antenatal distress symptoms may be amenable to intervention and is therefore one of the primary research questions.

Summary of Section 5.D Self-identified need for support

- Fewer women identified themselves as wanting or needing additional support than were identified by the adapted PRI.
- Self-identification was more common in women who were high on risk (either with or without high symptom) than those who were high on symptom only.
- Some women not identified by the PRI (i.e. ‘low’ women) reported wanting or needing additional support.
- Personality attributes concerning coping style and adult attachment style may be associated with self-identified need.
- Current (perceived) social support was more associated with self-identified need than were the measures of symptoms and risk; this was particularly pronounced for emotional (rather than practical) support.
- The relationship between current (perceived) social support and self-identified need may partly explain why self-identification of need was more common in those who were high on risk, due to social support being a component of risk.
This section describes how the multivariate models were developed, informed by conceptual modelling and preliminary univariate analyses.

**Choice of multivariate analysis technique**

Multiple regression is used to explore the relationship between several predictors (which may be continuous or categorical) and one continuous criterion variable (in this case, EPDS, STAI-S, GAD-2 or EPDS-3A scores). Ideally, the criterion variable should be normally distributed. As described in Appendix 5.1 (preliminary analyses), parametric analyses were considered appropriate when using the distress scores as criterion (i.e. dependent) variables.

In standard (or simultaneous) regression, all predictors are entered simultaneously. The final model describes the unique variance in the criterion explained by each predictor and the total variance explained by the set of predictors. Hierarchical (or sequential) multiple regression is used to assess the contribution of certain variables after controlling for the effects of other variables. Unlike some types of regression (specifically, the different versions of stepwise regression), variables are entered in order of importance based on theoretical, rather than solely statistical, considerations (Field, 2005). Hierarchical regression is therefore appropriate here, with the conceptual modelling informed by the literature.

**Reducing the list of predictors and the use of alternative models**

Various models were run to determine the most parsimonious model that best described the data; that is, giving preference to models with fewer predictors, rather than risking ‘overfitting’ by including numerous predictors that fit the sample data well but are not generalisable (i.e. ‘ask[ing] too much from the available data’ (p.411) and being too ‘optimistic’ (p.419) about the model’s performance) (Babyak, 2004).

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30 The terminology of ‘correlates’ more accurately describes the relationships being explored due to the study design (which prohibits inferences of causality). The statistical terms predictor and criterion variables are favoured here over independent and dependent variables; however, it is acknowledged that while this may be an accurate description for the historical static factors (e.g. sociodemographic characteristics) it does not accurately describe variables such as current (perceived) social support.
A reduced list of predictors was produced using a combination of theoretical and statistical considerations. As part of conceptual modelling, variables were grouped into domains (e.g. social support, see Figure 5.2). Unlike the other instruments, the ANRQ encompasses multiple domains and the individual items were therefore allocated to relevant domains, rather than using the total score, number of risk factors, or overall classification.\(^{31}\)

Grouping all variables in this way, which was done with the approval of a statistician familiar with this study, was particularly important because different instruments were used to assess the same underlying constructs (e.g. assessing social support on the ANRQ and the MSSS, or obtaining mental health history through the ANRQ and health records); additionally, single instruments often contained multiple items on a related topic (e.g. on the ANRQ, mental health history included occurrence, impact, seeking professional help, and taking tablets/herbal medicine). The univariate analyses were then used to statistically inform the choice of variables within each (conceptually determined) domain.

**Univariate analyses performed**

Correlates of distress symptoms were explored using bivariate correlations (where both distress and the other variable were continuous, or at least ordinal) and independent samples t-tests (where mean distress scores were compared across two groups of a characteristic, e.g. those with and without a risk factor). The effect size (ES) statistic \(r\) was calculated for each test\(^{32}\), providing a standardised way to measure the strength of the association (rather than simply the statistical significance). This enabled comparisons to be drawn across variables to inform short listing within domains, using .2 (representing a small-medium effect size) as a guideline.\(^{33}\)

\(^{31}\)This approach was supported by a Principal Components Analysis of the ANRQ which was largely consistent with this classification, grouping as: mental health history, recent stress, historical stress/early adversity (emotionally supportive mother in childhood and historical abuse factors), and one factor comprising both social support (partner and support with baby) and personality variables. Further details are available in Appendix 5.7.

\(^{32}\)Given that Pearson’s correlation produces the ES statistic \(r\) (i.e. the correlation coefficient), \(ES = r\) was also calculated for the independent t-tests (using the formula \(r = \sqrt{(t^2 / (t^2 + df))}\), where \(df = (n \text{ for first group}) + (n \text{ for second group}) - 2\); p.302, Field, 2005).

\(^{33}\)A standard approach to statistically-informed reduction is to use a cut-off based on the statistical significance of the difference. Statistically-informed reduction commonly involves multiple tests which increases the likelihood of Type I errors (rejecting the null hypothesis where no difference exists). The \(p\) value could therefore be reduced to a more stringent criterion (e.g. \(p<.01\)); however, this increases the likelihood of Type II errors and reduces the power of the test to detect a difference. Therefore, it is common to adopt more liberal alpha levels (e.g. \(p<.20\)) than is commonly used in Null Hypothesis Significance Testing (i.e. \(p<.05\)) because the purpose is simply to create a shortlist for further analyses. Rather than using a criterion based on statistical significance, the current research used an effect size approach, recognising the limitations of \(p\)-values and Null Hypothesis Significance Testing (Clark-Carter, 1997). The magnitude of the ES \(r\) was based on established guidelines, with .1, .3 and .5 respectively considered small, medium and large ES (Cohen, 1988; 1992).
**Summary of findings for univariate analyses**

Many variables showed the same trend across all distress measures, reflecting the strong positive correlations of the EPDS, STAI-S, GAD-2 and EPDS-3A total scores. Therefore, the focus here is on areas of differences between measures (based on effect sizes), which are summarised in Table 5.13 (the full results are available in Appendix 5.7).

The most marked difference was found for socio-economic status (as measured by the Index of Multiple Deprivation, Nobel et al., 2008), which correlation analyses confirmed had a small to medium ES for EPDS and EPDS-3A (whereby those living in more deprived areas had higher EPDS and EPDS-3A scores) whereas there was no statistically significant relationship for STAI-S or GAD-2. Statistically significant differences in distress were consistently found for different levels of social support (irrespective of the social support measure used), i.e. women with lower levels of perceived social support reported higher levels of distress. This was observed across all distress measures and even the smallest ES (found with GAD-2 and STAI-S scores) were close to the chosen cut-off of .2 (sub-threshold ES between .168 and .189).

The size of the difference in distress levels for women with and without mental health and treatment history was greatest for EPDS and STAI-S, where large ES were observed for history that was based on health records. Obstetric factors concerning previous pregnancies and previous loss reached the chosen cut-off for GAD-2 only, whereby women with previous pregnancies and women with previous perinatal loss reported more frequent symptoms of anxiety. In contrast, obstetric factors concerning intendedness of pregnancy (preferring the timing to be later) were only associated with distress symptoms as measured by the EPDS and STAI-S. Findings for GAD-2 also differed concerning smoking status at booking and childhood relationship with the woman’s mother. For smoking, GAD-2 was the only measure where a small-medium ES was not found (i.e. where smokers were not found to have statistically significant higher distress scores). For relationship with mother, statistically significant higher distress levels were only found for GAD-2; however this was likely due to the unequal variances (linked to the small sample size for women with the risk factor) because the ES were non-significant due to the altered degrees of freedom required.

Further differences were found between measures when the items concerning occurrence (ANRQ4a) and impact (ANRQ4b) were rescoring according to type of stresses. As shown in Table 5.13, findings were comparable across different distress symptoms when using the original items (i.e. ‘any’ stresses). Once rescored, pregnancy-specific stresses remained a small-medium effect size when measured by the EPDS, STAI-S and GAD-2 (most marked for GAD-2), whereas non pregnancy-specific stresses only demonstrated a small-medium effect size for EPDS (and was further limited to those stresses having substantial impact, rather than simple occurrence).
Table 5.13 Key differences found in the univariate analyses, based on effect sizes (n=191)

<table>
<thead>
<tr>
<th>Variable (predictor)</th>
<th>EPDS n</th>
<th>ES</th>
<th>STAI-S n</th>
<th>ES</th>
<th>GAD-2 n</th>
<th>ES</th>
<th>EPDS-3A n</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-demographic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index of Multiple Deprivation (social deprivation) (correlation)</td>
<td>179</td>
<td>.200**</td>
<td>176</td>
<td>.073</td>
<td>176</td>
<td>.004</td>
<td>179</td>
<td>.217**</td>
</tr>
<tr>
<td>Social support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inadequate support (based on MSSS)</td>
<td>185</td>
<td>.408***</td>
<td>180</td>
<td>.227**</td>
<td>182</td>
<td>.168*</td>
<td>185</td>
<td>.320***</td>
</tr>
<tr>
<td>MSSS social support total (correlation)</td>
<td>189</td>
<td>.412***</td>
<td>184</td>
<td>.272***</td>
<td>187</td>
<td>.189*</td>
<td>189</td>
<td>.333***</td>
</tr>
<tr>
<td>ANRQ3 (emotionally supportive partner)</td>
<td>188</td>
<td>.330***</td>
<td>183</td>
<td>.177*</td>
<td>186</td>
<td>.229**</td>
<td>188</td>
<td>.245**</td>
</tr>
<tr>
<td>Mental health and treatment history</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental health history (in health records)</td>
<td>184</td>
<td>.483**</td>
<td>179</td>
<td>.524**</td>
<td>181</td>
<td>.161*</td>
<td>184</td>
<td>.209**</td>
</tr>
<tr>
<td>Previous mental health medication (in health records)</td>
<td>184</td>
<td>.510*</td>
<td>179</td>
<td>.527**</td>
<td>181</td>
<td>.141</td>
<td>184</td>
<td>.188*</td>
</tr>
<tr>
<td>ANRQ2a (history of altered mood or mental illness)</td>
<td>182</td>
<td>.223**</td>
<td>177</td>
<td>.202*</td>
<td>179</td>
<td>.175*</td>
<td>182</td>
<td>.200**</td>
</tr>
<tr>
<td>ANRQ2c (sought professional help)</td>
<td>189</td>
<td>.191**</td>
<td>184</td>
<td>.276*</td>
<td>187</td>
<td>.125</td>
<td>189</td>
<td>.204**</td>
</tr>
<tr>
<td>ANRQ2d (took tablets/herbal medicine)</td>
<td>189</td>
<td>.239*</td>
<td>184</td>
<td>.418**</td>
<td>187</td>
<td>.180*</td>
<td>189</td>
<td>.230**</td>
</tr>
<tr>
<td>Obstetric factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primigravida (no previous pregnancies)</td>
<td>183</td>
<td>.141</td>
<td>178</td>
<td>.109</td>
<td>180</td>
<td>.206**</td>
<td>183</td>
<td>.091</td>
</tr>
<tr>
<td>Any previous perinatal loss</td>
<td>189</td>
<td>.152*</td>
<td>184</td>
<td>.170*</td>
<td>187</td>
<td>.214**</td>
<td>189</td>
<td>.090</td>
</tr>
<tr>
<td>Would have preferred pregnancy later</td>
<td>187</td>
<td>.433**</td>
<td>183</td>
<td>.282**</td>
<td>184</td>
<td>.069</td>
<td>187</td>
<td>.281</td>
</tr>
<tr>
<td>Health behaviours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoker (at booking)</td>
<td>185</td>
<td>.204**</td>
<td>180</td>
<td>.183*</td>
<td>182</td>
<td>.135</td>
<td>185</td>
<td>.195*</td>
</tr>
<tr>
<td>Early adversity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANRQ1 (emotionally supportive mother)</td>
<td>184</td>
<td>.350</td>
<td>179</td>
<td>.205</td>
<td>181</td>
<td>.437*</td>
<td>184</td>
<td>.128</td>
</tr>
<tr>
<td>Recent stresses (occurrence and impact)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANRQ4a (any stresses in last year)</td>
<td>182</td>
<td>.196**</td>
<td>177</td>
<td>.166*</td>
<td>179</td>
<td>.187*</td>
<td>182</td>
<td>.129</td>
</tr>
<tr>
<td>ANRQ4b (level of distress caused by any stresses)</td>
<td>182</td>
<td>.304***</td>
<td>177</td>
<td>.235**</td>
<td>179</td>
<td>.298***</td>
<td>182</td>
<td>.225**</td>
</tr>
<tr>
<td>ANRQ4a (occurrence of pregnancy-specific stresses)</td>
<td>182</td>
<td>.153*</td>
<td>177</td>
<td>.300</td>
<td>179</td>
<td>.198**</td>
<td>182</td>
<td>.068</td>
</tr>
<tr>
<td>ANRQ4a (occurrence of stresses excl. pregnancy-specific)</td>
<td>181</td>
<td>.078</td>
<td>176</td>
<td>.044</td>
<td>178</td>
<td>.019</td>
<td>181</td>
<td>.073</td>
</tr>
<tr>
<td>ANRQ4b (impact of pregnancy-specific stresses)</td>
<td>179</td>
<td>.178*</td>
<td>176</td>
<td>.286</td>
<td>176</td>
<td>.239**</td>
<td>179</td>
<td>.094</td>
</tr>
<tr>
<td>ANRQ4b (impact of stresses excl. pregnancy-specific)</td>
<td>185</td>
<td>.198*</td>
<td>180</td>
<td>.134</td>
<td>182</td>
<td>.116</td>
<td>185</td>
<td>.156</td>
</tr>
</tbody>
</table>

Notes: ES= effect size; p<.05*, p<.01**, p<.001***; shading indicates a statistically significant ES > .2 (non-significance may arise due to unequal variance)
Reference model

A reference model was developed (see Figure 5.3), based on the ANRQ items, to enable all decisions regarding the final model to be described relative to one model. It should be noted that the same models were used across each of the distress measures (i.e. EPDS, STAI-S, GAD-2). That is, if only one criterion were being explored, then a different combination of variables would have been used (i.e. the theoretical considerations would have largely identified the same domains but the statistical considerations would have led to different refined sets, due to different relationships between the predictors and the criterion variables, as shown in Table 5.14 summarising the main differences). Using the same models enabled direct comparison between predictors of the different symptoms (as operationalised by the three measures).

The order of block entry was informed by the literature review, including previous meta-analyses in a related topic (Beck, 2001; Lancaster et al., 2010; O’Hara & Swain, 1996; Robertson, 2004), with personality entered as the final block given the relative paucity of published data in this area. Selection of which items should be included in the reference model was informed by theoretical and statistical considerations, as described below.

Each conceptually-informed block was explored in turn. Some domains contained multiple variables demonstrating an ES > .2; however, entering conceptually similar items in the same model risks the problem of shared variance whereby the relative contribution of related variables is underestimated. For example two variables may separately be significant predictors but by using both variables in the same analysis, neither is statistically significant. The problem of shared variance may occur even when there does not appear to be a problem of multicollinearity (i.e. based on the tolerance values). In such cases, different variants of the model were run to identify the most appropriate variables to retain.

Each variation is presented below, describing the different scoring and combinations of variables used and rationale for the content of the ANRQ-based reference model.
1) Exploring block 1 (mental health history)

Some of the ANRQ items (ANRQ2b, ANRQ2c, ANRQ2d) are contingent on the presence of ANRQ2a (history of mood/distress lasting more than two weeks); it is therefore not appropriate to retain all of these factors in the same model because this would present the problem of multicollinearity. Alternatives were therefore explored to choose between ANRQ2a and one or more of the other items. Of note, despite not being scored as a risk factor in the original tool, ANRQ2d (took tablets/herbal medicine) is deemed sufficiently relevant to assess in the ANRQ and is part of the mental health history taking in the HHN, reflecting clinical guidelines; it was therefore considered for inclusion in the model. ANRQ2b, scored as 0-5, is an unclear variable because it contains two pieces of information: previous history (0 vs. any other score) and impact (1-5); this qualitative difference between women reporting no history and women reporting a history with minimal impact is not accommodated in multiple regression, i.e. the difference between 0 and 1 is assumed to be comparable with the difference between 3 and 4 (i.e. 1 unit change). ANRQ2b was therefore treated as a dichotomous risk factor.

Models compared: a) 2arf, b) 2brf 2crf 2drf, c) 2brf.

Finding: There was a problem of shared variance when more than one mental health item was entered. The strongest predictor was ANRQ2a followed by ANRQ2b.

Decision: ANRQ2a was chosen as a conceptually clear measure offering greater comparison with other literature and, indeed, the notes-based measures of mental health.

2) Exploring block 2 (stress/trauma - early adversity)

Univariate analyses identified that there was no statistically significant difference between psychological distress symptoms for women with and without a history of abuse growing up (as shown in Appendix 5.7); ANRQ8a and ANRQ8b were therefore not included on statistical grounds. Exploration of early adversity was instead limited to ANRQ1 (emotionally supportive mother in childhood).

Models compared: a) 1rf, b) 1 (ordinal, 1-6), c) excluded from the model.

Finding: Regardless of scoring used, the block was not significant.

Decision: ANRQ1 was not retained for the reference model.

3) Exploring blocks 3 (stress/trauma – recent stresses/changes/losses) and 4 (obstetric factors/attitude to pregnancy, including pregnancy-specific stress/trauma)

As with Block 1, ANRQ4b (impact of stresses) being contingent of ANRQ4a (occurrence of stresses) presented the issue of multicollinearity; it was therefore not appropriate to retain both items. In light of the univariate analyses (Appendix 5.7), impact (4b) was retained rather than occurrence (4a) due to the larger ES for the former. As with ANRQ2b above (impact of previous mood), ANRQ4b (impact of stresses/changes/losses) was dichotomised rather than retaining the ordinal format. A further conceptual complication arose due to the stress-related items potentially being pregnancy-specific (e.g. perinatal loss) and therefore
confounding two blocks (i.e. stress/trauma and obstetric factors). Alternative scorings of recent stresses were used (as described previously with the decision to re-code ANRQ4, 5.B.3) to ensure clear conceptual modelling and to investigate the relative importance of different types of stressors.

Different models used i) the original ANRQ item (i.e. that does not differentiate the type of stressor) and ii) two variables derived by rescoring the original item. As described in 5.A.1.2.3, the item was rescored in two ways; firstly, by whether the stressor was pregnancy-specific (‘anypreg’; e.g. perinatal loss, threat to current pregnancy, previous traumatic delivery or comment about timing of pregnancy)) and secondly, by whether the stressor concerned perinatal loss (‘periloss’).

**Models compared:** a) ANRQ4b (original, i.e. ‘any stress’) (rf) [Block 3]; b) ANRQ4b rescored as non-anypreg and anypreg (rf) [Blocks 3 and 4]; c) ANRQ4b rescored as non-periloss and periloss (rf) [Blocks 3 and 4].

**Finding:** Retaining the original format (model a), the stress block was a significant predictor for all three measures of distress; however, the predictor was only sig for EPDS and GAD-2 (not STAI-S).

Regardless of coding as ‘anypreg’ (model b) or ‘periloss’ (model c), the non pregnancy block (and predictor) was non-significant for all measures of distress (although for EPDS, the non pregnancy block (and predictor) approached significance). The pregnancy block was significant when scored as ‘anypreg’ (all measures of distress). The pregnancy block was significant for EPDS and GAD-2 and approaching significance for STAI-S (p=.05) if scored as ‘periloss’. The pregnancy predictor was significant across all measures of distress, regardless of anypreg or periloss.

**Decision:** Recoding ANRQ4 was considered a more conceptually appropriate approach to avoid confounding of blocks. The ‘anypreg’ scoring was favoured above ‘periloss’, given the findings with STAI-S.

4) **Exploring block 5 (social support)**

Of note, social support was not entered as an interaction term because two-way analyses of variance (ANOVAs) found no evidence of a buffering relationship between social support and recent stress (further details are available in Appendix 5.8).

**Models compared:** a) ANRQ3 (ordinal), b) ANRQ7 (ordinal), c) ANRQ3 and ANRQ7 (ordinal).

**Finding:** The social support block was significant, regardless of distress measure; in contrast, the predictors were significant only for EPDS. Of note, there was no indication of shared variance, with the same trends observed (i.e. non-significance of predictor and significance of block) regardless of whether the two items were included separately or together, with the block making the greatest contribution where both items were included.
**Decision:** Both ANRQ3 (emotionally supportive partner) and ANRQ7 (support with baby) were retained.

5) **Exploring block 6 (personality)**

**Models compared:** a) ANRQ5 (ordinal), b) ANRQ6 (ordinal), c) ANRQ5 and ANRQ6 (ordinal).

**Finding:** Exploring these different combinations identified a problem of shared variance whereby, for STAI-S and GAD-2, both variables were individually significant predictors but only the ANRQ5 (tendency to worry) remained significant if entered together. Although both remained significant predictors of EPDS when entered jointly, shared variance was indicated by the reduced size of the predictors.

**Decision:** Either predictor (but not both) could have been retained for the reference model. ANRQ5 was chosen due to being a larger predictor (i.e. greater beta value).

Due to the findings concerning early adversity, block 2 was excluded, leaving five blocks in the reference model rather than the original six. The original block numbers are retained for clarity: block 1 (mental health), 3 (stress – recent, excluding pregnancy-specific), 4 (obstetric factors), 5 (social support), 6 (personality).

**Models explored in determining the definitive final model**

Seven models were run to determine the definitive final model. Findings are described relative to the reference model.

1) **Exploring block 1 (mental health)**

In addition to the mental health history reported on the ANRQ, history was extracted from the health records (detailed comparison of these two sources is reported later, in Chapter 7).

**Model 1 - comparison:** Any mental health history\(^{34}\) (notes-based) (instead of ANRQ2arf).

**Finding:** The mental health block and predictors were both significant regardless of which variable was used, although the notes-based history was a more important predictor (most marked for STAI-S).

**Decision:** ANRQ2arf was retained, consistent with the ANRQ-based approach.

2) **Exploring block 3 (stress – recent)**

As described in sample characteristics (Chapter 4), IMD was selected as a measure of socioeconomic status, indicating psychosocial stress.

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\(^{34}\)All reports of mental health history were scored in this variable, rather than classifying by type of condition.
Model 2 - comparison: IMD (in addition to predictors in reference model).
Finding: IMD was a significant predictor, although only for EPDS.
Decision: IMD was added to the final model.

3) Exploring block 4 (obstetric factors)
In addition to the ANRQ-based variable (included in the reference model), obstetric factors were available from other measures in the ARMS questionnaire and from obstetric histories extracted from the health records. While a comprehensive list was given in the univariate analyses, a reduced set of more common risk factors were compared for the multivariate analyses to give wider application of findings. In total, four models were explored in determining block 4.
Model 3 - comparison: positive pregnancy experience,
Model 4 - comparison: previous perinatal loss,
Model 5 - comparison: perinatal loss in past year,
Model 6 - comparison: attitude to timing of pregnancy (prefer later pregnancy).
Finding:
Model 3: pregnancy experience added to the overall variance explained by the model for all symptom types (most marked for STAI-S) without altering the significance of ANRQ4bfr (pregnancy-specific stress, i.e. not a problem of shared variance);
Models 4 and 5: shared variance was found with ANRQ4bfr (due to ANRQ4b most commonly concerning loss);
Model 6: later timing was a significant predictor for STAI-S only.
Decision: Multiple variables could not be included in the same model due to shared variance (e.g. loss and nature of loss). Pregnancy experience (ordinal format) was added to the final model.

4) Exploring block 5 (social support)
In addition to the ANRQ-based measures (ANRQ3 emotionally supportive partner and ANRQ7 support with baby), support was measured using the MSSS. The partner-related items (ANRQ3 and MSSS items 3-6) were not independent and therefore could not be entered in the same model.
Model 7 - comparison: MSSS (total) (instead of ANRQ items)
Finding: The support block was no longer significant for STAI-S and GAD-2 (and the support predictor remained non-significant); for EPDS, the block and predictor remained significant but the contribution of the predictor was reduced.
Decision: The original ANRQ support items were retained (ANRQ3 and ANRQ7).

5) Exploring block 6 (personality)
No further variables were investigated in addition to the reference model.
Having determined the final model (shown in Figure 5.3), the multiple regression analyses were performed for distress symptoms measured using the EPDS, STAI-S, GAD-2 and EPDS-3A.

**Mental health history**
- history of mood > 2 weeks (ANRQ2a, rf2)
- impact (ANRQ2b, rf3)
- sought professional help (ANRQ2c, rf4)
- took tablets/herbal medicine (ANRQ2d)

**Stress/trauma (early adversity)**
- emotionally supportive mother (ANRQ1, rf1)
- history of abuse (ANRQ 8a, rf11; ANRQ8bc, rf12)

**Stress/trauma (recent stresses)**
- stresses in past year (ANRQ4a, rf6)
- impact (ANRQ4b, rf7)

**Obstetric factors/attitude to pregnancy (incl. pregnancy-specific stress/trauma)**
- (re-coded ANRQ4; not part of original)

**Social support**
- emotionally supportive partner (ANRQ3, rf5)
- support with baby (ANRQ7, rf10)

**Personality factors**
- tendency to worry (ANRQ5, rf8)
- need for order (ANRQ6, rf9)

- Scored as (dichotomous) risk factor
- Scored in ordinal format (and may be dichotomised as presence of risk factor)
- Not scored as a risk factor in the original ANRQ

Figure 5.2 Conceptual model of correlates of psychological distress, showing original ANRQ variables (12 risk factors and ANRQ2d)
Mental health history
- history of mood > 2 weeks (ANRQ2a, rf2)

Stress/trauma (recent stresses)
- any non pregnancy-specific stresses in past year (with impact) (ANRQ4b, rf7 rescored)
- social deprivation (IMD)

Obstetric factors/attitude to pregnancy (incl. pregnancy-specific stress/trauma)
- any pregnancy-specific stresses in past year (with impact) (ANRQ4b, rf7 rescored)
- current pregnancy a positive experience

Social support
- emotionally supportive partner (ANRQ3, rf5)
- support with baby (ANRQ7, rf10)

Personality factors
- tendency to worry (ANRQ5, rf8)

- Scored as (dichotomous) risk factor
- Scored in ordinal format
- Scored in continuous format
- risk factor
- Italics Addition to reference model

Figure 5.3 Final multiple regression model

Psychological distress
[EPDS/ STAI/ GAD/EPDS-3A]
5.E.1 Primary analyses – multiple regression model for the full sample

Preliminary analyses were conducted to assess normality, linearity, multicollinearity and homoscedasticity; details of which are available in Appendix 5.9. All models were highly statistically significant (p<.001) and respectively explained 50.7% of the variance in EPDS symptoms, 34.5% in STAI-S, 28.2% in GAD-2 and 32.8% in EPDS-3A. Full details of the models are shown in the four figures displaying the models (Figures 5.4-5.7). While the values in the left-hand blocks show the contribution (beta) and statistical significance of each predictor in the final model, the central arrows show the contribution (adjusted R square) of each block after controlling for the preceding blocks. Findings for each block are described before considering similarities and differences across different symptoms.

Mental health history (history of altered mood)
Irrespective of the distress measure investigated, the mental health block made only a small statistically significant contribution (EPDS 4.4%, STAI-S 3.1%, GAD-2 2.5%, EPDS-3A 3.5%), despite being viewed as the most important of these variables for referral criteria (discussed further in the next chapter). Furthermore, the predictor was non-significant for all models, suggesting that the significance of the block was due to it being the first block entered and therefore significant only when the comparison model was based on there being no predictors.

Non pregnancy-specific stress
Non pregnancy-specific stress did not make a statistically significant contribution to predicting anxiety symptoms (as measured by STAI-S and GAD-2) and was thus the only of the five blocks that did not contribute to the model. Exploration at the predictor level identified that the contribution to EPDS and EPDS-3A symptoms was due to the IMD measure of social deprivation, not the ANRQ item based on recent stresses (although the ANRQ item approached statistical significance for EPDS; p=.072).

Obstetric factors, including pregnancy-specific stress
This was found to be the most influential block for all of the main measures and even after controlling for the effects of mental health history and non pregnancy-specific stress, respectively explained 19.4% of the variance in EPDS symptoms, 23.1% in STAI-S, 12.6% in GAD-2 and 7.8% in EPDS-3A (for which it was the second most influential block).
**Social support**

Social support was most relevant to depression symptoms (measured by EPDS), explaining 13.9% of the total variance after controlling for the effects of the preceding three blocks. In contrast, the block explained 2.5% for STAI-S, 4.0% for GAD-2 and 6.5% for EPDS-3A. Furthermore, once all predictors were entered, the social support variables only remained statistically significant for EPDS, with support with baby (ANRQ7) being the second most influential predictor in the EPDS model.

**Personality**

The personality block (which comprised one predictor, tendency to worry, ANRQ5) was the most influential block for EPDS-3A and second most influential for STAI-S and GAD-2. After controlling for the effects of all other variables entered in the model, it respectively explained 7.5% of EPDS variance, 5.4% of STAI-S, 9.5% of GAD-2 and 9.7% of EPDS-3A. Additionally, tendency to worry was the only predictor to be statistically significant across all symptoms.

**Similarities and differences between symptoms**

STAI-S and GAD-2 shared a similar trend in terms of overall contribution of blocks, with pregnancy-specific stress most influential, followed by personality and with the non pregnancy-specific stress block being non-significant. Correlates of EPDS-3A were most similar to correlates of EPDS with all blocks being statistically significant reflecting the key role of socioeconomic status (as measured by the IMD) for both EPDS and EPDS-3A. Compared with EPDS, for EPDS-3A the size of the contribution made by each block was generally more balanced. Also in EPDS-3A, personality played a larger role and in this respect was more comparable to the findings for STAI-S and GAD-2.

At a predictor level, the majority were statistically significant for EPDS; unlike the other distress symptoms (STAI-S: pregnancy experience and personality; GAD-2: pregnancy-specific stress, pregnancy experience and personality; EPDS-3A: IMD and personality). Although EPDS was strongly positively correlated with GAD-2, the findings of the multiple regression models suggested that STAI-S and GAD-2 may have more comparable correlates, with these anxiety symptoms being most characterised by pregnancy-specific stress and personality.

Having conducted the primary analyses for the definitive multiple regression model across the full sample, further secondary analyses were performed.
Figure 5.4 Multiple regression model for explaining variance in EPDS symptoms

Note: boxes on the left illustrate the contribution of each variable when all variables are entered into the model; values accompanying the arrows illustrate the contribution of each block, after controlling for the previous block(s).
Figure 5.5 Multiple regression model for explaining variance in STAI-S symptoms

Note: boxes on the left illustrate the contribution of each variable when all variables are entered into the model; values accompanying the arrows illustrate the contribution of each block, after controlling for the previous block(s).
Figure 5.6 Multiple regression model for explaining variance in GAD-2 symptoms

Note: boxes on the left illustrate the contribution of each variable when all variables are entered into the model; values accompanying the arrows illustrate the contribution of each block, after controlling for the previous block(s).
Figure 5.7 Multiple regression model for explaining variance in EPDS-3A symptoms

Note: boxes on the left illustrate the contribution of each variable when all variables are entered into the model; values accompanying the arrows illustrate the contribution of each block, after controlling for the previous block(s).
5.E.2 Secondary analyses: Parity

To explore possible differences in the correlates of symptoms for primiparas and multiparas, the final regression model was run across the two sub-samples. The contribution of each predictor and block are shown in Tables 5.12 and 5.13. The models were found to be largely similar across primiparas and multiparas, with the differences outlined below according to each symptom measure.

**EPDS**

History of altered mood was statistically significant for primiparas only at the block level; however, the predictor was not significant in either. Non pregnancy-specific stress was statistically significant for multiparas only, with the block accounting for approximately 20% of variance in EPDS. This was mainly due to the ANRQ predictor, which was only significant for multiparas. Personality (both at the block and predictor level) was significant for both but more relevant to primiparas (explaining approximately 10% compared with approximately 2% after controlling for all other blocks).

**STAI-S**

History of altered mood was statistically significant for multiparas only at the block level; however, the predictor was not significant in either. Of note, this was the only distress measure where this pattern was observed. Pregnancy-specific stress was the biggest block for both primiparas and multiparas. Social support was only significant for primiparas at the block level, where it explained approximately 11% (with supportive partner only being significant at the predictor level for primiparas). Personality was only statistically significant for primiparas, both at the block and the predictor levels (explaining approximately 10% in the variance of STAI-S for primiparas after controlling for the effects of all other blocks).

**GAD-2**

Common with EPDS, history of altered mood was significant only for primiparas. Although non pregnancy-specific stress was more relevant to multiparas (common with EPDS), this did not reach statistical significance. Common with STAI-S, pregnancy-specific stress was the biggest block for both primiparas and multiparas. Also common with STAI-S, social support was only statistically significant for primiparas, with the block explaining approximately 5% in variance (compared with no variance for multiparas); however, the predictor was non-significant for both sub-samples.
**EPDS-3A**

As for EPDS and GAD-2, the history of altered mood block was significant only for primiparas, with the predictors non-significant for both sub-samples. Common with the full EPDS, non pregnancy-specific stress was statistically significant for multiparas only, with the block accounting for approximately 23% of variance in EPDS-3A for multiparas; this was mainly due to the ANRQ item. Unlike the other measures, pregnancy-specific stress was found to make a statistically significant contribution only for primiparas. As with EPDS, while personality was a statistically significant block (and predictor) for both sub-samples, it was more relevant to primiparas (explaining approximately 13% compared with 4% for multiparas).

**5.E.3 Secondary analyses: History of altered mood or mental health**

The final model was re-run excluding the first block. As shown by the results reported in Tables 5.12 and 5.13, there was no change to the statistical significance of blocks or predictors with one exception where the probability value was close to the cusp of .05 (EPDS, ANRQ non pregnancy-specific stress went from p=.072 in the full model to p=.042). It was therefore unnecessary to perform further secondary analyses for sub-samples of women with and without a history of altered mood lasting at least two weeks.
Table 5.14 Magnitude and significance of each block of predictors across different models and different criterion variables

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<thead>
<tr>
<th>Criterion (distress measure)</th>
<th>Model</th>
<th>Sample</th>
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<th>Adjusted $R^2$ (full model)</th>
<th>Block 1 Adjusted $R^2$ (mental health, mood)</th>
<th>Block 2 Adjusted $R^2$ (non pregnancy-specific stress)</th>
<th>Block 3 Adjusted $R^2$ (pregnancy factors)</th>
<th>Block 4 Adjusted $R^2$ (social support)</th>
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Notes: Adjusted $R^2$ is the proportion of variance explained by the block of predictors, adjusted for the effects of preceding blocks. **p<.001**, *p<.01*, **p<.05**; n/a = not applicable (due to reduced model excluding Block 1)
Table 5.15 Magnitude and significance of each predictor across different models and different criterion variables

<table>
<thead>
<tr>
<th>Criterion (distress measure)</th>
<th>Model</th>
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</tr>
<tr>
<td>EPDS-3A Final</td>
<td></td>
<td>Full</td>
<td>177</td>
<td>.033</td>
<td>.084</td>
<td>.195**</td>
<td>.090</td>
<td>-.125</td>
</tr>
<tr>
<td>EPDS-3A Final</td>
<td></td>
<td>Primips.</td>
<td>105</td>
<td>.069</td>
<td>-.021</td>
<td>.154</td>
<td>.152</td>
<td>-.175*</td>
</tr>
<tr>
<td>EPDS-3A Final</td>
<td></td>
<td>Multips.</td>
<td>72</td>
<td>-.034</td>
<td>.307**</td>
<td>.195</td>
<td>.062</td>
<td>-.085</td>
</tr>
<tr>
<td>EPDS-3A Excl. Block 1</td>
<td></td>
<td>Full</td>
<td>177</td>
<td>.091</td>
<td>.198**</td>
<td>.093</td>
<td>-.131</td>
<td>.116</td>
</tr>
</tbody>
</table>

Notes: magnitude is shown by standardised beta (showing the size of the contribution of the individual predictor where an increase of one standard deviation of the predictor leads to that amount of standard deviations increase or decrease in the criterion); p<.001***, p<.01**, p<.05*
5.E.4 Secondary analyses: Predicting caseness

Logistic regression was performed to assess the impact of several variables on the likelihood that women would score above threshold on the measures of psychological distress used in the questionnaire pack (EPDS, STAI-S, GAD-2 and EPDS-3A). Although some authors report the same sample size requirement as for multiple regression (i.e. 10 participants per predictor variable, e.g. a model involving 5 predictors requires 50 participants), others have argued that logistic regression may require 10 participants per event (e.g. a model involving 5 predictors requires 50 participants with the outcomes event under investigation (Tabachnick & Fidell, 2001), requiring a larger sample size, and having particular impact for prediction of rare events). In light of this consideration, the logistic regression analyses were limited to the total sample, due to containing too few participants with events (i.e. scoring above threshold) when the group is split further (e.g. by parity). The logistic regression model contained the same eight predictor variables as was used in the primary multiple regression analyses: experiencing previous depressed/anxious mood lasting more than two weeks (ANRQ2a), reporting a non pregnancy-specific stressor (and it having a ‘high’ impact, i.e. >3 on ANRQ4b), IMD, reporting a pregnancy-specific stressor (and it having a ‘high’ impact, i.e. >3 on ANRQ4b), pregnancy experience, emotional support from partner (ANRQ3), support with baby (ANRQ7), tendency to worry (ANRQ5).

Findings
All models were highly statistically significant (p<.001), indicating ability to distinguish between women who did and did not score above threshold. Agreement between predicted and observed classification ranged between approximately 70% and 90%, with poorest agreement observed for GAD-2 at the 1/2 threshold, reflecting that this is too low a threshold to be meaningful as almost half of women (76/168) scored above 1. Of note, while the agreement generally appears high, the models generally have poor specificity (i.e. identifying several false positives, that is, predicting in the model that women would be above threshold but finding that the score was below threshold). Due to the inherent balancing act of sensitivity and specificity, the greatest specificity and poorest sensitivity was naturally found with those models using higher thresholds. In comparison with the multiple regression model (for the full model), which explained between 30% and 50% of the variance in distress scores (EPDS: 50.7%; STAI-S: 34.5%; GAD-2:28.2%; EPDS-3A: 32.8%), the logistic regression model explained approximately 40% of the variance in EPDS and STAI-S classification and approximately 30% of the variance in GAD-2 and EPDS-3A status (using the Naelkerke R squared estimate, see Appendix 5.10).
**Mental health history (history of altered mood)**

While the block was significant for all analyses (regardless of symptom type or threshold), the predictor only remained significant in the final model for GAD-2 2/3. There, the odds ratio was 3.2, i.e. women reporting a previous episode of altered mood were more than three times more likely to score above threshold.

**Non pregnancy-specific stress**

This block was significant only for EPDS 9/10, as was the associated ANRQ predictor. Socioeconomic status (measured by IMD) was not a significant predictor in any model.

**Obstetric factors, including pregnancy-specific stress**

The pregnancy block was commonly one of the most influential blocks; this was particularly pronounced for STAI-S, where both predictors were statistically significant. Recent pregnancy-specific stress (ANRQ4b) was a significant predictor of classification across all symptom types (but not the higher EPDS threshold). It was also the most important predictor for anxiety classification with women reporting recent pregnancy-specific stress (with impact>3) being approximately three times more likely than women not reporting such stress to score above threshold for STAI-S and seven times for GAD-2 (STAI-S 40/41: odds ratio = 3.2; GAD-2 2/3: odds ratio = 7.4).

Pregnancy experience was a significant predictor of classification only for STAI-S (both levels). Because the odds ratio for pregnancy experience was less than 1 (approximately 0.5), this indicated that those with higher ratings of positive pregnancy experience were less likely to score above threshold for STAI-S symptoms; that is, with every reducing point of positive pregnancy experience rating, women were twice as likely (i.e. the inverse of 0.5) to score above threshold for STAI-S symptoms.

**Social support**

Although significant for the majority of measures and thresholds (the exception being GAD-2 1/2), social support was most important for higher levels of EPDS. Emotionally supportive partner (ANRQ3) was not a statistically significant predictor whereas, at the higher thresholds for EPDS and STAI-S, women were approximately twice as likely to score above threshold with each increasing point on the support with baby item (ANRQ7).

**Personality**

Tendency to worry (personality block) was a significant predictor for all distress measures, regardless of threshold. The odds ratio was approximately 2 which, due to being an ordinal
measure, indicated that with each increasing point on the item (ANRQ5), women were twice as likely to score above threshold for distress.

Comparing findings using multiple regression and logistic regression

As shown in Table 5.16, significance of blocks was largely comparable across distress measure and scoring approach, with the majority of blocks being statistically significant. The main exception concerned block 2 (non pregnancy-specific stress) which was only significant for EPDS and EPDS-3A in multiple regression and EPDS in logistic regression. Additionally, mental health did not remain statistically significant for EPDS-3A in the logistic regression, nor did pregnancy-specific stress for the lower GAD-2 threshold or EPDS-3A.

Comparisons at the predictor level (Table 5.17) found that whereas the majority of predictors were statistically significant in explaining variance of EPDS in the multiple regression, only non pregnancy-specific stress (measured by the ANRQ), pregnancy-specific stress (measured by the ANRQ) and tendency to worry were significantly able to predict scoring above threshold at the 9/10 cut-off and, at the higher threshold, only support with baby and tendency to worry. Significant predictors were largely similar across analysis approaches for STAI-S with pregnancy-specific stress (measured by the ANRQ) additionally being significant at predicting scoring above threshold (for both thresholds) and, at the higher threshold, also support with baby. For GAD-2, both pregnancy-specific stress and tendency to worry were significant for multiple and logistic regression analyses; however, pregnancy experience was no longer a significant predictor for the latter. Additionally, at the higher GAD-2 threshold (2/3), history of mental health was a significant predictor. For EPDS-3A, both IMD and tendency to worry were significant across multiple and logistic regression analyses with pregnancy experience also being significant in predicting scoring above threshold.
Table 5.16 Comparing significance of blocks by type (EPDS, STAI-S, GAD-2, EPDS-3A) and scoring (continuous, dichotomised) of distress symptoms (n=191)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Multiple Regression</th>
<th>Logistic Regression (chi-square values for each block)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EPDS n=176</td>
<td>STAI-S n=175</td>
</tr>
<tr>
<td></td>
<td>GAD-2 n=176</td>
<td>GAD-2 n=176</td>
</tr>
<tr>
<td></td>
<td>EPDS-3A n=176</td>
<td>EPDS 9/10 n=171</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPDS 12/13 n=171</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STAI-S 40/41 n=166</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STAI-S 44/45 n=166</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GAD-2 1/2 n=168</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GAD-2 2/3 n=168</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPDS-3A 5/6 n=171</td>
</tr>
<tr>
<td>1 mental health (history altered mood)</td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>4.67*</td>
<td>4.06*</td>
</tr>
<tr>
<td></td>
<td>12.11***</td>
<td>5.74*</td>
</tr>
<tr>
<td></td>
<td>4.37*</td>
<td>13.32***</td>
</tr>
<tr>
<td></td>
<td>3.11</td>
<td></td>
</tr>
<tr>
<td>2 non pregnancy stress</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>7.22*</td>
<td>4.53</td>
</tr>
<tr>
<td></td>
<td>0.78</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>2.82</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>3.75</td>
<td></td>
</tr>
<tr>
<td>3 IMD (social deprivation)</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>17.91***</td>
<td>10.7**</td>
</tr>
<tr>
<td></td>
<td>28.73***</td>
<td>27.6***</td>
</tr>
<tr>
<td></td>
<td>15.85***</td>
<td>16.8***</td>
</tr>
<tr>
<td></td>
<td>9.80**</td>
<td></td>
</tr>
<tr>
<td>4 pregnancy stress / obstetric factors</td>
<td>***</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>8.78*</td>
<td>14.36**</td>
</tr>
<tr>
<td></td>
<td>11.11**</td>
<td>13.81**</td>
</tr>
<tr>
<td></td>
<td>2.89</td>
<td>7.33*</td>
</tr>
<tr>
<td></td>
<td>2.97</td>
<td></td>
</tr>
<tr>
<td>5 pregnancy experience</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>14.66***</td>
<td>4.09*</td>
</tr>
<tr>
<td></td>
<td>9.57**</td>
<td>5.87**</td>
</tr>
<tr>
<td></td>
<td>18.06***</td>
<td>6.9**</td>
</tr>
<tr>
<td></td>
<td>9.59**</td>
<td></td>
</tr>
</tbody>
</table>

Notes: p<.001***, p<.01**, p<.05*; shading indicates statistical significance
Table 5.17 Comparing significance of predictors by type (EPDS, STAI-S, GAD-2, EPDS-3A) and scoring (continuous, dichotomised) of distress symptoms (n=191)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Multiple Regression</th>
<th>Logistic Regression (chi-square values for each block)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EPDS 9/10 n=176</td>
<td>EPDS 12/13 n=176</td>
</tr>
<tr>
<td></td>
<td>STAI-S 40/41 n=176</td>
<td>STAI-S 44/45 n=166</td>
</tr>
<tr>
<td></td>
<td>GAD-2 1/2 n=168</td>
<td>GAD-2 2/3 n=168</td>
</tr>
<tr>
<td></td>
<td>EPDS-3A 5/6 n=171</td>
<td>EPDS-3A 5/6 n=171</td>
</tr>
<tr>
<td>mental health</td>
<td>0.99</td>
<td>2.45</td>
</tr>
<tr>
<td>(history altered mood)</td>
<td></td>
<td>2.04</td>
</tr>
<tr>
<td>non pregnancy stress</td>
<td>3.73*</td>
<td>1.32</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>1.61</td>
</tr>
<tr>
<td>IMD (social deprivation)</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>1.02</td>
</tr>
<tr>
<td>pregnancy stress</td>
<td>3.70*</td>
<td>1.13</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>3.24*</td>
</tr>
<tr>
<td>pregnancy experience</td>
<td>***</td>
<td>**</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>0.69</td>
</tr>
<tr>
<td>supportive partner</td>
<td>*</td>
<td>1.02</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>1.28</td>
</tr>
<tr>
<td>support with baby</td>
<td>***</td>
<td>**</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>1.67</td>
</tr>
<tr>
<td>tendency to worry</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>2.11***</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>1.67*</td>
</tr>
</tbody>
</table>

Notes: p<.001***, p<.01**, p<.05*; shading indicates statistical significance
Summary of Section 5.E Wider correlates of antenatal psychological distress symptoms

- Measures of distress were themselves strongly positively correlated (5.A) and therefore had largely similar relationships with wider correlates.
- Personality and pregnancy experience were the only variables that were significant correlates of all symptoms (EPDS, STAI-S, GAD-2) after controlling for the variance explained by other variables.
- Across all measures, pregnancy-specific stress was a stronger predictor of distress than were other stressors. This was particularly marked for anxiety symptoms.
- Early adversity, although an established correlate of perinatal depression symptoms, was not significant for any of the symptoms measured; potentially reflecting issues surrounding disclosure as well as sample size.
- The widely reported strong relationship between past mental health and perinatal distress was not observed, using the adopted measures (history of altered mood on the ANRQ and ‘any mental health’ documented in the health records).
- When controlling for the variance explained by other variables, social support was only a statistically significant correlate for depression symptoms; the relationship was most marked at high levels of distress.
- The multivariate analyses did not provide any further evidence to suggest that EPDS-3A may be used to assess anxiety.
- Social deprivation was an important correlate of depression symptoms but not anxiety symptoms.
- Exploratory secondary analysis by parity found that non pregnancy-specific stress may be more strongly associated with distress in multiparas whereas personality may be more strongly associated in primiparas; however correlates were largely similar.
Chapter 6. Observations of Antenatal Psychosocial Assessment in current (local) clinical practice

Having investigated in the previous chapter the assessment of symptom and risk (both separately and in combination) in relation to the ARMS questionnaire pack, this chapter presents observations from the health records, to illustrate current (local) practice concerning antenatal psychosocial assessment (APA), including: completion of the mental health assessment section of the handheld notes (HHN) (i.e. the Whooley questions, Arroll ‘help’ item, mental health history and treatment history); consistency of mental health documentation (in the HHN and the main notes, concerning antenatal appointments) and documented care provider responses to mental health assessment and other psychosocial issues.

6.A Completion of the mental health assessment section of the handheld notes (HHN)

Research Question B1: How is mental health assessment (including the depression screening questions) being completed in practice?

The layout and phrasing of the mental health assessment section of the HHN notes used locally (Pregnancy Notes, version 9.1) (Perinatal Institute, 2009a) are shown in Figure 6.1. The format predominantly contains ‘no’ ‘yes’ tick boxes with limited space to record ‘details’ (approximately 1cm depth box on an A4 page). Whereas the left-hand side documents historical factors, the right-hand side documents current symptoms, providing space to allow monitoring of the Whooley questions and Arroll ‘help’ question at up to three time points.
<table>
<thead>
<tr>
<th>Mental Health (record plan on page 11)</th>
<th>No</th>
<th>Yes</th>
<th>During the last month have you been bothered by:</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past or present mental illness</td>
<td>No</td>
<td>Yes</td>
<td>Feeling down, depressed or hopeless?</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Previous treatment/in-patient care</td>
<td>No</td>
<td>Yes</td>
<td>Having little interest or pleasure in doing things?</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Family history</td>
<td>No</td>
<td>Yes</td>
<td>Is this something you feel you need or want help with?</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

**Details**

Figure 6.1 Layout and phrasing of the handheld notes’ mental health assessment box (taken from the Pregnancy Notes, version 9.1 (Perinatal Institute, 2009a))
As shown in Figure 6.2, the sample size for health records was 191 (i.e. all Part 1 participants completing the ARMS questionnaire packs) and the sample size for HHN was 167. This was due to 172 women delivering at the local hospital, of which 97.1% had their HHN returned to the health records (i.e. four women lost their notes or did not return them).

Review of the HHN found that past or present mental illness was endorsed by 17 women (uncompleted = 2), previous treatment by four women (uncompleted = 2, including one disclosing previous history), and family history by 20 (uncompleted = 4).

Although 95.2% of Whooley and ‘help’ questions were completed at booking (159/167), of particular concern were three incomplete instances where the ‘help’ question had not been completed following a ‘yes’ response to Whooley (shown in Figure 6.2). One of these women had also not completed the second Whooley question.

The other key finding was that only one set of notes (0.6%) was completed at more than one timepoint, hence the planned longitudinal analysis of the trajectory of Whooley responses had to be abandoned. The woman who completed the notes at the second time point had responded ‘yes’ to both Whooley questions and ‘no’ to the Arroll question at booking, responding ‘no’ to both Whooley questions at the later stage.
Figure 6.2 Availability of handheld notes and completion of the Whooley questions

- Transferred care (n=15)
- Termination due to anomaly (n=1)
- Miscarriage (n=3)

- Woman lost HHN or not handed in (n=5)

- All items missing (n=5)
- ‘help’ question missing despite ‘yes’ response (n=3)
The responses contained in the 162 completed or partially completed notes are shown in Table 6.1. Of 30 (18.5%) saying ‘yes’ to at least one Whooley item, only six (i.e. 1 in 5) reported wanting/needig extra support (Arroll ‘help’ question), although (as mentioned) three (i.e. 1 in 10) did not complete the item. The majority wanting/needig extra support had endorsed both Whooley items (5/6). Of the 20 women referred at booking\(^{35}\) for specialist input, half had either endorsed Whooley item (i), or both items. Common features of referrals are returned to later (section 6.B.3).

<table>
<thead>
<tr>
<th>Whooley</th>
<th>(i) only (down, depressed, hopeless)</th>
<th>(ii) only (little interest or pleasure in doing things)</th>
<th>Both</th>
<th>Neither</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9(^*) (5.6%)</td>
<td>5 (3.1%)</td>
<td>16 (9.9%)</td>
<td>132 (81.5%)</td>
<td>162</td>
</tr>
<tr>
<td>Arroll</td>
<td>no</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>3</td>
<td>10</td>
<td>n/a</td>
<td>153</td>
</tr>
<tr>
<td></td>
<td>yes</td>
<td></td>
<td>5</td>
<td>n/a</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>uncompleted</td>
<td></td>
<td>1</td>
<td>n/a</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1(^*)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referral</td>
<td>4(^*)</td>
<td></td>
<td>6</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>

Notes: * includes one woman who did not complete Whooley item (ii); n/a = not applicable

### 6.B Mental health documentation and documented care provider responses

#### 6.B.1 Consistency of mental health documentation

**Research Question B2: How consistent is documentation of mental health history**

Documentation was observed for the HHN, antenatal notes completed by the midwife at booking and GP correspondence (sent when requesting antenatal care for their patient).

\(^{35}\)In total, 23 women had specialist referrals raised at booking however this included three women whose handheld notes were unavailable due to transferring their care elsewhere.
**Mental health history**

Mental health history was coded as 'any', rather than specifying type of mental illness documented, due to i) small numbers in groups, and ii) poor reliability of information (indicated by inconsistent terminology). None of the mental health histories documented at booking contained psychotic disorders. Comments such as 'patient is anxious due to recent miscarriage' (observed in GP referral letters) were not coded as mental health history because they were not framed as such by the health professional. Two instances ('previous overdose' and 'former alcoholic') were not coded as mental health due to being limited to printed primary care output of health history, without any description of mental health by the GP or in the maternity documentation.

Consistency of documentation is shown in Table 6.2 for the 28/191 who had any mental health history documented. Where the GP had documented mental health history, this was also documented by the booking midwife in the majority of cases (14/15). Of these, eight women had disclosed histories on the HHN, indicating that GP letters identified seven women who may not have otherwise been identified through the woman's self-report.

Midwives documented mental health histories for an additional 12 women who had not been identified by GP correspondence (including one where the GP letter was absent from the health records). Nine of these 12 women had disclosed a mental health history on the HHN, indicating that the remaining three were identified through further discussion between the midwife and woman.

One woman disclosed a mental health history on the HHN yet this was not documented by the midwife and the GP letter was missing from the health records, meaning that the HHN provided the only record of this history.

**Treatment history**

Previous mental health treatment (n=25) was coded for any mention of previous relevant medication (n=21) and/or psychological interventions (‘talking therapies’, e.g. counselling, cognitive behavioural therapy (CBT), therapist; n=9). Treatment history was unknown for the woman reporting mental health history in the HHN which was not documented elsewhere.

Of the 25 women with treatment histories documented, only four endorsed the treatment item in the HHN (i.e. previous treatment/in-patient care); this included two with a history of pharmacological treatment and two with a history of both pharmacological and psychological treatments. The majority (n=15) responded ‘no’ and one did not complete the item. HHN were unavailable for the remaining five. Details of treatment histories recorded in the HHN were inconsistent with the yes/no responses, with detail recorded for three reporting a
history and seven reporting no history. The majority of these details had been documented by the booking midwife.

Ten women had been taking prescribed mental health medication at the time of conception; four of which ceased prior to booking. Medication histories were documented in eight of the nine GP letters present; the other GP simply documented 'history of PND'. Only five of the histories were documented in the HHN whereas all ten were reported in the main antenatal notes. All ten women were referred to the specialist midwife (with further details available in Appendix 6.1).
Table 6.2 Consistency of documentation concerning mental health and treatment history in health records, where any mental health recorded (n=28)

<table>
<thead>
<tr>
<th>Mental health history (any)</th>
<th>Treatment history and type</th>
<th>Handheld notes (HHN)</th>
<th>Main notes</th>
<th>GP letter</th>
<th>total n (across sources)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mental health history</td>
<td>Treatment history</td>
<td>Mental health history</td>
<td>Treatment history</td>
</tr>
<tr>
<td>Yes</td>
<td>None</td>
<td>0 yes</td>
<td>n/a</td>
<td>2 yes</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 no</td>
<td></td>
<td>0 no</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>Pharmacological only</td>
<td>10 yes</td>
<td>2 yes</td>
<td>15 yes</td>
<td>8 yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 no</td>
<td>11 no</td>
<td>1 1 n/r</td>
<td>7 yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 missing</td>
<td>1 missing</td>
<td>2 no</td>
<td>8 missing</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>1 missing</td>
</tr>
<tr>
<td>Yes</td>
<td>Psychological only</td>
<td>1 yes</td>
<td>4 yes</td>
<td>2 yes</td>
<td>0 yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 no</td>
<td>4 yes</td>
<td>2 no</td>
<td>4 no</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 missing</td>
<td>0 no</td>
<td>0 no</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>Psychological and...</td>
<td>5 yes</td>
<td>5 yes</td>
<td>3 yes</td>
<td>1 both</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 no</td>
<td>0 no</td>
<td>2 no</td>
<td>(incl. current medication)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 no</td>
</tr>
<tr>
<td>Yes</td>
<td>n/r</td>
<td>1 yes</td>
<td>1 n/r</td>
<td>1 no</td>
<td>1 missing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 n/r</td>
<td>1 no</td>
<td>1 no</td>
<td></td>
</tr>
</tbody>
</table>

Notes: n/a = not applicable; n/r = not reported (i.e. question uncompleted); missing = document missing from health records
6. B. 2 Documentation for possible cases (as indicated by the Whooley questions)

<table>
<thead>
<tr>
<th>Research Question B3: What is documented when women endorse the depression case finding questions?</th>
</tr>
</thead>
</table>

Documentation was observed for the HHN and main notes concerning antenatal appointments. For women whose HHN were unavailable, there was no record of their Whooley responses, i.e. this information was not documented elsewhere; itself a finding.

For women responding ‘yes’, records were checked for any comments concerning mood, well-being, or psychosocial factors that could be taken as an indication of some discussion. As shown in Figure 6.3, approximately one-third of women had nothing documented anywhere (which comprised: one woman endorsing Whooley item (i), four endorsing Whooley item (ii), and four endorsing both, including one that did not complete the Arroll item). Of 21 with something documented, only eight had consistency between the HHN and main antenatal notes.

The care providers’ documentation regarding the 21 women transcended concern about mental health. There was some evidence of appropriate exploration of other explanations of symptoms, including comments on wider ‘psychosocial’ circumstances and somatic complaints, where symptoms were not viewed as symptomatic of mental health per se (n=11: pregnancy-related somatic (n=2); pregnancy-related previous loss (n=1); pregnancy-related overwhelmed (n=1); pregnancy-related unspecified (n=1); family illness/carer roles (n=3); work/housing (n=2); ‘no concerns’ (n=1)).

