The impact of a toolkit on use of standardised measurement tools in stroke rehabilitation

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Abstract

Objective: To evaluate the impact of a toolkit of psychometrically robust measurement tools, the Greater Manchester Assessment for Stroke Rehabilitation (G-MASTER) toolkit, on the use of measurement tools during stroke rehabilitation

Design: Mixed methods cohort design using non-participant observation of multi-disciplinary team meetings and semi-structured interviews with members of the team over three months before and three months after implementation of the assessment toolkit. Development and implementation of the toolkit are also described.

Setting: Ten in-patient stroke services in a large UK city.

Subjects: Members of the participating multi-disciplinary stroke teams.

Results: Before implementation standardised measures were seldom used in team meetings. After implementation, use of all measurement tools significantly increased (36% to 81% of occasions, *P*<0.000). Staff were generally positive about the toolkit and felt it enabled more accurate problem identification, effective progress monitoring, timely decision-making, communication and promoted inter-team relationships.

Conclusions: A toolkit of standardised measurement tools can be feasibly and acceptably implemented into stroke rehabilitation. It increases the use of measurement tools by the multi-disciplinary team and improves the processes and quality of care.

Introduction

Standardised, objective measurement tools are recommended as a key element of assessment during stroke rehabilitation.[1] Although use of such tools is prevalent, they are often unpublished and un-validated, and uptake is haphazard.[2] Health care professionals consistently report lack of consensus

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about which measures to use, as well as lack of knowledge about how to use them, time and resources as barriers to their use.[2-4]

Despite the huge literature on the psychometrics of stroke measurement tools, the make-up of assessment toolkits and their inclusion in clinical guidelines, there has been little research into the actual use of tools in clinical practice. Most investigation has considered the use of patient reported outcome measures of health related quality of life[5-9] and report that although information from these tools can improve problem detection, there is little impact on clinical management or patient outcomes. More specific to rehabilitation, several studies have considered the impact of implementing the Rehabilitation Activities Profile to provide a framework to describe patients' problems and facilitate goal setting.[10-15] They also reported no change in clinical outcomes but found improvements in the processes of care, in that staff spent more time during team meetings discussing common treatment goals or management strategies rather than mere information exchange. There was also modest improvement in patients' satisfaction with their care but not on staff's satisfaction. Similar results were found when the Canadian Occupational Performance Measure was introduced in to a rheumatology rehabilitation team to facilitate goal setting; a greater emphasis on patients' needs and patient participation in rehabilitation was noted.[16]

Despite these promising results and the importance attached to the use of standardised measurement tools, to the authors' knowledge, the implementation of standardised measurement tools has not been examined in stroke rehabilitation. We aimed to address this issue as part of a programme of work investigating multi-disciplinary stroke rehabilitation teams. There were two foci to the programme; the structure and function of stroke rehabilitation multi-disciplinary team meetings, and the use of standardised measurement tools in these meetings. This paper reports the work to develop a toolkit of standardised, objective measurement tools for stroke rehabilitation multi-disciplinary teams (called the Greater Manchester Assessment for Stroke Rehabilitation, G-MASTER)

and an initial evaluation of the impact on the use of measurement tools during in-patient stroke rehabilitation. Current practice, staff views and the barriers to using standardised measurement tools have been published previously.[2]

Simultaneously, we explored current practice and staff views of multi-disciplinary team meetings and constructed a framework to describe the process of the meetings. We then developed and implemented an intervention to improve the quality of multi-disciplinary team meetings, called the M4 model for rehabilitation meetings (which included the G-MASTER toolkit) and evaluated the impact on the quality of multi-disciplinary team meetings and patients' outcomes. A summary of the studies and publications associated with this programme of work is shown in Supplementary Material Appendix 1.[17-21]

