Original Article

Development and validation of Arabic version of the douleur neuropathique 4 questionnaire

ABSTRACT

Introduction: The douleur neuropathique 4 (DN4) questionnaire is a widely used tool for diagnosis of neuropathic pain (NP). The aim was to translate, culturally adapt, and validate the DN4 questionnaire in Arabic.

Methods: A systematic translation process was used to translate the original English DN4 into Arabic. After the pilot study, the Arabic version was validated among patients with chronic pain in two tertiary care centers. The reliability of the translated version was examined using internal consistency, test-retest reliability, and intraclass correlation coefficients. We examined the validity of the Arabic DN4 via construct validity, concurrent validity (associations with the numeric rating scale, brief pain inventory, and Self-Completed Leeds Assessment of Neuropathic Symptoms and Signs [S-LANSS]), face validity, and diagnostic validity. To investigate the responsiveness, the translated DN4 was administered twice among the same group of patients.

Results: A total of 142 subjects (68 men, 74 women) were included in the study. Cronbach's α was 0.67 (95% confidence interval [CI]: 0.59–0.75), and interclass correlation coefficients was 0.81 (95% CI: 0.76–0.87). The DN4 was moderately associated with the S-LANSS questionnaire. Results showed our Arabic DN4 to have good diagnostic accuracy, with area under the curve of 0.88 (95% CI: 0.82–0.94). As with the original version, a score of ≥ 4 was found to be the best cut-off for the diagnosis of NP, with a sensitivity of 88.31%, specificity of 74.47%, a positive predictive value of 85%, and a negative predictive value of 80%. Most patients found the DN4 questionnaire to be clear and easy to understand, and thought the questionnaire items covered all their problem areas regarding their pain.

Conclusion: Our Arabic version of the DN4 is a reliable and valid screening tool that can be easily administered among patients to differentiate between NP and non-NP.

Key words: Anesthesia; Arabic; douleur neuropathique 4; neuropathic pain; reliability; validity

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Abdullah Sulieman Terkawi[1,2,3], Abdullah Abolkhair[4], Bouhassira Didier[5,6], Tariq Alzhahrani[7], Mazen Alsohaibani[2], Yazzed Sulieman Terkawi[8], Yousuf Almoqbali[4], Yasser Younis Tolba[4], Evelyn Pangililan[4], Farida Foula[4], Siny Tsang[9]

[1]Department of Anesthesiology, University of Virginia, Charlottesville, VA, USA, [3]Outcomes Research Consortium, Cleveland, OH, [9]Department of Epidemiology, Columbia University, New York, NY, USA, [2]Department of Anesthesiology, King Fahd Medical City, [4]Department of Anesthesiology, King Faisal Specialist Hospital, Riyadh, Saudi Arabia, [7]Department of Anesthesiology, King Saud University, Riyadh, Saudi Arabia, [5]Inserm U987, Hopital Ambroise-Pare, Boulogne-Billancourt, France, [6]Universite Versailles-Saint-Quentin, Versailles, France, [8]School of Medicine, Omdurman Islamic University, Omdurman, Sudan

Address for correspondence: Dr. Abdullah Sulieman Terkawi, Department of Anesthesiology, University of Virginia, 1215 Lee Street, Charlottesville, VA 22903, USA. E-mail: asterkawi@gmail.com

Introduction

Chronic pain, particularly chronic back and neck pain, is a continuously increasing condition worldwide. In fact, chronic back pain is the most common cause of disability-adjusted life years worldwide.[1] Recent data from the eastern Mediterranean region, where most of the Arabic-speaking population resides, indicates an increase in the prevalence of chronic pain, particularly pain associated with musculoskeletal disorders.[2] This increasing prevalence of chronic pain will also lead to heightened demand on relevant assessment tools and services needed for pain treatment and management.