Critically, documentation indicating discussion was present for all six women responding ‘yes’ to the help question. Of those six, three were referred to the specialist midwifery service (although all were considered to not meet criteria for receipt of additional support; discussed in more detail later). The remaining three included one patient wanting help concerning hyperemesis gravidarum (i.e. a severe form of morning sickness). Another patient had carer roles and was ‘struggling’ but ‘declined referral to social services for extra support’. The final patient was described as ‘wanting counselling’ and was ‘advised to see GP and given leaflet on counselling’; discussed in further detail in Study Part 2 due to being an interviewee. Of the three where Arroll was not completed, one had nothing documented whereas the other two were referred to the specialist midwifery service.
Figure 6.3 Documentation for 30 women responding ‘yes’ to at least one Whooley item (with Arroll responses reported in italics)

Common features of referrals and actions taken in response to referrals were also assessed from a review of the clinical notes.
6.B.3 Common features of referrals

Research Question B4: What factors (apparently) influence mental health referrals being raised?

As reported in the earlier table (Table 6.1) summarising Whooley and Arroll responses, of the 20 women referred at booking for whom the HHN were available, 10 had responded yes to at least one Whooley item. This included three women who had responded yes to Arroll and two who had not completed Arroll. While this may appear to indicate that Whooley and Arroll responses influenced referrals, closer inspection of the referral details identifies that the common factor was instead previous mental health.

Details of the referrals for all 24 women referred antenatally are available in Appendix 6.1 and a description of the responses to referrals is presented in the next section. Critically, no women were referred who endorsed a Whooley item (or indeed reported wanting or needing extra support) but did not report a mental health history. This included three women who took part in Study Part 2.

Women who were not referred who had mental health histories documented
Four women had a mental health history documented at booking and were not referred. Of concern, one was due to apparently having been missed in the midwife’s documentation, having disclosed in the HHN previous depression as a teenager and PND and post-traumatic stress following the previous pregnancy. No GP letter was present for this woman. For the other three women, the midwives reported the reason that a referral was not being raised, documenting their clinical judgement. For one, the midwife reported that the woman had experienced depression as a teenager for which she had taken medication; however, the woman attributed to ‘just growing up’ and there had been no problems since. With the other two, there were inconsistencies between the GP’s letters and the women’s accounts. For one, the midwife documented that the GP reported a history of depression and having prescribed medication, whereas the woman refuted this diagnosis, reporting that she had had work-related stress and had not taken the medicine; the midwife also documented that the woman was happy to be pregnant and had a supportive partner. For the other, the GP documented a history of depression and related medication whereas the woman reported that she had seen the GP following abuse and had not taken any medication.
6.B.4 Responses to referrals

Details of the referrals to the specialist mental health midwifery service are available in Appendix 6.1. In total, 27 referrals were made concerning 24 women. The majority of referrals (23/27) were made at booking. The others included two that were raised in light of additional information provided by the GP, one by the research team in light of disclosures during interview and one by an obstetrician later in pregnancy.

The majority of referrals concerned depression or PND; the six concerning anxiety were described as work-related stress and anxiety (n=3), anxiety and depression (n=1), anxiety and depression since last pregnancy (n=1) and anxiety and stress since birth of last child (n=1). Women were rarely eligible for specialist mental health midwifery services, based on local criteria, whereas those referred concerning substance use and safeguarding concerns appeared to be managed by the relevant specialist midwives. Women ineligible for specialist mental health services included: women currently taking mental health medication; women with past and continuing PND; women with past and continuing anxiety; and women presenting with psychological distress symptoms combined with other difficulties (e.g. unwanted pregnancy, “eating problems”, carer roles, lack of social support).

Specialist responses were as follows: woman does not meet criteria/no plans to contact (n=12); no evidence of response (n=7); will contact patient (n=3); blank form returned (n=1). In the other instance a reply had not yet been received before the woman was re-referred by the research team; however the specialist service confirmed that the woman would not have been eligible based on the original referral. Only two women are known to have been contacted by the specialist service – one who had previous perinatal psychiatry input and asked to be contacted (having not heard back from the original referral) and one who was found to have severe mental illness (re-referred by the research team).

For the vast majority of women considered ineligible, there was no documentation indicating that any further action had been taken. In two cases, the antenatal clinic midwives had documented contacted the women concerned to inform them of ineligibility and confirming current GP involvement; the women reported being reviewed by the GP respectively four-weekly and three-monthly. Documentation indicated that four women were reviewed by obstetricians concerning their mental health.
Seven of the women who were referred took part in Study Part 2. This topic is returned to in detail in the qualitative element of the research (Chapter 8, Theme 5). Having presented in Chapter 5 the findings using the ARMS questionnaire pack and in Chapter 6 the findings concerning clinical practice, the next chapter compares findings across sources.

Summary of Chapter 6

There are no published studies reporting completion of the Whooley and Arroll items or responses by health professionals.

In this local sample,
- Current symptoms of maternal stress were not routinely monitored using Whooley, even for possible cases of depression, although some women with identified mental health problems were reviewed by obstetricians
- Nearly one in five women endorsed at least one Whooley item; of these, only one in five endorsed the Arroll ‘help’ item and a further one in ten did not complete the item
- The common feature of referrals to the specialist mental health midwifery service was found to be mental health history rather than current symptoms
- Occasionally, midwives exercised clinical judgement and decided not to refer women with mental health histories
- Referrals predominantly concerned depression or PND
- The majority of women referred were found to be ineligible for specialist services
- There appeared to be poor communication concerning management of referrals
- There seem to be inadequate resources for responding to need identified through mental health assessment
Chapter 7. Comparing Antenatal Psychosocial Assessment in clinical practice and the ARMS questionnaire (using the adapted PRI approach)

In this chapter, the findings from the questionnaire and health records are compared in two aspects: mental health assessment and identified psychosocial need.

7.A Mental health assessment

Section 7.A presents comparison for mental health history and treatment history, before presenting a ‘validation’ study concerning identification of possible ‘cases’ of distress.

7.A.1 Comparing mental health history and treatment history

<table>
<thead>
<tr>
<th>Research Question C1: How consistent are the mental health and treatment histories documented in health records and reported using the ANRQ questionnaire?</th>
</tr>
</thead>
</table>

Health records (including the handheld notes (HHN), main notes and GP letter) were compared with questionnaire responses for the 186 women who completed the relevant section of the ANRQ. As described previously (Chapter 5), the ANRQ contained four items concerning mental health: history of depressed or anxious mood lasting at least two weeks (ANRQ2a), impact of this period (ANRQ2b), having sought help (ANRQ2c, including a list of different professionals involved), and having taken ‘tablets or herbal medicine’ (ANRQ2d).

The original ANRQ additionally asks a question about ‘any other mental illness’ with the ‘history of mental health’ risk factor scored as present following endorsement of either this or ANRQ2a. In the main ARMS study, the health records were used, rather than asking in the questionnaire about ‘any other mental illness’.

Mental health history (ANRQ2a)

It was predicted that, given the lower severity implied by previous mood compared to mental health history, the ANRQ2a would uniquely identify women whereas the health records would not. Although the ANRQ did identify considerably more women (ANRQ 84/186; notes 28/186), four women were uniquely identified by the health records. As shown in column 4 of the contingency table (Table 7.1), this comprised one woman reporting no treatment history
who had refuted the GP’s description of mental health and treatment history) and three women reporting previous pharmacological treatments.

**Treatment history (ANRQ2c and ANRQ2d)**

Treatment history documented in the health records ("any" and type) was compared with the ANRQ responses, both in terms of "sought help" (ANRQ2c) and "took tablets/herbal medicine" (ANRQ2d). The findings are presented in the contingency table (Table 7.1). Of the 158 women who had no history documented in the health records, 21 reported on the ANRQ having previously sought help for a previous period of altered mood (including seven who accessed counselling) and 13 reported taking tablets or herbal medicine. For the remaining 26 women who had a mental health history documented, comparisons are described below, according to treatment type.

**No treatment history documented (n=3)**

Two women reported seeking help, including one who accessed counselling and one who saw a psychiatric nurse. The latter also took tablets or herbal medicine and had written in her HHN that she had a history of depression, postnatal depression and “post traumatic stress after last pregnancy”. Concerningly, no information was documented in the main notes and there was no GP letter in the health records.

**History of pharmacological treatment only (n=16)**

Of the 16 women with previous pharmacological treatment documented in the main notes, four women on the ANRQ reported not seeking help. This included three (of the four) women with a mental health history documented in the health records who did not report any history on the ANRQ (ANRQ2a; the fourth woman had no treatment history documented in the health records). Furthermore, only 11 of the 16 women reported taking tablets or herbal medicine; the remaining five included one who did not complete the ANRQ item (ANRQ2d), two who reported no history (ANRQ2a) and two where there was inconsistency in the health records (for both, the GP documented a history of antidepressants and the midwife reported that this was denied by the woman).

**History of psychological treatment only (n=4)**

All four disclosed on the ANRQ (ANRQ2c) seeking help and all reported accessing counselling. Of note, two also disclosed taking tablets or herbal medicine.

**History of psychological and pharmacological treatment (n=5)**

All disclosed seeking help and four of the five reported taking tablets or herbal medicine.

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36 A total of 163 women had no mental health history documented in the health records; however, only 158/163 completed any of ANRQ2.
Table 7.1 Comparing mental health and treatment history documented in the health records with ANRQ responses for history of symptoms (ANRQ2a), history of seeking help (ANRQ2c) and history of taking tablets/herbal medicine (ANRQ2d) (n=186)

<table>
<thead>
<tr>
<th>Source: Health records (from HHN, main notes, GP letter)</th>
<th>Source: ANRQ</th>
<th>Source: ANRQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental health history (any)</td>
<td>Source: ANRQ</td>
<td>Source: ANRQ</td>
</tr>
<tr>
<td>Treatment history and type</td>
<td>ANRQ2a (history of symptoms) (n=84)</td>
<td>ANRQ2c (sought help) (n=44)</td>
</tr>
<tr>
<td>n</td>
<td>(n=2)</td>
<td>(n=2)</td>
</tr>
<tr>
<td>No</td>
<td>None</td>
<td>n/a</td>
</tr>
<tr>
<td>Yes</td>
<td>Pharmacological only</td>
<td>n/a</td>
</tr>
<tr>
<td>Yes</td>
<td>Psychological only</td>
<td>n/a</td>
</tr>
<tr>
<td>Yes</td>
<td>Psychological and pharmacological</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Notes: n/r = not reported; n/a = not applicable
7.A.2 Agreement of measures in identifying possible ‘cases’ of psychological distress: Validation of the Whooley questions

In addition to comparing mental health history and treatment history, the questionnaire and health records were compared for the other element of routine mental health assessment: case finding for depression. Agreement of these measures was investigated to address the following primary research question and its sub-questions:

Research Question C2: How consistent are the diagnostic classifications of the depression screening questions recently introduced to practice (the Whooley questions) and a previously validated depression screening tool (the EPDS)?

Research Question C2 a): What is the specificity and sensitivity of the two Whooley symptom items when the EPDS is treated as the ‘gold standard’?

Research Question C2 b): Does the Arroll ‘help’ question improve specificity and sensitivity?

The validation study compared depression case finding using two instruments: the Edinburgh Postnatal Depression Scale (EPDS, completed in the questionnaire) and the Whooley questions (completed in the HHN). Here, the EPDS was treated as a criterion variable, i.e. the EPDS was viewed as a valid measure of antenatal psychological distress with the ability to identify possible cases. Although the EPDS is not diagnostic, measures of diagnostic validity were used (e.g. sensitivity, specificity) which is nonetheless considered appropriate for this type of investigation, the purpose of which is to assess the accuracy of a new test (i.e. Whooley) against an existing ‘gold standard’ (i.e. EPDS, using the thresholds recommended in the literature). Analyses were performed for different combinations of responses on the two Whooley items (i: feeling down, depressed or hopeless, and ii: having little interest or pleasure in doing things) and the Arroll ‘help’ item (is this something you feel you need or want help with?).

Validation of Whooley items against EPDS and the impact of using Arroll ‘help’ item to determine caseness

In line with the national clinical guidelines for the use of Whooley, the focus of the analyses were a) caseness as indicated by ‘yes’ to at least one of the Whooley items, and b) caseness as indicated by a ‘yes’ response to the Arroll item (following a yes response to at least one of the Whooley items).
As shown in Table 7.2, Whooley (defined as yes to either item) had better specificity (ranging between 92.1 and 84.9%) than sensitivity (ranging between 45.7 and 57.1%). That is, the majority of women who are non-cases (based on the EPDS) are identified as non-cases using Whooley. In contrast, only half of the women identified as possible cases using the EPDS are also identified using Whooley.

The probability of the Whooley result giving the “correct diagnosis” (where the EPDS is treated as the gold standard) is shown by the Negative Predictive Value (NPV) and Positive Predictive Value (PPV); however, these values are dependent on the underlying prevalence of caseness (Altman & Bland, 1994). Thus, the NPV is higher with higher EPDS thresholds, with women rarely misclassified as non-cases (i.e. false negatives). Conversely, the PPV is lower with higher EPDS thresholds, suggesting a worsening precision rate with women identified as cases using Whooley increasingly likely to be false positives. Due to its reliance on the underlying prevalence, it has been proposed (Heston, 2011) that standardised NPV (SNPV) and standardised PPV (SPPV) may be calculated, using a hypothetical standardised prevalence, e.g. 50%. As shown in the final columns of Table 7.2, the standardised values show greater consistency across EPDS thresholds and demonstrate that the NPPV is superior to the SNPV; that is, Whooley leads to fewer false positives than false negatives.

The results presented in Table 7.3 show the implication for diagnostic accuracy of Whooley when caseness is determined by a ‘yes’ response to Arroll. Irrespective of EPDS threshold, using Arroll as the criterion improves the specificity but leads to substantially reduced sensitivity (ranging between 9.1% and 16.7%, rather than 45.7-57.1%). Thus, the Arroll criterion identifies just one in ten women identified by the EPDS (compared with one in two when judged on either Whooley item), missing nine in 10 possible cases.

Of the six women saying yes to Arroll, four had EPDS scores of 10 or more. Comments on the HHN indicated that the other two (deemed ‘false positives’, using the EPDS as the gold standard) were due to somatic aspects of pregnancy (e.g. sickness in pregnancy). It should also be noted that three women did not answer Arroll following a yes response to at least one Whooley item and this included two women who were possible cases using the EPDS approach, both of whom had specialist referrals.

Comparison of different Whooley items
Agreement between EPDS classification and different combinations of Whooley responses was compared (i.e. item i only, item ii only, at least one of the items, both items). Further

[37] The SNPV and SPPV were calculated using the formulae for calculating NPV and PPV (Altman & Bland, 1994): NPV = [[(specificity) (1-prevalence)] / [[(specificity) (1-prevalence)] + [(1-sensitivity) (prevalence)]]]; PPV = [[(sensitivity) (prevalence)] / [([(sensitivity) (prevalence)] + [(1-specificity) (1-prevalence)]).]
details are available in Appendix 7.1. Diagnostic properties were largely comparable with the exception of sensitivity, which was greatest where caseness was based on item i, with caseness based on item ii increasing the proportion of false positives. Comments in the health records concerning Whooley responses indicate that this may be due to item ii partly reflecting somatic aspects, rather than psychological distress.
Table 7.2 Diagnostic accuracy of Whooley (defined as ‘yes’ to at least one of the two items) where the EPDS is treated as the gold standard (n=160)

<table>
<thead>
<tr>
<th>EPDS threshold</th>
<th>Whooley (either item)</th>
<th>Measures of performance</th>
<th>Standardised measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No (n=130)</td>
<td>Yes (n=30)</td>
<td>Sensitivity</td>
</tr>
<tr>
<td>9/10</td>
<td>Less than 10 (n=114)</td>
<td>105 (65.6)</td>
<td>9 (5.6)</td>
</tr>
<tr>
<td></td>
<td>10 or more (n=46)</td>
<td>25 (15.6)</td>
<td>21 (13.1)</td>
</tr>
<tr>
<td>12/13</td>
<td>Less than 13 (n=137)</td>
<td>118 (73.8)</td>
<td>19 (11.9)</td>
</tr>
<tr>
<td></td>
<td>13 or more (n=23)</td>
<td>12 (7.5)</td>
<td>11 (6.9)</td>
</tr>
<tr>
<td>14/15</td>
<td>Less than 15 (n=146)</td>
<td>124 (77.5)</td>
<td>22 (13.8)</td>
</tr>
<tr>
<td></td>
<td>15 or more (n=14)</td>
<td>6 (3.8)</td>
<td>8 (5.0)</td>
</tr>
</tbody>
</table>

Notes: sensitivity = proportion of women who are possible cases (based on the EPDS) who are identified as possible cases (using Whooley); specificity = proportion of women who are non-cases (based on the EPDS) who are identified as being non-cases (using Whooley); NPV (Negative Predictive Value) = proportion of women with negative test result (on Whooley) who are correctly classified as non-cases; PPV (Positive Predictive Value) = proportion of women with positive test result (on Whooley) who are correctly classified as possible cases; SNPV = Standardised NPV (based on a hypothetical underlying prevalence); SPPV = Standardised PPV
Table 7.3 Diagnostic accuracy of Whooley (defined as ‘yes’ to the Arroll ‘help’ question following ‘yes’ to at least one of the two Whooley items) where the EPDS is treated as the gold standard (n=157)

<table>
<thead>
<tr>
<th>EPDS threshold</th>
<th>Arroll ‘help’ item</th>
<th>Measures of performance</th>
<th>Standardised measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No (n=151)</td>
<td>Yes (n=6)</td>
<td>Sensitivity</td>
</tr>
<tr>
<td>9/10</td>
<td>Less than 10 (n=113)</td>
<td>111 (70.7)</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td></td>
<td>10 or more (n=44)</td>
<td>40 (25.5)</td>
<td>4 (2.5)</td>
</tr>
<tr>
<td>12/13</td>
<td>Less than 13 (n=136)</td>
<td>132 (84.1)</td>
<td>4 (2.5)</td>
</tr>
<tr>
<td></td>
<td>13 or more (n=21)</td>
<td>19 (12.1)</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>14/15</td>
<td>Less than 15 (n=145)</td>
<td>141 (89.8)</td>
<td>4 (2.5)</td>
</tr>
<tr>
<td></td>
<td>15 or more (n=12)</td>
<td>10 (6.4)</td>
<td>2 (1.3)</td>
</tr>
</tbody>
</table>

Notes: NPV = Negative Predictive Value; PPV = Positive Predictive Value; SNPV = Standardised NPV; SPPV = Standardised PPV
7.B Comparing identified need

Having compared across health records and the ARMS questionnaire mental health history, treatment history, and current symptoms, this section applies a similar comparison to identified need. Due to the small sample sizes prohibiting statistical comparison, a descriptive comparative analysis is presented, comparing classification from the questionnaire (using the PRI and self-identified need) with that from the HHN (the Whooley questions and the Arroll ‘help’ question).

Research Question C3: How consistent is classification of identified need based on using the PRI, self-identified need in the questionnaire and self-identified need in the HHN (Arroll ‘help’ question)?

**Self-reported social support needs (in the questionnaire) and needs disclosed in the handheld notes (clinical antenatal psychosocial assessment process)**

Whereas the ARMS questionnaire specified emotional and practical support, the Arroll ‘help’ item contained in the HHN does not specify the type of help. As shown in Table 7.4, across both types of support, approximately one-third of women saying ‘yes’ to at least one Whooley item also reported in the questionnaire that they wanted or needed additional support (emotional: 9/30; practical: 10/30). However, this represented approximately one-half of the women wanting additional emotional support (9/16) and one-third of those wanting practical support (10/28). Of the six women saying ‘yes’ to the Arroll ‘help’ question in the notes, three said in the questionnaire pack that they wanted or needed additional emotional support, of which two also wanted or needed additional practical support. None of the women saying ‘yes’ to Arroll reported on the questionnaire pack that they wanted practical but not emotional support.

Table 7.4 Comparison of self-identified want or need or different types of support and responses in the clinical assessment (Whooley and Arroll) (n=156)

<table>
<thead>
<tr>
<th>Self-identified want/need for support</th>
<th>Yes to at least one Whooley item</th>
<th>Yes to both Whooley items</th>
<th>Arroll ‘help’ item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Neither</td>
<td>18</td>
<td>106</td>
<td>13</td>
</tr>
<tr>
<td>Emotional only</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Practical only</td>
<td>3</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>Both</td>
<td>7</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>126</td>
<td>16</td>
</tr>
</tbody>
</table>
Needs disclosed in the handheld notes (clinical antenatal psychosocial assessment process) and needs indicated using the PRI (questionnaire-based)

Of the six women responding ‘yes’ to Arroll, three were comorbidly high on risk, anxiety and depression symptoms (‘high<sub>AD</sub>’), one was high on depression only, one high on risk only, and the other low on all PRI measures of maternal stress. Of the 30 endorsing at least one Whooley item, almost half (14/30) were comorbidly high on risk, anxiety and depression symptoms (‘high<sub>AD</sub>’). While two-thirds (21/30) were identified by the EPDS, based on scoring above a threshold of 10 or more (reducing to 11/30 at EPDS 12/13), 90% (27/30) were identified when using the PRI (i.e. measuring depression in combination with anxiety and risk). Full comparison of Whooley and Arroll responses with PRI responses is available in the contingency tables presented in Appendix 7.2.

The three women who endorsed at least one Whooley item and were not identified using the PRI (i.e. those considered ‘low’) were all Asian (either Asian Pakistani or Asian Indian), possibly suggesting cultural differences in completion across different measures. One of the three women responded ‘yes’ to Arroll and attributed these responses to her carer roles. The booking midwife offered a referral to social services, which the woman declined. Another (who responded ‘no’ to Arroll) wrote “due pregnancy” in her HHN alongside her Whooley response; however, nothing was documented by the midwife. The GP letter provided further insight, reporting that the woman was “a little bit anxious” due to having been trying to conceive for a long time and having had a recent ectopic pregnancy. The third woman did not complete the Arroll item and nothing was documented in respect of the Whooley response, either in the HHN or the main notes.
Summary of Chapter 7

- Comparison of the ARMS questionnaire and health records found that several women disclosed mental health and treatment histories in the research that were not documented in the health records.
- At both commonly used EPDS thresholds (9/10 and 12/13), the Whooley items identified approximately half of the possible cases.
- Inclusion of the Arroll 'help' question as a criterion improved the specificity of the approach used clinically but substantially reduced the sensitivity, missing nine in ten women who were above threshold on the EPDS (across both commonly used thresholds). Additionally, there were issues of non-completion of the Arroll item.
- Agreement with the EPDS was better for the first Whooley item (down, depressed, hopeless) than the second (little interest or pleasure), with the latter leading to more false positives, possibly reflecting somatic aspects of pregnancy.
- The majority of women who were identified using Whooley scored above threshold on at least one of the PRI measures of maternal stress; the exceptions where women identified using Whooley were low on all measures indicate areas for further research.
Chapter 8. Study Part 2: Interview findings

This chapter presents the findings from the interviews (Study Part 2), together with synthesis across Study Part 1 and Study Part 2.

8.A The process of Framework Analysis

Framework Analysis involves five stages: familiarisation, identification of a theoretical framework, indexing, charting, and mapping and interpretation (Ritchie & Spencer, 1994). The process of Framework Analysis was iterative, rather than comprising five sequential stages, and involved successive analyses over several months. The five stages and associated practical details, including the use of computer software, are summarised in Table 8.1.

Familiarisation and informal analysis

Early informal analysis occurred through familiarisation at the time of active data collection and the processes of direct transcription (12/62 interviews) and transcription-checking of those transcribed by an external confidentiality-bound agency (50/62). Field notes were made both before and after interviews and, where relevant, when arranging interviews. Later interviews (time 2 and time 3) had an added layer of analysis, with preparation involving reading the earlier transcripts and field notes.

In addition to familiarisation and deep engagement (step 1, Table 8.1), early informal analysis involved annotating with potential themes (step 2) and highlighting data associated with these themes (step 3), both on paper copies of transcripts and in NVivo.

Identifying theoretical framework and indexing

Coding initially used numerous specific nodes in NVivo (i.e. detailed coding) which were gradually re-configured into higher order sub-themes using node ‘hierarchies’. Thus, through indexing, the framework evolved from the a priori framework (i.e. the framework used for the research questions and topic guide) to data-driven frameworks. Frameworks were formally based on the time 1 interviews; although by this stage, all interviews had taken place and the frameworks therefore accommodated subsequent themes (e.g. being aware of changing fears in pregnancy), facilitated by sustained engagement with the research.

38 Direct transcription was conducted for the first interviews and those considered more emotive (e.g. including audible signs of distress, i.e. crying) or more sensitive in nature (e.g. discussing termination of pregnancy), including some from every timepoint. Transcription-checking involved removing identifying details and checking non-verbal language (e.g. distinguishing nervous laughter) (for transcription key, see Appendix 8.1).
*Charting, mapping and interpretation*

Earlier versions (Framework 1 and Framework 2) were accompanied by hand-drawn diagrams of the themes and sub-themes and their inter-relationships, involving elements of step 5 (mapping and interpretation). In contrast, Framework 3 (the Final Framework) was fully charted for the first five participants' initial interviews in Excel, using matrices where data was summarised by participants (depicted by rows) and with themes presented in columns. The charts were then used to map and interpret the phenomena across the dataset as a whole, looking for patterns within cases (including longitudinally), and between cases and groups of cases (both cross-sectionally and longitudinally), with attention to the original research questions and data-driven themes. Reflections on the charting, perhaps the most unique aspect of this type of qualitative analysis, are presented in Appendix 8.2, together with an example of the charting. The mapping and interpretation process was used to generate rich explanatory accounts (illustrated by direct participant quotes) that addressed the research questions.

### Table 8.1 Practical aspects of Framework Analysis

<table>
<thead>
<tr>
<th>Steps of Framework Analysis</th>
<th>Practical details about how this was accomplished</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. familiarisation (key ideas, recurring themes)</td>
<td>interviews, field notes, transcription process, preparation for later interviews (reading previous transcripts and field notes)</td>
</tr>
<tr>
<td>2. identifying theoretical framework (use of <em>a priori</em> ideas but data dictates themes and issues)</td>
<td>research questions and topic guide; combination of using NVivo and paper-based analysis alongside familiarisation and indexing; refined further through charting</td>
</tr>
<tr>
<td>3. indexing (identifying data corresponding to themes)</td>
<td>iterative with identifying framework, not subsequent; informal paper-based processes (i.e. highlighting and annotation), primarily using NVivo for formal coding of transcripts imported from Word</td>
</tr>
<tr>
<td>4. charting (matrices of themes, presented by participant, summarising data)</td>
<td>using Excel alongside NVivo (using a split computer screen and moving between the two); revising framework as thinking develops</td>
</tr>
<tr>
<td>5. mapping and interpretation (looking for patterns with attention to original research questions and data-driven themes)</td>
<td>concurrent with other processes; use of paper for conceptual mapping and relationships between elements of framework</td>
</tr>
</tbody>
</table>
8.B Developing the Final Framework

The a priori framework was conceived as comprising the following four themes: ‘origins’, ‘nature and impact’, ‘assessing’ and ‘responding’. This evolved to the data-driven Final Framework comprising six main themes and several sub-themes. The data-driven Final Framework is shown in Figure 8.1, with the a priori Framework shown in the grey boxes.

Origins, nature and impact (Themes 1 and 2)
The two a priori framework themes of ‘origins’ and ‘nature and impact’ (originally separated, reflecting causality) were replaced by two overarching themes that spanned these: context of pregnancy (Theme 1), and understandings of maternal stress (Theme 2).

Assessing and Responding (Themes 3-5)
The a priori theme of ‘assessing’ was originally conceived as acceptability of antenatal psychosocial assessment (APA) concerning views of the ARMS research questionnaire and questions asked clinically. Acceptability of APA remained a theme (Theme 3), which included women’s feedback in Study Part 1. This was accompanied by a theme concerning context of disclosure (Theme 4); with both themes shaped by understandings of maternal stress (depicted by the arrow from Theme 2 in Figure 8.1).

Whereas a priori, ‘assessing’ and ‘responding’ was viewed as a two-step process, this was revised to acknowledge the interplay between assessing and responding (depicted by the bidirectional arrow between assessing and responding in Figure 8.1). Firstly, ‘responding’ comprises not only the ‘action taken’ in response to maternal stress, but also the initial ‘reaction’ to maternal stress or its disclosure (described in Theme 5 and triangulated with observations from health records in Study Part 1). Secondly, past experiences of responding influence future disclosures and assessing. Areas of overlap are therefore discussed when illustrating the themes.

Research(er) as intervention (Theme 6)
The role played by the interview (and interviewer) was originally planned to form part of the methodological reflections but was found to be a key theme in its own right, involving both conducting APA and responding to disclosures.

Having briefly summarised here the structure of the final Framework, section 8.C provides detailed descriptions of each theme and sub-theme, illustrated by participant quotations. Longitudinal aspects, although not depicted in Figure 8.1, are described at each relevant stage, as is synthesis of findings with Study Part 1.

An additional theme concerning the maternal-fetal relationship was included in both the original and final frameworks but, due to space constraints, this element of the research is not reported in the thesis.
Theme 1: Context of pregnancy
1.1 Non pregnancy-specific stress (wider psychosocial)
1.2 Pregnancy-specific stress
   A) previous perinatal loss/trauma
   B) intendedness of pregnancy and relationship with partner
   C) identity/role
   D) fears and the unknown
   E) health services and systems

Theme 2: Understandings of maternal stress
2.1 Nature and impact of maternal stress
2.2 Personal mental health and stress history
   A) own history
   B) own relationship with stress
2.3 Views on treatment options

Theme 3: Acceptability of Antenatal Psychosocial Assessment (APA)
3.1 ARMS questionnaire
3.2 Clinical practice

Theme 4: Context of disclosure
4.1 Relevance to maternity services
4.2 Context of appointments (and previous experiences of disclosure and responses)
4.3 Recognising to self and others
4.4 Admitting to self and others

Theme 5: Responding to women’s needs
5.1 Current mental health systems and referrals
5.2 Internal resources: Coping differently in pregnancy
5.3 External resources: Type of support and support provider

Disclosure involves immediate responding
Responding influences future disclosures

Responding (not fully separable from assessing)

Understandings influence context of disclosure
Conducting APA (antenatal psychosocial assessment) - assessing current stress and past history

Theme 6: Research(er) as intervention
- reaction to disclosures
- motivation to access services
- signposting and referrals

Figure 8.1 Mapping the Final Framework (a priori framework shown as grey boxes)
8.C The Final Framework for ARMS

All of the themes shown in Figure 8.1 are described; however, due to space constraints, only the sub-themes of most relevance to the thesis are presented within this chapter.40

Theme 1: Context of pregnancy (including understanding and meaning of pregnancy)

Through charting, context of pregnancy was changed from a sub-theme (characterised by previous pregnancy and delivery outcomes) to a main theme. Descriptions were written to describe the most pertinent aspects of context for participants. This was easiest where women reported clear sources of stress (e.g. previous loss) or indeed particularly positive aspects, and most difficult where descriptions were more neutral. Context of pregnancy descriptions often contained sensitive, and potentially identifiable, combinations of information and are therefore not reported here. As shown in Figure 8.1, context of pregnancy comprised two main sub-themes: psychosocial stress and pregnancy-specific stress.

1.1 Non pregnancy-specific stress (wider psychosocial)

The sub-theme comprised psychosocial stresses that were pre-existing (prior to conception) or arose during the pregnancy (e.g. family illness or bereavement) and were considered stresses irrespective of the current pregnancy. Previous pregnancy-related loss or trauma, although meeting this definition, were primarily coded in the pregnancy-specific sub-theme, consistent with the approach used in Study Part 1 when coding the open-ended ANRQ stress question. Additionally, the distinction was consistent with women's comments about relevance of maternal stress to maternity services (described in Theme 4).

Psychosocial stresses included both life events and ongoing difficulties. Some stresses were chronic, including carer roles, relationship breakdown and application for residency. The interviews revealed that there were often multiple stresses, more so than indicated by the open-ended ANRQ stress question in Study Part 1. Additionally, women described interplay between stresses, for example having a "knock-on effect" (Anne, time 1) or a "domino effect" (Abbie, time 3).

Alongside interplay between non pregnancy-specific stresses, the pregnancy itself could

40 The following sub-themes of context of pregnancy (theme 1) are not presented in the findings: material concerns (i.e. wider social and environmental factors arising due to the pregnancy); somatic aspects of pregnancy (e.g. sickness, impact on sleep); complications in the current pregnancy (e.g. bleeding in pregnancy and growth concerns); and, health behaviours and practices (e.g. diet, smoking, alcohol consumption and infant feeding).
compound such stresses; for example, increasing concerns about work, finance, or housing when faced with the prospect of a(nother) child.

“At the moment, things are not going well. Because [husband] thinks, “we haven’t got money. We don’t know where to go.” And I’m pregnant.” (Grace, time 1)

The pregnancy could also compound strained partner relationships; however it could be difficult to disentangle the extent to which strain was pre-existing, compounded by pregnancy, or arising in pregnancy. Complexities of relationships were highlighted by Ruth, who strongly rejected the term ‘partner’ in health records and the ARMS questionnaire (favouring ‘baby’s father’).

“This has all sort of come at once really. Obviously broken up with [older child’s] dad. Meeting someone else and then this [conception] happening when we’d broken up … So everything’s kind of felt like it’s all gone wrong.” (Ruth, time 1)

Such inter-relationships thus highlighted the limitation of coding the ANRQ stressors without awareness of the surrounding context and the need to emphasise that non pregnancy-specific stresses were not necessarily unrelated to the pregnancy.

1.2 Pregnancy-specific stress
Stresses coded here were those viewed as bearing direct relevance to the current pregnancy. The five most salient sub-themes (shown in Figure 8.1) are described below.

1.2A) Previous perinatal loss/trauma (related to pregnancies, deliveries and perinatal mental health)
This sub-theme reflected not only the impact and implications of past pregnancy outcome and delivery outcome, but also past experiences of perinatal mental health (PMH).

Pregnancy experience
Pregnancy loss most commonly concerned miscarriage in the first trimester (Anne, Steph, Charlotte, Amanda, Rebecca, Michelle); however, two women had experienced later losses (Rania and Katie) due to fetal abnormalities. While the majority were reported on the ANRQ (and therefore known to the interviewer in advance), Anne’s was not (due to having happened more than a decade previously), nor was Michelle’s (possibly reflecting her recurrent losses or her chronic non pregnancy-specific stresses). Whereas all of these
women discussed their previous losses at the first interview, the health records identified that one further participant had experienced a termination that was not discussed.

Amanda described the possible impact of previous loss on later pregnancies:

"I think a lot of people see miscarriage as, "Oh well, it's one of those things." And, "Well you've got pregnant again so everything's fine." [dismissive tone] And, I don't think they realise a) how upsetting and traumatic it is - it's not just a physical process you go through. And b) that it does, I think, carry over into your next pregnancy, in terms of, sort of, worrying and it bringing things back." (Amanda, time 1).

Impact could be particularly pronounced when faced with threatened loss in the current pregnancy:

"The morning when I had the bleed I was really like traumatised and crying and like, "It's gonna happen again! It's gonna happen again!"" (Charlotte, time 1)

Ultrasound scans were also key milestones where anxiety peaked, even where a healthy pregnancy had followed the previous loss. Such peaks were most common for viability scans (where women attended an Early Pregnancy Unit due to possible signs of loss) and for routine dating scans but the sense of threat could continue through to anomaly scans, particularly where women had experienced later loss. Accounts of scans were highly emotive and often relayed interactions with health professionals, thus overlapping with the sub-theme 'health services and systems' (1.2E). For example, Rania described the sonographer's reaction at the dating scan when she tried to forewarn her that she found scans difficult due to her previous traumatic experiences, identifying a cardiac anomaly that was followed by several investigations and ultimately, the decision to terminate the pregnancy.

""I'm just here to date". That was the response that I got. [snorting laugh] So. Wasn't very understanding." (Rania, time 1)

The potential for staff to impact a woman's experience, positively as well as negatively, was illustrated by Charlotte’s contrasting experiences of early bleeding in two pregnancies:

"This [midwife said] "what have you turned up here for?" … she was like "you're too early, you're far too early in the pregnancy that we can do anything, I don't know why they've sent you here, go and sit in the waiting room", just really rude, and it's like you're going through like one of the most stressful things of your life. … this time [this pregnancy] … everybody was lovely, they did a scan, they did blood tests,
you know, I just felt like it was -. Even if it has been negative it would -. I was treated really well.” (Charlotte, time 1)

Delivery experience
Unlike previous loss, which is always documented in health records (and often on the ANRQ), previous birth experiences are limited to type of delivery and therefore not necessarily consistent with women’s experiences of delivery as traumatic. Thus, details were only documented for Abbie, whose fistula had implications for maternity care, and for Louise, who connected her delivery experiences (involving an emergency caesarean) with her subsequent postnatal depression (PND).

Only Abbie acknowledged past birth experiences on the ANRQ, writing “Pregnancy itself. Brought up lots of fears having had bad birth experience with first baby.” Lack of disclosure reflected the ANRQ timeframe, which was limited by focusing on the timing of the event rather than the impact, as described by Abbie:

“It sort of felt arbitrary the last 12 months… it could have been five years ago but you’re still sort of - you know, you’re dealing with and that may have an impact now”
(Abbie, time 1)

Disclosures may also have been limited by birth experience and delivery-related trauma being harder to define than loss. Several women described their births as “traumatic”, “bad”, or “difficult” when explaining previous postnatal distress and effects could be lasting. For example, Michelle reported continuing symptoms, which showed similarity with those accompanying post-traumatic stress disorder:

“But you know, I still can’t talk about their [premature twins’] birth, you know, and what happened. I nearly lost [girl’s name]. Because it still gets me now, it still feels like it just happened.” (Michelle, time 1)

Elsewhere, birth experiences were acknowledged briefly or hidden within different layers of worry. Disclosure could also be gradual, with Dorothy waiting until her postnatal interview to describe her previous experience and associated concerns:

 “… the thing which was coming on my mind all the time [was] that maybe what happened to [middle son] will happen again … they said there’s no breathing - it’s 50/50, save the mother or baby. I never signed giving a consent form because it was really critical … I just realised that I had the baby later on … the first week I never saw the baby. I wasn’t even allowed to see him.”(Dorothy, time 3)
Past perinatal mental health (PMH) and the prospect of its relapse could also trigger pregnancy-related stress and for two women (Louise and Grace), this was their primary concern. Louise experienced PND following the birth of her last child, which was treated with medication and counselling. She described the prospect of its return as “absolutely terrifying” (Louise, time 1). This was her greatest source of stress but was not captured in the ARMS questionnaire. In contrast, Grace had written on the ANRQ “will discuss it” and disclosed in interview experiencing symptoms of auditory hallucinations, extreme paranoia and suicidality. She was “really scared” that this would return, particularly because, unlike her previous perinatal period, she was now facing chronic stress concerning residency.

The sub-theme had particularly pronounced links with two other areas of pregnancy-related stress: ‘intendedness of pregnancy’ (1.2B) and ‘fears and uncertainty’ (1.2D).

1.2B) Intendedness of pregnancy and relationship with partner

Intendedness was often discussed in relation to previous loss or trauma. For some women, carefully planning the pregnancy appeared important for having a sense of control, being prepared and “feeling ready” to be pregnant again where there had been past difficult pregnancy, delivery or PMH experiences. It could therefore be particularly distressing when the pregnancy was unplanned following previous loss or trauma, as shown by Katie who learned she was pregnant at a gynaecological appointment following her recent loss:

“We would not have chosen to be pregnant. Not because we don't want another baby. Just because we weren't in any way ready to be pregnant. [voice trembling]”

(Katie, time 1)

Irrespective of previous loss or trauma, unplanned pregnancies added a layer of complexity to the process of psychological adjustment to pregnancy, which was often related to the partner’s reaction and could offer insights into the relationship. Critically, unplanned pregnancies were not necessarily unwanted (e.g. Ruth, Anne, Jess, Lauren), even where the woman was not in a stable relationship or where there was uncertainty about paternity. For three women, their unplanned pregnancies were also unwanted and all three reported strained marriages; highlighting the need to distinguish unintended from unwanted pregnancy and unsupportive relationships from having no partner.
These three women reported a process of “coming to terms” with the pregnancy, having originally considered termination. For Dorothy and Grace, termination was against their religion and culture. For Helen, it was a choice between her husband and a termination:

“He just said … “That'll be it … I'll never forgive you and I'll leave you” – so I had to go through with it [the pregnancy], but I've come more to terms with it now, but it has been pretty stressful.” (Helen, time 1)

Of note, this sub-theme spanned the continuum of intendedness, including pregnancies that may be considered ‘mistimed’ due to conception taking longer than desired, for example where women had required assisted conception (e.g. Abbie and Rebecca).

1.2C) Identity / role
Pregnancy is recognised in the literature as a period of transition in women's lives, with implications for their personal identities and roles. Primiparous women commonly voiced thoughts that were simply indicative of healthy psychological adaptation processes yet, in the absence of this being talked about in society, some women (e.g. Lena and Charlotte) doubted themselves, questioning whether these thoughts were "normal".

Career and identity
Implications for women's careers could be viewed in different ways. For Anne, who had a substantial birth gap, this was an opportunity to have a different experience of mothering and be more involved this time, rather than putting work first. In contrast, other women were concerned about their possible loss of identity (particularly where their identity was strongly linked to their ‘career’) and that they may instead become defined by their role as ‘mother’. This battle was observed across the serial interviews and was often particularly pronounced where women were on maternity leave, sometimes feeling frustrated that they were not yet actively ‘doing’ their new role (i.e. tending to their baby’s needs) nor were they doing their previous role.

Threat to independence
The changing role and identity could create frustrations for women who were used to being self-sufficient and independent, accompanied by challenges with the changing dynamic in the partner relationship. Maternity pay could be important in this respect, as voiced by Charlotte and Louise:
“I’m actually accepting more that [partner]’s going to help me like financially and things and we’ve kind of agreed, we know what he’s got, we know what I’ve got.”
(Charlotte, time 2)

“I’ve still got money going to my account, not having to ask for money all the time.”
(Louise, time 1)

**Frustrations with role and identity, including pre-pregnancy**

Critically, some of the women experiencing the highest levels of current psychological distress (both based on the questionnaires in Study Part 1 and visible distress in the interviews) were frustrated or disappointed with their role and identity and this extended beyond a process of adaptation to motherhood.

For Abbie, her previous delivery-related trauma (for which she still required further operations three years on) had significantly impacted her identity and self-esteem, having lost confidence through being unable to return to work. The impact had been reinforced by needing to plan this pregnancy from medical, legal and financial perspectives, accompanied by five cycles of assisted conception:

“I had to almost ask permission to – to get pregnant, you know. I mean who – who as an adult has to ask permission.” (Abbie, time 1)

For Grace, who was subsequently diagnosed as having severe depression with psychosis, she felt she had not met her expectations and the prospect of another child reinforced this:

“[brother] he brought me here [to UK] to study. I started to study, but didn't finish. I got married, had children. ... In my mind, I think, “I didn't become anybody.” You know, I am still in [supermarket] working, you know. My life is (...) [exhales] it's too much. ... I'm not getting anywhere in my life [exhales, upset].” (Grace, time 1)

This was in stark contrast to Jess who had experienced recurrent episodes of depression and was currently on anti-depressants. Although unplanned, Jess embraced the prospect of motherhood, sense of purpose and the opportunity to excel at a new role:

“I would have thought by now I would have had an idea of what I wanted to do with my life ... I kind of think, “I wish I had, like, a definite goal”, yeah, just, “I wish I’d got a career path, or something” but I’m, kind of, hoping that maybe I’ll just be quite good at being a mum.” (Jess, time 1)
For Ruth, she struggled with her identity as a single parent, having divorced her daughter’s father and now having conceived in a second relationship that had broken down:

“I’m a single parent and I never thought I would be one … that sounds really bad” (Ruth, time 1).

For Michelle, she had struggled as a single parent to her eldest (by a previous partner) and now had broken up with her recent partner (with whom she already had children) for the second time:

“… my dream, after being completely on my own with [eldest], was a family, so not just once but twice now, he’s [partner’s] took that away from me.” (Michelle, time 1)

Nonetheless, she felt the pregnancy offered the opportunity to help “heal a bit” from past trauma following her twins’ birth, highlighting the need to consider the diversity of meanings of pregnancy, which may comprise risk or protective factors.

The sub-theme of identity/role additionally linked with topics not discussed further here, including somatic aspects of pregnancy and changing shape and self-image, as well as health behaviours and the moral and social code surrounding pregnancy.

1.2D) Fears and the unknown
Charting illustrated that this was the most common discourse and examples were identified for every participant. This is not surprising given that interviews probed the nature of women’s worries, anxieties, concerns and stressors. The sub-theme also overlapped with ‘health services and systems’ (1.2E) and their ability to create or allay fears.

Pregnancy was experienced as a time of uncertainty with possible concerns of things ‘going wrong’ and ‘the unknown’. Fears of something going wrong included, the pregnancy (i.e. loss), the baby (i.e. the baby’s health), the delivery, and the woman (in terms of PMH and coping, both of which linked to concerns about bonding). Concerns and fears ranged in severity, which is explored further in ‘nature and impact’ (2.1) and support relating to information and reassurance (described under Theme 5, ‘responding’).

Fear of the pregnancy going wrong and fear of something being wrong with the baby
As described in ‘previous perinatal loss/trauma’ (1.2A), those who had experienced early miscarriage faced fears about similar outcomes and found the early stages particularly stressful; however fears were not limited to these women.
Women sometimes attributed such concerns to not “feeling pregnant” in the absence of symptoms that, although unpleasant, would provide reassurance. For example, despite having only experienced healthy pregnancies in the past, Hannah had “convinc[ed] [her]self there was something wrong” before the dating scan. Women pregnant for the first time also reported doubts, particularly in the build up to the first scan. Emily’s concerns were heightened following “two small bleeds” which, when faced with a longer than anticipated wait for a routine scan, led her to visit her GP and ultimately access a scan sooner:

“I’d never been pregnant before, and I didn’t have any sickness, so I started questioning whether I was pregnant” (Emily, time 1)

Others, such as Sarah, attributed their fears to their tendency to worry:

“I’m just really paranoid about everything. So before [the scan], it was like, “oh my God, I will have had a missed miscarriage”.” (Sarah, time 1)

Although early viability scans and dating scans often were described as providing reassurance, this may only be temporary, as shown by Rania’s quote which also reveals her self-blame concerning her previous loss:

“I’ve got over one hurdle [an additional test performed due to the history], but then I think, at the 20 week scan they’re going to tell me there’s a leg missing or there’s two heads, or-. You start thinking silly things because in some ways you think, well I’m gonna be punished because of what I did in the previous pregnancy.” (Rania, time 1)

Steph described having early fears of the pregnancy going wrong, due to her recent early miscarriage, and these changed to fears about something being wrong with the baby. She attributed this to her role as a health professional:

“…once I had my [dating] scan and it sort of, like, reassured me that the baby was okay, that feeling went, but now I’m waiting for something to be abnormally wrong with it … I was never like that [in previous pregnancies]. I think it is because of where I work and what I know.” (Steph, time 1)

For other women, the fear was stillbirth, rather than abnormality; as found in two women with histories of recurrent depressive episodes, Helen and Jess. At time 2, Jess described how on her way to her dating scan (shortly before time 1), she had seen a newspaper headline about a celebrity who had lost her baby at seven months. She had “sat there trying not to cry
on the bus”. Jess linked this awareness to a continuing fear of something being wrong with the baby,

“… it had quite an effect on me and I think that was it, basically, I didn't want to (. . . I still don't, in a way, just in case, but, don't want to look too far ahead.” (Jess, time 2)

Health records accessed postnatally showed that later in the pregnancy, Jess called an ambulance due to decreased fetal movements and a midwife had documented that, following monitoring, Jess had been advised on the appropriate use of an ambulance; however, Jess did not discuss this at the final interview. Helen similarly described another celebrity news article and relayed a recent experience at work where she had been concerned about fetal movements and had telephoned the hospital and spoken to a midwife. Such contacts are not usually documented in health records therefore this was only known through the interview; highlighting the value of multiple data sources and challenges in measuring use of health services.

**Fear of delivery going wrong**

Fear of childbirth is increasingly recognised. For some women, this may reach clinical levels (i.e. tokophobia) and may lead to maternal request for caesarean section (CS) (National Collaborating Centre for Women's and Children's Health, 2011; Nieminen, Stephansson, & Ryding, 2009). Fear of delivery is not fully avoided by CS however. The prospect of a CS varied greatly depending on past experience and the reason for having a planned CS.

For women with planned sections, their main concern was the uncertainty that the baby could arrive sooner, losing the control afforded by a CS. This included Louise who, having previously experienced an emergency CS, felt a planned CS would offer greater control and therefore protect against the risk of her PND returning, rather than risk attempting a vaginal delivery that resulted in intervention. For Michelle, whose previous deliveries had been vaginal, she felt a CS was a necessary part of her “iron-clad plan” to ensure childcare for her older children (all with disabilities or complex health needs) to avoid them being placed into emergency foster care. For Abbie, a CS gave reassurance that the same thing could not go wrong again; however there remained the possibility of something different going wrong:

“You say to yourself that lightning isn’t going to strike twice but you can’t help but think … there’s no reason why it can’t happen to you again, you know, if you’re that one in, some remote figure – I was still that one”. (Abbie, time 1)
Fear of self going wrong

Women with previous PMH were extremely concerned about it “coming back”, as described in 1.2A. This was often strongly linked to a fear about being a good mother and fear of the impact on the baby. Hannah and Louise were concerned about bonding whereas Grace was concerned about possible harm:

“I don't understand how, you know, why I am scared is the fact those women, they kill their children. … Really I’m scared. I’m scared to end up like this [sad laugh] so, don’t know.” (Grace, time 1)

Some women were also concerned about their mental health during the pregnancy, which is explored further in the process of self-assessment described in ‘recognising to self and others’ (4.3).

The unknown

Rather than specific concerns or fears, ‘the unknown’ included both those things that could not be known (e.g. whether the baby would be healthy or how the woman would feel about how her baby when they met) but also aspects that were known by health professionals or other women but unknown to the woman (e.g. practical aspects about appointments, or how to judge different physical sensations). As described by Amanda, the unknown could trigger anxiety:

“… you just have unidentifiable pains and all sorts of things happen. And I think it's easy to start to think the worst when in fact it's just a normal pregnancy thing.”
(Amanda, time 1)

Changing fears

In this sample, women generally expressed most fears at time 1, accompanied by higher levels of distress although descriptions suggested that distress had often peaked around the booking visit, before having the dating scan.

Some women’s fears and distress had continued or increased at time 2. This included those experiencing considerable anxiety in relation to childbirth and their baby’s health (Ruth, Abbie, Dorothy, Jess and Helen) and women with continuing chronic stress (Michelle, Hannah and Grace); particularly those concerned that such stress rendered them more vulnerable to postnatal mental health difficulties (Hannah and Grace). Of note, while women at time 3 discussed their fears around the time 2 interview and subsequent fears before the delivery, women rarely disclosed new fears in the postnatal period. It cannot be known
whether this was an accurate representation or echoed how in the research women disclosed historical postnatal experiences for which they had not sought help at the time.

Women described finding it more difficult to discuss their early concerns within their support networks due to it being too soon to tell people about the pregnancy. Additionally, at the time of these early concerns, women may not yet have met a care provider or may feel that it was too soon for their worries to be considered valid. Thus, the initial interview could often be the first outpouring of these experiences. In contrast, by time 2, some women felt their concerns were about a ‘baby’ rather than the start of a pregnancy and therefore felt it was more ‘normal’ to be concerned and more ‘legitimate’; thus, any concerns could be raised with a care provider. Similarly, it was widely recognised that it was ‘normal’ to be anxious about childbirth. Thus, in the later stages, the pregnancy could offer a focus for women with a tendency towards anxiety without feeling ‘guilty’ about worrying. Additionally, at time 2, several women described how their anxiety was balanced with excitement. Such positive aspects may be protective factors yet have largely been neglected in APA, which focuses on vulnerability factors.

1.2E) Health services and systems

Through charting, this sub-theme was relocated from ‘responding’ (Theme 5) due to women frequently describing health services and systems as sources of maternal stress, or compounding of existing fears. Oakley (1992) acknowledges that, although pregnancy brings women into contact with health services and the “lens of medical surveillance … it is not in itself a state of illness” (p.348). Women’s discourses illustrated some of the tensions arising through appointments, tests and negotiating systems, combined with a complicated ‘patient role’ where the woman is not truly a ‘patient’.

Several women reported their disappointment at their first visit to the GP, having already self-tested their urine with a pregnancy test. Women anticipated that health professionals would provide above and beyond what they could already access themselves and therefore found the appointment an anti-climax when no additional test was performed or additional advice given. Women also felt there was assumed knowledge and poor communication about pathways, as expressed by Eliza:

“No one told me anything. He [GP] didn’t even say how long [the booking appointment] was going to take to come through. And I remember it was three weeks after I’d seen the doctor I still hadn’t heard anything, so I rang the doctor’s surgery and was like, “Well, am I actually going to see anyone? Is anyone going to actually tell me if I’m actually pregnant yet?” Because you give them your urine
sample, and no one’s actually even said, “Oh yes, it’s come back positive! It’s definitely - you are pregnant.” (Eliza, time 1)

Women were often surprised at the lack of contact in the early stages,

“Everyone says, the first three months are the most important … and yet you don’t see anybody.” (Emily, time 1)

Pregnancy was described as a “waiting game” (Eliza, Ruth). Women prepared themselves for periods of waiting (e.g. until scans or appointments) and frequently described “counting the weeks”. When delays were even longer than anticipated, this could trigger panic:

“It all came out, all sort of bubbled over. Because I just felt – I just felt so helpless. I was saying to [husband], “I just feel really frightened that – that something bad is going to happen again” … with hospitals you do feel like very kind of small fish … All these concerns that I had and just [wanted] somebody saying, “Everything’s okay.”” (Abbie, time 1)

Women then felt comforted once they were “in the system” and no longer “floating around” (Abbie, time 1) or wondering “Who do I belong to?” (Lena, time 1).

Problems of obtaining appointments, waiting times and rushed appointments suggested to women that the health professionals were too busy and many women reported being worried about wasting their time, particularly when concerns were not physical (returned to in ‘context of appointment’, 4.2).

While systems were a hassle for several women, the effect could be particularly marked for some individuals. Some women felt that they had been disempowered in their previous pregnancies (due to being young, or a “pushover”) and were determined to “stand up” for themselves this time, whether that be in negotiating access or the way in which they were spoken to.

As described previously (sub-theme 1.2A), interactions could be particularly important for women who felt vulnerable or emotional due to past experiences of perinatal loss and trauma, with accounts of early loss highlighting that maternal stress is not only seen by ‘maternity services’ but also, for example, primary care (i.e. GPs), staff in Accident and Emergency services, and those in gynaecology. Additionally, this extended to administrative staff who may be involved when arranging appointments.
At its core, all elements of this sub-theme on health services and systems could be subsumed under the need for patient-centred care, as summed up in Lena’s contrasting of her experience with two different care providers:

“I was just a patient like another hundred thousand patients … [whereas the booking midwife] treated me like a person not a patient.” (Lena, time 1)

Indeed, patient-centred care has the potential to accommodate all of the sub-themes of a woman’s unique context of pregnancy and, moreover, cuts across all of the main themes.

**Summary of Theme 1: Context (including understanding and meaning) of pregnancy**

- Context of pregnancy illustrated the relevance of life events perspectives to maternal stress, echoing women’s comments that every pregnancy is (or at least, feels) different – both between individual women and, for the same woman, between different pregnancies.
- Context of pregnancy was less salient where descriptions were more neutral, suggesting that not all women would necessarily identify with such an approach.
- Women experienced a diverse range of wider environmental factors and pregnancy-specific stresses that were not captured in Study Part 1. Additionally, there was interplay between different stresses and evidence of cumulative impact.
- Previous perinatal loss and trauma was found to extend beyond previous pregnancy and delivery experiences, to include previous PMH experiences; assessment of which could be readily incorporated within the booking visit.
- Intendedness of pregnancy often played a central role in the context of pregnancy and was sometimes linked to the partner relationship; with women’s accounts illustrating the limitations of measures that treat having no partner similarly to having an unsupportive partner.
- Women reported several fears and uncertainties, none of which were assessed using the ARMS questionnaire.
- This sub-theme highlighted the need to include anxiety and measures for pregnancy-specific stress in APA, rather than focusing on depression.
- Women’s experiences of health systems and health services could feature in the context of their pregnancy and maternity experience; illustrating the importance of patient-centred care.
- Of note, all aspects of context had the potential to provide protective as well as risk factors and this was particularly evident for the sub-theme concerning women’s identity and role.
Theme 2: Understandings of maternal stress

This theme concerns women’s wider understandings and meanings of mental health, well-being and stress and how these shape women’s understandings of maternal stress. Understandings are shaped by nature and impact of maternal stress in the current pregnancy (2.1) and any personal history prior to the current pregnancy (2.2). These relate to views on appropriate treatment options (2.3) and, combined with considering whether maternal stress is a distinct type of stress, the perceived relevance to maternity services (described further in 4.1).

2.1 Nature and impact of maternal stress (current pregnancy)

The nature and impact is also addressed in the previous theme (context of pregnancy), which focuses on possible sources of maternal stress. Symptoms commonly described in the current pregnancy included variants of “feeling paranoid”, “feeling vulnerable”, “feeling needy”, “being touchy” (i.e. defensive), “being weepy”, “overthinking” (including at night), and having a “rollercoaster” of moods. In contrast to the distress measures used in Study Part 1, women’s descriptions highlighted that severity could be judged by the impact on other aspects of women’s lives. The most frequently reported impact was on the partner relationship, for example, increased arguing; women also discussed increased arguments at work.

