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#### **Observational Studies**

Usman Abba Ahmed\*, Sonill S. Maharaj, Thayananthee Nadasan and Bashir Kaka

# Cross-cultural adaptation and psychometric validation of the Hausa version of Örebro Musculoskeletal Pain Screening Questionnaire in patients with non-specific low back pain

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#### **Abstract**

**Objectives:** Orebro Musculoskeletal Pain Screening Questionnaire (OMPSQ) is widely used in clinical practice and for research purpose to screen the risk of chronicity in patients with Non-specific low back pain (NSLBP). The questionnaire has been cross-culturally adapted into different languages, but to date, there has not been Hausa version of the questionnaire. This study is important as the Hausa language is widely spoken across sub-Saharan Africa. The study aims to cross-culturally translate the English version of the (OMPSQ) into Hausa language (OMPSQ-H) and to test its psychometric properties in Hausa patients with NSLBP.

UAA, TN and SSM conceptualized and designed the study protocol, UAA and BK collected and analyzed the data, SSM and TN provided critical review of the manuscript and they are the supervisors of UAA who is the correspondent author and a PhD student. Also, TN obtained funding for the study.

\*Corresponding author: Usman Abba Ahmed, MSc, Department of Physiotherapy, Rasheed Shekoni Specialist Hospital, Dutse, PMB 7200, Jigawa State, Nigeria; and Department of Physiotherapy, School of Health Sciences, College of Health Sciences, University of KwaZulu-Natal, Durban, South Africa. Phone: +234 7034832760, E-mail: uabba017@gmail.com. https://orcid.org/0000-0001-8495-4431

Sonill S. Maharaj and Thayananthee Nadasan, Department of Physiotherapy, School of Health Sciences, College of Health Sciences, University of KwaZulu-Natal, Durban, South Africa, E-mail: maharajss@ukzn.ac.za (S.S. Maharaj),

Nadasant@UKZN.ac.za (T. Nadasan). https://orcid.org/0000-0001-8288-6105 (S.S. Maharaj). https://orcid.org/0000-0003-2023-0324 (T. Nadasan)

Bashir Kaka, Department of Physiotherapy, Faculty of Allied Health Sciences, College of Health Sciences, Bayero University, Kano, Nigeria, E-mail: bkaka.pth@buk.edu.ng. https://orcid.org/0000-0001-9138-0675

**Methods:** This observational study involved the use of forward-backwards translation method for the English version of OMPSQ. Thus, 124 male and female participants with subacute NSLBP were recruited using convenient sampling techniques. The psychometric properties statistically tested included reliability, internal-consistency, ceiling and floor effects, acceptability and construct validity.

**Results:** The Hausa version of OMPSQ has demonstrated good reliability (ICC=0.82) and internal consistency (Cronbach's alpha=0.72) with good acceptability as all questions were answered in 5 min. Responsiveness was adequate as OMPSQ-H retest scores demonstrated good correlation with the global rating of change scale scores (r=0.67, p=0.01). Construct validity was evaluated using principal component analysis and it reveals six components structure for the OMPSQ-H.

**Conclusions:** The OMPSQ-H was successfully translated and cross-culturally adapted with no problem of comprehension. Moreover, it has shown adequate psychometric properties in terms of internal consistency, reliability, responsiveness and constructs validity. Consequently, the OMPSQ-H can be considered as a valid tool for identifying and screening both psychosocial risk factors and risk of chronicity of NSLBP in Hausa population.

**Keywords:** Hausa; non-specific low back pain; Orebro musculoskeletal pain screen questionnaire; pain management; validation; yellow flags.

# **Background**

Low back pain (LBP) is arguably the most prevalent musculoskeletal condition found among both developed and developing nations [1, 2]. Despite the high incidence and prevalence of LBP, little is known about its precise causes. As a clear pathoanatomic diagnosis cannot be

identified in 85% of the patients [3], thus, LBP in these patients are labelled as non-specific low back pain (NSLBP). According to the Global Burden of Disease (GBD) 2010 study, LBP is currently the 6th highest burden on a list of 291 conditions and is the cause of more years lived with disability globally than any other disease [4].