Neuropathic pain (NP) is a special type of pain that arises as a direct consequence of a lesion or disease in the somatosensory system.[3] It comprises a large group of neurological conditions, including diabetic and other sensory polyneuropathies, trigeminal neuralgia, postherpetic neuralgia, stroke, spinal cord injury, and multiple sclerosis, as well as common conditions, such as lumbar or cervical radiculopathies, traumatic or postsurgical nerve injuries. Proper identifications of this type of pain are of paramount importance as the response to different analgesics is dependent on the nature of painful stimulus and its underlying mechanism.

Many tools have been used to diagnose and evaluate NP, among which the douleur neuropathique 4 (DN4) questionnaire, introduced by Bouhassira *et al*. in 2005, is one of the most widely used. Initially validated in French, the DN4 is a simple and accurate questionnaire for clinical practice and research use.[4] Since its development, the DN4 has been translated into many languages and clear guidelines for the linguistic validation for use in international studies have been developed.[5,6] To the best of our knowledge, DN4 has already been psychometrically validated in the Moroccan Arabic dialect.[7] However, as residents of other Arab countries do not readily understand this dialect, it is almost impossible to administer the Moroccan Arabic version of the DN4 among patients in residing in other Arab locations.

The aim of this study is to translate, culturally adapt, and validate DN4 questionnaire into the standard Arabic language.

Methods

A repeated measures study was conducted between September 2014 and December 2016 in two tertiary hospitals in Riyadh, Saudi Arabia; King Faisal Specialized Hospital (IRB approval #2141 101) and King Fahad Medical City (IRB approval #14-107) Riyadh, Saudi Arabia. The same sample was also administered the Arabic version of the neuropathic pain questionnaire-short form (SF) questionnaire, report of which is also available in this issue.[8]

In our clinical practice, NP is defined as "pain arising as a direct consequence of a lesion or disease affecting the somatosensory system," as per the Special Interest Group on NP (NeuPSIG).[3] The diagnosis of NP was performed using the grading system proposed by NeuPSIG group: (1) Negative or positive sensory signs, confined to the innervation territory of the lesioned nervous structure (mainly by bedside sensory examination), and (2) diagnostic test confirming a lesion or disease explaining NP (e.g., neuroimaging or neurophysiological methods). If both criteria are present, the patient will be diagnosed as having "definite neuropathic pain." If only one criterion is present, the patient will be diagnosed as having "probable neuropathic pain." Patients with "probable" diagnoses were excluded from the accuracy analyses in the current study.

Translation and cultural adaptation

- Initial translation (forward translation): Five bilingual translators, from five Arabic countries (Syria, Saudi Arabia, Yemen, Sudan and Egypt) with different dialects, were assigned. All translators spoke Arabic as their mother language. Two of them were naive translators with no prior knowledge of the concepts being quantified, and they were not from the medical field. Each translator produced a written report of the translation that they completed, after which all the translators met to discuss the translation and came to a consensus of the translated version of the instrument
- Backward translation: Two translators who were totally blind to the original (English) questionnaire were assigned to translate the final Arabic version back into the English language. This is a process of validity check to make sure that the translated version reflects the same item content as the original version. English (the source language) was the mother tongue for these two translators, and they were not aware of the concepts being explored
- An expert committee was composed of a methodologist, health professionals, and language professionals. The expert committee's role was to consolidate all the versions of the questionnaire and develop the pre-final version of the questionnaire for field-testing. The committee eventually reviewed all the translations and reached consensus on any discrepancy.

Measures

Numerical rating scale

Numeric rating scale (NRS) is an 11-point pain intensity score used to assess current overall pain intensity (from 0 = "no pain" to 10 = "pain as bad as you can imagine").[9]

Douleur neuropathique 4 questions

The DN4 includes a 4-section, 10-item checklist assessing the NP. Seven items are associated with the characteristics of pain (burning, painful cold, electric shocks) and pain-associated symptoms (tingling, pins and needles, numbness, itching), and three items are related to neurological examination in the area of the pain (hypoesthesia to touch, hypoesthesia to prick, brushing). A yes response is scored as 1, whereas a no response is scored as 0. The total score is computed by summing all 10 items, with the cut-off score for the diagnosis of NP as 4/10.