Methods

Development of the G-MASTER Toolkit

The process to develop the G-MASTER toolkit is summarised in Figure 1. Firstly, the aspects of stroke rehabilitation (referred to as domains) that needed to be measured were identified. As communication during multidisciplinary team meetings often focuses on exchange of discipline-specific information that is irrelevant or incompletely understand by other team members,[10,11] it was important to identify domains that were relevant to all members of the team. To achieve this, impairments and activity limitations commonly affected by stroke were extracted from the International Classification of Functioning, Disability and Health,[22] previously published core datasets[23-25] and clinical guidelines.[1] This list of domains was then distributed electronically to the participating stroke teams. Each team identified the domains they considered essential elements of rehabilitation that needed to be measured (rather than known or noted, such as the family situation) for all stroke rehabilitation patients, and should be known by all members of the multi-disciplinary team to plan rehabilitation effectively. They also highlighted unnecessary domains and added any that had been missed. Responses were collated and a final list of domains that needed to be
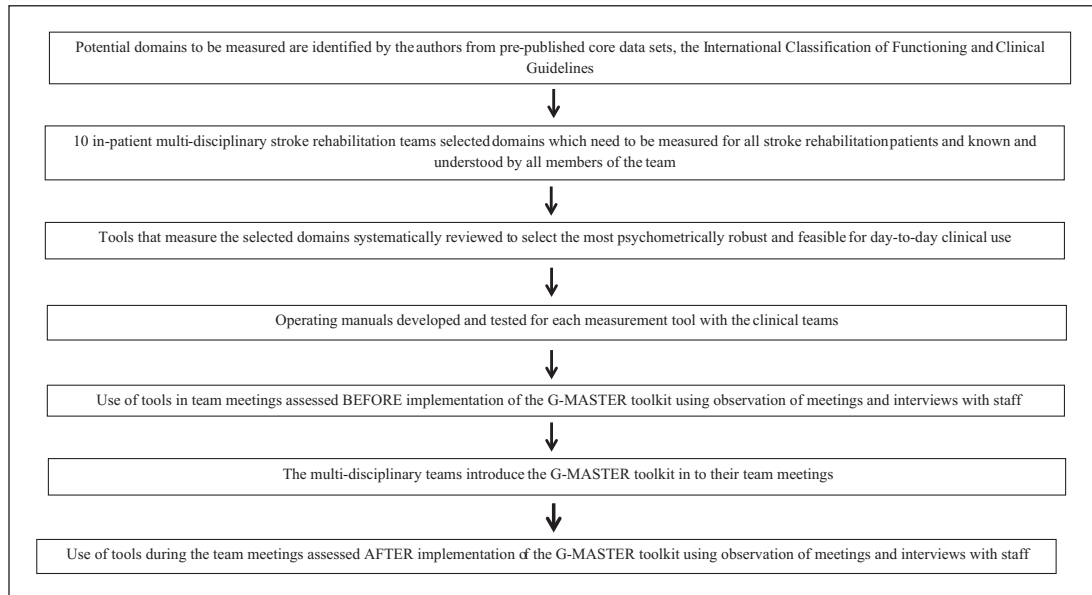
Potential domains to be measured are identified by the authors from pre-published core data sets, the International Classification of Functioning and Clinical Guidelines

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10 in-patient multi-disciplinary stroke rehabilitation teams selected domains which need to be measured for all stroke rehabilitation patients and known and understood by all members of the team

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Tools that measure the selected domains systematically reviewed to select the most psychometrically robust and feasible for day-to-day clinical use

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Operating manuals developed and tested for each measurement tool with the clinical teams

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Use of tools in team meetings assessed BEFORE implementation of the G-MASTER toolkit using observation of meetings and interviews with staff

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The multi-disciplinary teams introduce the G-MASTER toolkit in to their team meetings

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Use of tools during the team meetings assessed AFTER implementation of the G-MASTER toolkit using observation of meetings and interviews with staff

Figure 1. Flow diagram illustrating the process to develop, implement and evaluate the impact of the G-MASTER toolkit.

measured was agreed at a consensus conference. The selected domains were: activities of daily living; swallowing; mood; nutritional status; cognition and communication. Continence, washing, dressing, grooming, toileting, mobility and transferring were also identified and incorporated into 'activities of daily living'.