“I’ve noticed changes in my mood and my sort of relationship, in particular with my partner ... I don’t know whether it’s because of hormones or whatever but I have noticed that myself and a couple of times he’s commented on, you know, “Get a grip of yourself, what’s wrong with you? You’re not usually like this”” (Lauren, time 1)

Symptoms were common and not necessarily ‘unhealthy’ or indicative of an underlying psychological disorder. Women often described their symptoms of distress alongside reflecting on the extent to which these symptoms were ‘normal’ (explored further in 4.3, ‘recognising to self and others’). This was judged in relation to whether maternal stress is distinct to other types of stress and in relation to a woman’s own relationship with stress (2.2B) and “usual self”, a factor not included in the distress measures in Study Part 1.

Maternal stress as distinct

Women generally felt that key contributors to maternal distress in pregnancy and the postnatal period were respectively hormones and exhaustion. Ruth’s description and presentation illustrated this ‘rollercoaster’:
“If I wasn’t pregnant, I would probably deal with [family illness] better. But I think ‘cos you’re hormonal anyway, that’s when [sighs] you worry about that and you’re hormonal. And then you think “Oh my God. What about the baby? What am I doing to the baby?” So, it’s all connected when you’re pregnant. You do, - it does feel ten times worse. Then you cry about it. Then you feel like a muppet for crying. And then you think, “I’m pregnant, so it doesn’t matter!” [laughs]” (Ruth, time 1)

Knowing that mood could be affected by pregnancy made it harder for women to self-assess severity:

“I think maybe how I react to a stressful situation is a little bit more weaker when I would usually be quite strong and more positive, I’m probably not as positive as I would be usually.” (Charlotte, time 1)

It could also be difficult for health professionals to distinguish. Louise described how teariness in her previous pregnancy (preceding her PND) was attributed to “well, that’s hormones”. In hindsight, “looking back it was probably a bit more than that”. Having previous personal experience helped her to self-assess this time around, illustrating aspects of self-management:

“[Husband] saw me on a few weepy days and he was like “your depression’s coming back”. I was like “No it’s not. I’m just tired”. I sort of knew the difference. I knew I wasn’t depressed. [Daughter] saw the bond that I had with her straightaway. I sort of felt confident that I wouldn’t get depressed anyway because it was just instant. She was just gorgeous. [to daughter:] Weren’t you? Eh?” (Louise, time 3)

For others, it was the change between pregnancy and the postnatal period that reinforced maternal stress had been distinct to their usual stress. During pregnancy, Hannah had fears about her mental health and about bonding with her baby, which changed when her baby was born:

“As soon as I had him, it just felt like a weight had been lifted really. I just felt a lot less stressed, and a lot less down. I mean, I have been down, but not in the same way.” (Hannah, time 3)

Similarly, Dorothy had fears about her baby surviving, due to her past traumatic delivery. She described the change:

“The baby's there. The stress is gone.” (Dorothy, time 3)
Such examples suggest that stress which is more confined to the antenatal period may be due to being linked with concerns that are specific to this timeframe, dissipating once the fear has been disproved and the unknown is known.

**Trajectories and recall**

By interviewing the same women at different stages, it was possible to observe trajectories (illustrated above) but also women’s changing perspectives on their maternal stress. Hannah’s distress had increased further from time 1 to time 2. Her presentation suggested signs of depression, as did her account of her recent experiences, which showed significant impact on quality of life:

“I’m finding it hard on being my own but then hard being with different people. … I’ve been really, really, really emotional. Ridiculously emotional. To the point where [husband’s] come in, and I’ve just hysterically cried for hours. Crying myself to sleep, you know. Things that I’ve never done before in my life. … Every morning I’ve been crying. … I’ve not thought about self-harm or anything like that. But I’ve had weird thoughts. That I don’t think are kind of (. ) normal.” (Hannah, time 2)

Despite this, her later recall at time 3 appeared to minimise these levels of distress:

“Although I was very down in my pregnancy, now when I look back on it, really, what did it affect? … I was just quite fed up each day. Like I still had good times and that. … It was just in the evenings when I would feel quite down. But yeah, it didn’t really affect anything, I don’t think.” (Hannah, time 3)

These issues in recall were described by Abbie. At time 1, she described having “irrational fears” about what may go wrong in the delivery and described how her feelings “bubbled over” at one stage and her husband found her “sat on the bathroom floor in tears”. At time 3, Abbie admitted that in the build up to her CS, she had been thinking about the procedure “pretty much all the time.” Yet these aspects could be difficult to recall:

“I’m very calm when I think about it all now, and I feel like all that stress has - it’s hard to almost think about how stressed I was by comparison. I was very much, I felt, two different people really. … It’s nice to close that chapter and think; well, that was there, and it was probably there for a reason.” (Abbie, time 3)

Such reflections illustrate how serial interviewing may allow clearer access of experiences.
2.2 Personal mental health and stress history

History focused on own history of mental health (which may be perinatal or non-specific) and own relationship with stress. However, some women also mentioned previous experience of mental health in the family (usually mothers or sisters) and two with histories of anxiety commented that their partners “struggle with stress”.

2.2A) Own history

Interviews with women revealed that more had mental health histories than suggested by their health records, just as in Study Part 1 a higher proportion of women disclosed having sought help than was documented in the health records. This partly reflected ‘grey areas’ where women wondered if they had had, for example, PND, but had not been diagnosed. However, it also included women who had sought help, including PND (Anne), depression (Grace), post-traumatic stress disorder (Michelle) and obsessive compulsive disorder and panic attacks (Eliza). Details of mental health extracted from health records and disclosed in interview are shown in Table 8.2.

As described previously, some women with histories feared vulnerability to PMH. For others, their descriptions were more consistent with recovery models of mental health (Roberts & Wolfson, 2004), finding it “helpful to revisit”, feeling that they were now a “stronger person” and “wouldn’t let it happen again”.

2.2B) Own relationship with stress

Relationship with stress links to self-assessment (described in ‘recognising to self’, 4.3) and whether current stress is perceived as being like their usual stress or distinct (with implications for the ‘relevance to maternity services’, 4.1). Some women reported feeling surprised at their distress because they were not “the type”. Rebecca said:

“I’ve never been stressed before. It’s amazing what your mind could do. I didn’t think mine could lock down and I thought I could deal with anything because I’m normally a really strong open-mouthy person. But no that did. It was surprising how that did affect me.” (Rebecca, time 1)

In contrast, other women felt that their current maternal stress was usual for them and thus apparently high scores on the Study Part 1 measures were not indicative of a period of high distress. Sarah described several fears, including miscarriage but also other health-related anxieties, such as a fear that the blood tests would detect a problem, for example being HIV
positive. She stated that logically, this was unlikely because she is a blood donor and somebody would have told her but explained:

"If I can stress out about it, I will. ... it's very unlikely that it's happened [missed miscarriage]. But it's just in the back of my mind. ... It's not just in pregnancy. It's generally in life. I'm just like that. My personality." (Sarah, time 1)

### 2.3 Views on treatment options

Ways of coping with maternal stress and views on different types and sources of support are described in Theme 5 ('responding'). This sub-theme focuses on options for mental health – both in general and the perinatal period. Women often held strong views on treatment options, which reflected their understandings of stress and mental health and previous treatment experiences.

Several women described the ease with which GPs would prescribe medication (usually antidepressants) and contrasted with the difficulty of accessing talking therapies (e.g. counselling). Some women discussed fears of taking medication, including becoming regulated by and dependent on medication.

“all the drugs and stuff ... I tried for [laughingly] two days and went, “No”, even though my doctor said it would take three weeks to kick in, but my thought was, “Then how long is it going to take me to get off whatever they give me?” And it was so simple for [GP] to just say, “Here’s some drugs, go away”, rather than what is the issue, which it wasn’t about anything chemically, it was emotionally that had to be dealt with." (Anne, time 1)

“[The doctor] hardly spoke to me and he just went, “yeah, she just needs anti -. It’s postnatal depression” and chucked a prescription at me. I was just a bit gobsmacked because I’d never had anything like that before. I don’t even like to take paracetamol ... I’d rather sit and talk to somebody, I think, and not use the medication (Helen, time 1)

Nonetheless there was also some wariness towards alternatives, such as counselling or therapy. Helen, although prepared to engage, described her discomfort at an initial mental health assessment, arranged in her previous pregnancy due to her past PND:

“I found it really difficult ... she basically sat there, asked me a few prompting questions and, then, it just went silent when I stopped talking and I found it really
uncomfortable ... go sit and talk about yourself just, like, for an hour is a bit, like, bizarre, isn’t it.” (Helen, time 1)

For Eliza, previous counselling experiences when being treated for her obsessive compulsive disorder had put her off completely “because it started getting to real issues”. Jess too had been put off by previous experiences but was open to options due to her new role as a mother:

“I’ve always been, like, oh no, they sent me to a child psychiatrist when I was sixteen and it didn’t really do much for me. So I’ve always been a bit, like, mm, I don’t really want to see people. But now, because it’s not just me really that it affects, like the baby, and stuff, I’ve said, yeah, I’ll give anything a chance really.” (Jess, time 1)

Views on treatment options had implications for disclosure in terms of perceived purpose of assessment, returned to in ‘admitting to self and others’ (sub-theme 4.4).

### Summary of Theme 2: Understandings of maternal stress

- Symptoms were found to be common but varied in terms of impact and severity.
- Some symptoms were ‘usual’ for that individual, reflecting their personal relationship with stress.
- Some women’s symptoms were suggestive of mild/moderate (or even more severe) depression and anxiety episodes.
- Women often found it difficult to self-assess severity; this was partly due to overlap with other aspects of pregnancy and partly due to the lack of information about maternal stress.
- Women’s assessment of maternal stress as a distinct type of stress was often shaped by their personal mental health history and personal relationship with stress.
- The distinct nature of maternal stress was accessed by observing trajectories across interviews. Some women were found to experience high levels of maternal stress in the antenatal period that did not continue to the postnatal period; however, there may have been issues of disclosure.
- Serial interviewing revealed changing recall about perceptions of impact.
- Women disclosed more detailed mental health and treatment histories than were observed in the health records; this partly reflected issues of terminology, self-assessment and personal models (i.e. understandings) of maternal stress.
- Women’s personal models of maternal stress often linked to their views on treatment options, which were sometimes shaped by previous personal experience.
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<th>MH history (main notes)</th>
<th>Current MH referral</th>
<th>Whooley and Arroll responses (HHN)</th>
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Notes: MH = mental health; HHN = handheld notes; A = anxiety; D = depression; PND = postnatal depression; OCD = obsessive compulsive disorder; Whooley item i = down, depressed, or hopeless
Theme 3: Assessing women’s needs – Acceptability of Antenatal Psychosocial Assessment (APA)

This theme was informed by both sub-studies. *A priori*, acceptability of the APA conducted within the ARMS study had been viewed as acceptability of the self-completed questionnaire, with feedback gained through two sources – written feedback on the questionnaire (sometimes supplemented by verbal feedback to the researcher) and feedback by discussion in the interview. However, analysis identified that Study Part 2 could also be considered as performing APA and acceptability of the two *methods* of performing APA was also accessible. This theme focuses on the APA conducted through the ARMS questionnaire (3.1) and clinical practice (3.2), rather than the APA embedded in the in-depth interviews (Theme 6).

### 3.1 ARMS questionnaire

In Study Part 1, acceptability was gained through direct feedback and inferred through completeness of items. In interview, women’s views on the questionnaires were explored through free recall and, where women had provided comments in Study Part 1, some targeted exploration of previous feedback.

**Missing data**

Missing data (e.g. one anxiety item) was distinguished from those items deemed uncomfortable or distressing by encouraging women to record an asterisk for ‘prefer not to answer’. This option was used once for desired support, attitude to pregnancy timing, and recent stresses (on the ANRQ). In contrast, it was used by seven of the 12 women who did not complete the abuse questions on the ANRQ. Of note, patterns of responding highlighted that women may be willing to disclose one form of abuse but not another (e.g. disclosing sexual and marking ‘prefer not to answer’ for emotional; as shown in the table available in Appendix 8.3). Women may also disclose some types of abuse and leave the others uncompleted and it has been acknowledged elsewhere that women may not always distinguish these types of abuse (Priest, 2006).

**Feedback form, including ratings of distress**

The questionnaire included a feedback form where women were asked to rate whether they found the questionnaires distressing (between 1, not at all, and 5, very much). Of the 183 who assigned ratings, 154 rated as 1 (not at all distressing), 20 rated as 2, six
rated as 3 (somewhat) and three rated as 4. No women assigned a rating of 5 (very much). A summary of women’s feedback is available in Appendix 8.4.

Comments in interviews
Feedback in interviews was largely consistent with that provided in questionnaires, partly due to over-sampling those women who provided feedback in Study Part 1. Questions such as those concerning previous mental health or “difficult times” sometimes led women to “revisit” things, or “be reminded”. Some women felt that there was too much emphasis on symptoms and not enough on circumstances (i.e. stressors). The questions consequently did not offer the chance for women to explain their responses but may also mean that other needs were missed, as Michelle explained:

“When I was looking at some of the questions, I was thinking, they would flag up obviously if there was a mental health issue. But I would say mine is more practical and stresses of my family and meeting the needs of it, as opposed to mental health. I thought it’s quite a different thing. You know, it’s very very different.” (Michelle, time 1)

Although the ANRQ question potentially offered the opportunity for explanation, the phrasing of this question influenced what women wrote (due to the timeframe of one year and the examples provided), together with the small space to write in:

“You just think, well, if someone’s had a bereavement or had a divorce, that really is a huge, kind of, big thing. But, yeah, just then saying it out loud, like, yeah, breaking up with a long term partner and getting with a new one, moving house and getting pregnant, like, is … I was going to put, like, perhaps the problems with parents, but that would have been, sort of, ongoing really, so it wasn’t, like, a shock thing … I just wasn’t really sure if I’d started I just wouldn’t have stopped, you’d have had everything! Put an asterisk. See following ten pages! [laughs]” (Jess, time 1)

As discussed previously (1.2A), some women felt that timing of impact was more relevant than timing of occurrence. Issue of timing and trajectories (which were discussed in Theme 2) also applied to the timeframes for recent symptoms and the times at which to perform APA.

Some women felt that they would have liked to have talked about their stress sooner, when it had peaked before the dating scan and booking visit and they did not have contact with services. In contrast, Rania felt that asking symptom questions early in
pregnancy would not be accurate:

"I'm not a crier at all but during pregnancy, I cry at anything! ... So the first 12 weeks, I think you're not going to get a judge of anyone's emotional well-being because you're off your head anyway." (Rania, time 1)

Women therefore questioned the relevance of timeframes such as the previous week or previous two weeks for symptoms.

"I was just a bit confused about whether or not I was answering for now or for how I was before ... it's been four weeks since I started bleeding ... and the amount of emotions we've been through over those four weeks is amazing."

(Steph, time 1)

Interviews highlighted an additional area of acceptability not captured in the written feedback: views on 'personality measures'. Although women did not describe this as distressing per se, comments suggested women's discomfort or confusion about the purpose of being asked; as indicated by the following comments.

"I don't know what conclusion you'll draw from that.” (Hannah, time 1)

"What kind of person are you, are you kind of a – a cuddly person or I can’t remember the – the exact detail - or are you, you know, emotionally – emotionally inept [both laugh], you know, and they’re quite personal things”

(Abbie, time 1)

"Whether you felt or whether you thought you were a worrier naturally, which I was kind of like, yes I am. Which I think that, I know I am but I don’t admit it to myself, I kind of pretend that I’m not.” (Natalie, time 1)

Such comments are important when considering implications of Study Part 1 because, while personality factors may be significant correlates of distress (as found in Chapter 5), women may not find it acceptable to offer interventions on this basis.

3.2 Clinical practice – current questions asked in perinatal care

Women were asked about their views on being asked similar questions to those in the questionnaire as part of clinical practice and their views on the questions currently contained in the handheld notes (HHN; i.e. the Whooley questions). Most women who already had children also mentioned the questions used postnatally (i.e. the Edinburgh
Postnatal Depression Scale, EPDS). Given that guidelines also recommend using the Whooley questions postnatally and that past experiences of disclosures influence future disclosures, these views and experiences were included in this sub-theme, rather than restricting to the antenatal period.

Some women did not remember being asked questions about mental health or mood at booking. This may reflect feeling the question was not personally relevant, the volume of questions asked in the booking visit, or that women completed these unassisted, perhaps without further exploration by the midwife.

“There’s a lot going on and you’re sat there, surrounded by bits of paper. … I would have no issue in being asked that at all. And I think it’s a really, really good thing. … It was just, “I need to get this form filled in” [laughs]” (Amanda, time 1)

Some women, such as Emily, felt there should be more emphasis placed on APA.

“There’s like literally two questions … it didn’t seem enough. You answer so many questions about smoking and drug taking and things like that and you’re filling out that going, “God this is so not relevant”, and then you get to this tiny little section.” (Emily, time 1)

How women felt about being asked the questions could also change with their changing circumstances, as Katie described:

“I don’t know that they asked me those questions this time because I – I think I would have felt more about answering them and probably would have tried to avoid answering them. Whereas the first time, I just thought it was routine questions, like you’re asked a million questions, and it didn’t cross my mind that they would really be interested in how I was feeling … because I had never had any problems it never crossed my mind that I would be (.) feeling down or (.) you know anything about the pregnancy.” (Katie, time 1)

None of the women expressed a view suggesting they found such questions unacceptable or inappropriate. However, some women reported negative experiences of reactions to responses, rather than inappropriate questions per se (discussed further in 5.1, ‘experiences of mental health systems and referrals’). Additionally, some women questioned the purpose of assessment (returned to in Theme 4) and the relevance of such questions in maternity care, indicating more covert views on acceptability. Some questioned whether women would necessarily give “honest” answers and, as discussed
in Theme 2, histories disclosed in interviews were sometimes additional to those disclosed at booking. Possible reasons for this are explored in the context of disclosure (Theme 4). Additionally, the nature of self-selection means that those women who are opposed to, or neutral about, APA may have been less likely to have taken part in the research.

<table>
<thead>
<tr>
<th>Summary of Theme 3: Acceptability</th>
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<tr>
<td>• Questions focused on symptoms without the opportunity to explore the context.</td>
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<tr>
<td>• Women’s reporting on the ANRQ may be limited by the timeframe, the examples given and the size of the box in which to respond.</td>
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<tr>
<td>• Timings of assessing distress symptoms measures were also questioned.</td>
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<td>• Views on timing of APA varied; potentially highlighting the importance of monitoring, rather than focusing on the booking visit as a ‘convenient’ time.</td>
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<tr>
<td>• Assessing personality, although statistically significant based on the findings of Study Part 1, may not be acceptable to women.</td>
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<td>• Women may discuss acceptability more covertly by questioning the purpose of assessment.</td>
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<td>• The extent to which women felt at ease with the process could depend on the context in which they were asked and their changing circumstances.</td>
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Theme 4: Assessing women’s needs – Context of disclosure

Assessment and disclosure extended beyond (formal) assessment in the health services setting, to include self-assessment and assessment by significant others. Due to the focus of the current research, the emphasis is on maternity services and health professionals involved throughout the perinatal period. Although women relayed interactions with a range of health professionals (including obstetricians, sonographers and anaesthetists), accounts most commonly described midwives, GPs and Health Visitors.  

Four sub-themes emerged from the data: relevance to maternity services, context of appointments, recognising to self and others, and admitting to self and others. Women’s discussions of disclosure in previous of the current perinatal period are relevant to all

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41 Health Visitors (HV) are registered nurses specialising in community health. Each child has a named HV from birth to five years. Sometimes HVs visit in pregnancy; however this depends on individual practice. HVs are often the health professional involved in assessing PND, commonly using the EPDS as an assessment tool.
aspects and are described here, rather than in the theme concerning understandings of maternal stress; however there clearly is overlap, for example with personal PMH history.

4.1 Relevance to maternity services

This sub-theme reflected women's understandings of mental health and stress (including the distinct nature of maternal stress), the perceived remit of maternity services and the purpose of assessment. Relevance was shaped by perceptions of the focus of maternity care.

Emotional-physical divide

Women commonly felt the emphasis was on the physical, rather than the emotional. Anne described how questions such as “How are you?” were interpreted as concerning physical aspects to do with the pregnancy, rather than emotional aspects to do with the woman:

“They’re more interested in you medically … they’re asking you, “How are you? How are you feeling?” but it’s more, “Have you got any lumps and bumps and pains?” … they’re not asking you emotionally, “How are you feeling at the moment? Is this something that you’re coping well with or not coping well with?””  
(Anne, time 1)

For Lena, she felt the emphasis was “98% medical physical thing and 2% emotional”, and the remit of care did not need extend beyond the former:

“Sure, thank God you’re healthy, we’re here to take care of you but to a certain point.” (Lena, time 1)

Relatedness to pregnancy

Relevance also concerned whether maternal stress was related to the pregnancy. Jess described feeling that her psychosocial stresses (relationship breakdown and family estrangement) were “just personal circumstances”. Similarly, Emily described her reasons for talking to her GP, rather than the midwifery team, about her psychosocial stresses (family bereavement and work-related stress). This included issues of continuity of care but also the focus of maternity services being the pregnancy:
“I think, mainly because I’ve known the GP for longer, and maybe because the midwives - they ask how you are but they are completely preoccupied with – “okay well you look quite normal, the baby feels normal, the heartbeat’s normal, everything’s fine”. And actually you can’t - I don’t feel I can turn round and go “Yeah, but there’s this that’s gone on and that that’s gone on” and actually it’s unrelated to the pregnancy. I feel like, for them, they need to concentrate on the pregnancy side of things really.” (Emily, time 2)

Purpose of assessment and thresholds for intervention
Some women felt that maternity services could be in a position to help with early intervention:

“… to sort of trigger how are you feeling, you know, is it something that can be stopped before it gets any further?” (Anne, time 1)

However, women mostly felt the reality was that assessment was to identify risk of harm, rather than address underlying issues:

“I mean a doctor to take it seriously that you are having exceptional stress in pregnancy … almost like, we are just expected, as women, to just put up with it. … because to me, unless you’ve been suffering from sort of psychosis, you’re not gonna get any real, you know, service or support from anywhere anyway. It’s always like “worst case scenario then we will help you”. (Michelle, time 1)”

“The only question that she [health visitor] was more worried about is, would I self-harm or hurt the baby. I went “no”. That’s all she was more worried about, not dealing with the fact that, why am I upset?” (Rebecca, time 1)

Profile and awareness
Some women (notably Steph, Charlotte and Amanda) felt that there was increasing awareness of maternal stress in pregnancy, in comparison with their own or their sisters’ previous experiences of maternity services.

“The early pregnancy stuff and the during pregnancy stuff was probably quite new … I think everyone’s quite aware about postnatal depression and things” (Charlotte, time 1)
However, women largely felt there could be more awareness, combined with more recognition; as shown by Rania’s comment:

“There is a lot of anxiety about it. I think people just minimise it because they think, “Oh everyone does it. Women are giving birth all over the world.” Well, they are but in some countries, they also die from giving birth, on a regular basis. And children are born every day with serious problems. So it is quite a frightening time for women. And I think that is minimised.” (Rania, time 1)

4.2 Context of appointments
Perceived relevance reflected the context of appointments, both in terms of the nature of busy clinics and in relation to interactions with health professionals. Comments about appointments referred both to the booking appointments, which in this sample took place in a hospital antenatal clinic, and subsequent antenatal appointments either in the community or the hospital.

Pace of clinics and appointments
Women’s accounts of appointments highlighted a sense that there are too many tasks for the time available, with appointments consequently feeling rushed. Louise described how in the pregnancy before her previous PND, this context had influenced her not disclosing her feelings,

“… just like a conveyor belt. You’re in and you’re out. There isn’t really any discussion of how you’re getting on. They’re just: blood pressure, check your water, check the heartbeat, and then off. There’s no real conversation of how are you? So because I wasn’t really asked, I didn’t speak about it.” (Louise, time 1)

In contrast, Charlotte (whose health records showed she had endorsed the Whooley questions) described that she had been “quite open … and confident to talk about [her] feelings” but the other tasks at the booking visit limited the subsequent discussion:

“… there was so many other things to do. I don’t think you really did get much time and space to actually go through those things.” (Charlotte, time 1)
Interactions with health professionals

Even where such questions were asked, it was the manner in which they were asked that was of importance to this group of women. Women described interactions both for experiences in the current pregnancy and postnatal period and past perinatal periods (usually postnatal).

Some women raised the notions of trust and having confidence in the health professionals. This could be built through continuity of care and Katie’s comment illustrated that this could refer to teams of midwives, rather than solely individuals:

“Really it would be easier for them [community midwives] to ask. ... you see the same team of midwives, you’re much more likely to say how you feel to them.”
(Katie, time 1)

Instilling trust and confidence did not only hinge on continuity; several women described how it could be fostered by skills such as “really listening”. Such experiences were contrasted with those where discussions about well-being (i.e. psychosocial assessment) felt “a little bit false” (Abbie), as though they “were going through the motions of it” (Charlotte) with “bullet type things that they have to ask” (Helen).

Additionally, awkwardness arose where women perceived that health professionals felt uncomfortable or lacked confidence:

“[health visitor] was asking me the questions but she seemed very unconfident to ask them, as if she felt like she was prying” (Charlotte, time 3)

Abbie described that such factors were more important for disclosures concerning mental health and well-being than discussions of physical aspects of health.

“if you’ve got an emotional sort of problem it’s how much you feel you can trust the person to deal with that” (Abbie t1)

Lena hinted that this reflected the nature of vulnerability in “opening up” to discuss emotional aspects but that this could be encouraged through the context of the disclosure:

“... You’re a human being, you know, you will open up to the right person under the right circumstances.” (Lena, time 1)
Factors affecting disclosure were not limited to the perceived relevance to maternity services and the context of the appointment, with the next two sub-themes illustrating how disclosure also involved processes of recognising and admitting to self and others.

4.3 Recognising to self and others
Recognition of maternal stress (e.g. symptoms of distress) requires not only insight but also common understandings of stress and mental health and common terminology in order to perform some element of self-assessment. Challenges surrounding recognition and disclosure were often observable by women's comments in the interviews, rather than explicitly stated.

Women showed processes of self-assessment across interviews at all timepoints (returned to in Theme 6, ‘research(er) as intervention’). This was found both with discussions of experiences in the current pregnancy (and, to a lesser extent, postnatal period) and discussions of past pregnancies and postnatal periods.

Self-assessment of current experiences
Some women's self-assessment attempted to disentangle the role of the pregnancy:

“I think I’m just feeling more vulnerable because I’m pregnant but I don’t know whether I’m just not dealing with stress as well or it’s just ‘cos I’m pregnant, I’m not sure.” (Charlotte, time 1)

“… obviously I’m still hormonal but that’s just - it’s nothing excessive. It’s just normal. ... I don’t think it is depression.” (Louise, time 2)

Similarly, Jess described how she had been trying to assess what may be antenatal depression and how this may differ to her pre-existing depression:

“I was trying to work out what was just my depression and what was extra … The whole thing with [family argument] really knocked me really down but I would say that was just how I deal with things anyway … But the sickness and all the having no energy, that, I guess, was antenatal depression. … when I’m feeling really depressed, like, normally, I still make myself do stuff … but I couldn’t do anything and I felt very, like, a bit more useless than I already felt anyway really.” (Jess, time 1)

Others' self-assessment was relative to thresholds for action (i.e. responding), with some women feeling they really did not know where their experiences sat on the
continuum of severity and this could therefore deter them from seeking support, particularly in the absence of clear guidance from health services and care providers. Hannah felt it was “such a sort of wishy-washy area”; a sentiment shared by Katie:

“I mean, what does that mean, not having any high moments for two weeks? (...) It’s so subjective. You wouldn't just ring antenatal clinic and say, “Look, I know you're really busy, but I haven't had a high moment in two weeks.” (...) And you definitely wouldn’t go to your GP because they just wouldn't do anything. (...) I wouldn’t consider it important [enough] really. (...) It's because it's not a physical symptom, is it. If they’d said to you, “if you feel like this or this” or “do this or this”, then maybe you’d say, “okay”. (...) But they said, “just let somebody know”. (Katie, time 1)

Of note, self-assessment may not have only been concerned with disclosure – women appeared to also reflect on levels of normality and severity as part of appraisal and coping. Additionally, self-assessment may have been voiced as part of the self-reflection encouraged by the interview process, as suggested by Ruth’s comments at the end of the time 1 interview:

“I always go, “yeah I’m fine” [whispers]. But I’m not really, am I? Bit crazy. [serious tone]” (Ruth, time 1)

Given inherent sampling bias through self-selection, such processes of self-reflection may have been more common in these women. Overt self-assessment may have also served another purpose in the context of the interview concerning how women wished to present themselves (e.g. keen to avoid indicating any risk requiring referral, or, conversely, seeking an opportunity for referral).

*Previous PMH and self-assessment*
Processes of self-assessment were also observed in women’s accounts of past pregnancy and postnatal experiences where several women disclosed previous maternal stress and perinatal mental health problems. Women sometimes seemed unsure about whether their difficulties may have constituted a clinical level (i.e. disorder rather than symptoms).

“I had times of feeling very, very low. I don’t think I had postnatal depression. But I certainly had a couple of nights or days where I felt very depressed. And um, you know, I thought – I thought about throwing myself down the stairs on a few occasions. Which I never, ever thought about before.” (Hannah, time 1)
At time 2, Ruth disclosed how she had felt in her previous pregnancy, which extended into her postnatal period:

“I just sat in the flat and I didn’t do anything and then we moved into my mum’s and I just sat in the house. I didn’t speak to anybody. I lost contact with a lot of friends and family and people and I didn’t talk to anybody. I threw my mobile phone away and I didn’t speak to anybody. Totally, totally went into hibernation. … I don’t want to say I had postnatal depression because I probably didn’t but I did feel pretty crap and low and just a bit sad really. When I went back to work I did feel a lot better and felt like me again really.” (Ruth, time 2)

Uncertainty about severity was even found where women had sought help, either from family (Rebecca) or from counsellors (Anne); as shown by Anne’s description:

“I had a bit of postnatal depression with [daughter] … I saw a counsellor then for a couple of weeks, but it was only really just -. It wasn’t sort of stress or anything it was just emotional, and I think I was concerned, you know, “Gosh, is this what they class as (.)-” Probably, when you’ve only had one, you’re not sure what it is. But I just found it hard to bond with her and didn’t know whether it was because of having a difficult birth or different things. But I know when we sat down and spoke about it a lot of it was to do with because of having the miscarriage so soon before I had her.” (Anne, time 1)

Of note, all of these disclosures were spontaneous as previous perinatal experiences were not a planned interview topic. Nonetheless, the nature of the study design enabled comparison of disclosures with observations of mental health and treatment history in the health records (reported previously in Chapter 6). Although only two of the 13 multiparous women had previous perinatal mental health documented in the clinical records (Helen and Louise), approximately half discussed past perinatal difficulties with mood and mental health. Descriptions of nature and impact ranged from mild symptoms (with possible cases of PND described most commonly) to, with one woman (Grace), symptoms indicative of severe mental health (requiring a specialist referral).

**Assessment by others**

Women discussed previous experiences with the EPDS (Edinburgh Postnatal Depression Scale) and the extent to which this had helped in the process of assessment and recognising to self and others. Louise felt the EPDS had been critical in offering a way to communicate her PND to her HV and, ultimately, access support:
"[2nd son] was clean and he was looked after [so the health visitor] hadn’t picked up any telltale signs … I don’t think I probably would’ve gone to the doctor unless I’d had the Edinburgh score. I wouldn’t have gone to my GP and said “Oo, I think there’s something wrong.”" (Louise, time 1)

This contrasted with how high EPDS scores had been responded to for Rebecca and Hannah:

"[health visitor] said, “If I didn’t know you any better Rebecca, I’d say you’ve got postnatal depression because you failed it”. She didn’t know me any better!" (Rebecca, time 1)

"I don’t know what the question was, but say it was, “Have you ever thought about throwing yourself down the stairs?” Well, yeah, actually I have. And you think, “Oh my god, what are they gonna say about me now?” and she [health visitor] was actually, “Oh yeah”, you know, “you’ve thought about throwing yourself down the stairs! Haven’t we all?! De-de-dda-der.” … And I’m sure I was fine and I am fine. And you know maybe some other people had written like, they always think about throwing themselves down the stairs! But it just sort of felt a bit like she might have said that whatever I’d answered, you know.” (Hannah, time 1)

Women’s comments elsewhere in the interviews suggested these health professionals’ responses probably partly reflected Rebecca’s and Hannah’s presentations; highlighting the complexity for care providers.

"It’s amazing how someone can shut down and tell you that, “It’s alright, I’m fine.” But they’re not. You’ve got to … ask specific questions and you’ll actually find out whether they are actually dealing with it … It’s actually getting to recognise the signs, and not to be fobbed off by these people, because I would - I’d be very good at telling them I was fine, and I wasn’t." (Rebecca, time 1)

"I put up a front and I’m very jolly and like to be positive and all that, and you have to be able to scratch the surface of that." (Hannah, time 1)

Hannah’s comments illustrated that such presentation was not necessarily conscious, instead reflecting individual processes and self-awareness:
“There’s so much information to go through that it’s hard to sort of spend that time with somebody to find out how they really are. … It would be nice if you sort of had five minutes for them to say, yeah, “how are you feeling?” Just, “do you think you need any support?” But unless you’re at the stage where you’ve thought about, “yeah, I could really do with some support”, which I don’t think necessarily comes immediately and I don’t think comes to everybody either” (Hannah, time 1)

These observations highlight that disclosure concerns not only recognising to self and others, but also admitting to self and others.

4.4 Admitting to self and others
Admitting to self and others could be influenced by stigma but also the perceived purpose of assessment (overlapping with 4.1, ‘relevance to maternity services’) and concerns about treatment options (overlapping with 4.1 and also 2.3, ‘views on treatment options’).

Stigma
Stigma and wider sociocultural understandings of stress and mental health were highlighted by some of the terminology used by women, including “bonkers”, “loony bin”, “crazy”, and one woman’s comment, “Oh God, I’m really not mental. Please don’t record that I’m mad!” Steph’s comment highlights women’s own stigma:

“I did mention that to [husband], I said I think it might be depression … and then I was like, “Oh my God, the worst word in the world.” (Steph, time 1)

Similarly, Anne felt that admitting her difficulties with her work-related stress and subsequent sick leave was “a sign of weakness”, with implications for stages of disclosure:

“Because I think until I’d sort of admitted to myself that it wasn’t right that I wouldn’t have spoken to anybody about it.” (Anne, time 1)

Lena’s account illustrated that stigma towards stress and mental health was additionally recognised by health professionals, with distinctions drawn between anxiety and depression:
“She [booking midwife] was the first person who really treated me like a person rather than just a patient … [she said] “listen, I’m going to say you have some issues with anxiety, don’t write depression because it’s not good, you’re branded in a certain way”” (Lena, time 1)

Observation of Lena’s health records found that she had originally circled both previous mental health and the Whooley questions in the handheld notes before crossing these out, presumably reflecting the frank conversation with her booking midwife. Although such comments from health professionals may be surprising, Lena’s quote also demonstrated she valued the midwife’s openness; for Lena, this was an essential element of patient-centred care.

Admitting and the purpose of assessment
It should be noted that concerns and uncertainty about implications of disclosure extended beyond stigma and “branding” to include the purpose of assessment. Concerns about purpose included concerns about social services, which were realised for Louise following a disclosure to her counsellor when being treated for PND:

“I’d said something about how I didn’t feel any love for [2nd son] and she [counsellor] insinuated that I was a risk to him because I didn’t love him. … She said, like, “I’ll have to refer this now to social services for them to just have an interview with you”. … The actual time of waiting for them to phone, I was thinking, “Oh, they’re gonna take my children off me!”” (Louise, time 1)

Concerns about purpose of assessment also included concerns about possible treatment options, as illustrated by Grace’s comments about pharmacological interventions:

“I didn't go to see my GP.... I was scared... I [thought], “They will give me some medicine. And I will get more crazy”. … My only concern is you know, how people end up the way they end up, you know? ... I’m scared. I don’t know, if it’s because they took the medicine, or because they didn’t take their medicine?” (Grace, time 1)

Concerns about treatment options could also relate to psychological interventions and needing to feel ready to confront unresolved issues with oneself, as relayed by Eliza (whose health records showed no previous history):
“I think now I’ve suddenly developed a fear of going and talking to anyone professionally now, because of that thing that suddenly they’ll discover, “Oh there’s more to it than this.” [smiling] ... And I don’t want to have to go there really. So, yeah (.) So I don’t know if I would ever do it again, or not until I’m ready to (.). And I’m not ready now, to sort of talk to anyone too much about why I get stressed out. I know the reasons, and I suppose that’s enough really. I suppose, now I’ve been through some processes of counselling I’ve started to figure out.” (Eliza, time 1)

Concerns about admitting could alternatively relate to uncertainty about the implications:

“... just a few more questions that make you think about it a little bit more rather than just going, oh, I don’t talk about that, I’ll just tick no. Or if I tick yes, what does that mean, what’s going to happen?” (Emily, time 1)

For other women, rather than having concerns about treatment options *per se*, there could be reluctance to disclose where they felt the ‘responding’ would not meet their needs, either in terms of type of response or timeframe of response.

“I like to tell people how I’m feeling, if I feel that they can do something about it.”

(Abbie, time 3)

Abbie explained that this was why she had spoken about her considerable anxiety about her CS with her anaesthetist and midwife at the time of the CS – because they were able to take efforts to put her ease (including allowing her partner to accompany her at all times). In contrast, she had not felt similarly about other health professionals earlier in the pregnancy.

Katie felt she would be unlikely to disclose aspects about her current grief to a health professional for similar reasons:

“There is easily weeks when I don’t have any high moments. But it’s just my life at the moment, nothing anybody can change or do differently.” (Katie, time 2)

*Other factors affecting ‘admitting’*

Disclosure could also bypass the element of ‘admitting’ by being elicited through other processes, such as the need to discuss concerns about medication, or indeed by histories documented by other health professionals (e.g. those recorded in GP referral letters requesting maternity care).
Admission could also be influenced by significant others. This could occur through significant others disclosing on a woman’s behalf, as happened for Rebecca:

“Mum said to me “I’m just coming with you.” I didn’t think anything about it, because gosh, the amount of times she’s been in the doctor’s with me. I just thought, she just wants to sit there, she just wants to support me. I said [to the GP], “Yeah, I’m fine.” My mum went, “She’s not.” “No, I am fine.” And she went, “She’s not. She won’t talk about it. She’s not dealing with it” and then [the GP] decided then to sort of ask a bit more, “Are you dealing with it?”” (Rebecca, time 1)

Significant others could also influence the processes less directly, as described by Louise:

“I wanted to prove that I was alright, I wanted to say that I was ok. But I knew I wasn’t because I wasn’t like that with my other son. It was just completely different-. I knew really that I had to [say that I was not ok]. My mum was nagging me and my husband knew something was wrong.” (Louise, time 1)

Such examples of the roles played by significant others and health professionals overlap with the next theme, ‘responding’ (Theme 5).

**Summary of Theme 4: Context of disclosure**

- Women’s accounts demonstrated the importance of personal models of maternal stress and the perceived relevance of maternal stress to maternity services.
- Women sometimes viewed maternity services as only being concerned with the risk of harm, rather than tackling underlying causes of maternal stress.
- Perceived relevance was shaped by the context of the appointment, including clinic-level factors and the interaction with the individual health professional.
- Women often found the self-assessment process difficult in recognising maternal stress, which they sometimes illustrated through discussing previous experiences of maternal stress or mental health that were not documented in their health records.
- Assessment measures had the potential to help women recognise and admit experiencing maternal stress; however, this depended on the reactions of the health professionals concerned.
- Perceptions surrounding purpose of assessment could act as a barrier to admitting maternal stress.
Theme 5: Responding to women’s needs

The theme of responding is broad and includes women’s own responding to maternal stress (with considerations of coping and support) and the responses of others, including significant others and health professionals.

5.1 Current mental health systems and referrals

Despite all of the potential barriers to disclosure, women did disclose mental health history or current distress at booking. Care provider actions were presented in Study Part 1 (Chapter 6) based on documentation but were further informed by women’s accounts. Whereas observations of health records accessed referrals (i.e. actions taken), interviews additionally accessed health professionals’ reactions to disclosures and women’s perceptions of these.

Women who disclosed distress symptoms and were not referred

Four interviewees endorsed at least one Whooley item and were not referred: Hannah (both Whooley items and the Arroll ‘help’ item), Lena (both Whooley items, the Arroll item and mental health history, although all subsequently crossed out), Charlotte (first Whooley item (down, depressed or hopeless) annotated with “due moving house - job”), and Steph (both Whooley items). Of these, only Lena had a mental health history documented in the GP referral letter, a diagnosis she refuted. Her responses had been crossed out, possibly linked to the risk of “branding” indicated in her frank discussion with the midwife, which she had welcomed (discussed in Theme 4). For Steph too, her account indicated a response not suggested by the lack of documentation in the health records. She described how her midwife had been “amazing” and discussed possible sources of support, including counselling. Similarly, Charlotte’s response had been acknowledged, albeit without the time that she had hoped for, whereas the documentation did not reflect any recognition. Hannah’s case was unique in that she had also ticked the Arroll item and the midwife had documented their discussion and providing a list of telephone numbers for counselling services. Nonetheless, Hannah described at time 2 having made further disclosures and feeling surprised that neither of those health professionals had taken any action. When she ultimately self-referred (following the researcher’s advice at time 2), Hannah found that the reaction of the health professional contrasted with previous reactions:

“[The community midwife] said, ‘How are you?’ And I said, ‘Physically and everything, fine, emotionally I’m quite low, in fact I think I would like to speak to
somebody.’ But she just didn’t even ask me anything, she just said, ‘Right fine,’ and just started filling in all the documents, to the point where I was a bit like, ‘What are you doing?’ You know? That was brilliant.” (Hannah, time 3)

Sarah’s experiences differed to other women’s as her discussion concerned anxiety and history rather than the Whooley items for depression case finding; reflecting the absence of anxiety from the routine mental health assessment.

Interviewer: And did it [your anxiety levels] come up with the midwife?

Sarah: Um. She asked *something* about anxiety and depression. But then she said, “have you ever been to the doctor?” and I said “no” and that’s where it ended.

Probing in the interview identified that Sarah’s not seeking help did not necessarily reflect severity but rather barriers:

“I have got to a point where I’m like, “I should go and see my doctor about how anxious I am, how much anxiety I have, all the time”, but, erm, I never- I never have. (.) so. I just accept it. Can’t change who you are. … ‘Cos in my head I think that it’s stupid.” (Sarah, time 1)

However, Sarah was keen to emphasise that she was happy with the midwife’s response (i.e. she had not wished to be referred for further support). Of note, none of these women were asked about their mood at subsequent appointments and there was no evidence of any monitoring of their distress levels.

**Women who were referred at booking**

Six women were referred (with further details shown in Appendix 8.5). Women could be positive about both the referral system and obstetric review concerning mental health, despite a lack of clarity. Of the three women who appeared to have had obstetric review, only Louise (a multipara) reported knowing the purpose:

“He really took his time to explain things and go through my options [about medication].” (Louise, time 1)

The other two (both primiparas) seemed less clear, although positive:
“She just asked me, like, how I was feeling and if I felt that my medication was working … which I felt quite grateful for and, yeah, they listened to the baby and we got to hear the baby’s heartbeat and stuff … the appointment was called, like, a mental health review … She was definitely a doctor, I don’t know. Yeah, I think she was a psychiatrist, I think, I don’t know, to be honest. … But she wasn’t a midwife, she was a doctor.” (Jess, time 2)

“I did have a couple of consultant appointments which I presume were booked in because of that [referral].” (Amanda, time 3)

This group of women were also positive about the referral systems, feeling this was protective and offered them a ‘safety net’, should it be necessary.

“She [booking midwife] was really, really good and she said, “well, it’s up to you but I can, sort of, give your name to the”…I don’t know what they call it, the midwife who has, sort of, psychiatry training as well, or whatever, “just so they’re aware of it, just in case”” (Jess, time 1)

“They’ve put a sort of, protective referral in, just in case. … I think it’s a really good thing that the mechanism is there for me to be seen really quickly if I start to kind of get any symptoms that I’m worried about. So, I think it’s better to do that than, you start to feel like you’re losing control and you’re having to wait weeks and weeks to see somebody. Particularly because we have to be careful about medication and stuff as well.” (Amanda, time 1)

However, observations from health records and the later serial interviews indicated that these were not necessarily accurate perceptions. Additionally, it had not necessarily led to any monitoring, as described by Amanda who struggled postnatally:

“No, I’m really surprised [that the Health Visitor did not ask about mood postnatally] because obviously I’ve got a history of depression and it was only when talking to a friend who’s off on maternity leave, she’s a nurse, and she hadn’t had postnatal depression but she had had depression … And she said-- And I was quite low last time I saw her because I was having a bad tinnitus do, and she said, “Are you sure it’s not postnatal depression, has the health visitor spoken to you?” And I said, “No.” I am surprised actually thinking back, especially with the history that nobody was checking.” (Amanda, time 3).
As well as some uncertainty about the purpose and implications of the referral, there was some uncertainty about timescales. It became clear through the interviews that women were sometimes left waiting to hear:

“[booking midwife] did say that I could look at a referral. I don’t know if she’s done that or not done it, or(.)” (Anne, time 1)

Grace’s case highlighted how such lack of clarity with referral systems left women vulnerable to falling into gaps in care, which could be potentially dangerous:

“The way I am speaking to you today, I didn’t tell [booking midwife] deeply like this. She said they will refer me [to specialist midwife] who is very good. So I am waiting for her to look after me but they didn’t refer me yet. I didn’t receive any letter.” (Grace, time 1)

**Timescales for accessing services**

Whereas the one woman eligible for specialist services (Grace) was seen promptly, interviews revealed that, even for women with recurrent mental health episodes, timescales were not consistent with the timeframes indicated in the clinical guidelines. Jess had a history of depression since being a teenager and was signed off sick and was taking anti-depressants at the time of conception, awaiting an appointment with the Community Mental Health Team. She described that the pregnancy had “sped [the referral] up a bit” but it had still taken four months from the point of being prompted by the pregnancy.

Helen had a history of PND following both previous deliveries and a recent history of depression with medication stopped around conception. Despite being referred by her GP to the Community Mental Health Team at seven weeks, Helen still had not been contacted nine months later at the time of the postnatal interview. This echoed her experience of referrals in her previous pregnancy, where she had an initial assessment antenatally but the follow-up was not available until several months after delivery, by which she time she could not arrange childcare.

“I’ve not chased it up because I don’t feel overly bothered about it and it might have been a case of like last time, by the time we got the referral the baby was like so many months. … I don’t think they’ve done anything. I mean although they are good at that GPs but every time you go you see a different one … I don’t think they’re overly bothered.” (Helen, time 2)
She returns to this at time 3, saying:

“You don’t think that you need help but if it’s not pushed at you – well not pushed, but if it’s not kept on top with, you know, by the health professionals that you’re supposed to keep in contact with then it’ll get missed won’t it” (Helen, time 3)

Such delays were particularly concerning given women’s and health professionals’ reluctance to use pharmacological interventions in pregnancy with the observation from women’s health records being that several GPs took women off anti-depressants due to the pregnancy without putting in place anything else.

Although women with mild-moderate mental health problems were not generally eligible for specialist services and those referred to mental health teams and counselling services faced long delays, it varied across geographical areas. Thus, although all of these women were booked at one hospital and therefore went through the same APA and referral procedures, Hannah lived in a catchment that enabled her to access a unique specialist Health Visitor role where she was contacted within eight weeks at which time the staff apologised for not having contacted sooner. Following delays due to her delivery date being imminent, she was seen approximately four weeks later.

5.2 Internal resources: Coping differently in pregnancy

In relaying how women responded to (i.e. coped with) their maternal stress, a common discourse concerned coping differently in pregnancy. This could involve coping less well, due to feeling more vulnerable and more emotional (e.g. Charlotte, Lauren, Rebecca). However, it commonly involved positive aspects about approaching things differently, often due to feeling that priorities had changed (linked to identity and role, sub-theme 1.2C). Thus, the pregnancy state could lead to changes in appraisal-focused coping. For some women, the changing priority and need to protect the developing baby led them to tackle underlying stressors. This was particularly evident for women with work-related stress (e.g. Rebecca, Anne, Ruth, Emily):

“If I wasn’t pregnant I’d probably be back in the same routine; but it suddenly becomes that I’m not protecting me anymore. I’ve got to protect the baby and I can’t afford to be doing that.” (Anne, time 1)

Depending on their occupation, women’s positions could be helped by external support resources such as maternity rights and risk assessments at work leading to altered workload. Women could also find work-related stress easier to cope with by counting
down in weeks until maternity leave. For some women, it was their stress responses that changed, for example no longer venting emotion in the same way (e.g. shouting and swearing). Nonetheless, this was not necessarily accomplished easily. Emily aspired at time 1 to model a colleague’s handling of stress at work but described at time 2 that she had ultimately found this unachievable. Similarly Lena struggled:

“I'm doing so many things in terms of health but I'm bloody stressed constantly now how healthy is that? It's easy to eat well, it's easy to quit smoking, it's easy not to eat chocolate or whatever, but I don’t find it easy to relax.” (Lena, time 1)

Some women described how their anxiety in pregnancy differed to their anxiety at other times because of it being balanced with positive aspects; for example, describing their anxiety about the birth as feeling “nervous but excited”. It was also observed that women may consciously decide to have a different relationship with stress, as described by Eliza (who had a history of Obsessive Compulsive Disorder and panic attacks):

“I've taken on quite a new approach in my stress really … I’ve got someone else that's going to be depending on me that I have to live for in a way. And so just my perspective has changed. … If a certain thing is really panicking me, can I actually do anything about it? No. So why worry about it?” (Eliza, time 2)

For Amanda, she found that “slowing down” had helped her to “chill out” and she hoped that a baby would bring a different focus and help both her and her partner to be less anxious:

“If anything I think I felt more chilled out about other elements of life generally since I've been pregnant … I think your focus shifts away from yourself a bit more which I think is a good thing … I know my other half has problems with anxiety and he partly worries about the tiredness and all the rest of it but I think he feels actually I’m looking forward to focusing on somebody else and not worrying about my anxiety and actually having someone else to look after. So hopefully it will work out like that.” (Amanda, time 2)

Such accounts illustrated areas of possible resilience. As well as coping differently in pregnancy through use of internal resources (i.e. in terms of appraisal processes and self-management of stress responses), women reported various external resources as helpful or potentially helpful; discussed next.
5.3 External resources: Type of support and support provider

Through charting, external resources were grouped by type of support and support provider. Type of support was largely consistent with common typologies and was grouped as emotional, practical and informational. Women often talked about various support measures providing “reassurance”. It was observed that this could not occur without at least one of the main types of support (emotional, practical or informational) being received, although support could be received without it providing reassurance. Reassurance implied there was emotional distress requiring reassurance; thus, for informational and practical support to provide reassurance, it needed to tackle an underlying stressor that was then reappraised.

Support providers commonly included the woman’s partner, family (often with emphasis placed on the mother), friends, other women (which could be anonymous online or met for example at classes and groups), work or the government, health professionals, health tests (including ultrasound scans) and health education materials (including online resources).

**Emotional support**

This included an expressed need for nurturing, commonly from the woman’s mother or partner and sometimes the very presence of a key person could be reassuring. Lack of attention at home, particularly when “feeling needy” could be reinforced by considerable interest from colleagues and even strangers:

“I get it at work and it bothers me I don’t get it at home.” (Lena, time 1)

Emotional support also appeared consistent with concepts of gendered coping and the desire to “tend and befriend” (Taylor, et al., 2000), with women often welcoming support from other women. Several women talked about partners who were not inclined to provide the type of emotional support that they desired due to male tendencies (e.g. “he’s a doer not a talker”, “he wants to fix things but I want a hug”). In contrast, others (e.g. Hannah, Katie, Abbie, Emily, Eliza, Jess, Amanda) described relationships indicative of the partner being a ‘confidant’.  

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42 The term confidant is used to describe a close, intimate and confiding relationship and is a recognised protective factor in health, having first been described in relation to women’s mental health (Brown, Bhrolchain, & Harris, 1975).
Professional support
As well as low-level support, which women most commonly desired, some women expressed a need for more formal support, primarily counselling. However, there were a number of barriers to accessing professional services, including practical aspects of waiting lists, cost (for private access) and childcare. Of note, when Ruth accessed counselling privately after time 1 the sessions were by telephone due to her being a single parent. Hannah’s support accessed after time 2 (which included “practical stuff” and “my relationship with my self”) was provided at home by the Health Visitor, by which stage she had a toddler and newborn, with no family nearby who could offer childcare. There were also internal barriers, such as fears that talking therapies could “open up another box” (described by Helen), and barriers that overlapped with context of disclosure (Theme 4), as described by Ruth:

“When I’ve been in waiting rooms and stuff, it says, ‘Do you need to talk?’ and there’s like posters and stuff, but I do think when you come in for your 12 week scan I think you need to be given a leaflet with those numbers on. Just say, this is here if you need it. Because there is a stigma attached to admitting that you’re sad and upset and fed-up and you don’t want to admit that there is something wrong because it’s (.) admitting defeat in some sense to yourself.” (Ruth, time 2)

Classes and groups
Another resource providing different types of support was classes and groups, which, depending on the class, offered emotional support combined with the focused activity. These activities may include information and also practical aspects, such as relaxation techniques or exercise.

Women’s discussions of classes and groups also illustrated issues surrounding support providers. A minority of women did not favour this type of support, making comments such as “I don’t need more friends” (Ruth). Other women had concerns about social anxiety and attending alone and being in a room full of strangers (e.g. Eliza and Jess), with Jess suggesting that pregnant women could be put in touch with other women in their local area and could then access resources together and Eliza describing at time 2 how she had accompanied a friend to some local facilities at a Children's Centre so she felt less self-conscious. For most women however, the appeal of support from other women was, in comparison to health professionals they would be “just more on your level and going through the same sort of things” (Helen, time 3). A deciding factor about accessing classes and groups could thus be feeling whether the other women were in a similar position and therefore could relate to them. Michelle described her previous experience of a twins group following her previous deliveries where she had felt
alienated because the other mothers’ children had all been healthy. Similarly, Louise described the lack of opportunity to meet other women experiencing PMH difficulties. She had been introduced to a parenting class when experiencing PND and was appalled that when she went the other parents lacked parenting skills whereas her concern was her PND, not her parenting capacity, for she was not a “bad mother”. There were similar concerns of seeming a “bad mother” expressed by some multiparas who reported that they would feel if they went to a class or group about birth or being a new mother, then others may judge them for not already “knowing what to do”.

Several women discussed that, in contrast to the availability of postnatal groups, there were few classes and groups during pregnancy. One exception was antenatal exercise classes (e.g. aquanatal and pregnancy yoga) and women with experience of these during the current pregnancy or the previous pregnancy were all positive about the experience. The appeal of the classes was “you could give each other advice and just chat” (Helen, time 3), showing the different implications for reciprocity and costs of support acceptance when accessing groups for women. Helen also described the appeal of groups that were more targeted to women experiencing maternal stress while acknowledging that could there be barriers concerning stigma; likening it to a support group for substance use:

“Like a support group where there is, like, a figurehead, like an alcoholics anonymous type thing! You know, like, “My name’s Helen, I’m fourteen weeks and I’m feeling a bit down.”” (Helen, time 3)

It was noted that women had sometimes been unable to continue external classes and groups due to practical barriers such as cost, time, and, the need for childcare.

**Practical support**

Practical support included assistance from significant others, most commonly the partner. Where relationships were strained (Helen, Dorothy and Grace) or there was no partner (Ruth and Michelle), this could be a particularly salient unmet need; heightened by these women also having other children to care for and often not receiving much support from family members either (for example, due to health reasons or living elsewhere). Indeed, the most common concerns about unmet practical support needs concerned anticipated challenges with childcare due to lacking family close by; as Eliza said, “we’re close [emotionally] but they’re there and I’m here”. Some women living far away from family (Lena, Emily, Lauren) had arranged that their mother would come to stay and help. For Michelle and Grace however, their practical needs required professional services; respectively due to carer roles and residency issues.
Practical support also included support provided at work, including flexibility to attend antenatal appointments, changes to work duties and practical assistance from colleagues. Additionally, statutory practical support proved important, with women often acknowledging maternity pay. Four women (Rebecca, Ruth, Anne and Emily) described how the practical support of their GPs had helped to reduce work-related pressures; highlighting that GPs in primary care were generally playing a bigger role than were midwives in addressing women’s needs concerning maternal stress.

Informational support
Unlike emotional and practical support, women did not generally discuss their partner in relation to provision of informational support although there were a few exceptions where partners read the pregnancy books too. Furthermore, some women discussed the need for informational support for their partners, to help the partners better understand maternal stress. Informational support was an area where women wanted the support source to be trustworthy. This could be others in a similar position (i.e. other women who were pregnant or who had children), health professionals and health tests, or informational and educational resources.

