The use of measurement tools in clinical practice: an observational study of neurorehabilitation

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Objective: To explore the way in which standardized measurement tools are used in day-to-day clinical practice.

Design: Non-participant observation and semi-structured interviews.

Setting: Hospital-based adult neurorehabilitation unit.

Participants: The multidisciplinary team delivering rehabilitation in the unit.

Results: The multidisciplinary team used the measurement tools internally to establish the presence and severity of patients' impairments and activity limitations; predict recovery and discharge destination; inform treatment planning and monitor progress. They were used externally to demonstrate service effectiveness; communicate with patients, families and external agencies; enable other providers to plan continuing care and resource needs, and inform audit and service development.

Conclusion: When used in everyday clinical practice by a multidisciplinary neuro-rehabilitation team, standardized measures were used to support and inform, rather than replace, clinical decision-making.

Introduction

Recent health policy in the UK and elsewhere has called for the routine use of objective measurement tools, including outcome measures or 'metrics', to provide information for patients and service commissioners about the quality of services.^{1–3} Within rehabilitation, routine use of measurement tools is widely advocated in clinical guidelines and standards of practice as an essential component of evidence-based practice and a means of improving patient outcomes.^{4–8} Surveys within rehabilitati-

services on have revealed that this is relatively commonplace and has increased over time.^{9,10} The most recent survey¹⁰ indicated that 86% of neurological rehabilitation units in the UK collected at least one standardized measurement tool, with the Barthel Index^{11,12} and the UK Functional Independence Measure and/or Functional Assessment Measures (FIM+FAM)¹³ being the most common. Although these surveys show how clinical practice has progressed, they cast little light on how the information from the measurement tools is actually used by clinicians once it is collected.

A small number of studies have also explored the impact on patient care of using standardized measurement tools within rehabilitation settings^{14–16} and have found little impact on outcomes such as patient's function. However, one study found

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improvements in the process of care, such as increased client involvement in the formulation of treatment goals.¹⁶ This highlights the importance of exploring how clinicians make use of measurement tools to understand why they do, or do not, have an impact on patient care and outcomes.¹⁷ The current paper addresses this issue. As we wished to investigate clinicians' actual practice, rather than their perceptions or beliefs, a qualitative approach was needed to directly observe clinicians while they used standardized measurement tools in their day-to-day practice. These data were collected as part of a larger qualitative study to explore whether, and how, the routine collection of measurement tools influences clinical decision-making, using neurorehabilitation as a case study.^{18,19}

Methods

Setting

A unit who routinely used standardized measurement tools was purposefully selected. It was a 19-bed specialist inpatient adult neurorehabilitation unit in a large National Health Service teaching hospital. Involvement in the study was discussed initially with the consultants and then approved by the whole multidisciplinary team, who all gave written informed consent. University and National Health Service ethical approval and local R&D approval was obtained.

Data collection

Data were collected by JG using non-participant observation and semi-structured interviews. Non-participant observation focused on the bi-weekly multidisciplinary team meetings as this was when the measures were shared and discussed. These meetings lasted about one-and-a-half hours and were normally chaired by a rehabilitation consultant. At every meeting there were representatives from medical, nursing, occupational therapy and physiotherapy staff. Medical staff were present throughout the meeting, while other disciplines attended when 'their' patients were discussed. A family liaison health visitor attended most

meetings and social workers attended when discharge arrangements were being finalized. Medical, nursing and therapy students also occasionally attended. At each meeting, six or seven patients were discussed with each allocated a 15-minute timeslot.

A total of 14 meetings were attended, during which 39 patients were considered. Field notes were also collected and analytical memos were developed as the fieldwork progressed. Towards the end of the observation phase of the study, at least one clinician from each profession in the multidisciplinary team was interviewed ($n = 11$). The interviews explored team members' perceptions of the role and influence of measurement tools in clinical decision-making, their experience of using measurement tools, the challenges or limitations and the factors that influenced these. These interviews were audiotaped and transcribed verbatim.