Brief pain inventory

The brief pain inventory (BPI) is used to assess patients' pain in clinical settings. Two domains of pain are assessed with the BPI – pain severity and pain interference. Pain severity is measured with four items, assessing pain at its "worst," "least," "average," and "now" (current pain). The intensity of pain is rated from 0 (no pain) to 10 (pain as bad as you can imagine). Pain interference is measured with seven items, assessing the extent to which pain has interfered with seven daily activities (general activity, walking, work, mood, enjoyment of life, relations with others, and sleep). Patients rated, from 0 (does not interfere) to 10 (completely interferes), how pain has interfered with their functioning.[10] We used the MD Anderson Cancer Center Arabic BPI-SF version, a previously translated and validated version.[11] In the current study, Cronbach's alpha (α) was 0.82 and 0.87 for pain severity and pain interference, respectively.

Self-Completed Leeds Assessment of Neuropathic Symptoms and Signs

The Self-Completed Leeds Assessment of Neuropathic Symptoms and Signs (S-LANSS) includes seven items assessing pain of primarily neuropathic origin. It comprises a 7-item pain scale, including the sensory descriptors and items for sensory examination. A score of 12 or above with the S-LANSS suggests pain of predominantly neuropathic origin.[12] We used a previously translated and validated Arabic version of the questionnaire.[13] Cronbach's α was 0.59 in the current sample.

Study protocol

An Arabic version of the DN4 questionnaire was administered twice to chronic pain patients in the pain clinic. This questionnaire was part of a package that contained other questionnaires (the BPI, S-LANSS, and NRS) as validating questionnaires (all in Arabic). Eligible patients were between 17 and 80 years old and reported chronic pain of at least 3 months' duration. Exclusion criteria included psychosis, significant visual impairment, physical disability, or patient's refusal to participate in the study. The patients completed the questionnaire for the first time (time 1) in the clinic, after the researcher explained the purpose of the study, obtained verbal consent, and answered all queries. At the first time, the investigator taught the patient how to test for question 9 and 10. For question 9, the investigator instructed the patient to use sharp nontraumatic object (e.g., toothpick) to test for sensation, and for question 10 to use a brush (e.g., toothbrush) to test for sensation. The questionnaire was completed the second time (time 2) by telephone interview after at least 3 days. Electronic data-capturing template was made to standardize data collection and maintain quality.

Pilot study

The prefinal version was pilot tested on a group of 34 patients (19 males and 15 females, data not shown). Both interviews (time 1 and time 2) were completed in person, after which the participants were asked about their experience and thoughts about the current version. No specific constructive feedback was received. The committee met at this point and approved the prefinal version as final [the final Arabic version is presented in the Appendix 1]. No changes were implemented to the prefinal version.

Assessing face validity

After completing the DN4 for the first time, patients responded to five statements regarding the DN4 items on a 5-point Likert type scale: 1 = totally disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree. The five statements were: (1) Questions were clear and easy; (2) questions covered all your problem areas with your pain; (3) you would like the use of this questionnaire for future assessments; (4) the questionnaire lacks important questions regarding your pain; (5) some of the questions violate your privacy.

Statistical analysis

All data analyses were performed in R version 3.3.2 (October 31, 2016). As the DN4 is rated on ten dichotomous (yes/no) items, the proportion of each response is presented for the ten DN4 items. Descriptive statistics (mean, standard deviation [SD], minimum, maximum) were presented for the total DN4 pain score, NRS, BPI items, and the S-LANSS composite score.