Wasting health professionals’ time
Women in the early stages of pregnancy often felt particularly anxious and had questions that they feared were not legitimate. Many wanted someone with the time to answer these questions and, given the nature of the context of appointments (described in Theme 4), feared they were “pestering” or “mithering” with “stupid questions”. Some felt it would be easier to contact by telephone to ask questions. Eliza described telephone services as avoiding the need to “go through the process of getting an appointment” or “plucking up the courage to go”. She suggested that a similar system to NHS Direct43 could be used for maternity to help women know if there was a “real problem”. Similarly, Ruth felt that there could be a telephone service or drop-in service that could be publicised through the handheld notes:

“I think midwives have enough to do. But I think if you had a team of people who (...) obviously were health professionals, or just volunteers, or just someone else that you just didn’t feel that you were wasting their time really.” (Ruth, time 1)

43 NHS Direct is a telephone service where patients answer a series of questions before speaking to a health professional who will advise, where necessary, that the individual see their GP or access a health service more urgently.
Helen described how her antenatal care was now provided at a Children’s Centre and she no longer felt able to drop in as she had when it was based at her GP practice:

“… they told me it was because they viewed pregnancy -. It's not an illness, which I know it’s not and it’s a natural thing and you shouldn’t need to keep, you know. … We know it’s not an illness, and all that, but sometimes you do just want a chat with someone who knows what they’re talking about.” (Helen, time 1)

Women often chose to access information through other means to avoid being seen as demanding (or perhaps anxious) by health professionals. There was clear evidence of the role of technology in providing informational support, both in terms of the emphasis placed on ultrasound scans and in relation to accessing online resources, including website and, commonly, internet forums.

Ultrasound scans
Several women voiced wanting more scans or having the first scan sooner, possibly reflecting the high levels of distress in early pregnancy in this sample. Some women who expressed considerable anxiety about fear of the pregnancy going wrong (e.g. notably Ruth, Helen, Jess and Amanda) were particularly keen to have additional ultrasound scans for extra reassurance. There was evidence of additional use of services due to such concerns, with Jess and Helen both accessing services in the third trimester due to concerns about decreased fetal movements (as described in 1.2D). One woman (Amanda) paid to access private scans on two occasions in early pregnancy, almost using the facility as a triage system:

“We decided we’d pay for one, reluctantly. I don't really like the idea of going private. But I just felt the idea of waiting until 12 weeks, um, I'm not sure how well I would have coped with that. So we had a scan at seven weeks, and the heartbeat was present. So that was good. I did then have a small bleed um a couple of weeks later um, but I didn’t feel it was serious enough to come in. So we had another (laughs) - we paid for another scan.” (Amanda, time 1)

This growing trend for accessing private scans was further illustrated by Louise and Lena, who both paid for scans in the third trimester. Louise sought reassurance of the baby’s sex (despite having confirmation at her anomaly scan) due to not wanting to risk any “surprises” that could leave her vulnerable to her PND “coming back”. In contrast, Lena had heard some “horror stories” of breech presentation being undiagnosed before labour and wanted to avoid this scenario.
Leaflets, awareness and self-help

Several women identified leaflets as a way to raise awareness (both for women and for partners) and to help women self-assess the normality of their experiences:

“God knows there’s so many complicated feelings involved. … maybe be told what to expect or that is just a passing phase or that hormones affect your way of thinking. I don’t know what kind of explanations you should expect medically to kind of cope better and saying do you know what, I’m not a loony and I’m not a bad person.” (Lena, time 1)

It was also identified as an easy way to access self-help tips, as Katie described:

“[at the baby clinic postnatally] they had loads of leaflets on postnatal depression and how to beat the baby blues. And actually, they were incredibly useful. They should have those earlier on. (.) Because it's just reassuring, you know? …. little things like imagine that you - you are a friend and you've gone to visit yourself [laugh] and give yourself some advice on how you're doing. And see if you give positive or negative advice. And it'd be like you would give positive advice, you know, your baby's fine, your baby's growing, everything's fine, so you haven't done the washing up, it doesn't really matter. … I thought it was a good leaflet, just thought I should have seen it earlier.” (Katie, time 3)

Websites and internet forums

Most women reported using the internet; however one (Jess) described needing to access it at the local library for financial reasons but found this too public an arena for reading potentially distressing information. Women reported that online materials (in contrast to those that were printed) could be more interactive and allow them to search for more detail on those areas that they were most interested in. This included the ability to search for symptoms they were experiencing and the ability to read other women's comments; both of which facilitated self-assessment processes, as well as offering comparison with other women. The distinction that women made between reading others’ contributions and posting comments in chat rooms illustrated how emotional support could also be accessed by direct responses from other women; although some felt they would feel “exposed” by doing this. Two women also talked about forums being checked by a moderator who, if necessary, would contact directly to advise of the need to access professional support (e.g. from a midwife); thus providing a further safety net or “back up”.

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Women usually used national websites, which had the advantage of giving information on health services and systems (e.g. timing of appointments and scans); with "week-by-week" formats found to be particularly popular and sections that were grouped by topics, including practical aspects (e.g. checklists such as preparing a hospital bag). Certain websites (particularly those linked to the NHS) were viewed as "reliable" but women admitted that while they intended to access only reputable sites, they could easily find themselves drifting:

“I looked at the NHS website and I tried to sort of look at sensible things, because I was advised by the midwife not to look at other things, but then I did find myself looking at some forums and stuff and then realising you shouldn’t really look at them because they’re probably nonsense.” (Natalie, time 1)

A few women reported that they felt they became over reliant on internet sources. One woman (Eliza) described herself as “living online” and when asked how frequently women were using forums, some said (somewhat sheepishly) “pretty much every day”; indicating the need for continual reassurance. With informational support, there were issues of timing and quantity of information provision and whether this information heightened or reduced anxiety. The ability of information to provide reassurance did not only apply to online resources, as highlighted by Abbie who at time 2 was waiting for another scan due to concerns found at a growth scan. She described her recent interaction with the obstetrician and responses following this:

““Well, okay, so what happens in three weeks time if the baby hasn’t grown?” And obviously the registrar doesn’t really want to sort of say, “Well, worst case scenario is this”, but – and I mean I think it depends on how you tick really – but I kind of want to prepare myself. And so I asked some questions; and she was happy to answer but I could tell that she was not wanting to tell me too much for the sake of kind of worrying and these kind of things – which again is fair enough – so of course you come home and look on the Internet [laughingly] instead, don’t you?” (Abbie, time 2)

Alongside women’s explicit descriptions of effective or potentially effective resources, characteristics of support that may be beneficial to women were identified through reflecting on the research process; presented in the next theme.
Summary of Theme 5: Responding

- Women’s accounts of mental health systems and referrals suggested greater recognition by booking midwives than was indicated by the health records, suggesting lack of documentation rather than lack of discussion.
- Nonetheless, accounts indicated a similarly poor picture of referrals, with women not being informed of the outcome of their referrals for specialist support and women with mild-moderate disorder not receiving appropriate services within appropriate timeframes. Accounts and health records consistently found that women’s mood was rarely monitored.
- Women described coping differently in pregnancy, highlighting the need to consider protective factors and possible resilience, rather than solely focusing on risk factors.
- Women provided feedback on existing external resources and made suggestions for potentially helpful resources.
- Information and practical support were found to provide emotional support through the process of reassurance where women were experiencing psychological distress.
- Women often experienced barriers to accessing professional support and provided several suggestions for accessible and acceptable low-level support resources. Suggestions included peer support through classes and groups, and informational support available through printed and electronic resources that could serve multiple functions; including elements of self-management.

Theme 6: Research(er) as intervention

As shown in the figure depicting the final Framework, this theme transcended the other major themes.

Study Part 1 was designed to perform APA, requiring some degree of self-assessment and disclosure of one’s own maternal stress. In designing Study Part 2, the emphasis was on gaining women’s views and experiences of APA, their unmet psychosocial needs and ways to meet these needs. However, it was realised that Part 2 also involved performing APA as part of this process, albeit through in-depth discussion rather than unassisted self-completion. As such, the sub-studies enabled reflections on acceptability of different approaches to APA (linking with Theme 3) and also involved disclosures.
(Theme 4). In contrast to the ‘assessing' that was conducted in Study Part 1, the interviews also involved ‘responding' to these disclosures (Theme 5). This included: the reaction in the conversation; responses that had implications for accessing professional support; and direct social support within the interaction.

6.1 Assessment as reassurance - The extent to which APA provides reassurance and how this varies with method

Acceptability appeared linked to how women felt about these processes of self-assessment and appraisal. Some women had embraced self-reflection in Study Part 1.

“It was good to kind of look at that and reflect on that and how I really had been doing. I'd been trying not to think about it and just get on with stuff.” (Amanda, time 1)

“For me, it was difficult because it suddenly was brought up and I hadn't thought about it, but then I thought, this could be quite interesting.” (Emily, time 1)

For Charlotte, the process had provided her reassurance by offering her a sense of normality; thus highlighting how APA may itself act as an intervention:

“I was reading through the questions thinking that lots of women may be having the same experiences, similar thoughts, and it just makes you feel like well it's not you either, you know, being weak or not being able to deal with things, it's quite natural. … it just makes you feel like that you're not going bonkers.” (Charlotte, time 1)

For other women, the process of APA through self-completed questionnaires had not provided reassurance. Abbie described how she felt “wounds were opened up” through Study Part 1 but then Study Part 2 had “helped to explore” this further, both with the researcher (because she had wanted to be able to explain and explore why she felt the way she did) and with herself. Abbie later commented she had found it “really useful actually” to think about these things. These observations highlighted how interview prompts and the nature of the topic guide may have encouraged women to engage in deeper reflections; for example, through asking women about the nature of their fears and encouraging them to connect their thoughts, feelings and behaviours.

For Ruth, Study Part 1 had required her to confront her maternal stress (i.e. recognising and admitting to self; 4.3 and 4.4) and this had been challenging:
“I think if you had someone to sit with you and go through it with you, I think it would be a nicer experience. And I think if someone did break down on your shoulder, you could then go, “I think it would be a good idea if you told your midwife this”. Or a number, or someone to phone, like, “why don’t you go and speak to your doctor about this?” Because you’re doing it cold and you don’t get feedback from it. You’ve just filled it out. And I think filling out the questionnaire, it does kind of open you up to thinking, “God I really am stressed about this” and you don’t really realise until you’ve answered the questionnaire. I didn’t feel like, “Oh God, I was left on my own”. But it did make me think about some things and I spoke to [baby’s father] on the way home.” (Ruth, time 1)

Hannah described how the interview process elicited disclosures in a way the questionnaire had not; highlighting the potential to access more private accounts and facilitating ‘recognising’ and ‘admitting’ maternal stress (sub-themes 4.3 and 4.4):

“When you fill out a questionnaire, it’s how you want to – it’s the same when you talk to somebody as well - how you want to portray yourself or whatever, but things come out when you talk that you don’t necessarily think would, I think more than – you can sort of put on a face with a questionnaire.” (Hannah, time 2)

All these women had expressed an interest in having counselling at time 1, therefore it is possible that their different experiences of Study Part 1 and Study Part 2 reflected that they were willing to accept that they were feeling stressed and were more keen to engage with processes of appraisal. They appeared to favour sharing their feelings with another person rather than being “left to worry on [their] own” (Ruth).

6.2 Interviews as reacting to disclosures

Study Part 2 involved not only the assessment element of APA but also immediate responding within the interaction. Although not necessary for all women, as the interviewer, there was the opportunity to offer women validation of their experiences balanced with such experiences being relatively common and therefore ‘normal’. It was therefore the opportunity to convey a similar message to that described in Emily’s positive account of her GP’s reaction to her maternal anxiety (fear of pregnancy going wrong). Emily described the interaction in detail and the interviewer therefore checked her understanding of Emily’s description:
Interviewer: So it sounds like you found that quite a good response of [the GP];
taking it seriously, but also saying, “and a lot of people might feel like that and
so it's normal”.

Emily: Absolutely. [nodding]

Interviewer: “but it's also important”.

Emily: Yeah, absolutely, yeah.

This message of “normal but important” recognised that the impact of maternal stress
can be significant for a woman, and indeed her partner, but women also often seek
reassurance that this is not abnormal, or a failure on their part. Conveying such a
message validates and normalises the woman feelings, concerns and ‘objective’
appraisal, which can reassure against fears such as ‘self going wrong’ (Theme 1).

It should be noted that the message need not be explicit but may take the form of subtle
features of language and communication (discussed below, under interviewing style)
when women appeared to be ‘thinking aloud’ or ‘searching for answers’, for example
saying, “I think it’s probably natural anxieties”. This may have contributed to women
providing themselves with reassurance through the processes of self-reflection and
appraisal in the presence of someone else. This was particularly found with primiparas
who appeared to be working through the processes of psychological adaptation involved
in pregnancy and motherhood.

“Talking about it now, I feel already better [laughs]. I’m thinking, this is you
know, I’m like flying now [laughs].” (Lena, time 1)

Other women’s searching for answers could be more overt. For example, at time 2,
Hannah directly asked how her experiences compared with those of other women. This
was part of Hannah’s attempts to assess her severity. Given her presentation and
descriptions of nature and impact, combined with her previous and unsuccessful
attempts to access support, it was considered appropriate to emphasise that the
interviewer was not trained in that area but to reflect back that it sounded as though the
impact on her life was significant, and that she may benefit from talking to her GP or
midwife.

Grace too was trying to self-assess and asked whether the sounds she heard (which
she thought was perhaps the spirit of the devil) were “normal”, or whether she was
maybe “ill” (by which she meant mental health problems). Here, the priority was to
remain calm, validate her concern, affirm that she had ‘done the right thing’ and that the researcher would pursue with the specialist the help that Grace wanted. Additionally, the researcher would contact Grace within the week to give her an update, after which time the specialist would be in touch and would be able to discuss all of her concerns in detail.

6.3 Interviews as listening visits – the need to talk
Coding and indexing highlighted (quite literally) that with most women the majority of the interaction was spent talking about issues that were important to them and led by them. This was particularly apparent at time 1, where the interview often offered women the first opportunity to ‘offload’. Women could readily speak for an hour and appeared to really need to talk. At time 2 and time 3, interactions contained a notably higher proportion of more casual ‘chat’; they were more conversational and felt less like a listening visit. Two notable exceptions were Ruth and Hannah who respectively described the interviews as “like therapy sessions” and “like counselling sessions”. Some women, even those who were seemingly less forthcoming, commented that this was the first opportunity they had been given to talk about their feelings and experiences. One example was Dorothy:

“It’s my first time, like, having a one to one chat with somebody, I don’t normally do that. I normally brush off things all the time, but this time I just said, I wanted to say my mind. Just to share sometimes is good so that other people will know how you can overcome some situations, so I’m really happy with your research.”
(Dorothy, time 1)

Similarly, Katie’s comment at time 2 was not expected as she had not always appeared as comfortable in talking about her experiences:

“Do you think by doing these interviews you change (. ) the results a little bit? Because actually talking to somebody if you’re anxious makes you less anxious (. ) Because you’re giving people an opportunity to release any tension [laughs]. And I would say, you know, that’s mostly what you need, someone to listen to. That’s not offered.” (Katie, time 2)
6.4 Interviews as impacting the use of services

For some women, the interview went beyond a listening visit or reactions to disclosures, impacting use of other services. This could either be through influencing women’s support seeking (Ruth and Hannah) or through a direct referral (Grace). Both Ruth and Hannah reported that they had been considering counselling. It is possible that they may have chosen to access such services anyway; however, their comments and actions indicated that the interview had encouraged them to access services. Ruth said at time 2,

“I think what triggered getting everything sorted out was actually talking to you about it. I was having a really, really bad day when I came in here. And I actually went and spoke to a counsellor after I had spoken to you and it’s the most liberating thing I’ve ever done.” (Ruth, time 2)

Hannah emailed the interviewer a few days after the time 2 interview to say that she had seen her midwife the day after the interview and had asked to be referred to the care team. This may have been partly due to the interview asking about current and desired support, and the barriers to accessing the desired support. Also, it likely reflected that the interviewer gave Ruth contact details of local counselling services (when Ruth commented that she did not “really know where to go” to get counselling) and advised her Hannah to see her GP or midwife. Both women were highly educated and regular users of the internet and it was therefore unlikely to be the actual information that was provided but rather the acknowledgement that this may be useful, and therefore a validation to the women of the significance of their distress.

In contrast, for Grace, she had already accessed support by visiting her GP. The Participant Information Sheet had then led her to seek help again, through disclosing to her booking midwife that she “felt depressed”:

“Last time, when I went to him [GP], the first time. I told him that I really feel depressed. …. He didn’t do anything [for] me. So when I came here again, and I read in this paper about this thing [research], so I decided to speak to them again.”

Realising that Grace’s current mental health referral would not meet eligibility for accessing services, the interviewer made a referral detailing Grace’s history and symptoms and indicating severe mental health concerns. This led to specialist services being quickly put in place.
6.5 Interviewing style and relationship with the interviewer

Reflections on the interviewing style and interview interactions were promoted through the transcription process, field notes and reflective diary. These processes offered insights into aspects of the interviewing style (and research design) that may have promoted the role of the research as intervention. These included factors that may have facilitated disclosure, reactions to disclosures and reactions to distress.

As described in Theme 4 (context of disclosure), women valued interactions where health professionals “really listened” and did not seem to be simply “going through the motions”. Such interactions helped to foster the sense of trust and confidence that some women felt they needed in order to make personal and sensitive disclosures. Detailed transcription (which used the transcription key available in Appendix 8.1) illustrated the nuances of the interviewer’s communication that demonstrated “engaged listenership” and signs of a “supportive and engaged listener” (Lambertz, 2011). Examples included the frequent use of ‘response tokens’ (Gardner, 2001, cited by (Oliver, Serovich, & Mason, 2005)) by both the interviewer and the participant. Response tokens serve three main functions: alignment (echoing an opinion, e.g. ‘mm’, ‘yeah’), acknowledgment (when the speaker requests acknowledgement or agreement, e.g. ‘you know’) and continuers (signals for the speaker to continue, e.g. ‘uh huh’, ‘oh’, ‘right’) (Lambertz, 2011). The interviewer also frequently used ‘backchannelling’ (e.g. ‘mm’, ‘right’, ‘oh’, ‘uh huh’, ‘really’, ‘yeah’), showing continued attention (Lambertz, 2011).

Transcription and self reflexivity also identified interviewer comments that followed disclosures. These ‘listener responses’ (described here as reactions to disclosures) are particularly important when individuals make potentially sensitive or emotional disclosures (Hepburn, 2004). For example, using the descriptions offered by Hepburn (2004), there was evidence of ‘empathic receipts’ (e.g. to Louise’s disclosures about the nature and impact of her past PND, “that sounds a long time to have felt like that”), assuring the speaker ‘take your time’ (through body language and appropriate pauses) and, in the case of Grace, assurance of ‘doing the right thing’ (“it’s important that you’ve said this”).

As well as reactions to disclosures, the reactions to distress illustrated the nature of the interviewing style and interaction. Responses were tailored to the individual participant and the interviewer’s perceptions of her needs and preference; for example, pausing while one woman (Louise) wept quietly but taking another’s lead (Hannah) by continuing with conversations where she frequently cried while speaking. Further examples of these reflections are available in Appendix 8.6.
Alongside aspects of interviewer style that were relevant to disclosures, for other women, apparent benefits came through having an activity that provided distraction (e.g. from physical symptoms) and, to some extent, company. Jess and Eliza were house-bound through their severe morning sickness and unable to work and both mentioned therefore 'having the time' to take part. Both reported not having friends or family nearby and feeling lonely. Additionally, Jess specifically mentioned missing female company and reflections in field notes identified that, for many women, it appeared important that the interviewer was a woman.

**The role of continuity**

The ‘relationship’ between researcher and participant began at the time of booking when recruiting for Study Part 1. This meant that, with the exception of reception staff, the researcher could be the first and last person that women saw at the hospital across their maternity experience. In addition to the various communication for arranging interviews and the serial interviews themselves, some women also saw the researcher at subsequent appointments due to the researcher attending antenatal clinics for six months. Completely unprompted, Louise described how this ongoing contact had impacted her:

”It’s been really nice seeing you. It’s been support in itself doing the questionnaires and just sort of saying it all as it comes into my head. So it’s been a support just doing the research and doing the questionnaires, and having the same face and seeing you in clinic as well, sort of like as an additional-. It’s been really nice.” (Louise, time 3)

After thanking Louise for taking part, she said:

“No it’s been nice to talk about the end now. My end to it now.” (Louise, time 3)

The poignancy of this was how her experiences had changed from the first meeting where she was “absolutely terrified” of the return of her PND and not bonding, to the last contact where she could now put the past behind her.

**6.6 Provider-recipient support transactions**

Women may not have felt any personal benefit or disbenefit from taking part in the research. For those who did however, reframing the interviews with a ‘support transactions’ lens helped explore the processes and how the research may be viewed
as intervention. The nature of recruitment meant that women did not need to engage with active support seeking. Active seeking can be challenging because it requires some element of recognising and admitting the need for support (as discussed in Themes 4 and 5). Indeed, the Participant Information Sheet was carefully phrased to avoid ‘labelling’ or stigma, stating, “we are particularly interested in … women who report some experiences or symptoms of stress”.

Feeling benefit through taking part in research may be perceived very differently to having, for example, a session of counselling or contacting the GP or midwife, due to not having the same implications for costs of support acceptance. The research adopts a unique position by being separate to the clinical care, with an independent ‘research phone’ and ‘research office’ yet still being linked by the physical presence in the hospital and, for example, inclusion of NHS Trust logos (along with University logos) on all paperwork (as required by governance).

Critically, the researcher is being given assistance from the participant in helping with the research, meaning that there is reciprocity. Indeed, objectively the participant is the provider and the researcher is the recipient. This is conveyed not only through verbal thanks but also reimbursement of travel costs and arranging the interview at the woman’s convenience. This also reduces some of the barriers to support than women report (discussed in Theme 5), including transport and childcare.

Having few costs of support acceptance combined with the discrete ways in which support was provided (highlighted by the reflections on interviewer style) may have led to the support being more ‘invisible’ and therefore not necessarily perceived as support. If some women felt disbenefit (beyond practical inconvenience) it is likely that it would be due to the nature of the research raising self-awareness that some women may find uncomfortable.
Summary of Theme 6: Research(er) as intervention

- Self-reflexivity and deep engagement through the transcription process identified ways in which the research(er) acted as an intervention for some women.
- Differences were highlighted between performing APA in different ways, including the possibility for the interview setting to provide greater reassurance.
- Interviews also provided validation of women’s experiences and appropriate responses to disclosures that were sometimes lacking in health professional interactions and were important for the current perinatal period but also have potential implications for future assessing and disclosing.
- For some women, the interviews acted as a listening visit and there were some occasions where the interviews appeared to influence access of services.
- Reflecting on the mechanisms through which the intervention was able to act as an intervention illustrated the importance of provider-recipient support transactions to modelling social support interventions, including some aspects that are unique to the research setting.
- Interviewer style rather than factors such as interview setting appeared key to providing rich data, building trust and reciprocity. Several women had interviews in both settings, depending on their commitments at the time. There was no clear trend between choice of setting and characteristics such as level of distress, disclosure made, and reports of experiences of taking part in the research.
- It is not possible to disentangle the role played by the research and the observed trajectories of stress and support. However, providing reassurance, signposting to services or making referrals were nonetheless necessary from an ethical perspective. Efforts to minimise the impact of the research could include: using a more structured interview schedule, using telephone interviews (reducing non-verbal communication), or reducing the ongoing participant-researcher relationship (for example, by the researcher not also conducting recruitment for Study Part 1, or by not conducting serial interviews).
8.D Rigour in Study Part 2

Quality measures were incorporated in the design stage (where the research protocol, including the topic guide, was subjected to academic peer review), in data collection and data analysis. Member checking of the interpretations following Framework Analysis was not used due to inherent challenges; including, different agendas, changed perceptions (which may be particularly relevant with serial interviews), and ethical dilemmas (e.g. resolving disagreement) (Flick, 2005). Instead, member checking was used in the interviews by summarising discussions to check that the summaries reflected the participants’ views. This increased credibility and also offered participants the opportunity to provide any further information. Credibility was also built through prolonged engagement, which was promoted by the longitudinal design. Transcription and transcription-checking further contributed to prolonged engagement, but also offered deeper engagement by promoting reflections on the use of language and the participant-interviewer interaction (which were particularly relevant to shaping Theme 4, ‘context of disclosure’, and Theme 6, ‘research(er) as intervention’). Self-reflexivity, which was complemented by field notes recording contextual factors and reflections on the research process, thus contributed beyond demonstrating rigour. That is, reflecting on the researcher’s impact on that is being researched uncovered additional findings about the impact on the participant, both in the current perinatal period and, potentially, future understandings and disclosures.

The decision-making processes involved in Framework Analysis were documented as part of the audit trail; capturing changes across different Framework versions and areas where knowledge of Study Part 1 responses led to assumptions in Part 2. Such processes built dependability and confirmability. The development of the final Framework also highlighted the inductive (data-driven) themes; illustrated with quotations from all 22 participants, further building credibility.

To enhance confirmability, possible bias was explored through detailed discussion with the supervisory team about the researcher’s interpretations and personal reflexivity on the researcher’s own experiences. Peer debriefing was accessed by presenting and defending findings at research group meetings and conferences and sharing the findings with interested groups (e.g. student midwives, obstetric consultants); processes which helped to explore alternative explanations.

Data saturation

One quality measure that was more complicated was the issue of data saturation, which has implications for confirmability. Qualitative researchers commonly state that sample size is based on principles of data saturation, i.e. while there is always the potential for “the new to emerge”, saturation is the point where it becomes “counter-productive” and
“the new” does not add to the research (p.136) (Strauss & Corbin, 1998). Few researchers describe this process in detail. Furthermore, sampling differs in serial interviewing whereby later samples are determined by the original sample; thus, saturation cannot guide sampling at each timepoint. Here, while the formal framework was not established at the stage of ceasing recruitment to Study Part 2 (time 1), no new themes were emerging and it was therefore anticipated that the framework would not change substantially with further time 1 interviews. Ceasing recruitment was also pragmatic, recognising the potential to become overwhelmed with the data, particularly given the longitudinal nature of the qualitative research and broad focus of the research questions.

Nonetheless, it is likely that the research did not reach true saturation in under-represented groups, e.g. Black and Minority Ethnic women. Indeed, the final four participants included three women with more severe mental health problems (informing sub-theme 5.1 considerably) and three with unwanted pregnancies (particularly relevant to Theme 1, ‘context of pregnancy’). Such views would therefore not have been heard if recruitment had ceased sooner. Nonetheless, Strauss and Corbin (1998) acknowledge that true saturation cannot be reached due to pragmatic aspects such as availability of participants. Indeed, as shown previously in Figure 4.4, 12 women who were eligible for Study Part 2 could not be contacted or declined taking part. Saturation is not only concerned with the raw data but also the analysis, which in the current study was extensive and returned to over several months. Thus, on reflection, it was felt that with further data collection, the Framework would have only changed concerning examples, not overall structure.

Finally, authenticity was promoted by the addition of postnatal interviews (the addition of which was primarily participant-led), empowerment of participants through having made a ‘contribution’ (with participants commenting on wishing to ‘help other women’), meaningful change for women directly resulting from the research (through providing reassurance, and signposting or referring to professional support) and generating action (through making recommendations for clinical practice, including dissemination of findings to clinicians).
Chapter 9. Discussion

9.1 Revisiting the main findings and the aims of the research

The overarching aim of this research was to inform theory and practice surrounding maternal stress, against the context of routine antenatal psychosocial assessment (APA) being introduced in developed countries. The research had initially intended to address the lack of guidelines on social support interventions for the prevention and treatment of mild-moderate mental disorder; using qualitative methods to explore women’s needs and ways of meeting these needs and using quantitative methods as a sampling framework. However, the early ‘problem definition’ work in the literature review identified the concerns raised over existing APA measures, to explore how women may be identified as ‘at-need’, women’s views on possible APA questions and views on provision of support. Thus, the research expanded its scope from responding to maternal stress to assessing and responding to maternal stress; requiring greater equivalence of quantitative and qualitative research methods. The context additionally shifted, due to the changing national clinical context whereby APA was being introduced despite concerns over validation, combined with introduction locally within the lifetime of the research. Thus, investigation of APA extended beyond a research context to additionally evaluate local practice; requiring access to health records to complement women’s experiences of existing services.

There were eight main findings of the research:

- Maternal stress was found to be relatively common and could cause significant negative impact for women’s lives; it was noted that some women found it difficult to self-assess levels of severity.
- There was a need to expand the focus of assessing and responding to maternal stress from postnatal depression (PND) to include perinatal anxiety and depression (PAD) as well as wider psychosocial perspectives and trajectories.
- Anxiety measures (STAI-S (Spielberger, et al., 1987) and GAD-2 (Kroenke, et al., 2007)) appeared to share a common dimension of anxiety characterised by ‘worry’ whereas the STAI-S additionally spanned a dimension characterised by tension; there was no evidence to suggest that the EPDS could be used as a case finding instrument for perinatal anxiety.
- The recently introduced case finding instrument for perinatal depression (the Whooley questions; (Whooley, et al., 1997)) was found to ‘miss’ a lot of possible
cases, particularly when used with the Arroll ‘help’ question (Arroll, et al., 2003).

- APA had been introduced without adequate consideration of the topics of most relevance to women, context of disclosure or adequate resources for consistently responding to identified need.
- Women’s mental health history and treatment history were under-reported in the clinical setting.
- Women identified how some of their unmet needs may be met using low-level interventions; some of which may be universal and some which may need to be tailored to different needs.
- Self-reflexivity concerning research(er) as intervention uncovered additional research findings, beyond demonstrating rigour of the research.

The findings and their implications are presented here, using the Medical Research Council (MRC) Complex Interventions Framework (CIF) (Medical Research Council, 2000, 2008) as a way to extend theory and illustrate how the findings could provide the foundation for future development, evaluation and implementation of interventions. Due to the applied nature of the research, the discussion emphasises application to clinical practice and service development.

9.2 Positioning the findings within the Medical Research Council (MRC) Complex Interventions Framework (CIF)

As described in the Introduction, the MRC CIF was adopted to inform development of social support interventions designed to address the target problem of maternal stress; informing the nature and size of the target problem and, through modelling processes, identifying possible pathways to maternal stress that may be amenable to intervention. An alternative position is to view the processes of assessing and responding to maternal stress as representing higher order complex interventions, within which the multi-faceted social support interventions are embedded. Discussion of the findings considers both of these levels of complex intervention within the framework.

9.2.1 Nature and size of the target problem (maternal stress)

Several of the key findings informed the nature and size of the target problem, the measures used for its assessment and considerations concerning assessment; including, context of disclosure, trajectories of stress and the need to consider
psychological distress as a broader concept and not just ‘depression’. Adopting the MRC CIF, such findings inform eligibility for interventions and assessing their effectiveness.

**Impact of maternal stress**

Women’s accounts demonstrated the profound impact of maternal stress across domains of women’s lives, as reported elsewhere (Furber, et al., 2009). This is consistent with wider demands to recognise the antenatal period as important in its own right, rather than simply as a risk factor for postnatal mental disorder (Austin, 2004). Yet, it would appear that the clinical practice focus on a history of mental health problems as shaping referrals indicates preoccupation with prediction of future ill-health – rather than considering current ‘problems’. Some women were concerned about the possible implications of their maternal stress for their baby’s development, highlighting the challenges in this area and need to balance early intervention with possible over-medicalising or the risk of creating further anxiety.

**Women’s assessment of ‘high’ maternal stress**

While distress was common, women with objectively high levels (based on assessment measures) varied as to whether they self-identified with wanting or needing additional support. Women found it difficult to self-assess severity for a combination of reasons, including the limited profile of antenatal maternal stress, the need for ‘benchmarks’, and overlap between symptoms of distress and somatic aspects associated with pregnancy. The centrality of women’s personal models of health and illness was apparent, a finding observed in other domains of Health Psychology (Hagger & Orbell, 2003), with implications for disclosure. Researchers have begun to identify some of the possible discriminatory symptoms of antenatal depression (Kammerer, et al., 2009) and such findings may help women to have clearer indicators to aid interpretations of feelings and symptoms.

**Prevalence of ‘high’ distress and measures used**

The quantitative research found that antenatal psychological distress suggestive of possible disorder was common. Rates of possible caseness for depression were comparable with other research using the EPDS, across both thresholds (9/10 and 12/13) (Heron, et al., 2004; Jomeen & Martin, 2005b), with the lower threshold identifying approximately twice as many women (approximately 1 in 4 vs. 1 in 8). The prevalence based on the higher threshold is also consistent with prevalence of depression based on diagnostic interview (Bennett, et al., 2004).
Anxiety rates appeared higher in the current sample than other research using the STAI-S (Teixeira, et al., 2009), with between 1 in 3 and 1 in 5 women identified, depending on the threshold adopted. Indeed, average STAI-S scores were more comparable with those used in intervention studies for maternal anxiety (Newham, et al., 2012). Despite the STAI-S being the most widely used anxiety measure in research in the perinatal period (Littleton, et al., 2007), direct comparison of possible cases was difficult to obtain because research commonly occurs in the second trimester whereas the ARMS study was conducted at the booking visit (predominantly the first trimester) to maximise application to practice, being the stage where antenatal psychosocial assessment (APA) is undertaken in clinical practice. Concerns about the STAI-S have been raised elsewhere (Green, Kafetsios, Statham, & Snowdon, 2003) due to being focused on immediate symptoms that may be highly transient. Related to this, the qualitative research indicated the significance of trajectories, with such high levels of anxiety potentially reflecting a period of heightened anxiety preceding the routine ultrasound scan and booking visit.

The GAD-2 (Kroenke, et al., 2007) may be more appropriate due to asking about the previous two weeks, as well as being appropriately brief for a clinical setting. Due to a lack of reference scores for the perinatal period, the research adopted the threshold recommended for the general population (Kroenke, et al., 2010). This indicated far higher rates of possible cases of antenatal anxiety than indicated by studies using diagnostic interview (1 in 5 vs. between 1 in 10 and 1 in 20 depending on the anxiety disorders included) (Buist, et al., 2011). The limited range of scores mean that with each increasing point on the threshold, the proportion of women classed as ‘high’ was approximately halved and a higher threshold may be required in pregnancy than the general population.

Fewer than half of the women identified as high anxiety were identified by both the STAI-S and GAD-2. Measuring anxiety using the EPDS was also explored, following the proposal that as well being the most widely used case finding instrument for depression in the perinatal period, the EPDS could be used to screen for perinatal anxiety (Matthey, 2008). Clearly, applying the EPDS to the spectrum of perinatal anxiety and depression has intrinsic clinical appeal: it has demonstrated acceptability with women and health professionals and its brevity would likely satisfy the time constraints of clinical settings (Cox & Holden, 2003). Although the three items of the proposed subscale consistently loaded together, the ARMS study did not provide evidence to support that this reflected an anxiety component per se; indeed, such findings may partly reflect the valence of items (Goodchild, et al., 2005). Indeed, the relationship between EPDS and each of STAI-S and GAD-2 was stronger than the relationships amongst these so-called anxiety measures, yet no-one has argued the use of the full EPDS as an anxiety measure.
Concurrent validation of the EPDS-3A against clinical diagnosis of anxiety disorders is limited to the postnatal period (Matthey, 2008; Rowe, et al., 2008). It seems likely that while it may distinguish those with and without anxiety disorders, it may fail to differentiate between anxiety and either depression, or co-morbidity (Rowe, et al., 2008). This may in part reflect that even cases classified as perinatal depression are perhaps more likely to be accompanied by an anxiety component than is depression occurring outside the perinatal period (Ross, et al., 2003).

**Neglect of anxiety**

The ARMS questionnaire and interviews found that both anxiety and depression symptoms were common, and while symptoms often co-occurred some women experienced predominantly one type. This confirms the suitability of conceptualising the target problem as maternal stress which spans perinatal anxiety and depression, rather than focusing on PND. Nonetheless, clinical practice remained focused on depression, both in terms of treatment history and current symptoms.

Anxiety varied in nature; for some women it reflected their dispositional relationship with stress; for others, it appeared largely pregnancy-specific and for some, it was related to histories of anxiety or related disorders, or could even be indicative of more severe mental illness. Anxiety-related disorders that were largely undocumented in health records were discussed in interviews, partly reflecting that women may not volunteer such information unless explicitly asked, despite being prepared to discuss such issues (Holden, 1994; Matthey, et al., 2005).

Adapting the Psychosocial Risk Index (PRI) (Austin, 2003) to include anxiety identified an additional 1 in 10 women who would have otherwise been missed (due to being ‘low’ on risk and symptom when restricted to depression), an additional 1 in 4 who would have otherwise been classed as high on risk only, and also found that the majority of women with high risk and depression symptoms were additionally high on anxiety. The implications of neglecting anxiety are returned to later in this chapter. In addition, further discussion of the relationship between risk factors and distress are returned to when considering the findings in relation to the ‘modelling’ processes promoted by the MRC CIF.

**Prevalence observed in clinical practice**

Measures were informed both by both data sources used in Study Part 1: the ARMS questionnaire and observations from health records. Case finding based on a ‘yes’ response to either Whooley item identified more women than did the more conservative EPDS threshold (18% vs. 13%). Whooley items only identified half of the women identified using the EPDS. Documentation in health records indicated that the Whooley
items (particularly the item concerning little interest or pleasure) are perhaps more likely to be confounded with somatic aspects (e.g. sickness in pregnancy) in contrast to the EPDS where avoiding overlap with somatic aspects was a clear intention in its development (Cox, et al., 1987). Such neglect of somatic aspects may however be seen as a limitation with increasing calls to consider emotional and somatic aspects (Traviss, West, & House, 2012). The relationship between somatic aspects and responses on the Whooley items and EPDS could not be tested because the research did not include any measure of pregnancy-related symptoms.

Agreement between the Whooley items and EPDS was poorer than indicated elsewhere (Bennett, et al., 2008). This may partly reflect that although in the ARMS study both instruments were usually self-completed in the antenatal clinic waiting room, reducing method variance (Strauss & Smith, 2009), their perceived purposes and implications differed across clinical and research settings, with women’s accounts illustrating the significance of the context of disclosure concerning maternal stress.

Concerns about the costs of management of false positives are the primary reason that a national screening programme for postnatal depression has been rejected (Hewitt, et al., 2009). The Arroll ‘help’ item is intended to reduce false positives but a recent review found that no studies had evaluated its use in the perinatal period (Mann & Gilbody, 2011). The ARMS research provided the first validation of this item in the perinatal period; albeit against a self-report measure rather than diagnostic interview. Using the ‘help’ item as a criterion dramatically compromised sensitivity, with possible caseness based on the Arroll item potentially missing 9 in 10 women identified by the EPDS, compared with missing approximately 1 in 2 when based on the Whooley items alone. Half as many women did not complete the help item as endorsed it, with interviews highlighting that ‘help’ appeared vague and the purpose of assessment unclear, accompanied by concerns of involvement of services. Nonetheless, documentation in health records indicated greater consistency of documentation following endorsement of the ‘help’ item suggesting that midwives relied more heavily on the ‘help’ item.

**Trajectories of maternal stress**

Even for women who endorsed the ‘help’ item, maternal stress was not routinely monitored using the Whooley and Arroll instruments, neglecting trajectories of maternal stress. As well as being an important finding in its own right, this limited the quantitative assessment of maternal stress to a cross-sectional design. The key added benefit of the serial interviews was that trajectories could be observed. Time course perspectives highlighted the need to recognise that women’s experiences do not mirror the artificial separation of services, instead requiring approaches spanning the perinatal period. This included both the transition between antenatal and postnatal and women’s experiences...
of maternal stress before being cared for by maternity services. The time of waiting before booking was a time when women wanted information, as observed elsewhere (Lavender, Moffat, & Rixon, 2000). This raises issues about how to address maternal stress in early pregnancy and provide support to women in early stages.

It is possible that the relatively high prevalence of maternal stress at booking reflected distress that may be relatively transient and part of the healthy processes of psychological adjustment. Critically, not all antenatal distress continued through to postnatal distress, especially once threat had passed; for example, fear of delivery going wrong or fear not bonding with the baby. Possible alternative explanations exist for high distress being more common in early pregnancy in this sample. Firstly, the trajectories in this study may have reflected the sampling for the qualitative research, which was driven by high maternal stress in early pregnancy (i.e. at the time of booking). This highlights potential concerns about emphasis on clinical assessment at one time point. Secondly, it is possible that women were less likely to disclose distress postnatally due to the changing context of disclosure and possible heightened fears of involvement of social services concerned with welfare of the child. Third, there is the potential that the research acted as an intervention and may have, for some women, altered trajectories – or women may have felt uncomfortable acknowledging difficulties having had previous improvement in well-being between time 1 and time 2.

**Maternal stress pathways**

Associations between distress and other variables indicate possible pathways to maternal distress and thus inform modelling of the interventions designed to target maternal stress; returned to later. Statistical analyses concerning correlates of distress, together with women’s accounts, confirmed that interventions to address the target problem of maternal stress needed to address both symptoms of distress and triggers of stress; consistent with using symptom and risk based approaches in combination (Edwards, et al., 2008a, 2008b; Ingram & Taylor, 2007; Matthey, et al., 2004b; Priest, et al., 2008).

Although the ANRQ was developed to shape care pathways targeting the prevention of PND, based on established risk factors for PND (Austin, 2003), its items were strongly associated with both antenatal depression symptoms and antenatal anxiety depression symptoms. This is unsurprising given that antenatal distress predicts postnatal distress and disorder (Heron, et al., 2004) and both types of symptoms are strongly correlated with each other.

Using the Psychosocial Risk Index (PRI) to generate four risk classifications (based on depression symptoms (EPDS) and risk factors (ANRQ)) identified a similar trend to
previous work in terms of overall risk-symptom classifications (Priest, 2006). Women more commonly presented high symptoms in the presence of high risk, than without high risk; consistent with vulnerability-stress models of mental health originally highlighted by the seminal work of Brown and Harris (1978). The observed relationship between risk factors and distress may have been inflated by confounding of measurement given the cross-sectional design and causality cannot be inferred.

**Static risk factors**

Historical static risk factors such as early adversity and mental health history are likely to be less vulnerable to such confounding of measurement. Early adversity (e.g. childhood abuse and relationship with mother) has consistently found to be a risk factor for PMH, in particular PND, yet this was not found here. Possible explanations include statistical aspects due to the small numbers of women with these risk factors and the varied distress scores amongst these women. Varied scores may reflect failing to distinguish between women who perceived their mothers to be unsupportive with those who lacked mother figures and the possibility of resilience in some of these women. Additionally, the early adversity items clustered with the personality items and relationships may therefore have been obscured by shared variance. Small sample sizes of women with these risk factors also likely reflect issues surrounding acceptability and disclosure, having been identified in the questionnaire feedback as the items most likely to be described as distressing.

It is important to note that the questions relating to abuse did not appear acceptable to staff, given the lack of guidance for responding to historical abuse. There has been discussion of introducing such assessment in future but this would require extensive consultation and planning because even enquiry about current abuse continues to be controversial (Perinatal Institute, 2009b); an issue raised in relation to mental health assessment in elsewhere in healthcare (Hepworth & McGowan, 2012). Clinical safeguards introduced for the research highlighted the problems encountered when psychosocial assessment is introduced in the absence of training or referral pathways (Buist, et al., 2002; Holden, 1994). Midwives are expected to routinely ask about current domestic abuse (Department of Health, 2000, 2004) whereas a local policy for disclosure of historical abuse is lacking; therefore staff lacked confidence in responding to the disclosure.

Similarly, the widely reported strong relationships between past mental health problems and PMH disorder and symptoms were not observed when the effects of other variables were controlled for (Lancaster, et al., 2010; O’Hara & Swain, 1996; Robertson, et al., 2004). There were three possible explanations for this. Firstly, history based on the ANRQ was common, with past history of altered mood lasting at least two weeks
reported by almost half of the sample and therefore unlikely to offer strong discrimination. Secondly, history based on the health records pooled ‘any mental health’ due to the limited descriptions and apparent inconsistencies in terminology. Relationships may therefore have been obscured by failing to distinguish different types of histories or indeed where histories were described as past (i.e. resolved) or continuing, combined with anxiety-related histories largely being undocumented. Thirdly, the research did not measure possible resilience whereas there was some evidence in women’s accounts that past mental health and past interventions could promote self-management and offer protective functions.

**Type of stressor**
The relationship between stress and distress depends on: nature of stressor, impact of stressor and timing of impact (rather than occurrence). Such findings are consistent with approaches to stress measurement that recognise the context of stressors (Bernazzani, et al., 2005; Brown & Harris, 1989). Applying a basic coding framework to the open-ended stresses revealed that pregnancy-specific stressors were stronger correlates of distress than were non pregnancy-specific stresses. This pattern was more marked for anxiety (measured by either anxiety instrument), consistent with the argument that the nature of stressors are particularly relevant to anxiety (Green, et al., 2003); highlighting the importance of pregnancy-specific measures (Alderdice, Lynn, et al., 2012; Lobel, et al., 2008).

Some of these observations may be partly attributable to limitations of the design given that the stresses item was open-ended, increasing the likelihood that women would report those experiences that were most salient to them, i.e. confounding stress exposure with stress appraisal. Furthermore, the reporting of the stresses was confounded with the reporting of the distress, rather than attempting any standardised approach whereby severity ratings are assigned based on objective scoring systems (Brown, 1989).

**Context of pregnancy**
The research illustrated the centrality of the individual woman’s meaning of her pregnancy. This was shaped by wider environmental factors as well as pregnancy-specific factors and recognised the cumulative impact and interplay between stresses. Such findings are consistent with applying life events and difficulties perspectives to understanding maternal stress and maternity experience (Bernazzani, et al., 2005), recognising the need to consider the “event’s internal representation and a person’s cognitive and emotional responses to it” (p.8) (Brown, 1989). The key challenge is the resource-intensive nature of such approaches; however, women identified several
salient topics that have the potential to be incorporated into obstetric history taking and recommendations are returned to under Implications for Practice.

Social support

The research did not provide any evidence for the buffering hypothesis of social support (Cassel, 1976; Cobb, 1976). That is, levels of high support did not appear to moderate the relationship between stress and distress. This may be because the study did not succeed in measuring the transactional nature of the stress process; Lobel and colleagues advocate multiple measurement, encompassing stimulus-based (life events), appraisal-based (perceived stress) and response-based (anxiety) measures (Lobel, et al., 2008; Lobel & Dunkel-Schetter, 1990; Lobel, et al., 1992). Measurement of stimulus and appraisal (i.e. occurrence and impact) were limited to the ANRQ items whereas women’s current ‘response’ (i.e. distress symptoms) need not relate to that stimulus and appraisal. This was indicated by women’s reported frustrations at feeling that the questionnaire did not provide the opportunity to explain the causes of their distress, remaining focused on response-based measurement. By potentially failing to assess the stimuli underlying the responses observed, it is questionable whether the study was appropriately designed to test the buffering hypothesis. Alternative statistical approaches such as path analysis may have offered further insights into the various inter-relationships between these variables. A larger-scale study would likely be necessary given the small sample sizes in some of the conditions (e.g. low stress-low support). Additionally, social support is recognised as a meta-construct creating challenges in measurement (as described in the Introduction) and it may be that the social support measures used were not sufficiently sensitive to test the multiple dimensions of social support that can act as a buffer against stress.

It could be however that the relationship between social support and distress is more accurately described through a main effects model (Cassel, 1976; Cobb, 1976), such that social support benefits health regardless of level of stress or, conversely, inadequate support is associated with poor health (e.g. distress) regardless of other stresses. Very few women reported inadequate support and those who did generally reported high levels of distress. It is therefore likely that the main effects of inadequate support (itself a stressor) overshadowed any potential buffering effects. In such circumstances, social support interventions may therefore act through targeting the underlying stressor (i.e. lack of support), rather than influencing the relationship between stressor and distress (e.g. via appraisal processes). This highlights the importance of considering self-identified need when determining eligibility for social support interventions, as argued in the Introduction. Indeed, perceived social support had a stronger relationship with self-identified need than did the main measures of maternal stress.
**Personality**

There is growing interest in the role of personality in relation to maternal stress and PMH (Boyce, et al., 2001; Jones, et al., 2010; Monk, Leight, & Fang, 2008) and its role in maternal stress pathways was indicated in the current research with anxiety and obsessionality traits found to be amongst the strongest correlates of distress. Critically, however, women's feedback suggested that personality and, particularly adult attachment styles, were unlikely to be an acceptable element of APA; thus having limited application to practice, contrary to the suggestion that it could help tailor screening and target interventions aimed at modifying insecure attachment schemas (Monk, et al., 2008).

**Comparison of possible pathways for anxiety and depression**

Other research groups (Teixeira, et al., 2009) have formed sub-groups (e.g. high depression, high anxiety, comorbidly high depression and anxiety) to enable further insights into the relationship between anxiety and depression in the perinatal period. Unfortunately the current study was under-powered for investigating correlates by such groups; however it was possible to explore which variables were stronger predictors or each type of symptom. In brief, reporting predominantly anxiety symptoms was linked to the context of pregnancy and the need to assess pregnancy-specific stress, whereas predominant features of depression were more linked to social disadvantage and material deprivation, consistent with recent longitudinal research demonstrating a relationship between social characteristics of the environment and postnatal depressive symptoms (Kritsotakis, et al., 2013).

**Parity**

The ARMS research was not restricted by parity. Exploratory secondary analyses were performed to investigate maternal stress pathways separately for primiparas and multiparas. There was some evidence to suggest that personality may be more related to distress in primiparas and non pregnancy-specific stress may be more related to distress in multiparas; however, pathways were found to be largely similar. Observations from the qualitative research suggested that while older children could offer a distraction in coping with maternal stress, there also could be additional concerns (including parenting, finance and fears based on previous perinatal experiences). It was additionally clear that while maternal stress impacted both primiparas and multiparas, the latter may feel that their support needs were less catered for, due to assumptions and expectations (both by health professionals and other women) that they were already experienced in childbearing. This is consistent with the finding that, regardless of parity, women felt that information provided in maternity care was inadequate, including information regarding "emotions" (Lavender, et al., 2000).
9.2.2 Defining the intervention and its components
There were several important observations that had implications for defining the intervention. Through the research (and in particular, through the qualitative element), it emerged that assessing and responding to maternal stress were not entirely separable and may be more accurately viewed within an overarching approach to maternal stress. Specifically, by investigating APA in both research and clinical practice, the importance of context of disclosure was illustrated, as was the potential for assessment itself to act as an intervention (e.g. through appraisal processes and through influencing women’s understandings of maternal stress and perceived relevance to maternity services). Care provider responses were found to be inconsistent and women were found to fall into gaps; partly due to lack of monitoring and partly due to poor communication. Critically, there was a lack of resources for women already being referred under the existing APA systems.

In light of these findings, the ‘complex intervention’ is not limited to the social support intervention being offered but rather extends to include the care pathway of assessing and responding to maternal stress, within which the social support intervention is situated. This is consistent with the CIF guidance that highlights the need to develop ‘treatment protocols’ that acknowledge all aspects. Thus, a protocol would need to address not only the social support intervention but also aspects such as the assessment process, the interaction with the health professional, the referral process and timeframes.

Women made several suggestions for low-level interventions, some of which could be universally available and some of which could be of different benefit to different women. Possible low-level interventions and resources are described later under Implications for Practice, as is consideration of APA as a care pathway.

9.2.3 Modelling possible mechanisms of interventions
Within the MRC CIF, the findings can also be understood as informing the modelling, helping to identify how interventions may act or fail to act (Medical Research Council, 2000, 2008).

How does ‘social support’ work?
Theoretical modelling was performed through applying psychosocial stress theory to women’s suggestions of helpful (i.e. effective) or potentially helpful resources.
As discussed previously, the quantitative research provided greater evidence of main effects of social support than stress-buffering effects. Consistent with this, the qualitative research offered examples where negative support (e.g. from partners or health professionals) could themselves be stressors. Nonetheless, women’s accounts offered examples of how social support could influence the stress-distress pathway through influencing appraisal and coping. There was evidence of appraisal-focused coping (Pearlin, et al., 1981; Pearlin & Schooler, 1978) directed at the internal meaning of the stressor, which may alternatively be viewed as cognitive problem-focused coping (Thoits, 1986). External support resources were found to promote appraisal-focused coping where information helped women to reappraise their experiences. Here, informational support could be particularly effective; however some women found that information could lead to reappraisal indicating greater threat (rather than allaying concerns), of relevance to coping styles discussed later. For some women, appraisal-focused coping had not required external resources, but rather reflected women’s changing priorities; this was particularly pronounced for work-related stress.

Women’s accounts illustrated that where the stress response (emotional distress) had itself become a stressor, women needed reassurance and all types of support (emotional, practical or informational) could potentially provide this; either through changing the original underlying stressor, or re-appraising it. These findings were consistent with the transactional model of psychosocial stress conceptualised in the Introduction.

Alongside the need for reassurance, there was often an expressed need for nurturing, which offers parallels with the literature on ‘mothering the mother’ in the perinatal period (Breedlove, 2005; Klaus, Kennell, & Klaus, 1993). While women often desired such nurturing and caring from their partners, women’s accounts often illustrated the significance of their relationships with other women. This was not limited to other women who were significant others (e.g. mothers or sisters), often including women met at groups or even relatively anonymous online support. Indeed, this need for a “virtual connection” with other women in pregnancy has been reported elsewhere in a study concerned with antenatal depression (Raymond, 2009). Such observations are consistent with the theory that biobehavioural stress responses are gendered such that women’s responses may be better characterised as “tend-and-befriend” (respectively nurturing offspring and affiliating with social groups) than as “fight-or-flight” (Taylor, et al., 2000).

Formal testing of modelling would comprise part of the evaluation of complex interventions. Although this research was not designed to evaluate a social support intervention, processes of self-reflexivity and deep engagement with ‘researcher’ as
intervention’ enriched the findings and proposed possible ‘active ingredients’ or ‘components’ of the research that may have enabled it to act as an intervention, offering further insights into possible social support interventions.

For some women, APA itself appeared to be effective with its very existence providing validation and normalisation of their experiences. For others, it appeared that APA may require that women confront the extent of their distress and in the immediate period this may cause further distress. This is consistent with the finding that denial may, particularly in the short-term, provide an adaptive coping strategy (Jerry & Fletcher, 1985). Thus, for APA to be an effective intervention, some women needed it to be guided or accompanied by further support.

The research interviews appeared to meet this need for some women and deep engagement with the interview interactions suggested that this may have been due to similarities between the interviewer style and interventions such as listening visits (also known as non-directive counselling), which have been recommended for the pregnant population (Clement, 1995; National Collaborating Centre for Mental Health, 2007). It was also reflected that asking women about their use of existing support could potentially influence their coping and asking women about their barriers to accessing support may share overlap with approaches such as motivational interviewing (Rollnick & Miller, 1995). The nature of the interview topics also encouraged women to connect their thoughts, feelings and behaviours, which shares characteristics with approaches such as cognitive behavioural therapy that are effective in the treatment of depression and anxiety (Hollon, Stewart, & Strunk, 2006).

While the majority of modelling was framed around functional aspects of social support that were considered ‘received’ support behaviours (e.g. instances of emotional support, practical support, informational support), reflections on research(er) as intervention also illustrated the application of perceived support and its potential determinants to modelling. This was done through considering provider-recipient transactions and costs of support acceptance (Cohen & Syme, 1985; Cutrona, 1990) and how these contrasted with some of women’s interactions with health professionals or views on support and treatment options, including barriers to access.

**Who is most likely to benefit?**
Considering those most likely to benefit from an intervention includes consideration of those most at risk and consideration of those for whom pathways are most amenable to change.
It has been suggested elsewhere that different combinations of symptom and risk may require different management (Priest, et al., 2008) and it is logical that those who are high on both are most at risk of mental disorder. Further modelling of those most at risk requires longitudinal approaches, greater attention to combinations of risk factors and assessment of protective factors. This should also include other possible diatheses in the stress-vulnerability model of mental health, including biological factors that may have different relationships with different sub-types of disorder (Kammerer, et al., 2006). Possible protective factors were indicated by women’s examples of altered coping through changing priorities accompanying changing role and identity as well as altered coping informed by previous experience of stress and effective interventions and warrant further investigation. Importantly, those most at risk may not be those most likely to benefit.

Those whose pathways are most amenable to change may be linked to whether the support need can be relatively easily met (e.g. through information provision, addressing tangible practical needs, or reducing a practical barrier to a resource) as well as individual factors such as motivation and engagement. Here, it is important to consider who may be most likely to seek support and/or accept the offer of support.

**Self-identified need**
The adapted PRI (Priest, et al., 2008) identified women who did not identify themselves as wanting or needing additional support. This could reflect that the thresholds for ‘high’ risk and symptom were set too low, consistent with the need for benchmarks. It could also reflect the processes of both recognising to self and others and admitting to self and others, which were identified through women’s accounts in relation to the context of disclosure but are also relevant to wider support seeking and support acceptance. Essentially, assessment measures may identify women but this does not mean that they will be receptive to the offer of additional support. The research did not involve providing women with feedback on their scores or their views on being offered interventions on the basis of their scores, requiring further work on acceptability.

The ARMS study also indicated that the adapted PRI was not necessarily identifying all of women’s own identified needs. The majority of these were women reporting wanting or needing additional practical support, suggesting that the adapted PRI approach may not be able to adequately capture some of the more tangible needs of women, due to focus on symptoms and historical risk factors. If this were investigated on a larger scale it would be possible to compare whether self-identified need is more common for those with high risk, high symptom, or both.
**Window of opportunity**

Those most likely to benefit may link to the personal context of pregnancy and the extent to which pregnancy is seen as a window of opportunity with different motivations, different priorities and different appraisals; a point raised elsewhere in relation to obesity and pregnancy (Furber & McGowan, 2011).

**Personality**

While there may be some concerns about the acceptability of personality forming part of APA, this may depend on the aspect of personality being considered. Adult attachment style was associated with wanting or needing emotional but not practical support, which could have implications for understanding uptake and effectiveness of interventions but comments indicated possible discomfort with such measures. In contrast, no concerns were raised in relation to the coping style measure (Carver, 1997) which indicated that women's reported styles concerning use of emotional and practical support were at odds with their identified support needs, possibly because they lacked the resources to adopt their ideal strategies. This highlighted the need to distinguish individuals' desired coping efforts from how they actually respond (Krohne, 2001).

