The Persian Version of Örebro Musculoskeletal Pain Screening Questionnaire: Translation and Evaluation of its Psychometric Properties

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ABSTRACT

Background: Screening of psychosocial risk factors for chronic low back pain (LBP) is essential. The Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ) is one of the most recognized and widely used instruments for this purpose. This study aimed to translate the ÖMPSQ into Persian, to adapt it for Iranian culture, and to investigate its psychometric properties.

Methods: Using a linguistic methodology, the ÖMPSQ was translated into Persian according to the World Health Organization guideline. A total of 106 patients with LBP participated in the study. Internal consistency and test-retest reliability were evaluated. Concurrent validity was estimated with Pearson’s correlation between the ÖMPSQ and short form health survey (SF-12), Hospital Anxiety and Depression Scale (HADS), and visual analog scale (VAS). Factor analysis was used to evaluate dimensionality.

Results: The content validity index was 0.80. The instrument had a good test-retest reliability (intraclass correlation coefficient = 0.82) and internal consistency (Cronbach’s \( \alpha \) =0.82). Factor analysis indicates that factorial structure of Persian version was similar to original questionnaire. There was a significant correlation \((r = 0.252–0.639, P < 0.01)\) between VAS score and all the ÖMPSQ domains. Physical component summary of SF-12 was positively correlated with miscellaneous domain \((r = 0.384, P < 0.05)\) and negatively correlated with psychology domain of ÖMPSQ \((r = -0.364, P < 0.05)\). A significant correlation between total score and anxiety component of HADS and psychology domain of ÖMPSQ was found \((r = 0.49, P < 0.01)\) and \((r = 0.442, P < 0.05)\), respectively. Correlations between the ÖMPSQ and SF-12 and HADS and VAS indicate acceptable concurrent validity.

Conclusions: The Persian version of ÖMPSQ was as a valid and reliable instrument and also a good cross-cultural equivalent for original English version.

Keywords: Linguistic validation, low back pain, Örebro Musculoskeletal Pain Screening Questionnaire, psychometric properties
INTRODUCTION

Musculoskeletal disorders are among the major causes of disability and dysfunction in Iran and worldwide. Low back pain (LBP) is the most common musculoskeletal problem and is known as one of the most prevalent causes of morbidity all across the globe as up to 90% of adults experience LBP at some stages in their lives. LBP has been shown to be the second cause of Disability Adjusted Life Years in all age groups of Iranian people. Epidemiologic studies in Iran revealed high prevalence of musculoskeletal problems, particularly LBP (acute and chronic) among Iranian population. In a recent national health survey conducted among more than 25,307 Iranians of both rural and urban areas, 29.3% of the subjects reported LBP. Moreover, LBP is the source of significant economic burden for societies, due to high level of resulting activity limitation. The majority of these costs arise from the chronicity of the disease. Pain subsides within first 2–3 months in about 80%–90% of cases, and for the rest (about 10%–20%), chronic pain syndromes develop. The underlying pathologic of chronic LBP cannot be still identified in about 85% of cases that is called as nonspecific chronic LBP. Despite advances in surgical and pharmaceutical interventions, 32% of patients with LBP report some episodes of limitations in daily activities due to LBP even after receiving of usual treatments. These findings more highlight the importance of psychosocial factors in the disability and burden of LBP on the societies. Consistent with this, a cohort study conducted on industrial workers in Iran showed that workers with lower job satisfaction and higher job strains are more likely to report LBP. Psychosocial factors or “yellow flags” can increase the risk of development or continuation of chronic pain. They are major contributors in the transition of acute LBP to chronic LBP. Early identification and treatment of these contributing factors can prevent transition from acute to chronic LBP.

Application of an appropriate measure is the essential part of screening for psychosocial risk factors of chronic LBP. Several screening tools have been introduced in the literature, which have included psychological and physical prognostic factors. The original Örebro Musculoskeletal Pain Screening Questionnaire (OMPSQ) is one of the most widely used and investigated instruments in this field. ÖMPSQ was recommended for evaluation of workers who are under the compensation insurance coverage and also recognized as a useful tool for prediction of absenteeism, chronicity, pain, and impairment. Shortened form of this questionnaire (ÔMPSQ-10) is also recently validated by Linton et al. and has been shown to be more feasible than the long form of the questionnaire with acceptable predictive ability and can be utilized in clinical and research settings.