Reliability

The internal consistency of the DN4 was examined using Cronbach's α. Cronbach's α ranges from 0 (no internal consistency; none of the items are correlated with each other) to 1 (perfect internal consistency; all of the items are perfectly correlated with each other). α was computed for the 10-item DN4. An instrument with $\alpha \geq 0.70$ is typically considered to have adequate internal consistency.[14]

Test-retest reliability was assessed by a second administration (time 2) of the DN4, after at least 72 h of the first administration (time 1). The stability of the individuals' responses was estimated using the Pearson's correlation coefficients (r) between their responses in the two administrations. Pearson correlation coefficient (r) between the two assessments was computed for the DN4 total pain scores. Test-retest reliability was considered weak if $r < 0.3$, moderate if $0.3 \geq r < 0.5$, and strong if $r \geq 0.5$. Intraclass correlation coefficients (ICCs) were also computed, with ICC ≥ 0.70 considered to indicate good test-retest reliability.[15]

Validity

The diagnostic validity of the DN4 in distinguishing between patients with and without NP was assessed using receiver operator characteristics (ROC) analysis. Area under the curve (AUC) was calculated, with an AUC <0.60 considered as negative, 0.61–0.80 as doubtful, 0.81–0.90 as good, and >0.91 as very good.[16] For each cut-off value of the DN4, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated. The Youden index was computed (sensitivity + specificity − 1) to identify the optimum cut-off point.[17] In addition, Cohen's kappa coefficient[18] was computed to examine the agreement of NP diagnosis between the DN4 (cut-off ≥4) and the reference clinical diagnosis. A kappa of <0 is indicative of no agreement, 0–0.2 as slight agreement, 0.2–0.4 as fair agreement, 0.4–0.6 as moderate agreement, 0.6–0.8 as substantial agreement, and >0.8 as almost perfect agreement.[19]

Construct validity of the DN4 was examined by investigating the association between the DN4 NP score and the NRS. To establish concurrent validity of the DN4, the extent to which the DN4 is correlated with two other validated measures of pain, the BPI and the S-LANSS. Pearson's correlation coefficient (r) was used to evaluate the strength of the associations; $r < 0.3$ was considered to be weak, moderate if $0.3 \geq r < 0.5$, and strong if $r \geq 0.5$.

Results

A total of 142 patients (68 men, 74 women) participated in the validation study of the DN4 questionnaire. The average age was 51 (SD = 15.5), with average body mass index of 32 (SD = 7.6). Most patients had university-level education (42.3%), with fewer proportions having received some high school (30.7%), less than high school (11.7%), or no education (15.3%). The majority of these patients were married (84%), whereas 9% were single, 3% were divorced, and 4% were widowed. Of the enrolled patients, 27% were rated as 1, 52% were rated as 2, 27% were rated as 3, and 27% was rated as 4 on the American Society of Anesthesiologists score. 109 (76.8%) patients were from KFSH (King Faisal Specialist Hospital, Riyadh, Saudi Arabia), and 33 (23.2%) from KFMC (King Fahad Medical City, Riyadh, Saudi Arabia). Most patients (92.3%) reported having current pain.

Excluding 18 patients with "probable neuropathic pain," 124 patients had definite diagnoses of NP (yes/no). Among these patients, 77 (62%) were diagnosed "definite neuropathic pain," Demographic characteristics of patients diagnosed with or without NP are presented in Table 1. Eighteen patients were diagnosed as having "probable neuropathic pain" and were excluded from the neuropathic diagnostic accuracy analyses. These patients had the following clinical diagnoses: Failed back surgery syndrome ($n = 7$), unknown etiology ($n = 4$), complex regional pain syndrome ($n = 2$), sacroiliitis ($n = 2$), trigeminal neuralgia ($n = 2$), fibromyalgia ($n = 1$), mechanical neck pain ($n = 1$), and occipital neuralgia ($n = 1$).

On average, the patients were contacted for the second interview 7.4 (SD = 50) days after their initial participation. The majority of the patients (93%) completed the second interview within 10 days after the initial interview.