Furthermore, women’s comments about timing and content of informational support appeared consistent with theory concerning monitor and blunter styles of coping (Miller, 1987). Miller’s theory concerns how individuals process information in personally threatening situations, particularly those concerning health-related risk or threat, and the tendency to seek out or avoid information. Such an approach may therefore inform those most likely to benefit from maternal stress interventions given that women’s accounts clearly illustrated perceived health-related threat to pregnancy, baby and self that some women may experience. This was combined with behaviours indicative of monitor and blunter styles (Miller, 1987; Miller, et al., 1999). Possible examples of high monitors included apparent preoccupation with seeking information through internet resources, accessing private ultrasound scans and possible links between attending to threatening cues (e.g. somatic sensations) and increased use of health services. Possible examples of high blunters included feeling overwhelmed with the information presented and wanting to avoid information about labour and birth, sometimes accompanied by reluctance to attend antenatal classes. Acceptability of assessing monitor-blunter styles was not investigated but has been used in Health Psychology with various populations to match message framing to individuals’ coping styles (Williams-Piehota, Schneider, Pizarro, Mowad, & Salovey, 2004).
9.3 Implications for Practice

The critical finding of direct relevance to clinical practice is that APA has been introduced without adequate consideration of the topics of most relevance to women, the context of disclosure, or resources for responding to identified need. This has potential impacts and implications for women's maternity experiences, their access of services, and their postnatal period and developing relationship with their baby. Implications and recommendations for practice are presented across five priority areas to address the intended aims of APA: the prevention and treatment of mild-moderate disorder and holistic care that improves outcomes for the woman and her baby. The five areas are: APA topics; the need for patient-centred care; care pathway perspectives and improvement of existing referral pathways; provision of realistic, low-level resources; and, the challenge of embedding into practice.

9.3.1 What’s missing from APA topics?

Recommendations for practice need to be realistic and, given the pressures of the consultation, topics cannot be as exhaustive as those described previously in the section concerning measures within the MRC framework. The aspects found to be most relevant in the ARMS study are summarised below.

Current symptoms need to include anxiety

Assessment of symptoms should correspond to intended interventions, identifying both anxiety and depression. The ultra-brief GAD-2 (Kroenke, et al., 2007) could be used alongside the Whooley questions, consistent with the recent guidelines for other health services, embracing a ‘common mental health disorders’ perspective that assesses both depression and anxiety (National Collaborating Centre for Mental Health, 2011).

Assessment of symptoms should be contextualised

Women expressed frustration at being asked about their symptoms without the opportunity to expand on the underlying causes of their distress or the nature of their concerns. Context of pregnancy may identify wider environmental factors that may appear unrelated to their pregnancy but may be compounded by the pregnancy. Certain environmental factors may also have implications for maternity care, for example in birth planning for women with carer roles.

Current obstetric history taking could be adapted to establish context of pregnancy, recognising the centrality of previous experiences rather than solely clinical outcomes;
for example, assessing previous pregnancy experiences, previous birth experiences and previous postnatal experiences. This could help to identify pregnancy-specific stress and also promote disclosure of perinatal mental health difficulties. Some of this may be more appropriate for community midwives at serial visits, rather than focusing on the booking visit, particularly given the potentially changing context of pregnancy and changing nature of fears with, for example, concerns about previous birth experiences becoming more salient as pregnancy progresses.

Brief single items could be used as prompts; two were found to be accessible to women in the ARMS study and both have been used elsewhere in clinical practice. The first was the item used in the United States concerning pregnancy timing (American College of Obstetricians and Gynecologists, 2006), with the wording revised to distinguish ‘no pregnancy at all’ and the need to acknowledge that preferring the pregnancy to have been ‘earlier’ may not reflect ‘unintended’ pregnancy but rather pregnancies following assisted conception and/or previous perinatal loss. The second was the item concerning pregnancy experience, taken from the Pregnancy Risk Questionnaire (Austin, et al., 2005); the format of which could be well-suited to revisiting throughout the pregnancy. Its use is also consistent with the recent finding that the best single overarching question to ask about experiences of healthcare (in terms of clarity and consistency) is the extent to which the experience was positive (very poor experience to very good experience) (Graham & MacCormick, 2012). Any routine questions concerning life events of chronic conditions should concern current impact rather than being driven by the timing of the occurrence and past impact.

Acknowledging the diversity of contexts of pregnancy does not demand that services are bespoke but rather that services and health professionals are mindful that women may not identify with the predominant discourse. Recognition of pregnancy as life event also needs to be balanced with the possible concern of placing ‘too much’ emphasis on pregnancy as a life event. For many women, pregnancy is a positive and fulfilling experience and it also should be remembered that pre-existing stresses would have contributed to allostatic load and potentially have precipitated mental health problems even in the absence of pregnancy.

**History taking needs to be accessible and enabling**

Reporting of mental health history and treatment history in the research questionnaire and health records highlighted issues surrounding terminology and purpose of assessment. History taking could be made more effective by changing the terminology and examples given. Clinical observations found that mental health history focused on depression; thus, relevant histories were not always documented. The need to include
anxiety history in APA is being increasingly recognised and personal communication with the Department of Health confirmed that its inclusion is intended in the assessment tool they are developing (Mellows, 2010).

Treatment history was found to focus on pharmacological treatments whereas psychological interventions are also relevant; they may indicate level of severity of past episodes but also may suggest possible resilience and protective factors, as illustrated by some women's accounts of changed coping due to previous interventions. Additionally, there was evidence of the importance of personal models of health and illness (Leventhal, Benyamini, & Brownlee, 1997) and past experiences of treatment influencing attitudes to future treatment options, should the need arise.

The ANRQ item about having previously “sought help” in combination with examples such as counselling was found to elicit more detailed histories and similar examples may helpful in clinical practice. Language concerning mental health history should replace ‘treatment/in-patient care’ with questions about ‘seeking help’ (in line with the ANRQ; Austin, 2003) or accessing counselling or taking mental health medication. Importantly, such history may not only concern risk but also protective factors.

*Asking if women feel they want or need ‘help’ should specify types of help*

Type of help could be further classified, particularly given women's uncertainties about the purpose of assessment. In the ARMS study, women endorsed both Arroll-style items about wanting or needing ‘practical support’ and ‘emotional support’, showing that help can be described using simple, accessible language. Interviews identified that ‘information’ would be another source of help that women identify with (particularly in relation to health-related concerns). These items may adopt the ‘help’ item phrasing or, for example, ask women who they have for each type of support, helping to identify possible sources of support.

There is a need to distinguish unsupportive relationships and absence of key relationships. It should be considered whether asking questions about support in the partner’s presence may not always be appropriate and may lead to false responses (Matthey, et al., 2005). Social support, although not specifically targeted to partners, is a question on the Pregnancy Notes. The item was often uncompleted and none of the women had selected ‘no’ in this sample.

*Information should be provided when conducting APA*

APA acts as an intervention, which raises self-awareness and presents an opportunity for information provision that may shape women’s understandings of maternal stress,
self-assessment, disclosures and support seeking behaviours. Often women's partners or family and friends accompany them to the booking visit and it is therefore also an opportunity to provide information to the woman's potential support network. Women desire information on the purpose of assessment, the types of support that are available and the remit of services; for example, which concerns women should speak to their midwife about and which they should speak to their GP about. Women also welcome information on possible 'signs' or 'symptoms' look for, which need not contradict the current drive for promotion of 'normality' in pregnancy and childbirth (Department of Health, 2007b); instead recognising the context of pregnancy as a life event that may be experienced in different ways, with maternal stress being relatively common but still important to recognise.

9.3.2 What's missing from the APA interaction?

The need for an enabling environment
While the previous section provided suggestions for topics, women consistently conveyed that more important than the exact phrasing was the manner in which they were asked, the manner in which they were responded to and the perceived purpose of assessment. Such findings concerning the context of disclosure echo guidelines that accompanied the introduction of routine enquiry for domestic abuse; highlighting the need for an enabling environment given issues of social desirability, concerns over involvement of services, and, in the case of domestic abuse, fears for personal safety (Taket, et al., 2003). Essentially, asking ‘psychosocial’ questions does not ensure ‘psychosocial’ or ‘holistic’ care.

Patient-centredness
Women's views and experiences of health professional interactions readily map onto the patient-centredness conceptual framework developed by Mead and Bower (2000), as do the APA topics proposed above. The framework has five conceptual dimensions: biopsychosocial perspective; ‘patient-as-person’; sharing power and responsibility; therapeutic alliance; and ‘doctor-as-person’. For example, a biopsychosocial perspective demands that symptoms be contextualised and a “willingness” for health professionals to recognise this wider context, not just patients’ “biomedical” concerns. Other particularly relevant dimensions are ‘patient-as-person’, recognising the importance of women's “personal meanings” of maternal stress and possible impact on seeking help and the nature of help sought, together with the health professionals' own
understandings and context of pregnancy and maternal stress ('doctor-as-person'). The final dimension also links to ‘consultation-level factors’, which recognise that factors such as time limitations and work pressures also impact patient-centredness (Mead & Bower, 2000). Similarly, patient-centredness may be impacted by the health professional's lack of knowledge and confidence due to wider training needs and a lack of resources for responding to women's needs. Such factors are returned to later ('embedding into practice').

Patient-centred interviewing, informed by Mead and Bower's conceptual framework, has been applied to practice through the ABC-E model of emotion (Briddon, Baguley, & Webber, 2008) which is delivered by graduate primary care mental health workers as part of Improving Access to Psychological Therapies (IAPT) (Department of Health, 2008). Features of this interviewing may be incorporated into even time-pressured clinical consultations; for example, demonstrating active listening and empathic responses (rather than 'going through the motions') and recognising the importance of the individual's environment. Care needs to be taken to ensure that consultations resist proceduralisation, which can lead to de-skilling of staff through processes such as ticking multiple boxes (Parton & O'Byrne, 2000). The model also illustrates how the research interviews acted as an intervention by deconstructing maternal stress into components such as environmental triggers and responses, including physical effects, behaviours (e.g. arguing) and changes in patterns of thinking.

9.3.3 What's missing from APA as part of a clinical pathway?

Relevant to the introduction of APA in routine care is the often-cited quotation, “All screening programmes do harm; some also do good.” (p.983) (Gray & Austoker, 1998). Although APA does not involve any biomedically invasive procedures, the ARMS study found that the assessment process had the potential to act as an intervention; that there were concerns about “opening up wounds”; together with raising women's expectations; providing unclear information about referral pathways; and, critically, women falling into gaps. Arguably, it is therefore unethical to introduce assessment without appropriate responses in place.

These concerns reflect the distinction between clinical guidelines, which are used to guide decisions in healthcare through advising on criteria for treatment and management, and integrated care pathways (or clinical pathways), which are more related to the quality aspects of care; operationalising patient-centred care and aiming to standardise care processes and improve outcomes, by reducing variability in responses of care providers and health services (Vanhaeckt, Panella, van Zelm, & Sermeus, 2010). The introduction of more detailed mental health assessment, including the Whooley
questions (Whooley, et al., 1997), thus followed a clinical guideline, adding questions with the potential to shape referrals, rather than being introduced as part of a care pathway.

A care pathway approach needs to be developed for the introduction of APA. Of note, pathways themselves (not only the interventions provided within them) are increasingly being recognised as complex interventions (Vanhaecht, et al., 2010), with implications for research and practice. Examples of what a pathway may include are provided below and are informed by recent guidelines for developing local care pathways for common mental health disorders (National Collaborating Centre for Mental Health, 2011); elements of which may be applied to the perinatal period.

**Recognising the involvement of different services and professionals**

Guidelines on developing mental health pathways (National Collaborating Centre for Mental Health, 2011) recommend that they are jointly designed by clinicians, managers and commissioners across primary and secondary care to ensure accessible services with coordinated delivery. This recommendation should apply also to APA. Some women in the ARMS study were found to have bidirectional referrals between GPs and maternity services, without either following up the provision of care. Fragmentation of services has been identified as a challenge in perinatal mental health (PMH) (Ramsay, Welch, & Youard, 2001) and joint development would help to clarify the remit of maternity services and improve joint working; an area identified as needing improvement (Rothera & Oates, 2011). The ARMS study also identified that women may come into contact with other health services (e.g. gynaecology or Accident and Emergency) at times of heightened maternal stress. These settings also offer opportunity to provide women with additional support.

**Stepped care models**

Service delivery follows stepped-care models based on providing the least intrusive, most effective intervention first (National Collaborating Centre for Mental Health, 2011). Consequently, pathways commonly have different ‘levels’ requiring clear criteria for referral that maps onto different levels of the pathway. In the perinatal period, thresholds for access to psychological therapies should be lower due to the risks of pharmacological interventions and waiting times should be shorter, with current guidelines recommending that, during pregnancy, women requiring psychological interventions should be “seen within one month of initial assessment and no longer than three months afterwards” (p.9) (National Collaborating Centre for Mental Health, 2007).
Individual motivation and readiness is an important predictor of effectiveness of interventions (Norcross, Krebs, & Prochaska, 2010) and women’s personal models of illness and views on treatment options identified that role change and transition may reduce some of the internal barriers that women may have to psychological interventions and tackling the causes of distress and mental health. This provides further argument to improve access during pregnancy yet unfortunately, women struggled to access talking therapies or psychological interventions.

In contrast to guidelines recommending gradual withdrawal from mental health medication or switching to a medication with fewer risks to the fetus (National Collaborating Centre for Mental Health, 2007), the ARMS study found that women’s mental health medication was sometimes abruptly stopped by GPs, without providing an alternative intervention. Additionally, eligibility criteria for accessing specialist support adopted a high threshold, avoiding false positives but missing women with mild-moderate disorder and, potentially, those with severe mental health problems. Women’s personal models should be discussed when deciding on interventions and management plans need to be realistic.

**Training for health professionals**

Midwives in the pilot study feedback expressed a lack of confidence in assessing PMH and the qualitative research indicated that some women picked up on this lack of confidence. Low staff confidence has been reported elsewhere (King, Pestell, Farrar, North, & Brunt, 2012) and training needs have been identified, including knowledge of PMH and resources available to women and staff (McCauley, Elsom, Muir-Cochrane, & Lyneham, 2011). Training is needed across services (e.g. maternity and primary care) to provide consistent knowledge about the purpose of assessment and possible treatment options, as well as an understanding of the context of disclosure, including patient-centred care. Notably, a recent study provided psychological assessment skills training (including assessment measures and a review of communication skills) to community midwives and hospital maternity staff increased staff’s self-rating of confidence but there remained concerns about time constraints and the need for a more structured referral pathway (King, et al., 2012); highlighting factors beyond the influence of the individual health professional.

**Assessment**

Assessment should be consistent with an approach targeting prevention and treatment of both anxiety and depression. For example, the GAD-2 (Kroenke, et al., 2007) should
be used alongside the Whooley items (Whooley, et al., 1997) and anxiety should also feature in mental health history. History taking and the content of referrals could be standardised by providing structure with clear terminology concerning mental health and treatment history, together with a section on current presentation (e.g. symptoms). In light of the ARMS findings, further assessment should not be restricted to those endorsing the ‘help’ item (Arroll, et al., 2003) because this will lead to the majority of possible cases being missed. ‘Help’ items should be developed to include different types of support (e.g. emotional support, practical support, information). There should be firm provisions for ‘yes’ responses and clearer information on defined roles for further assessment, monitoring and the appropriate timeframes.

**Monitoring**

Monitoring processes and periods of ‘watchful waiting’ are a key element of stepped care models in the general population and UK mental health services are largely based around these principles (National Collaborating Centre for Mental Health, 2011). These processes should not however compromise prompt access of services, given the changing timeframes required in the perinatal period. Low-level interventions promoting well-being could also be available when waiting to access services, depending on women’s needs.

Observations of health records and interviews with women identified that monitoring rarely occurred, either using the Whooley questions or other forms of assessment. Practical aspects to promote monitoring include revising the documentation to assess symptoms at multiple timepoints. Monitoring processes are likely to involve different professionals, potentially requiring ‘review’ timeframes more clearly defined roles and responsibilities for professionals and highlighting the need for improved communication and joint working (Rothera & Oates, 2011).

**Communication (including documentation)**

The ARMS study identified the importance of the GP referral letter in influencing referrals by the midwives at booking but also found examples where communication had broken down. Specific concerns included cases that were either only documented in the handheld notes or the hospital records; particularly given the lack of continuity of care both within and between teams (including primary care, hospital midwifery and community midwifery). Documentation was generally more consistent where the Arroll ‘help’ item had been endorsed; highlighting the potential for protocols to encourage documentation. Transportability could be improved by using the same items or layout in the relevant sections of the health records and handheld notes.
Maternity care provided between teams often relies on the information documented in the handheld notes. Care pathways need to consider how realistic the notes are as a communication tool between care providers and services. Additionally, these notes are accessible to family and friends and concerns about documentation of potentially sensitive information have been raised elsewhere (Furber, 2011).

Alongside addressing communication between care providers, there is a need for improved communication with women to ensure that they have accurate expectations of the referral systems. While the ‘safety net’ of a ‘protective referral’ may provide reassurance if it does not need to be used, it is possible that this approach could be harmful if the safety net is tested and found not to work. Women who have been referred should be informed of their (in)eligibility or provided with updates when facing waiting times for access; particularly given the potential to impact future disclosures.

**Resources**

Pathways also need to include provision of resources. As well as improving existing systems and services (as described above), consistent with stepped care models, low-level resources could be made available either at a universal level or for those women considered mild-moderate; described further below.

### 9.3.4 How could the needs be met of women with mild-moderate disorder and/or maternal stress?

The ARMS study found that locally the specialist mental health midwifery service received numerous referrals and consequently had high thresholds for access. While the needs of women with severe mental health histories received timely specialist services, women with mild-moderate disorder were not eligible for local services. These unmet needs were perhaps partly masked by the existence of a specialist service to which women were referred.

Access to psychological therapies is notoriously poor, as recognised by the national Improving Access to Psychological Therapies (IAPT) initiative, which received £170 million investment (Department of Health, 2008). Although the perinatal population was identified as a special interest group having particular needs and requiring tailored service provision (Department of Health, 2007a), such services are not yet established. No women in the research were found to have contact with the initiative and there are questions about the initiative’s future in the current economic climate. Given the pressures on the NHS (Health and Social Care Bill, 2012) and future of maternity
services (Royal College of Midwives, 2011), there is a need for low-cost interventions that are accessible and effective.

**Low-level interventions can be used in different ways**
The use of low-level interventions is consistent with a stepped care model of mental health. For example, when using the ABC-E model, interventions for individuals at the mild stage include guided self-help, socially focused problem solving, signposting and facilitating access to community resources and support; including advice for carers (Briddon, et al., 2008). Low-level interventions developed for women with mild-moderate disorder may also provide resources while women wait to access more intensive services. Certain resources could be made available at a universal level to promote positive well-being. While mental health promotion and mental disorder prevention respectively focus on increasing protective factors and reducing symptoms, they use common strategies and have complementary outcomes (Saxena, Jane-Llopis, & Hosman, 2006). Importantly in the perinatal population, universally available resources and mental health promotion may be acceptable to women who do not identify with ‘mental health’ terminology despite describing symptoms and impact indicative of clinical levels.

**Recovery models**
Women in the ARMS study made several suggestions that are consistent with the recovery model, which is a guiding principle of current service provision for mental health in the UK (Department of Health, 2001). Although originally developed in relation to severe mental health, its principles apply to mild-moderate disorder, maternal stress and APA. Key differences between the recovery model of mental health and the medical model of relevance here are that the former focuses on distressing experience rather than psychopathology and interest is centred on the person rather than the disorder; positioned within a social context rather than decontextualised (Roberts & Wolfson, 2004). Subsequently, the recovery model promotes self-management and patient as expert.

**Acceptable interventions**
As well as considering the costs of service provision, it is also necessary to consider costs of support acceptance for women. For interventions to be accessible and effective, they must be acceptable to women; potentially including terminology of stress alongside mental health, providing universal access and reducing practical barriers. Women’s suggestions therefore shaped these recommendations.
Recommendations, requiring further development, implementation and evaluation

There should be availability of self-help and self-management materials, either paper-based or online, to provide women with reliable information that they can use in the processes of self-assessment as well as providing more information on what to expect in the perinatal period. Such materials need to be written in such a way that women find acceptable. Information need not contradict the drive towards normality within maternity (Department of Health, 2007b) and may embrace a life course and life events perspectives, recognising the significance of this time of transition and that women (and partners) may have mixed feelings and emotions that are part of adjustment the process.

Different coping styles (especially monitors and blunter; Miller, 1987) need to be considered when developing informational support and electronic resources may be helpful in this respect due to the option to have links to further information. Information should also be widely accessible to partners, family and friends in the woman’s own support network. Although internet and multi-media resources are increasingly popular, provision needs to take into account possible socioeconomic barriers to internet access, known as e-inclusion (Kaplan, 2005). Informational support also needs to be available that is tailored for different literacy levels and language; for example, the use of images and approaches such as the Distress Thermometer (Roth, Kornblith, & Batel-Copel, 1998) that adopts a visual analogue scale.

Self-help tips and self-management packages have been developed elsewhere for managing distress using images and simple language (e.g. the Five Areas resources (Williams, 2007)). Such resources may be developed for the perinatal population. These may also include tips from other women (e.g. setting an activity each week to help pass the time) that are realistic and acceptable. Women may also find it helpful to have resources available that address role change and adjustment, including the transition between the work role and ‘mother’ role when commencing maternity leave. Women’s regular contact with services throughout pregnancy offers opportunity to distribute such information relatively easily.

GPs increasingly recommend computer-based support (e.g. Mood Gym) (Christensen, Griffiths, & Jorm, 2004) to patients, containing guided exercises to help with the prevention and treatment of common mental health disorders and similar approaches could be used with the perinatal population. Consistent with the recovery model (Roberts & Wolfson, 2004) and cognitive-behavioural approaches (Hollon, et al., 2006), guided exercises may include, identifying triggers, recognising signs and symptoms (physical,
behavioural and cognitive), and thinking about pasting experiences and what helped or did not help.

Women reported a shortage of antenatal groups and several welcomed greater access to peer support systems, including groups and one-to-one befriending. Exercise classes offer a range of benefits and, in this sample, were found to be popular but often found to have barriers to access. Such classes may be made available in venues such as Children’s Centres where crèche facilities exist and offered on prescription where financial barriers exist, a practice known as social prescribing or community referral, which is increasingly used in primary care to improve mental health and well-being (Friedli & Watson, 2004). Some women experienced social anxiety; an observation reported elsewhere (Furber, et al., 2009), which, together with low self-esteem, could present barriers to accessing facilities. In such cases, one-to-one peer support or befriending may help women to access existing facilities and similar approaches are being introduced elsewhere (Eyles, 2009). Establishing these links antenatally may also encourage use of facilities in the postnatal period, where classes and groups such as baby massage have been found to have positive effects in relation to postnatal mood as well as mother-infant interaction (Onzawa, Glover, Adams, Modi, & Kumar, 2001).

The other area suggested by women was the provision of telephone support, which reduces physical barriers to access as well as potential internal barriers concerning support acceptance (e.g. perceptions of being a burden). Telephone support has recently been evaluated in the postnatal period using a peer support model, which found that such support was associated with reduced depression and anxiety symptoms (Dennis, et al., 2009). Such services may not ultimately be accessed repeatedly by women, consistent with the apparent benefits of the research for women being most pronounced at their first opportunity to talk. Similarly, it has been argued elsewhere in a study providing women with debriefing by midwives following childbirth that “one discussion session is enough for most women or that their knowing about the availability of this service offers adequate reassurance” (p.218) (Lavender & Walkinshaw, 1998). Of note, a telephone support service is currently available in the UK which offers pregnant women the opportunity to talk to a midwife (Tommy's, 2012). The service is run by Tommy’s baby charity and sponsored by a national supermarket chain, making it free to use and thus reducing some of the barriers reported by women in the ARMS study. None of the women appeared to be aware of such a resource; highlighting the need to raise awareness of existing support resources.

Unfortunately, realistic provision of support is unable to address gaps in women’s own support networks. The health benefits of a confidant are consistently reported across longitudinal studies in different areas of health and different populations (Dickens, et al.,
2004) and the significance of such a “close, intimate, and confiding relationship” have long been recognised in women's mental health specifically (p.234) (Brown, et al., 1975). Furthermore, it is recognised that satisfaction with key relationships may be central to psychological distress (Kaul & Lakey, 2003) and this may be pronounced in the perinatal period where women may require particular individuals to be support providers; usually, the baby's father or the woman's mother, depending on the population (Collins, et al., 1993; Turner, et al., 1990).

Nonetheless, existing support may be facilitated through provision of information that includes women's wider networks. Perceived support should form part of the eligibility criteria for accessing support interventions with more intensive options available to those who are socially isolated, as is currently being introduced at several sites across the UK (Eyles, 2009).

9.3.5 Embedding into practice
Embedding patient-centred assessing and responding into practice requires additional considerations, beyond the individual health professional or conceiving APA within a care pathway. To understand some of the barriers to implementation, it is important to reflect on the overall context and approach to managing mental health in pregnancy.

Consultation-level factors were identified both by women (who described ‘conveyor belt’ care) and by midwives, following the pilot study, who discussed the challenges with the ever-increasing amount to get through in the time of the booking visit. Clearly, wider systems are over-burdened, including time-pressured booking visits and the resources of the specialist midwifery mental health service. Linked to this, there continues to be a focus on severe mental illness; however mild-moderate disorder still has the potential to impact women’s lives and their babies. Furthermore, health professionals see such women on a daily basis yet they continue to lack an appropriate care pathway.

Implementation and sustainability of new ways of working requires that the innovation must not conflict with other priorities (Greenhalgh, et al., 2004). A likely barrier is that staff have other competing demands to contend with and there continues to be a focus on biomedical aspects of maternity care and treatment, rather than prevention. Essentially, urine testing and blood pressure testing is routine whereas monitoring of women’s emotional well-being is not. Other contextual factors include the lack of continuity of care, both between teams (e.g. hospital, community, primary care) and within teams. This may explain why breakdown in communication (for example referrals not being pursued) is not followed up.
Implementation and sustainability requires that the introduced innovation is seen as part of the “core’ business and priorities" (Greenhalgh, et al., 2004). Embedding thus requires not only training and supervision and resources, but also culture change about the perceived relevance of maternal stress to maternity services. This could be encouraged through targeting personal models of maternal stress in women and health professionals and through vicarious learning and the involvement of service users (Cullum, Ciliska, Haynes, & Marks, 2008). Additionally, staff require a sense of ‘ownership’ which is facilitated by staff involvement at all levels (Greenhalgh, et al., 2004); this could be achieved, for example, through involvement in the development of the care pathway.

9.4 Implications for Research

The findings of the research presented in the thesis offer the foundation for the development of evidence-based interventions that assess and respond to maternal stress. As described in Implications for Practice, APA needs to be considered as part of clinical care pathway which recognises that assessment itself may act as an intervention, responding includes the reactions of health professionals and the effectiveness of social support interventions depend on referral pathways.

Scoping review of existing resources

There should be a scoping review of existing resources that could fit within a stepped care model. This includes reviewing internet-based resources, printed materials and community resources (including classes and groups). There is evidence that online interventions such as those based on cognitive behavioural principles can be effective, although the evidence concerning depression appears stronger than that concerning anxiety (Griffiths & Christensen, 2011). Less is known about the effectiveness of online interventions in the perinatal period or indeed the effectiveness of online resources, rather than targeted interventions. Women in the ARMS study often used the internet in search of information yet struggled to find reliable, good quality resources. Identifying such resources is important for health professionals and for women and a similar approach could be adopted to that used recently in reviewing postnatal mental health websites (Moore & Ayers, 2011). Findings of the ARMS research have been disseminated to Tommy’s Baby Charity (who co-funded the studentship associated with the research) and will contribute towards the development of online resources for women experiencing stress and mental health problems.
Involving women in development of resources

For resources and interventions to be effective they need to be acceptable and accessible to women. Women’s views should be sought on existing resources and their input could additionally inform development of new resources. The value of resources based on qualitative research into health experiences are being increasingly recognised (Health Talk Online, 2012; Ziebland & Herxheimer, 2008). Such an approach would be consistent with the finding that women particularly valued the experiences of other women. Similarly, women could be involved in developing self-help materials by providing their own advice and tips in ways that the women relate to. Involving women from different cultures would help to address the neglected PMH needs of Black and Minority Ethnic Women (Edge, 2010). Such cultural perspectives may also help improve information about self-assessment because there is some evidence that the relationship between emotional and somatic symptoms may vary with ethnicity (Traviss, et al., 2012). Involving women in the development of resources would also help to determine the content of information in a way that recognises women’s different coping styles in relation to health information (Miller, 1995; Miller & Mangan, 1983).

Stakeholder involvement and choice of outcomes

Involvement of stakeholders, including health professionals and women, in the research process would inform the most appropriate outcomes to use in an evaluation. These should be mapped onto the theorised mechanisms of change and may include appropriate use of health services, use of community resources (and measures such as social capital) in addition to well-being, distress and disorder and relationship with self and with baby. Some of the outcome measures may require development, with the ARMS study having highlighted some of the challenges in gauging use of services; including, the need to focus on appropriate use of services rather than necessarily increased or decreased use of services based on the number of appointments and the need to consider different sources of information about use of services, due to not all contacts being documented. Here, involvement of health professionals in health research ensures an understanding of the potentially overwhelming array of health records and monitoring systems. Such outcomes concerned with use of services are likely to be of interest to service commissioners given implications for evaluating cost-effectiveness of interventions.

Multi-disciplinary research teams

Given the applied nature of the work, further research in this area would benefit from staff that bridge research and clinical practice. Such ways of working promote authenticity in research and are likely to benefit the practical aspects of research, such as recruitment and retention of participants, as well as facilitating collaboration and
ownership with local staff and ensuring that interventions are realistic of the demands of clinical practice.

**Training health professionals**

Future research could develop, implement and evaluate training resources for health professionals, borrowing from training in mental health in the general population and any resources targeted to the perinatal population (Ross-Davie, et al., 2007). Resources need to acknowledge local context and provide staff with knowledge of local pathways.

The research illustrated how analysis of the interview interactions could inform health professional interactions. Discourse analysis has been used elsewhere to train staff who work with sensitive disclosures in their professional roles (Hepburn, 2004) and similar methods may be translated to this area. As well as training in PMH, psychological skills assessment and updating communication skills (King, et al., 2012), it has been proposed that illness perceptions of staff should be considered in relation to distress and disorder in the perinatal period (Jomeen, Glover, & Davies, 2011). Further understanding of such perceptions (including purpose of assessment) is important for both health professionals and women themselves given the apparent role of personal models of maternal stress in the context of disclosure that was identified in the ARMS study.

**Validation**

Of greatest importance for women was the manner in which APA was performed but health professionals nonetheless require validated instruments that help to equip them with confidence. A two-stage assessment approach needs to be validated against diagnostic interview. In the absence of validated measures to assess anxiety in clinical practice in the perinatal population (Meades & Ayers, 2011), it is proposed here that validation studies include the Whooley items (Whooley, et al., 1997) and the GAD-2 (Kroenke, et al., 2007), in line with the common mental health disorders guidelines (National Collaborating Centre for Mental Health, 2011). Re-phrasing of the generic Arroll ‘help’ item is warranted and this would need to be tested.

**Formalising the modelling processes**

The modelling processes used in the ARMS study could be used in future research and formalised using an approach such as Realistic Evaluation (Pawson & Tilley, 1998) which encourages greater detail to processes of ‘what works, for whom under what circumstances’. This involves identifying and testing the mechanisms through which change is achieved and the contexts in which they operate. Such an approach could complement the MRC CIF (Medical Research Council, 2000, 2008), as has recently
been suggested elsewhere (Dalkin, Jones, Lhussier, & Cunningham, 2012). Applied to this topic, it could involve a pilot study analysing women’s accounts of their experiences of interventions. These could inform check lists and process measures for use in a definitive study. It would be important to classify how this related to women’s differing types of maternal stress; including their stressors and their different symptoms.

**Attention to local context**

Realistic Evaluation (Pawson & Tilley, 1997) emphasises that outcomes are dependent on the introduction of the mechanisms (intervention) and the appropriate context (social and cultural conditions). Such attention to context is therefore recommended in applied research evaluating introduction of innovations in healthcare (Greenhalgh, et al., 2004). This is of clear relevance to assessing and managing maternal stress given local factors such as self-assisted completion of the mental health assessment questions, hospital-based booking visits with the majority of antenatal care provided in the community, and the existence of a specialist mental health midwifery service.

It is acknowledged that embedding new practice requires time for the new practice to become the ‘norm’ (Greenhalgh, et al., 2004) and the research into mental health assessment and referral pathways took place 12-18 months after introduction of Whooley. Future research could use historical records to analyse referrals before and after the introduction of the Whooley items, together with possible changes following training of health professionals and awareness campaigns. Alongside differences in context across time, differences across units and Trusts could be investigated through the use of multi-site evaluations that could enable meta-evaluation of individual approaches (Pawson, 2002). Such an approach would be critical in evaluating APA as a complex intervention, rather than restricting evaluation to the support interventions provided.

Possible research questions concerning the pathway include:

- Do women disclose as intended?
- Is mental health assessment being completed as intended?
- What are health professionals’ views on the pathway (and relevance to maternity services)?
- What are women’s views of health professional interactions?
- Are women being referred as intended?
- What are women’s experiences of referrals?
- Are referrals being acted on as intended?
- Does management of referrals translate into accessing interventions? What are women’s experiences of interventions?
- Do the referrals ‘help’ women (i.e. improve outcomes) as intended?
- How do all of these findings vary with context and how does this influence the outcomes?

**Observational methods**

Accessing health records is informative but insights into clinical decision-making are limited by what is documented. Observational methods, subject to the relevant ethical considerations, could improve understanding of how APA is introduced in practice and ultimately contribute to improve practice. Such methods are perhaps increasingly important for health services and delivery where changes are introduced before an evidence base has been established.

**Protective factors**

More research is needed on protective factors and maternal stress, consistent with demands to expand focus beyond maternal stress to also consider well-being in pregnancy (Alderdice, Perra, & McNeill, 2012). Such approaches would fit with care pathways that concern both mental health promotion and mental disorder prevention; an area which, across populations, is lacking on “real world implementation” (Saxena, et al., 2006).

Possible diatheses in the stress-vulnerability model of mental health are not limited to psychosocial factors. A biopsychosocial approach should be adopted to investigating possible vulnerability and protective factors and the interactions between different systems. Here, attention should be given to different sub-types of disorder, which may require pregnancy-specific definitions given changes in the stress response during pregnancy (Kammerer, et al., 2011).

### 9.5 Implications for Policy

**Introduction of screening**

The Whooley and Arroll questions were introduced without an appropriate evidence base and are not being used in the way intended, or achieving the outcomes intended. The National Screening Committee sets criteria for adoption of screening strategies as part of national health policy. Despite the Whooley questions not meeting these criteria, routine assessment was introduced to be used at booking and postnatally. Concerns
over high false positive rates are consistently raised in respect of such ultra-brief screening tools (Mitchell & Coyne, 2007) and a Health Technology Assessment concluded that, while further validation work concerning the Whooley questions was needed, a national screening programme for PND would not be cost-effective due to the costs of treating false positives (Hewitt, et al., 2009). In contrast, the ARMS study raised concerns about the high number of false negatives when using the Whooley questions in combination with the Arroll ‘help’ item. These items needed to be viewed within a two-stage process (Bennett, et al., 2008; Gjerdingden, Crow, McGovern, Miner, & Center, 2009), as indicated by the guideline recommendations that the Whooley questions be followed up using a longer instrument such as the EPDS, PHQ-9 or HADS (National Collaborating Centre for Mental Health, 2007). Within such an approach, the first step needs to have stronger sensitivity to avoid ‘missing’ potential cases, yet this is compromised by the use of the ‘help’ item in its current format.

**Duties**

Reasons cited for finding the ARMS questionnaire distressing suggested that the women did not want to be “reminded” of difficult experiences; suggesting continuing impact for these women, which could be relevant to psychosocial assessment and holistic care (Matthey, et al., 2005). Thus, while it is important for the health professional interaction to help create an enabling environment and provide empathic responses, the nature of the topics may inherently remain challenging. Similarly, women may be identified as high risk, high symptom, or both, and not find interventions acceptable. It is important to reflect on the remit of services, purpose of assessment and duties of care that may shape provision, rather than simply the extent to which support is available at a woman’s request.

**Neglect of anxiety**

Despite health policy focus shifting towards a common mental health disorders perspective in recognition of the wider impact of anxiety and depression on the health and economy of the population (National Collaborating Centre for Mental Health, 2011) and the perinatal guidelines encompassing depression and anxiety within mild-moderate disorder (National Collaborating Centre for Mental Health, 2007), case finding has been limited to depression. This perhaps partly reflects cultural expectations with anxiety and ‘stress’ being more normalised than depression in what is generally considered to be a happy time. Nonetheless, anxiety has implications for the woman and for her developing child (Furber, et al., 2009; Glover & O’Connor, 2006). The clinical implication of focusing on depression is that women with anxiety alone may remain undetected, and those with both anxiety and depression may be mis-classified and only treated for depression, despite requiring treatment for both sets of symptoms; such women may be at greatest
risk of postnatal disorder and their difficulties may be particularly resistant to treatment (Matthey, et al., 2003).

Community resources
Funding for national early years development programmes such as Sure Start have been reduced under the Coalition Government with concerns that such initiatives have not targeted the most hard to reach (Camps & Long, 2012). Recent evaluations suggest however that there are improvements across different sociodemographic characteristics and that previous evaluations indicating less effectiveness may have reflected more “immature” programmes (Melhuish, Belsky, & Barnes, 2010). As well as highlighting the need for evaluations to assess changes over time with complex interventions, such findings raise concerns about changes to funding given the demonstrated relationship between social deprivation and depression symptoms, combined with women’s discussion of community resources. Indeed, places such as Sure Start Children’s Centres and local libraries have recently been identified as potentially important in providing ‘safety nets’ for women with antenatal depression (Raymond, 2009) and highlight the need for community approaches to mental health promotion and mental disorder prevention within policy.
9.6 Strengths and limitations of the research presented within the thesis

The relative strengths and limitations of the study design and adopted methods were discussed in the methodology chapter (Chapter 2). Quality measures to build rigour with the adopted methods were presented with the relevant findings. To avoid repetition, the focus here is instead on the main strengths and limitations observed through the research process.

The key strengths of the research lie in its originality and importance for clinical practice in an area of relevance to women and health professionals.

A foundation on which to build evidence-based complex interventions

By drawing on the strengths of different research methods and different settings, the research has addressed research questions that together provide a foundation for the development of evidence-based interventions. This has been promoted through the use of a systematic framework on which to hang the findings.

Synergy through mixed methods and mixed settings

The research evolved to include APA in research and clinically settings. This enabled the research to provide the first validation study that included the Arroll ‘help’ question. Validation based on properties of measures was complemented by attention to the context of disclosure and practical issues in implementation. Thus, alongside informing future interventions, the research informs existing provision for women experiencing maternal stress.

The adopted methods complemented each other in several ways, illustrated through the areas of synthesis presented with the qualitative findings. For example, using observations of health records together with women’s accounts offered alternative perspectives and richer understandings of management of referrals and context of disclosure. Thus, whereas the study design combined mixed methods primarily to answer different research questions, the end product was greater than the constituent parts, reflecting that the mixed methods were integrated in the analysis stage (Bryman, 2007; Moran-Ellis, et al., 2006).

Serial interviewing

Study Part 2 adopted a longitudinal approach, capitalising on the unique opportunity afforded by pregnancy to conduct research that is “longitudinal in a temporally collapsed
meaning of that term” (p.347) (Oakley, 1992). This approach enabled trajectories to be explored, including women’s changing fears and the changing nature and impact of maternal stress. The design additionally enabled exploration of issues of recall, which could not have been captured by retrospective interviews; a strength observed elsewhere in relation to serial interviewing: “The resulting continuous and changing account would be difficult, if not impossible, to construct from a series of snapshot interviews.” (p.959) (Murray, et al., 2009).

The main challenge of the in-depth serial interviews was the large volume of data generated by a relatively small sample size which can risk becoming an “unmanageable process” (Murray, et al., 2009). For example, rich narratives were produced that were not represented by Framework Analysis and the focus of the research questions.

**Cross-sectional measurement of maternal stress and its correlates**
The serial interviews were particularly valuable given that the key limitation of Study Part 1 was that all measures were taken at one timepoint; hence the language of ‘correlates’ and association, rather than causality. This limitation was balanced with women’s feedback in the pilot study, indicating that a longitudinal quantitative study would not have been feasible in this setting with the resources available. Unfortunately, the planned longitudinal component concerning prediction of Whooley responses was not possible due to the lack of monitoring ultimately observed.

**Lack of clinical diagnoses**
The measures used are not diagnostic and therefore validation of the Whooley questions and validation of the proposed anxiety component of the EPDS could not use the gold standard of clinical interview. Additionally, the lack of clinical diagnoses and strong correlation between anxiety and depression symptoms meant that possible pathways to different subtypes of disorder could not be investigated.

**Interpretations based on health records**
Analysis of mental health referrals primarily relied on observation of health records. It is possible for example that the Whooley questions offered a communication device or shaped clinical decision-making in ways that were not indicated by documentation. Additionally, community records were not accessed in the study, instead limited to health records documenting maternity care.
Extending the findings beyond the sample

The rich findings of the current research are based on one local unit and although attention to context is essential in the field of complex interventions (Campbell, et al., 2007; Craig, et al., 2008), care must be exercised in generalising the findings. Within this local context, a probability sample was not possible for Study Part 1, leading to potential bias that limits the generalisability of the findings concerning the prevalence of maternal stress and its relationship with other constructs. Nonetheless, some external validity and ecological validity was indicated by there being no difference between the pilot and main sample for demographic characteristics or maternal stress measures. Comparison of sample characteristics and local Trust data identified over-representation of White British women. This likely reflected the pragmatic approach of recruiting at hospital-based booking clinics (given that the inner-city populations, which are usually more deprived and ethnically diverse communities, are booked in the community) combined with the English language proficiency required for unassisted self-completion.

Although qualitative research does not have the same need for representativeness, it is important to acknowledge the views that are being represented. Interviews were limited to those with high levels of maternal stress as defined by the chosen measures whereas the views of women with low maternal stress are also relevant; for example, regarding universal resources aimed at mental health promotion and resilience. Many women in this sample were highly educated and recruitment of women attending hospital clinics is likely to have over-represented women who have made a clear decision to access a non-local unit, potentially increasing the salience of patient-centredness and desire for information in Study Part 2. Similarly, women who volunteer to participate in research may be more inclined to engage with processes of self-assessment or have certain attachment styles; all of which are relevant to the modelling processes in this area.
9.7 Conclusions

Despite an apparent shift away from postnatal depression towards broader perinatal mental health perspectives, antenatal psychosocial assessment in current local practice remains focused on symptoms and history of depression. This is at odds with the nature and impact of maternal stress. Although it may be more acceptable to adopt the umbrella term of ‘perinatal anxiety and depression’ due to variation in onset and features (Matthey, 2004), this needs to be balanced with ensuring that all needs are responded to and possible vulnerabilities (including those that are biological) that vary across sub-types are not neglected.

There is a need for increased awareness of maternal stress amongst health professionals, women and society as a whole. Women’s psychological distress needs to be contextualised, consistent with life event perspectives. In addition, validated tools are needed that can be readily applied in routine maternity care to assess anxiety and depression. Concerns over the exact phrasing of items need to be balanced however with the reality of the context of disclosure when antenatal psychosocial assessment is performed in clinical practice – psychosocial questions do not inherently result in holistic care. Research and practice need to recognise that assessment itself has the potential to act as an intervention and is not entirely separable from responding.

Critically, there is no shortage of referrals of women experiencing maternal stress. Pursuit of improved identification of women needs to be situated within wider care pathways where subsequent referral and management of referrals are also included. Provision for women identified through existing approaches needs to be improved which may be facilitated through relatively simple changes to documentation encouraging improved communication between care providers and services.

The development, implementation and evaluation of low-cost accessible resources embedded in care pathways are essential, consistent with stepped care models developed for mental health in the general population. The significance of maternal stress for women and its relatively common occurrence call for further research in this area to be viewed as a priority.

“Because frankly even if they ask you and even if you admit you have certain emotional – what are they going to do for you?
That’s the bottom line, what are they going to do for you?
What’s the solution to that?” (Lena)
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Appendix 3.1 Pilot study background information sheet
Stress and pregnancy project – Questionnaire A

Below are some questions about you. They help us get an idea of who has taken part. All answers will be anonymous and confidential - no identifying details will be presented anywhere. You do not have to answer any questions that you would rather not (please mark *). Please circle your answers or write in the spaces.

1. How old are you? __________
2. What is your employment status?
   - Full-time mum
   - Unemployed
   - Employed full-time
   - Employed part-time
   - Student
   - Other ______
3. What is your job title (if applicable)? ___________________
4. What area do you live in?
   - Postcode________________
5. Who do you live with? (circle any)
   - Partner
   - Children
   - Parents
   - Friends
   - Alone
   - Other ______
6. What is your marital status?
   - Single
   - Partner
   - Married
   - Civil Partnered
   - Separate
   - Divorced
   - Widowed
   - Other ______
7. Is your partner the baby’s father?
   - Yes
   - No
8. Where were you born?
   - Britain
   - Outside Britain
9. What is your ethnic group?
   - European White
     - British
     - Irish
     - Other White Background_____
   - Mixed/ multiple ethnic groups
     - White and Black Caribbean
     - White and Black African
     - White and Asian
     - Other Mixed Background_____
   - Asian or Asian British
     - Indian
     - Pakistani
     - Bangladeshi
     - Chinese
     - Other Asian Background_____
   - Black or Black British
     - Caribbean
     - African
     - Other Black Background_____
   - Any other ethnic group_____________
   - Prefer not to answer
10. How many times have you been pregnant before? (not including this pregnancy) __________
11. How many children do you have? ______
12. How many of your children are living with you? __________
13. Approximately how many weeks pregnant are you now? ______
14. If you could change the timing of this pregnancy, would you want it?...
   - Earlier
   - Later
   - Not at all
   - No change
15. How often did you smoke before becoming pregnant?
   - Never
   - Occasionally
   - Under 5 a day
   - 5-10 a day
   - 11-20 a day
   - Over 20 a day
16. How often do you smoke now?
   - Never
   - Occasionally
   - Under 5 a day
   - 5-10 a day
   - 11-20 a day
   - Over 20 a day
17. How often did you drink alcohol before becoming pregnant?
   - Never
   - Occasionally
   - Under 7 units a week
   - 7-14 units a week
   - Over 14 units a week
   - One unit = half a pint beer/lager, or single measure of spirit, or glass of wine.
18. How often do you drink alcohol now?
   - Never
   - Occasionally
   - Under 7 units a week
   - 7-14 units a week
   - Over 14 units a week
19. Do you take or use any of these? (please circle all that apply)
   - Cannabis
   - Cocaine/Crack
   - Ecstasy
   - Speed
   - Hallucinogens
   - Methadone
   - Opiates (e.g. heroin)
   - Amphetamines
   - Other ______
   - None
20. Are you receiving treatment for any addiction? Yes No
Appendix 3.2 Pilot study feedback form

Stress and pregnancy project – Questionnaire F: Feedback form

Thanks for taking part in this study. We would like your feedback so that we can make sure our main study is user-friendly for the women that take part. Please circle your answers or write in the spaces.

1. Was any aspect of these questionnaires distressing to you?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
<td>somewhat</td>
<td>very much</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If so, which questions? (questionnaire A-E and question numbers)

………………………………………………………………………………………………………………

………………………………………………………………………………………………………………

………………………………………………………………………………………………………………

2. If you found any aspect distressing, please could you explain why?

………………………………………………………………………………………………………………

………………………………………………………………………………………………………………

………………………………………………………………………………………………………………

3. What could we do to make these questionnaires less distressing?

………………………………………………………………………………………………………………

………………………………………………………………………………………………………………

………………………………………………………………………………………………………………

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You will not be asked to take part in an interview for this study.

In the main study we will invite women to take part in interviews about half-way through their pregnancies and again after their babies are born. Interviews will discuss women’s views on how we could help to support women experiencing stress in pregnancy. Interviews will be between the woman and the researcher. All information will be anonymous and it will not be possible to identify the woman. The interview location and time will be chosen by the woman.

4. If you had been asked to take part in an interview, do you think this is something that you would have been interested in? Yes No Not sure

5. If yes, where you would you have wanted the interview to take place? (e.g. home, hospital, Sure Start's Children Centre, other) ………………………………..

6. What would make you more likely to take part in an interview?

………………………………………………………………………………………………………………

………………………………………………………………………………………………………………

………………………………………………………………………………………………………………

7. Do you remember being sent information about this research before today? Yes No

8. If yes, did you read this information? Yes No

9. Is there anything else that you would like us to know about any part of the research? For example, do you have any feedback about the information that you were given about the study, or the consent form that you were asked to sign?

………………………………………………………………………………………………………………

………………………………………………………………………………………………………………

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Appendix 3.3 Pilot study referral memo

Referral to the clinical care team

MEMO: Referral to the clinical care team

FAO: Antenatal clinic core team co-ordinator

Name of patient (in full) _________________________________________

Date of booking visit ___________ A.M. / P.M.

Name of co-ordinator spoken with ____________________________

As per our discussion today, ____________, the named patient has taken part in a research study and disclosed information that suggests the need for further consultation and possible action by a health professional as soon as possible.

CC: [Name of] Antenatal Clinic Manager

Please contact me if you would like to discuss this further.

Zoe Darwin, PhD Student, Maternal and Fetal Health Research Group
Telephone: 0161 276 xxxx
E-mail: zoe.darwin@postgrad.manchester.ac.uk
Research project title: Stress and pregnancy: A pilot study of how we can identify and help women who are experiencing stress in pregnancy.
### Appendix 3.4 Management of research referrals in the pilot study

<table>
<thead>
<tr>
<th>Referral</th>
<th>Midwife grade</th>
<th>When identified and discussed with clinical team</th>
<th>Staff already aware</th>
<th>Attended appointment alone</th>
<th>Reason for referral</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Junior</td>
<td>After booking</td>
<td>Yes (so did not need to explore with woman)</td>
<td>Yes</td>
<td>Abuse</td>
</tr>
<tr>
<td>2</td>
<td>Senior</td>
<td>After booking</td>
<td>Yes (so did not need to explore with woman)</td>
<td>Yes</td>
<td>Abuse</td>
</tr>
<tr>
<td>3</td>
<td>Senior</td>
<td>After booking and after woman left because midwife in next consultation</td>
<td>No (had assessed current abuse and no partner therefore midwife did not view abuse as an issue; midwife later phoned woman to discuss EPDS and woman reported she had misread the question and she had felt that way in the past, not recently)</td>
<td>Yes</td>
<td>Both</td>
</tr>
<tr>
<td>4</td>
<td>Senior</td>
<td>After booking</td>
<td>No (when woman waiting for blood tests, midwife asked woman back into booking room under pretence of weighing to assess abuse due to partner presence; identified that abuse was historical)</td>
<td>Yes</td>
<td>Abuse</td>
</tr>
<tr>
<td>5</td>
<td>Senior</td>
<td>Before booking</td>
<td>No (explored as part of booking; midwife reported surprise that woman continued to say she felt that way and was very “matter of fact”)</td>
<td>No</td>
<td>Thoughts of self-harm</td>
</tr>
<tr>
<td>6</td>
<td>Senior</td>
<td>After booking and after midwife left shift but woman reviewed by consultant</td>
<td>Yes (so did not need to explore with woman)</td>
<td>No</td>
<td>Both</td>
</tr>
<tr>
<td>7</td>
<td>Student</td>
<td>During booking</td>
<td>No (student required to have paperwork signed by supervisor so staff informed after main booking discussion but before woman left; clinic coordinator able to see in booking room)</td>
<td>No but waited until partner left room</td>
<td>Abuse</td>
</tr>
</tbody>
</table>
Appendix 3.5 Power calculations on which the sample size for the main study was based

Power calculations for univariate analyses where the outcome is qualitative (i.e. categorical)
A total sample size of 200 would give the following expected sample sizes for anxiety and depression: 159 for low STAI-S and 41 for high STAI-S and 147 for low EPDS and 53 for high EPDS. This is based on the proportion of subjects with high STAI-S scores and high EPDS scores in the pilot study, which were respectively 13/63 and 17/64 (using pre-specified thresholds of 40/41 and 9/10 for STAI-S and EPDS).

Univariate analyses where the outcome is qualitative involves testing for an association between distress (low-high anxiety or depression) and the presence of a risk factor (e.g. recent life event). This is done by comparing the proportion of women in the low distress (STAI-S or EPDS) group that have the risk factor (e.g. recent life event) with the proportion of women in the high distress group that have the risk factor.

Based on nQuery Advisor power calculations for anxiety, the study would have 80% power to detect an odds ratio greater than 3.9 for risk factors with a percentage in the range 10% to 70% (i.e. where 10% to 70% of the low STAI-S group have the risk factor), and odds ratios greater than 3.0 for variables with proportions in the range 30-40%. For depression, slightly smaller differences between the two groups can be detected with 80% power than for anxiety (e.g. odds ratios greater than 2.7 for variables with proportions in the range 30-40%). This is because the smaller group for depression (n=53) is larger than the smaller group for anxiety (n=41). All calculations assume a two-sided 5% significance level and the expected sample sizes listed above.

Power calculations for univariate analyses where the outcome is quantitative (i.e. continuous)
For anxiety (238 low STAI-S vs. 62 high STAI-S), the study will have 80% power to detect a significant difference in scores on a risk factor between subjects with and without anxiety if the effect size is 0.4 or greater. For depression (220 low EPDS vs. 80 high EPDS), the study will have 80% power to detect a significant difference between subjects with and without depression if the effect size is 0.37 or greater. These are considered to be small to medium effect sizes.
Invitation to take part in research
Our team in the Maternal and Fetal Health Research Group is part of the University of Manchester. We’re based at St Mary’s Hospital and carry out lots of research studies here. The projects are about trying to find solutions to different problems in pregnancy. The information in this leaflet is about one of our studies that you may be invited to take part in when you attend your antenatal appointment.

Please read this information carefully. Before you decide if you want to take part, it’s important to understand why the research is being done and what taking part involves. You do not need to decide anything now. You can speak with Zoe Darwin (the researcher) and ask if anything isn’t clear or you’d like more information before deciding to take part. If you’d rather not be approached about the research then just let staff know when you arrive for your appointment.

What’s the study about?
We all experience stress at times in our lives. Pregnancy itself can bring lots of changes and many women experience stress in pregnancy (‘maternal stress’). For some women, maternal stress can impact their day-to-day well-being during and after pregnancy, as well as the ‘bonding’ process with their baby. Maternal stress has also been linked with some pregnancy and delivery complications, and infant outcomes such as babies’ sleep patterns and temperament.

In future, women having antenatal care in England will be asked extra questions to identify stress so extra support can be offered to women who feel they want or need it. Some questions about symptoms of stress were recently added to the green handheld notes that women fill out at the ‘booking visit’ (the appointment that you are due to attend). We want to find out how useful these questions are and also compare them with other possible questions that could be used. It’s important to find out how common stress is in our local area so that we know how much extra support could be needed. We also want to find out what type of support women would like and how this may relate to the types of stress they are facing and their existing support and coping. So the research has two parts – 1) ways of assessing maternal stress (which involves filling out questionnaires) and 2) ways of responding to maternal stress (which involves one-to-one interviews). This information sheet is only about Part 1 (questionnaires).

Invited to take part in Part I (questionnaires)
- 250 women
- at appointment

Invited to take part in Part 2 (two interviews)
- 20 women
  - a) within 3 weeks of appointment
  - b) late pregnancy (30 weeks onwards)

Why have I been invited to take part?
We are inviting women that have their antenatal booking appointment at St Mary’s Hospital between June 2010 and December 2010. You are being invited because your appointment is in this timeframe, not because of your individual circumstances.

Do I have to take part?
No. It is entirely your choice. This information sheet is just about taking part in the questionnaire study. (There is additional information about the interview research if you would like to find out about that as well.) If you decide to take part in the questionnaire study, you’ll be asked to sign a
consent form and will also be given a copy to keep. You're still free to withdraw if you change your mind and you don't have to give a reason. If you decide to withdraw when you're filling out the questionnaires then your information will be destroyed and not used for research. Your decision about taking part and about withdrawing won't affect your antenatal care.

What will I have to do if I decide to take part in the questionnaire study?
Taking part involves filling out some questionnaires. There are no right or wrong answers. We are simply interested in your experiences and views on the following topics: symptoms of stress (e.g. feeling anxious or depressed), your feelings towards your pregnancy, your relationships, recent stresses (e.g. relationships, housing, finance, work), past stresses (e.g. abuse when you were growing up), how you deal with stress, and any feedback on the questions. Examples include rating feelings (e.g. ‘I feel calm’), and answering questions such as ‘Were you emotionally abused when you were growing up?’ Some of these are personal and sensitive topics. You will not be asked to provide detailed answers and you can choose not to answer questions that you would rather not answer. The questions used in the current study have been used in other research or in antenatal care in other countries.

The questionnaires should take about 20 minutes. You will complete the questionnaires on your own. Most women fill them out in the waiting room before they see the midwife or immediately after. Alternatively, if it has not been possible for you to complete the questionnaires while waiting, the researcher can give you a pre-paid envelope to return to them by post. The researcher will ask the midwife or doctor to speak with you if you have disclosed thoughts of self-harm.

We will collect some background information from your medical notes held at St Mary’s (e.g. age, ethnicity, marital status, pregnancy history, mental health history, smoking, alcohol and drug use) so that you do not need to fill out the same questions twice. We will also collect information on your pregnancy and delivery outcomes from your patient notes to look at possible relationships with stress. This will not involve any further action on your part.

If you would like to receive a summary of the research findings and/or if you are interested in finding out about taking part in the interview research, you will be asked to provide contact details.

What are the possible disadvantages and risks of taking part?
There are no physical or financial disadvantages or risks. These kinds of questions have been used in other research and are asked in some other countries when women book for antenatal care. We would like to know how women feel about answering these questions because similar questions may be introduced in England in the future.