The authors then undertook systematic reviews of the psychometric properties and clinical utility of tools that measured each domain to identify those which would produce the most robust information and could feasibly be used in day-to-day clinical practice.[18,19] These were included in the toolkit. The tools selected to measure each domain were:

- Independence in the activities of daily living: Barthel Index[26].
- Mood: Stroke Aphasic Depression Questionnaire (SADQ-H10)[27]; Patient Health Questionaire-9 (PHQ-9)[28] and GAD-7[29] or Depression Intensity Scale Circles (DISCs)[30].
- Cognition: Montreal Cognition Assessment[31].
- Communication: communication section of the National Institutes of Health Stroke Scale[32] or Language Screening Tool (LAST)[33] (for

screening) and Therapy Outcome Measures (dysphasia) (to measure outcome)[34].
- Swallowing: Greater Manchester Stroke Water Swallow Screening Tool (for screening) and Therapy Outcome Measures (dysphagia) (to measure outcome)[34].
- Nutritional Status: Malnutrition Universal Screening Tool (MUST)[35].

Operating manuals were obtained for the selected tools, piloted with the participating stroke teams and amended (with further detail) as necessary. The manuals included how to administer and score the measures, timing and repetition of assessments and how they should be reported in multi-disciplinary team meetings. The operating manual containing full details of the toolkit and how it should be used is available to download.[36]

Implementation of the G-MASTER Toolkit

The participating stroke teams (detailed below) then started to use the toolkit in their daily practice and multi-disciplinary team meetings. As team

meetings provides the main opportunity for teams to discuss patients and co-ordinate care, implementation of the toolkit focused on these meetings. Team members would undertake the assessments and make relevant observations during their interactions with patients. They then discussed and, where appropriate, jointly decided the patients' scores for each tool in the team meetings, and information from the scores was used to inform decision-making (such as treatment or referral decisions or discharge plans). To support this, a best practice model for the conduct of multi-disciplinary team meetings (the M4 model for rehabilitation meetings) was also developed and implemented.[20,21]

The toolkit was implemented gradually using established service development methods such as 'Plan Do Study Act' cycles, learning sets and action planning.[37] During this time, the authors regularly met with the teams to monitor progress, set and review actions, and address any difficulties.

Evaluation of the G-MASTER Toolkit

A mixed methods cohort design assessed the use of standardised measurement tools during multi-disciplinary team meetings before and after implementation of the G-MASTER toolkit. Non-participant observation of standardised measurement tools during weekly team meetings were undertaken before and after the implementation phase. Additionally, to gain an insight in to staff's views of implementing the toolkit and the impact on clinical practice, semi-structured interviews with a purposive sample of team members (to ensure a full range of professions was represented) were undertaken during the post-implementation phase.

Selection criteria were broad. All the in-patient stroke rehabilitation teams (*n*=10) in a large city in the UK agreed to participate which covered a range of types of hospital, services and socio-economic areas. Four were combined acute and rehabilitation units and 6 were 'stand-alone' rehabilitation units. Further details of the stroke units, models of service delivery and current practice have been published previously.[20,21]

Observation data were collected by one of the authors (LB) over two, three month periods; before and after implementation. At least one meeting was observed at each site at each stage, the discussion was audio-taped and field notes made. Recordings were transcribed verbatim and anonymised. To evaluate tool usage, two of the authors (LB and ST) independently analysed the meeting transcripts to identify whether the following were reported:

- scores on the identified tools, with interpretation if required
- date of assessment
- resulting actions, e.g. onward referral for further assessment
- allocation of any unreported or incomplete tools to a specific team member with time frame for completion.

Items relating to the team's overall use of the tools were also addressed. Full details are found in Table 1. For each site we ascertained whether each item was:

- always completed (score = 2);
- sometimes completed, but not consistently (score = 1),
- rarely or never completed (score =0).

A score for each tool for each site was calculated by summating the scores for each item and a percentage completion rate (the score/ maximum score x100) calculated to standardise the scores. A score of 100% would indicate that all the criteria for the measurement tool were met all of the time. Scores before and after implementation were compared using Mann-Whitney U tests.

Fifteen staff were interviewed, including nurses; physical, occupational and speech therapists; stroke coordinators; stroke ward managers; a psychologist and a social worker. Four were junior grades (NHS band 5); two were senior therapists (NHS Band 6); one was a highly specialist therapist (NHS band 8) and the others were in specialist posts (NHS Band 7). Length of experience in stroke care varied from a few months to over twenty years. Further details are withheld to maintain anonymity. The interviews were audio-recorded and field notes taken. The recordings

Table 1. Use of standardised measures before and after implementing the G-MASTER toolkit.

