

Clinical assessment series

The use of patient reported outcome measures (PROMs) in clinical assessment

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Introduction

The clinical assessment series began with a paper by [Flynn et al. \(2015\)](#) setting out the components of clinical assessment including:

- History taking
- Physical Examination (Observation/Inspection, palpation, range of movement, special tests)
- Clinical investigations (laboratory tests, x-rays and scans)

In addition to these core components of assessment, Patient Reported Outcomes Measures (PROMs) are increasingly being used, both in initial assessment of patients presenting to orthopaedic services and to measure improvement following interventions such as joint replacement and surgery or other interventions for injury. PROMs have been widely used in the speciality of orthopaedics and trauma internationally for over 2 decades.

This paper aims to provide an overview of the purpose of PROMs, a summary of PROMs commonly used in orthopaedic and musculoskeletal trauma services and to discuss their use and value in clinical assessment. It will also consider some of the challenges faced when using PROMs, particularly with patients with multiple joint disease, comorbidities or cognitive, learning and/or communication difficulties.

The use of PROMs

PROMs are assessment questionnaires that seek to ascertain patients' views of their symptoms, functional status and health related quality of life ([Black, 2013](#)). They provide an opportunity for patients to evaluate outcome of an intervention. Outcomes are the end results of a specific event or intervention. In healthcare, they are often used as a measure of change, with the end outcome being compared with the situation or experience before an intervention such as surgery. This enables practitioners, patients and services to track the success of treatment and care and to develop optimum care, treatment and management strategies ([Kyte et al., 2015](#)). Measurement of outcomes aims to provide a way to make comparisons by using a relative value (representing a concept, for example, such as pain or function) rather than an absolute one. The most important aspect is that the outcome measure is 'patient reported', capturing patient views and experiences rather than focussed on the views of health practitioners.

PROMs are often sub-classified into 2 groups: 1) generic health status measures and 2) disease or specific measures ([Dawson et al., 2010](#)). Generic PROMs consider broad issues related to general symptoms, functioning and quality of life and are often used for patients with complex health problems such as rheumatoid arthritis or following spinal cord injury or a combination of different conditions such as in psoriatic arthritis or following multiple injuries. Specific measures are designed or adapted for use with conditions, injuries or following interventions. Some PROMs are also adapted for different languages and locations.

PROMs can be used to identify patient improvement or deterioration. This is particularly common following surgery, or an intervention aimed at resolving, treating or improving a health condition or injury and the PROM is used as an outcome measure designed to identify the success or otherwise of the intervention. As well as being used as a clinical assessment tool, PROMs are also used to measure outcomes in research studies evaluating interventions

or considering, for example, the benefits of one intervention in comparison to another. Recently, PROMs have been suggested as an approach to capturing patient experience and to measuring outcomes following enhanced recovery after orthopaedic surgery (Jones et al., 2014).

A single PROM can be used, or more than one to enable several aspects of the patient's symptoms and experience to be evaluated. Although in research it is recommended that both generic and specific measures are used to maintain a high degree of specificity, in clinical assessment often only one disease or condition specific measure is used to maintain simplicity and timeliness of the process. Many patients, particularly older people, suffer with co-morbid conditions and use of a generic PROM provides an overall view of the patient's health status, but not the specific impact of one condition.

Typically, patients are asked to complete either a paper or on-line version of a questionnaire that aims to evaluate their own views or perceptions of their experience of issues such as pain, disability, function and other related symptom or the questionnaire is completed on their behalf by a health professional during an interview (or telephone interview) if the patient is unable to complete the questionnaire without help.

PROM questionnaires usually attempt to provide a 'measure' of the patient's experience by seeking responses consisting of named items or categories such as symptoms, functional ability or impact. For each item, patients are asked to state yes or no in relation to a specific question or to 'score' their response based on a rating scale (for example, responding to a 5- or 7-point scale) that represents the frequency or severity of their symptoms, abilities or experiences. Rating scale responses may, for example, use one or more of the following (Streiner & Norman 2014):

- Numerical rating scales (e.g. scoring an item 0 to 10)
- 'Adjectival' scales where descriptive words such as 'none', 'poor', 'some', 'severe', 'extremely' may be used.
- Visual analogue scales (a line with a fixed length with 'anchors' such as 'pain' and 'worst pain possible' and the patient places a mark on the line to represent their experience)
- 'Likert' scales where the patient is asked to choose a word that describes their response along a range using words such as strongly agree, agree, no opinion,

Each item response is often ascribed a score that is added together to give the patient a total score for that measure.