Answering questions about history of abuse or mental health problems may be distressing for some women. If you experience any distress, then you can speak with the researcher (Zoe) or one of her supervisors. If you would like help with any of the issues raised, then we would encourage you to speak with your midwife or to contact one of the support organisations. The contact details are provided at the end of this information.

What are the possible benefits of taking part?
There are no intended clinical benefits for you or your baby. Taking part will help us to help women and their babies in future by developing ways to assess and respond to maternal stress.

Will my taking part in the study be kept confidential?
Yes. We will let your midwife know if you take part in case you have any questions or comments about the research. Everything that you say will be treated with respect and privacy. All information collected will remain anonymous and strictly confidential. The only exception would be if you disclose something that suggests that you or someone else is at risk of harm (e.g. if you disclose thoughts of self-harm). In this case we would need to tell a midwife or doctor who may then ask to speak with you to make sure you have support available.
Your responses will be stored securely. Questionnaire scores and any other details will be kept separately from your name and contact details. Participants will be assigned codes and it will be impossible to identify you in any results. Authorised persons may look at the information collected to make sure that the study is being carried out correctly. Any such person will have a duty of confidentiality to you as a research participant. Contact details will only be used to provide summary findings or contact you about possible involvement in interviews – whichever you give permission for.

**What will happen to the results of the research study?**
The results will be presented at clinical and scientific meetings and published in journals read by midwives and doctors who care for women during pregnancy and their babies. You will not be identified in any results. We are unable to give individual feedback about the things that you say but we are happy to give you a summary of the general findings next year.

**Who is organising and funding the research study?**
The study is organised by the University of Manchester. The study is funded by the University of Manchester, the Medical Research Council and Tommy’s Baby Charity.

**Who has reviewed the research study?**
All research in the NHS is looked at by an independent group, called a Research Ethics Committee, to protect your dignity, rights, safety, and well-being. This study has been reviewed by the GM East Research Ethics Committee. The Committee has given ethical approval for the study (application number 10/H1013/12).

**What if there is a problem?**
If you have a concern about any aspect of this study, you should ask to speak to the researcher (Zoe) who will do her best to answer your questions. If she is unable to resolve your concern or you wish to make a complaint regarding the study, please contact a University Research Practice and Governance Co-ordinator on 0161 275### or 0161 275### or by email to [name]@manchester.ac.uk.

**What do I need to do now?**
If you have any questions then ask Zoe (the researcher). If you would like to take part then please sign the consent form and complete the questionnaires. Please then return these directly to Zoe while you are still at the antenatal clinic.

**Who can I contact for more information?**

| Zoe Darwin          | [name] |
| PhD student         | Divisional Research Manager (St Mary’s Hospital) |
| Telephone 07818 23### | Telephone 0161 276### |
| Email zoe.darwin@postgrad.manchester.ac.uk | Email [name]@cmft.nhs.uk |

| Dr Leroy Edozien | Dr Linda McGowan |
| Consultant Obstetrician, research supervisor | Health Psychologist, research supervisor |
| Telephone (secretary) 0161 276 ### | Telephone 0161 306 ### |
| Email [email]@manchester.ac.uk | Email [address]@manchester.ac.uk |

**Address:**
Maternal and Fetal Health Research Group, University of Manchester, 5th Floor, St Mary’s Hospital, Oxford Road, Manchester, M13 9WL

Thank you for taking the time to read this information sheet. There is a list of contact details on the next page related to services that provide additional support.
Invitation to take part in research
Our team in the Maternal and Fetal Health Research Group is part of the University of Manchester. We’re based at St Mary’s Hospital and carry out lots of research studies here. The projects try to find solutions to different pregnancy problems. This project is about stress in pregnancy (‘maternal stress’).

Please read this information carefully. Before you decide if you want to take part, it’s important to understand why the research is being done and what taking part involves. If anything isn’t clear or you’d like more information then ask Zoe Darwin (the researcher).

What’s the study about?
We all experience stress at times in our lives. Pregnancy itself can bring lots of changes and many women experience stress in pregnancy (‘maternal stress’). For some women, maternal stress can impact their day-to-day well-being during and after pregnancy, as well as the ‘bonding’ process with their baby. Maternal stress has also been linked with some pregnancy and delivery complications, and infant outcomes such as babies’ sleep patterns and temperament.

In future, women having antenatal care in England will be asked extra questions to identify stress so extra support can be offered to women who feel they want or need it. Some questions about symptoms of stress were recently added to the green handheld notes that women fill out at the ‘booking visit’ (the appointment that you’re here for today). We want to find out how useful these questions are and also compare them with other possible questions that could be used. It’s important to find out how common stress is in our local area so that we know how much extra support could be needed. We also want to find out what type of support women would like and how this may relate to the types of stress they are facing and their existing support and coping. So the research has two parts – i) ways of assessing maternal stress (which involves filling out questionnaires) and ii) ways of responding to maternal stress (which involves one-to-one interviews). This information sheet is about Part 1 (questionnaires).

Why have I been invited to take part?
We are inviting women that have their antenatal booking appointment at St Mary’s Hospital between June 2010 and December 2010. You are being invited because your appointment is in this timeframe, not because of your individual circumstances.

Do I have to take part?
No. It is entirely your choice. This information sheet is just about taking part in the questionnaire study. (There is additional information about the interview research if you would like to find out about that as well.) If you decide to take part in the questionnaire study, you’ll be asked to sign a consent form and will also be given a copy to keep. You’re still free to withdraw if you change your
mind and you don’t have to give a reason. If you decide to withdraw when you’re filling out the questionnaires then your information will be destroyed and not used for research. Your decision about taking part and about withdrawing won’t affect your antenatal care.

**What will I have to do if I decide to take part in the questionnaire study?**
Taking part involves filling out some questionnaires. There are no right or wrong answers. We are simply interested in your experiences and views on the following topics: symptoms of stress (e.g. feeling anxious or depressed), your feelings towards your pregnancy, your relationships, recent stresses (e.g. relationships, housing, finance, work), past stresses (e.g. abuse when you were growing up), how you deal with stress, and any feedback on the questions. Examples include rating feelings (e.g. ‘I feel calm’), and answering questions such as ‘Were you emotionally abused when you were growing up?’ Some of these are personal and sensitive topics. You will not be asked to provide detailed answers and you can choose not to answer questions that you would rather not answer. The questions used in the current study have been used in other research or in antenatal care in other countries.

The questionnaires should take about 20 minutes. You will complete the questionnaires on your own. Most women fill them out in the waiting room before they see the midwife or immediately after. Alternatively, if it has not been possible for you to complete the questionnaires while waiting, the researcher can give you a pre-paid envelope to return to them by post. The researcher will ask the midwife or doctor to speak with you if you have disclosed thoughts of self-harm.

We will collect some background information from your medical notes held at St Mary’s (e.g. age, ethnicity, marital status, pregnancy history, mental health history, smoking, alcohol and drug use) so that you do not need to fill out the same questions twice. We will also collect information on your pregnancy and delivery outcomes from your patient notes to look at possible relationships with stress. This will not involve any further action on your part.

If you would like to receive a summary of the research findings and/or if you are interested in finding out about taking part in the interview research, you will be asked to provide contact details.

**What are the possible disadvantages and risks of taking part?**
There are no physical or financial disadvantages or risks. Answering questions about history of abuse or mental health problems may be distressing for some women. These kinds of questions have been used in other research and are asked in some other countries when women book for antenatal care. We would like to know how women feel about answering these questions because similar questions may be introduced in England in the future. If you experience any distress, then you can speak with the researcher (Zoe) or one of her supervisors. If you would like help with any of the issues raised, then we would encourage you to speak with your midwife or to contact one of the support organisations. The contact details are provided at the end of this information.

**What are the possible benefits of taking part?**
There are no intended clinical benefits for you or your baby. Taking part will help us to help women and their babies in future by developing ways to assess and respond to maternal stress.

**Will my taking part in the study be kept confidential?**
Yes. We will let your midwife know if you take part in case you have any questions or comments about the research. Everything that you say will be treated with respect and privacy. All information collected will remain anonymous and strictly confidential. The only exception would be if you disclose something that suggests that you or someone else is at risk of harm (e.g. if you disclose thoughts of self-harm). In this case we would need to tell a midwife or doctor who may then ask to speak with you to make sure you have support available.

Your responses will be stored securely. Questionnaire scores and any other details will be kept separately from your name and contact details. Participants will be assigned codes and it will be
impossible to identify you in any results. Authorised persons may look at the information collected to make sure that the study is being carried out correctly. Any such person will have a duty of confidentiality to you as a research participant. Contact details will only be used to provide summary findings or contact you about possible involvement in interviews – whichever you give permission for.

**What will happen to the results of the research study?**
The results will be presented at clinical and scientific meetings and published in journals read by midwives and doctors who care for women during pregnancy and their babies. You will not be identified in any results. We are unable to give individual feedback about the things that you say but we are happy to give you a summary of the general findings next year.

**Who is organising and funding the research study?**
The study is organised by the University of Manchester. The study is funded by the University of Manchester, the Medical Research Council and Tommy’s Baby Charity.

**Who has reviewed the research study?**
All research in the NHS is looked at by an independent group, called a Research Ethics Committee, to protect your dignity, rights, safety, and well-being. This study has been reviewed by the GM East Research Ethics Committee. The Committee has given ethical approval for the study (application number 10/H1013/12).

**What if there is a problem?**
If you have a concern about any aspect of this study, you should ask to speak to the researcher (Zoe) who will do her best to answer your questions. If she is unable to resolve your concern or you wish to make a complaint regarding the study, please contact a University Research Practice and Governance Co-ordinator on 0161 275#### or 0161 275#### or by email to [name]@manchester.ac.uk.

**What do I need to do now?**
If you have any questions then ask Zoe (the researcher). If you would like to take part then please sign the consent form and complete the questionnaires. Please then return these directly to Zoe while you are still at the antenatal clinic.

**Who can I contact for more information?**
| Zoe Darwin | (name) |
| PhD student | Divisional Research Manager (St Mary’s Hospital) |
| Telephone 07818 23#### | Telephone 0161 276#### |
| Email zoe.darwin@postgrad.manchester.ac.uk | Email [name]@cmft.nhs.uk |

| Dr Leroy Edozien | Dr Linda McGowan |
| Consultant Obstetrician, research supervisor | Health Psychologist, research supervisor |
| Telephone (secretary) 0161 276#### | Telephone 0161 306#### |
| | Email [address]@manchester.ac.uk |

**Address:** Maternal and Fetal Health Research Group, University of Manchester, 5th Floor, St Mary’s Hospital, Oxford Road, Manchester, M13 9WL

Thank you for taking the time to read this information sheet. There is a list of contact details on the next page related to services that provide additional support.
Appendix 4.3 Details of support organisations

Contact details of organisations that can offer help with mental and social well-being

The Manchester NHS Primary Care Trust recommends the following contact details for further advice, information or help in relation to mental well-being in pregnancy:

National Childbirth Trust (NCT)
www.nct.org.uk

Association for Postnatal Depression
www.apni.org

Surestart
www.surestart.gov.uk

Net Mums
www.netmums.com

NHS Direct
0845 4647

Samaritans
08457 90 90 90

Mind
www.mind.org.uk

Saneine
0845 767 8000

There are also other organisations that may be of use:

Citizens Advice Bureaux (Manchester)
www.manchestercab.org.uk

National Domestic Violence helpline
0808 2000 247 (freephone)

Miscarriage Association
01924 200799

Stillbirth and Neonatal Death Society (SANDS)
020 7436 5881
Appendix 4.4 Consent form (Study Part 1)

**CONSENT FORM (Study Part 1)**

1. I have read the participant information sheet dated 12/07/10 (version 3) for the study on maternal stress. I have had the opportunity to consider this information and to ask any questions.

2. I understand that this consent form only relates to the first stage of the study (questionnaires) and that by taking part in this I am not under any obligation to take part in the second stage (interviews).

3. I understand that taking part is voluntary and that I am free to withdraw at any time when I am completing the questionnaires, without giving a reason, and without my medical care or legal rights being affected.

4. I understand that any information given during the study will be considered confidential and private, unless I disclose information that suggests that I or someone else could be at risk of harm (e.g. if I disclose thoughts of self-harm). If this happens then I understand that a midwife or doctor would be informed and may want to talk with me.

5. I understand that no participant will be individually identified in any written report.

6. I agree voluntarily to take part in the first stage of the study (questionnaires).

7. I agree to my midwife being informed of my participation in the study. I understand that a copy of the consent form will be placed in my patient notes for this purpose but this will not affect my medical care.

8. I understand that the researcher will collect some background information (e.g. age, ethnicity, marital status, pregnancy history, mental health history, smoking, alcohol and drug use) and information on my current pregnancy and delivery outcomes from my patient records to provide information relevant to the study. This will not require me to do anything.

9. I understand that relevant sections of the data collected during the study may be looked at by individuals from The University of Manchester, from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records for the purpose of monitoring the research.

__________________________  ________________  ______________________
Name of patient                Date                  Patient signature

__________________________  ________________  ______________________
Name of researcher             Date                  Researcher signature

If you have any comments about the way this study was conducted, then please contact Zoe Darwin (E-mail zoe.darwin@postgrad.manchester.ac.uk or Telephone 07818 23####) or your midwife.

1 for patient; 1 for researcher; 1 to be kept with hospital notes
Appendix 4.5 Contact details form

Your contact details (OPTIONAL)

Any contact details you provide will be kept separate from the research project data to make sure that the data remains anonymous. Your details will not be used for any other purpose or given to anyone else.

ARMS – Assessing and Responding to Maternal Stress, Part I – Assessing (questionnaires)

We are happy to send you a summary of the research findings next year when the study is complete. If you would like to receive a copy, please provide either your postal address or email address.

Name:

Postal address:

Email address:

ARMS – Assessing and Responding to Maternal Stress, Part 2 – Responding (interviews)

Please provide your contact details below if you would be interested in finding out about taking part in the research interviews on how to support women in pregnancy. We will also give you an information sheet to take away with you today. We will only be interviewing approximately 10% of the women that take part in the questionnaire study and are particularly interested in the views of women who report some experiences or symptoms of stress. If you express an interest and we would like to invite you to interview then the researcher (Zoe) will contact you within the next week. The researcher will first check your patient notes to see if there are any reasons that it would be best not to contact you.

Telephone number (home or mobile):

Are there any times that you would prefer to be phoned?

Is it ok to leave a message on this number?

When is your due date (EDD)?
Assessing and Responding to Maternal Stress

Questionnaire Pack

Instructions:
Below are some questions about you, about your pregnancy, and about how you are feeling. There are no right or wrong answers. All answers will be confidential, with the exception that if you disclose something that suggests a possible risk of harm to you or someone else (e.g. thoughts of self-harm) then we will need to let your midwife know today. Taking part is voluntary - you do not have to answer any questions that you would prefer not to. If you would prefer not to answer a question then just mark it with a star (*). Please circle your answers or write in the spaces. Please give this pack to Zoe (the researcher) before you leave the clinic. Thank you for taking part.
Who you have around you

Who do you live with?  
- Alone  
- Partner/baby's father  
- Parent  
- Friend  
- Children  
- Other

Feelings of anxiety (STAI-S and GAD-2)

For each of the following statements, please circle one number which describes best how you feel right now, that is, at this moment.

<table>
<thead>
<tr>
<th>Item</th>
<th>Not at all</th>
<th>Somewhat</th>
<th>Moderately so</th>
<th>Very much so</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 I feel calm</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2 I feel secure</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3 I am tense</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4 I feel strained</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5 I feel at ease</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6 I feel upset</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7 I am presently worrying over possible misfortunes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8 I feel satisfied</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9 I feel frightened</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10 I feel comfortable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11 I feel self-confident</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12 I feel nervous</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13 I am jittery</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14 I feel indecisive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15 I am relaxed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16 I feel content</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17 I am worried</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18 I feel confused</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19 I feel steady</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20 I feel pleasant</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

For each of the following statements, please circle one number that describes best how often you have been bothered by the following problems over the past two weeks.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Not at all</th>
<th>Several days</th>
<th>More than half the days</th>
<th>Nearly every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling nervous, anxious, or on edge</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Not being able to stop or control worrying</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
**Feelings of depression (EPDS)**

For each of the following questions, please circle one answer that describes best how you have felt in the *PAST SEVEN DAYS*.

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
</table>
| 1. I have been able to laugh and see the funny side of things:         | □ As much as I always could  
□ Not quite as much now  
□ Definitely not so much now  
□ Not at all |
| 2. I have looked forward with enjoyment to things:                      | □ As much as I ever did  
□ Rather less than I used to  
□ Definitely less than I used to  
□ Hardly at all |
| 3. I have blamed myself unnecessarily when things went wrong:           | □ Yes, most of the time  
□ Yes, some of the time  
□ Not very often  
□ No, never |
| 4. I have been anxious or worried for no good reason:                  | □ No, not at all  
□ Hardly ever  
□ Yes, sometimes  
□ Yes, very often |
| 5. I have felt scared or panicky for no very good reason:              | □ Yes, quite a lot  
□ Yes, sometimes  
□ No, not much  
□ No, not at all |
| 6. Things have been getting on top of me:                              | □ Yes, most of the time I haven’t been able to cope at all  
□ Yes, sometimes I haven’t been coping as well as usual  
□ No, most of the time I have coped quite well  
□ No, I have been coping as well as ever |
| 7. I have been so unhappy that I have had difficulty sleeping:         | □ Yes, most of the time  
□ Yes, sometimes  
□ Not very often  
□ No, not at all |
| 8. I have felt sad or miserable:                                       | □ Yes, most of the time  
□ Yes, quite often  
□ Not very often  
□ No, not at all |
| 9. I have been so unhappy that I have been crying:                     | □ Yes, most of the time  
□ Yes, quite often  
□ Only occasionally  
□ No, never |
| 10. In the *past 7 days*, the thought of harming myself has occurred to me: | □ Yes, quite often  
□ Sometimes  
□ Hardly ever  
□ Never |

**NB:** If you have had ANY thoughts of harming yourself, please tell your doctor or your midwife today.
Stresses questionnaire (ANRQ)

Please circle your answers (yes/no or the number) or write in the spaces provided. All answers will be anonymous and confidential. **You do not have to answer any questions that you would rather not answer.** If you would rather not answer a question, then please mark with a star (*).

1. **When you were growing up, did you feel your mother was emotionally supportive of you?** (If you had no mother, circle 6.)
   
   1 2 3 4 5 6
   
   very much not at all no mother

2. a) **Have you ever had a period of 2 weeks or more when you felt particularly worried, miserable or depressed?**
   
   Yes No (go to Q3)
   
   If yes, please complete b) to d):

   b) **Did this seriously interfere with your work and your relationships with friends and family?**
   
   1 2 3 4 5
   
   not at all very much

   c) **Did this lead you to seek professional help?**
   
   Yes No
   
   If yes, did you see a:
   Psychiatrist Psychologist Counsellor GP Other__________

   d) **Did you take tablets/herbal medicine?**
   
   Yes No

3. **Is your relationship with your partner emotionally supportive?** (If you have no partner, circle 6).
   
   1 2 3 4 5 6
   
   very much not at all no partner

4. a) **Have you had any stresses, changes or losses in the last 12 months** (e.g. separation, domestic violence, unemployment, bereavement)?
   
   Yes No (go to Q5)
   
   If yes, please specify:
   
   ______________________________________
   ______________________________________
   ______________________________________
   ______________________________________
   ______________________________________

   b) **How distressed were you by these stresses, changes or losses?**
   
   1 2 3 4 5
   
   not at all very much

5. **Would you generally consider yourself a worrier?**
   
   1 2 3 4 5
   
   not at all very much

6. **In general, do you become upset if you do not have order in your life** (e.g. regular time table, a tidy house)?
   
   1 2 3 4 5
   
   not at all very much

7. **Do you feel you have people you can depend on for support with your baby?**
   
   1 2 3 4 5
   
   very much not at all

8. **Were you abused when you were growing up:**
   
   a) emotionally? Yes No Prefer not to answer
   
   b) physically? Yes No Prefer not to answer
   
   c) sexually? Yes No Prefer not to answer

**NB:** If you would like to seek some help with any of these issues please tell your midwife or your doctor.
Social support questionnaire (MSSS and Arroll-style items)
For each of the following statements, please tick one box which describes best how you feel about the support you have right now.

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>Rarely</th>
<th>Never</th>
<th>No current partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I have good friends who support me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>My family is always there for me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>My husband/partner helps me a lot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>There is conflict with my husband/partner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>I feel controlled by my husband/partner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>I feel loved by my husband/partner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Do you feel you need or want more emotional support than you have? Yes No
8. Do you feel you need or want more practical support than you have? Yes No

Relationship questionnaire (RQ)
For each of the four descriptions, rate the extent to which the description corresponds to your general relationship style. Circle the number which best describes you for each statement.

A) It is easy for me to become emotionally close to others. I am comfortable depending on others and having others depend on me. I don't worry about being alone or having others not accept me.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
<td>like</td>
<td>very</td>
<td>like</td>
<td>me</td>
<td>me</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B) I am comfortable without close emotional relationships. It is very important to me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
<td>like</td>
<td>very</td>
<td>like</td>
<td>me</td>
<td>me</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C) I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don't value me as much as I value them.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
<td>very</td>
<td>like</td>
<td>like</td>
<td>me</td>
<td>me</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

D) I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt if I allow myself to become too close to others.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
<td>very</td>
<td>like</td>
<td>like</td>
<td>me</td>
<td>me</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 4.6(j): Questionnaire pack, current gestation and pregnancy attitudes
Appendix 4.6(k): Questionnaire pack, PRAM (non-verbal MFR measure)

**About your pregnancy**

1. Approximately how many weeks pregnant are you now? _____________

2. Approximately how many weeks ago did you find out you are pregnant? __________

3. If you could change the timing of this pregnancy, would you want..? (please circle one)

<table>
<thead>
<tr>
<th>Earlier pregnancy</th>
<th>Later pregnancy</th>
<th>No pregnancy at all</th>
<th>No change to timing</th>
</tr>
</thead>
</table>

4. Overall, has this pregnancy been a positive experience for you? (please circle a number)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
<td>very much</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Your baby in your life at the moment**

Please imagine that the larger outer circle represents your life as it is at the moment. The small inner circle represents you (‘my self’). Please mark a cross representing where your baby is placed in your life at the moment.

(If this seems an unusual task then an example may help: if a woman was asked to mark a cross representing her work and work was an essential part of her life that made all the difference to how she saw herself then she may mark a cross in the centre.)
Feelings about your baby and pregnancy

The following sentences describe thoughts, feelings, and situations women may experience during pregnancy. Please circle the number which best describes your experience during the past month. Some sentences may not apply if you are at an earlier stage of pregnancy so just tick not applicable.

<table>
<thead>
<tr>
<th>Item</th>
<th>Almost always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Almost never</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I wonder what the baby looks like now.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>I imagine calling the baby by name.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>I know things I do make a difference to the baby.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>I plan the things I will do with my baby.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>I buy/make things for the baby.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>I feel love for the baby.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>I like to sit with my arms around my tummy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>I dream about the baby.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>I share secrets with the baby.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>I get very excited when I think about the baby.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>I think that my baby already has a personality.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>I stroke the baby through my tummy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>I know the baby hears me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>I try to imagine what the baby is doing in there.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>I imagine what part of the baby I’m touching.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16</td>
<td>I know when the baby is asleep.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17</td>
<td>I tell others what the baby does inside me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18</td>
<td>I enjoy feeling the baby move.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19</td>
<td>I know why the baby is moving.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>I let other people put their hands on my tummy to feel the baby move.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21</td>
<td>I can make my baby move.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Coping questionnaire (Brief COPE)
We are interested in how people respond when they face difficult or stressful events. There are lots of ways to try to deal with stress. This questionnaire asks you to say what you generally do and feel, when you experience stressful events. Obviously, different events bring out different responses, but think about what you usually do when you are under a lot of stress.

<table>
<thead>
<tr>
<th>Item</th>
<th>Not at all</th>
<th>A little bit</th>
<th>A medium amount</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I turn to work or other activities to take my mind off things.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. I concentrate my efforts on doing something about the situation I'm in.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. I say to myself 'this isn't real'.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. I use alcohol or other drugs to make myself feel better.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. I get emotional support from others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. I give up trying to deal with it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. I take action to try to make the situation better.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. I refuse to believe that it has happened.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. I say things to let my unpleasant feelings escape.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. I get help and advice from other people.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. I use alcohol or other drugs to help me get through it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12. I try to see it in a different light, to make it seem more positive.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13. I criticise myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14. I try to come up with a strategy about what to do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15. I get comfort and understanding from someone.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16. I give up the attempt to cope.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17. I look for something good in what is happening.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18. I make jokes about it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19. I do something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20. I accept the reality of the fact that it has happened.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21. I express my negative feelings.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>22. I try to find comfort in my religion or spiritual beliefs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>23. I try to get advice or help from other people about what to do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>24. I learn to live with it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>25. I think hard about what steps to take.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>26. I blame myself for things that happened.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>27. I pray or meditate.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>28. I make fun of the situation.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Feedback form

Thanks for taking part in this study. We would like your feedback. Please circle your answers or write in the spaces.

1. Was any aspect of these questionnaires distressing to you?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>not at all</td>
<td>somewhat</td>
<td>very much</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If so, which questions? (questionnaire, page and question numbers)

…………………………………………………………………………………………………………
…………………………………………………………………………………………………………

2. If you found any aspect distressing, please could you explain why?

…………………………………………………………………………………………………………
…………………………………………………………………………………………………………
…………………………………………………………………………………………………………
…………………………………………………………………………………………………………

3. What could we do to make these questionnaires less distressing?

…………………………………………………………………………………………………………
…………………………………………………………………………………………………………
…………………………………………………………………………………………………………
…………………………………………………………………………………………………………

4. Do you remember being sent information about this research before today? Yes No

5. If yes, did you read this information? Yes No

6. Is there anything else that you would like us to know about any part of the research?

…………………………………………………………………………………………………………
…………………………………………………………………………………………………………
…………………………………………………………………………………………………………

THANKS FOR TAKING PART IN THIS STUDY.

PLEASE LET US KNOW IF YOU HAVE ANY QUESTIONS.
ARMS – Assessing and Responding to Maternal Stress
Part 2 – Responding (interviews)

Interview Participant Information Sheet (Version 1: 22/1209)

Invitation to take part in research
This is the second stage of a research project about Assessing and Responding to Maternal Stress (ARMS). It is an interview study that women can take part in if they have previously taken part in the first stage, which involves fill out questionnaires.

Before you decide if you want to take part, it's important to understand why the research is being done and what taking part involves. Please read this information carefully. If anything isn't clear or you'd like more information then ask Zoe Darwin (the researcher).

What's the study about?
As you know from the first study, we are comparing different questions that have been used to assess stress (Part I of the research). In this second stage, we want to find out what type of support women would like and how this may relate to the types of stress they are facing and their existing support and coping. The research will help us to develop possible interventions to provide support to women in future. We are asking women to take part in two interviews because support needs may change in different stages of pregnancy, or with changing circumstances. This information sheet is about Part 2 (interviews).

Why have I been invited to take part?
We are inviting women that previously took part in the first stage (questionnaires). We are particularly interested in the views of the women who report some experiences or symptoms of stress.

Do I have to take part?
No. It is entirely your choice. If you decide to take part, we would like you to take part in two interviews – one within 2 weeks of the questionnaires, and one towards the end of your pregnancy. The second interview would ideally be between 30 and 38 weeks of pregnancy, but it could be done after your delivery if you gave birth earlier than expected and still wanted to take part. If you decide to take part, Zoe (the researcher) will arrange a time and place for the first interview where you’ll be asked to sign a consent form (the consent form is also included at the end of this information sheet so that you can see it in advance). You’re still free to withdraw if you change your mind and you don’t have to give a reason. If you decide to withdraw during the interview then your information will be destroyed and not used for research. If you decide to withdraw following the first interview then you do not need to take part in the second interview. Your decisions about taking part and about withdrawing won’t affect your antenatal care.

What will I have to do if I decide to take part in the interview study?
Taking part involves interviews where you will be asked about any stress that you may be experiencing, the support that you have available to you, your views on stress being assessed as
part of antenatal care and extra support being offered. We would also like to discuss in details your views on the kind of support that you would like to be available for pregnant women. We would like you to take part in two interviews because support needs may change in different stages of pregnancy, or with changing circumstances.

The interviews should each take less than an hour. They are intended to be relaxed and conversational. They will be audio-recorded to allow us to write-up everything that is said. The interviews can be held either in a room at the research facility in St Mary's Hospital, or in your home – whichever you prefer. We'll make every effort to find a time that's convenient for you and if you come to St Mary's then we'll pay your travel expenses or parking.

**Would you still want me to take part if something goes wrong in my pregnancy?**
Naturally we would not expect you to continue to take part in the research but if you still wanted to take part then we would be happy to talk with you. Often the views of women that experience difficulties or a loss in pregnancy are not heard and it is just as important to make sure that these women have the right support available to them.

**What are the possible disadvantages and risks of taking part?**
There are no physical or financial disadvantages or risks. Discussing your stress and pregnancy experiences may at times cause upset and the researcher has experience of interviewing about sensitive topics. If you feel that you don't want to carry on with the research or the interviews you can stop at any time.

**What are the possible benefits of taking part?**
There are no intended clinical benefits for you or your baby. Taking part will help us to help women and their babies in future by developing ways to assess and respond to maternal stress.

**Will my taking part in the study be kept confidential?**
Yes. We will put a copy of your consent form in your patient notes in case you have any questions or comments about the research. Everything that you say will be treated with respect and privacy. All information collected will remain anonymous and strictly confidential. The only exception would be if you disclose something that suggests that you or someone else is at risk of harm (e.g. abuse or thoughts of self-harm). In this case the researcher would be obliged to tell an appropriate professional (e.g. your obstetrician or midwife).

The audio recordings will be transferred word for word into a written format for analysis by the researcher and research team. Following transcription the audio recordings will be destroyed, leaving the written format only. The data will be analysed by the researcher and the research team and authorised persons may look at the information collected to make sure that the study is being carried out correctly. All recordings (audio and written copies) will be stored securely. You will not be identified in any results. Instead, we use a number or false name to refer to the women that take part.

**What will happen to the results of the research study?**
The results will be presented at clinical and scientific meetings and published in journals read by midwives and doctors who care for women during pregnancy and their babies. You will not be identified in any results. We are unable to give individual feedback about the things that you say but we are happy to give you a summary of the general findings next year.

**Who is organising and funding the research study?**
The study is organised by the University of Manchester. The study is funded by the University of Manchester, the Medical Research Council and Tommy's Baby Charity.
Who has reviewed the research study?
All research in the NHS is looked at by an independent group, called a Research Ethics Committee, to protect your dignity, rights, safety, and well-being. This study has been reviewed by the GM East Research Ethics Committee. The Committee has given ethical approval for the study (application number 10/H1013/12).

What if there is a problem?
If you have a concern about any aspect of this study, you should speak to the researcher (Zoe) who will do her best to answer your questions. If she is unable to resolve your concern or you wish to make a complaint regarding the study, please contact a University Research Practice and Governance Co-ordinator on 0161 275#### or 0161 275#### or by email to 
[name]@manchester.ac.uk.

What do I need to do now?
If you have any questions then ask Zoe (the researcher). If you would like to take part and are approached to take part in the study then Zoe will arrange a convenient time and location to have the first interview. At this meeting you will sign the consent form before the interview begins.

Who can I contact for more information?
Zoe Darwin
PhD student
Telephone 07818 23####
Email zoe.darwin@postgrad.manchester.ac.uk
Address Maternal and Fetal Health Research Group, University of Manchester, 5th Floor, St Mary’s Hospital, Oxford Road, Manchester, M13 9WL

Thank you for taking the time to read this information sheet.
Invitation to take part in a follow-up interview
Thank you for taking part in the research project about Assessing and Responding to Maternal Stress (ARMS). You have previously filled out questionnaires and taken part in interviews during your pregnancy.

Some of the women we interviewed have suggested that it would helpful to do an interview after delivery of the baby (‘postnatal interview’), in order to get a complete picture. We have adopted this suggestion, and are conducting postnatal interviews with any women who are interested. We believe that the postnatal interviews will give us a fuller understanding of how support needs may change in pregnancy and also consider some of the stresses and support needs that women have around delivery and the early postnatal period. The third interview is shown below.

Do I have to take part?
No. It is entirely your choice. As before, you're still free to withdraw if you change your mind and you don't have to give a reason. If you decide to withdraw during the interview then your information will be destroyed and not used for research. Your decisions about taking part and about withdrawing won’t affect your care.

What will I have to do if I decide to take part in the postnatal interview study?
You would take part in one additional interview. The interview would follow the same format as before and cover the same topics.

As before, the interviews will be audio-recorded and can be held either in a room at the research facility in St Mary’s Hospital, or in your home – whichever you prefer. We’ll make every effort to find a time that’s convenient for you and if you come to St Mary’s then we’ll pay your travel expenses or parking.

We will put a copy of your consent form in your patient notes in case you have any questions or comments about the research. Everything that you say will be treated with respect and privacy. All information collected will remain anonymous and strictly confidential. The only exception would be if you disclose something that suggests that you or someone else is at risk of harm (e.g. abuse or thoughts of self-harm). In this case the researcher would be obliged to tell an appropriate professional (e.g. your obstetrician or midwife).

Who can I contact for more information?
Zoe Darwin (PhD student) Telephone 07818 23#### Email zoe.darwin@postgrad.manchester.ac.uk
Appendix 4.9 Interview consent form

INTERVIEW CONSENT FORM

1. I have read the participant information sheet dated 11/02/10 (version 1) for the study on maternal stress. I have had the opportunity to consider this information and to ask any questions.

2. I understand that this consent form relates to the second stage of the study (interviews).

3. I understand that taking part is voluntary and that I am free to withdraw at any time, without giving a reason, and without my medical care or legal rights being affected.

4. I understand that any information given during the study will be considered confidential and private, unless I disclose information that suggests that I or someone else could be at risk of harm (e.g. abuse or thoughts of self-harm). If this happens then I understand that the researcher will be obliged to inform an appropriate professional (e.g. a midwife or doctor).

5. I understand that no participant will be individually identified in any written report.

6. I agree voluntarily to take part in the second stage of the study (interviews) which involves taking part in up two interviews that are audio-recorded. I understand that the recordings will be transferred word for word in a written format and analysed, and that anonymised quotations may be published.

7. I agree to my midwife or doctor being informed of my participation in the study. I understand that a copy of the consent form will be placed in my patient notes for this purpose but this will not affect my medical care.

8. I agree to the researcher contacting me later in my pregnancy to arrange a time and location for the second interview if I still want to take part.

9. I understand that relevant sections of the data collected during the study may be looked at by individuals from The University of Manchester, from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records for the purpose of monitoring the research.

_________________________  ____________________  ____________________________
Name of patient  Date  Patient Signature

_________________________  ____________________  ____________________________
Name of researcher  Date  Researcher Signature

If you have any comments about the way this study was conducted, then please contact Zoe Darwin (E-mail zoe.darwin@postgrad.manchester.ac.uk or Telephone 07818 23####) or your midwife.

1 for patient; 1 for researcher; 1 to be kept with hospital notes
POSTNATAL INTERVIEW CONSENT FORM

1. I have read the participant information sheet dated 10/12/10 (version 1) for the postnatal interview on maternal stress. I have had the opportunity to consider this information and to ask any questions.

2. I understand that taking part is voluntary and that I am free to withdraw at any time, without giving a reason, and without my medical care or legal rights being affected.

4. I understand that any information given during the study will be considered confidential and private, unless I disclose information that suggests that I or someone else could be at risk of harm (e.g. abuse or thoughts of self-harm). If this happens then I understand that the researcher will be obliged to inform an appropriate professional (e.g. a midwife or doctor).

5. I understand that the interview is audio-recorded and that the recording will be transferred word for word in a written format and analysed, and that anonymised quotations may be published. I understand that no participant will be individually identified in any written report.

7. I have previously taken part in antenatal interviews and understand that this consent form relates to the postnatal interview. I agree voluntarily to take part in the postnatal interview.

7. I agree to my midwife or doctor being informed of my participation in the study. I understand that a copy of the consent form will be placed in my patient notes for this purpose but this will not affect my medical care.

8. I understand that relevant sections of the data collected during the study may be looked at by individuals from The University of Manchester, from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records for the purpose of monitoring the research.

Name of patient ___________________________ Date ___________ Patient Signature ___________________________

Name of researcher ___________________________ Date ___________ Researcher Signature ___________________________

If you have any comments about the way this study was conducted, then please contact Zoe Darwin (E-mail zoedarwin@postgrad.manchester.ac.uk or Telephone 07818 23####) or your midwife.

1 for patient; 1 for researcher; 1 to be kept with hospital notes
Appendix 4.11 Proforma for Study Part 1

Participant Identification Number for this study _______________

Central Manchester University Hospitals NHS Foundation Trust

Proforma for researcher use

Handheld notes (*)
1. Are the handheld notes present? Yes (1) No (0)

Background characteristics (source: Pregnancy Notes p.1-3, and blue census form)
2. Date of birth __xx/xx/xx_______
3. Postcode __xxx xxx_______
4. EDD ____________
5. Marital status Single (1) Married/CP (2)
   Partner (3) Separated (4) Divorced (5)
   Widowed (6) Missing (7)
6. Partner details completed Yes (1) No (0)
7. Current partner is baby's father Yes (1) No (0)
8. Country of birth _______ [type in full]________
9. Ethnicity
   Wh_British (1) Wh_Irish (2) Wh_Other (3)
   Mixed_Wh Bl Caribbean (4) Mixed_Wh Bl African (5)
   Mixed_WhAsian (6) Mixed_Other (7)
   As_Indian (8) As_Pakistani (9)
   As_Bangladeshi (10) As_Chinese (11)
   As_Other (12) Bl_Caribbean (13)
   Bl_African (14) Bl_Other (15)
   Any Other (16) Prefer not to answer (17)
   Missing (18)
10. Maternal height at booking (cm) ____________
11. Maternal weight at booking (kg) ____________

Social Assessment (source: Pregnancy Notes p.2 (*), and green special circumstances form)
12. Highest educational qualification* _______ [type in full]________
13. Employment status* Employed F/T (1) P/T (2)
   Home (3) Student (4)
   Sick (5) U/E (6)
   Retired (7) Other (8)
   Missing (9)
14. Occupation of woman* _______ [type in full, or n/a]________
15. Occupation of partner* (if applicable) _______ [type in full, or n/a]________
16. Housing*  
<table>
<thead>
<tr>
<th>Owns (1)</th>
<th>Rents (2)</th>
<th>Family/friend (3)</th>
<th>UKBA (4)</th>
<th>NFA (5)</th>
<th>Care services (6)</th>
<th>Temp accom. (7)</th>
<th>Other (8)</th>
<th>Missing (9)</th>
</tr>
</thead>
</table>

17. Entitled to claim benefits*  
| No (0) | Yes (1) | N/R |

18. A) Has support from partner/family/friend*  
| No (0) | Yes (1) | N/R (miss) |

B) Referred*  
| No (0) | Yes (1) | N/R (miss) |

19. A) Household current/past social services *  
| No (0) | Yes (1) | N/R (miss) |

B) Referred*  
| No (0) | Yes (1) | N/R (miss) |

20. Social circumstances referral [green form]  
| No (0) | Yes (booking) (1) | Yes (later) (2) |

21. Referral concerning domestic abuse  
| No (0) | Yes (booking) (1) | Yes (later) (2) |

22. Transfer of care  
| No (0) | Yes (1) |

23. Transfer of care details  
[gestation, location, reason (e.g. moved)]

24. Social circumstances referral details (e.g. referral raised due to late booking; type of specialist midwives involved; then code full dataset) _____________________________

___________________________________________

__________________________________________________________________

__________________________________________________________________

Health behaviours (source: Pregnancy Notes p.2 (*)) (record booking only)

Smoking

25. Smoke/tobacco  
| No (0) | Yes (1) | N/R (missing) |

26. # per day*  
[missing] |

27. Smoked last 12 months*  
| No (0) | Yes (1) | N/R (missing) |

28. When stopped smoking*  
| (date) | N/R (missing) | N/A |

29. Anyone else in home smoke  
| No (0) | Yes (1) | N/R (missing) |

30. Referral detail  
| No (because n/a) (0) | N/R (missing) | accepted/declined |

Drug use

31. Street drugs, gas or glue*  
| No (0) | Yes (1) | N/R (missing) |

32. Details  
[missing] |

33. Receiving treatment  
| No (0) | Yes (1) | N/R (missing) |

34. Referral  
| No (0) | Yes (1) | N/R (missing) |

35. Anyone else in home use street drugs*  
| No (0) | Yes (1) | N/R (missing) |

Alcohol

36. Drink alcohol  
| No (0) | Yes (1) | N/R (missing) |

37. Units per week*  
| Pre-pregnancy | Current | N/R |

38. Referral  
| No (0) | Yes (1) | N/R (missing) |

Medical history (specific to current pregnancy, at booking) (source: Pregnancy Notes p.3)

39. Fertility problems this pregnancy* (e.g. assisted conception)  
| No (0) | Yes (1) |

40. Vaginal bleeding this pregnancy* No (0) Yes (1)
41. Other complications* ____ (type) ______________________

**Mental health** *(source: Pregnancy Notes p.3)*

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>N/R</th>
</tr>
</thead>
<tbody>
<tr>
<td>42. Past or present mental illness (disorder)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43. Previous treatment/in-patient care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44. Family history*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45. Time1 Whooley i) (down, depressed, hopeless)*</td>
<td>No</td>
<td>Yes (1)</td>
<td>N/R</td>
</tr>
<tr>
<td>46. Time1 Whooley ii) (little interest or pleasure)*</td>
<td>No</td>
<td>Yes (1)</td>
<td>N/R</td>
</tr>
<tr>
<td>47. Time1 Arroll (feel you need or want help)*</td>
<td>No</td>
<td>Yes (1)</td>
<td>N/R</td>
</tr>
<tr>
<td>48. Time2 Whooley i) (down, depressed, hopeless)*</td>
<td>No</td>
<td>Yes (1)</td>
<td>N/R</td>
</tr>
<tr>
<td>49. Time2 Whooley ii) (little interest or pleasure)*</td>
<td>No</td>
<td>Yes (1)</td>
<td>N/R</td>
</tr>
<tr>
<td>50. Time2 Arroll (feel you need or want help)*</td>
<td>No</td>
<td>Yes (1)</td>
<td>N/R</td>
</tr>
<tr>
<td>51. Time3 Whooley i) (down, depressed, hopeless)*</td>
<td>No</td>
<td>Yes (1)</td>
<td>N/R</td>
</tr>
<tr>
<td>52. Time3 Whooley ii) (little interest or pleasure)*</td>
<td>No</td>
<td>Yes (1)</td>
<td>N/R</td>
</tr>
<tr>
<td>53. Time3 Arroll (feel you need or want help)*</td>
<td>No</td>
<td>Yes (1)</td>
<td>N/R</td>
</tr>
</tbody>
</table>

54. Mental health details (i.e. diagnosis given/family details reported)*

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes (booking)</th>
<th>No (0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>55. Mental health referral</td>
<td>Yes (booking)</td>
<td>No (0)</td>
</tr>
</tbody>
</table>

56. Referral details, action taken and date of action taken (also see Q.24; include any discrepancy between referral being made and booking proforma mental health details)

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes (booking)</th>
<th>No (0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>55. Mental health referral</td>
<td>Yes (booking)</td>
<td>No (0)</td>
</tr>
</tbody>
</table>

**Obstetric history** *(source: Pregnancy Notes p.5)*

<table>
<thead>
<tr>
<th>Question</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>57. Number of pregnancies (incl. current) (gravidity)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>58. Previous number of deliveries (parity)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>59. Neonatal death</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60. Stillbirth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61. Miscarriage (excluding ectopic pregnancy)</td>
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<td>62. Miscarriage due to ectopic pregnancy</td>
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<td>63. TOP (termination of pregnancy)</td>
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<td>64. Loss details (date of loss and gestational age)</td>
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<tr>
<td>65. Details of any previous complications (e.g. previous C-section, PPH, 3rd degree tear, ‘difficult delivery’, IUGR)</td>
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</table>

**Current pregnancy and delivery outcomes** *(source: computerised birth summary, PAS system, handheld notes)*

**Antenatal details**
66. Birth plan details (incl. antenatal notes on analgesia, C-section etc)*
   [page 21 not completed or birth plan details]

67. Type of antenatal care
   Midwifery-led (1)
   Independent midwives (2)
   Consultant-led shared care (3)
   Consultant-led specialist care (4)

68. Scan details
   [record date of dating scan (and if occurred before booking eg due to bleeding); and details of any other scans (dates & reasons) beyond dating and anomaly]
84. Any other pain relief details [including postnatal; record maternal requests, comments and pain assessment chart detail, e.g. '0 for rest and movement throughout' for C-section/spinal]

85. Duration of labour 1\textsuperscript{st} stage
86. Duration of labour 2\textsuperscript{nd} stage
87. Duration of labour 3\textsuperscript{rd} stage
88. Duration of labour total (1\textsuperscript{st} and 2\textsuperscript{nd})

89. Mode of delivery
- Normal (SVD) (1)
- Breech vaginal delivery (2)
- Assisted – ventouse/forceps (3)
- Caesarean – planned (elective) (4)
- Caesarean – urgent (5)
- Caesarean – emergency (6)

90. 3\textsuperscript{rd} stage
- Normal (1)
- Haemorrhage (2)
- Retained placenta (3)

Other information

91. Skin-to-skin contact
- Yes (1) No (0) N/R (missing)

92. Breast feeding immediately
- Yes (1) No (0) N/R (missing)
- Mixed (2)

93. Breast feeding at discharge
- Yes (1) No (0) N/R (missing)
- Mixed (2)

94. Additional notes concerning stress and coping [e.g. recordings about women’s anxieties, previous traumatic experiences etc]
Appendix 4.12 Data management plan (Study Part 1)

This data management plan refers to the plan for Study Part 1; however the pilot study (reported in Chapter 3) followed the same principles.

1. Datasets and databases

Questionnaire packs
The questionnaire responses were entered into a file in Microsoft Office Excel 2007, using double data entry to ensure accuracy, as described by Elliot and colleagues (2006) (i.e. two identical versions of the spreadsheet were created, the responses were entered into each, and compared). Any discrepancies (n=9) were checked against the original questionnaire to correct inaccuracies. Responses were distinguished as uncompleted (‘missing’) and those where the participant had used the requested ‘*’ to denote ‘prefer not to answer’.

Two copies of the Excel file were saved: the original with all the questionnaire responses, including any comments made about items; and a second containing only those items for import into SPSS 19. The data was imported from Excel into SPSS and data checks were performed to verify the accuracy of the import (e.g. total score calculations).

Health records
Data extraction and input was assisted by a second researcher, the primary PhD supervisor, which ensured that any clinical queries could be handled as they arose. The participants’ demographic data, medical history, mental health details, referral details and obstetric details were collected from health records and entered into a file in Microsoft Office Excel 2007, which had been designed for the variables contained in the proforma. A coding template, also known as a ‘data dictionary’ (Elliott, Hynan, Reisch, & Smith, 2006), was developed to assist data extraction and input, and facilitate inter-rater reliability, by detailing all necessary information, e.g. variable name, label, description, codes, recording missing values.

An inter-rater reliability check on the first 14 files (containing 83 variables) found 94.8% agreement (with disagreement occurring in only 61/1162 data items). Following initial piloting with 14 records, the proforma was revised (approved as a substantial ethics amendment), as was the coding template and Excel file. Two variables were considered too subjective to retain: documentation concerning pain (including open-ended staff comments about participants’ pain in labour and details of any pain assessment charts) and the frequency of fetal blood sampling in the labour notes (recorded as an indicator of fetal distress). These were excluded from the inter-rater calculation. The layout of the mental health details was revised to facilitate inter-rater reliability. Any issues arising concerning data extraction and input were discussed at each data session, and any agreed changes or points of clarification were added to the coding template. Examples of approaches to data inconsistencies are described later.

Data was cleaned to ensure consistency in textual variables (e.g. description of the referral procedures). Coding of health and obstetric details, past and current, was undertaken once all files (n=191) had been extracted.

Numerical data was imported into SPSS 19 using a second copy of the Excel file, as described with the questionnaire responses. SPSS was used to analyse the data.

2. Types of data

Numerical data
The research included the following types of data: categorical (categories, e.g. ethnicity, preferred pregnancy timing, mode of delivery); ordinal (describing rank order, e.g. Likert
ratings, where the differences between adjacent values are not necessarily equal, for example, pregnancy experience); and ratio (where the difference between values is meaningful and there is an absolute/true value of zero, for example maternal or gestational age). Categorical data may be described as ‘qualitative’ data with the other previously mentioned types being described as quantitative; however this terminology was avoided due to the potential for creating confusion in mixed methods research.

The questionnaire pack predominantly involved measures based on Likert ratings which, although technically ordinal, are commonly treated as ratio data. Risk and symptom measures were generally used in two formats: total score and categorical classification (according to thresholds suggested in the literature).

Ratio data could follow either a discrete or continuous format, e.g. gestation was counted in completed weeks whereas maternal age could take any value; however, for simplicity, statistical comparisons were described as using either categorical or continuous variables (where continuous included true ratio and interval data and data treated as such but derived from ordinal data, i.e. total symptom scores).

Data were described using standard descriptive statistics. Categorical data were described using frequencies and relative frequencies (e.g. proportions and percentages). Continuous variables were described using measures of central tendency and dispersion (i.e. the mean and standard deviation for parametric data and the median and interquartile range for non-parametric data).

Inferential statistics (i.e. those performed to statistically test hypotheses and make generalisations about the population) are described in further detail in the associated sections of the findings (Chapter 5).

**Textual data**

String variables were created to accommodate open-ended responses for variables. For the questionnaire pack, this included the nature of recent stresses (ANRQ) and any feedback concerning the research. String variables for the health records accommodated socioeconomic details (e.g. occupation, highest qualification), details of previous health and obstetric history, complications in the current pregnancy, mental health details and referral details (including actions taken). The majority of the string variables were subjected to further coding to create categorical data.

### 3. Management of missing data and inconsistencies with the questionnaire pack

#### 3.1 Handling missing data in the questionnaire pack

SPSS syntax was written to return total scores conditional on the number of items completed.

**State-Trait Anxiety Inventory (STAI-S) (Spielberger, et al., 1987)**

The tool's authors (Spielberger, Gorusch, & Lushene, 1987) recommended calculating a weighted total provided that no more than two of the 20 items were missing. A total of 169 participants provided complete STAI-S datasets and weighted scores were calculated for a further 15 participants. The number of participants with missing items was as follows: 1 item (n=14), 2 items (n=1), 3 items (n=2), 4 items (n=1), 5 items (n=1), 8 items (n=1). One participant did not complete any of the STAI-S with one further participant completing only one of the 20 items.

**GAD-2 (Kroenke, et al., 2007)**

In the absence of a guideline, the total score was only calculated where both items were completed (n=187), removing from analyses the one case where only one item was completed. A further three cases did not complete either item.

**Edinburgh Postnatal Depression Scale (EPDS) (Murray & Cox, 1990)**
Complete EPDS datasets were provided by 187 participants. In the absence of a guideline for missing data, weighted scores were calculated for the two participants with one item missing. A further two participants did not complete any of the EPDS.

Antenatal Risk Questionnaire (ANRQ) (Austin, 2003)
The number of participants with missing risk factors was as follows: 1 item (n=8), 2 items (n=7), 3 items (n=2), 4 items (n=1), 6 items (n=1). A further two participants did not complete any of the ANRQ. Since the time of designing the research, the approach to handling missing data has been revised by the tool authors, originally allowing a maximum of one missing item (and using an unweighted score), and later allowing a maximum of two missing items with weighted scores calculated in such circumstances; affecting the scoring of 15 cases. These alternatives were explored with the ARMS sample. Scoring issues are discussed in more detail in Chapter 5 ('scoring the ANRQ').

Maternity Social Support Scale (MSSS) (Webster, et al., 2000)
Total scores were not calculated unless all six items had been completed, resulting in total scores being available for 180 participants.

3.2 Handling discrepancies in the questionnaire pack
ANRQ (Austin, 2003)
Testing the ANRQ in the pilot study identified the need to perform checks on the 'impact' items (ANRQ2b, impact of previous mood, and ANRQ4b, impact of recent stresses) that were conditional on the 'occurrence' items (ANRQ2a, history of previous mood, and ANRQ4a, history of recent stresses). Logically, ratings should only be assigned following a yes response to occurrence and any yes response should always be followed by a rating. Rules were generated to handle discrepancies: an impact score of 1 following a 'no' response to occurrence was re-scored as 0 (used with these items to denote 'not applicable'), whereas any higher rating in the presence of a 'no' response required that the items instead be treated as missing. Contingency tables were generated which confirmed that checks by the researcher had identified all discrepancies.

MSSS (Webster, et al., 2000)
MSSS data relating to partner support was compared with the relevant ANRQ item (ANRQ3, emotionally supportive partner) to explore consistency of responses concerning partner support.

Four women reported on both the MSSS and ANRQ having no partner, consistent with the recorded marital status (single n=3, separated n=1). One participant who was separated reported having no partner on the ANRQ but wrote ‘can’t answer in boxes’ for the MSSS. The remaining participant reporting no partner on the ANRQ (marital status = single) completed the participant items on the MSSS (rating the partner as unsupportive and there being conflict). Conversely, one participant (marital status = single) reported no partner on the MSSS yet assigned a rating of 3 on the ANRQ. A further participant (marital status = single) responded ‘prefer not to answer’ for the MSSS partner items and assigned a rating of 3 on the ANRQ.

Alongside differences being observed between MSSS and ANRQ scores, there were two instances of apparent inconsistencies between MSSS partner items (with extreme positive and extreme negative scores reported by the same individuals, n=2).

Rather than making assumptions about any of these observations, the original scores were retained. Inferences were only made for the two occasions of double entry. In both examples, the adjacent row was uncompleted and the intended score for each item was inferred due to the layout and other item responses.

Arroll style support questions (want or need emotional or practical support)
The decision was taken to assign a score reflecting a ‘yes’ response where a participant had written ‘maybe’ rather than selecting ‘yes’ or ‘no’ a response. As with all decisions concerning rescoring, this was discussed with another researcher and considered in light of the exact phrasing of the item.
About pregnancy: Timing of pregnancy (pregnancy intendedness)
There was one instance of double entry which, given the mutually exclusive categorical nature of the data could not be rescored as was therefore treated as missing data.

Relationship Questionnaire (RQ) (Bartholomew & Horowitz, 1991)
In two cases, women marked scores between two Likert ratings, using the measure more as a continuous Visual Analogue Scale. The rating closer to the mark was taken as the final score. One participant provided scores for each individual statement within the description, treated as missing data.

In seven cases, women’s overall choice of description was contradictory with the individual ratings (i.e. the overall choice was assigned a lower rating than that of a different description). A decision was made to exclude the data on overall choice given that the tool’s authors recommendation that scoring instead prioritise the ratings, and the observation that the questionnaire layout may have been misleading for selecting overall choice.

Brief COPE (Carver, 1997)
Each subscale was scored by summing its two items. The subscale was treated as missing where only one item had been completed. One woman wrote ‘not applicable’ for the items concerning use of alcohol or drugs and one wrote it for the items concerning religion. To distinguish from these items being missing, they were rescored as the lowest rating, i.e. using this strategy ‘not at all’.

4. Management of missing data and inconsistencies with the health records
Variables were excluded where they were found not to distinguish participants (e.g. ‘details of drug use’ was not completed for any participants).

Inconsistent completion was most commonly found with variables taken from the handheld notes (HHN). Smoking data presented several inconsistencies. There was variation in the completion of date of stopping smoking, e.g. including the exact date (dd/mm/yr), month (mm/yr), or ‘x weeks ago’. Where women had reported ‘x weeks ago’, a date was created (relative to the date of booking). Date of stopping smoking could be ‘not applicable’ for two reasons: not smoking (or at least, not smoking in the past year), continuing to smoke; requiring additional coding to be created. Syntax was written to derive variables for whether the women had stopped before the pregnancy or during the pregnancy.

The variables concerning smoking referrals were excluded due to inconsistent completion by midwives, with some using this to document provision of information on smoking, rather than a referral per se. Also, it was found that the HHN and hospital records recorded separate information, whether the partner smoked and whether anyone in the home smoked.

Questions concerning alcohol consumption appeared to be inconsistently interpreted by women, with some women responding that they did not consume alcohol, yet providing a number of units ‘pre’ pregnancy; i.e. using this item to describe current consumption rather than consumption outside of pregnancy. Similarly, there was inconsistency between the HHN and hospital records with only the HHN asking about ‘pre’ intake. The variable concerning consumption was therefore excluded; using only the items concerning quantity. Additional variables were created to record ‘any pre’ and ‘any current’ to accommodate scoring where women wrote a response (e.g. ‘occasionally’, ‘rarely’) rather than a number.

The variables concerning socioeconomic status were particularly problematic. The variable concerning benefits was often uncompleted, which, given the discussions held in Study part 2, may have partly reflected uncertainty about entitlements. Additionally, information on highest qualification was often uncompleted. The detail presented under occupation often did not contain adequate detail to provide a classification.
Postcode information, which was used to calculate an index of social deprivation, could change during the pregnancy; therefore, it was decided to calculate the deprivation score based on the postcode at the time of booking.

Codes were devised to distinguish between data that was missing due to variables being uncompleted in the HHN and those that were missing due to the HHN being absent from the health records.

In some instances, it was possible to locate missing data using other sources; for example, demographic details unavailable via the HHN (e.g. occupation) may be reported elsewhere (e.g. in referral letters). Similarly, where length of labour was not completed on the birth summary, it was sometimes possible to calculate the length using times reported on the electronic maternity system. Also, some inconsistencies were found concerning estimated date of delivery and gestational age at delivery, which could be resolved by consulting the electronic records concerning ultrasound scans to obtain accurate due dates.

