A note of caution with respect to the Low Back Pain Perception Scale in primary care physiotherapy

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Abstract.
BACKGROUND: The predictive validity of the Low Back Pain Perception Scale is determined in two studies in general practice and showed sufficient discriminative ability, although the psychometric properties of the scale have never been established until now.
OBJECTIVE: To determine the reliability and validity of the Low Back Pain Perception Scale in acute nonspecific low back pain patients.
METHODS: The Low Back Pain Perception Scale has been authorized translated into Dutch by two bilingual content experts. A sample of 84 acute low back pain patients in physiotherapy primary care, mean age (SD) age 42 (12) years participated in this study. Internal reliability and a test-retest procedure within one-week interval were evaluated.
RESULTS: The internal consistency Cronbach $\alpha = 0.38$ (95% CI 0.09 to 0.56) and test–retest reliability within one week Intra Class Correlation coefficient $= 0.50$ (95% CI 0.31 to 0.64). Minimal Detectable Change was measured 1.95. The concurrent validity demonstrates Pearson’s $r = 0.35$ (95% CI 0.14 to 0.53).
CONCLUSIONS: The Low Back Pain Perception Scale demonstrates poor internal consistency and reliability and moderate concurrent validity. Extreme high or low scores may be clinical relevant therefore the scale can be used as a first screening instrument.

Keywords: Perception, reliability, validity, acute low back pain, prognosis

1. Introduction

The role of illness perception in musculoskeletal disorders, which is specified in the Common Sense Model of self-regulation of illness (CSM), represents a number of cognitive properties like identity, consequences, cause, timeline, cure and control [1–3]. These representations are patients’ beliefs concerning cause, condition and expectations about recovery and the possibility to underpin coping behaviour of low back pain patients [4,5]. Although the short-term natural course of acute nonspecific low back pain (ANSLBP) is favourable, however, the probability of recurrence within a year is high. The latter may be influenced by patients’ perceptions of complaints [6,7]. There is evidence that the course of (acute) nonspecific low back pain can be improved by a change of patients’ illness perception [8–10].

The generic Brief Illness Perception Questionnaire (IPQ-B) is derived from the revised version of the Illness Perception questionnaire by Broadbent et al., 2009 and validated for nonspecific low back pain [11, 12]. A specific instrument is developed by Miller et al., 1994, the Low Back Pain Perception Scale (LBPPS) to
assess patients’ perception of ANSLBP, which can be used to predict the risk of chronic complaints [13]. The predictive validity of the LBPPS is determined by evaluating the subjective interpretation of the general practitioner (GP) measured by pain intensity, pain duration and functional status during 4 months follow-up [14]. The predictive validity of perception of ANSLBP using the LBPPS is also determined by assessing the likelihood of chronic low back pain in ANSLBP patients [15]. Although this scale may also be suitable in primary care physiotherapy psychometric properties including reliability and concurrent validity have not been studied until now.

Therefore, the aim of this study is to examine internal consistency, test-retest reliability and concurrent validity of the Dutch version of the LBPPS in ANSLBP patients in primary care physiotherapy.

2. Methods

2.1. Patients and setting

The study sample consists of Dutch patients all with ANSLBP, consecutively recruited by physiotherapists. Inclusion criteria: age 20–60 years, a new episode of ANSLBP (time since onset < 6 weeks) with or without radiating pain in the leg and being capable to read and understand in the Dutch language. Exclusion criteria: specific cause of low back pain like nerve root disorders, lumbar spinal stenosis, spondylololisthesis, after injury, infection, osteoporosis, tumour or rheumatic diseases such as M. Bechterew. Patients aged over 55 years were especially screened for having a first episode of low back pain to exclude serious pathology.

All participants were preliminary screened by general practitioners and referred to physiotherapists in two multidisciplinary health care centres in the northern part of the Netherlands. After a written informed consent was signed and verbally confirmed, patients filled in the demographic characteristics questionnaire and the procedure of the study was explained. Measurements of the LBPPS and the IPQ-B were obtained prior to the usual standard physiotherapy care service. At this initial contact only history and physical examination were carried out after the data was collected. Physiotherapists were instructed to avoid giving any information what might influence patients’ perception of low back pain. All data were treated as confidential in order to protect the privacy and anonymity. The current purely observational, non-interactive study was carried out without interference in standard usual care or interfering with normal practice and approvals. Ethics approval was therefore not considered. The study was performed in agreement with the directives given in the Helsinki Declaration as revised in 2007 [16].

