Clinical Research

Validity and reliability of the Indonesian version of the Douleur Neuropathique 4 for neuropathic pain

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ABSTRACT

BACKGROUND The Douleur Neuropathique 4 (DN4) is a widely used questionnaire for assessing neuropathic pain, demonstrating good sensitivity and specificity across various languages. Originally developed in France, cultural and linguistic differences necessitate its translation, validation, and reliability testing before use in Indonesia. This study aimed to translate, culturally adapt, and evaluate the validity and reliability of the Indonesian version of the DN4 questionnaire (DN4-Ina) for use in clinical and research settings.

METHODS Translation and cross-cultural adaptation were conducted following World Health Organization guidelines in Indonesian. A cross-sectional study was conducted in the Neurology Clinic, Cipto Mangunkusumo Hospital, to assess the validity and reliability of the DN4-Ina. The study subjects were selected through consecutive sampling of adult patients with chronic pain visiting the clinic from June to December 2023. Validity and reliability were assessed using SPSS software version 25. Validity testing utilized adjusted item-total correlation analysis, while reliability testing was evaluated using the test-retest method, intraclass correlation coefficient (ICC), and Cronbach's alpha for internal consistency.

RESULTS Of 40 participants, 65% were female, with a mean age of 51.85 (13–92) years, moderate pain intensity (mean numeric rating scale of 4.25 [2.99]), and pain duration of 7.95 (4.41) months. All DN4-Ina questions showed a correlation coefficient (r) greater than the table's value (0.312). The reliability test showed an ICC of 0.99 and a Cronbach's alpha of 0.746.

CONCLUSIONS The DN4-Ina score is a valid and reliable questionnaire for assessing neuropathic pain in the Indonesian population.

KEYWORDS diagnosis, neuropathic pain, questionnaires, reliability and validity

Neuropathic and nociceptive pain require different diagnostic approaches and treatments. Neuropathic pain results from a lesion or dysfunction of the somatosensory system, presenting as numbness, electric shock sensations, and burning, while nociceptive pain stems from structural damage.[1–3] Globally, neuropathic pain affects 7–10% of the population, with an Indonesian study reporting a 21.8% prevalence among outpatients according to the Indonesian Neurological Association (INA) report in 2012; however, the inclusion criteria for defining neuropathic pain were not specified.[2,4]

Nociceptive pain is more readily diagnosed due to observable local inflammatory responses and structural damage. Conversely, neuropathic pain frequently originates from nerve tissue damage at sites distant from the perceived pain location, necessitating comprehensive physical and neurological examinations

to identify the precise etiology.[2,3] Consequently, while anti-inflammatory agents effectively treat nociceptive pain, they provide no benefit for neuropathic pain, which requires anticonvulsants or other nerve-targeting medications. Inappropriate therapeutic selection results in prolonged suffering and patient discomfort.

A comprehensive examination of neuropathic pain can be time-consuming, prompting the development of screening questionnaires to facilitate diagnosis. Mathieson et al[2] identified the Douleur Neuropathique 4 (DN4) questionnaire as the most effective clinical tool, demonstrating high predictive accuracy with 83% and 90% sensitivity and specificity, respectively. While this instrument has been translated and validated into 50 and 15 languages, respectively,[3–5] adaptation for Indonesian clinical use remains pending. Establishing the validity and reliability of DN4 in Indonesia would provide clinicians with a standardized diagnostic tool for neuropathic pain. This study aimed to translate, culturally adapt, and evaluate the validity and reliability of the Indonesian version of the DN4 questionnaire (DN4-Ina) for application in clinical and research settings.

METHODS

Following approval from the DN4 developers, Bouhassira D, and the MAPI Research Trust, the official body responsible for the copyright management, licensing, and standardized translation procedures of the DN4 instrument, this study adhered to World Health Organization guidelines for translation and cross-cultural adaptation. The process comprised seven steps: (1) initial translation by two certified (AF and S); (2) expert review of the initial translation by neurologists from the Division of Pain and Headache, Department of Neurology, Faculty of Medicine, Universitas Indonesia, Cipto Mangunkusumo Hospital; (3) back-translation into English by two certified (AF and GJW) translators following initial revision; (4) review and refinement by an expert panel from the Division of Pain and Headache, Department of Neurology, Faculty of Medicine, Universitas Indonesia, Cipto Mangunkusumo Hospital, comprising three neurologists, including one consultant specializing in pain management; and (5) discussion to resolve discrepancies and finalization of the DN4-Ina. Validity and reliability testing of the DN4-Ina revealed no significant modifications were required by the two physicians at Cipto Mangunkusumo Hospital; however, additional linguistic and cultural adaptations were implemented to better capture the symptoms and clinical manifestations of neuropathic pain.

A cross-sectional study was conducted in the Neurology Clinic, Cipto Mangunkusumo Hospital, to assess the validity and reliability of the DN4-Ina. The study subjects were selected through consecutive sampling of adult patients with chronic pain visiting the clinic from June to December 2023.