It is important that PROMs used in the assessment process are used and analysed appropriately and that they are reported carefully in the patient's care record (Nelson et al., 2015). Staff using PROMs must also be appropriately experienced and trained in the use of specific PROMs including how to ensure they are completed correctly by patients (or others where they need help) and in recording and interpreting the data.

PROMs commonly used in orthopaedics and trauma

PROMs commonly used in orthopaedics and trauma consider physical aspects of the patient's daily life and function such as pain, mobility, joint function and activities of daily living. They can also consider general, social and psychological elements such as general health status, social functioning, cognition, mood and quality of life. Examples of commonly used PROMs in orthopaedics and musculoskeletal trauma can be found in Table 1. Further information about PROMS commonly used in orthopaedics can be found at www.orthopaedicscores.com. Table 2 Provides examples of the type of questions found with commonly used PROMs. Some PROMs require permission, and sometimes payment, to the copyright holder.

Table 1 Examples of Patient Reported Outcome Measures (PROMs) used in orthopaedics and trauma.

alt-text: Table 1

Focus	Name of PROM	Purpose
General	SF36 (General MOS 36-Item Short-Form Health Survey (SF-36), EQ-5D)	A well-validated and commonly used questionnaire that provides an indication of general health status. The questions consider 8 main categories of health and life function: vitality, physical functioning, bodily pain, general health perceptions, physical role functioning, social role functioning and mental health.
	Nottingham Health Profile (NHP)	Used to gain a brief overview of a person's own view of their physical, emotional and social health problems. Designed for use in primary health care. Considers; energy levels, pain, emotional reactions, sleep, social isolation, physical abilities and life areas affected.
	Short-Form McGill Pain Questionnaire (SF-MPQ)	A shortened version of the original McGill pain questionnaire, widely used in the measurement of pain. Asks questions about sensory pain (how it feels) and the 'affective' impact of pain on the patient's life.
	Musculoskeletal Functional	A questionnaire with 100 patient-reported health items, designed for assessment of patients with musculoskeletal health problems.

	Assessment Instrument (MFA)	
	Barthel index	A questionnaire consisting of 10 items that assess a person's functional ability with a focus on activities of daily living and mobility. Considers: feeding, transfers, walking, going up and down stairs, dressing and continence. It is frequently used with patients undergoing rehabilitation in a variety of settings, not just orthopaedics and enables monitoring of improvement in function over time. There is also a modified version of this index available.
Condition specific	Osteoarthritis Western Ontario and McMaster Universities Osteoarthritis (WOMAC) Index	A health status questionnaire with a specific focus on patients with hip or knee osteoarthritis that enables the clinician to assess pain, stiffness and physical function using 24 questions about the effects of their joint pathology. Has Likert scale and visual analogue versions
Hip	Oxford Hip Score (OHS)	A short 12-item questionnaire developed and validated specifically for patients undergoing THR to self-assess their function and pain.
	Hip disability and osteoarthritis Outcome (HOOS)	A refined version of the WOMAC index used for patients with hip disability with or without OA. Comprises 6 sections assessing: symptoms, stiffness, pain, function (daily living), function (sports & recreation) and quality of life.
Knee	Oxford Knee Score (OKS)	A short 12-item questionnaire developed and validated specifically for patients undergoing TKR to self-assess their function and pain.
	Knee Injury and Osteoarthritis Outcome (KOOS)	Designed and validated to be used following knee injury that results in post-traumatic OA or ACL, meniscus, chondral injuries. Comprised of same 6 sections as HOOS.
Upper limb	Disabilities of arm, shoulder and hand Score (DASH)	A 30-item questionnaire developed & validated for patients to self-assess symptoms and function related to conditions or injury affecting their arms, shoulders or hands. There is also a shorter version comprising 11-items.
	Oxford Shoulder Score	12-item questionnaire developed and validated for patients to self-assess symptoms & function following shoulder surgery or due to degenerative conditions such as OA or rotator cuff problems.
Spine	Oswestry Low Back Pain Disability Questionnaire	Requires patients to consider their back problems over the previous 4 weeks, comprises 10 sections related to pain intensity, activities and function.