To the best of our knowledge, very few studies conducted in Iranian population regarding the role of psychosocial factors in LBP. We believe reasons for this gap of literature about the role of psychological factors in LBP may be due to lack of appropriate measures. The purpose of the study was to develop Persian version of OMPSQ (ÔMPSQ-P) and to assess its validity and reliability.

METHODS

Linguistic validation

On the basis of standard guideline of World Health Organization (WHO), the English version of OMPSQ was translated into Persian. Accordingly, the questionnaire was translated into Persian by translators whose mother tongue was Persian and had enough expertise in English. After reaching a consensus regarding the translated Persian version, it was back translated by two native English speakers to English. In a meeting, all the translators and researchers and two experts evaluated all versions of the questionnaires and the final Persian version of the questionnaire was developed and its content validity was tested accordingly. In this regards, ten patients filled out the questionnaire and words with unclear meaning were replaced and the final version was provided. An independent bilingual translator back translated the final Persian version to English.

The content validity and equivalence testing was performed by six independent academic psychiatrists and psychologists. They rated the degree that each questionnaire item assesses defined content. A 5-point Likert scale in the ascending trend of “appropriateness” and “relevance” was used.

Participants

Volunteer patients who participated in this study were recruited consecutively from LBP clinic of sports medicine unit affiliated to Tehran University of Medical Sciences (TUMS), Tehran, Iran. All the patients had chronic nonspecific LBP (at least 3 months in the past 6 months). Patients with age less than 18 or more than 65 years, inability to read and write in Persian, and with red flags who were suspicious that their LBP were due to specific origin such as inflammatory diseases (rheumatologic diseases), infectious diseases, neoplasms, fractures, cauda equina syndrome were excluded by a sports medicine specialist from the study. The protocol of the study was approved by our Institutional Ethics Committee.

Measures

Ôrebro Musculoskeletal Screening Questionnaire

The original-ÔMPSQ has 25 self-administered questions, of which 21 of them are scored (on a 0–10 point
response scale) giving a total score of 0 to 210. These are
designed around five proposed domains: function, pain,
psychological, fear-avoidance, and miscellaneous.[25] The
ÖMPSQ items have been derived from the “Acute LBP
Screening Questionnaire” (ALBPSQ)[32] by removing the
word “back” and adding further body areas to question
#1.[16] Patients were classified into “low,” “medium,”
and “high” risk groups using derived cutoff of ≥112 for
high risk group and a cutoff of 90 to separate low from
medium risk group patients.[16,21,33]

The ÖMPSQ and ALBPSQ were used in several studies in
different countries with various languages,[10,27,34] However,
there is no validated questionnaire in Persian-language
available for screening of psychosocial factors in LBP.

According to the five components of ÖMPSQ, we selected
hospital anxiety and depression scale (HADS) and short
form health survey (SF-12) and visual analog scale (VAS)
for evaluation of psychological component, function and
disability, and pain and their correlation with ÖMPSQ.

**Short form health survey**
SF-12 as a shorter alternative of the SF-36 was
repeatedly used in health outcomes surveys. It includes
12 self-administered questions for measuring eight
health concepts: physical functioning (2 items), role
limitations due to physical problems (2 items), bodily
pain (1 item), general health (1 item), vitality (1 item),
social functioning (1 item), role limitations due to
emotional problems (2 items), and perceived mental
health (2 items). These eight health concepts form
two distinct subscales related to physical and mental
health known as physical component summary (PCS)
and mental component summary.[35,36] The SF-12 was a
reliable and valid instrument to measure health-related
quality of life among the Iranian population.[37]

**The Hospital Anxiety and Depression Scale**
HADS is a brief and widely used self-administered
questionnaire to determine the levels of anxiety and
depression in the persons with medical problems. It
is a 14-item scale. Seven of the items are pertaining
to anxiety and seven to depression.[38] It has been
translated and validated in many languages, and it
is widely used in Persian population for clinical and
research purposes.[39]

**Visual analog scale**
VAS is an instrument that tries to measure a characteristic
like pain which is ranging across a continuum of values
and cannot easily be directly measured. VAS is a standard
and valid measure of pain intensity with high test-retest
reliability.[40]

**Psychometric and statistical analysis**

**Reliability**
The ÖMPSQ-P was tested for internal consistency
through calculation of Cronbach’s alpha coefficient
for each domain and also the whole questionnaire. All
of the participants were tested 2 weeks after initial
assessment. Intraclass correlation coefficient (ICC) was
utilized for assessing the test-retest reliability of the
questionnaire.

