RESEARCH ARTICLE

Psychometric Properties of the Persian Version of the ID-Pain Questionnaire

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Received: 03 February 2021 *Accepted: 03 April 2021*

Abstract

Background: The Identification Pain questionnaire (IDPQ) is one of the recommended tools by the Neuropathic Pain Special Interest Group of the International Association for the Study of Pain for neuropathic pain screening. This study aimed to translate, cross-culturally adapt, and validate the Persian version of the IDPQ.

Methods: First, the IDPQ was translated based on the recommended guidelines. Afterward, the internal consistency (Cronbach's alpha coefficient), test-retest reliability (intraclass correlation coefficient), construct validity (compared to the Douleur Neuropathique 4 [DN4] questionnaire), and discriminant validity (Receiver operating curve analysis) of the IDPQ-P were evaluated. A total of 90 patients with neuropathic (n=50) and nociceptive pain (n=40) were enrolled in the study. In the next 72 h after the initial assessment, 30 patients (15 with neuropathic and 15 with nociceptive pain) completed the IDPQ-P.

Results: No modifications were needed in the process of translation and cultural adaptation. Cronbach's alpha coefficient was obtained at 0.47 for all patients, indicating poor internal consistency. The intraclass correlation coefficient was estimated at 0.97, showing excellent test-retest reliability. A high correlation was found between the DN4 questionnaire and IDPQ-P (0.74), showing acceptable construct validity. The area under the curve was 0.94 (95% CI: 0.88-0.99) and 0.92 (95% CI: 0.85-0.99) when the physician's diagnosis and the DN4 cut-off value were used as the reference standard, respectively. The optimal cut-off value of ≥ 2 demonstrated the highest sensitivity (98%) and specificity (79%).

Conclusion: The IDPQ-P can be used in the clinical setting as an accurate and quick screening tool to diagnose patients with neuropathic pain. Sufficient test-retest reliability, construct validity, discriminant validity, and high diagnostic accuracy were found for the IDPQ-P.

Level of evidence: I

Keywords: ID-pain questionnaire, Neuropathic pain, Nociceptive pain, Diagnostic tool, Psychometric properties

Introduction

Neuropathic pain occurs as a result of any primary lesion or dysfunction in the peripheral or central nervous system. Individuals suffering from neuropathic pain also report a wide cluster of symptoms, such as burning, needling, hypersensitivity (e.g., allodynia and hyperalgesia), and electrical-like pain sensation (1). These symptoms could be either localized or widespread. Since the patients' reports of impairments can significantly vary due to diversity in clinical manifestation of neuropathic pain, neuropathic pain diagnosis can be challenging in some instances. In this regard, especially classifying whether the pain is neuropathic or nociceptive can sometimes be challenging in the clinical context (2).

The Identification Pain Questionnaire (IDPQ) was developed in English to differentiate neuropathic pain from nociceptive pain inputs with sufficient accuracy (3). There is some evidence to suggest that the IDPQ has satisfactory sensitivity; therefore, it can be a useful tool in the initial screening for the presence of neuropathic pain (4). Over the years, the IDPQ has been translated and culturally adapted to identify neuropathic pain in individuals who speak Arabic (5), Italian (6), Chinese (7, 8), Thai (9), Taiwanese (10), Spanish (11), and Turkish (12).

The prevalence of neuropathic pain in Iran is estimated

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at 13.7% (13). Considering this high prevalence, self-reported questionnaires, such as IDPQ, can be useful in conducting preliminary screening to identify individuals who may potentially have neuropathic pain.

This study aimed to improve the processes of screening for neuropathic pain and sought to translate and culturally adapt IDPQ in the Persian language (IDPQ-P). A preliminary assessment was conducted to measure the properties of IDPQ-P.

Materials and Methods

Patients

A total of 90 patients with either nociceptive or neuropathic pain, diagnosed by their physician, were enrolled in the study within April-July 2019. The Ethics Committee of the University of Social Welfare and Rehabilitation Sciences, Tehran, Iran, approved the study protocol. Informed consent was obtained from all the patients.