Table 2 Examples of questions from commonly used PROMS.

alt-text: Table 2

PROM	Example questions	Response options
Oxford hip score	During the past 4 weeks, how would you describe the pain you usually had from your hip?	5- point Likert scale- none, very mild, mild, moderate, severe.
	During the past 4 weeks, have you been able to put on a pair of socks, stockings or tights?	5-point Likert scale – Yes, easily, with little difficulty, with moderate difficulty, with extreme difficulty, No, impossible.
WOMAC index	Enter the amount of pain experienced in your study joint in the last 48 h	5- point Likert scale, none, mild, moderate, severe, extreme
DASH	During the past week, <i>to what extent</i> has your arm, shoulder or hand problem interfered with your normal social activities with family, friends, neighbours or groups?	5- point Likert scale: No difficulty, mild difficulty, moderate difficulty, severe difficulty, unable

The benefits of using PROMs in clinical assessment

PROMs are a useful component of clinical assessment because they give patients an opportunity to report their own individual perceptions of the impact of a condition/s on their lives, particularly their self-assessment of pain. They also enhance communication between the patient and practitioner and help to develop a patient-focused plan of care (Jette et al., 2009) as well as the opportunity to assess how surgery and other interventions have impacted on the patient's health and functional status.

Gaining the patient's perspective is important for several reasons; increasing clinicians' understanding of the difficulties faced by patients because of their musculoskeletal condition and because clinician-rated assessment using tools such as the Harris Hip score (Harris, 1969) and Mayo Hip Score (Kavanagh and Fitzgerald, 1985) frequently do not match the perceptions of patients themselves, particularly in areas such as pain and function. Clinicians are known to underestimate the levels of pain and disability patients experience (Wylde et al., 2005). The experiences of living with a musculoskeletal condition or impact of a traumatic injury are subjective and influenced by multiple factors both intrinsic to the patient (such as coping, stress and anxiety) and external factors (such as support from others (informal and formal), availability of aids and adaptations and prior experience of injury or poor health). Therefore, PROMs are an essential component of clinical assessment if person-centred care is to be achieved. Research studies also frequently use PROMs as measures of success or otherwise of interventions in further recognition of the need for patient-centeredness in research that ultimately leads the development of health care provision.

The problems and pitfalls of using PROMs in clinical assessment

There are, however, several problems with PROMs that the clinician needs to consider when using them to undertake patient assessment. Depending on the way PROMs are constructed and delivered, they can be difficult to complete, and patients and carers may find them confusing and complicated and take too much time for the clinician or patient to complete. Some PROMs may not be appropriate for patients because they have not been developed specifically for that patient group or clinical problem and may not have been developed using the most appropriate language or cultural sensitivity (Jette et al., 2009). It is important; therefore, the clinician selects the PROMs for use in assessment carefully.

For many patients with functional, cognitive and communication difficulties it may be impossible for them to complete a PROMs questionnaire. This leads to a risk that these patients' views and experiences are not captured. Failing to consider the views and experience of patients such as those with learning disabilities or dementia, for example, leads to the provision of health care services that are not tailored to meet the needs of vulnerable groups, so it is essential that these difficulties are overcome.

