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Specificity of the minimal clinically important difference of the quick Disabilities of the Arm Shoulder and Hand (QDASH) for distal upper extremity conditions

Major(P) Enrique V. Smith-Forbes PhD, OTR/L, CHT [a,*], Dana M. Howell PhD, OTD, OTR/L [b,c], Jason Willoughby MHS, OTR/L, CHT [d], Donald G. Pitts MS, OTR/L, CHT [d], Tim L. Uhl PT, ATC, PhD, FNATA [b]

[a] Graduate Medical Education, Fort Sam Houston Clinic, Building 1179, Room 1A38, 3100 Schofield Road, Fort Sam Houston, TX 78234, USA
[b] Department of Rehabilitation Sciences, College of Health Sciences, University of Kentucky, Lexington, KY, USA
[c] Department of Occupational Therapy, Eastern Kentucky University, Richmond, KY, USA
[d] Kentucky Hand & Physical Therapy, Drayer Physical Therapy Institute, Lexington, KY, USA

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ABSTRACT

Retrospective cohort design. The minimal clinically important difference (MCID) for the quick Disabilities of the Arm, Shoulder and Hand (QDASH) has been established using a pool of multiple conditions, and only exclusively for the shoulder. Understanding diagnoses-specific threshold change values can enhance the clinical decision-making process. Before and after QDASH scores for 406 participants with conditions of surgical distal radius fracture, non-surgical lateral epicondylitis, and surgical carpal tunnel release were obtained. The external anchor administered at each fourth visit was a 15-point global rating of change scale. The test-retest reliability of the QDASH was moderate for all diagnoses: intraclass correlation coefficient model 2, 1, for surgical distal radius = 0.71; non-surgical lateral epicondylitis = 0.69; and surgical carpal tunnel = 0.69. The minimum detectable change at the 90% confidence level was 25.28; 22.49; and 27.63 points respectively; and the MCID values were 25.8; 15.8 and 18.7, respectively. For these three distal upper extremity conditions, a QDASH MCID of 16–26 points could represent the estimate of change in score that is important to the patient and guide clinicians through the decision-making process.

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Introduction

The Minimal Clinically Important Difference (MCID) represents a change in score on a standardized assessment that is perceived to be beneficial or harmful by the patient.[1] The MCID may be calculated for patients with upper extremity (UE) deficits using two common UE assessments, the quick Disabilities of the Arm, Shoulder and Hand (QDASH)[2] and The Global Rating of Change (GROC).[3] The MCID can be clinically used to interpret patient change scores to guide clinical decision-making.

The QDASH, a region specific outcome measure, is a shortened version of the Disabilities of the Arm Shoulder and Hand (DASH).[4] Both instruments are widely used in rehabilitation.[5,6] The GROC, a generic global change scale, allow patients to decide how much they have changed during recovery. The QDASH's MCID has been determined using the GROC to identify those patients who have improved and comparing them to those who have not improved with UE diagnoses.[7] However, the results of these studies have generated a wide range of MCID (8–20),[7–11] which represents 10–20% of the 100-point scale and suggests the instrument may have poor responsiveness. One potential explanation for this variance may be because a single diagnosis was not used in most of the previous studies.[7] The MCID may differ among diagnoses, and this may help explain the varying results in the literature.[12] This is the primary rationale for examining MCID among separate diagnoses.

The QDASH's psychometric and clinimetric properties have been investigated. Rasch analysis[13] and classical theory[14–16] have been used to investigate the strength and weaknesses of the QDASH measures. A recent systematic review found the QDASH English version tool to perform well with strong positive evidence for reliability and validity (hypothesis testing) and moderate positive evidence for structural validity testing. Strong negative evidence was found for responsiveness due to lower correlations with global estimates of change.[17]

Multiple approaches have been used to calculate the responsiveness of these measures. The MCID current and previous values become critical in assisting providers in making clinical decisions. Several authors have suggested clinicians and researchers work with a range of MCID values instead of a fixed value,[18,19] another has questioned the validity of a single overall MCID.[8] Distribution-based and anchor-based methods have been the two general approaches used to interpret changes. The strategy for distribution-based approaches lies in identifying the Minimal Detectable Change (MDC), which is the smallest change in score that can be distinguished beyond random error.[20] Distribution-based approaches do not give a good indication of the importance of the observed change and therefore cannot provide the MCID.[18] In contrast, with anchor-based methods the choice of the anchor among other things will determine the precision of the MCID.