The prevalence of LBP worldwide is estimated to be between 30 and 80 percent among the general population and has been found to increase with age [4]. Besides, a higher prevalence of LBP has been associated with lower socioeconomic status and lower education levels [2, 5]. A recent systematic review and meta-analysis published in 2018 revealed that the lifetime, annual and point prevalence of LBP among African nations, was higher than the global LBP prevalence [6]. The majority of studies included in this meta-analysis were conducted in Nigeria, which is a lower-middle-income country. In Nigeria, the annual prevalence rate of LBP reported has been between 33 and 74%, mostly affecting workers [7].

Affecting just about anyone, of any gender, race or socioeconomic background [8], LBP has a substantial impact on the overall physical, economic and psychosocial well-being of an individual and the society [1, 8]. The prognosis after an acute episode of LBP is less favourable than once thought [9, 10], as 60–80% of the patients will experience recurrence or chronicity of this disabling condition [10]. Furthermore, chronic NSLBP disability results in a poor quality of life, decreased functional disability, activity limitations and participation restrictions.

Predictive factors resulting in disabling chronic NSLBP have been implicated in the transition from acute to chronic NSLBP [11]. The risk of developing chronic disability is associated with psychosocial factors (yellow flags) [10, 11]. The psychosocial factors are important risk factors for long-term disability and guidelines for the management of LBP highlights the importance of screening for psychosocial factors [12, 13]. Therefore, it's clinically important to assess and evaluate the psychosocial factors to screen patients at risk of future chronicity which will help make clinical decisions regarding prognosis and treatment plan.

This should be done with a valid and specific instrument [14, 15]. World Health Organization International Classification of Functions and Diseases (WHO-ICF), recommends Örebro Musculoskeletal Pain Screening Questionnaire (OMPSQ) as an instrument for screening the risk of chronicity and measurement of psychosocial risk factors in patients with NSLBP [16]. The Örebro Musculoskeletal Pain Screening Questionnaire (OMPSQ), originally referred to as the Acute Low Back Pain Screening Questionnaire (ALBPSQ) was developed by Linton & Halldén [17] to assist primary care practitioners in identifying psychosocial

"yellow flags" and patients at risk of future work disability due to persistent pain.

The Hausa Language is widely spoken in sub-Saharan Africa. It is the predominant language in the Northern part of Nigeria. It is the first language of about 50 million people and the second language of about 20 million people. Therefore, approximately 70 million people use the language as a medium of communication [18]. It has however been reported that a sizeable number of patients in Nigeria do not speak or write English [19].

This modified OMPSQ has adequate Psychometric properties [20, 21] and other languages across the world; German [22], Persian [23], Chinese Hong-Kong [24], Turkish [25], Brazilian–Portuguese [14], French [26], Spanish [27], Dutch [28], Norwegian [29] and Chinese (Mandarin) [30].

Therefore, the purpose of this study was to translate the original OMPSQ into the Hausa Language and determine its psychometric properties in terms of validity, reliability and internal consistency of its use among Hausa speaking patients with NSLBP for its easy administration by clinicians and researchers.

# **Methods**

#### Study design

A cross-sectional study aimed at translating OMPSQ into Hausa language and then testing its psychometric properties in patients with chronic NSLBP.

#### **Participants**

According to Terwee et al. [31] on the quality criteria for measurement properties of health status questionnaires, they recommend recruitment of ≥50 participants for construct validity, reliability, responsiveness and ceiling/floor effect analyses. This was also reported by a study on Cross-cultural adaptation, validity and reliability of the Hausa version of the Neck Disability Index Questionnaire [18]. For this study, 124 participants were initially recruited but only 120 completed the study, the participants comprised both male and female patients receiving treatment at Physiotherapy departments.

Only participants who met the inclusion criteria were considered for the study. The inclusion criteria included; participant who can read, write and speaks Hausa language; NSLBP as diagnosed by a physician and commonly associated with referred lower extremity pain; NSLBP ≤3 months; participants with age ≥18 years; pain in the lumbopelvic region; movement coordination impairments while performing community, recreational or occupational activities; low back pain not of specific origin diagnosed by a physician (Fracture, tumours, malignancy, ankyloses, Infections and pregnant women). Participants were excluded when they presented with previous spinal surgery; chronic low back pain with related generalized pain; spinal

pathologies and diseases associated with cognitive impairment or widespread neurological symptoms.