Table 1 illustrates the differences in DN4, BPI, S-LANSS, and NRS scores between patients who were previously diagnosed with NP and those who were not diagnosed with NP. Results from linear regression models showed that patients previously diagnosed with NP had statistically significantly higher scores in all the pain measures (all Ps < 0.05), except BPI current pain.

The proportion of responses (yes/no) for all DN4 items [Table 2] and the descriptive statistics of the DN4, BPI, and S-LANSS [Table 3] are presented for all patients in the current study. Of the 142 patients, 91 (64.08%) and 92 (64.79%) met the diagnostic cut-off (4/10) for NP at time 1 and time 2, respectively.

Reliability

Cronbach'sα for the DN4 is 0.67 (95% confidence interval [CI]: 0.59–0.75) and 0.7 (95% CI: 0.63–0.77) for time 1 and time 2, respectively. Results suggested a moderate to good internal consistency for the ten DN4 checklist items.

Test-retest reliability

Test-retest reliability was computed using patients ($n = 142$) with complete DN4 data for both interviews. The correlation coefficient (r) between the two interviews was 0.81 (95% CI: 0.75–0.86), and ICC was 0.81 (95% CI: 0.76–0.87). Results suggested good test-retest reliability for the DN4 total score.

Table 1: Descriptive statistics between patients diagnosed with and without neuropathic pain

	Neuropathic pain patients (*n*=77)	Nonneuropathic pain patients (*n*=47)	*P*
Gender (% female)	38 (49.4)	27 (57.4)	0.49
Age	51.97 (14.77)	49.85 (15.81)	0.45
Clinical diagnoses (%)	Radiculopathy=55 (71.4) Nerve injury/trauma=8 (10.4) Spinal stenosis=3 (3.9) Postamputation=2 (2.6) Spinal cord injury=2 (2.6) Spondylolisthesis with radiculopathy=2 (2.6) Carpal tunnel syndrome=2 (2.6) Diabetic neuropathy=1 (1.3) Meralgia paresthetica=1 (1.3) Thoracic outlet syndrome=1 (1.3)	Osteoarthritis=10 (21.3) Musculoskeletal=10 (21.3) Mechanical low back pain=9 (19.1) Radiculopathy=9 (19.1) Sacroiliitis=3 (6.4) Mechanical neck pain=2 (4.3) Rotator cuff tear=1 (2.1) Faceculopathy=1 (2.1) Chronic headache=1 (2.1) Spondylosis=1 (2.1)	NA
DN4 total	5.65 (1.88)	2.55 (1.69)	<0.001
S-LANSS	14.68 (5.54)	8.26 (5.62)	<0.001
BPI			
Worst pain	8.26 (1.62)	7.26 (2.17)	0.004
Least pain	4.73 (2.47)	3.47 (2.15)	0.005
Average pain	6.55 (1.82)	5.49 (2.21)	0.005
Current pain	6.17 (2.3)	5.23 (3.02)	0.05
Pain severity	6.43 (1.62)	5.4 (1.89)	0.002
Pain interference	5.75 (2.22)	4.25 (2.33)	<0.001
NRS	7.23 (1.62)	6.26 (1.95)	0.003

Descriptive statistics for gender and clinical diagnoses are presented as number (%), and the remaining descriptive statistics are presented as mean (SD). Linear regression models were used to examine the differences between neuropathic pain and nonneuropathic pain patients. SD: Standard deviation; NA: Not available; DN4: Douleur neuropathique 4; BPI: Brief pain inventory; S-LANSS: Self-Completed Leeds Assessment of Neuropathic Symptoms and Signs; NRS: Numeric pain scale

Table 2: Proportion of responses for each douleur neuropathique 4 items in time 1 and time 2 for all patients in the current study

