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ORIGINAL RESEARCH

Translation, validation, and cross-cultural adaptation of the Polish version of the pain sensitivity questionnaire

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Introduction: The purpose of this study was to provide a translation, cross-cultural adaptation, and validation of the Polish language version of the pain sensitivity questionnaire (PSQ). The process followed widely accepted guidelines.

Methods: The translated questionnaire underwent thorough psychometric testing. In total, the data of 144 subjects (mean age 52.53±13 years), who underwent evaluation for lower back pain, were included.

Results: The exploratory factor analysis revealed a two-factor structure, PSQ-moderate and PSQ-minor. The internal consistency was good (Cronbach's α was 0.96). There was a fair and significant correlation between the results of the PSQ and the coping strategy questionnaire (CSQ; Spearman's rho was 0.27). The test-retest reliability was favorable, and the intraclass correlation coefficient (ICC) for the CSQ total was 0.93 with a mean interval of 9.04 days between administrations.

Conclusion: Our results show that the Polish version of the PSQ is valid and can be recommended for Polish-speaking patients.

Keywords: pain sensitivity questionnaire, PSQ

Introduction

According to The International Association for the Study of Pain, "pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage".[1] Pain is a subjective first-person experience, and the associated perception and response are individual-specific. Increased pain sensitivity can indicate susceptibility to the development of chronic pain disorders, eg, chronic lower back pain.[2–4] Moreover, it may be used to identify patients who are at risk of poor outcomes after certain surgical procedures.[5,6] Preoperative assessment of pain sensitivity can predict acute postoperative pain to a certain degree, although this relationship is also dependent on the type of surgery performed.[7] A recent study by Azimi and Benzel[8] showed that the pain sensitivity questionnaire (PSQ) could be used in clinical practice to predict surgical success in patients with lumbar disc herniation. They provided a cutoff value of 5.2 for the PSQ that reliably predicted favorable surgical outcomes.

With growing interest in individual sensitivity to pain, new methods have been developed to measure pain sensitivity. One such method is the PSQ developed by Ruscheweyh et al.[9,10] It comprises 17 items that describe daily life situations and asks the respondent to rate her or his pain on a numeric rating scale from 0 (not painful

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at all) to 10 (worst pain imaginable).[9] The PSQ has been proven to be a valid instrument for the evaluation of pain sensitivity in both healthy individuals and those suffering from chronic pain.[9,10]

This study aimed to develop a cross-cultural adaptation of the PSQ for Polish-speaking patients. In order to assess its validity and conceptual equivalence, the resulting Polish version[11] underwent certain psychometric tests.

Methods

In this study, Beaton's guidelines for the cross-cultural adaptation of self-reported measures were used.[12]

Process of translation and synthesis

The process of translation and cross-cultural adaptation of the original PSQ questionnaire in English was performed in accordance with the recommendations of the American Academy of Orthopedic Surgeons.[12] Two independent native Polish speakers translated the English version[13] of the original PSQ using the method developed by Ruscheweyh et al.[9] The two versions were then analyzed by a neurosurgeon until a consensus was reached. The resulting version was then translated into English by two independent native English speakers, who were unaware of the purpose of the translation. The final version was carefully reviewed by the expert committee that evaluated four aspects of equivalence: semantic, idiomatic, experiential, and conceptual. All the elements of the questionnaire, including the instructions and headings, were analyzed and the discrepancies between the members were discussed until a consensus was reached. This process concluded with a written report, resulting in the prefinal version.

Test of the prefinal version

The prefinal version was applied to a convenience sample of 12 patients with spine-related disorders, and after completion, all the subjects were asked for their opinion on the content and structure of the questionnaire. The same expert committee evaluated the gathered information in another meeting, and the prefinal version was accepted without further changes.

Patients

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of the University of Poznan. Each patient signed a written informed consent. A total of 161 patients from a single department were enrolled. The inclusion criteria were lower back pain, age 18 years or above, and good comprehension of the Polish language. Of the original 161 patients who returned the baseline questionnaires, 17 cases were missing mandatory information and therefore were not included in any further evaluations.

