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Scientific/Clinical Article

Cross-cultural adaptation, reliability and validity of the Turkish version of the Upper Limb Functional Index (ULFI)

Eda Tonga PT, PhD^{a,*}, Neslihan Durutürk PT, PhD^a, Philip C. Gabel PT, PhD^b, Agah Tekindal MSc^c^a Baskent University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Ankara, Turkey^b Centre for Healthy Activities, Sport and Exercise, Faculty of Science, University of the Sunshine Coast Queensland, Sippy Downs, Australia^c Baskent University, Faculty of Medicine, Department of Biostatistics, Ankara, Turkey

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ABSTRACT

Study design: Clinical measurement.

Background: The Upper Limb Functional Index (ULFI) is a patient reported outcome (PRO) measure with sound clinimetric properties and clinical viability for determination of upper limb function.

Purpose-methods: The aims of this study were to cross-culturally adapt the ULFI for Turkish-speaking patients (ULFI-Tk) and investigate the reliability and validity in patients with upper limb problems. Patients (n=102, age 49.1±16.6) with upper limb disorders were consecutively recruited. All participants completed the ULFI-Tk and the Disability of Arm, Shoulder and Hand Turkish-version (DASH-Tk) criterion at baseline and day-three.

Results: The ULFI-Tk demonstrated good internal consistency ($\alpha=0.87$), moderate criterion validity (DASH-Tk: $r=0.68$; $p<0.05$), moderate reliability (ICC2:1=0.72, CI=0.58–0.80) and strong error measurement (SEM=2.94; MDC90=5.35). Exploratory factor analysis demonstrated a dual factor structure that explained 31.2% of total variance.

Conclusions: The ULFI-Tk is a reliable and valid PRO that could be used to assess upper limb musculoskeletal disorders in Turkish speaking patients

Level of evidence: Class 2.

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Introduction

Upper extremity musculoskeletal disorders involve tendons, muscles, ligaments, neural tissue and in some instances may have a contributing component from the cervical spine.^{1–4} The major factors affecting function are range of motion, muscle strength and pain. Functional loss related to problems with these factors can limit an individual's activities of daily living (ADL) and cause disability.⁵ This in itself can be a major problem or one that leads to negative effects on an individual's health-related quality of life (HRQOL).^{5–7}

The effectiveness of any treatment to the upper extremity often focuses on the evaluation of physical symptoms, including range of motion, grip strength and sensory capacity. However, these findings are unable to identify the patients' level of independence and functional capacity in ADL. For these reasons, patient reported outcome (PRO) tools that consider HRQOL, such as

the SF-36 and Euro-QOL, are commonly used for supplementary assessment.^{8–13}

However, these PROs are not sufficiently sensitive to accurately evaluate function related changes^{9,12–15} in the upper limb. This led to the development and use of joint- or disease-specific tools^{2,16,17} and more recently a move toward region-specific tools. These latter PROs consider and subsequently evaluate the upper extremity as a single kinetic chain.^{2,10,14,18} The region-specific PROs have emerged as the preferred option due to their greater application across a wider variety of clinical and research conditions and situations.^{19,20} They are more practical and easier to administer than physical objective clinical measures.¹⁹ Consequently regional PROs can require fewer patients and a smaller 'number needed to treat' to detect the effectiveness of an intervention.^{21,22} This self-report data indicates the clinical changes that represent the patients' perception of their function with unique information specific to their condition.^{19,23}

Seven region-specific upper limb PROs developed for use in general populations were found in the literature: the Neck and Upper Limb Index (NULI),² the Upper Extremity Functional Index (UEFI),²⁴ the Upper Extremity Functional Scale (UEFS)²¹ the

* Corresponding author. Tel.: +90 3122466673; fax: +90 3122466674.

E-mail addresses: etonga@baskent.edu.tr, eda-fzt@hotmail.com (E. Tonga).

Disabilities of the Arm, Shoulder, and Hand (DASH),^{9,10} the DASH shortened-version QuickDASH with 11-items²⁵ and the QuickDASH-9 with nine-items²⁶ and most recently the Upper Limb Functional Index (ULFI), initially as a dichotomous tool²⁷ and subsequently as a three-point response option PRO.¹⁸ In the literature there is no review on region-specific PROs. Furthermore, there is no gold standard for the assessment of upper extremity function in patients with upper limb musculoskeletal disorders.²⁸