Recent studies recommend the MCID be based primarily on anchor-based procedures,[21] not be based on one study[1] and should be higher than the MDC values (the typical boundary of stable patients),[20,21] and not be based on a single study.[1] Nevertheless, there are limited studies calculating the MCID through anchor-based approaches for the QDASH.[7–10] Furthermore, it seems the best option to determine MCID is to select a small range of threshold estimates from the same sample and compare and interpret multiple reference standards.[1,21,22] This approach has been applied in a few studies on the DASH and QDASH.[11,16] Some of the approaches to calculate the MCID utilized in the literature are: $0.2 \times$ standard deviation at baseline, $0.5 \times$ standard deviation at baseline, and one standard error of measurement (test-retest), among many others.[16]

The main aim of this study was to use both anchor-based and distribution methods to triangulate on MCID values for the QDASH. We used a retrospective large sample of patients with UE musculoskeletal disorders who had undergone hand therapy. The objective was to determine condition specific thresholds for the MCID in order to enhance confidence in interpreting patient change scores for clinical decision-making.

Methods

Subjects

This retrospective study population consisted of patients in a database seen at an outpatient UE orthopedic condition rehabilitation multi-center, over the last 4 years. There were approximately 5000 patients in the existing database treated for multiple orthopedic conditions. All data in the database was de-identified and transferred to a data sheet for study purposes and then provided to the primary investigator (PI) for use by the database manager. The University of Kentucky's Institutional Review Boards approved this exempt category study prior to data analysis.

Inclusion and exclusion criteria

Subjects age 18–89, were included if they were not missing QDASH scores at initial visit and visit 4, not missing last visit score determined per diagnoses at either visit 8 or visit 12, and not missing associated GROC scores for the QDASH. Diagnoses not totaling at least 100 records, based on the above criterion were excluded. Surgical distal radius fracture, non-surgical lateral epicondylitis, and carpal tunnel release were included as the three most common conditions treated by hand therapists at these facilities.

Assessment

The QDASH uses 11 items to measure the degree of difficulty in performing various physical activities due to a shoulder, arm, or hand problem. It utilizes a 5-point Likert scale for seven functional items and three symptom items. Ten of the 11 items need to be completed for the scores to be valid. The score is calculated on a 0-to-100 point scale. A higher score reflects greater disability. The 2 optional scales of the QDASH (work and sport/music) are not commonly collected in this clinical practice and therefore were not part of this study.

In contrast, the GROC scale[23] asks that a person assess his or her current health status in relation to when they start their treatment and rate their level of change on a 15-point scale (-7 = a very great deal worse, 0 = same, $+7$ = a very great deal better).[24] Both instruments have been reported to be valid and reliable.[2,25,26]

Procedure

The database was reviewed to identify the most commonly treated diagnoses. It is known from review of the database that the typical number of visits for all diagnoses ranged from 8 to 12 visits. A screening process was used to identify that adequate scores were present at the time point of interest at initial, 4th, 8th, and 12th visit (Fig. 1). In addition, the range of days treated was explored to determine a cutoff point for the last visit.

Statistical analysis

Descriptive statistics

All statistical analyses were performed using Stata/IC Version 13.1 (StataCorp LP, College Station, TX). Baseline characteristics per diagnoses between improved and not improved patients were determined for patient demographics of age, initial QDASH, and length of days in care using a t-test for parametric data and a Wilcoxon Mann–Whitney test for nonparametric data. A Chi-square test was used to calculate baseline gender differences (Table 1).[9] Patients were sub-divided per diagnoses into two groups each, stable and improved, in order to analyze baseline
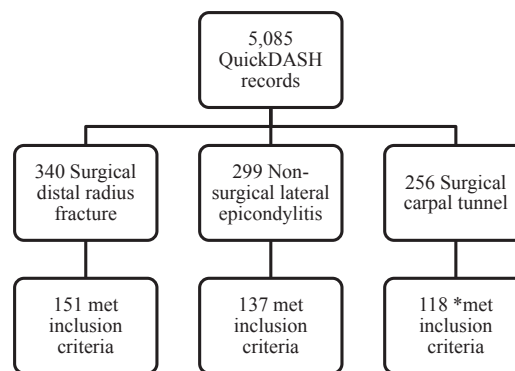
Inclusion criteria: have values for QDASH initial, visits 4,8 and 12, and GROC visit 12.
*= last visit for QDASH and GROC is visit 8 instead of 12.

Fig. 1. Flow of charts meeting inclusion criteria.