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EDITORIAL

DEVELOPMENT OF NEW ASSESSMENT TOOLS IN PHYSICAL MEDICINE AND REHABILITATION: A CHALLENGE TO CURRENT RESEARCH

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This paper deals with the development of the Neck pain and Functional Limitation Scale, a new outcome measure for the assessment of neck pain in the Asian context.^[1]

Being grateful to the authors for their efforts, we strongly encourage researchers in developing capabilities to analyze psychometric properties of clinical tools which are essential for the bio-psycho-social evaluation of patients with spinal disabilities. It is our responsibility to ensure psychometrically sound measures that can be administered carefully and analyzed correctly.^[2]

Assessment is fundamental in the medical sciences and aims at replacing an empirical approach to the disabled person with a

scientific methodology, thereby improving the effectiveness of clinical practice.^[3] Therefore, a number of aspects should be cautiously considered when assessing the psychometric properties of a new or translated outcome measure.

According to the traditional Test theory, psychometrics is concerned with the precision of measurement and expresses this in terms such as reliability, validity, and responsiveness to change.

Reliability indicates whether the measure is internally consistent and reproducible. Internal consistency indicates the degree of connectiveness among the items of the scale whereas reproducibility, or test-retest reliability, demonstrates the stability of the instrument over repeated measures. The length of time between two test administrations should be appropriate: a very short time interval increases the probability of carryover effects due to memory, practice, or mood, whereas a longer interval increases the chances of a change in status.^[4]

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There are many aspects of validity: content validity seeks to make sure that the items selected cover the concepts to be measured. Face validity evaluates the credibility of the items of the measure. Criterion-related validity is determined by comparing the results of the scale against the gold standard. Concurrent validity is ascribable to criterion validity, showing the ability of a test to predict results obtained by another test administered at the same time or in the future (predictive validity). Construct validity expresses the ability of an instrument to measure a specific concept; this involves gathering evidence using other types of validity such as convergent (the new scale should correlate positively with other instruments measuring the same construct) or discriminant (the new scale should not correlate at all with instruments that measure a different construct) validity.^[4]

Responsiveness is the ability to identify changes or differences that are clinically or individually meaningful (minimal clinically important difference). This concept should be clearly distinguished from “minimum detectable change” which represents the ability to detect the measurement error (*i.e.*, imprecision or noise) of the instrument.^[4]

Clinicians and researchers have also to consider further features of a measure: the appropriateness (how well the content of the scale matches the purposes which the specific trial is intended to address), the precision (the exactness of the instrument, which is mainly based on the number and accuracy of distinctions made), the interpretability (how the measure can be understood by others), the acceptability (how easy the measure

is for respondents to complete), and the feasibility (how easily the instrument can be administered).

When investigating the psychometric properties of a multidimensional tool, it is also recommended to provide a factor analysis, a useful method for exploring the underlying dimensions of a measure and for reducing variables into summary indices. Exploratory analysis should be initially performed, whereas factor loadings of the single items should be achieved through subsequent orthogonal (Varimax) or oblique (Promax) rotations.

The application of international guidelines is strongly recommended for cross-cultural adaptation of an already existing measure.^[5] The first step consists of translating the outcome measure from the original language into the target language, retaining the original concepts. The second step consists of the back translation into the original language to identify any difficulties and inconsistencies in translation and taking into account any possible cultural diversities, conceptual equivalences, or differences in vocabulary. Both steps require independent native speakers who are unaware of the concepts being explored. The third step includes the submission to a committee consisting of clinicians and psychometric experts so as to receive an external approval. The fourth step encourages the performance of an on-field test to verify whether the formulation of the items is clear.

We advise clinicians and researchers who desire to approach the assessment of outcome measures to take into consideration these suggestions so to be able to increase the

soundness of new outcome tools and related clinical decisions.

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