Physical Functioning and Pain in Chronic Low Back Pain: A Systematic Review of Psychometric Properties of Various Outcomes Measures

INTRODUCTION

The American Academy of Family Physicians defines Low Back Pain (LBP) as "pain, muscle tension, or stiffness located below the costal margin and above the inferior gluteal folds, with or without radiation." 1

LBP is said to be chronic (CLBP) when it persists for 12 weeks or more. 2

There is no clear consensus about the diagnosis, treatment, and assessment of outcomes for CLBP. 3

Since pain is subjective, the effectiveness of CLBP treatment is assessed using outcome measures covering various domains such as pain, quality of life, mood, sleep, and functional capacity (physical, cognitive, emotional, and social).

A variety of such outcome measures have been used in CLBP randomized controlled trials (RCTs) for assessing efficacy of different treatment options.

The analysis of psychometric properties of such outcome measures will provide a basis for selecting the best measurement instrument for a specific patient population.

Many studies have evaluated the psychometric properties of various physical functioning and pain outcome measures used in CLBP.

It is also important to assess the methodological quality of the studies which have investigated psychometric properties of the CLBP outcome measures.

OBJECTIVE

To evaluate the methodological quality of studies that evaluated psychometric properties of functioning and pain outcome measures for CLBP using Consensus-based Standards for the selection of health status Measurement Instruments (COSMIN) checklist.

MATERIALS AND METHODS

A systematic search was conducted following the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines.

We searched PubMed and EMBASE databases from inception to June 2015 with specific key words.

Longitudinal cohort and cross-sectional studies which included at least one assessment of psychometric property of outcomes measures in CLBP patients were included.

Studies published in English language and on humans were included.

Studies published as reviews, editorials and case reports and other than CLBP were excluded.

Two reviewers independently performed study selection, data extraction and quality assessment procedures; disagreements between reviewers were resolved through discussion.

The COSMIN Checklist with 4-point Scale

STEP 1: Evaluated measurement properties in the article: internal consistency, reliability; relative measures (including test-retest reliability, inter-rater reliability), measurement error; absolute measures content validity (including face validity), structural validity, hypothesis testing, cross-cultural validity, criterion validity, responsiveness, and interpretability

STEP 2: Determining whether the statistical method used in the article is based on Classical Test Theory (CTT) or Item Response Theory (IRT). Box General requirements for studies that applied IRT models: excellent/good/fair/poor

STEP 3: Determining whether a study meets the standards for good methodological quality: excellent/good/fair/poor

STEP 4: Determining the Generalizability of the results.

RESULTS

Key results of reliability

Measures having excellent and good psychometric properties scores on COSMIN

- Pain Catastrophising Scale
- Roland Morris Disability Questionnaire
- Japan Low Back Pain Evaluation Questionnaire
- Oswestry Disability Index
- Pain Beliefs and Perceptions Inventory
- Core Outcome Measures Index

The analysis of psychometric properties of CLBP outcome measures is shown in Table 1. The results are also discussed in relation to the COSMIN criteria.

Key results of validity

Measures having excellent construct and content validity on COSMIN

- Chronic Pain Acceptance Questionnaire
- Quebec Back Pain Disability Scale
- Pain Catastrophising Scale
- Roland Morris Disability Questionnaire
- Oswestry Disability Index
- Disability Rating Index etc.

Many treatment options are in use for CLBP, but there is no clear consensus as to which treatment modality is the best. 4

RCTs on CLBP have focused on the statistical significance of change in scores from outcome measures. 5

Examples for such outcome measures include:

- Oswestry Disability Index
- Roland/Morris Disability Questionnaire (RMDQ)
- Quebec Back Pain Disability Score (QBDPS)
- Pain disability index
- Pain catastrophising scale
- Disability Rating Index etc.

For these to be meaningful, the outcome measures considered in these RCTs must be valid and represent the true impact of the intervention on various domains.

The NICE guidelines for nonspecific LBP recommend that any intervention should have a high impact on patients’ outcomes in particular pain, disability or psychosocial distress. 6

To achieve comprehensive multidimensional evaluation of outcome in LBP MMPACT proposes six core outcome domains that should be considered:

- (1) pain, (2) physical functioning, (3) emotional functioning, (4) participant ratings of improvement and satisfaction with treatment, (5) symptoms and adverse events and (6) participant disposition.

Various studies have evaluated the psychometric properties of many of these outcome measures having the core domains in the background.

Our study was done with an intention to assess the methodological quality of some of these studies.

CONCLUSIONS

We found moderate methodological quality for most of the measures to advise tools used based on psychometric properties.

Further research is needed to investigate the psychometric properties of all outcome measures used in CLBP research.

REFERENCES

6. NICE clinical guideline 99 (May 2009) Low back pain: Early management of nonspecific low back pain