#### Instruments

Orebro Musculoskeletal Pain Screening Questionnaire: The OMPSQ was developed by Linton and Boersma [20] to assist primary care practitioners in identifying psychosocial "yellow flags" and patients at risk of future work disability due to persistent pain. The questionnaire consists of 25 items, item 1-4 take sociodemographic information whilst item 5-25 formed the six components (factors) of the questionnaire (i.e. Pain, Coping Strategy, Distress, Work return expectancy, Fear-avoidance beliefs, Function) each item was scored from 0-10 [27]. The scored items were summed to provide a total score ranging from 0 to 210, a higher score indicates a higher disability. The maximum score is 210 points; a score of <105 points indicates a low disability, that between 105 and 130 points indicate a moderate disability and that >130 points indicates a high disability [20].

The items involve the region of pain (item 5), Sick leave (absenteeism) (item 6), pain duration (item 7), Work characteristics (item 8), Current pain intensity (items 9), chronic pain severity (item 10), pain frequency (item 11), coping strategy (item 12), Anxiety (item 13), depression (item 14), Risk of persistency (item 15), Restart work (item 16), job satisfaction (item 17), Physical activity (item 18), Increase pain (item 19), Performing work (item 20), Lightwork (item 21), Walking (item 22), home activity (item 23), ADL and social activity (item 24) and sleeping (item 25) [21, 32].

Global rating of change Scale (GROC): The global rating of change scale (GROCS) was used to evaluate the participants' overall perceived effect of treatment. This outcome tool was used to evaluate overall patient satisfaction on health status after treatment and to determine the responsiveness of the OMPSQ-H by checking the relationship between OMPSO changes and GROC scores of the participants.

The global rating of change (GROC) is a scale which ranges from -7 (a very great deal worse) to 0 (about the same) to +7 (a very great deal better). Incremental descriptors of worsening and improving were assigned values from -1 to -7 and from +1 to +7, respectively [33]. The following classifications have been proposed regarding the GROC scores:

- 0, 1, or −1 signifies no change
- ±2 to 3 signifies a minimal change
- ±4 to 5 signifies a moderate change
- ±6 to 7 signifies a large change in a patient's condition.

Patients with an average GROC rating ≥3 (somewhat better) were considered to have improved, while patients with an average rating of <3 to -3 were considered to have remained stable, while patients with an average rating of  $\leq -3$  (somewhat worse) were considered to have worsened [34]. In this study, all the patients were classified into the four groups for data analysis.

#### **Translation process**

The consent and approval of the original developer of OMPSQ were sought and obtained before the commencement of this study and the original English OMPSQ was used as the basis for this translation.

The translation of OMPSQ into the Hausa Language followed the guidelines for the process of translation of the self-reported questionnaire as recommended by Beaton et al. [35].

The Forward translation: Two independent bilingual translators from the department of Linguistics Bayero University Kano whose mother tongue was Hausa Language and were proficient in English with expertise in translation of questionnaires produced the translated version of OMPSQ into Hausa language ( $T_1$  and  $T_2$ ). The two translators had different backgrounds; one of the translators was a Physiotherapist and knew the concepts being examined in the questionnaire. The other translator was a linguist who did not have an idea or information of the concept to be quantified in the questionnaire.

The Synthesis of the Translations: The two translators were instructed to meet and synthesize the result of their translation to produce one common translation  $(T_{1, 2})$ , the process obligates both translators to produce a written report of the completed translation, highlighting challenging phrases and uncertainties as well as a summary of the rationale behind their choice of words.

The Back Translation: Another two independent translators who were blinded to the original version of the questionnaire and without medical background translated the synthesized Hausa version  $(T_{-12})$ back to English (source language).

The Expert Committee: For the targeted questionnaire to achieve a cross-cultural equivalence with the source version, an expert committee was established which involved two physiotherapists (with experience in cross-cultural adaptation studies), the translators (involved in both forward and backward translations) and two research experts in cross-cultural studies. The committee consolidated all the versions of the questionnaire and developed the pre-final version of the questionnaire.

Test of the pre-final version: The pre-final version of the OMPSQ-H was administered to 30 patients diagnosed with chronic NSLBP to assess face validity. The participants after completing the questionnaire were called for an interview to probe what they think was meant by each item of the questionnaire and their chosen response. In the meeting both the meaning of the items and responses were explored. This was to ensure that the adapted version still retained its equivalence as the original version and thus it was considered the final Hausa version of OMPSQ.

#### Study procedure

Initially, 132 participants indicated interest to participate in the study, but only 124 successfully met the study inclusion criteria, thus were recruited and administered the OMPSQ-H questionnaire and GROCS for baseline assessment. After two weeks, the participants were reassessed using the same outcome tools, those who were not available were contacted and reassessed through phone calls. However, four participants could not be contacted after two weeks and were excluded from the study. Therefore, only 120 participants completed the present study and thus their data reported.