2.2. Scale

The LBPPS is used as a self-reported, self-administered two point Likert scale with 5 items to express patients perceived perception towards low back pain (total score range 5–10): a high score reflects high risk for not recovery [14]. A cut off point of \( \geq 2 \) and \( \geq 4 \) is determined [15].

LBPPS components:

1. Do you expect a fast recovery of your low back pain? (Expectations, hope)
2. Do you feel limited in your activities? (Activities, behavioural)
3. Are you worried about your low back pain? (Worrying, affective)
4. Did you find a way to deal with your low back pain? (Coping, behavioural)
5. Does your low back pain influence the most important elements of daily life? (Meaning of pain)

2.3. Cross-cultural adaptation and translation

To maintain content validity of health status self-reported questionnaires when used in another country or culture, the items need to be translated in a cross-culturally adapted way. The original authors of the LBPPS gave permission for authorised translation and re-validation of the LBPPS. Cross-cultural adaptation and the authorised translation procedure were carried out according Beaton’s guideline [17]. Two bilingual translators who achieved consensus and synthesis of the two translations performed forward translation English into Dutch. Another two bilingual English native speakers living in The Netherlands for 23 years performed the back translation procedure, Dutch into English unaware of the English version; these translations were merged into one version. This version is compared with the original English version and as a consequence two bilingual physiotherapists obtained the translated version and reached consensus concerning this final version of the LBPPS.

2.4. Reliability

Assessment of test-retest of the LBPPS is carried out with one-week interval to measure the same con-
Table 1  

Patients' characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Count (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of patients</td>
<td>84</td>
</tr>
<tr>
<td>Age (years), mean (SD)</td>
<td>42 (12)</td>
</tr>
<tr>
<td>Female, n (%)</td>
<td>36 (43%)</td>
</tr>
<tr>
<td>Relapse (a) – yes</td>
<td>28</td>
</tr>
<tr>
<td>Sports (b) – yes</td>
<td>40</td>
</tr>
<tr>
<td>Education (c)</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>10</td>
</tr>
<tr>
<td>Intermediate</td>
<td>45</td>
</tr>
<tr>
<td>High</td>
<td>29</td>
</tr>
<tr>
<td>Height (cm), mean (SD)</td>
<td>178 (9)</td>
</tr>
<tr>
<td>Weight (kg), mean (SD)</td>
<td>81 (15)</td>
</tr>
<tr>
<td>BMI (kg/m²), mean (SD)</td>
<td>25 (4)</td>
</tr>
<tr>
<td>Pain (millimeter), mean (SD)</td>
<td>57 (20)</td>
</tr>
</tbody>
</table>

\(a\) Last previous episode was < 6 months. \(b\) Organized sports. \(c\) Low = Primary school; intermediate = secondary education; high = higher education.

structs at two different points in time. All patients received the same intervention and to avoid influence on patients’ perception by the examiners during the study any information about the natural course of ANSLBP was prohibited and administration was executed prior to intervention.

2.5. Concurrent validity

The IPQ-B as a validated instrument in ANSLBP is used to assess concurrent validity by examining correlations of items with the same construct [11,12]. A three-week test-retest interval show a Pearson’s \(r = 0.62\) in a sample of renal patients, and the associations between the cognitive perception scales in the IPQ-B and the IPQ-R showed strong correlations with the perception of personal control and treatment control [18]. This ordinal (0–10) eight item instrument measures the cognitive patients’ perceptions concerning illness like consequences (item 1), timeline (item 2), personal control (item 3), treatment control (item 4), identity for describing the condition and the symptoms of low back pain (item 5), illness comprehensibility (item 7), concern and emotions (item 6 and 8).

2.6. Statistical analyses

Statistical analyses were performed using SPSS 19.0. For internal consistency Cronbach’s alpha was calculated. The Intraclass Correlation Coefficient (ICC) and its confidence intervals (95%) were calculated to evaluate test-retest reliability. An ICC value above 0.70 indicates acceptable reliability; those below 0.7 are moderate [19]. Pearson’s correlation coefficient is used to assess concurrent validity with the IPQ-B. A Bland Altman plot represents the limits of agreement (LOA) between two measurements on a ratio scale: mean values of two assessments and mean difference of the two assessments considering 95% of the results vary between the mean difference.