	Time 1		Time 2	
	No	Yes	No	Yes
Burning	46	54	46	54
Painful cold	75	25	75	25
Electric shocks	47	53	44	56
Tingling	40	60	38	62
Pins and needles	33	67	33	67
Numbness	30	70	34	66
Itching	73	27	76	24
Hypoesthesia to touch	67	33	65	35
Hypoesthesia to prick	69	31	73	27
Brushing	66	34	57	43

Validity

Diagnostic validity

The diagnostic validity of the DN4 was evaluated using only patients with valid neuropathic/non-NP diagnosis (n = 124). Using a cut-off score of ≥4 as a diagnosis of NP, the DN4 showed a sensitivity of 88.31%, specificity of 74.47%, a PPV of 85%, and a NPV of 80% [Table 4]. The AUC was 0.88 (95% CI: 0.82–0.94). Consistent with the recommended cut-off score, results from the ROC analysis identified a cut-off score of ≥4 as the best score to distinguish between patients with or without NP [Figure 1]. There was substantial agreement between the diagnosis of NP using the DN4 (cut-off ≥4) and the prior clinical diagnosis (Cohen's kappa = 0.64, 95% CI: 0.49–0.78, P < 0.001).

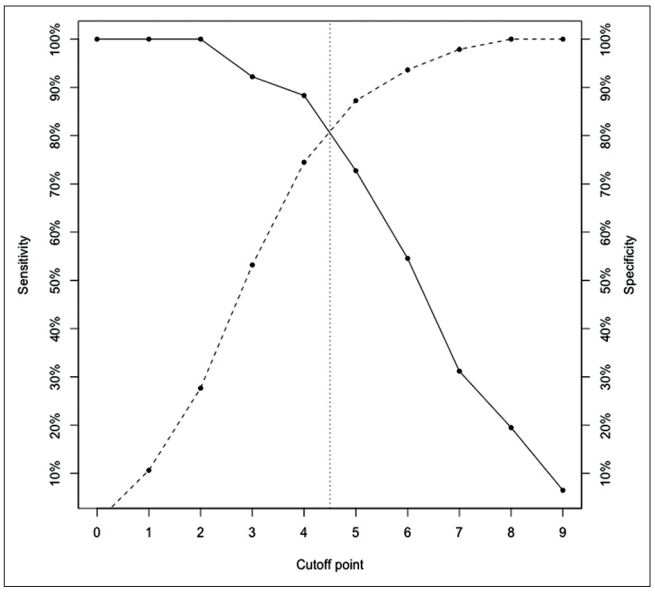

Figure 1: Cut-off point in the douleur neuropathique 4 optimizing the sensitivity and specificity to distinguish between patients with and without neuropathic pain in the current study

Construct validity

The construct validity of the DN4 was assessed by examining the correlations between the DN4 and the numerical pain

Table 3: Descriptive statistics of the douleur neuropathique 4, brief pain inventory, Self-Completed Leeds Assessment of Neuropathic Symptoms and Signs, and numeric pain scale for all patients in the current study

	Time 1				Time 2			
	Mean	SD	Minimum	Maximum	Mean	SD	Minimum	Maximum
DN4 total	4.5	2.4	0.00	9	4.5	2.4	0.00	9
BPI								
Worst pain	7.9	1.9	1.00	10	7.5	2.1	1.00	10
Least pain	4.3	2.4	0.00	10	4.2	2.3	0.00	10
Average pain	6.2	2.1	0.00	10	6.0	2.1	0.00	10
Current pain	5.9	2.6	0.00	10	5.6	2.7	0.00	10
Pain severity	6.1	1.9	0.75	10	5.8	1.9	0.25	10
Pain interference	5.3	2.4	0.71	10	5.1	2.4	0.00	10
S-LANSS	12.6	6.2	0.00	24	11.8	6.5	0.00	24
NRS	6.9	1.9	1.00	10	6.4	2.1	0.00	10

SD: Standard deviation; DN4: Douleur neuropathique 4; BPI: Brief pain inventory; S-LANSS: Self-Completed Leeds Assessment of Neuropathic Symptoms and Signs; NRS: Numeric pain scale