#### Data analyses

Normality of data distribution was tested using the Kolmogorov-Smirnov test. Acceptability of the questionnaire was assessed by recording the time spent answering the questionnaire, once completed the patients were asked about whether they might have encountered any difficulty while filling the questionnaire and the examiners checked for any missing or multiple responses.

Sociodemographic variables were analyzed using descriptive statistics of mean, frequency, percentages and correlation matrix. The descriptive statistics were also used to determine the floor/ ceiling effects, which could be considered present when more than 15% of the patients scored either the lowest or highest possible scores. Reliability was investigated by testing internal consistency using Cronbach alpha coefficient, test-retest reliability (interclass correlation coefficient; ICC) and using correlation analysis, the testretest reliability measures reliability over time by administering the same questionnaire to the same subjects after a certain interval (2 weeks for this study). The internal consistency reflects the homogeneity of the questionnaire, which would be considered good if the value of Cronbach  $\alpha$  was more than 0.70 [31]. For responsiveness, Pearson correlation coefficient was used to check the relationship between OMPSQ changes and Global Rating of Change (GROC) scores of the participants,  $\alpha$  value set at 0.05. For responsiveness, Pearson correlation coefficient was used to check the relationship between OMPSQ changes and Global Rating of Change (GROC) scores of the participants,  $\alpha$  value set at 0.05.

Construct Validity (factor analysis), the 21 items of the OMPSQ-H scale were subjected to Principal Component Analysis (PCA). PCA was used to elucidate the covariance structure of a set of variables. Before performing PCA, the suitability of the data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of many coefficients of 0.3 and above. The Kaiser-Meyer-Olkin value was 0.60; which was equivalent to the recommended value of ≥0.6, and Bartlett's test of sphericity reached statistical significance, supporting the factorability of the correlation matrix [36].

## Results

#### Normality test

A Kolmogorov–Smirnov test indicated a value of p>0.06; this showed that the data was normally distributed.

## Sociodemographic characteristics

The age of the participants ranged from 22–70 years, with a mean age of 37.26  $\pm$  11.3. Eighty-eight of the participants were male while 32 were female, i.e. 73.3 and 26.7% respectively (Table 1).

Table 1: Sociodemographic characteristics of participants.

Variables	Frequency (n)	Percentages (%)
Gender		
Male	88	73.3
Female	32	26.7
Native Hausa		
Yes	86	71.7
No	34	28.3
Age	years	$mean \pm SD$
	22–70	$37.26 \pm 11.3$

SD, standard deviation.

# Floor/ceiling effects

Based on the interpretation of original OMPSQ by Linton and Boersma [20] the scores are computed as a single screening tool with a maximum score of 210 and a minimum of 0. For this study, the participants with maximum score were 6 (5%) while those with minimum score were 5 (4.2%). Given that '15% of the participants scored the maximum and minimum scores, therefore, the (OMPSQ-H) had no ceiling or floor effects.

# Acceptability

All the OMPSQ-H questions were well accepted, the average time taken to complete filling in the questionnaire was 5 min. Additionally, no missing responses or multiple answers were found and there were no problems with comprehension as regards the questions in respect to literal and contextual meaning.

# Reliability

The internal consistency Cronbach  $\alpha$  of the OMPSQ-H was 0.718. The test-retest reliability (interclass correlation coefficient) was 0.82 (95% CI; 0.65-0.90) and the correlation between the two different administrations of the instrument-first administration and after two weeks-was determined using the Spearman's correlation. There was a significant correlation between the first and the second administration (r=0.84, p<0.05) of the OMPSQ-H and with a minimum detectable change score of 28.3 and standard error of measurement 24.7 (Table 2). This implies that the OMPSQ-H has shown good reliability and internal consistency.

Table 2: Test-retest reliability and internal consistency of the Hausa version of ÖMPSQ-H.

Questionnaire Mean $\pm$ SD		Chronbach's alpha	ICC (95% CI)	SEM	MDC	
	Test (n=120)	Retest (n=120)				
OMPSQ-H	119.3 (28.1)	117.3 (21.7)	0.718	0.82	24.7	28.3

SD, standard deviation; CI, confidence interval; SEM, standard error of measurement; MDC, minimal detectable change; ÖMPSQ-H, Örebro Musculoskeletal Pain Screening Questionnaire Hausa version.

