



Under-diagnosis of Hearing Loss in Primary Care: Evidence from the English Longitudinal Study of Ageing (ELSA)

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Aim

- To examine the patterns of diagnosis of hearing loss in primary care for referral to secondary care.
- To investigate the accuracy of self-reported measures of hearing difficulty in English adult population in comparison to objective hearing data measured by a handheld audiometric screening device.

Background

Hearing loss is a major public health issue that affects over 11 million people across the UK. Hearing loss is far beyond a sensory impairment, and is associated with negative physical, social, cognitive, economic and emotional consequences [1].

Primary health care (PHC) is the point of referral to NHS audiological services for hearing loss in adults [2]. However, as hearing loss nearly always develops gradually, people do not see it as a dramatic health problem requiring urgent intervention.

Method

Cross-sectional analysis comparing self-reported hearing data and data acquired by a handheld audiometric screening device (HearCheck) [3], from the Wave 7 of the English Longitudinal Study of Ageing (ELSA), which is a representative sample of people in England aged 50 years and above [4].

The questions were on hearing difficulties of the participants, hearing in noise, quality of care in hearing, and hearing aid recommendation (n=9,666).

We fitted multiple logistic regression models to evaluate the variables predicting false negative report of hearing difficulties on the sample with objectively identified hearing loss >35dB HL at 3.0kHz, in the better-hearing ear (n=8,529).

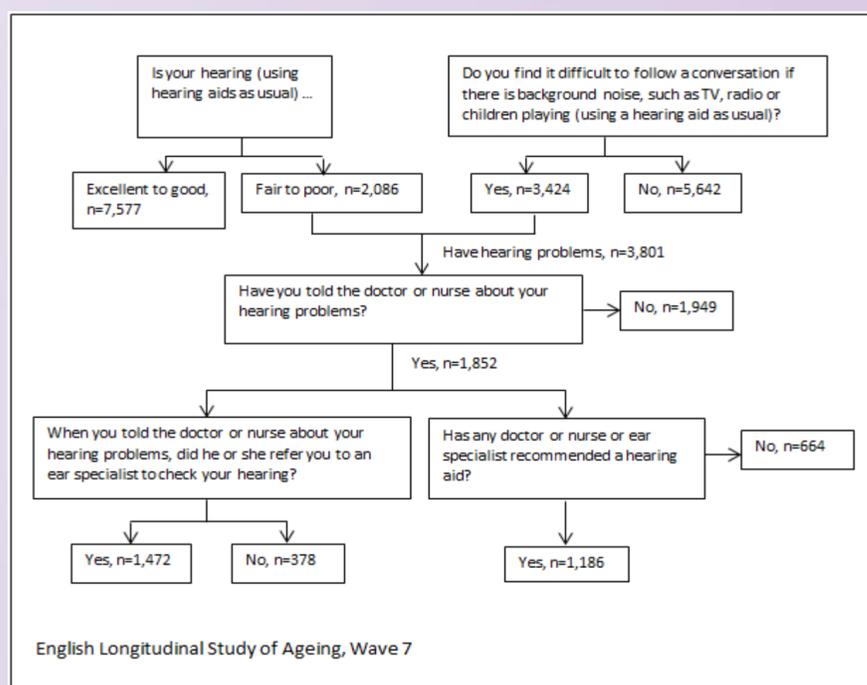


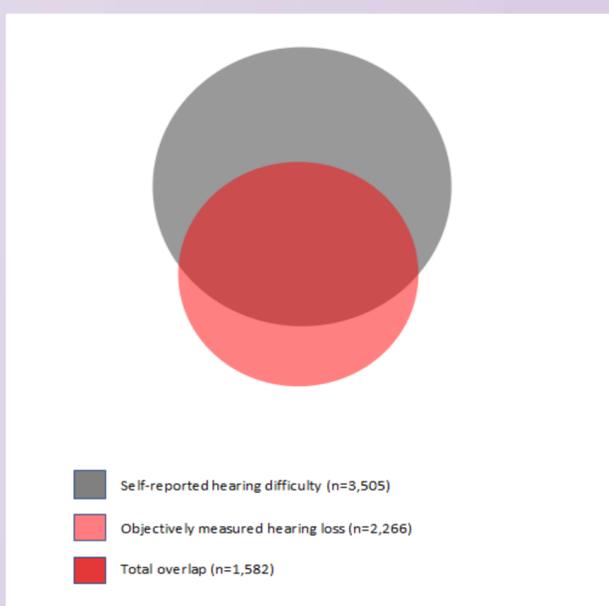
Figure 1. The questions on hearing difficulties, hearing in noise, quality of care in hearing and hearing aid recommendation in ELSA Wave 7 (n=9,666)

Results

The prevalence of the self-reported hearing difficulties in ELSA Wave 7 was 39.3% (n=3,801/9,666) (Figure 1). Over the half of those did not tell a health professional about their hearing problem (51.3%, n=1,949/3,801), so as to be given the opportunity to be referred to an audiologist for further assessment.

Analysing the two categories that the self-reported hearing difficulty was comprised of (not mutually exclusive events), we found that the above phenomenon was more obvious among those who reported difficulty to follow conversation if there is background noise and did not tell a health professional (51.2%, n=1,753/3,424), compared to those that had a self-reported hearing fair to poor and did not tell a health professional (33.1%, n=691/2,086).

Comparing the self-reported hearing data with data acquired by the objective assessment of hearing ability, a sensitivity of 69.81% of the self-reported measure was found, which refers to the ability to correctly identify those with hearing loss (true positives). However, as shown in Figure 2, the 30.19% of those with hearing loss, as measured by the handheld audiometric screening device, went undetected (false negatives).



Variability	Values
Sensitivity ^a	69.81%
Specificity ^b	69.29%
Correctly Classified	69.43%
Positive predictive value ^c	45.14%
Negative predictive value ^d	86.39%
LR+	2.27
LR-	0.43
ROC Area	0.69 [0.68- to 0.71]
Std.Err	0.0056
Obs	8,529

Figure 2. Venn diagram of the participants with both objective and self-reported hearing data in ELSA Wave 7 (n=8,529)

^aSensitivity: $TP / (TP + FN) = 1,582 / (1,582 + 684) = 69.81\%$

^bSpecificity: $TN / (TN + FP) = 4,340 / (4,340 + 1,923) = 69.29\%$

^cPositive predictive value: $TP / (TP + FP) = 1,582 / (1,582 + 1,923) = 45.14\%$

^dNegative predictive value: $TN / (TN + FN) = 4,340 / (4,340 + 684) = 86.39\%$

Discussion

These findings revealed a potential diagnostic error of hearing loss in primary care, provided that there is no hearing loss screening program among older adults in England [2] and the health seeking behaviour for hearing difficulties starts with individual's self-diagnosis and initiation of contact with a health provider in primary health care settings. That highlights a serious gap into the continuity of hearing health care and patient safety, provided that hearing loss is the first leading cause of morbidity among adults 70 years and older and the second leading cause among adults 50-69 years [5].

Our findings support the need for health policy strategies, aiming for an early detection of hearing problems in primary care and referral to secondary care, to mitigate the adverse effects of hearing loss in older adults in England.

Summary

- The self-identification of hearing difficulties is a major non-financial barrier for the initiation of help-seeking, which can affect the referral to ear specialists and the consequent hearing aid uptake.
- The self-report measures did not identify the same people with hearing loss who were identified using audiometric measure of hearing and should not therefore be considered representative to influence the GP's judgement for referral to secondary care, which revealed a potential diagnostic error of hearing loss in primary care.

References

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