The ULFI is a self-report questionnaire designed to assess activity limitations and participation restrictions resulting from upper limb musculoskeletal disorders.²⁷ A study showed that the original ULFI had high internal consistency, excellent test-retest reliability, good convergent validity with the QuickDASH questionnaire and good responsiveness.¹⁸ In addition, the ULFI was translated and culturally adapted to both Spanish and French-Canadian. Both these studies indicated the ULFI was a valid and reliable PRO with similar psychometric properties to the English language version.^{29–31} The ULFI has some advantages for clinicians and patients that include a short implementation time, simple scoring and readability levels.²⁹ Hamasaki et al concluded in their study that the ULFI appears to be an appropriate outcome measure for health professionals working with French-speaking patients with upper limb musculoskeletal disorders in a clinical setting where the time issue is critical.²⁹ Similarly, in Turkey the health professional generally works in a busy clinical environment. To date the DASH is the only regional PRO cross-culturally adapted to Turkish and is shown to be preferred to other upper limb joint or condition specific tools.^{16,32} Because of these reasons the ULFI was selected to be culturally adapted to Turkish as it would provide an additional PRO to the DASH for upper limb regional assessment in Turkish speaking populations.

The aims of this study were to cross-culturally adapt the ULFI for Turkish-speaking patients (ULFI-Tk) and determine the clinimetric properties of reliability, criterion validity, internal consistency, measurement error and factor structure in patients with upper limb problems. As the DASH was the only other upper extremity regional PRO available in Turkish it was concurrently investigated as the criterion standard.

Materials and methods

Subjects

Subject inclusion criteria were an age minimum of 18 years, symptoms duration of ≤ 12 weeks, providing an acute to subacute population, and being referred by a medical practitioner to the Baskent University Physical Therapy Clinic with a diagnosis of an upper limb problem. Exclusion criteria were the inability to read Turkish or respond to the questionnaires, recent surgery, infectious disease, neurological diseases, cancer or other systemic diseases that may affect the upper limb. The study was approved by the Baskent University Non-Interventional Clinical Researches Ethics Committee.

Procedure

Baseline data was collected by a physiotherapist with a minimum qualification of a PhD on the day of the patient's initial attendance. All participants were informed of the study's details and signed an informed consent. All patients were given the ULFI-Tk and DASH-Tk to complete. Patients were asked to repeat the questionnaires for test-retest reliability including an additional external 'global rating of change (GRoC)' scale at a subsequent attendance following a two day period of non-treatment.^{17,31} All tests were again collected by the same physiotherapist.

Questionnaires

The ULFI is a single page, 25-item upper limb regional PRO with three response options: "Yes"/"Half"/"No" and scored by assigning 1 point for "Yes" 0.5 points for "Half" and 0 points for "No." The total points are added and multiplied by four to score the functional limitation, then subtracted from 100 to provide a functional status scaled from 0 (worst function) to 100 (maximum or pre-injury function). Up to two missing responses are permitted.^{18,27}

The DASH is a 30-item PRO that evaluates impairments, activity limitations and participation restrictions for leisure activities and work. A total of 21 items evaluate difficulty with specific tasks, five items evaluate the symptoms and a single item evaluates social function, work function, sleep and confidence. Response options are scaled as 1-no difficulty, 2-mild difficulty, 3-moderate difficulty, 4-severe difficulty and 5-unable. The DASH raw scores are then multiplied by a conversion formula to produce values from 0 to 100 for each module where the higher score indicates severe functional loss. The DASH-Tk has been shown to have excellent test-retest reliability and validity and demonstrated as an adequate and useful tool for measuring functional disability in upper extremity complaints of Turkish speaking patients.^{16,32}

The external GRoC is a criterion standard provided at retest to assess the presence of change during the intervening period.³³ This study used the three response option question: 'Is your condition better, the same, or worse as compared to the day of the first test?'; where the required response for inclusion in the reliability component was 'the same'.

Translation and cross-cultural adaptation

A double forward and backward translation was completed. Forward translation was performed independently by two Turkish native-language translators. This allowed detection of errors and divergent interpretations of items with ambiguous meanings. To improve idiomatic and conceptual (rather than literal) equivalence and improve reliability, one translator had knowledge of the questionnaires concepts and the study's purpose. This enabled any unexpected meanings in the original tool to be recognized. Back translation was performed blindly and independently by two English native-language speakers. The final versions were compared to the original version for inconsistencies and a pilot consensus version completed.^{14,34}

Cultural adaptation

The ULFI-Tk was pilot tested on 20 patients with upper extremity musculoskeletal disorders. The participants found the questionnaire easy to understand and applicable to their conditions. Subsequent review and discussion found most of the questionnaire translated without difficulty, but some discrepancies were present due to linguistic and cultural differences. Changes were made through finer adjustments to wording that enabled a final consensus agreed format from all translators with changes compared to the English version as follows:

- Item 15 was not understood by Turkish patients and modified to an English equivalent of 'I feel physically weaker and stiffer';
- Item 20 was changed from 'I have difficulty eating and/or using utensils (knife, fork, spoon, chop sticks) with 'chop sticks' removed as this was not applicable';
- Item 21 was changed from 'I have difficulty holding and moving dense objects (e.g.: mugs, jars, cans)' to include the example of a 'tea glass.'

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