#### Responsiveness

The post GROC scores and OMPSO-H changes scores were correlated using the Pearson's moment correlation; this revealed a significant relationship (r=0.67, p=0.01).

#### **Construct validity (factor analysis)**

The principal components analysis used revealed the presence of six components with eigenvalues exceeding 1, this explained 23.80, 15.95, 9.11, 7.80, 7.10 and 6.50% of the variance respectively. A scree plot revealed a clear break after the sixth component. Using Cattell's scree test, it was decided to retain all the six components for further investigation. This was further supported by the results of a parallel analysis, which showed all the six components exceeded the eigenvalues corresponding to criterion values for a randomly generated data matrix of the same size. The six components solutions explained a total of 70.23% of the cumulative variance explained in Table 3.

To aid the interpretation of these six components, an Oblimin rotation was performed because varimix rotation does not allow factors to be inter-correlated, while by contrast, the oblimin rotation allows factors to be intercorrelated (28). The rotated solution revealed the presence of simple structures with both components showing some strong loadings >0.3, and all variables loading substantially on all the components. The rotation process simplifies the structure and the interpretation of how each question

Table 3: Cumulative total variance of the structure of the components explained.

Component Eigenva					
	Total	% of variance	Cumulative %		
Pain	5.0	23.80%	23.80%		
Coping	3.4	15.95%	39.75%		
Distress	1.9	9.11%	48.86%		
Work return expectancy	1.7	7.80%	56.66%		
Fear-avoidance beliefs	1.5	7.10%	63.76%		
Function	1.3	6.5%	70.26%		

Extraction method: Principal component analysis.

saturates the components in the OMPSQ-H questionnaire. Normally, the saturation level of a question should be close to one, so that it saturates on a single component. However, it has been noted that some questions have moderate saturation and thus saturate on more than one component. Specifically, question 9 saturated on five components, questions 21, 11, 10, 2, 4 & 15 saturated on four components, questions 16, 7, 6, 13, 4 & 5 saturated on three components. questions 20, 18, 19, 17, 8 & 3 saturated on two components, while questions 1 & 12 saturated only on one component (Table 4). Commonalities also gave information on the size of the variance in each item; values less than 0.4 indicated a misfit while values above 0.4 showed that the items were well fitted with one another (Table 4).

# **Discussion**

The translation and adaption process was successfully done following the recommendation from the work of Beaton et al. [35], however, the few problems encountered with wording were simply overcome by expert consensus. The OMPSQ-H can be self-administered and proved easy to administer in clinical practice during this study. The OMPSQ-H had a good score on psychometric properties and thus can reasonably be confirmed that it can be used successfully to screen patients with psychosocial factors who were at risk of developing long-term disabilities associated with NSLBP.

To this authors' knowledge, this is the first crosscultural adaptation study on OMPSQ into the Hausa language, and the aim was to determine its psychometric properties. There were no difficulties encountered in translating the questionnaire, however question 4 from the original English version which says "Were you born in Australia" was replaced with "are of native Hausa tribe from Nigeria". Due to cultural difference, there were only a few missing values, but the overall contextual equivalence was retained in all the questions as the participants demonstrated no problem in completing and understanding the questions given in the questionnaire.

Furthermore, in comparison with previous studies on translation and measurement of psychometric properties

Table 4: Exploratory factor analysis of six factors solution for OMPSQ-H using structural matrix and Oblimin rotation.

						Factor Coping	c
	Pain	Function	Distress	Work return expectancy	Fear-avoidance beliefs		
Q24 ADL and social		0.55					0.62
Q22 Walk or light recreational activity		0.41					0.80
Q23 Home activities		0.50					0.86
Q21 Light work - 1 h		0.41					0.89
Q25 Sleep or movement on bed		0.31	0.36		0.39		0.67
Q15 Risk of persistence of problem	0.43	0.33	0.45				0.69
Q20 Fear avoidance: stop work/ADL if worse		0.45	0.44				0.63
Q11 Pain frequency	0.58	0.55					0.84
Q 10 Pain intensity-chronic	0.73	0.50					0.84
Q13 Anxiety	0.50	0.38		0.43		0.30	0.91
Q14 Depression	0.46	0.55		0.32			0.75
Q6 Absenteeism	0.31			0.34	0.46		0.71
Q17 Job satisfaction		0.32		0.48			0.61
Q5 Region of pain							0.73
Q12 Coping strategy				0.32			0.60
Q9 Pain intensity-acute	0.31	0.56					0.75
Q8 Burdensome		0.41			0.56		0.91
Q18 Fear-avoidance: activity makes worse		0.44	0.49	0.53			0.80
Q19 Fear-avoidance: stop activity if worse	0.38		0.37			0.50	0.65
Q16 Recovery expectation: of work							0.77
Q7 Pain duration	0.55						0.69