Table 4: Receiver operating characteristic of the douleur neuropathique 4 for the diagnosis of neuropathic pain

DN4 total	Sensitivity	Specificity	PPV	NPV	Youden index
0	100.0	0	62	NA	0.00
1	100.0	11	65	100	0.11
2	100.0	28	69	100	0.28
3	92.2	53	76	81	0.45
4	88.3	74	85	80	0.63
5	72.7	87	90	66	0.60
6	54.5	94	93	56	0.48
7	31.2	98	96	46	0.29
8	19.5	100	100	43	0.19
9	6.5	100	100	40	0.06
10	0.0	100	NA	38	0.00

Youden index=Sensitivity+specificity−1. PPV: Positive predictive value; NPV: Negative predictive value; NA: Not available; DN4: Douleur neuropathique 4

scale. The DN4 NP scores were weakly to moderately associate with the NRS (*R*s = 0.27 and 0.31, both *P*s < 0.01 for time 1 and time 2, respectively).

To investigate the concurrent validity of the DN4, the extent to which the DN4 was associated with the BPI and S-LANSS was examined. As shown in Table 5, the DN4 NP score was moderately correlated with pain severity and interference assessed with the BPI (*R*s = 0.26 to. 33, all *P*s < 0.01). The DN4 was positively correlated with the four BPI items assessing the worst, least, average, and current pain (*R*s = 0.17– 0.29, all *P*s < 0.05). The DN4 NP score was also moderately associated with NP assessed with S-LANSS ($r = 0.54$, $P < 0.001$).

Face validity

Patients' responses to the five questions assessing the face validity of the DN4 are presented in Table 6. The majority of patients endorsed agree or strongly agree for the first three questions assess face validity. Results showed that most patients found the DN4 questions to be clear and easy to understand, the questionnaire items covered all their problem areas regarding their pain, and that most would like to use the DN4 for their long-term follow-up assessment. Most patients disagreed that the DN4 lacks important questions regarding their pain, suggesting that the DN4 addressed most, if not all, of the important issues associated with their pain. Finally, most patients felt that the DN4 questions did not violate their privacy.

Discussion

The subjective nature of pain and the different ways patients describe pain necessitate the development of a precise scale that can be easily administered and accurately interpreted by the evaluator. General pain assessment tools such as the Short Form-McGill pain questionnaire have shown poor correlation with the NP.[20] Studies have suggested that NP may be identified with specific characteristics of pain, such as burning and numbness. Although no one symptom and/or sign is indicative of NP, the combination of some of these symptoms and signs have high discriminative values for identifying NP.[21] The DN4, which takes into account symptoms indicative of NP, is specifically designed to assess NP. The DN4 questionnaire was translated in many languages including Greek,[22] Portuguese,[23] and Spanish.[24]

The translation and validation of the DN4 into local languages offers patients and practitioners a valuable tool to assess NP. This study is the first validation of the DN4 questionnaire in the standard Arabic language. Results suggested that our translated version of the DN4 is reliable and valid to use among Arabic speaking patients. The internal consistency of our translated version ($\alpha = 0.67$–0.7) was comparable to those of other translated versions (e.g., 0.63 for the Arabic-Moroccan version).[7] Our Arabic version of the DN4 showed good accuracy in distinguishing between patients

Table 5: Pearson correlation coefficients between douleur neuropathique 4, brief pain inventory, and Self-Completed Leeds Assessment of Neuropathic Symptoms and Signs among patients

	DN4	BPI					
		Worst pain	Least pain	Average pain	Current pain	Severity	Interference
BPI							
Worst pain	0.29***						
Least pain	0.19*	0.43***					
Average pain	0.24**	0.62***	0.63***				
Current pain	0.17*	0.41***	0.56***	0.60***			
Severity	0.26**	0.73***	0.82***	0.86***	0.82***		
Interference	0.33***	0.38***	0.36***	0.46***	0.37***	0.48***	
S-LANSS	0.54***	0.25**	0.26**	0.26**	0.31***	0.33***	0.30***