Analysis

Data analysis was iterative and ongoing throughout the study using directed content analysis techniques^{20–22} and the data were managed using QSR Nvivo v2.0. Throughout the field work, field notes and transcripts were distributed among the research team, who read them repeatedly and identified a set of initial themes. Emerging themes were discussed, areas of divergence explored and themes refined through regular meetings. For the analysis presented in this paper, the different ways in which clinicians reported using the measurement tools were abstracted from the interview data (e.g. uses in relation to stages in the patient's journey at initial assessment, monitoring change over time, discharge planning). We then re-examined the transcripts of the multidisciplinary team meetings to find illustrations of these uses and any additional uses, based on the approach of directed content analysis.²² This led to the identification of an additional dimension, differentiating 'internal' uses for patient management and 'external' uses by the team in communication with others outside the team.

Results

Measurement tools used by the team

The measures collected, discussed and scored by the multidisciplinary team were the Barthel Index,^{11,12} Northwick Park Dependency Score,²² Leeds Handicap Scale²³ and Waterlow Score.²⁴ A set of 'home-grown' single-item scores (which had not been psychometrically assessed) was also used. These categorized the patients' ability in language reception and expression, functional communication, memory, concentration, confusion/orientation, drive/motivation, anxiety and depression, behaviour and preparation of snacks and meals. For some patients, individual members of the multidisciplinary team also used more specific measurement tools within their unidisciplinary assessment and treatment and reported the results to the rest of the team within the meetings on an ad-hoc basis. Details of the process of scoring the measurement tools within multidisciplinary team meetings have been reported elsewhere.¹⁹

The team's use of measurement tools: overview of themes

Two dimensions were identified. First, the measurement tools were used 'internally' within the process of rehabilitation to:

- understand the patient's problems by identifying the presence and severity of the patient's impairments and activity limitations;
- predict the patient's expected level of recovery and discharge destination; and
- inform treatment planning and monitor progress.

Second, the team used the measurement tools 'externally' to:

- demonstrate the effectiveness of rehabilitation to their managers thereby justifying their existence and resources;
- communicate with patients and families;
- enable external agencies, such as social care services and other health care providers to plan continuing care and resource needs; and
- undertake audit and to inform service development.

Each is explored in turn.

Internal use: identify and understand the patient's problems

The measures provided a framework to define and describe the patients' problems using a common language that was understood and accepted by the whole multidisciplinary team. In cases where the scores were not clear cut, they used the structure, definition and language of the measures to clarify their clinical reasoning, decide whether there is a problem and, if so, its severity (i.e. to diagnose). This was most apparent shortly after admission when the team were familiarizing themselves with the nature and extent of the patient's problems. Box 1 presents an extract when the team scored a stroke patient for the first time a few days after his admission to the unit in which they decide on his orientation score (OR). The consultant points to orientation being 'around four or five'; after some further comments, the scoring guidelines are referred to; then the decision is made of '5b'.

As the occupational therapist explained in her interview, the scores help the team to get an overall picture of a patient:

I think the first time we score a patient you'd get an overall picture of the person, of what they're able to achieve at that stage. (Occupational therapist 1)

The staff did not expect the measures to cover all aspects of the patient's problems and life situation.

Box 1 Internal use: identifying the patients' problems

Consultant 1: 'OR' [orientation].

OT 2: 'Er hard to say.'

Consultant 1: 'Orientation, well you should be able to manage that one I think because ... it can't be full, it must be around four or five.'

[Inaudible: SALT is looking in her notes and says he has aphasia and the nurse is also discussing it with the physio and the OT]

Consultant 1: 'It's here isn't it' [referring to scoring guidelines].

Physio 2: 'Severe difficulties' (?)

Consultant 1: 'Any communication problems?'

OT, nurse and physio together: 'It's going to have to be 5B' [referring back to OR].