The questionnaire was filled out by 50 patients with neuropathic pain and 45 patients with nociceptive pain at baseline. Most of the participants were female (n=56, 62%), and the mean age was obtained at 50±15 years [Table 1]. Within 72 h following the first session, 30 patients (15 in neuropathic and 15 in the nociceptive group) completed the IDPQ-P. To assess the patient's stability at the retest, the patients also completed the Global Rating of Change Scale (GRC).

Table 1. Demographic characteristics of patients (n=90)

		Neuropathic Pain patients (n=50)	Nociceptive Pain patients (n=40)
Male		23 (46%)	11 (27%)
Female		27 (54%)	29 (73%)
Age		49 (14)	50 (16)
Body diagram	Upper extremity	31 (62%)	26 (65%)
	Lower extremity	13 (26%)	11 (28%)
	Trunk	2 (4%)	2 (5%)
	Mix	4 (8%)	1 (2%)
Diagnosis	CTS	24 (48%)	
	SCI	13 (26%)	
	MS	7 (14%)	
	Amputation	6 (12%)	
	Tennis Elbow		12 (30%)
	LBP		18 (45%)
	Arthropathies		10 (25%)

CTS: Carpal tunnel syndrome; SCI: Spinal cord injury; MS: Multiple sclerosis; LBP: Low back pain

Measures

The IDPQ is a 6-item self-administered screening tool with 'yes' or 'no' as response options used for identifying neuropathic pain. It has six items for different characteristics of neuropathic pain, such as burning and electrical shocks sensations, numbness, perceiving pins/needles, hypersensitivity to touch, and the location of the most painful part of the body.

The scores of 1 and 0 are assigned to the 'yes' and 'no' answers for the first 5 items, respectively. The 'yes' answer on item 6 results in a score of -1, whereas the 'no' answer on this item results in a score of 0. The total score ranges from -1 to 5, with higher scores indicating pain with a neuropathic component (3).

The Douleur Neuropathique 4 is a 10-item screening questionnaire, in which 7 items are related to pain characteristics and sensational variations and 3 items are related to clinical findings in the painful area. The total score ranges from 0 to 10, with higher scores indicating pain with more neuropathic characteristics (14). The cut-off value of 4/10 has been calculated for neuropathic pain diagnosis (15).

Global Rating of Change Scale is a tool to assess the current health status of a person compared to a previous time-point. This instrument is scored on a Likert scale ranging from "very much worse" on the left side to "no change" on mid-point and "very much better" on the right side (16).

Translation and Cross-cultural Process

Translation and cross-cultural adaptation process were performed based on the guidelines for cross-cultural adaptation and validation of self-report measures (17) in five stages:

Forward translation: One occupational therapist and one epidemiologist whose first language was Persian and were familiar with the terminology of the area covered by the questionnaire translated the IDPQ to Persian.

Synthesis: The two versions of translations were reviewed for synthesis by the whole panel (translators and the first author), and the final version was prepared on consensus.

Back Translation: The prefinal version of the IDPQ was back-translated to English by two bilingual professional clinicians (a physiotherapist and an occupational therapist) who were native English speakers, fluent in Persian, and blind to the original English version. The final back-translated English version of the ID pain was sent to the developer (i.e., Russell Portenoy) for any possible deviation.

Expert Committee Review: The new Persian version of the ID pain questionnaire (IDPQ-P) was compared with the original version by all the experts involved in translation in a meeting. Based on consensus, no item needed modification.

Cognitive debriefing and pretesting: The IDPQ-P was tested on 19 patients (9 males and 10 females) either with (n=10) or without neuropathic pain (n=9) to assess the relevance, comprehensiveness, and comprehensibility. This pilot process was performed using the cognitive interview method to investigate the patient's understanding of each item, determining cognitive equivalence, as well as debriefing. The result of this pilot indicated that all 19 patients understood all the IDPQ-P items with no difficulty.

Statistical analysis

The statistical analyses were performed in IBM SPSS Statistics 23 (SPSS Inc., Chicago, IL). Demographic data (i.e., age, gender, and type of injury) were presented in terms of frequency, percentage, mean, and standard deviation. Psychometric properties of the IDPQ-P,

including internal consistency, test-retest reliability, construct validity, and discriminant ability, were also calculated.