*$P<0.05$; **$P<0.01$, ***$P<0.001$. DN4: Douleur neuropathique 4; BPI: Brief pain inventory; S-LANSS: Self-Completed Leeds Assessment of Neuropathic Symptoms and Signs

Table 6: Descriptive statistics for face validity

	Mean	SD	Totally disagree (%)	Disagree (%)	Undecided (%)	Agree (%)	Strongly agree (%)
Questions were clear and easy	4.4	0.55	0.0	0.0	3.5	55.6	40.1
Questions covered all my problem areas with my pain	4.0	0.77	0.0	4.2	14.8	52.8	27.5
I would like the use of this questionnaire for future assessments	4.1	0.66	0.0	1.4	12.0	59.1	27.5
The questionnaire lacks important questions regarding my pain	2.5	0.86	5.6	54.2	27.5	9.9	2.8
Some of the questions violate my privacy	1.6	0.64	47.9	46.5	4.2	1.4	0.0

SD: Standard deviation

with and without NP, with AUC of 0.88 (95% CI: 0.82–0.94), which was comparable to that of the original version (AUC 0.92).[4] We found a score of 4 (from the 10-item questionnaire) to be the best cut-off, with sensitivity of 88.31%, and specificity of 74.47%. The results are comparable with the findings in the original DN4, with sensitivity of 82.9% and specificity of 89.9%. Of note, similar accuracy was reported for the Arabic-Moroccan (AUC = 0.88); although, a cut-off score of 3 was recommended.

In addition, our findings support the high discriminatory value of the DN4 questionnaire in its standard Arabic version for the identification of NP. An ideal test (questionnaire) should be both highly sensitive and highly specific. In practice, there is a trade-off between sensitivity and specificity. As with any screening tools, practitioners should be aware that the DN4 might not be able to identify all patients with NP. Among patients previously diagnosed with NP, it has been posited that screening tools may fail to correctly identify 10%–20% of these patients.[25]

A clear benefit from this study is the development of DN4 in standard Arabic, which provides not only a suitable scale for diagnosing NP, but the opportunity for Arabic-speaking researchers to produce meaningful studies in this field.

Conclusion

The standard Arabic version of DN4 questionnaire is a reliable and valid screening tool that can be easily administered to differentiate between NP and non-NP patients in daily clinical practice and research settings.

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Conflicts of interest

There are no conflicts of interest.

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DN4 Questionnaire for neuropathic pain		استبيان عن الآلام ذات المنشأ العصبي ، من فضلك ضع علامة (✓) في المكان المناسب لك:
		مقابلة المريض
لا	**نعم**	**(أ) هل تشعر بأن الألم الحالي يحمل خاصية أو أكثر من الخواص التالية:**
		1. حارق
		2. بارد مؤلم
		3. يشبة الصدمات الكهربائية
لا	**نعم**	**(ب) هل يترافق الألم مع واحدة أو أكثر من الأعراض التالية في نفس المنطقة:**
		4. خدر (خَدَران)
		5. وخز دبابيس او مسامير
		6. تنميل
		7. حكة
		فحص المريض
لا	**نعم**	**(ج) عند فحص منطقة الألم، هل وُجِدت أي من الأعراض التالية ؟**
		8. نقص في الإحساس عند اللمس
		9. نقص في الإحساس عند الوخز
لا	**نعم**	**(د) في منطقة الألم، هل يصدرالألم أو يزيد ب:**
		10. التفريش (تدليك المنطقة بالفرشاة)

From: Bouhassira et al, Comparison of pain syndromes associated with nervous or somatic lesions and development of a new neuropathic pain diagnostic questionnaire (DN4). Pain 114 (2005) 29-36.

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Appendix 1: Arabic version of the douleur neuropathique 4 questionnaire