The interviews revealed that the measures were used to quickly deal with the elements that were measurable. This left time and effort to spend on the more complex, difficult to measure and subjective issues, such as the social, emotional and behavioural issues, the family, and funding for future care and support on discharge. The measurement tools acted as screening measures to signpost where more work was needed:

I don't think it's the total score that makes a difference so much as making sure that we cover specific ground over key issues that can influence the outcome. For example, if we know that somebody has to be independent in personal care, and is in most aspects, that would then highlight for us where do we need to focus more work or where do we need to find some external support because something or other cannot be achieved. Erm, so it's an aide-memoire for the team, for the process. It can also yield certain patterns of problems which might indicate that we need to further investigations, further assessments. (Consultant 2)

Internal use: predicting potential for recovery and discharge destination

The measurement tools were often used within two weeks of admission to the rehabilitation unit to predict the patient's potential for improvement and their possible discharge destination. This enabled the complex arrangements for continuing community-based care, alternative accommodation or transfer to another unit to start early, thereby preventing delayed discharges and providing time to prepare the patient and family appropriately. Box 2 presents an extract from the first time the multidisciplinary team scored a patient who had acquired brain injuries, causing severe cognitive difficulties.

Interview data illustrate how team members in general combine their clinical knowledge and impression of the patient with the patient's scores to make predictions. This was reiterated by the speech and language therapist:

I think it's really more the Barthel and the handicap scores. If you hear a Barthel score of zero or 10 you know that this person is going to be heavily dependent. (Speech and language therapist 1)

Box 2 Internal use: predicting recovery and outcome

Consultant 2: 'What was his Northwick Park dependency score?'

Nurse 3: 'It won't be high. ... I'm sure it was in the high 40's. Would that seem about right?'

Consultant 2: 'I put his at about 42, something like that.'

SHO 1: 'Some of his standard scores, most of his Barthel's like the feeding, and he's zero on every one.'

Nurse 3: 'The feeding was just ... he has to be supervised because he'll choke. Erm, yeah, zero for that as well.'

SHO 1: 'I've got zero.'

Nurse 3: 'Mmmhmm. He's got an indwelling catheter, he's incontinent of faeces. He's very unsafe. Erm, he unclips things, pulls his catheter out. He's got MRSA in his gastrostomy tube.'

Nurse 3: 'I was thinking about having an early family meeting next Tuesday.'

[They have some discussion of the nature of his communication problems.]

Consultant 2: 'Umm yes an early family meeting with a view to, I think unfortunately, I don't think we're going to get very far with this man ... I think he's going to be destined for a nursing home.'

The clinical psychologist described how she used measures of cognitive function, behaviour and emotional state to advise the multidisciplinary team about a patient's potential for improvement:

Because X didn't actually have any significant behavioural difficulties and, cognitively, he had very poor memory and attention difficulties he wasn't really learning. I didn't feel that with, even with a lot of intensive rehab that he'd be able to change the level of independence. (Clinical psychologist 1)

The consultant explained in her interview that the scores also helped the team to identify aspects of care that needed to be in place to plan for discharge.

I think they [the scores] trigger us at certain stages in the rehabilitation process. For example, if we are aware that a barrier to be discharged is the ability to manage one or two steps for access to a property, that crops up as part of the Barthel score. If you know they can now do stairs with supervision and we know there's a

carer to help with that, then we can then think ourselves into the next stage and towards planning discharge. (Consultant 2)

Internal use: monitoring progress

The measurement tools provided a commonly agreed benchmark to monitor patients' progress. By comparing current scores with those of previous weeks, the multidisciplinary team assessed whether the patient was changing. In Box 3, the multidisciplinary team is scoring a patient who had been in the unit for seven weeks. They use the scores to track his improvement over time. As the nurse commented in her interview, comparing the scores allowed the team to monitor progress.