Reliability: Reliability or the extent to which a questionnaire produces the same results for repeated measurements in patients who have not been changed was assessed by internal consistency and test-retest analysis.

Cronbach's alpha (CA) coefficient represents the interrelatedness among items and ranges from 0 to 1, with higher values indicating stronger internal consistency. Usually Cronbach's alpha coefficient is interpreted as the α values of > 0.9, 0.8-0.9, 0.7-0.8, 0.6-07, 0.5-0.6, and < 0.5 are considered to be excellent, good, acceptable, questionable, poor, and unacceptable, respectively (18).

Intraclass correlation coefficient (ICC) was calculated to assess the reproducibility of the results which is scored on a range of 0-1, where values greater than 0.7 indicate good test-retest reliability (19).

Validity: Validity is the degree to which a questionnaire assesses the construct it purports to measure (19). The construct validity of the IDPQ was examined by calculating Pearson Correlation Coefficients to quantify the relationship between IDPQ-P and Douleur Neuropathique 4 (DN4) questionnaire. A correlation coefficient greater than 0.7 was considered an indicator of good construct validity (20).

Discriminant validity of the IDPQ-P was assessed by the area under the curve (AUC) derived from receiver operating curves (ROC) to test the ability of the IDPQ-P to distinguish between patients with neuropathic and nociceptive pain. The ROC was plotted with IDPQ-P total score against two reference standards (i.e., physician's diagnosis and DN4 cut-off value). The AUC values were interpreted as follows (21): AUC = 0.5: No discrimination, 0.7 ≤ AUC <0.8: Acceptable discrimination, 0.8 ≤ AUC <0.9: Excellent discrimination, and AUC ≥ 0.9: Outstanding discrimination. The best cut-off value for the total score was calculated based on Youden's index (22).

Results

The demographic characteristics of patients are presented in Table 1. The mean age scores of patients were obtained at 49 and 50 years in patients with neuropathic pain and patients with nociceptive pain, respectively, and most of the patients were female in both groups. The mean IDPQ-P scores at baseline for patients with neuropathic pain and patients with nociceptive pain were estimated at 3±1.01 and 0.5±1.06, respectively [Table 2].

Reliability

Cronbach's alpha coefficient for the total score of the IDPQ-P was 0.47, showing unacceptable internal consistency over six items. The value of CA increased to 0.59 after the deletion of item 5. However, CA did not exceed the total coefficient after the deletion of the other items [Table 3].

Based on the GRC completed by patients, none of the 30 participants had changed at the retest occasion. Furthermore, ICC for the total score was 0.97, with a 95% confidence interval of 0.96 to 0.98, indicating excellent reliability (P<0.001).

Table 2. IDPQ-P and ND4 scores at the baseline and retest occasion

	Baseline		Retest	
	Neuropathic	Nociceptive	Neuropathic	Nociceptive
IDPQ-P	3.0 (1.01)	0.5 (1.06)	3.21 (1.02)	0.68 (1.05)
DN4	7.15 (2.29)	0.89 (1.31)	-	-

IDPQ-P: Identification Pain Questionnaire Persian version; DN4: Douleur Neuropathique 4

Table 3. Reliability analysis after item deletion

	Mean	SD	Corrected item-total correlation	Cronbach's alpha if item deleted
ID1	1.49	1.67	0.32	0.37
ID2	1.64	1.83	0.21	0.44
ID3	1.60	1.64	0.37	0.35
ID4	1.69	1.70	0.32	0.38
ID5	1.73	2.26	-0.09	0.59
ID6	2.34	1.78	0.34	0.37

Validity

The Pearson correlation coefficient between the IDPQ-P and DN4 indicated good construct validity of the IDPQ-P (r=0.74, P<0.001).