People with intellectual disabilities (known as learning disabilities in the UK), communication difficulties and/or cognitive impairments such as Dementia are regular recipients of orthopaedic and trauma interventions and should receive PROMS questionnaires. It is unknown if or how patients with these difficulties complete a PROMs questionnaire either before or after orthopaedic or trauma interventions. If they do not complete a PROMs questionnaire then their unique experiences are not captured or evaluated which has implications for this group of patients, commissioners of services as well as health care providers as this results in a significant amount of data that has not been collected. However, if someone else, such as a health care professional or support worker, a family or a paid carer has completed the PROMs questionnaire on behalf of the patient, there is a risk that the patient's experiences may not have been captured reliably. However, for patients with the most complex needs, the carer who knows the patient well is invaluable as communication is most successful with familiar, responsive partners who care about the person they are communicating with (Goldbart and Caton, 2010).

All hospitals in the UK have a legal responsibility to provide reasonable adjustments for people with an intellectual disability (Equality Act, 2010) and this encompasses changes to communication methods, provision of easier to read information, use of hospital/communication passports and reasonably adjusted procedures (Drozd and Clinch, 2016), for example the completion of PROMS questionnaires that are tailored to meet the individual needs of patients with intellectual disabilities, communication difficulties and/or cognitive impairments. Good health care services are individualised and person-centred with a focus on the quality of the relationship with staff and the person with an intellectual disability (Mansell, 2010) which is the same requirement as for a patient without an intellectual disability, communication difficulty or cognitive impairment. Central to this relationship is effective communication (Bradbury-Jones et al., 2013). When patients are admitted into hospital or attend another health care setting, Drozd and Clinch (2016) highlight the requirement for effective 'flagging systems' to be in place to identify people with intellectual disabilities, cognitive and/or communication impairments to ensure that these particularly vulnerable patients are identified. Following this, appropriate support along with reasonable and achievable adjustments can be implemented. This requires staff to have specific competencies when caring for people with these difficulties (RCN, 2017). Furthermore, the role of the Acute Liaison Learning Disability Nurse in the UK can provide invaluable support and facilitate communication between the patient and the staff (MacArthur et al., 2015). Goldbart and Caton (2010) suggest that these patients may be enabled to communicate more effectively if alternative methods of communication are implemented such as the use of communication/hospital passports, pictures, photographs or symbols, signing such as the use of Makaton, using objects of reference, the Picture Exchange Communication System (PECS) or the use of high technology Alternative and Augmentative Communication (ACC) devices. There is on-going evaluation of these interventions. Time must also be allowed for the patient to process information and express responses (Goldbart and Caton, 2010) and whilst some patients may be able to understand short and simple sentences, additional time should be allocated to communicate in the most appropriate person-centred way.

Not all conditions or injuries have a specific PROM related to them. For example, Haywood et al. (2017) point out that there is no specific PROM for hip fracture patients and Burton et al. (2012) states the same for patients following limb reconstruction. There may also be difficulties created by using a score designed for another purpose. For example, the Oxford Hip Score has been developed for use with patients undergoing elective hip procedures, but it may not be appropriate for use in patients with hip injuries (Haywood et al., 2017). These are groups of patients who have sustained complex injuries leading to care needs and problems that are particularly difficult to capture. In this instance clinicians are obliged to use either generic measures or measures designed for other purposes and they should always be aware that such measures may not provide valid or useful information. This may change in the future

as more measures are developed, but this will also make the situation more complex for both clinician and patient.

Choosing a PROM

Selecting the best PROM for assessment of a patient is an important aspect of ensuring assessment is accurate and individualised. Clinicians must ensure that any PROM used as part of clinical assessment has been developed and validated specifically for the condition/injury relevant to the individual patient. It is essential to ensure that PROMs being used are valid, reliable, sensitive, specific and practical (see [Table 3](#) for further detail) otherwise they provide an inaccurate clinical picture.