	Before implementation (% completion)	After implementation (% completion)	P value
Use of Barthel Index to assess independence in the activities of daily living			
Patients' score stated	3 (18%)	13 (81%)	0.007
All relevant members contribute to scoring	4 (24%)	10 (63%)	0.161
Standardised documentation used to record scores	4 (24%)	12 (75%)	0.105
Scores compared to the previous week	1 (6%)	9 (54%)	0.021
Total (maximum score = 64)	12 (19%)	44 (69%)	0.00
Use of Therapy Outcome Measures to assess language and swallowing			
Patients with language difficulties scored	0 (0%)	12 (75%)	0.000
Patients with swallowing difficulties scored	0 (0%)	13 (81%)	0.000
Scores compared to previous weeks	0 (0%)	4 (24%)	0.234
Total (maximum score = 48)	0 (0%)	29 (60%)	0.000
Use of standardised screening tools to assess mood			
Patients' score stated	2 (13%)	9 (54%)	0.021
Date of completion stated	1 (6%)	1 (6%)	1
Interpretation of screen stated	2 (13%)	10 (63%)	0.015
Action as a result of screen stated	1 (6%)	8 (48%)	0.009
If incomplete, completion is allocated to a specific member with a deadline	0 (0%)	6 (36%)	0.038
Total (maximum score = 80)	6 (8%)	34 (43%)	0.000
Use of Montreal Cognitive Assessment to assess cognition			
Patients' scores stated	1 (6%)	6 (36%)	0.083
Date of completion stated	0 (0%)	0 (0%)	1
Interpretation stated	1 (6%)	9 (54%)	0.065
Action as a result of screen stated	0 (0%)	3 (18%)	0.189
If incomplete, completion is allocated to a specific member with a deadline	0 (0%)	6 (36%)	0.234
Total (maximum score = 80)	2 (3%)	24 (30%)	0.000
Use of Malnutrition Universal Screening Tool to assess nutrition			
Patients' scores stated	1 (6%)	10 (63%)	0.005
Date of completion stated	0 (0%)	0 (0%)	1
Interpretation stated	0 (0%)	7 (42%)	0.038
Action as a result of screen stated	0 (0%)	8 (48%)	0.038
If incomplete, completion is allocated to a specific member with a deadline	0 (0%)	*2 (12%)*	0.721
Total (maximum score = 80)	1 (1%)	27 (33%)	0.000
Team's overall use of standardised measures in meetings			
Scores and dates of completed assessments reported	2	13	0.001
Members can interpret scores	4	9	0.065
Scores are related to the patient's goals	0	4	0.442
Team members bring information to score measures during the meeting	2	13	0.021
Total (maximum score =64)	8 (13%)	39 (61%)	0.000
All items combined (maximum score = 416)	161 (39%)	213 (51%)	0.000

% completion: how often each item was completed in the observed multidisciplinary team meetings, 100%: item was addressed for all patients in all observed meetings, 0%: the item was never addressed.

were transcribed verbatim and anonymised for person and site. Data collection methods and analysis have been described previously,[36] but in summary we used inductive thematic content analysis to identify staff's views about the toolkit; effectiveness, benefits and barriers to success and how it could be improved.

Although we sought ethical approval from the National Research Ethics Service, their view was that the project did not require approval. All participating staff gave consent for data collection.

Results

Before implementation of the G-MASTER toolkit, standardised measures were seldom used in team meetings (overall score =38%, Table 1). Measures of communication, swallowing, cognition and nutrition were never or very rarely discussed. The Barthel Index (a measure of independence of the activities of daily living) was reported most often but only two sites did so consistently (overall score =19%). After implementation, use of all measurement tools significantly increased (36%-81%, *P*<0.000, Table 1).

The interviews showed that staff were generally positive about the toolkit. The most frequently noted change was that it enabled patients' progress to be objectively monitored. As a physiotherapist explained: *"[We] would not want to just make an assumption about, or treat on gut feeling, so to have a bit of an objective marker helps the team focus"*.