The postnatal health behaviours were also found to contain several inconsistencies between data sources concerning skin-to-skin contact and infant feeding. The handwritten intrapartum notes were chosen as the default in these cases. Similarly, the handwritten intrapartum notes sometimes documented the use of non-pharmacological methods of analgesia (e.g. TENS machine, use of pool) which that had not been recorded on the electronic records; again, highlighting the benefits of extraction from the handheld and hospital notes.

In the event of being unable to resolve discrepancies across data source, the item was coded as missing.
Appendix 4.13 Interview topic guide

Introduction:
- We want to find out how to develop services to support pregnant women who are experiencing stress.
- You took part in the first part of the study, which involved filling out some questionnaires about stress.
- The interviews are looking in more detail about types of stress women may have. We are also looking at things that might be helpful in dealing with these stresses.
- We are also interested in how stress and support may change throughout pregnancy. This is why we would like you to take part in two interviews – one early in pregnancy and one towards the end of pregnancy.

How have you been since the last time we met (when you had your first appointment at St Mary's/at our last interview)?
- Prompts:
  - When was the last time you felt stressed? What happened?
  - How have things been with…. home, work, family, friends, your pregnancy?
  - Has this been any different because you are pregnant? (if appropriate)

What support did you get when that happened/when you felt like that?
- What was good about that?
- What was not so good about that?
- Prompts:
  - How did it help?/How did it not help?
  - Did it change how you felt?
  - Did it change the situation?
  - Did it matter when it was?
  - Did it matter who it was?
  - Is this something that you would usually do?
  - How would you have liked the support to have been different?
  - How do you think would this helped the situation?
  - Do you go to any classes/use any services (e.g. children's centres)?
  - How did you find out about that?
  - What do they involve?
  - What's good/not so good about them?
  - How are they helpful?
  - How could they be better?

Thinking back to the questions you filled out in the first part of the research and the questions you filled out in your booking visit,
- How did you find them?
- Prompts:
  - Do you remember any of the questions?
  - Did you feel like anything was missing?/unnecessary?
  - What do you think about asking women these types of questions as part of routine antenatal/pregnancy care?
  - When do you think is the best time during pregnancy to ask the questions?
  - Who do you think is the best person to ask these questions?
  - What do you think about offering women extra support based on these types of questions?

Summary
- Re-cap
- Would you like to add anything?
- Thank and discuss second interview.
Referral to the clinical care team (Version 1: 11/02/10)

MEMO: Referral to the clinical care team

FAO: Antenatal clinic core team co-ordinator

CC: [NAME], Antenatal Clinic Manager

Name of patient (in full) ________________________________

NHS number ________________________________

Name of consultant ________________________________

Date of booking visit ________________________________

Name of booking midwife ________________________________

Spoken with booking midwife Yes ☐  No ☐

Name of co-ordinator spoken with ________________________________

Today’s date ________________________________

As per our discussion today, the named patient has taken part in a research study and disclosed information that suggests the need for further consultation and possible action by a health professional as soon as possible. The clinical care team has been informed and will act accordingly. Any other actions will be documented using the standard clinical procedures.

Please contact me if you would like to discuss this further.

Zoe Darwin, PhD Student, Maternal and Fetal Health Research Group
Telephone: 07818 235### or 0161 701 6###
E-mail: zoe.darwin@postgrad.manchester.ac.uk
Research project title: Assessing and Responding to Maternal Stress (ARMS).
Supervisor: Dr Leroy Edozien
## Appendix 4.15 Monitoring log for Study Part 1

### Monitoring log for Study Part 1 (complete for all women due to book at clinics attended by the researcher)

<table>
<thead>
<tr>
<th>Title of Study</th>
<th>Assessing and Responding to Maternal Stress (ARMS) – Part 1 (questionnaires)</th>
<th>R&amp;D PIN</th>
<th>R00998</th>
</tr>
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<tbody>
<tr>
<td>Principal Investigator</td>
<td>Zoe Darwin</td>
<td>Site</td>
<td>St Mary’s Hospital, CMFT</td>
</tr>
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</table>

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<th>Date:</th>
<th>Day of the week:</th>
<th>A.M. / P.M.</th>
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<tr>
<th>Bookers</th>
<th>Due appointment (time)</th>
<th>Missed booking</th>
<th>Received (time)</th>
<th>Approached (yes - researcher, no - reason)</th>
<th>Eligible (language, literacy, age)</th>
<th>Approach (reason)</th>
<th>Hesitated (yes - reason)</th>
<th>Consented (before/after)</th>
<th>Time given (PIS)</th>
<th>Time given (Notes)</th>
<th>Time returned (PIS)</th>
<th>Time returned (Notes)</th>
<th>Time consented (time)</th>
<th>Time booked (time)</th>
<th>Attended alone/with adult(s)/with child(ren)</th>
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### Enrolment log for Study Part 1 (complete for all Part 1 participants)

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<th>Participant Name</th>
<th>NHS number</th>
<th>Study ID code</th>
<th>Date recruited to Part 1</th>
<th>Day of week recruited; AM/PM</th>
<th>Completed all measures?</th>
<th>Consent form on file, in patient notes and given to participant?</th>
<th>Comments (e.g. referral made or withdrawal)</th>
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# Appendix 4.17 Monitoring log for Study Part 2

**Monitoring log for Study Part 2 (complete for all Part 1 participants)**

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<th>R00998</th>
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<td>Zoe Darwin</td>
<td>Site</td>
<td>St Mary’s Hospital, CMFT</td>
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<thead>
<tr>
<th>Study ID</th>
<th>Date of Part 1</th>
<th>Date of Part 2</th>
<th>Expressed interest in Part 2</th>
<th>Eligibility for Part 2 (risk, anxiety, depression, support)</th>
<th>Date of follow-up telephone call/reason not approached</th>
<th>Consented? (any reason given if not)</th>
<th>Date of 1st interview</th>
<th>Date of 2nd interview</th>
<th>Withdrawal? (any reason given)</th>
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</tbody>
</table>

396
**Enrolment log for Study Part 2 (interviews) (complete for all Part 2 participants)**

<table>
<thead>
<tr>
<th>Participant Name</th>
<th>NHS number</th>
<th>Study ID code</th>
<th>Study Pseudonym</th>
<th>Date recruited to Part 2</th>
<th>Date of 1st interview</th>
<th>Date of 2nd interview</th>
<th>Consent form on file, in patient notes and given to participant?</th>
<th>Comments (e.g. referral made or withdrawal)</th>
</tr>
</thead>
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</tr>
</tbody>
</table>

**Title of Study**
Assessing and Responding to Maternal Stress (ARMS) – Part 2 (interviews)

**R&D PIN**
R00998

**Principal Investigator**
Zoe Darwin

**Site**
St Mary’s Hospital, CMFT
Appendix 4.19 Example of field notes (heavily edited)

[Date]

#1118 - time 1

Got there early - lives far out - chose hospital due to previous bad experience. Found café to sit in for half an hour. Big car - people carrier. Later realised would not fit all children and buggies in regular car. NB - big car not necessarily sign of affluence though. Lots of financial concerns - needing to save money to have support in postnatal period due to children’s multiple needs.

Did not know what to expect as seemed a little cynical about the research when met in antenatal clinic. In hindsight - think this is healthy pessimism! Lots of practical needs - great quote about ‘A doctor to take seriously that having exceptional stress - you’re a woman - that’s what you’re for!’

Having to put needs of her children (‘would cut myself into bits for them - my children are my life’) before own. Struggling with coordination of services - therefore understandable that cynical about provision of support for ‘stress’.

NB - distinguished that ARMS questionnaire more re: symptoms (‘mental health’) and would not pick up the needs of her family. Although focusing on practical needs, says wants/needs counselling (‘get self sorted’) at some stage - barriers in the past re: childcare etc. Sees this pregnancy as an ‘opportunity to heal’. After last birth had ‘post-traumatic stress, more or less’.

Use of humour throughout - ‘being sectioned would be nice break from it all!’ Issues of severe sleep deprivation due to needs of family - carer roles. She described it as ‘mad house’. Endless activity. Caring for young children throughout interview (feeding, changing nappies). Clearly experienced at multi-tasking - able to continue talking throughout. Workmen around throughout. Ended up being longer due to interruptions.
### Appendix 4.20 Substantial ethical amendments

<table>
<thead>
<tr>
<th>Description</th>
<th>Need</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Flyer to advertise in the hospital</td>
<td>To increase the profile of the research study in the hospital, consistent with materials used in other research locally.</td>
<td>The flyer did not offer an alternative recruitment pathway; therefore, no change to protocol required.</td>
</tr>
<tr>
<td>2 Introduction of postal participation</td>
<td>Postal participation was necessary to ensure adequate sample size. 1) Restricting participation to women who had received a Postal PIS excluded some women who may wish to take part. Introduction of postal return ensured women could have adequate time to decide about taking part. 2) Clinical systems were changed, resulting in shorter waiting times for women; the waiting time during which women were usually approached and participated; therefore the option of postal return was needed.</td>
<td>a) Two envelopes (marked with a unique code) enabled separate return of consent forms and questionnaires. b) Contact details were given for women to discuss any aspect of the research. c) Clinical referrals would be delayed by postal return (where women reported on the EPDS thoughts of self-harm). Discussed with antenatal clinic manager who agreed that women would have had clinical mental health assessment at booking; likely to identify concerns. Postal return of the EPDS has been used elsewhere (Green, Snowdon &amp; Statham, 1991).</td>
</tr>
<tr>
<td>3 Storage of data on encrypted storage devices</td>
<td>Accessing health records necessitated use of non-networked computers and working off-site, requiring a transportable list of participant details (including names and hospital numbers).</td>
<td>Storage devices avoided the need to carry paper-based participant details. The highest level of encryption was used (Advanced Encryption System 256-bit).</td>
</tr>
<tr>
<td>4 Revision of the proforma used with health records</td>
<td>1) Consultation of health records identified more appropriate ways to capture referrals and use of services. 2) Inter-rater reliability checks identified ways of re-structuring and re-ordering the questions to maximise accuracy and assist input. 3) Women’s interviews suggested the need to record additional information, including previous complications and the recency of previous pregnancy-related losses, rather than simply the number.</td>
<td>Some of the proposed revisions led to more detailed data extraction; however, no identifying details were recorded in any reports (e.g. exact dates or rich descriptions).</td>
</tr>
<tr>
<td>5 Introduction of postnatal (PN) interviews</td>
<td>1) Responsive to women’s comments. a) Some women asked why PN interviews were not planned. b) Some women (both primiparas and multiparas) expressed concerns specifically relating to the intrapartum and early PN periods. 2) Scientific interest for considering the trajectory of distress, particularly given that Study Part 1 had identified longitudinal Whooley responses would not be available.</td>
<td>Women’s views were sought at time 2 interviews (n=8) and all were in favour. Also offers additional benefit to the participants through opportunity to share their full ‘story’, providing a clear ‘ending’ to participation. A participant information sheet and a consent form were devised for the postnatal interview. The voluntary nature of participation was emphasised.</td>
</tr>
</tbody>
</table>
Appendix 4.21 Pregnancy, delivery and baby outcomes for Study Part 1

Pregnancy outcomes
Pregnancy outcome data were available for 176 of the participants due to 15 women (7.9%) not continuing their care at the local unit. Of the nulliparous women (n=111), 100 delivered at the local unit, including 95 live singleton deliveries and five live twin deliveries. Two of the remaining 11 women experienced perinatal losses (due to miscarriage and ectopic pregnancy) and the other nine did not continue their care locally. Of the 80 multiparous women, 72 delivered locally, including 69 live singleton deliveries, two live twin deliveries and one stillbirth. Two of the remaining eight women experienced perinatal losses (due to miscarriage and termination of pregnancy for chromosomal abnormality) and the other six did not continue their care locally. Further details of pregnancy outcomes presented by parity and by care type at booking are available in the tables.

Complications in the index pregnancy included placenta praevia (low-lying placenta; n=14), growth restriction (n=6), hypertension (high blood pressure; n=14), headache or visual disturbance (n=4), preterm or threatened pre-term labour (n=8), polyhydramnios or oligohydramnios (an excess or deficiency of amniotic fluid; n=3), obstetric cholestasis (accumulation of bile acid in the bloodstream; n=4), gestational diabetes (n=2), anaemia (n=3), symphysis pubis dysfunction (characterised by pelvic pain; n=8), urinary tract infection (n=3) and sexually transmitted infection (n=1); highlighting the diversity of complications that would require consideration in exploring, for example, the relationship between maternal stress and appropriate use of services. Such complications are more common in the current setting due to being a specialist centre, more likely to manage high risk pregnancies.

Delivery outcomes
Of the 164 live singleton deliveries, 130 were vaginal (including 83 normal, one breech and 46 assisted instrumental deliveries) and 34 were by caesarean section (including 16 planned, three scheduled, seven urgent and eight emergency). Further details on mode of delivery presented by care type and parity are available in the tables.

Onset of labour and use of epidural analgesia were recorded for the 143 women where labour commenced, i.e. excluding the 19 women with planned or scheduled caesareans and the two women with urgent or emergency sections performed before labour commenced. Approximately one-quarter of these women were induced (37/143). Rate of epidural use was 24.5% (26/106) in those with spontaneous onset of labour and 54.1% (20/37) in those whose labour was induced. Rate of assisted instrumental or operative delivery was 76.1% (35/46) following epidural analgesia compared with 24.7% (24/97) where epidural analgesia was not used. Further details are available in the tables.

Baby outcomes
Of the 164 live singleton deliveries, five were considered low birthweight (weighing less than 2500g), which included two of the five babies born prematurely (before 37 completed weeks). Individualised Birth Ratios (IBRs) were derived using the GROW algorithm provided by the Perinatal Institute (version 6.4) to determine the birthweight centile, adjusted for gestational age at delivery, maternal ethnicity, BMI (Body Mass Index) and parity. This identified 11 babies scoring below the fifth centile and therefore considered Small for Gestational Age (SGA). Calculating the IBRs confirmed that whereas the three low babies born at term with low birthweight were SGA, the two babies that were both premature and low birthweight were not SGA, i.e. the low birthweight reflected their prematurity rather than, for example, growth restriction. None of the SGA babies were admitted to special care; however, three of the eleven babies admitted were premature, which included the two babies that were both premature and low birthweight.
IBRs were not calculated for the 14 babies born following twin pregnancies (n=7) because the GROW algorithm is only appropriate for singleton pregnancies. None of these births were premature and none of the babies were admitted to special care.

Table 4.21a Pregnancy outcome data by parity and care type

<table>
<thead>
<tr>
<th>Pregnancy outcome</th>
<th>caretype and parity combination</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MLC nullips.</td>
<td>MLC multips.</td>
</tr>
<tr>
<td>live delivery at research site</td>
<td>79</td>
<td>26</td>
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<tr>
<td>stillbirth</td>
<td>0</td>
<td>1</td>
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<tr>
<td>miscarriage</td>
<td>1</td>
<td>0</td>
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<tr>
<td>ectopic pregnancy</td>
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<td>0</td>
</tr>
<tr>
<td>termination of pregnancy (TOP)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>did not continue care locally</td>
<td>9</td>
<td>4</td>
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<tr>
<td>Total</td>
<td>90</td>
<td>31</td>
</tr>
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</table>

Note: MLC = midwifery-led care. Care type refers to assignment at the time of booking and does not capture whether women subsequently received specialist care or changed pathway.

Table 4.21b Mode of delivery presented by care type and parity for live singleton births

<table>
<thead>
<tr>
<th>Mode of delivery</th>
<th>caretype and parity combination</th>
<th>Total</th>
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<tr>
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<td>MLC nullips.</td>
<td>MLC multips.</td>
</tr>
<tr>
<td>normal</td>
<td>39</td>
<td>20</td>
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<tr>
<td>breech</td>
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<td>assisted</td>
<td>32</td>
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<td>CS planned</td>
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<td>CS scheduled</td>
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<td>CS emergency</td>
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<tr>
<td>Total</td>
<td>79</td>
<td>26</td>
</tr>
</tbody>
</table>

Notes: Two of the emergency and urgent sections were conducted for women before onset of labour, both of which were non-MLC multips.; MLC = midwifery-led care; CS = caesarean section.
<table>
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<tr>
<th>Induction</th>
<th>Epidural</th>
<th>Mode of delivery</th>
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<td></td>
<td>MLC nullips.</td>
<td>MLC multips.</td>
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<td>normal</td>
<td>4</td>
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<td>3</td>
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<tr>
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<td>no</td>
<td>normal</td>
<td>39</td>
<td>20</td>
</tr>
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<td></td>
<td></td>
<td>assisted/instrumental</td>
<td>32</td>
<td>5</td>
</tr>
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<td></td>
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<td>operative/CS</td>
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<tr>
<td>Total</td>
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<td>77</td>
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</table>

Notes: MLC = midwifery-led care; CS = caesarean section.
### Appendix 4.22 Exploring the representativeness of the sample in Study Part 1: Comparison with local maternity data

Table 4.22a Comparison of ARMS sample characteristics and local maternity data (for categorical data)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>ARMS Study Part 1 (n=191)</th>
<th>Local maternity data (n=3892)</th>
<th>Local maternity data, excluding teenage pregnancy clinic (n=3636)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td></td>
<td>Chi-square goodness-of-fit</td>
<td>df</td>
<td>p</td>
</tr>
<tr>
<td>Ethnicity: White British</td>
<td>No 61 (32.1)</td>
<td>No 1908 (63.8)</td>
<td>82.64</td>
</tr>
<tr>
<td></td>
<td>Yes 129 (69.7)</td>
<td>Yes 1081 (36.2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N/R 1</td>
<td>N/R 903</td>
<td></td>
</tr>
<tr>
<td>Primipara (no previous deliveries)</td>
<td>No 80 (41.9)</td>
<td>No 1534 (39.4)</td>
<td>0.494</td>
</tr>
<tr>
<td></td>
<td>Yes 111 (58.1)</td>
<td>Yes 2358 (60.6)</td>
<td></td>
</tr>
</tbody>
</table>

Notes: N/R = not reported; df = degrees of freedom; p<.05*, p<.01**, p<.001***
Table 4.22b Comparison of ARMS sample characteristics and local maternity data (for continuous data)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>ARMS Study Part 1 (n=191)</th>
<th>Local maternity data (n=3892)</th>
<th>Local maternity data, excluding teenage pregnancy clinic (n=3636)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean (s.d.)</td>
<td>mean (s.d.)</td>
<td>Independent-samples t-test</td>
</tr>
<tr>
<td></td>
<td>t df p</td>
<td>95% CI</td>
<td>t df p</td>
</tr>
<tr>
<td>Maternal age at booking (years)</td>
<td>31.1 (5.3)</td>
<td>28.5 (6.0)</td>
<td>6.57 214.0 &lt;.001*** 1.82, 3.39</td>
</tr>
<tr>
<td>Gestational age at booking (weeks)</td>
<td>13.4 (5.4)</td>
<td>14.2 (8.1)</td>
<td>-1.86 233.6 .064 -1.58, 0.04</td>
</tr>
<tr>
<td>Maternal BMI at booking (kg/m²)</td>
<td>25.5 (5.9)</td>
<td>24.6 (7.5)</td>
<td>2.08 219.4 .039* 0.05, 1.80</td>
</tr>
</tbody>
</table>

Notes: N/R = not reported; s.d. = standard deviation; df = degrees of freedom; CI = confidence interval; p<.05*, p<.01**, p<.001***
Appendix 4.23 Exploring the representativeness of the sample in Study Part 1: Comparison with pilot study data

Table 4.23a Comparison of sample characteristics for Study Part 1 and pilot study (for categorical data)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>ARMS Study Part 1 (n=191)</th>
<th>Pilot study (n=64)</th>
<th>Chi-square test for independence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>N (%)</td>
<td>n</td>
</tr>
<tr>
<td>Marital status in a relationship (partner/married)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status in a relationship (partner/married)</td>
<td>191</td>
<td>174 (91.1)</td>
<td>64</td>
</tr>
<tr>
<td>Reside with partner</td>
<td>171</td>
<td>159 (93.0)</td>
<td>64</td>
</tr>
<tr>
<td>British born</td>
<td>191</td>
<td>141 (73.8)</td>
<td>64</td>
</tr>
<tr>
<td>Ethnicity: White British</td>
<td>190</td>
<td>129 (67.9)</td>
<td>64</td>
</tr>
<tr>
<td>1st pregnancy (nulligravida)</td>
<td>191</td>
<td>71 (37.2)</td>
<td>63</td>
</tr>
<tr>
<td>1st delivery (primipara)</td>
<td>191</td>
<td>111 (58.1)</td>
<td>64</td>
</tr>
<tr>
<td>Previous perinatal loss</td>
<td>191</td>
<td>80 (41.9)</td>
<td>63</td>
</tr>
<tr>
<td>Trimester at booking</td>
<td>191</td>
<td>1st 144 (75.4)</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>2nd 39 (20.4)</td>
<td>2nd 18 (28.1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd 8 (4.2)</td>
<td>3rd 5 (7.8)</td>
<td></td>
</tr>
<tr>
<td>Late booking (&gt; 20 weeks)</td>
<td>191</td>
<td>14 (7.3)</td>
<td>64</td>
</tr>
<tr>
<td>Preferred pregnancy timing</td>
<td>184</td>
<td>Earlier 10 (5.4)</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Later 31 (16.8)</td>
<td>Later 6 (9.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No pregnancy 3 (1.6)</td>
<td>Not at all 9 (14.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No change 140 (76.1)</td>
<td>No change 41 (65.1)</td>
<td></td>
</tr>
<tr>
<td>Currently smokes</td>
<td>191</td>
<td>12 (6.3)</td>
<td>64</td>
</tr>
<tr>
<td>Characteristic</td>
<td>ARMS Study Part 1 (n=191)</td>
<td>Pilot study (n=64)</td>
<td>Independent-samples t-test</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>---------------------------</td>
<td>-------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>mean (s.d.)</td>
<td>n</td>
</tr>
<tr>
<td>Maternal age at booking (years)</td>
<td>191</td>
<td>31.1 (5.3)</td>
<td>64</td>
</tr>
<tr>
<td>IMD centile (2007)</td>
<td>191</td>
<td>30.9 (19.9)</td>
<td>51</td>
</tr>
<tr>
<td>Gestational age at booking (weeks)</td>
<td>184</td>
<td>13.4 (5.4)</td>
<td>64</td>
</tr>
</tbody>
</table>

Notes: N/R = not reported; s.d. = standard deviation; df = degrees of freedom; CI = confidence interval; p<.05*, p<.01**, p<.001***; Yates’ Correction for Continuity used for all 2 by 2 comparisons.
Table 4.23c Comparison of maternal stress measures for Study Part 1 and pilot study (for categorical data)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>ARMS Study Part 1 (n=191)</th>
<th>Pilot study (n=64)</th>
<th>Chi-square test for independence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>N (%)</td>
<td>n</td>
</tr>
<tr>
<td>STAI-S &gt; 40</td>
<td>184</td>
<td>55 (29.9)</td>
<td>63</td>
</tr>
<tr>
<td>EPDS &gt; 9</td>
<td>189</td>
<td>53 (28.0)</td>
<td>64</td>
</tr>
<tr>
<td>EPDS &gt; 12</td>
<td>189</td>
<td>25 (13.2)</td>
<td>64</td>
</tr>
<tr>
<td>ANRQ total &gt; 23</td>
<td>183</td>
<td>61 (33.3)</td>
<td>61</td>
</tr>
<tr>
<td>ANRQ risk factors &gt; 3</td>
<td>183</td>
<td>55 (30.1)</td>
<td>61</td>
</tr>
</tbody>
</table>

Notes: N/R = not reported; df = degrees of freedom; p<.05*, p<.01**, p<.001***; Yates’ Correction for Continuity used for all 2 by 2 comparisons.

Table 4.23d Comparison of maternal stress measures for Study Part 1 and pilot study (for continuous data)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>ARMS Study Part 1 (n=191)</th>
<th>Pilot study (n=64)</th>
<th>Independent-samples t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>mean (s.d.)</td>
<td>n</td>
</tr>
<tr>
<td>STAI-S</td>
<td>184</td>
<td>35.5 (10.9)</td>
<td>63</td>
</tr>
<tr>
<td>EPDS</td>
<td>189</td>
<td>6.5 (5.1)</td>
<td>64</td>
</tr>
<tr>
<td>ANRQ total</td>
<td>183</td>
<td>19.5 (10.4)</td>
<td>61</td>
</tr>
<tr>
<td>ANRQ risk factors</td>
<td>183</td>
<td>2.5 (2.2)</td>
<td>61</td>
</tr>
<tr>
<td>Questionnaires</td>
<td>183</td>
<td>1.2 (0.6)</td>
<td>62</td>
</tr>
</tbody>
</table>

Notes: N/R = not reported; s.d. = standard deviation; df = degrees of freedom; CI = confidence interval; p<.05*, p<.01**, p<.001***
Appendix 5.1 Preliminary analyses undertaken in respect of the symptom data
This appendix describes the preliminary analyses undertaken in respect of the symptom data in preparation for subsequent analyses.

Internal consistency (reliability)
Adequate internal consistency (>0.70) has repeatedly been demonstrated for the EPDS and STAI-S (Cox & Holden, 2003; Spielberger, et al., 1987). Cronbach alpha coefficients in the current study were respectively .88 and .93, indicating high internal consistency.

The minimum number of items required for calculating Cronbach’s alpha is debated; however, the the value of Cronbach’s alpha depends on the number of items, whereby alpha increases with the number of items (Cortina, 1993, cited in Field, 2005). While alpha can be calculated provided there is a minimum of two items (Bland & Altman, 1997), mean inter-item correlations for the items may be more appropriate if using fewer than 10 items (Briggs and Cheek, 1986, cited in Pallant, 2007). GAD-2 items had a Cronbach’s alpha of .833, with an inter-item correlation of .717, indicating high internal consistency.

Outliers
All outliers (see Table 5.1a) were checked and confirmed as correctly entered data. The high values appeared reasonable continuations of the frequency histograms that did not strongly influence the overall measure of central tendency (i.e. the mean), with values for 5% trimmed mean (i.e. excluding the outliers) and original mean respectively: EPDS 6.1 vs. 6.5, STAI-S 35.0 vs. 35.5, GAD-2 1.4 vs. 1.6. Women classified as outliers were found to have common features of previous mental health history and/or recent perinatal loss for EPDS and STAI-S, but not GAD-2, outliers.

Assessing normality (and the decision not to transform the data for further analyses)
Inspection of the shape of the distributions (presented as histograms below) identified that distress symptoms were heavily positively skewed, as is commonly found with distress (i.e. the majority of the population are not experiencing distress).

Normality was assessed using Kolmogorov-Smirnov and confirmed that none of the measures were normally distributed (all p<.05), which was primarily due to skewness (i.e. an asymmetrical distribution) rather than kurtosis (i.e. a peaked or flat distribution). Square root and log transformations were applied, after which the transformed STAI-S data met the assumption of normality (indicated by non-significant Kolmogorov-Smirnov results). In contrast, transformed EPDS and GAD-2 scores were non-normal; therefore transformations were not used in any subsequent analyses.

Despite not being normally distributed, the shapes of the distribution and the relatively large sample size (which makes a significant violation of the normality assumption more likely) were considered adequate for using parametric statistics (Altman, 1999). A medical statistician was consulted regarding the choice of analyses.
Figure 5.1a Histogram depicting distributions of EPDS scores

Figure 5.1b Histogram depicting distributions of STAI-S scores
Table 5.1a Outliers and normality of the distress (symptom) measures

<table>
<thead>
<tr>
<th>Distress</th>
<th>Outliers</th>
<th>Normality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total score</td>
<td>Square root transformation</td>
</tr>
<tr>
<td></td>
<td>z &gt; 3.29 (n)</td>
<td>z &gt; 1.96 (n)</td>
</tr>
<tr>
<td>EPDS</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>STAI-S</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>GAD-2</td>
<td>7</td>
<td>10</td>
</tr>
</tbody>
</table>

Notes: outliers are shown by z scores (where those with scores exceeding 1.96 indicate the most extreme 5% of scores and those exceeding 3.29 the most extreme 0.1%); K-S = Kolmogorov- Smirnov (test statistic for testing the assumption of normality); df = degrees of freedom (which equals n in this analysis); ^ns. = non-significant result (indicating normally distributed data)
### Appendix 5.2 Convergent validity of EPDS-3A

#### Figure 5.2a Scatterplot matrix showing correlations between the symptom measures

#### Table 5.2a Bivariate correlations to examine convergent validity

<table>
<thead>
<tr>
<th></th>
<th>STAI-S total (weighted)</th>
<th>GAD-2 total</th>
<th>EPDS anxiety component (items 3,4,5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPDS total (weighted)</td>
<td>Pearson’s r .689**</td>
<td>.686**</td>
<td>.868**</td>
</tr>
<tr>
<td></td>
<td>p (2-tailed) &lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>n 183</td>
<td>185</td>
<td>188</td>
</tr>
<tr>
<td>STAI-S total (weighted)</td>
<td>Pearson’s r .608**</td>
<td></td>
<td>.600**</td>
</tr>
<tr>
<td></td>
<td>p (2-tailed) &lt;.001</td>
<td></td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>n 182</td>
<td></td>
<td>183</td>
</tr>
<tr>
<td>GAD-2 total</td>
<td>Pearson’s r</td>
<td>.625**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>p (2-tailed) &lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n 185</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: all p<.001***
Appendix 5.3 Scoring the ANRQ

At the time of designing the research and conducting the pilot study, the only available data on the ANRQ used a threshold of '<24' (for low) and '>23' (for high), i.e. high was '24 or more' (alternatively written 23/24); this was described as identifying the top tertile of women (Austin, 2006; Austin et al., 2008). However, a recent article recommends a threshold as '23 or more' (Austin et al., 2011) as offering best equivalence of sensitivity and specificity for predicting postnatal depression; sensitivity = 62%; specificity = 64%; PPV = 30%). Additionally, the approach to handling missing data has been revised, originally allowing a maximum of one missing item (and using an unweighted score), and later allowing a maximum of two missing items with weighted scores calculated in such circumstances. These alternatives were explored with the ARMS sample.

Table 5.3a presents data based on allowing weighted scoring for up to two missing items. This scoring approach affected 15 cases with either one (n=8) or two missing items (n=7, including 5 where this concerned both abuse risk factors). The overall classification was only altered in one case where a participant’s unweighted score was 23 (with three risk factors), resulting in 'high' classification by introducing weighting of scores. Critically, this highlights that excluding the datasets from analyses due to missing items would have 'lost' meaningful data, i.e. total risk classification for women with largely complete datasets were still meaningful and accurate.

Choice of threshold for total score (22/23 vs. 23/24) influenced classification where women scored 23 (n=6). Of these, five had three risk factors and one had four risk factors; therefore agreement between classification based on total score and number of risk factors was greater for the higher threshold (see Table 5.3a, agreement for 164/185 cases at 22/23 vs. 168/185 cases at 23/24). The higher threshold was additionally more comparable with the tertile split, classifying as high 35.1% vs. 38.4%. Subsequent analyses therefore adopted the 23/24 threshold proposed in the original PRI.

Internal consistency was not appropriate for the ANRQ due to containing dichotomous variables, and due to the impact items (risk factors 3 and 7) depending on responses to other items (risk factors 2 and 6) (Streiner, 2003).

Table 5.3a Comparing classification by total score and total number of risk factors (n=185)

<table>
<thead>
<tr>
<th>Threshold</th>
<th>&gt;3 risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>low (n=127)</td>
</tr>
<tr>
<td>22/23</td>
<td></td>
</tr>
<tr>
<td>Less than 23 (n=114)</td>
<td>110 (59.5)</td>
</tr>
<tr>
<td>23 or more (n=71)</td>
<td>17 (9.2)</td>
</tr>
<tr>
<td>23/24</td>
<td></td>
</tr>
<tr>
<td>Less than 24 (n=120)</td>
<td>115 (62.2)</td>
</tr>
<tr>
<td>24 or more (n=65)</td>
<td>12 (6.5)</td>
</tr>
</tbody>
</table>
### Appendix 5.4 Comparing self-identified need and PRI-identified need using different criteria to determine the PRI classification

#### Table 5.4a Comparing self-identified need and PRI-identified need

<table>
<thead>
<tr>
<th>Original PRI category</th>
<th>Adapted PRI category</th>
<th>Adapted PRI sub-category</th>
<th>Risk (ANRQ)</th>
<th>Depression (EPDS)</th>
<th>Anxiety (STAI-S/GAD-2)</th>
<th>EPDS 9/10; STAI-S 40/41</th>
<th>EPDS 9/10; GAD-2 2/3</th>
<th>EPDS 9/10; either anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>total n</td>
<td>Not want/need</td>
<td>Want/need</td>
<td>total n</td>
<td>Not want/need</td>
<td>Want/need</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>high</td>
<td>high</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>21</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>high</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>10</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>high</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>med</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td>25</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>med</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>15</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>med</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>6</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>med</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>7</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>low</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>82</td>
<td>71</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>total n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>173</td>
<td>139</td>
<td>4</td>
<td>17</td>
<td>13</td>
<td>16</td>
</tr>
</tbody>
</table>
## Appendix 5.5 Mann-Whitney U analyses comparing women who do and do not self-identify the need for emotional or practical support

Table 5.5a Mann-Whitney U analyses comparing women who do and do not self-identify the need for emotional or practical support

<table>
<thead>
<tr>
<th>Conceptual domain</th>
<th>Variable</th>
<th>Self-identified need for emotional support</th>
<th>Self-identified need for practical support</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Md</td>
<td>n</td>
</tr>
<tr>
<td>Adult Attachment Style</td>
<td>RQ model of self</td>
<td>5</td>
<td>159</td>
</tr>
<tr>
<td></td>
<td>RQ model of other</td>
<td>2</td>
<td>159</td>
</tr>
<tr>
<td>Coping style: tendency to use support</td>
<td>Brief COPE emotional</td>
<td>7</td>
<td>163</td>
</tr>
<tr>
<td></td>
<td>Brief COPE instrumental</td>
<td>6</td>
<td>162</td>
</tr>
<tr>
<td>Current (perceived) social support</td>
<td>ANRQ3 (emotionally supportive partner)</td>
<td>1</td>
<td>164</td>
</tr>
<tr>
<td></td>
<td>ANRQ7 (support with baby)</td>
<td>1</td>
<td>167</td>
</tr>
<tr>
<td></td>
<td>MSSS1 (supportive friends)</td>
<td>5</td>
<td>168</td>
</tr>
<tr>
<td></td>
<td>MSSS2 (supportive family)</td>
<td>5</td>
<td>168</td>
</tr>
<tr>
<td>Psychological distress symptoms</td>
<td>EPDS</td>
<td>5</td>
<td>167</td>
</tr>
<tr>
<td></td>
<td>STAI-S</td>
<td>34</td>
<td>163</td>
</tr>
<tr>
<td></td>
<td>GAD-2</td>
<td>1</td>
<td>164</td>
</tr>
<tr>
<td>Psychosocial risk</td>
<td>ANRQ total</td>
<td>18</td>
<td>163</td>
</tr>
</tbody>
</table>

Notes: Md = median; U = Mann-Whitney U test statistic; ES = effect size, calculated using the formula, \( r = z/\sqrt{n} \). Guidelines consider .1 a small effect, .3 a medium effect and .5 a large effect (Cohen, 1988)
Appendix 5.6 Principal Components Analysis of the ANRQ

The ANRQ items were subjected to principal components analysis. The Kaiser-Meyer-Olkin value was .65, exceeding the recommended value of .60 (Kaiser, 1970) and Bartlett’s test of Sphericity was statistically significant (chi-square (78) = 1154.9, p<.001), supporting the factorability of the correlation matrix. Both the scree plot and Eigenvalues indicated the extraction of four components, which explained 69.1% of the total variance. To aid interpretation, oblimin rotation was performed. The four rotated components were: mental health history (ANRQ2a-2d, explaining 28.5% variance), early adversity (ANRQ1 and ANRQ8a-c, explaining 14.6%), recent stresses (ANRQ4a-b, explaining 13.8%), and a component characterised by social support (ANRQ3 and ANRQ7) and personality (ANRQ5 and ANRQ6, explaining 12.2%). As shown in the component correlation matrix, all four factors were weakly positively correlated with each other.
Table 5.6 Correlation matrix for the ANRQ

<table>
<thead>
<tr>
<th></th>
<th>ANRQ 1</th>
<th>ANRQ 2a</th>
<th>ANRQ 2b</th>
<th>ANRQ 2c</th>
<th>ANRQ 2d</th>
<th>ANRQ 3</th>
<th>ANRQ 4a</th>
<th>ANRQ 4b</th>
<th>ANRQ 5</th>
<th>ANRQ 6</th>
<th>ANRQ 7</th>
<th>ANRQ 8a</th>
<th>ANRQ 8bc</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANRQ1 emotionally supportive mother</td>
<td>1.000</td>
<td>.131</td>
<td>.228</td>
<td>.066</td>
<td>.060</td>
<td>.139</td>
<td>-.052</td>
<td>-.044</td>
<td>.241</td>
<td>.035</td>
<td>.354</td>
<td>.405</td>
<td>.318</td>
</tr>
<tr>
<td>ANRQ2a history of altered mood or mental illness</td>
<td>.131</td>
<td>1.000</td>
<td>.901</td>
<td>.622</td>
<td>.498</td>
<td>.010</td>
<td>.199</td>
<td>.235</td>
<td>.307</td>
<td>.076</td>
<td>-.030</td>
<td>.230</td>
<td>.179</td>
</tr>
<tr>
<td>ANRQ2b impact of mood</td>
<td>.228</td>
<td>.901</td>
<td>1.000</td>
<td>.666</td>
<td>.548</td>
<td>.040</td>
<td>.170</td>
<td>.212</td>
<td>.305</td>
<td>.138</td>
<td>.012</td>
<td>.283</td>
<td>.188</td>
</tr>
<tr>
<td>ANRQ2c sought help</td>
<td>.066</td>
<td>.622</td>
<td>.666</td>
<td>1.000</td>
<td>.650</td>
<td>.159</td>
<td>.101</td>
<td>.143</td>
<td>.250</td>
<td>.124</td>
<td>.114</td>
<td>.155</td>
<td>.155</td>
</tr>
<tr>
<td>ANRQ2d took tablets/herbal medicine</td>
<td>.060</td>
<td>.498</td>
<td>.548</td>
<td>.650</td>
<td>1.000</td>
<td>.134</td>
<td>.146</td>
<td>.185</td>
<td>.307</td>
<td>.211</td>
<td>.103</td>
<td>.090</td>
<td>.023</td>
</tr>
<tr>
<td>ANRQ3 emotionally supportive partner</td>
<td>.139</td>
<td>.010</td>
<td>.040</td>
<td>.159</td>
<td>.134</td>
<td>1.000</td>
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<td>ANRQ8a history of emotional abuse</td>
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<td>.121</td>
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<td>.188</td>
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<td>.252</td>
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<td>-.021</td>
<td>.024</td>
<td>.098</td>
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416
Table 5.6b Pattern matrix for the four rotated components of the ANRQ

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<td>ANRQ1 emotionally supportive mother</td>
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<td></td>
</tr>
<tr>
<td>ANRQ2a history of altered mood or mental illness</td>
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<td></td>
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<tr>
<td>ANRQ2b impact of mood</td>
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<td>.830</td>
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<tr>
<td>ANRQ2c sought help</td>
<td>.745</td>
<td>.609</td>
<td></td>
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<tr>
<td>ANRQ3 emotionally supportive partner</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ANRQ4a recent stresses (any)</td>
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<tr>
<td>ANRQ4b impact of stresses</td>
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<tr>
<td>ANRQ5 tendency to worry</td>
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<td></td>
<td></td>
<td>.673</td>
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<tr>
<td>ANRQ6 need for order</td>
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<td></td>
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<td>ANRQ7 support with baby</td>
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<td>ANRQ8a history of emotional abuse</td>
<td></td>
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<td>ANRQ8bc history of physical/sexual abuse</td>
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Table 5.6c Structure matrix for the four rotated components of the ANRQ

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<td>.344</td>
<td></td>
</tr>
<tr>
<td>ANRQ2a history of altered mood or mental illness</td>
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<tr>
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<td>.835</td>
<td>.765</td>
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<td></td>
<td>.626</td>
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<tr>
<td>ANRQ3 emotionally supportive partner</td>
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<td></td>
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</tr>
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<td>ANRQ4a recent stresses (any)</td>
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</tr>
<tr>
<td>ANRQ4b impact of stresses</td>
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<td></td>
<td>.978</td>
<td></td>
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<tr>
<td>ANRQ5 tendency to worry</td>
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<td>.396</td>
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<tr>
<td>ANRQ6 need for order</td>
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<td>.683</td>
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</tr>
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<td>ANRQ7 support with baby</td>
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<td>.700</td>
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<td>ANRQ8a history of emotional abuse</td>
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<td>ANRQ8bc history of physical/sexual abuse</td>
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Table 5.6d Component correlation matrix of the ANRQ

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<th>4</th>
</tr>
</thead>
<tbody>
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<td>.166</td>
<td>.170</td>
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<tr>
<td>2</td>
<td>.096</td>
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<td>.060</td>
<td>.139</td>
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<td>3</td>
<td>.166</td>
<td>.060</td>
<td>1.000</td>
<td>.074</td>
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<tr>
<td>4</td>
<td>.170</td>
<td>.139</td>
<td>.074</td>
<td>1.000</td>
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### Appendix 5.7 Univariate analyses of correlates of distress symptoms

#### Table 5.7a Bivariate correlations between distress and other characteristics (in ordinal or continuous format)

<table>
<thead>
<tr>
<th>Variable (predictor)</th>
<th>EPDS</th>
<th>STAI-S</th>
<th>GAD-2</th>
<th>EPDS-3A</th>
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<tbody>
<tr>
<td></td>
<td>ES</td>
<td>p</td>
<td>n</td>
<td>ES</td>
</tr>
<tr>
<td>Maternal age in years</td>
<td>-.107</td>
<td>.142</td>
<td>189</td>
<td>.029</td>
</tr>
<tr>
<td>IMD (social deprivation)</td>
<td>.200**</td>
<td>.006</td>
<td>189</td>
<td>.073</td>
</tr>
<tr>
<td>BMI at booking in kg/m² (indicator of obesity)</td>
<td>.018</td>
<td>.803</td>
<td>187</td>
<td>.051</td>
</tr>
<tr>
<td>Gestation at booking in weeks</td>
<td>.020</td>
<td>.783</td>
<td>189</td>
<td>-.131</td>
</tr>
<tr>
<td>Weeks since pregnancy found out</td>
<td>-.019</td>
<td>.802</td>
<td>184</td>
<td>-.134</td>
</tr>
<tr>
<td>Pregnancy experience</td>
<td>-.445***</td>
<td>&lt;.001</td>
<td>184</td>
<td>-.499***</td>
</tr>
<tr>
<td>MSSS total (social support)</td>
<td>-.412***</td>
<td>&lt;.001</td>
<td>179</td>
<td>-.272***</td>
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<td>ANRQ (total score)</td>
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<td>&lt;.001</td>
<td>184</td>
<td>.369***</td>
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<tr>
<td>ANRQ1 (emotionally supportive mother)</td>
<td>.181*</td>
<td>.013</td>
<td>187</td>
<td>.144</td>
</tr>
<tr>
<td>ANRQ2b (impact of mood on functioning)</td>
<td>.253***</td>
<td>.001</td>
<td>184</td>
<td>.205**</td>
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<tr>
<td>ANRQ3 (emotionally supportive partner)</td>
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<td>&lt;.001</td>
<td>185</td>
<td>.271***</td>
</tr>
<tr>
<td>ANRQ4b (impact of recent stresses)</td>
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<td>184</td>
<td>.222**</td>
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<tr>
<td>ANRQ5 (tendency to worry)</td>
<td>.542***</td>
<td>&lt;.001</td>
<td>187</td>
<td>.443***</td>
</tr>
<tr>
<td>ANRQ6 (need for order)</td>
<td>.406***</td>
<td>&lt;.001</td>
<td>188</td>
<td>.297***</td>
</tr>
<tr>
<td>ANRQ7 (support with baby)</td>
<td>.482***</td>
<td>&lt;.001</td>
<td>188</td>
<td>.308***</td>
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<tr>
<td>ANRQ4b (impact of perinatal loss stresses)</td>
<td>.157*</td>
<td>.034</td>
<td>182</td>
<td>.144</td>
</tr>
<tr>
<td>ANRQ4b (impact of pregnancy-specific stresses)</td>
<td>.164*</td>
<td>.027</td>
<td>182</td>
<td>.162*</td>
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<tr>
<td>ANRQ4b (impact of stresses excl. perinatal loss)</td>
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<td>.052</td>
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<td>.120</td>
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<tr>
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<td>.073</td>
<td>181</td>
<td>.099</td>
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Notes: p<.001***, p<.01**, p<.05*; shading indicates statistically significant effect sizes (ES) less than -.2 or greater than .2.
Table 5.7b Independent samples t-tests results comparing mean distress (EPDS symptoms) across ANRQ risk factors

<table>
<thead>
<tr>
<th>Variable (predictor)</th>
<th>low risk</th>
<th>high risk</th>
<th>t</th>
<th>p</th>
<th>df</th>
<th>ES</th>
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<tbody>
<tr>
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<td>64</td>
<td>9.4</td>
<td>-5.442</td>
<td>&lt;.001</td>
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<tr>
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<td>6.2</td>
<td>21</td>
<td>9.0</td>
<td>-1.769</td>
<td>.091</td>
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<tr>
<td>ANRQ2a (history of altered mood or mental illness)</td>
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<td>5.5</td>
<td>83</td>
<td>7.8</td>
<td>-3.092</td>
<td>.002</td>
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<td>6.0</td>
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<td>-2.452</td>
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<td>-2.626</td>
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<td>6.3</td>
<td>21</td>
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<td>.073</td>
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<tr>
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<td>28</td>
<td>8.2</td>
<td>-2.071</td>
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<td>18.6</td>
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</table>

Notes: p<.001***, p<.01**, p<.05*; shading indicates statistically significant effect sizes (ES) less than -0.2 or greater than 0.2; df = degrees of freedom (non-integer dfs arise where the variance for the two groups is unequal, requiring adjusted scores to be used in recognition that a significant result is harder to obtain in situations of unequal variance)
<table>
<thead>
<tr>
<th>Variable (predictor)</th>
<th>low risk</th>
<th>high risk</th>
<th>t</th>
<th>p</th>
<th>df</th>
<th>ES</th>
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<td>-1.010</td>
<td>.323</td>
<td>23.2</td>
<td>.205</td>
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<td>ANRQ2a (history of altered mood or mental illness)</td>
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<td>.202*</td>
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<td>177</td>
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<td>57.8</td>
<td>.276*</td>
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<tr>
<td>ANRQ2d (took tablets/herbal medicine)</td>
<td>147 34.3</td>
<td>30 41.3</td>
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<td>36.1</td>
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<td>.177*</td>
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<td>.166*</td>
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<td>.235**</td>
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<td>.132</td>
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<td>-1.524</td>
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<td>.312</td>
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<td>24 39.6</td>
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<td>26.9</td>
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<td>34 38.7</td>
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<td>ANRQ8bc (history of physical/sexual abuse)</td>
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Notes: p<.001***, p<.01**, p<.05*; shading indicates statistically significant effect sizes (ES) less than -.2 or greater than .2; df = degrees of freedom
Table 5.7d Independent samples t-tests results comparing mean distress (GAD-2 symptoms) across ANRQ risk factors

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Notes: p<.001***, p<.01**, p<.05*; shading indicates statistically significant effect sizes (ES) less than -.2 or greater than .2; df = degrees of freedom
Table 5.7e Independent samples t-tests results comparing mean distress (EPDS-3A symptoms) across ANRQ risk factors

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<td>ANRQ2a (history of altered mood or mental illness)</td>
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Notes: p<.001***, p<.01**, p<.05*; shading indicates statistically significant effect sizes (ES) less than -.2 or greater than .2; df = degrees of freedom
Table 5.7t Independent samples t-tests results comparing mean distress (EPDS symptoms) across characteristics

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Notes: p<.001***, p<.01**, p<.05*; shading indicates statistically significant effect sizes (ES) less than -.2 or greater than .2; df = degrees of freedom
Table 5.7g Independent samples t-tests results comparing mean distress (STAI-S symptoms) across characteristics

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Notes: p<.001***, p<.01**, p<.05*; shading indicates statistically significant effect sizes (ES) less than -.2 or greater than .2; df = degrees of freedom
Table 5.7h Independent samples t-tests results comparing mean distress (GAD-2 symptoms) across characteristics

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Notes: p<.001***, p<.01**, p<.05*; shading indicates statistically significant effect sizes (ES) less than -.2 or greater than .2; df = degrees of freedom
Table 5.7i Independent samples t-tests results comparing mean distress (EPDS-3A symptoms) across characteristics

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</table>

Notes: p<.001***, p<.01**, p<.05*; shading indicates statistically significant effect sizes (ES) less than -.2 or greater than .2; df = degrees of freedom
Appendix 5.8 Investigating the relationship between stress and support

Two-way between-groups analyses of variance (ANOVAs) were conducted to explore the relationship between stress (as measured by the ANRQ) and support (measured by ANRQ items and the MSSS) and symptoms of distress. Results (shown in the tables below) were comparable by stress type (any, pregnancy-specific, or non pregnancy-specific), support measure (emotionally supportive partner, support with baby, or overall support) and symptom type (EPDS, STAI-S and GAD-2). Statistically significant main effects were found for social support such that women reported significantly higher levels of distress where perceived social support was lower, providing evidence supporting the direct effects hypothesis of social support. No evidence was found to support the buffering hypothesis of social support with no statistically significant interactions found to suggest that the relationship between stress and distress was different in different conditions of social support (i.e. that social support buffers against the effects of stress). Although two statistically significant interactions were found, these indicated that distress was higher in low stress conditions where social support was low. This was due to high GAD-2 scores in women with low stress and highlighted that the analyses were limited by small sample sizes in each group due to few women being classified as low support and this being further separated by stress level. There was no evidence of a statistically significant relationship between stress and distress, despite this being demonstrated through the univariate analyses, which likely reflected the sample sizes in each group.
Table 5.8a Two-way between-groups ANOVAs for stress and support (where stress is defined as any stress reported on ANRQ4)

<table>
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<th>Distress</th>
<th>Support</th>
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<th>low stress-high support</th>
<th>high stress-low support</th>
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<th>support main effect</th>
<th>stress-support interaction</th>
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<td>s.d.</td>
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Notes: ANRQ3 concerns emotionally supportive partner; ANRQ7 concerns support with baby; shading shows statistically significant interaction (p<.05)
Table 5.8b Two-way between-groups ANOVAs for stress and support (where stress is defined as any non pregnancy-specific stress reported on ANRQ4)

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<th>high stress-low support</th>
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<th>stress main effect</th>
<th>support main effect</th>
<th>stress-support interaction</th>
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<td>s.d.</td>
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<td>6.00</td>
<td>2.45</td>
<td>4</td>
<td>2.72</td>
<td>2.08</td>
<td>132</td>
<td>4.50</td>
</tr>
<tr>
<td>EPD</td>
<td>S-3A</td>
<td>4.60</td>
<td>2.23</td>
<td>15</td>
<td>2.53</td>
<td>2.03</td>
<td>115</td>
<td>4.20</td>
</tr>
</tbody>
</table>

Notes: ANRQ3 concerns emotionally supportive partner; ANRQ7 concerns support with baby; shading shows statistically significant interaction (p<.05)
Table 5.8c Two-way between-groups ANOVAs for stress and support (where stress is defined as any pregnancy-specific stress reported on ANRQ4)

<table>
<thead>
<tr>
<th>Distress</th>
<th>Support</th>
<th>low stress-low support</th>
<th>low stress-high support</th>
<th>high stress-low support</th>
<th>high stress-high support</th>
<th>stress main effect</th>
<th>support main effect</th>
<th>stress-support interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>mean</td>
<td>s.d.</td>
<td>n</td>
<td>mean</td>
<td>s.d.</td>
<td>n</td>
<td>mean</td>
</tr>
<tr>
<td>EPD S</td>
<td>ANRQ3</td>
<td>11.67</td>
<td>6.22</td>
<td>9</td>
<td>5.77</td>
<td>4.79</td>
<td>144</td>
<td>14.00</td>
</tr>
<tr>
<td>EPD S</td>
<td>ANRQ7</td>
<td>18.60</td>
<td>3.05</td>
<td>5</td>
<td>5.69</td>
<td>4.54</td>
<td>149</td>
<td>14.00</td>
</tr>
<tr>
<td>EPD S</td>
<td>MSSS</td>
<td>11.00</td>
<td>5.70</td>
<td>21</td>
<td>5.17</td>
<td>4.39</td>
<td>124</td>
<td>10.75</td>
</tr>
<tr>
<td>STAI-S</td>
<td>ANRQ3</td>
<td>41.11</td>
<td>12.35</td>
<td>9</td>
<td>34.32</td>
<td>10.07</td>
<td>138</td>
<td>45.00</td>
</tr>
<tr>
<td>STAI-S</td>
<td>ANRQ7</td>
<td>50.11</td>
<td>9.52</td>
<td>5</td>
<td>34.25</td>
<td>9.93</td>
<td>143</td>
<td>45.00</td>
</tr>
<tr>
<td>STAI-S</td>
<td>MSSS</td>
<td>41.27</td>
<td>10.91</td>
<td>21</td>
<td>33.40</td>
<td>9.77</td>
<td>120</td>
<td>37.50</td>
</tr>
<tr>
<td>GAD-2</td>
<td>ANRQ3</td>
<td>2.56</td>
<td>2.01</td>
<td>9</td>
<td>1.31</td>
<td>1.39</td>
<td>140</td>
<td>2.00</td>
</tr>
<tr>
<td>GAD-2</td>
<td>ANRQ7</td>
<td>4.00</td>
<td>1.41</td>
<td>5</td>
<td>1.29</td>
<td>1.37</td>
<td>145</td>
<td>2.00</td>
</tr>
<tr>
<td>GAD-2</td>
<td>MSSS</td>
<td>2.29</td>
<td>2.00</td>
<td>21</td>
<td>1.22</td>
<td>1.30</td>
<td>120</td>
<td>1.00</td>
</tr>
<tr>
<td>EPD S-3A</td>
<td>ANRQ3</td>
<td>4.67</td>
<td>2.18</td>
<td>9</td>
<td>2.73</td>
<td>2.13</td>
<td>143</td>
<td>3.00</td>
</tr>
<tr>
<td>EPD S-3A</td>
<td>ANRQ7</td>
<td>6.00</td>
<td>1.87</td>
<td>5</td>
<td>2.74</td>
<td>2.10</td>
<td>148</td>
<td>3.00</td>
</tr>
<tr>
<td>EPD S-3A</td>
<td>MSSS</td>
<td>4.57</td>
<td>2.13</td>
<td>21</td>
<td>2.50</td>
<td>2.04</td>
<td>123</td>
<td>3.75</td>
</tr>
</tbody>
</table>

Notes: ANRQ3 concerns emotionally supportive partner; ANRQ7 concerns support with baby; shading shows statistically significant interaction (p<.05)
Appendix 5.9 Checking assumptions for the final model used in the multiple regression analyses

Preliminary analyses were conducted to ensure that multiple regression was an appropriate statistical technique for the data. Univariate analyses had confirmed evidence of some relationship between the predictors and criterion (i.e. distress). Consulting the correlations between variables confirmed that while there was some relationship, there was not the problem of multicollinearity, i.e. the items were not too highly correlated with each other.

Due to the distress data being heavily skewed, there was some violation of the assumption of normality (particularly for EPDS, GAD-2 and EPDS-3A), shown by standardised residuals (not adhering to the diagonal in the Normal Probability Plots and not providing centralised rectangles in the scatterplots, with examples available below). However, Cook scores indicated that the outliers were <1, indicating that the extremely high distress scores did not have undue influence on the overall model (Tabachnick & Fidell, 2001).

Multivariate outliers for the predictors were explored formally by identifying whether the Mahalanobis distance for each case exceeded the critical value of 26.13 (determined by the number of predictors investigated (k=8) and chosen alpha level (p<.001, based on recommended guidelines, Pallant (2007), p.157). It should be noted that multivariate outliers are the same regardless of the distress measure because these outliers concerns the predictors, not the criterion. For the main multiple regression model, four multivariate outliers were found. Re-running the analyses and excluding these outliers did not prevent further outliers, with a further three identified in the reduced set of cases. Similarly, the secondary analyses found two outliers in the primiparas dataset and three outliers in the dataset based on the exclusion of mental health history; highlighting that outliers are likely in datasets of these sizes. The models did not change substantially when re-run without the outliers; however the statistical significance of some predictors and blocks did change; highlighting the need for caution in generalising findings about the significance and magnitude of predictors beyond the sample.
Appendix 5.10 Logistic regression models for distress symptoms

Logistic regression models were run as a secondary analysis to the primary multiple regression models. An overall summary of the logistic regression models is provided in Table 5.10a, followed by details of the models at the block level (Table 5.10b). Finally, details of the seven models are provided at the predictor level (Table 5.10c-5.10i), showing the ability of each variable to predict high distress scores.