**Concurrent validity**
To examine concurrent validity of the instrument
all of the participants completed SF-12, HADS and
VAS questionnaires concurrent with ÖMPSQ and the
correlation of the scores of all questionnaires were
calculated.

**Construct validity**
Factorial structure and dimensionality of the
questionnaire were assessed through factor analysis with
a varimax rotation and Kaiser normalization. Although
varimax rotation as a type of orthogonal rotation is used
when there is not any inter-correlation among different
factors as field mentions in his book,[41] if the correlation
between factors was insignificant in oblique rotation, it is
logical to use orthogonal rotation.

For determining the degree of agreement between expert
panel members in the second step of translation process,
a content validity index (CVI) was calculated. Lynn has
indicated that a CVI of 0.78 or higher is acceptable.[42]
To assess reliability of the ÖMPSQ, Chronbach’s alpha
coefficient assessed for internal consistency. Cronbach’s
alpha greater than 0.7 was assumed satisfactory.[43] For
test-retest analysis, intraclass correlation coefficient
(ICC) was utilized. Fleiss describes ICC values from 0.40
to 0.75 as “fair to good.”[44]

Factor analysis was utilized for analyzing dimensionality
of the questionnaire. Concurrent validity of ÖMPSQ was
evaluated using correlations between ÖMPSQ-P subscale
scores and HADS, SF-12, and VAS scores. A significance
level of $P \leq 0.05$ was assumed satisfactory.

**RESULTS**

**Linguistic validation**
The ÖMPSQ-P was developed in complete conformance
with the previously mentioned translation process. Each
step of process provides further information for the
improvement of understandability and acceptability of
the questionnaire. The only cultural discrepancy between
English and Persian version was that people in Iran
usually do not go shopping weekly, but most of them go
shopping when they need something to buy. As a result,
we delete the term “weekly” in question #20.

Content validity examined by experts’ panel. The CVI
for the total and the five subscales instrument (function,
pain, psychological, fear-avoidance, and miscellaneous)
was 0.80, 0.82, 0.84, 0.80, 0.85, and 0.78, respectively.
The paucity of missing data in psychometric evaluation
also confirmed the acceptability of the instrument.
Psychometric evaluation

A total of 106 patients with LBP participated in this study. The demographic characteristics of the subjects are summarized in Table 1. The descriptive statistics of different measures are presented in Table 1.

Internal consistency was found to be acceptable with Cronbach’s alpha coefficient between 0.56 and 0.82 [Table 2]. The ICC for test-retest reliability was 0.82 (95% confidence interval 0.142–0.244, P < 0.0001).

Concurrent validity of ÖMPSQ is measured by Pearson’s correlation coefficient between ÖMPSQ domains and scores of HADS, SF-12, and VAS. As shown in Table 3, the comparable domains of ÖMPSQ and other questionnaires were significantly correlated. There was a significant correlation (r = 0.252–0.639, P < 0.01) between VAS score and all the ÖMPSQ domains. PCS of SF-12 was positively correlated with miscellaneous domain (r = 384, P < 0.05) and negatively correlated with psychology domain of ÖMPSQ (r = −0.364, P < 0.05). A significant correlation between total score and anxiety component of HADS and psychology domain of ÖMPSQ was found (r = 0.49, P < 0.01 and r = 0.442, P < 0.05 respectively).

The solution emerged from factor analysis revealed five factors with eigenvalues of 4.97, 2.30, 1.92, 1.45, and 1.36 which were accounted for 57.20% of variance observed [Table 4]. The factors that were extracted in this study were consistent with most of the domains of original version of ÖMPSQ except for miscellaneous domain. Items of the function domain were correlated with factor 1, items of the pain domain were associated with factor 2, items of the psychology domain were correlated with factor 3, and items of fear-avoidance beliefs were correlated with factor 5.

