**TITLE:**

The development and evaluation of a data calculator to facilitate the introduction and use of a standardised outcome measure (Musculoskeletal Health Questionnaire).

**Author(s):**

1. Sarigiovannis P, Musculoskeletal Clinical Specialist Physiotherapist1, Pre-Doctoral Clinical Academic Fellow1,2

Address: Midlands Partnership NHS Foundation Trust, 2nd Floor, Morston House, The Midway, Newcastle-under-Lyme, Staffordshire ST5 1QG, UK

Telephone: (0044) 7595 087542

Email: Panos.Sarigiovannis@mpft.nhs.uk

2. Bradbury H, Head of Allied Health Professionals for Quality and Strategic Delivery1

2. Bishop A, Honorary Senior Research Fellow2

**Institute(s):**

Midlands Partnership NHS Foundation Trust, Newcastle under Lyme, United Kingdom1 Keele University, Primary Care Centre Versus Arthritis, School of Primary, Community and Social Care, Keele, United Kingdom 2

**A B S T R A C T**

Purpose: Musculoskeletal (MSK) physiotherapy teams within Midlands Partnership NHS Foundation Trust (MPFT) used a variety of patient-reported outcome measures (PROMs) and data collection, inputting and analysis methods varied considerably. Therefore, a standardised MSK PROM was introduced across MPFT: the MSK-Health Questionnaire (MSK-HQ), which is an outcome measure specifically developed for MSK conditions. The purpose of this project was to develop a data calculator to facilitate the introduction and use of MSK-HQ and to understand the impact that this calculator had in relation to implementing the MSK-HQ.

Methods Phase 1: A data inputting and analysis calculator was developed to facilitate the implementation of the MSK-HQ in MPFT. Methods Phase 2: The calculator was made freely available to other NHS Trusts and it was shared with over 50 NHS Trusts. An online questionnaire was then developed and distributed via Google Drive to all clinicians who received a copy of the MSK-HQ calculator (n=53). Responses were collected over a four-week-period.

Results Phase 1: Over 6,000 complete data sets (6,044 in February 2019) have been recorded since the introduction of the MSK-HQ. Overall completion rates across MPFT are 10.2%. Phase 2: A total of 32 questionnaires were returned (60.4%). 19 of the respondents (59.4%) used the calculator in their clinical setting. 78.9% reported that the calculator was simple to use. 78.9% of the respondents also reported that the calculator helped them implement the MSK-HQ outcome measure. Finally, 68.7% of all respondents reported that they would find it either useful or very useful to have a similar calculator when implementing other outcome measures.

Conclusion: The outcome measure calculator facilitated the implementation of MSK-HQ and it provided clear guidance on data collection, which assisted clinicians’ interpretation of results and enhanced their engagement. The evaluation of the calculator highlighted that clinical and operation leads would like similar tools to be made available when they implement a new PROM. Researchers, outcome measures developers and operational leads should consider providing such calculators when new outcome measures are released to increase clinical uptake and implementation.

Keywords: Outcome measures, Musculoskeletal Health Questionnaire, Calculator

**Introduction:**

The need for physiotherapists to use standardised PROMs has been recognised and is recommended in clinical guidelines (Swinkels et al, 2011). Although the importance of standardising the use of PROMs within the physiotherapy profession is well recognised, this has largely failed to be delivered in practice (Kyte et al 2015). A number of barriers for implementation of standardised outcome measures have been reported including the lack of knowledge and the lack of instructions in relation to the application, scoring and interpretation of the outcome measure(s) (Jettte et al, 2009).