Table 3 Definitions of terms used to describe the accuracy of PROMs.

alt-text: Table 3	
Validity	The PROM measures what we think it does rather than some other aspect of the patient's experience that we did not intend to measure. This also refers to the amount of confidence clinicians can have in the information we are given by the PROM and its impact on the decisions they make.
Reliability	The degree to which the result of a measurement (in this case, from a PROM), can be depended on to be accurate. This can also mean the degree to which the same results can be gained using a PROM with a specific patient under the same conditions at the same time: for example between more than one clinician at the same
Sensitivity	The ability of the PROM to enable fine discrimination between levels of impact of the condition/disease.
Practicality	The degree of usefulness of the PROM in terms of the ability of patients to be able to complete it or understand the questions

It is important that the practitioner selects a PROM that meets as many of these criteria as possible. To be able to do this, it is essential that the evidence underpinning the measure is considered. Some PROMs have been explored by researchers to ascertain how well they meet these criteria and have been subjected to psychometric testing to ensure they measure what they set out to measure. However, this is variable, and the practitioner needs to be aware of any weaknesses of the measures they are using by exploring the literature relating to the PROM and the specific assessment they are trying to make. They need to be aware of whether the measure has been evaluated and validated for use with that specific condition or injury. [Haywood et al. \(2017\)](#), for example, conducted a systematic review to ascertain the quality and acceptability of existing PROMs for use with patients with hip fractures, as few had been used with this group of patients before. They found that there was limited and poor-quality research evaluating the use of PROMs for the assessment of patients with hip fracture and that further research is urgently needed to identify the best measures for use in this patient group.

PROMs enable patients to assess their own symptoms, function and health from a subjective perspective that reflects the experience of the individual. The inherent subjectivity within each measure is a strength as, when used alongside other methods of assessment, they provide a fuller, more balanced view of the patient's condition that can positively influence collaborative decision making relating to treatment options following assessment. However, the weaknesses of PROMs need to be considered. For example, [Murray et al. \(2007\)](#) reported concerns about the clarity, coverage and content validity (the representativeness of the range of questions being asked within the PROM) related to the Oxford Hip Score. A study by [Wylde et al. \(2005\)](#) exploring patients' perspectives of the Oxford Hip Score found 5 specific areas of difficulty: lack of question clarity (particularly concerning the use of aids), difficulty in reporting measurement of pain, restrictive and irrelevant questions, the influence of co-morbidities on responses and double-barrelled questions. These findings support the authors' experiences of using PROMs in assessment; specifically, that patients often find it difficult to rate their pain in a joint or region when they have multiple joint involvement or injuries and are unsure if their mobility and function are compromised due to a specific problem or general frailty or co-morbid conditions. It is, therefore, important that the completed PROMs are discussed with the patient to clarify any areas of confusion and for the clinician to obtain a more detailed understanding of their responses.

When and how PROMs are used

PROMs can be used as part of an initial assessment to form a baseline to support subsequent reviews following treatment or intervention e.g. joint replacement surgery, fracture fixation, use of pain management therapies, joint injections, medications and rehabilitation. By using a PROM during an initial assessment and then again for follow-up assessments a before and after treatment comparison can be made. There is debate about whether patients should be provided with their previous scores before completing the PROM during assessment, the disadvantage of this maybe that patients may complete their scores to reflect an improvement/deterioration rather than focusing on their current status. Many countries now have national joint and fracture registries or databases which require orthopaedic services to submit PROMs data and these are used as part of the data set to evaluate the success of types of prostheses, centres and individual surgeons. PROMS can be administered face to face or also by post or on-line for non-face (telephone/tele-medicine) reviews.

Summary

This paper has discussed how the patient's perspective on their symptoms and the extent their condition impacts on their functional ability can be captured by incorporating PROMs into the assessment process. PROMs are also used following interventions such as orthopaedic surgery and comparisons made with the pre-intervention scores to ascertain the effectiveness of the intervention from the patient's perspective. It has also been highlighted that we need to be mindful that not all patients can complete PROMs without assistance and that patients with multiple joint disease and/or co-morbidities often find it difficult to differentiate between symptoms or difficulties caused by a specific musculoskeletal problem and other health conditions and therefore it is recommended that whenever possible the PROM is discussed with the patient during the assessment process rather than solely relying on the composite score alone.

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Queries and Answers

Query: Please check whether the designated corresponding author is correct, and amend if necessary.

Answer: yes all 3 author surnames correct

Query: The citations [Royal College of Nursing 2017; McMurray et al (2007)] have been changed to match the author name in the reference list. Please check here and in subsequent occurrences.

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