Regarding discriminant validity, the value of AUC was 0.94 (95% CI: 0.88-0.99) when the physician's diagnosis was selected as the reference standard (Sensitivity: 0.98, Specificity: 0.79) [Figure 1]. Furthermore, the AUC was 0.92 (95% CI: 0.85-0.99) when the DN4 cut-off value was used as the reference standard (Sensitivity: 0.96, Specificity: 0.80) [Figure 2]. The best cut-off value with the highest sensitivity and specificity was a total score of ≥ 2 in both ROC curves.

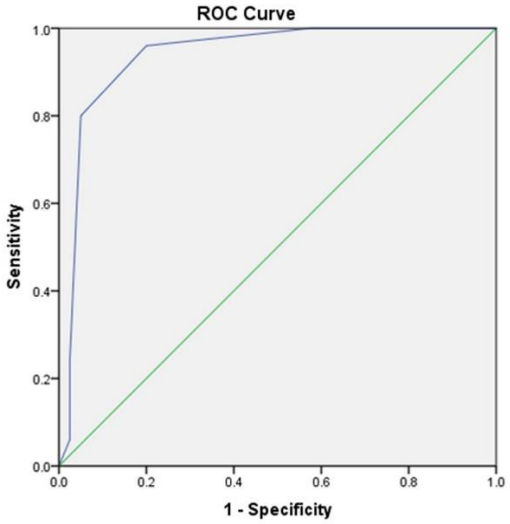

Figure 1. ROC curve for the IDPQ-P against physician's diagnosis. AUC value is 0.94 (95% CI: 0.88-0.99).

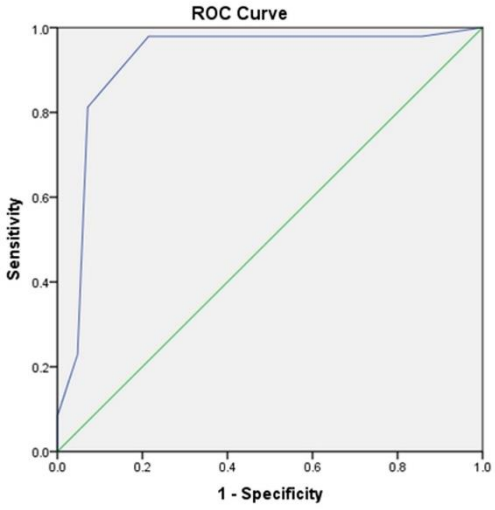

Figure 2. ROC curve for the IDPQ-P against DN4. AUC value is 0.92 (95% CI: 0.85-0.99).

Discussion

In this study, the ID pain questionnaire was culturally adapted and translated into the Persian language, and the reliability and validity of the IDPQ-P were tested. Our study results indicated a sufficient level of test-retest reliability, construct validity, and discriminant validity for the IDPQ-P. Furthermore, the IDPQ-P showed high sensitivity and specificity to discriminate patients with or without neuropathic pain. However, the internal consistency of the IDPQ-P was not acceptable.

The Identification Pain Questionnaire is one of the questionnaires recommended by the Neuropathic Pain Special Interest Group of the International Association for the Study of Pain for neuropathic pain screening (23). The IDPQ has been translated and validated in different languages, including English, Turkish, Arabic, Thai, Taiwanese, Spanish, Italian, and Chinese. Regarding internal consistency, the literature provides very little evidence regarding the unsatisfactory internal consistency of the IDPQ (4). Only Turkish (12) (α=0.71; 197 patients) and Chinese (7) (α=0.80; 140 patients) versions found satisfactory results on Cronbach's alpha coefficient. The Chinese version (7) has also reported the Guttman split-half coefficient as the index of internal consistency, which was obtained at 0.74, indicating acceptable internal consistency.

The value of Cronbach's alpha coefficient in the Taiwanese version (α=0.6) with 317 patients (10), Thai version (α=0.31) with 100 patients (9), and Arabic version (α=0.50 at pre-assessment and α=0.53 at post-assessment) with 375 patients (5) were at questionable and poor levels. The Arabic version has also calculated the value of Cronbach's alpha coefficient for neuropathic and nociceptive pain groups separately and a poor level of internal consistency was found for both groups (α=0.35 for neuropathic pain group and α=0.44 for nociceptive pain group).