DISCUSSION

This study aimed to develop ÖMPSQ-P and to assess reliability and validity of it. The Persian translated version was provided using standard forward-backward guideline. The final version of the questionnaire was prepared after assessment of face and content validity. The ÖMPSQ was clearly understood and easily applicable to the patients. Content validity indices of total and specific domains of questionnaire were robust. As stated by Lynn, in the condition that six or more persons judging an item, the CVI should be at least 0.78 for the item to be acceptable.[42] The Cronbach’s alpha for the whole questionnaire which provides an estimate of internal reliability was 0.82 which is high and satisfactory. The similar value found by Gabel et al. while assessing 143 acute LBP persons.[45] In another study conducted by Grotle et al., they evaluated 123 Norwegian patients with acute LBP and 50 patients with chronic LBP. The results show a Cronbach’ alpha of 0.95.[27] In a validation study of Dutch version of ÖMPSQ, Heneweer et al. reported a Cronbach’s alpha of 0.81.[20] Schmidt et al. evaluated 360 German patients

| Table 1: Demographic and descriptive characteristics of participated patients |
|-----------------|------------------|
| Characteristics | Values           |
| Total number    | 106              |
| Female (%)      | 47.2             |
| Age (years), mean±SD | 41.74±13.27 |
| Education level (%) |               |
| Under diploma   | 18.9             |
| Diploma         | 37.7             |
| Bachelor of science | 32.1        |
| Higher education| 11.3             |
| Employment status (%) |          |
| Homemaker       | 32.1             |
| Employed        | 51.9             |
| Jobless         | 9.4              |
| Retired         | 6.6              |
| Score of ÖMPSQ (0-210) |            |
| Total           | 96.33 (29.80)    |
| Pain domain     | 29.96 (9.43)     |
| Psychology domain | 21.45 (9.73)   |
| Fear-avoidance beliefs domain | 17.81 (7.51) |
| Function domain | 16.70 (11.69)    |
| Miscellaneous domain | 10.41 (5.56)  |
| Score of VAS for pain (0-10) | 55.2 (24.81)  |
| Score of HADS (0-21) |              |
| Total           | 16.72 (6.54)     |
| Depression      | 7.23 (3.34)      |
| Anxiety         | 9.26 (4.36)      |
| Score of SF-12 (0-100) |         |
| MCS             | 39.16 (10.18)    |
| PCS             | 37.74 (7.81)     |

ÖMPSQ=Örebro Musculoskeletal Pain Screening Questionnaire, VAS=Visual analog scale, HADS=Hospital Anxiety and Depression Scale, SF-12=short form health survey, MCS=Mental Component Summary, PCS=Physical Component Summary, SD=Standard deviation

| Table 2: Cronbach’s alpha value of total and domain-specific of Örebro Musculoskeletal Pain Screening Questionnaire |
|-----------------|------------------|
| ÖMPSQ items     | Number of items | Cronbach’s alpha |
| Total score     | 21               | 0.82              |
| ÖMPSQ domains   |                 |                   |
| Pain            | 5                | 0.64              |
| Function        | 5                | 0.63              |
| Psychology      | 5                | 0.56              |
| Fear-avoidance beliefs | 3            | 0.62              |
| Miscellaneous   | 3                | 0.65              |

ÖMPSQ=Örebro Musculoskeletal Pain Screening Questionnaire
with acute and subacute LBP and Cronbach’ alpha was 0.80.\(^{46}\)

Test-retest reliability over 2 weeks using ICC was 0.82 which is comparable to similar studies\(^{20,27,45}\) and shows high stability of ÖMPSQ over time.

Factor analysis revealed five-factor solution for this questionnaire. This finding is similar to five dimensions of the original questionnaire and Dutch version of ÖMPSQ. Two studies have reported inconsistent number of factors. In the validation study of the Norwegian version ALBPSQ, the authors reported three factors for the measure.\(^{27}\) In another more recent study, six factors have been reported for this measure.\(^{45}\)

The current study has various limitations that should be considered in interpretation of the results. First, ÖMPSQ is a self-administered questionnaire; therefore, results may be affected by response bias. Second, the sample size of the study may not be an ideal sample size for factor analysis. We suggest the recent Persian validated Fear-Avoidance Beliefs Questionnaire be used for concurrent validity of the fear-avoidance domain of ÖMPSQ in future.\(^{47}\)

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**Table 3:** Pearson’s correlation coefficient of the Örebro Musculoskeletal Pain Screening Questionnaire subscales and scores of Visual analog scale, Hospital Anxiety and Depression Scale, and Short Form Health Survey