Musculoskeletal (MSK) physiotherapy teams within Midlands Partnership NHS Trust (MPFT) used a variety of outcome measures including the EuroQol (EQ-5D-5L) alongside condition specific PROMS and a patient reported experience measure, in line with the Chartered Society of Physiotherapy’s recommendations (Kyte et al 2015). Nevertheless, the teams did not use the same outcome measure and data collection, inputting and analysis methods varied considerably. Following a consensus exercise with clinical and operational leads, the Musculoskeletal-Health Questionnaire (MSK-HQ) was introduced as a standardised MSK PROM across MPFT (Sarigiovannis et al, 2017). The MSK-HQ is an outcome measure specifically developed for MSK conditions. It contains 14 items that capture key aspects that patients with a range of MSK conditions have prioritised as important across the clinical pathway. The MSK-HQ is scored on a range of 0-56, with a higher score indicating better MSK-HQ health status. It has been shown that this outcome has excellent test–retest reliability and strong convergent validity with reference standards, including the EQ-5D-5L, and Oxford Hip, Knee and Shoulder scores (Hill et al, 2016). NHS England, the Chartered Society of Physiotherapy, the Royal College of General Practitioners and Versus Arthritis have endorsed the MSK-HQ. Data analysis and interpretation were considered crucial to enhance clinical engagement of the MSK-HQ. Therefore, it was decided to develop a data inputting and analysis calculator to facilitate its implementation in MPFT. The purpose of this paper is to describe the development of the calculator and the evaluation of its impact in clinical practice in relation to implementing the MSK-HQ.

**Methods:**

1. Phase 1

The calculator was designed and developed based on the feedback received from physiotherapy operational and clinical leads. The Trust’s Performance and Information Management and Technology Teams provided support with the technical aspects. The calculator includes various fields and it shows whether a minimal clinical important difference has been achieved based on the pre and post treatment scores. Once piloted, the calculator was introduced gradually to all MSK physiotherapy teams within MPFT: teams with administrative support were the first implementers. The calculator was made available to the teams within the Trust's intranet system: designated administrative staff and the clinical and operational leads for each team were granted access. A standard operating procedure, in relation to using the calculator, and a data collection sheet, which was made available via the Electronic Patient Record, were produced to simplify the implementation process.

1. Phase 2

The calculator was made freely available to other NHS Trusts and it was shared with over 50 NHS Trusts. Seven months later, an online questionnaire was developed to evaluate the use of the calculator. The questionnaire included open and closed ended questions about using the MSK-HQ calculator and it was piloted prior to its release. The aim was to keep its design as short and simple as possible in order to improve response rates while collecting the data required to evaluate the calculator. Finally, it was distributed via Google Drive to all clinicians and/or managers who received a copy of the MSK-HQ calculator (N=53). Responses were collected over a four-week-period. A personalised email explaining the purpose of the evaluation was sent to all clinicians/managers to enhance participation followed by a personalised reminder two weeks after the initial distribution.

**Results:**

1. Introduction of the MSK-HQ and data analysis

Over 6,000 complete data sets (6,044 in February 2019) were recorded since the introduction of the MSK-HQ. Overall completion rates across MPFT were 10.2%; these varied considerably between teams that had administrative support (19.1%) and teams that did not have administrative support (3.7%). Data was consistent across all teams and demonstrated that over 80% of patients achieved a significant clinical improvement following physiotherapy treatment. Specifically, 5114 patients (84.6%) achieved an improvement equal to or greater than the minimal clinically important difference (MCID) for the MSK-HQ; whereas 866 patients (14.3%) had no clinically significant change and 64 patients (1.1%) had a clinically important deterioration. Patients with duration of symptoms up to 2 weeks (N=109) had the greatest improvement in MSK-HQ score (19.4), followed by those who had duration of symptoms 2-6 weeks (N=648) with average positive improvement of 17.6 whereas patients with duration of symptoms of over 1 year (N=1909) had the smallest improvement (13.1). Patients who achieved a significant clinical improvement had an average initial MSK-HQ score of 30 or lower whereas patients who did not had an initial score of 34 or greater.