3. Results

3.1. Patients’ characteristics

One hundred and five participants were recruited. Excluded were 21 participants because of chronic complaints, like nerve root disorders, rheumatic diseases or other specific causes. The obtained sample consists of 84 ANSLBP patients with a mean (SD) age of 42 (11) years and complaints less than six weeks. Individual patient data are listed in Table 1.

3.2. Internal consistency

The inter-item consistency Cronbach’s alpha of the LBPPS is 0.38 (95% CI: 0.09–0.56). Except one, the ‘expectation’ item, all items show a Cronbach’s alpha less than the overall value, if they were deleted, see Table 2. In addition, items reflecting ‘coping’ and ‘meaning of pain’ will substantially cause a decrease of the overall alpha if they were deleted.

3.3. Test-retest reliability

Mean score at the first assessment of the LBPPS is 7.29 (1.25) and at the second assessment mean score 6.83 (1.28). The mean difference of 0.37 (1.16) tested by the paired t-test is significant \((t = 2.86, df = 81, p = 0.005)\). There was one participant with missing values at the first administration and another participant at the second.

The Bland Altman plot showed Limits of Agreement between −1.90 and 2.64, see Fig. 1. The coefficient of regression of the difference on the mean 0.24 (SE = 0.13, \(p = 0.054\)) was not significantly different from zero. The distribution is homogenous, no clear outliers were detectable and no systematic trend is visible.
The two-way consistency ICC for single measures equals 0.50 (95% CI: 0.31–0.64). The Smallest Detectable Change (SDC) was measured 1.95.

3.4. Concurrent validity

A Pearson’s correlation coefficient was used to analyse the concurrent validity with the IPQ-B, Pearson’s $r = 0.35$ (95% CI: 0.14–0.50).

4. Discussion

In this study we found poor internal consistency of the LBPPS in ANSLBP patients. This may be attributed to the multidimensionality of the scale, the fact that the construct is psychological, and the low number of items [19]. The test-retest reliability ICC is 0.50 (95% CI: 0.32–0.64) and considered moderate [20]. When compared with the IPQ-B, concurrent validity of the LBPPS revealed a ‘medium’ correlation in terms of magnitude of effect size whereas a correlation value of $>0.50$ is acceptable [21,22].

Systematic difference within one week is significant but small from clinical perspective. The smallest detectable change of 1.95 indicates that larger differences on the scale may reflect a changed perception of low back pain, however, as a result of the positive natural course in ANSLBP patients’ perception of pain might also have been influenced in a positive way. To minimize treatment influence all data was collected just before the two interventions, therefore the altered LBPPS score might be due internal or external factors. It is crucial that physiotherapists use reliable instruments to identify perception of acute nonspecific low back pain and teach patients to cope with negative beliefs.

When deleting the item describing, “Do you expect a fast recovery of your low back pain” in the LBPPS, the overall reliability of the scale will be considerably increased, which can be interpreted as measuring another construct within the scale. It is also possible that patients understood the implications of this item well and that it strongly appealed. In recent literature “negative patients’ expectations for recovery” has proved to be a strong predictor for chronic complaints in musculoskeletal disorders and in particular in patients with ANSLBP [23,24].

A limitation of the study was the relatively long time between test and retest so patients could have been influenced by the favourable natural course of ANSLBP, which may explain the difference between test and retest measurements. Although the physiotherapists were instructed to avoid giving any information that might affect patients’ perception of pain in a subjective way this remains uncertain. A changed perception of pain within one week may have negatively influenced the test-retest reliability results. The Hawthorne effect may have been present: a change to a positive result and a more positive perception of pain due to participation in the study thanks to special at-
tention and to please the examiners patients’ behaviour might have altered and thus skewed the results [25].

This study suggests that this short, five-item scale must be used with caution; large differences seem to be clinically relevant whereas small differences should not be over interpreted.

5. Conclusion

We conclude the LBPPS for use in primary care physiotherapy shows poor internal consistency and reliability and moderate concurrent validity. Although the IPQ-B is a reliable alternative in primary care physiotherapy, the LBPPS can be a useful first screening instrument, which can be quickly administered. As a result of this study we will not discourage implementation of this instrument, however it’s use must be done with caution.

References