The Turkish version has also reported Cronbach's alpha coefficient post-assessment with a 3-day interval. The value of Cronbach's alpha coefficient was obtained at 0.68 for the overall sample at post-assessment. However, the value of Cronbach's alpha coefficients for the Turkish version in a subgroup of patients with or without neuropathic pain were not acceptable neither at the pre-assessment (0.42 and 0.38, respectively) nor post-assessment (0.39 and 0.30, respectively). One possible reason for this low value could be a low number of questions (18). Insufficient internal consistency (α<0.05) could also indicate that the items were unrelated or weakly related (24).

Item total correlation, as an index of item discrimination, showed that items number two (i.e., Did the pain feel hot/burning?) and five (i.e., Is the pain made worse with the touch of clothing or bed sheet?) were less correlated with the total score. Similarly, item five had the least correlation with the total score (r:0.30) in the Thai version (9). Furthermore, the CA exceeds the total coefficient after the deletion of item five. This issue could indicate that these two items may not be appropriate for measuring the construct of interest in this questionnaire. Overall, the IDPA has demonstrated weak internal inconsistency across different cultures and populations.

The ICC value of the IDPQ has been calculated in three versions (original (3), Arabic (5), and Turkish (12)), and all demonstrated satisfactory results (ICC>0.7), indicating good test-retest reliability of this tool. The results of our study are in line with those of previous studies regarding test-retest reliability. As recommended by the guidelines, GRC was used to make sure that our patients were stable at the retest assessment (19, 25). Similar to the findings of our study, Italian (6) and Turkish (12) versions of the IDPQ found a highly significant correlation between the IDPQ and

DN4 questionnaire, indicating strong construct validity of the IDPQ.

As the IDPQ has been developed as a neuropathic pain screening tool to distinguish between patients with or without neuropathic pain, it is essential to evaluate the discriminant validity of this questionnaire. The results of several studies have reported the AUC and best cut-off value for the IDPQ total score with the highest sensitivity and specificity (5-12). In most studies and our study, the total score of ≥ 2 for the IDPQ is considered the best-cut of value to distinguish between patients with or without neuropathic pain [Table 4].

Table 4. IDPQ discriminant validity across different versions

Study	External criterion	Cut-off value	AUC (95% CI)	Sensitivity	Specificity
Arabic (5)	Physician (clinical) diagnosis	(≥2)	0.81 (0.76,0.85)	84.3%	66.7%
Thai (9)	Physician (clinical) diagnosis	(≥2)	0.89 (0.82,0.95)	83%	80%
Taiwanese (10)	Physician (clinical) diagnosis	(2)	0.82	77%	74%
Turkish (12)	-	(≥2)	0.92	77.2%	85%
Italian (6)	-	-	-	78%	74%
Chinese (8)	Physician (clinical) diagnosis	(≥3)	0.78	81%	65%
Chinese (7)		(≥1)	0.95 (0.92,0.98)	97.1%	72.9%
Spanish (11)	Physician (clinical) diagnosis	(≥3)	0.89	81%	84%
Persian	Physician (clinical) diagnosis	(≥2)	0.938 (0.88,0.99)	98%	79%
	DN4	(≥2)	0.92 (0.85,0.99)	96%	80%

AUC: Area under the curve; CI: Confidence interval; DN4: Douleur Neuropathique 4

To compensate for the lack of objective gold standard in diagnosing neuropathic pain, two measures as the external criterion (3), dichotomized physician (clinical) diagnosis, and DN4 results were chosen in the present study. The values of AUC, sensitivity, and specificity extracted from both ROC curves indicated the excellent discrimination ability of the IDPQ-P to distinguish between patients with or without neuropathic pain.

The high sensitivity (low false negative) rate of the IDPQ-P helps clinicians diagnose patients with neuropathic pain accurately, and subsequently, provide them with more appropriate evaluation and treatment options.

Overall, the IDPQ-P demonstrated sufficient test-retest reliability, construct and discriminant validity, and diagnostic accuracy. The IDPQ-P can be used in the clinical setting as a quick screening tool to diagnose patients with neuropathic pain.

Conflicts of interest: The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

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