1. Evaluation of the MSK HQ calculator

32 questionnaires were returned (60.4%). 31 respondents were practicing physiotherapists, 81% of them (n=25) for over 10 years, 16% for over 5 and 3% less than 5 years. As can be seen in Table 1 around one half of respondents reported masters level qualification and nearly a half (46.9%) described their current post as clinical. The majority (68.9%) of respondents worked in primary care settings. The respondents’ characteristics are presented in table 1. When they were asked whether they used the MSK-HQ calculator 59.4% (n=19) replied that they used it. When the respondents who did not use the calculator (n=13) were asked to provide any other feedback of why they did not use the original calculator, 46.1% (n=6) reported that they devised their own calculator and 38.5 % (n=5) that they had not implemented the MSK-HQ.

78.9% (n=15) of the 19 respondents who used the MSK-HQ calculator in their clinical setting reported that the calculator was either very simple or simple to use. Furthermore, 78.9% (n=15) reported that the calculator helped them implement the MSK-HQ outcome

measure (figure 1). When they were asked to describe one way the MSK-HQ calculator had impacted on their clinical practice, comments included that the calculator simplified data collection, analysis and reporting (n=7) and that it facilitated staff engagement (n=5). 68.7% of all respondents (n=22) reported that they would find it either useful or very useful to have a similar calculator when implementing other outcome measures (figure 2). Finally, when asked how they would improve the MSK-HQ calculator, 9 respondents indicated that they would prefer a calculator compatible with the patient electronic record systems, 2 that they would simplify it and 4 that they would prefer more support.

**Discussion:**

59.4% of all respondents (n=19) replied that they used the calculator. The outcome measure calculator simplifies data collection, analysis and interpretation. This practical guidance is important when implementing a PROM in clinical practice. The evaluation results (phase 2) highlight that clinicians and managers consider practical guidance in relation to data collection, analysis and interpretation, enhanced by the use of a calculator such as the MSK-HQ calculator, important when implementing a PROM in their clinical practice.

The themes highlighted in this evaluation are consistent across other studies. Boyce et al (2014)reported thatpractical considerations such as workload implications, the ease of data collection, the level of collaboration among colleagues, the provision of clear guidelines forimplementation, the level of managerial involvement, the availability of training and support, and the use of technology are all important when implementing PROMs to improve the quality of care. Duncan and Murray (2012) also highlighted that organisations can increase the likelihood of successful routine outcome measurement by providing appropriate training, sufficient administrative support and adequate allocation of resources. Similarly, Jette et al (2009) reported that although physiotherapists believe that PROMs could aid in directing the plan of care and enhancing the thoroughness of their examinations, logistical problems such as time, additional paperwork, and lack of administrative staff were important barriers in their implementation. Our results support the findings of the aforementioned studies.

Feedback from the users about improving the MSK-HQ calculator indicated that they preferred an electronic form. When the MSK-HQ calculator was developed, the aim was to integrate it in the development of the Trust’s electronic clinical systems. However, this was particularly challenging as a new clinical system was rolled out across the Trust making difficult to incorporate additional features in the software. The respondents in the MSK-HQ evaluation questionnaire commented that they would prefer that any calculator is linked to the electronic patient records system. This is also highlighted in Gibbon and Fitzpatrick’s (2018) study who reported that electronic capture of data was seen as the ideal method for the MSK-HQ outcome measure, especially if incorporated into clinical systems.

**Conclusion:**

The MSK-HQ calculator enhanced the implementation and clinical use of a standardised outcome measure by providing clear guidance on data collection and interpretation of results. The evaluation of the calculator highlighted that clinical and operation leads would like similar calculators to be made available when they implement a new PROM. Such calculators should ideally be compatible with electronic clinical systems. Researchers, outcome measures developers and operational leads should consider providing such calculators when new outcome measures are released together with the provision of appropriate administrative support to increase clinical uptake and implementation.

**Funding Statement**

Panos Sarigiovannis is funded by a National Institute for Health Research (NIHR) award (Pre‐Doctoral Clinical Academic Fellowship ICA-PCAF-2018-01-014) for this research project.