<table>
<thead>
<tr>
<th></th>
<th>Pain</th>
<th>Miscellaneous</th>
<th>Psychology</th>
<th>Fear-avoidance beliefs</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAS</td>
<td>0.639**</td>
<td>0.252**</td>
<td>0.398**</td>
<td>0.309**</td>
<td>0.348**</td>
</tr>
<tr>
<td>SF-12-PCS</td>
<td>−0.256</td>
<td>0.384*</td>
<td>−0.364*</td>
<td>−0.172</td>
<td>−0.167</td>
</tr>
<tr>
<td>SF-12-MCS</td>
<td>0.037</td>
<td>−0.324</td>
<td>−0.327</td>
<td>−0.242</td>
<td>0.102</td>
</tr>
<tr>
<td>HADS-total</td>
<td>−0.298</td>
<td>0.061</td>
<td>0.490**</td>
<td>0.254</td>
<td>0.011</td>
</tr>
<tr>
<td>HADS-depression</td>
<td>−0.175</td>
<td>0.092</td>
<td>0.330</td>
<td>0.203</td>
<td>0.158</td>
</tr>
<tr>
<td>HADS-anxiety</td>
<td>−0.287</td>
<td>−0.013</td>
<td>0.442*</td>
<td>0.171</td>
<td>−0.091</td>
</tr>
</tbody>
</table>

\(^{*P<0.05, **P<0.01}\). ÖMPSQ=Örebro Musculoskeletal Pain Screening Questionnaire, VAS=Visual analog scale, HADS=Hospital Anxiety and Depression Scale, SF-12=Short form health survey, MCS=Mental Component Summary, PCS=Physical Component Summary.

**Table 4:** The Cronbach’s alpha value if item deleted of the Örebro Musculoskeletal Pain Screening Questionnaire items and factor loading from factor analysis of it

<table>
<thead>
<tr>
<th>ÖMPSQ items</th>
<th>Cronbach’s alpha if item deleted</th>
<th>Factor 1 - function</th>
<th>Factor 2 - pain</th>
<th>Factor 3 - psychology</th>
<th>Factor 4</th>
<th>Factor 5 - fear-avoidance beliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>0.825</td>
<td></td>
<td>0.513</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>0.825</td>
<td></td>
<td>0.320</td>
<td></td>
<td>0.320</td>
<td></td>
</tr>
<tr>
<td>Q3</td>
<td>0.830</td>
<td></td>
<td>0.568</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q4</td>
<td>0.832</td>
<td></td>
<td>0.571</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5</td>
<td>0.820</td>
<td></td>
<td>0.509</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q6</td>
<td>0.818</td>
<td></td>
<td>0.812</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q7</td>
<td>0.817</td>
<td></td>
<td>0.780</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q8</td>
<td>0.819</td>
<td></td>
<td>0.607</td>
<td></td>
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</tr>
<tr>
<td>Q9</td>
<td>0.824</td>
<td></td>
<td>0.836</td>
<td></td>
<td></td>
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<tr>
<td>Q10</td>
<td>0.820</td>
<td></td>
<td>0.825</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Q11</td>
<td>0.816</td>
<td></td>
<td>0.731</td>
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<td></td>
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<tr>
<td>Q12</td>
<td>0.819</td>
<td></td>
<td>0.464</td>
<td></td>
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<tr>
<td>Q13</td>
<td>0.821</td>
<td></td>
<td>0.556</td>
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<tr>
<td>Q14</td>
<td>0.818</td>
<td></td>
<td>0.543</td>
<td>0.556</td>
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<td>Q15</td>
<td>0.823</td>
<td></td>
<td>0.803</td>
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<tr>
<td>Q16</td>
<td>0.815</td>
<td></td>
<td>0.758</td>
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<tr>
<td>Q17</td>
<td>0.817</td>
<td>0.661</td>
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<td></td>
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<tr>
<td>Q18</td>
<td>0.822</td>
<td>0.818</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q19</td>
<td>0.807</td>
<td>0.739</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q20</td>
<td>0.819</td>
<td>0.790</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q21</td>
<td>0.819</td>
<td></td>
<td></td>
<td>0.672</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Eigenvalues  | 4.97 | 2.30 | 1.92 | 1.45 | 1.36 |
| Percent of variance | 23.676 | 10.95 | 9.17 | 6.92 | 6.47 |

ÖMPSQ=Örebro Musculoskeletal Pain Screening Questionnaire
CONCLUSIONS

The ÖMPSQ-P is a reliable and valid measure that can be used for psychosocial screening of patients with LBP. This instrument could assist the clinicians to have a biopsychosocial and multidimensional approach to chronic non-specific LBP.

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Conflicts of interest

There are no conflicts of interest.

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