They are useful when you see a change from the two weeks before If you score someone and you write a number down it doesn't mean a right lot if you've just got another number down, you know, but it's when you compare them to the previous week. (Nurse 1)

Conversely, the scores also enabled the multidisciplinary team to identify lack of progress. As the consultant explained, a lack of change in the scores raised questions about whether treatment needed to change or whether the patient was capable of making further change.

Box 3 Internal use of measurement tools: monitoring progress

Consultant 1: 'Now he was admitted on the 27th and his Barthel started at 11, has gone to 52 last time. Northwick Park dependency 32 and 25 ... and his discharge date is the 7th April.'

[His scores on the Barthel Index and the home-grown measures are read out.]

Registrar 1: 'Language reception?'

Nurse 3: 'He's much better, yeah.'

SALT 1: 'Erm so I think he'll be a three.'

Registrar 1: 'Three for reception?'

SALT 1: 'Three, yup three for reception ... four for expression and four for functioning so he is participating.'

If you see that the Barthel's not changing over weeks and weeks, you think: What are we doing here? Are we wasting time? Are we not addressing the right thing? Or is the patient actually incapable of making any change? Have we got to accept that as reality? (Consultant 1)

External use: communication with other care providers

The measurement tools provided a structure to objectively decide resource allocation. The nurse explained how they were used to decide which patients to admit to the unit.

It used to be that somebody got to the top of the list and they come in next. But not any more. We do the Northwick Park every week. So, say, if we've got a medium [level of care and dependency] patient bed space, then we look for a medium patient to come in. (Nurse)

Similarly, the physiotherapist commented that the measurement tools provided a common metric to communicate with agencies providing follow-on care. This allowed agencies to prepare care packages or continue to track the patients' progress using the same benchmarks that had been used during their inpatient rehabilitation.

Other places that we refer patients to will use similar measures so it gives them a baseline of where they are. (Physio 1)

The team also used the measurement tools to justify funding from social services to meet patients' care needs after discharge; they were seen as more objective and therefore more credible than subjective clinical information.

If you are reporting to an external body it's much better if you've got a validated measure. (Consultant 1)

However, one of the consultants expressed concern that external agencies were not aware of some of the limitations of the measurement tools and did not have the necessary insight to accurately interpret the measurement tools, which could lead to poor decision-making.

We are all well aware that the Barthel score is never intended to pick up those sorts of [cognitive] problems but I sometimes feel that outsiders may come in and say 'oh that person looks independent, they must be fine, they can go home on their own.' Whereas the reality is different if they had significant cognitive dysfunction. (Consultant 2)

External use: communication with families and patients

The clinical psychologist and physiotherapist noted that the measurement tools were used to explain the patient's problems to the patient and/or their family (to help them understand complex problems such as cognitive impairments and their effect on everyday life) and give feedback to patients about their progress

One of the purposes of doing cognitive assessment is to help the patient and their family understand what's going on. It's not just for us. (Clinical psychologist)

I think patients quite like the Berg [a measure of balance] because you say 'Well this is what you got when you came in, and this is what you've got now'. It'll show a change. It's like you know they know they're better but the score shows they're better. (Physiotherapist)

Conversely, other team members commented that the measurement tools were sometimes used to lend support to the team's opinion that the patient was not making progress during rehabilitation in discussions with family members.

It can be useful to have the structured scores, to be able to say 'here's this score, we do each week to measure their [inaudible] and as you can see from the scores, we're not making any progress'. (Registrar)

External use: justifying the service

The measurement tools were used to demonstrate the value of rehabilitation to hospital managers. This was particularly timely, as the unit had been threatened with closure in the months before the data collection began.

The Northwick Park Dependency Scale is a new exercise to try and quantify the saving in cost of dependence by our procedures, which is an effort to convince management that we're actually perfectly useful. (Consultant 1)

I should stress they [the measures] have got a really valuable, really vital role because as a service we need to not to just explore for ourselves but also demonstrate for others whether or not we can influence things for people with brain injury for the better. (Consultant 2)

External use: audit and service development

The team kept a database of the measures collected, which they used retrospectively to audit their activity and to further develop the service.