Statistical analysis

Calculations and statistical analyses were made using SPSS v.17 statistical software (SPSS Inc., Chicago, USA) and Medcalc v.12 (MedCalc Software bvba, Ostend, Belgium). The floor and ceiling effects were evaluated by calculating the proportion of patients who reached the minimum and maximum possible scores, respectively, on the first application. If this proportion is too high, it may negatively affect the test's discrimination ability. The desired value for the floor/ceiling effect is less than 15% to 20%[14,15] and values greater than 70% can adversely affect the results.[16,17] In the present study, this was calculated for PSQ-minor, PSQ-moderate, and PSQ-total. As a measure of internal consistency, Cronbach's alpha was used. Construct validity can be defined as the degree to which an instrument measures what it claims to be measuring.[18] Convergent validity is a particular form of construct validity where the measures of similar concepts correlate to a certain degree. To examine this property, we evaluated the correlation coefficient between PSQ and the Coping Strategy Questionnaire (CSQ)[19] using the Spearman's rank correlation coefficient (rho). The following ranges were selected for the interpretation of this value: rho of more than 0.8 was an excellent correlation, 0.61–0.8 very good, 0.41–0.6 good, 0.21–0.4 fair, and 0–0.2 poor.[20] We included CSQ questionnaires that had at least 90% of the questions answered. The exploratory factor analysis with principal components extraction with Varimax rotation[21] was performed on all items to determine the dimensions of the scale. The minimum accepted number of eigenvalues was greater than 1. Test-retest reliability is a measure of reliability, obtained by retesting the same population over a predetermined time interval. In this study, the accepted time period was between 2–28 days. Then, the resulting data were used to calculate the intraclass correlation coefficient (ICC) and the standard error of measurements (SEM), each with 95% CI.

Results

Patients

After exclusion, there were 64 females and 80 males, and the mean age of the participants was 52.53 years (range 19–80

Table 1 Demographic data of subjects included in the study

	All	F	M	*P*-value (M vs F)
n	144	64	80	
Age	52.53 (19–80)	55.44 (19–80)	50.2 (22–77)	0.47
PSQ total	4.02 (3.70–4.34)	4.35 (3.85–4.85)	3.76 (3.34–4.17)	0.6
PSQ moderate	5.22 (4.88–5.55)	5.56 (5.04–6.08)	4.95 (4.51–5.39)	0.71
PSQ minor	3.71 (3.37–4.06)	4.01 (3.47–4.56)	3.48 (3.03–3.93)	0.55

Abbreviations: F, female; M, male; PSQ, pain sensitivity questionnaire score.

years) (Table 1). Of the 144 subjects, 80 (55.55%) returned the completed retest questionnaire within 2–33 days after the baseline test. The mean time between applications was 9.04 days (range 1–33 days).

Baseline data normality and floor and ceiling effects

The PSQ-total score was not normally distributed, according to the Kolmogorov–Smirnov test. None of the subjects obtained the lowest possible score; two subjects scored the maximum of 10, and therefore, the floor and ceiling effect value was 1.39%.

Factor analysis

Two factors were extracted with the exploratory factor analysis, and the total variance accounted for by these factors was 70.69%. All items, except items 6, 7, and 8 loaded at least 0.5 on one factor and former items loaded on each factor at more than 0.5 eigenvalue (Table 2). Items 6, 7, and 8 were loaded on both factors. The first factor (mean eigenvalue 0.738; range: 0.583–0.863), consistent with the PSQ-minor subscale (items 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14), was significantly less painful than the second one (mean 0.71; range: 0.595–0.809), which represented the PSQ-moderate subscale (items 1, 2, 3, 4, 6, 7, 8, 15, 16, and 14) (Figure 1).

Internal consistency

The Cronbach's α for the baseline questionnaires (n=144) was 0.96. The corrected item-total correlation was consistent throughout all the questions and ranged from 0.65 for item 2–0.85 for item 8. Item 13 showed the lowest mean value and item 17 showed the highest value (Figure 2).

Convergent validity

Due to incomplete answers, this analysis only included the data of 128 subjects. The Polish version of PSQ showed a fair correlation with the CSQ-total. The Spearman's rank correlation coefficient (rho) was 0.27 (CI =95%, 0.10–0.43, $P<0.01$).

Table 2 Factor analysis

Item	Component	
	Minor	Moderate
1	0.245	**0.763**
2	0.194	**0.809**
3	0.461	**0.633**
4	0.233	**0.790**
5	**0.793**	0.217
6	**0.583**	**0.587**
7	**0.621**	**0.551**
8	**0.606**	**0.632**
9	**0.825**	0.293
10	**0.681**	0.473
11	**0.805**	0.374
12	**0.835**	0.308
13	**0.863**	0.225
14	**0.770**	0.379
15	0.542	**0.616**
16	0.554	**0.595**
17	0.307	**0.763**

Note: Primary factors loaded by each item are highlighted in bold.

Test-retest reliability

The ICC was 0.93 for PSQ-total (CI =95%, 0.89–0.95), 0.87 for PSQ-moderate (CI =95%, 0.80–0.91) and 0.91 for PSQ-minor (CI =95%, 0.86–0.94). The SEM for PSQ-total was 0.12.

Discussion

This study was designed to produce a translated and cross-culturally adapted Polish version of the PSQ. It closely followed the methodology described by Beaton et al.[12] The study population was a casual sample of subjects, recruited from among the neurosurgical patients who were undergoing evaluation due to lower back pain that was primarily caused by degenerative diseases. Similar populations were selected in analogous studies for the validation of the Iranian[22] and Korean[23] versions. The Polish version of the PSQ turned out to be easy to comprehend and could be easily administered to patients. All the items were straightforward and did not cause problems for the subjects.