Extraction method: Principal component analysis (six components extracted) (n=120), Rotation Method: Oblimin with Kaiser Normalization. C, communalities; ADL, activities of daily living; OMPSQ-H, Orebro Musculoskeletal Pain Screening Questionnaire Hausa version.

of OMPSQ, this study showed that the OMPSQ-H has proven to be a reliable and valid tool in identifying patients with NSLBP that were at risk of developing chronicity of NSLBP. These results were overall comparable with the original English version of OMPSQ [21, 37] and other OMPSQ cross-cultural studies into different languages e.g. German [22], Chinese [24], Chinese—Mandarin [30], Persian [23], Turkish [25] Brazilian—Portuguese [14], Spanish [27], French [26], Dutch [28] and Norwegian [29] (Table 5).

The determination of OMPSQ-H factor structure using PCA revealed six clear factors which replicate the theoretical conceptualization of the original English questionnaire [11]. The PCA was selected based on the study of Westman et al. [11] the results of this analysis showed that all the components have substantial adequate loading on all the items of the questionnaire and thus the items were further analyzed using Oblimin rotation to aid further interpretation of the six components. All items had adequate factor loading and in agreement with the analysis of their respective commonalities which revealed all items were well fitted with one another (Table 5) and that, the common features of the extracted factors were in agreement with the various domains of the ALBPSQ [17]. Therefore, it was not necessary to eliminate any of the items from the OMPSQ-H version. The percentage of the variance was a little higher than the

original English version [17] but closely approximate with both ALBPSQ and Modified OMSQ version [17, 38]. Additionally, the percentage of variance was comparable to the Spanish and Dutch version of OMPSQ [27, 28], however, Grotle et al. [29] initially reported three components factor on the Norwegian OMSPQ, but Gabel et al. [38] stated that the reanalyzed data of the work reveals six components factor.

Patient satisfaction with the therapeutic intervention is very important in the management of patients with chronic NSLBP due to the implication of the psychosocial factors associated with chronic disabling LBP [39]. Thus, in this study, GROCS was used to determine if OMPSQ-Hausa was able to detect changes over some time. Consequently, a strong correlation was found between OMPSQ-H and GROCS which suggests that OMPSQ-H was able to detect changes over some time and thus it can be applied in the clinic for the assessment of Hausa speaking patients with NSLBP.

Some of the limitations of this study include; firstly, conducting the retest was not easy in this population, therefore, the fact that the administration methods were different from the test to the retest is a limitation of the, however, that was the only option available for the authors. Secondly, Dawson et al. [40] recommended 2–3 days for test-retest assessment to ensure that changes in the patient's condition were minimal [40], however, both Linton et al. [37]

Table 5: Summary of psychometric properties of OMPSQ from previous cross-cultural adaptation studies.

Language	Sample size	Test-retest reliability (ICC) (95% CI)	Internal consistency (Cronbach's α)	Responsiveness	Construct validity (factor analysis)	Flow-ceiling effect (F-C)
1. Brazilian- Portuguese [14]	100 acute/subacute LBP	0.76	0.83	0.73 (RMDQ)	-	No F-C effect
2. Chinese (Man- darin) [30]	45 acute LBP	-	0.88	0.74 (FPS)	-	-
3. Chinese (Hong- Kong) [24]	465, both LBP & NP; 305 & 160 respectively	0.814 LBP grp	0.843 LBP grp	0.525 (RMDQ) LBP grp; 0.494 (NPRS); 0.452 (TSK)	-	_
4. Norwegian [29]	150 acute LBP	0.90	0.95	0.64 (FABQ); 0.57 (NPRS)	3 component struc- ture, 49% variance	-
5. French [26]	91 acute LBP	_	_	0.49 (ODI)	_	_
6. German [22]	74 CNP	0.93	0.94	0.70 (ODI); 0.58 (VAS)	_	No F-C effect
7. Spanish [27]	104 musculoskeletal disorders (LBP, NP, OA)	0.951	0.967	0.610 (ODI)	6 component struc- ture, 75% variance	_
8. Turkish [25]	120 acute-subacute LBP	0.93	0.96	r≥0.6 (VAS, ODI); r<0.3 (FABQ)	3 component struc- ture, 43% variance	-
9. Dutch [28]	69 subacute LBP	-	0.81	0.69 (FABQ); 0.53 (PCI); 0.53 (TSK)	5 component struc- ture, 59.8% variance	-
10. Persian [23]	202 subacute	0.89	0.71	0.72 (PDQ)	_	No F-C effect