Objective information also facilitated communication with patients' families about progress and future plans: *"I was reluctant to do the Barthel every week, because I didn't know what it would add, but actually in its own way, for those patients are not achieving at all, it can be a really useful tool to demonstrate to patients and relatives"*. [Occupational Therapist].

Staff felt that objective measures enabled them to monitor treatment plans and rehabilitation goals which informed planning and decision-making by providing structure and prompted them *"to think"* [Occupational Therapist] comprehensively. An additional benefit was that it enabled *"more proactive"* [Physiotherapist] identification of higher level difficulties that were missed before, which prompted more timely treatment or referrals.

There was also an impact on the team climate. Staff reported that discussion around the scores enhanced awareness and understanding of the patients' difficulties and each disciplines' work to manage them. This built camaraderie: *"Understanding each other's scores, which I think we're starting to do, that's what's helpful"*. [Speech therapist]

These effects were not instantaneous however; it took time and training for the teams to become familiar with the measures and their interpretation. However once embedded, they *"became second nature"* providing a common language that facilitated discussion and decision-making: *"Everyone understands [the tools] and that gives us the opportunity to understand the patient's deficit and quickly work out management strategies, which helps discharge planning. I think our throughput is quick now, ... we are getting to grips with patients' difficulties, managing them and moving forward to discharge more efficiently than we were"*. [Stroke co-ordinator]

Discussion

These results indicate that a toolkit of psychometrically robust standardised measurement tools can be implemented feasibly and acceptably into in-patient stroke rehabilitation and improves the usage of measurement tools by multi-disciplinary teams. It can also improve the effectiveness of team meetings and quality of care, in that staff reported the toolkit enabled more accurate problem identification, effective progress monitoring, timely decision-making, communication and promoted inter-team relationships. Furthermore the increased use of standardised measurement tools would enable recommendations in national clinical guidelines to be met; a proxy marker of service quality.[1] These results compliment quantitative reports that use of standardised measures can improve the process of care. However, our use of both quantitative and qualitative methods gives

greater detail and insight in to possible mechanisms for the improvements seen.

Although significant improvements in measurement tool usage were noted, adherence to the toolkit was still sub-optimal in some areas, particularly the assessment of mood, cognition, nutrition and for monitoring scores from week to week. This may be a reflection of the lack of psychologists and dieticians in most participating multi-disciplinary teams; however the selected measurement tools could be administered by any member of the team. Alternatively, professional tribalism may have made some staff reluctant to engage in work they considered the remit of other professions. This suggests that although staff noted the tools promoted inter-team understanding and a focus on patients' problem rather than professional activity, there is still some way to go before some teams function in an inter-disciplinary 'patient-centred' manner. Furthermore, we used best-evidence implementation and service improvement strategies to promote change in practice,[38-40] but like other authors we found it had limited success in some cases.[40-42] Further work is needed to establish clinically and cost-effective ways to improve service delivery, particularly for complex interventions delivered by multi-disciplinary teams as most work to date has focused on changing prescribing practice by doctors.[40]

Our encouraging findings came from an uncontrolled cohort design so the observed changes cannot be solely attributed to the G-MASTER toolkit (although we are unaware of other work which would induce such changes). Furthermore, assessments could not blinded; staff knew they were being assessed and the assessors were involved in the development and implementation of the intervention which may have produced reporting bias and/or a Hawthorne effect. Nevertheless, our results indicate that a feasible, acceptable toolkit of measurement tools for stroke rehabilitation can be implemented and may impact on clinical practice. Clinical trials are warranted to investigate the impact of the G-MASTER toolkit on outcomes using more robust trial designs.

Clinical messages

- Stroke rehabilitation professionals consider that the activities of daily living, mood, cognition, communication, nutrition and swallowing should be measured for all patients and be understood by all members of the team.
- The G-MASTER toolkit enabled more efficient identification of patients' problems; progress, monitoring; timely decision-making, whilst promoting communication and inter-team relationships, and significantly increased the use of standardised measurement tools.

Conflict of interest

The authors declare that there is no conflict of interest.

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