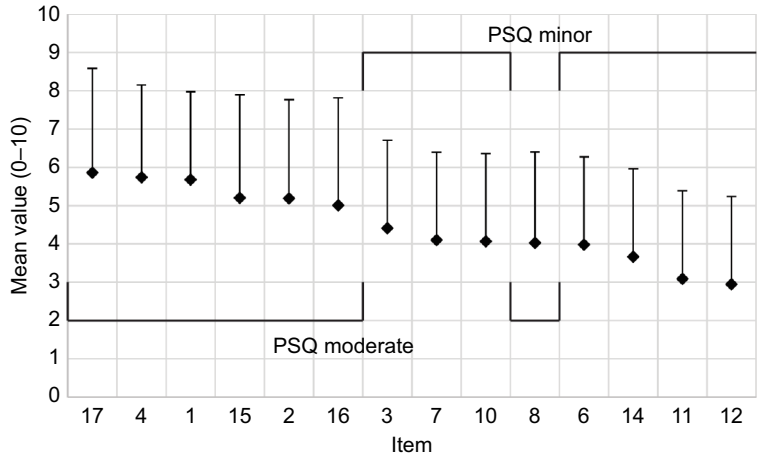

Figure 1 The mean score of each item with the corresponding CI 95% bars.
Note: The items are assigned to two subscores based on the exploratory factor analysis.
Abbreviation: PSQ, pain sensitivity questionnaire

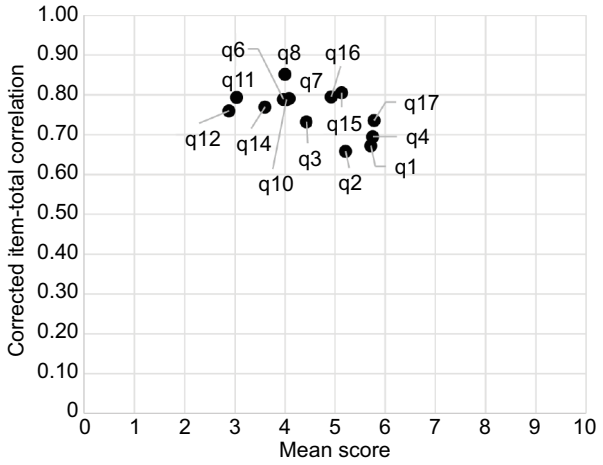

Figure 2 Internal consistency of the PSQ_{total}.
Note: Numbers (1–10) indicate items of the questionnaire.
Abbreviation: PSQ, pain sensitivity questionnaire

Factor analysis

The exploratory factor analysis revealed a factor structure that was strikingly similar to that identified by the authors of the scale[9] and replicated in a Korean study.[23] However, in this study, three items were loaded on both factors (6, 7, and 8), although the load value was relatively low in all these cases.

Internal consistency

The internal consistency was very high; Cronbach's α was 0.96. This is higher compared to the original questionnaire[9] as well as other validated versions.[22,23] Consistently, the corrected item-total correlation was high throughout all the questions and ranged from 0.65 to 0.85.

Convergent validity

The Polish version of the PSQ showed a less fair but significant correlation with the CSQ. The latter is probably ill-suited for the task as it had been designed to measure a somewhat different concept. For example, the Pain Catastrophizing Scale[24] would be a better fit; however, to date no validated Polish version is available.

Test-retest reliability

The questionnaire had a good repeatability. The ICC of 0.93 was higher than that reported in similar works;[9,10,22,23] however, in the present study, the mean interval was 9.04 days, whereas this was close to 4 weeks in the articles cited above. With a short time between administrations, there is a risk of recall bias;[25] however, in the case of a relatively complex questionnaire booklet, like the one used in this study, this should not pose a problem. The SEM value (1.2%) proves that the Polish version of the questionnaire shows excellent reliability in repeated administrations.

This study has few limitations. Firstly, the study population was narrowed to patients with lower back pain. In theory, the subjects with greater pain sensitivity may be overrepresented; a study on patients suffering from chronic pain showed that the mean PSQ score was significantly higher than in the healthy population.[10] Secondly, the interval between repeated administrations of the test is shorter than in analogous studies,[9,22,23] but as stated above, this has a significant effect on the results. Lastly, for practical reasons, the source questionnaire for the translation was in English, although the original measure was in German; however, the English version has undergone a formal validation,[13] making

it unlikely that this had a significant impact on the content validity of the Polish version.

Conclusion

The study resulted in a Polish version of the PSQ. The translated questionnaire underwent a thorough evaluation of psychometric properties according to state-of-the-art recommendations. The subjects were recruited from among the patients suffering from lower back pain. The resulting data showed that this version of the instrument is valid and can be recommended for Polish-speaking patients.

Disclosure

The authors report no conflicts of interest in this work.

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