Table 5.10a Summary of the overall logistic regression models

<table>
<thead>
<tr>
<th></th>
<th>EPDS 9/10</th>
<th>EPDS 12/13</th>
<th>STAI-S 40/41</th>
<th>STAI-S 44/45</th>
<th>GAD-2 1/2</th>
<th>GAD-2 2/3</th>
<th>EPDS-3A 5/6</th>
</tr>
</thead>
<tbody>
<tr>
<td>N in analyses</td>
<td>171</td>
<td>171</td>
<td>166</td>
<td>166</td>
<td>168</td>
<td>168</td>
<td>170</td>
</tr>
<tr>
<td>N with event</td>
<td>47</td>
<td>21</td>
<td>50</td>
<td>37</td>
<td>76</td>
<td>32</td>
<td>24</td>
</tr>
<tr>
<td>N without event</td>
<td>124</td>
<td>150</td>
<td>116</td>
<td>129</td>
<td>92</td>
<td>136</td>
<td>146</td>
</tr>
<tr>
<td>Model $\chi^2$</td>
<td>53.22</td>
<td>37.75</td>
<td>62.32</td>
<td>53.67</td>
<td>43.98</td>
<td>44.66</td>
<td>29.22</td>
</tr>
<tr>
<td>Model df</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Model p value</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Cox &amp; Snell $R^2$</td>
<td>26.7</td>
<td>19.8</td>
<td>31.3</td>
<td>27.6</td>
<td>23.0</td>
<td>23.3</td>
<td>15.8</td>
</tr>
<tr>
<td>Nagelkerke $R^2$</td>
<td>38.7</td>
<td>37.7</td>
<td>44.3</td>
<td>42.2</td>
<td>30.8</td>
<td>27.5</td>
<td>28.4</td>
</tr>
<tr>
<td>% cases agreement</td>
<td>79.5</td>
<td>90.6</td>
<td>78.3</td>
<td>83.7</td>
<td>72.0</td>
<td>83.9</td>
<td>85.3</td>
</tr>
<tr>
<td>specificity</td>
<td>92.7</td>
<td>98.0</td>
<td>90.5</td>
<td>93.8</td>
<td>78.3</td>
<td>95.6</td>
<td>97.3</td>
</tr>
<tr>
<td>sensitivity</td>
<td>44.7</td>
<td>38.1</td>
<td>50.0</td>
<td>48.6</td>
<td>64.5</td>
<td>34.4</td>
<td>12.5</td>
</tr>
<tr>
<td>PPV</td>
<td>70.0</td>
<td>72.7</td>
<td>69.4</td>
<td>69.2</td>
<td>71.0</td>
<td>64.7</td>
<td>42.9</td>
</tr>
<tr>
<td>NPV</td>
<td>81.6</td>
<td>91.9</td>
<td>80.8</td>
<td>86.4</td>
<td>72.7</td>
<td>86.1</td>
<td>87.1</td>
</tr>
</tbody>
</table>
Table 5.10b Details of the blocks of the logistic regression models

<table>
<thead>
<tr>
<th>block</th>
<th>EPDS 9/10 (n=171)</th>
<th>EPDS 12/13 (n=171)</th>
<th>STAI-S 40/41 (n=166)</th>
<th>STAI-S 44/45 (n=166)</th>
<th>GAD-2 1/2 (n=168)</th>
<th>GAD-2 2/3 (n=168)</th>
<th>EPDS-3A 5/6 (n=170)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>df</td>
<td>Chi-square</td>
<td>p</td>
<td>Chi-square</td>
<td>p</td>
<td>Chi-square</td>
<td>p</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>4.67</td>
<td>0.031</td>
<td>4.06</td>
<td>0.044</td>
<td>12.11</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>7.22</td>
<td>0.027</td>
<td>4.53</td>
<td>0.104</td>
<td>0.78</td>
<td>0.677</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>17.91</td>
<td>&lt;.001</td>
<td>10.7</td>
<td>0.005</td>
<td>28.73</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>8.78</td>
<td>0.012</td>
<td>14.36</td>
<td>0.001</td>
<td>11.11</td>
<td>0.004</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>14.66</td>
<td>&lt;.001</td>
<td>4.09</td>
<td>0.043</td>
<td>9.57</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Notes: block 1 = history of mental health / altered mood; 2 = non pregnancy-specific stress; 3 = pregnancy-related factors; 4 = social support; 5 = personality; shading shows statistically significant results.
Table 5.10c Full details of the predictors of the logistic regression model for high EPDS scores (threshold 9/10) (n=171)

<table>
<thead>
<tr>
<th>EPDS 9/10</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Odds Ratio</th>
<th>95% C.I. for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>ANRQ2a (history of mood) (1)</td>
<td>-.01</td>
<td>.45</td>
<td>.00</td>
<td>1</td>
<td>.982</td>
<td>.99</td>
<td>.41</td>
</tr>
<tr>
<td><strong>ANRQ4b non pregnancy stress</strong></td>
<td>1.32</td>
<td>.54</td>
<td>5.99</td>
<td>1</td>
<td>.014</td>
<td><strong>3.73</strong>*</td>
<td>1.30</td>
</tr>
<tr>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10.70</td>
</tr>
<tr>
<td>IMD (social deprivation)</td>
<td>.02</td>
<td>.01</td>
<td>3.40</td>
<td>1</td>
<td>.065</td>
<td>1.02</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>ANRQ4b pregnancy stress (1)</strong></td>
<td>1.31</td>
<td>.57</td>
<td>5.30</td>
<td>1</td>
<td>.021</td>
<td>3.70*</td>
<td>1.21</td>
</tr>
<tr>
<td>pregnancy experience</td>
<td>-.37</td>
<td>.20</td>
<td>3.63</td>
<td>1</td>
<td>.057</td>
<td>.69</td>
<td>.47</td>
</tr>
<tr>
<td><strong>ANRQ7 (support with baby)</strong></td>
<td>.51</td>
<td>.29</td>
<td>3.19</td>
<td>1</td>
<td>.074</td>
<td>1.67</td>
<td>.95</td>
</tr>
<tr>
<td><strong>ANRQ5 (tendency to worry)</strong></td>
<td>.75</td>
<td>.21</td>
<td>12.79</td>
<td>1</td>
<td>&lt;.001</td>
<td><strong>2.11</strong>*</td>
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</tr>
<tr>
<td>Constant</td>
<td>-3.62</td>
<td>1.23</td>
<td>8.61</td>
<td>1</td>
<td>.003</td>
<td>.03</td>
<td></td>
</tr>
</tbody>
</table>

Notes: (1) denotes categorical variable; B denotes unstandardised coefficients for generating equation to calculate overall probability of a woman scoring above threshold whereas odds ratio is standardised; CI refers to odds ratio; p<.05*, p<.01**, p<.001***; shading shows statistically significant results.
Table 5.10d Full details of the predictors of the logistic regression model for high EPDS scores (threshold 12/13) (n=171)

<table>
<thead>
<tr>
<th>EPDS 12/13</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Odds Ratio</th>
<th>95% C.I. for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANRQ2a (history of mood) (1)</td>
<td>.89</td>
<td>.65</td>
<td>1.89</td>
<td>1</td>
<td>.169</td>
<td>2.45</td>
<td>.68 - 8.76</td>
</tr>
<tr>
<td>ANRQ4b non pregnancy stress (1)</td>
<td>.28</td>
<td>.70</td>
<td>.16</td>
<td>1</td>
<td>.692</td>
<td>1.32</td>
<td>.33 - 5.25</td>
</tr>
<tr>
<td>IMD (social deprivation)</td>
<td>.02</td>
<td>.02</td>
<td>1.72</td>
<td>1</td>
<td>.190</td>
<td>1.02</td>
<td>.99 - 1.05</td>
</tr>
<tr>
<td>ANRQ4b pregnancy stress (1)</td>
<td>.12</td>
<td>.82</td>
<td>.02</td>
<td>1</td>
<td>.882</td>
<td>1.13</td>
<td>.23 - 5.61</td>
</tr>
<tr>
<td>pregnancy experience</td>
<td>-33</td>
<td>.25</td>
<td>1.78</td>
<td>1</td>
<td>.183</td>
<td>.72</td>
<td>.44 - 1.17</td>
</tr>
<tr>
<td>ANRQ3 (supportive partner)</td>
<td>.25</td>
<td>.24</td>
<td>1.10</td>
<td>1</td>
<td>.294</td>
<td>1.28</td>
<td>.81 - 2.04</td>
</tr>
<tr>
<td>ANRQ7 (support with baby)</td>
<td>.77</td>
<td>.32</td>
<td>5.85</td>
<td>1</td>
<td>.016</td>
<td>2.16*</td>
<td>1.16 - 4.02</td>
</tr>
<tr>
<td>ANRQ5 (tendency to worry)</td>
<td>.51</td>
<td>.26</td>
<td>3.91</td>
<td>1</td>
<td>.048</td>
<td>1.67*</td>
<td>1.00 - 2.77</td>
</tr>
<tr>
<td>Constant</td>
<td>-5.25</td>
<td>1.67</td>
<td>9.86</td>
<td>1</td>
<td>.002</td>
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<td>.01</td>
</tr>
</tbody>
</table>

Notes: (1) denotes categorical variable; B denotes unstandardised coefficients for generating equation to calculate overall probability of a woman scoring above threshold whereas odds ratio is standardised; CI refers to odds ratio; p<.05*, p<.01**, p<.001***; shading shows statistically significant results
Table 5.10e Full details of the predictors of the logistic regression model for high STAI-S scores (threshold 40/41) (n=166)

<table>
<thead>
<tr>
<th>STAI-S 40/41</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Odds Ratio</th>
<th>95% C.I. for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>ANRQ2a (history of mood) (1)</td>
<td>.71</td>
<td>.46</td>
<td>2.38</td>
<td>1</td>
<td>.123</td>
<td>2.04</td>
<td>.82</td>
</tr>
<tr>
<td>ANRQ4b non pregnancy stress (1)</td>
<td>.48</td>
<td>.55</td>
<td>.74</td>
<td>1</td>
<td>.388</td>
<td>1.61</td>
<td>.55</td>
</tr>
<tr>
<td>IMD (social deprivation)</td>
<td>.01</td>
<td>.01</td>
<td>.20</td>
<td>1</td>
<td>.657</td>
<td>1.01</td>
<td>.98</td>
</tr>
<tr>
<td>ANRQ4b pregnancy stress (1)</td>
<td>1.18</td>
<td>.58</td>
<td>4.18</td>
<td>1</td>
<td>.041</td>
<td>3.24*</td>
<td>1.05</td>
</tr>
<tr>
<td>pregnancy experience</td>
<td>-.66</td>
<td>.20</td>
<td>10.60</td>
<td>1</td>
<td>.001</td>
<td>.52**</td>
<td>.35</td>
</tr>
<tr>
<td>ANRQ3 (supportive partner)</td>
<td>.46</td>
<td>.20</td>
<td>5.12</td>
<td>1</td>
<td>.024</td>
<td>1.58</td>
<td>1.06</td>
</tr>
<tr>
<td>ANRQ7 (support with baby)</td>
<td>.12</td>
<td>.30</td>
<td>.16</td>
<td>1</td>
<td>.688</td>
<td>1.13</td>
<td>.63</td>
</tr>
<tr>
<td>ANRQ5 (tendency to worry)</td>
<td>.61</td>
<td>.21</td>
<td>8.74</td>
<td>1</td>
<td>.003</td>
<td>1.84**</td>
<td>1.23</td>
</tr>
<tr>
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<td>1.17</td>
<td>2.54</td>
<td>1</td>
<td>.111</td>
<td>.15</td>
<td></td>
</tr>
</tbody>
</table>

Notes: (1) denotes categorical variable; B denotes unstandardised coefficients for generating equation to calculate overall probability of a woman scoring above threshold whereas odds ratio is standardised; CI refers to odds ratio; p<.05*, p<.01**, p<.001***; shading shows statistically significant results
Table 5.10f Full details of the predictors of the logistic regression model for high STAI-S scores (threshold 44/45) (n=166)

<table>
<thead>
<tr>
<th>STAI-S 44/45</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Odds Ratio</th>
<th>95% C.I. for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANRQ2a (history of mood) (1)</td>
<td>.50</td>
<td>.51</td>
<td>.93</td>
<td>1</td>
<td>.334</td>
<td>1.64</td>
<td>.60</td>
</tr>
<tr>
<td>ANRQ4b non pregnancy stress (1)</td>
<td>.45</td>
<td>.61</td>
<td>.55</td>
<td>1</td>
<td>.459</td>
<td>1.57</td>
<td>.48</td>
</tr>
<tr>
<td>IMD (social deprivation)</td>
<td>.00</td>
<td>.01</td>
<td>.00</td>
<td>1</td>
<td>.957</td>
<td>1.00</td>
<td>.97</td>
</tr>
<tr>
<td>ANRQ4b pregnancy stress (1)</td>
<td>1.38</td>
<td>.59</td>
<td>5.47</td>
<td>1</td>
<td>.019</td>
<td>3.99*</td>
<td>1.25</td>
</tr>
<tr>
<td>pregnancy experience</td>
<td>-.60</td>
<td>.21</td>
<td>8.19</td>
<td>1</td>
<td>.004</td>
<td>.55**</td>
<td>.36</td>
</tr>
<tr>
<td>ANRQ3 (supportive partner)</td>
<td>.31</td>
<td>.22</td>
<td>2.01</td>
<td>1</td>
<td>.157</td>
<td>1.36</td>
<td>.89</td>
</tr>
<tr>
<td>ANRQ7 (support with baby)</td>
<td>.63</td>
<td>.31</td>
<td>4.27</td>
<td>1</td>
<td>.039</td>
<td>1.88*</td>
<td>1.03</td>
</tr>
<tr>
<td>ANRQ5 (tendency to worry)</td>
<td>.51</td>
<td>.22</td>
<td>5.53</td>
<td>1</td>
<td>.019</td>
<td>1.67*</td>
<td>1.09</td>
</tr>
<tr>
<td>Constant</td>
<td>-2.62</td>
<td>1.26</td>
<td>4.32</td>
<td>1</td>
<td>.038</td>
<td>.07</td>
<td></td>
</tr>
</tbody>
</table>

Notes: (1) denotes categorical variable; B denotes unstandardised coefficients for generating equation to calculate overall probability of a woman scoring above threshold whereas odds ratio is standardised; CI refers to odds ratio; p<.05*, p<.01**, p<.001***; shading shows statistically significant results
Table 5.10g Full details of the predictors of the logistic regression model for high GAD-2 scores (threshold 1/2) (n=168)

<table>
<thead>
<tr>
<th>GAD-2 1/2</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Odds Ratio</th>
<th>95% C.I. for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>ANRQ2a (history of mood) (1)</td>
<td>-0.17</td>
<td>0.40</td>
<td>0.18</td>
<td>1</td>
<td>0.670</td>
<td>0.84</td>
<td>0.39</td>
</tr>
<tr>
<td>ANRQ4b non pregnancy stress (1)</td>
<td>0.91</td>
<td>0.48</td>
<td>3.54</td>
<td>1</td>
<td>0.060</td>
<td>2.49</td>
<td>0.96</td>
</tr>
<tr>
<td>IMD (social deprivation)</td>
<td>0.01</td>
<td>0.01</td>
<td>0.89</td>
<td>1</td>
<td>0.345</td>
<td>1.01</td>
<td>0.99</td>
</tr>
<tr>
<td>ANRQ4b pregnancy stress (1)</td>
<td>1.65</td>
<td>0.56</td>
<td>8.57</td>
<td>1</td>
<td>0.003</td>
<td>5.20**</td>
<td>1.72</td>
</tr>
<tr>
<td>pregnancy experience</td>
<td>-0.21</td>
<td>0.17</td>
<td>1.40</td>
<td>1</td>
<td>0.236</td>
<td>0.81</td>
<td>0.58</td>
</tr>
<tr>
<td>ANRQ3 (supportive partner)</td>
<td>0.00</td>
<td>0.19</td>
<td>0.00</td>
<td>1</td>
<td>0.996</td>
<td>1.00</td>
<td>0.69</td>
</tr>
<tr>
<td>ANRQ7 (support with baby)</td>
<td>0.13</td>
<td>0.26</td>
<td>0.25</td>
<td>1</td>
<td>0.617</td>
<td>1.14</td>
<td>0.68</td>
</tr>
<tr>
<td>ANRQ5 (tendency to worry)</td>
<td>0.73</td>
<td>0.18</td>
<td>15.63</td>
<td>1</td>
<td>&lt;0.001</td>
<td>2.07***</td>
<td>1.44</td>
</tr>
<tr>
<td>Constant</td>
<td>-2.18</td>
<td>1.07</td>
<td>4.19</td>
<td>1</td>
<td>0.041</td>
<td>1.11</td>
<td></td>
</tr>
</tbody>
</table>

Notes: (1) denotes categorical variable; B denotes unstandardised coefficients for generating equation to calculate overall probability of a woman scoring above threshold whereas odds ratio is standardised; CI refers to odds ratio; p<.05*, p<.01**, p<.001***; shading shows statistically significant results
Table 5.10h Full details of the predictors of the logistic regression model for high GAD-2 scores (threshold 2/3) (n=168)

<table>
<thead>
<tr>
<th>GAD-2 2/3</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Odds Ratio</th>
<th>95% C.I. for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>ANRQ2a (history of mood) (1)</td>
<td>1.17</td>
<td>.54</td>
<td>4.69</td>
<td>1</td>
<td>.030</td>
<td>3.22*</td>
<td>1.12 9.29</td>
</tr>
<tr>
<td>ANRQ4b non pregnancy stress (1)</td>
<td>.55</td>
<td>.58</td>
<td>.89</td>
<td>1</td>
<td>.347</td>
<td>1.73</td>
<td>.55 5.41</td>
</tr>
<tr>
<td>IMD (social deprivation)</td>
<td>- .01</td>
<td>.01</td>
<td>.38</td>
<td>1</td>
<td>.539</td>
<td>.99</td>
<td>.96 1.02</td>
</tr>
<tr>
<td>ANRQ4b pregnancy stress (1)</td>
<td>2.00</td>
<td>.59</td>
<td>11.42</td>
<td>1</td>
<td>.001</td>
<td>7.39**</td>
<td>2.32 23.58</td>
</tr>
<tr>
<td>pregnancy experience</td>
<td>-1.19</td>
<td>.21</td>
<td>.89</td>
<td>1</td>
<td>.346</td>
<td>.82</td>
<td>.55 1.23</td>
</tr>
<tr>
<td>ANRQ3 (supportive partner)</td>
<td>.29</td>
<td>.21</td>
<td>1.87</td>
<td>1</td>
<td>.171</td>
<td>1.34</td>
<td>.88 2.02</td>
</tr>
<tr>
<td>ANRQ7 (support with baby)</td>
<td>.25</td>
<td>.30</td>
<td>.71</td>
<td>1</td>
<td>.400</td>
<td>1.29</td>
<td>.71 2.32</td>
</tr>
<tr>
<td>ANRQ5 (tendency to worry)</td>
<td>.57</td>
<td>.22</td>
<td>6.41</td>
<td>1</td>
<td>.011</td>
<td>1.76*</td>
<td>1.14 2.74</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.34</td>
<td>1.39</td>
<td>9.73</td>
<td>1</td>
<td>.002</td>
<td>.01</td>
<td></td>
</tr>
</tbody>
</table>

Notes: (1) denotes categorical variable; B denotes unstandardised coefficients for generating equation to calculate overall probability of a woman scoring above threshold whereas odds ratio is standardised; CI refers to odds ratio; p<.05*, p<.01**, p<.001***; shading shows statistically significant results
Table 5.10i Full details of the predictors of the logistic regression model for high EPDS-3A scores (threshold 5/6) (n=170)

<table>
<thead>
<tr>
<th>EPDS-3A 5/6</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Odds Ratio</th>
<th>95% C.I. for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>ANRQ2a (history of mood) (1)</td>
<td>.08</td>
<td>.56</td>
<td>.02</td>
<td>1</td>
<td>.884</td>
<td>1.08</td>
<td>.36</td>
</tr>
<tr>
<td>ANRQ4b non pregnancy stress (1)</td>
<td>.27</td>
<td>.65</td>
<td>.17</td>
<td>1</td>
<td>.678</td>
<td>1.31</td>
<td>.37</td>
</tr>
<tr>
<td>IMD (social deprivation)</td>
<td>.02</td>
<td>.01</td>
<td>3.31</td>
<td>1</td>
<td>.069</td>
<td>1.02</td>
<td>1.00</td>
</tr>
<tr>
<td>ANRQ4b pregnancy stress (1)</td>
<td>-.18</td>
<td>.75</td>
<td>.06</td>
<td>1</td>
<td>.809</td>
<td>.83</td>
<td>.19</td>
</tr>
<tr>
<td>pregnancy experience</td>
<td>-.47</td>
<td>.22</td>
<td>4.49</td>
<td>1</td>
<td>.034</td>
<td>.63*</td>
<td>.41</td>
</tr>
<tr>
<td>ANRQ3 (supportive partner)</td>
<td>.22</td>
<td>.21</td>
<td>1.12</td>
<td>1</td>
<td>.290</td>
<td>1.25</td>
<td>.83</td>
</tr>
<tr>
<td>ANRQ7 (support with baby)</td>
<td>-.22</td>
<td>.32</td>
<td>.46</td>
<td>1</td>
<td>.496</td>
<td>.81</td>
<td>.43</td>
</tr>
<tr>
<td>ANRQ5 (tendency to worry)</td>
<td>.72</td>
<td>.24</td>
<td>8.67</td>
<td>1</td>
<td>.003</td>
<td>2.05**</td>
<td>1.27</td>
</tr>
<tr>
<td>Constant</td>
<td>-3.23</td>
<td>1.38</td>
<td>5.48</td>
<td>1</td>
<td>.019</td>
<td>.04</td>
<td></td>
</tr>
</tbody>
</table>

Notes: (1) denotes categorical variable; B denotes unstandardised coefficients for generating equation to calculate overall probability of a woman scoring above threshold whereas odds ratio is standardised; CI refers to odds ratio; p<.05*, p<.01**, p<.001***; shading shows statistically significant results.
## Appendix 6.1 Summary of referral details and responses to referrals

Details are presented across three tables, based on Whooley responses.

Table 6.1a Referrals where women’s handheld notes were unavailable due to transfer of care (Whooley items unknown) \((n=3)\)

<table>
<thead>
<tr>
<th>Woman [Study Part 2]</th>
<th>Mental health history</th>
<th>Current symptoms</th>
<th>Psychosocial factors</th>
<th>Treatment history - pharm.</th>
<th>Treatment history - psych.</th>
<th>Wants help</th>
<th>GP ref. in</th>
<th>GP in SCF</th>
<th>Specialist midwifery response and other management</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Depression (past)</td>
<td></td>
<td></td>
<td>C (past)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No evidence of response</td>
</tr>
<tr>
<td>2</td>
<td>Depression (past)</td>
<td>Bereavement</td>
<td>Past</td>
<td></td>
<td></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No evidence of response</td>
</tr>
<tr>
<td>3 [Michelle]</td>
<td>None documented</td>
<td>Health needs of older children; domestic abuse (separated from partner)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Does not meet criteria. Consider completing a CAF checklist.</td>
<td></td>
</tr>
</tbody>
</table>

Notes: C = counselling; CAF = Common Assessment Framework; GP ref. in = mental health histories documented in original GP referral letter; GP in SCF = GP involvement mentioned in referral; pharm. = pharmacological; psych. = psychological
Table 6.1b Referrals where women replied ‘no’ to the Whooley items (n=11)

<table>
<thead>
<tr>
<th>Woman</th>
<th>Mental health history</th>
<th>Current symptoms</th>
<th>Psychosocial factors</th>
<th>Treatment history - pharm.</th>
<th>Treatment history - psych.</th>
<th>Wants help</th>
<th>GP ref. in</th>
<th>GP in SCF</th>
<th>Specialist midwifery response and other management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Suspected PND (recent - previous baby born within 6 months of booking)</td>
<td>Attributes symptoms to current pregnancy</td>
<td></td>
<td>Stopped BB</td>
<td></td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No evidence of response</td>
</tr>
<tr>
<td>5</td>
<td>Depression</td>
<td>Good mood</td>
<td></td>
<td>Current</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No evidence of response</td>
</tr>
<tr>
<td>6</td>
<td>PND (past)</td>
<td>Well since</td>
<td>Past</td>
<td>CBT (past)</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No evidence of response</td>
</tr>
<tr>
<td>7 [Amanda]</td>
<td>Depression and anxiety (past)</td>
<td></td>
<td></td>
<td>CBT (past)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No evidence of response</td>
</tr>
<tr>
<td>8</td>
<td>PND (past)</td>
<td>Normal at present</td>
<td>Divorce</td>
<td>Past</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No evidence of response</td>
</tr>
<tr>
<td>9*</td>
<td>Low mood, eating problems</td>
<td>Low mood</td>
<td>Strained relationships; carer roles</td>
<td>C (past)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Does not meet criteria</td>
<td></td>
</tr>
<tr>
<td>10 [Louise]</td>
<td>PND (past)</td>
<td></td>
<td></td>
<td>Past</td>
<td>C (past)</td>
<td>Yes</td>
<td>Yes</td>
<td>Will not contact but re-refer if any problems.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Work-related stress and anxiety (past)</td>
<td>Well and happy since</td>
<td>Work</td>
<td>Past</td>
<td>C declined - well when offered</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No plans to contact</td>
</tr>
<tr>
<td>12</td>
<td>Anxiety and stress following birth of older child (past)</td>
<td>Tearful because not having scan today; appeared well when</td>
<td>Past</td>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>No plans to contact. Please inform patient and advise to see GP if concerned (no evidence of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leaving</td>
<td>Psychiatric Referral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---------</td>
<td>----------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Depression and psychiatric referral (past)</td>
<td>Happy at present</td>
<td>Serious road traffic accident</td>
<td>Past</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No plans to contact. Please inform patient and advise to see GP if concerned (no evidence of this).</td>
<td></td>
</tr>
<tr>
<td>14a</td>
<td>Depression</td>
<td>Depression</td>
<td>Bereavement (death of child)</td>
<td>C (current)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No plans to contact</td>
<td></td>
</tr>
<tr>
<td>14b*</td>
<td>Previous suicide attempt</td>
<td>Alcohol misuse</td>
<td>Traumatic circumstances, including past domestic abuse</td>
<td>Yes</td>
<td>Yes</td>
<td>Repeated involvement from specialist drug and alcohol MW and safeguarding MW. Referred to primary care for CBT.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: * referral raised separately to booking visit (further contact by the GP (ID 14 and 9); AN = antenatal; BB = before booking; C = counselling; CBT = cognitive behavioural therapy; GP ref. in = mental health histories documented in original GP referral letter; GP in SCF = GP involvement mentioned in referral; MW = midwife; pharm. = pharmacological; PND = postnatal depression; psych. = psychological
Table 6.1c Referrals where women replied ‘yes’ to at least one Whooley item (n=10)

<table>
<thead>
<tr>
<th>Woman [Study Part 2]</th>
<th>Arroll</th>
<th>Mental health history</th>
<th>Current symptoms</th>
<th>Psychosocial factors</th>
<th>Treatment history - pharm.</th>
<th>Treatment history - psych.</th>
<th>Wants help</th>
<th>GP ref. in</th>
<th>GP in SCF</th>
<th>Specialist midwifery response and other management</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>No</td>
<td>Work-related stress and anxiety (sick leave)</td>
<td>Feeling down</td>
<td>Work</td>
<td>Stopped BB</td>
<td>Stoped BB</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Does not meet criteria. Advise to see primary care if concerned. Reviewed by OBs and advised to see GP and recommence Citalopram. DNAs. Recommented Citalopram then stopped again.</td>
</tr>
<tr>
<td>16 [Anne]</td>
<td>No</td>
<td>Work-related stress and anxiety (sick leave)</td>
<td>Work</td>
<td>Stoped BB</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Does not meet criteria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>No</td>
<td>Depression</td>
<td>Low mood, thoughts of self harm** but would never carry out</td>
<td>Older children live with grandmother</td>
<td>Stopped BB</td>
<td>Yes</td>
<td>Yes</td>
<td>Will contact (no documentation to evidence further contact). Concerns raised on PN ward about ability to cope with ill child.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 [Helen]</td>
<td>No</td>
<td>Depression and PND</td>
<td>Stressed</td>
<td>Stopped BB</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Will contact (interviews confirmed no contact and no action by primary care).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>No</td>
<td>PND (9 years - current)</td>
<td>Current</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Will contact patient. No contact so patient again requested contact. Contact made. Reviewed by consultant OB and care plan made.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>n/r</td>
<td>Depression</td>
<td>Low mood, feeling</td>
<td>Current</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Reply form blank. Reviewed by</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Jess]</td>
<td></td>
<td>“empty”, lacking confidence</td>
<td></td>
<td>OBs who also documented that referral already made at booking.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>---</td>
<td>-----------------------------</td>
<td>---</td>
<td>---------------------------------------------------------------</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21a</td>
<td>n/r</td>
<td>Depression</td>
<td>Lone parent, social isolation, domestic abuse</td>
<td>Current</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Inform HV, consider referral to domestic abuse support service, Sure Start, and liaise with CMW. Safeguarding MW liaised with social services and CMW. Reviewed by OB who re-referred (see below).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21b*</td>
<td>See above</td>
<td>Depression</td>
<td>Teary, low mood</td>
<td>Lone parent, social isolation</td>
<td>Current</td>
<td>No</td>
<td>No</td>
<td>No plans to contact. Please inform patient and advise to see GP. Safeguarding MW liaised with CMW.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Yes</td>
<td>Depression since older child born (2 years)</td>
<td>Low mood, no thoughts of suicide or self-harm</td>
<td>Current</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Does not meet criteria. ANC staff phoned to inform and direct to primary care. Being reviewed 4-weekly by GP.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Yes</td>
<td>Anxiety and depression since last pregnancy (3 years)</td>
<td>Reports anxiety and depression</td>
<td>Current unplanned pregnancy, unhappy about pregnancy, no partner</td>
<td>Current</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Does not meet criteria. ANC staff phoned to inform and direct to primary care. Being reviewed 3-monthly by GP.</td>
<td></td>
</tr>
<tr>
<td>24a</td>
<td>[Grace]</td>
<td>Depression (past)</td>
<td>Feeling depressed</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Second referral raised before responded</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24b*</td>
<td>See</td>
<td>Depression, auditory</td>
<td>Auditory</td>
<td>Past</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Perinatal psychiatrist input, care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>above hallucinations and suicidal thoughts in previous PN with some continuing hallucinations</td>
<td>plan including anti-psychotic medication for PN. Seen by specialist MW on multiple occasions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: * referral raised separately to booking visit (due to disclosures in the research (ID 24), review by an obstetrician (ID 21)); ARMS raised through the research (ID 24); ANC = antenatal clinic; BB = before booking; C = counselling; CBT = cognitive behavioural therapy; CAF = Common Assessment Framework; CMW = community midwife; DNA = non-attendance at appointments; HV = Health Visitor; MW = midwife; n/a = not applicable; n/r = not reported; OB = obstetrician; PN = postnatal; PND = postnatal depression; GP ref. in = mental health histories documented in original GP referral letter; GP in SCF = GP involvement mentioned in referral; pharm. = pharmacological; psych. = psychological
Appendix 7.1 Diagnostic accuracy of Whooley using different definitions of caseness (i.e. different combinations of responses) (n=160)

<table>
<thead>
<tr>
<th>EPDS threshold</th>
<th>Diagnostic property</th>
<th>Yes to either Whooley item</th>
<th>Yes to Arroll response following yes to either Whooley item</th>
<th>Yes to Whooley item i (down, depressed, hopeless)</th>
<th>Yes to Whooley item ii (little interest or pleasure)</th>
<th>Yes to both Whooley items</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/10</td>
<td>Sensitivity</td>
<td>45.7</td>
<td>9.1</td>
<td>39.1</td>
<td>33.3</td>
<td>26.7</td>
</tr>
<tr>
<td></td>
<td>Specificity</td>
<td>92.1</td>
<td>98.2</td>
<td>93.9</td>
<td>94.7</td>
<td>96.5</td>
</tr>
<tr>
<td></td>
<td>NPV</td>
<td>80.8</td>
<td>73.5</td>
<td>79.3</td>
<td>78.3</td>
<td>76.9</td>
</tr>
<tr>
<td></td>
<td>PPV</td>
<td>70.0</td>
<td>66.7</td>
<td>72.0</td>
<td>71.4</td>
<td>75.0</td>
</tr>
<tr>
<td>12/13</td>
<td>Sensitivity</td>
<td>47.8</td>
<td>9.5</td>
<td>47.8</td>
<td>27.3</td>
<td>27.3</td>
</tr>
<tr>
<td></td>
<td>Specificity</td>
<td>86.1</td>
<td>97.1</td>
<td>89.8</td>
<td>89.1</td>
<td>92.7</td>
</tr>
<tr>
<td></td>
<td>NPV</td>
<td>90.8</td>
<td>87.4</td>
<td>91.1</td>
<td>88.4</td>
<td>88.8</td>
</tr>
<tr>
<td></td>
<td>PPV</td>
<td>36.7</td>
<td>33.3</td>
<td>44.0</td>
<td>28.6</td>
<td>37.5</td>
</tr>
<tr>
<td>14/15</td>
<td>Sensitivity</td>
<td>57.1</td>
<td>16.7</td>
<td>57.1</td>
<td>46.2</td>
<td>46.2</td>
</tr>
<tr>
<td></td>
<td>Specificity</td>
<td>84.9</td>
<td>97.2</td>
<td>88.4</td>
<td>89.7</td>
<td>93.2</td>
</tr>
<tr>
<td></td>
<td>NPV</td>
<td>95.4</td>
<td>93.4</td>
<td>95.6</td>
<td>94.9</td>
<td>95.1</td>
</tr>
<tr>
<td></td>
<td>PPV</td>
<td>26.7</td>
<td>33.3</td>
<td>32.0</td>
<td>28.6</td>
<td>37.5</td>
</tr>
</tbody>
</table>
Appendix 7.2 Contingency tables showing needs disclosed in the handheld notes and needs indicated using the Psychosocial Risk Index

Table 7.2a Contingency table of Whooley and PRI responses (where Whooley is measured by a ‘yes’ response to at least one item) (n=150)

<table>
<thead>
<tr>
<th>Whooley (yes/no)</th>
<th>Adapted PRI categories</th>
<th>low</th>
<th>med*</th>
<th>med^DA</th>
<th>med^DU</th>
<th>high*</th>
<th>high^D</th>
<th>high^DU</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td></td>
<td>62</td>
<td>17</td>
<td>9</td>
<td>4</td>
<td>8</td>
<td>7</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>yes</td>
<td></td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>65</td>
<td>21</td>
<td>11</td>
<td>6</td>
<td>12</td>
<td>7</td>
<td>1</td>
<td>27</td>
</tr>
</tbody>
</table>

Note: Criteria for PRI categories were EPDS 9/10, anxiety measured by STAI-S or GAD-2, ANRQ 23/24

Table 7.2b Contingency table of Arroll and PRI responses (n=147)

<table>
<thead>
<tr>
<th>Arroll (yes/no)</th>
<th>Adapted PRI categories</th>
<th>low</th>
<th>med*</th>
<th>med^DA</th>
<th>med^DU</th>
<th>high*</th>
<th>high^D</th>
<th>high^DU</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td></td>
<td>63</td>
<td>20</td>
<td>11</td>
<td>5</td>
<td>12</td>
<td>7</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td>yes</td>
<td></td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>64</td>
<td>21</td>
<td>11</td>
<td>6</td>
<td>12</td>
<td>7</td>
<td>1</td>
<td>25</td>
</tr>
</tbody>
</table>

Note: Criteria for PRI categories were EPDS 9/10, anxiety measured by STAI-S or GAD-2, ANRQ 23/24
Appendix 8.1 Transcription key

Interviewer: speaker*
(.) pause (if long, i.e. clearly relevant)*
- false start or incomplete sentence
[crying] use of non-verbal language (e.g. crying, laughing, sighing)*
[nodding] relevant use of body language (often recall-based or using field notes)
[son] names changed to relationships due to avoid numerous pseudonyms
[child crying] events relevant to the interaction (e.g. partner enter the room, phone rings)
really low emphasis placed by speaker

* Used by the transcription agency (who used 'verbatim' transcription, e.g. transferring abbreviations to full grammar and not transcribing different features of speech)

Appendix 8.2 Application of Framework Analysis - Reflections on charting

The charting process is perhaps the stage of Framework Analysis that is most unique to the approach, with all other stages (i.e. familiarisation, coding, generating themes, interpretation) being found with other types of qualitative analysis.

The charting process was helpful in identifying repetition and inconsistencies across themes and sub-themes of the Framework. Although some double coding was necessary to provide complete pictures of individual sub-themes, patterns of repetition highlighted areas for revision in developing the final Framework. For example, repetition across ‘context of pregnancy’ (Theme 1) identified the need to revise the sub-themes to clarify differences between pre-existing psychosocial stress and current pregnancy-related stress, including the addition of ‘material concerns’.

Charting additionally identified where areas related to most participants (i.e. ‘context of pregnancy’ and ‘fears and uncertainty’); this encouraged returning to the transcripts to check for examples with the remaining women.

A practical challenge was found with NVivo where node hierarchies contained several levels (e.g. theme → sub-theme → element of a sub-theme → example) which was time-consuming and required much of the computer screen to view the relationships. It was therefore necessary to collapse some of these lower-level nodes to form fewer hierarchy levels, each containing more ‘references’ (i.e. selected text to be used for quotations). Similarly, simpler hierarchies were used when coding the later interviews, by which stage the framework was largely established and therefore did not risk premature synthesis, where it can be time-consuming to retrieve the references.

The NVivo nodes provided quotations, with field notes stored separately within NVivo. In contrast when charting, the quotes needed to be summarised, adding a further layer of analysis and interpretation and also leading to questioning researcher assumptions about the stresses described by women, for example where women had mentioned having long-term health conditions but had not framed them as stresses. The charting could additionally contain the researcher’s explicit reflections and interpretations.
Framework Analysis guidelines (Ritchie & Spencer, 1994) recommend 2-3 words in each cell of the chart and the use of page and line numbers; however, when imported into NVivo, page line numbering is not retained thus the quotes could not be identified in this way. Additionally, it can be helpful to have a stand-alone charting document without the need for cross-referencing. Such abbreviated descriptions can also present difficulty in capturing the essence of the example; this is particularly pertinent when analysing across a prolonged period or when providing the charting for feedback within the research team.

Therefore, to balance the level of detail with the size of the Excel spreadsheet, two versions of the chart were developed: one detailed and one summary. The size of the chart was also made more manageable by limiting it to certain themes (for example, working separately on the theme concerning reflections on the research).

Mapping was primarily paper-based and visual but was complemented by adding a row below the titles in the chart to describe links between sub-themes. Together, these informed the Framework described (and associated diagrams).

Alongside informing the Final Framework and visual mapping, charting was used to explore the longitudinal aspects by inserting additional rows for each participant below their original (time 1) row and drawing comparisons across time. These elements were also recorded in the brief synopsis of each participant written in preparing for later interviews (i.e. time 2 and time 3) and updated when writing field notes. The synopses additionally assisted in reflective processes, highlighting the covert factors influencing interpretation.

Charting was additionally used to inform the synthesis of Study Part 1 and Study Part 2 by inserting further rows containing for example, the details of the ANRQ stress item and the overall PRI classification (i.e. classification of maternal stress) derived from the ARMS questionnaire, and details from health records containing obstetric history, mental health history and mental health referrals.
Table 8.2a Extract of summary chart for Theme 1 (Context of pregnancy)

<table>
<thead>
<tr>
<th>False name</th>
<th>1. Context description</th>
<th>1.1 Non pregnancy-specific stress</th>
<th>1.2A loss/trauma</th>
<th>1.2B intended-ness</th>
<th>1.2C identity/role</th>
<th>1.2D fears+unknown</th>
<th>1.2E health services+systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hannah</td>
<td>put off getting pregnant because of mum’s illness; hard telling her; sad she won’t be part of it</td>
<td>mum (ill / bereavement); multiple carer roles; child’s behavioural + health [layers] [identity - career]</td>
<td>not got a career [pre-existing + this preg]; try to do it all by self; may be over-mothering</td>
<td>'had put off'</td>
<td>fear pre-scan that something would be wrong; fear coping with 2 children; fear of PND</td>
<td>CMW – dismissive; HV – judgemental; wants counselling – but barriers [see 2.3]</td>
<td></td>
</tr>
<tr>
<td>time 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hannah</td>
<td>feel not given the pregnancy/baby enough attention – due to other difficulties; hysterical crying daily</td>
<td>mum’s health; family bereavement → more carer roles</td>
<td>‘big baby’ last time - got stuck - needed resuscitation</td>
<td>should help wider family - because don’t work (duty)</td>
<td>fear of PND, fear of not bonding, fear of ‘big baby’</td>
<td>[not stressor-see 5.1 re: responses to disclosures]</td>
<td></td>
</tr>
<tr>
<td>time 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hannah</td>
<td></td>
<td>mum’s health; child’s behavioural + health</td>
<td></td>
<td></td>
<td>fear of not bonding not realised</td>
<td>[see 5.1 – referral]</td>
<td></td>
</tr>
<tr>
<td>time 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charlotte</td>
<td>threat to job just at time when she wanted to be most secure; previous M and bleeding in current pregnancy</td>
<td>work stress job at threat (cuts to services) [house move = due to pregnancy so coded in 1.2 material concerns]</td>
<td>previous M (1st tri)</td>
<td>challenge with independence - used to being self-sufficient</td>
<td>fear of M when bleeding (pre-booking) [see 2.1]; coping with role change; lack of £ security</td>
<td>comparison of two viability scans – really rude, awful experience vs. caring – better regardless of outcome</td>
<td></td>
</tr>
<tr>
<td>time 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charlotte</td>
<td>2 more bleeds, 4 day inpatient; hard to rest / rely on others – doesn’t feel ill + is used to doing things</td>
<td>work = purpose, role, value, responsibilities, not just money – struggling on mat. leave before new role started; has planned return to work; has been work first then family, now other way round</td>
<td>work = purpose, role, value, responsibilities, not just money – struggling on mat. leave before new role started; has planned return to work; has been work first then family, now other way round</td>
<td>few weeks ago got fixated on how bad birth might be → asked people - responses more positive than she expected, pain not so bad, so ‘over that now’ [see 5.3]; not worried re: possible prematurity – she + sister were early</td>
<td>really nice when had to stay in hospital; felt like a fraud as not really ill – but not because of anything they did/said</td>
<td></td>
<td></td>
</tr>
<tr>
<td>time 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charlotte</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>time 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: CMW = community midwife; HV = Health Visitor; M = miscarriage; PND = postnatal depression
Appendix 8.3 Combinations of incomplete abuse data on the ANRQ (n=12)

<table>
<thead>
<tr>
<th>ANRQ8a (emotional)</th>
<th>ANRQ8b (physical)</th>
<th>ANRQ8c (sexual)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>No PNA n/r</td>
<td>No PNA n/r</td>
<td>Yes No PNA n/r</td>
<td>1</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>4</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>3</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>1</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: PNA = “prefer not to answer” (which participants could denote by marking an asterisk); n/r = item not completed

Appendix 8.4 Summary of feedback provided in Study Part 1 (including ratings of the extent to which the questionnaire was distressing)

<table>
<thead>
<tr>
<th>Questionnaire items</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological distress</td>
<td>Most women did not report anything in relation to these measures. One wrote alongside GAD-2 “better this month”. One wrote alongside STAI-S “will be more confident after all tests done”.</td>
</tr>
<tr>
<td>symptoms</td>
<td></td>
</tr>
<tr>
<td>Social support</td>
<td>One woman (distress rating = 1) wrote alongside the MSSS partner items, “can’t say in these boxes” and alongside the ANRQ partner item, “ask me”. Interview later identified that this was due to not being in a relationship with the baby’s father and therefore rejecting the term “partner”.</td>
</tr>
<tr>
<td>Pregnancy experience</td>
<td>The following comments were written alongside the item concerning pregnancy experience: “Feeling physically ill and having responsibilities. Having to look after another child.” (distress = 1); “only because of sickness” (distress = 1); “had bleed initially” (distress = 2); “just anxious about miscarrying again” (distress = 1).</td>
</tr>
<tr>
<td></td>
<td>One participant (distress = 1) wrote in the feedback section: “In the questions there could be a bit more clarity between being happy about being pregnant and ‘enjoying the pregnancy’. I love the fact I’m pregnant but I hate being pregnant due to physical symptoms i.e. tiredness and sickness. I find being pregnant stressful but I really want the baby.”</td>
</tr>
<tr>
<td>Psychosocial risk (ANRQ)</td>
<td>a) One (distress = 1) wrote ‘prefer not to answer’ for the stress question (ANRQ4).</td>
</tr>
<tr>
<td></td>
<td>b) One (distress = 1) wrote “will discuss it” in the detail section of the stress question. In the feedback section she listed this question and wrote “I had some problems but can’t write it”. For the possible solution, she wrote, “discuss it maybe”.</td>
</tr>
<tr>
<td></td>
<td>c) One (distress = 2) identified the abuse items (see details below).</td>
</tr>
<tr>
<td></td>
<td>d) One (distress = 2) identified the ANRQ stress question (see details below).</td>
</tr>
<tr>
<td></td>
<td>e) One (distress = 4) identified the abuse question and stress question (see details below).</td>
</tr>
<tr>
<td>Comments accompanying ‘distress’ ratings, including those questions</td>
<td>Of the 183 who assigned ratings, 154 rated as 1 (not at all distressing), 20 rated as 2, six rated as 3 (somewhat) and three rated as 4. No women assigned a rating of 5 (very much). The majority of women who provided ratings greater than 1 did not provide any further explanation; the comments of those who did are presented below.</td>
</tr>
</tbody>
</table>

Rating of 2:
| Identified as responsible | a) Items responsible: “stress questions”. Comment: “off work at the moment due to pressures. Just emotional at the moment.” Possible solution to making questionnaires less distressing: “no issues, just me”.
  b) Items responsible: none identified. Comment: none. Possible solution: “shorten them”.
  d) Items responsible: none identified. Comment: “not distressing but brought back memories of previous postnatal depression.” Possible solution: none suggested.
  e) Items responsible: none identified. Comment: “was questioning myself.” Possible solution: none suggested.
  f) Items responsible: “abuse questions”. Comment: “very personal question to ask” Possible solution to making questionnaires less distressing: “should be in/check patient notes - should be a midwife or health professional asking this question - not for a researcher to ask this”. The woman reported no to the abuse items and was low on all stress measures. Her additional comments are provided below concerning waiting times.
  g) Items responsible: ANRQ stress question and items concerning the maternal-fetal relationship. Comment: “it's hard to think about what's happening in my life sometimes and how I'm not really focusing on the baby very much” Possible solution to making questionnaires less distressing: “nothing. It’s down to me”.

**Rating of 4:**
Items responsible: history of abuse (ANRQ) and recent stresses (ANRQ). Comment: “very emotional”. Possible solution: “I don’t think anything’s possible”.

| General feedback | Some women provided general feedback that was not linked to finding the questionnaire ‘distressing’ per se:
  “I may have answered differently if you had asked me before scan. i.e. more stressed then as not sure how baby was”
  “Nowhere to really say why stressed”
  “I have had 2 miscarriages in the last 2 years and a threatened miscarriage on this pregnancy - this is the only reason for my current anxiety around this pregnancy”
  “I received therapy and was on citalopram but I often still feel the same but I know that I am a strong person and can get through it - I'm still here! I've been off citalopram only a week and have seen a decrease in my mood - I'm more angry and quick-tempered and can't sleep.”
  “Nothing been mentioned about stress of waiting for 3 month/12 wk scan for mother/father. Too long - main worry for patients.” This woman also commented on the abuse items, for which she assigned a distress rating.

| Discussions and debriefs (based on notes made by the researcher) | While several women spoke with the researcher when returning the questionnaire, comments largely duplicated their written comments. The exceptions were :
  a) One women was mostly worried because of what happened in her last pregnancy but that was not in the last year so she had not reporte dit on the ANRQ. Also, she was a 'bit stressed' with work.
  b) One woman reported (in relation to the EPDS responses) that she was on holiday the previous week so was particularly . She volunteered that she also ‘suffers from panic attacks' and has her own business, which is ‘stressful’.
  c) One women did not complete the adult attachment style question because ‘it was getting too deep’.
Appendix 8.5 Women in Study Part 2 who were referred at booking

<table>
<thead>
<tr>
<th>Participant</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Louise</td>
<td>Referral detailed history of PND and its treatment (anti-depressants and counselling) as well as the patient’s linking of her traumatic delivery with the PND onset. Reviewed by a doctor at booking after consultation with the midwife. Discussed possible doses for medication. No further contact/involvement commented on.</td>
</tr>
<tr>
<td>Anne</td>
<td>Off work at time of booking with work-related stress and anxiety. Discussed with midwife due to briefly taking medication for anxiety and referred by midwife. Anne expressed uncertainty about referral process. Anne had visited GP 3 months prior to booking and not yet heard anything (time 1) so wondering if could access sooner via midwives. Anne never heard back about mental health referral but by time 2 was accessing counselling via initial GP request (approx. 6 months earlier).</td>
</tr>
<tr>
<td>Amanda</td>
<td>History of anxiety and depression and treatment (using cognitive behavioural therapy). Referred by midwife. Amanda viewed as protective measure in case prompt access of services required. Records showed that Amanda not eligible for services. Had additional antenatal appointments which Amanda assumed was due to her mental health history.</td>
</tr>
<tr>
<td>Michelle</td>
<td>Referral raised for multiple reasons (partner’s domestic abuse and sole carer for children with disabilities), which did not include mental health. Response recommended use of the Common Assessment Framework concerning the family’s needs.</td>
</tr>
<tr>
<td>Helen</td>
<td>Referred due to history of PND following both previous births and recent depression. Referral acknowledged that GP already involved and made a referral to the Community Mental Health Team. Specialist response said that specialist would make contact with Helen but this did not happen. Helen, like Anne, seemed to desire more information on the process. Helen had not been contracted regarding the GP’s referral within the study timeframe (9 months after original referral).</td>
</tr>
<tr>
<td>Grace</td>
<td>Referred due to “feeling depressed” and history of depression (which midwife documented had not been treated with medication). At time 1, Grace reported she had not heard nor had her GP but was waiting to speak to specialist midwife. Realising Grace would not meet criteria and may not even be contacted, researcher raised a referral following time 1, identifying severe mental health concerns. Grace seen promptly by specialist midwife and perinatal psychiatry service.</td>
</tr>
<tr>
<td>Jess</td>
<td>Referred due to history of depression, for which currently unable to work and taking anti-depressants. Jess shared Amanda's view of this offering a protective referral. GP pursued the referral to the Community Mental Health Team (originally made prior to conception) when Jess presented in early pregnancy. Appointment took four months from point of being pursued. Jess had mental health review in antenatal care at 25 weeks.</td>
</tr>
</tbody>
</table>
Appendix 8.6 Reflections on interviewing style - excerpt

Having accessed Dorothy’s health records before the postnatal interview, I knew about Dorothy’s previous birth being premature but no further details beyond the gestational age at delivery. Knowing about the prematurity, I was more aware to explore this when the opportunity arose. Additionally, previous comments were offered as “ways in” to broach topics, change direction or elaborate further.

The postnatal interview also had a different dynamic, being held at Dorothy’s house and without the time being pressured. Dorothy had chosen for both antenatal interviews to be on the day of antenatal appointments to minimise disruption but her childcare needs had meant that the antenatal interviews felt rather rushed and “cut short” in order for Dorothy to travel home. The change in dynamic between settings was therefore more marked than with other participants. The conversation reflected this different context, switching between more casual conversations about the children and their activities and the planned topics; a luxury not afforded in a clinical setting.

With Dorothy, prompts were central in eliciting her experiences, as shown in this excerpt.

Dorothy: … Like when I had [middle son] that’s the thing which was coming on my mind all the time that maybe what happened to [middle son] will happen again and I was like the whole pregnant was painful a lot. I wasn’t well, everything was -. So it was really hard.

Interviewer: And what had happened with [middle son] then?

Dorothy: [middle son], they thought it was swine flu. They thought that I had swine flu. That’s the time when swine flu was (.)

Interviewer: Yeah, big.

Dorothy: [nod] So the problems like I was feeling my legs, they were paining me. I couldn’t walk. I didn’t have a cold. That’s the problem, I never had a cold or a cough. So when I went to the hospital they send me back home and said go and take paracetamol, it’s just the pregnancy. First time. Like it was Thursday. And then the Friday I called an ambulance. They sent me back home. On the Saturday I had to take a taxi and I went to the hospital. I had to go for a -. Like I phoned and talked with a doctor on the phone and the doctor said come, and then I went to the emergency doctor. The doctor just sent me to the maternity ward straight away, and then when I went to the maternity ward they said there’s no breathing - it’s 50/50, save the mother or baby. I never signed giving a consent form because it was really critical that time. They asked me who came with you, because I couldn’t walk. They take forever to call a nurse for me inside, and then they have to put me on a wheelchair from outside and then went inside, so it was really difficult. I just realised that I had the baby later on. Did I say to you, no, [researcher shakes head] I was like this, you’re going to have a caesarean section now, it’s emergency, because the baby’s not breathing so we need to. So they put him in the incubator and then I was fine.

Interviewer: And did you say he was in about a month? [picking up on an earlier comment]

Dorothy: In the hospital, yeah. Because they make sure he’s able to feed himself, because at first they use tube until they see it’s time for him to try to use the bottle.

Interviewer: Yeah, so you’re worrying that something similar- [picking up on comment about ‘coming on my mind’]

Dorothy: Can happen.
Dorothy: So it took time for me, and I was really, really not happy about the pregnancy at first because the nightmare which I had with [middle son's name] was really very hard, and I stayed in hospital for maybe two weeks. It's worrying staying in hospital for a long time, and the first week I never saw the baby. I wasn't even allowed to see him because they say you are not very well so we need to take care of the baby first and you need to be fine first. So it was really, really hard. He's sleeping now. So I'm okay now. At least everything is fine.

In contrast, Hannah could easily be diverted on a tangent about those stresses that may be described as daily hassles, seemingly reflected her 'layers of worry' and sense of being overwhelmed by so many stresses. Pointed questions were therefore often needed, such as asking at time 1, “So what do you think might be the kind of deciding factor about if you were to contact [someone from the list of counselling services]?” I revisited Hannah’s response to this question at time 2 and, on reflection, felt that this had been a key point in the interview acting as an intervention to seek professional support:

Interviewer: Last time we spoke, and about what things would need to be like for you to go and seek the counselling, or whatever it might be, or speak about how you're feeling? Um. I know you’d said, “I think if I got to that point where I felt it was that –

Hannah: -yeah-

Interviewer: - that bad” or [husband] might say, “come on”, you know, “it's time”.-

Hannah: -yeah-

Interviewer : How do you feel things are –

Hannah: -Err-

Interviewer: - in relation to that?

Hannah: Well. [breaks down - crying] we’ve [with husband] kind of talked a little bit [crying throughout] about kind of worries for the future. I haven’t thought so much about how I feel right now. But I’m quite worried about when the baby’s born. Erm, you know, because I haven’t - I just haven’t thought about him very much at all [crying].

Similarly with Grace, she indicated that there were a range of concerns, including some that she would ‘maybe’ discuss. I sensed that this included something that would be difficult to talk about and that we needed to spend some time first talking about things that she found easier to discuss. In reality, this only required seven minutes before she disclosed her symptoms that indicated severe mental illness; highlighting that rapport could be built within a relatively short space of time. I reflected that this was built through empathic responses and through reflecting back some of her comments to demonstrate understanding and active listening, as shown in the following excerpt which occurred four minutes into the interview:

Interviewer: So things have gone off track, it feels, does it?

Grace: [sighs] That's how I feel, in my life.

Clearly, experiences such as Grace’s are relatively uncommon. Nonetheless, there were similarities across the spectrum of severity of maternal stress meaning that such features of the interviewer style remained relevant. I found that, whereas women were often prepared to talk in detail about the causes of their maternal stress, the nature and impact could take more coaxing. Indeed, the extent of the impact of maternal stress
could easily be missed. Abbie acknowledged a peak of stress that had “bubbled over”, before discussing in greater detail the circumstances surrounding this. At the next opportunity, I explored this further:

Interviewer: Yeah, so when you say that it – that it did all kind of bubble over at that point and feeling, you know, very frightened.

Abbie: Yeah.

Interviewer: You said you spoke to your husband about it.

Abbie: Well he found me on the – I was sort of sat on the bathroom floor like in tears.

Interviewer: Right, right.

Abbie: “Oh is everything alright?” and he’s thinking you know there’s – there’s kind of like something wrong with the baby and I went, “No, it’s just me, it’s just me,” you know, I was just don’t know what to do. You know, this is – it’s just too far away, and I think I was only – I think I was only ten weeks at that point as well so it – it was two and a half months before I was then able to – to then see somebody. You know, about all these concerns that I had and – and just – just somebody saying, “Everything’s okay, you know, you’ve – we’ve taken your blood results and got, you know, you are on our treadmill,” as opposed to just kind of floating around and – and not knowing where you – where your care is going to be provided.

Interviewer: Yeah.

Abbie: That yeah, no that was (.)

Picking up on Abbie’s pause as indicating possible discomfort or distress and recognising that Abbie had described herself as a “private person”, I altered the direction by acknowledging the source of stress:

Interviewer: It’s a long time isn’t it?

Abbie: Yeah, it was, it was a long time.

I reflected on the distress policies that are often included in protocols are part of the ethics application process. For example, they commonly describe being alert to signs of distress that may require the interview to be paused or stopped. In contrast, I felt that women may often be very sensitive to presenting their distress and could be concerned about possible reactions. Women’s distress could be acknowledged through far subtler ways that avoided them feeling uncomfortable through fearing that they had made the interviewer feel uncomfortable, or perhaps even concerned that they presented a risk to themselves or others. For example, Louise cried at one point in her first interview and had already mentioned that her partner and mother could be concerned that her crying was a sign of the return of her PND. It was therefore critical that I did not react as though this was cause for concern when it simply reflected our discussion of how difficult her PND had been and the impact it had on her family life.

I perceived that Ruth’s needs and preferences differed to those of Louise. Ruth talked about “looking like a muppet for crying” and also had commented that “pregnant women cry all the time”; therefore, when on one occasion she apologised for crying, I reassured her that it was no problem, that there was nothing to apologise for and that she was by no means the only one to have cried during interview. Hannah was different again and simply acknowledged at the start that she was likely to cry. I therefore took her lead and continued conversation, as she did, throughout her periods of crying.

[End of excerpt]