If we wanted to look at whether it makes any difference to mobility if we allow our patients to have self-propelled wheelchairs at an early stage, we could evaluate that sort of problem by exploring outcomes in terms of the mobility scores. (Consultant 2)

Discussion

Our findings indicate that when used in daily clinical practice by a well-established multidisciplinary team, standardized measurement tools provided a framework to define the presence and severity of the patients' impairments and activity limitations; informed treatment planning and monitoring of progress; facilitated communication; and enabled service developments. As reported elsewhere,¹⁸ the measures were always combined with clinical knowledge of the patient and acted as a support, rather than a replacement for clinical decision-making. It was notable that team members universally used the term 'outcome measures' in their interviews. However, measuring outcome was only one, relatively small, aspect of the role played by the measurement tools. While such a usage is not uncommon, it would be more accurate and helpful if a clear distinction was made between 'measurement tools', whose uses may be highly varied, embracing both internal and external purposes, and 'Outcome measures'; instruments used specifically to measure the outcomes of treatment.²⁵

Recent health policy developments^{1–3} have stipulated the systematic use of measurement tools or ‘metrics’ to measure clinical outcomes and act as performance indicators. The study findings suggest that such metrics can have a much wider application to support clinical reasoning, effective service delivery and aid communication. If measurement tools are to be used successfully in these multifaceted ways, it is important that the chosen tools provide relevant, appropriate information to patients, clinicians and managers. This is challenging, particularly for services for people with multiple and complex problems, such as the neurorehabilitation unit in this study.

Our findings cohere with previous studies of the impact of implementing objective measurement tools into clinical practice within rehabilitation settings.^{14–16} These showed improvements in the multidisciplinary team’s focus on patient-centred goals, patient participation in goal setting and satisfaction.^{15,16} This suggests that the benefits of implementation relate to the process of care and interaction between the multidisciplinary team and patient, rather than as ways to improve patient throughput. This is important, since improving team working is a key objective in improving service quality.^{7,26} Further research needs to establish the most effective measurement tools for different clinical services; explore patients’ and carers’ perspective; investigate the most effective way of implementing such tools and measure the effects of implementation. This will require measures of the effectiveness of team working and communication, speed of decision-making or quality of discharge planning and utilization of a range of quantitative and qualitative approaches.

Given the study’s case study approach, caution must be exercised in generalizing our findings. Focus lay on only one neurorehabilitation unit and its mode of operation may not be reflective of other units. Moreover, the unit had been using measurement tools for many years and the role of measurement tools in supporting clinical decision-making may have taken time to develop. It could not be assumed that measurement tools would have the same influence if newly implemented. The data also relate to multidisciplinary team meetings and there was no observation of other interactions such as ward rounds, corridor conversations, or goal setting and family meetings in

which measurement tools may have been used. However, the measurement tools used by the multidisciplinary team were typical of those used in other neurorehabilitation units in the UK, although more extensive than many units.¹⁰ Prior negotiation also indicated that multidisciplinary team meetings were the time when the measurement tools were most extensively used, a view reiterated in the interviews. As such, this strengthens our conclusions about how the multidisciplinary team as a whole, as opposed to individual therapists, used the measurement tools to support and inform decision-making in patient care.

This is the first study to directly observe how multidisciplinary teams use measurement tools within clinical practice. Previous studies within rehabilitation settings have used surveys to identify which measures have been collected¹⁰ but have not identified how such measurement tools are then used in clinical care.

Clinical messages

- Standardized measurement tools support and inform clinical decision-making and communication with others.
- Internal uses include assessing and monitoring the patient’s condition, predicting recovery and aiding in discharge planning.
- External uses include facilitating communication with families, demonstrating service effectiveness and supporting audit and service development.

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