CI, Confidence Interval; FABQ, Fear Avoidance Belief Questionnaire; F-C, Floor Ceiling effect; FPS, Face Pain Scale; grp, Group; ICC, Interclass Correlation Coefficient; LBP, Low Back Pain; NP, Neck Pain; NPRS, Numeric Pain Rating Scale; OA, Osteoarthritis; ODI, Oswestry Disability Index; OMPSQ, Orebro Musculoskeletal Pain Screen Questionnaire; PCI, Pain Coping Inventory; PDQ, Pain Disability Questionnaire; RMDQ, Roland-Morris Disability Questionnaire; TSK, Tampa Scale of Kinesiophobia; VAS, Visual Analogue Scale.

and Linton & Boersma, [20] used 7-28 days, 2 weeks interval was the protocol used in this study to minimize the effect of recognition as supported by the work of Gabel et al. [21]. Thirdly, for the evaluation of responsiveness of OMPSO-Hausa, this study used only GROCS as against previous studies that used multiple of self-reported questionnaires (e.g. RMDQ, ODI, VAS, PNRS, TSK, FABQ, PCI, etc.), however, we aimed to determine if OMPSQ-H can detect changes over some time of psychosocial variables associated with NSLBP that formed the construct of the questionnaire. Also, there was no study in the literature examining the responsiveness of OMPSQ with GROCS to establish the correlation between psychosocial factors in NSLBP and overall patient satisfaction with treatment effect after sessions of physiotherapeutic interventions.

The following recommendations were that this study did not evaluate the predictability of OMPSQ to screen chronicity over a period of time; therefore, we recommend further study to determine the predictive validity of the questionnaire. Furthermore, this study did not involve the short-form of OMPSQ, however, we recognized its clinical importance with regards to ease of administration.

Consequently, we strongly recommend further study to be conducted on the short-form OMPSQ to determine its psychometric properties and thus provide clinicians and researchers with options for the assessment of the risk of chronicity in patients with NSLBP.

#### Conclusion

The OMPSQ-H was successfully translated, it was well accepted by the participants as all questions were adequately responded to with no problem of comprehension and there was no missing responses or multiple answers. Therefore, the OMPSQ-H has demonstrated in this study a good acceptability, reliability, internal consistency, responsiveness and constructs validity with no ceiling or floor effects. Thus, it has an ideal factor structure and constructs agreement with the original OMPSQ.

This shows that the OMPSQ-H can be considered as a validated tool for identifying and screening both psychosocial risk factors and risk of chronicity of symptoms of NSLBP in Hausa population of Nigeria and subSaharan Africa. In practical terms, this result indicates evidence that treatment targeting these psychosocial factors itemized in the questionnaire will significantly improve the treatment outcomes on disabilities associated with NSLBP.

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**Conflict of interest:** The authors declared that they have no competing interests.

**Informed consent:** All participants signed an informed consent form before participating in the study.

Ethical approval: This study has been approved by the Biomedical Research Ethics Committee of the University of KwaZulu Natal (South Africa) (Ethics Number: BFC198/18) and by the Human Research Ethics Committee of the study hospital facilities i.e. Rasheed Shekoni Specialist Hospital (RSSH) (RSSH/GEN/226/V.II/7) and the Federal Medical Centre, Birnin-Kudu (FMC BKD) both Jigawa state Northwestern Nigeria where the study was conducted. The RSSH and FMC are 300 and 200-bed capacity tertiary health facilities respectively, serving patients from within and around the state. However, in Nigeria, all tertiary hospital facilities also provide primary health care services at general outpatients department or clinics.

**Availability of data and materials:** The datasets used and/ or analyzed during the current study are available from the corresponding author (Usman AA) on reasonable request. However, the findings from the study would be made available to participating researchers as required by law.

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