**Disclaimer**

This publication presents independent research funded by the National Institute for Health Research (NIHR). The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health and Social Care.



**REFERENCES**

Boyce MB, Browne JP, Greenhalgh J 2014 The experiences of professionals with using information from patient-reported outcome measures to improve the quality of healthcare: a systematic review of qualitative research. BMJ Quality and Safety; 23(6):508–18. <http://dx.doi.org/10.1136/bmjqs-2013-002524>

Duncan and Murray 2012 The barriers and facilitators to routine outcome measurement by allied health professionals in practice: a systematic review. BMC Health Services Research; 12:96 <https://doi.org/10.1186/1472-6963-12-96>

Gibbons E, Fitzpatrick R 2018 An alternative approach to implementing patient-reported outcome measures. Pilot and Feasibility Studies (2018) 4:96 <https://doi.org/10.1186/s40814-018-0289-1>

Hill JC, Kang S ,Benedetto E, Myers H, Blackburn S, Smith S, Dunn KM, Hay E, Rees J, Beard D, Glyn-Jones S, Barker K ,Ellis B, Fitzpatrick R, Price A 2016 Development and initial cohort validation of the Arthritis Research UK Musculoskeletal Health Questionnaire (MSK-HQ) for use across musculoskeletal care pathways. BMJ Open; 6:e012331. [http://dx.doi.org/10.1136/bmjopen-2016- 012331](http://dx.doi.org/10.1136/bmjopen-2016-%20012331)

Jette DU, Halbert J, Iverson C, Miceli E, Shah P 2009 Use of standardized outcome measures in physical therapist practice: perceptions and applications. Physical Therapy;89:125-135. <http://dx.doi.org/10.2522/ptj.20080234>

Kyte DG, Calvert M, van der Wees PJ, ten Hove R, Tolan S, Hill JC 2015 An introduction to patient-reported outcome measures (PROMs) in physiotherapy. Physiotherapy 101:119–125. <http://dx.doi.org/10.1016/j.physio.2014.11.003>

Sarigiovannis P, Porter I, Beardmore 2017 Producing a data-inputting and analysis calculator to facilitate the implementation and standardisation of outcome measures in a community physiotherapy service. Physiotherapy 103, Supplement 1, p e126. <https://doi.org/10.1016/j.physio.2017.11.111>

Swinkels RAH, van Peppen RPS, Wittink H, Custers JWH & Beurskens AJH 2011 Current use and barriers and facilitators for implementation of standardized measures in physical therapy in the Netherlands. Swinkels et al. BMC Musculoskeletal Disorders 2011, 12:106 <http://www.biomedcentral.com/1471-2474/12/106>

**APPENDICES**

**TABLES & GRAPHS**

**Table 1:** Characteristics of respondents

|  |  |
| --- | --- |
| **Characteristics** | **No of responses (% of responses)** |
| **Occupation:**PhysiotherapistOther | 31 (96.9%)1 (3.1%) |
| **Years qualified as physiotherapist**10 years or more1-5 years5-10 years | 25 (80.6%)1 (3.2%)5 (16.1%) |
| **Highest qualification**DiplomaBScMaster module(s)Masters (MSc, MPhil, MBA)Post graduate CertificatePhD | 1 (3.1%)8 (25%)4 (12.5%)17 (53.11 (3.1%)1 (3.1%) |
| **Post description**ClinicalClinical academicClinical and managerialManagerialOther (Service improvement) | 15 (46.9%)1 (3.1%)8 (25%)7 (21.9%)1 (3.1%) |
| **Clinical setting**Primary/Community CareSecondary Care | 22 (68.9%)10 (31.3%) |

**Figure 1: How much has the MSK HQ calculator helped you implement the MSK HQ outcome measure? (1= little, 5=a lot)**

**Figure 2: Would you find it useful to have a similar calculator for other outcome measures that you use? (1= very useful, 5= no useful at all)**