The study population comprised all adult patients presenting with chronic pain at the Neurology Clinic of Cipto Mangunkusumo Hospital (No: KET-807/UN2.F1/ETIK/PPM.00.02/2023). Inclusion criteria stipulated that participants must be Indonesian speakers with pain intensity scores exceeding three on the numeric rating scale (NRS). Patients presenting with primary headache disorders were excluded from the study. Sample size determination utilized a formula based on target sensitivity and specificity parameters, incorporating a 95% confidence interval and the 21.8% prevalence of neuropathic pain reported by INA in 2012.[4] The calculated minimum sample size was 40 participants. Each participant underwent dual assessment by two trained mid-level resident physicians using the DN4.

Data collection continued until the sample size was met. Statistical analysis was performed using SPSS software version 25 (IBM Corp., USA), with results reported in frequency distribution and cross-tabulation tables. Validity testing assessed whether the DN4-Ina questions were valid using Pearson correlation to evaluate the corrected item-total correlation. A statement was considered valid if its r-value exceeded the 5% significance threshold. Reliability was assessed using two methods: the test-retest method, evaluated via the intraclass correlation coefficient (ICC) to determine agreement between raters; and internal consistency, measured by Cronbach's alpha to assess coherence among all questionnaire items, with a minimum acceptable value of 0.7.

RESULTS

The initial translation by two sworn translators was reviewed by an expert team, who selected the most accurate sentences from both versions. The original DN4 reference is provided in Supplementary

Table 1. Validity test of DN4-Ina scores

Questions	r value	r table 5%	Note
Is the pain has one or more of the following characteristics?			
Burning	0.581	0.312	Valid
Tingling or cold sensations	0.633	0.312	Valid
Electric shock-like sensations	0.533	0.312	Valid
Is the pain associated with one or more of the following symptoms in the same area?			
Like being tickled	0.321	0.312	Valid
Tingling	0.613	0.312	Valid
Numbness	0.768	0.312	Valid
Itching	0.365	0.312	Valid
Does the pain felt at the physical examination site show one or more of the following characteristics?			
Hypesthesia when touched	0.571	0.312	Valid
Hypesthesia when pricked	0.693	0.312	Valid
Light touch	0.452	0.312	Valid

DN4-Ina=the Indonesian version of the Douleur Neuropathique 4

Table 1. The two translations were then combined to produce the consensus DN4-Ina (Supplementary Table 2). Subsequently, back-translation into English was performed by two different sworn translators. The back-translation results were reviewed by a panel team to ensure the final translation was identical to the original version (Supplementary Table 3). The panel team verified that the combined back-translation of the DN4-Ina matched the original instrument. To establish validity and reliability, the DN4-Ina was tested with 40 participants. Most participants were female (65%), with a mean (standard deviation [SD]) age of 51.85 (13.92) years, moderate pain intensity (mean NRS score of 4.25 [2.99]), and a mean pain duration of 7.95 (4.41) months.

Validity assessment examined the corrected item-total correlation (r-value) for each variable to determine whether the questions appropriately measured the intended construct. Pearson correlation analysis evaluated associations between individual questionnaire items and total scores. Items achieving r-values exceeding the critical value at 5% significance level (0.312) were considered valid. All DN4-Ina items demonstrated r-values greater than 0.312, thereby confirming validity (Table 1).[6] Reliability assessment used the test-retest method, with internal consistency evaluated through Cronbach's alpha, and inter-rater agreement assessed via ICC. The DN4-Ina demonstrated a Cronbach's alpha of 0.746, indicating satisfactory internal consistency (>0.7), and an ICC of 0.99, reflecting excellent reliability (>0.8).

DISCUSSION

The DN4-Ina underwent several cross-cultural adaptations during development. The final version incorporated modifications to questions 2 and 10, specifically addressing "painful cold" and "brushing" terminology. Given Indonesia's tropical climate, lacking winter seasons, the term "painful cold" was considered culturally inappropriate. Following expert consultation, this descriptor was revised to represent a stabbing sensation more relevant to the Indonesian population. Similarly, "brushing," originally assessed using a paintbrush, posed translation challenges. The Indonesian term "*menyikat*" connotes cleaning activities, which can potentially cause confusion. Consequently, this was modified to "*mengusap*" (stroking). This adaptation maintained DN4 scoring integrity as it pertained to physician examination procedures rather than patient-reported symptoms.

A pilot test was conducted until 40 participants were recruited, with females comprising 65% of the sample. This corresponds with previous studies in Bandung, where neuropathic pain prevalence was higher among females (66.9%).[4] Our analysis excluded healthy individuals, focusing exclusively on patients with chronic pain seeking treatment at the Neurology Clinic. A systematic review indicated that females are more likely to visit or seek health consultations than males, possibly due to their coping mechanisms, which involve seeking explanations or assistance.[7,8]

Epidemiologically, neuropathic pain is more prevalent among females. Thus, our findings align with existing literature. However, sex may influence questionnaire validity, as a few individuals might overreport their pain. As age and life expectancy increase, chronic disease conditions occur more frequently in females. The most common chronic diseases among females are arthritis and osteoporosis. Both conditions can cause pain through direct inflammation or fractures.[9]

In the reliability test, the DN4-Ina achieved a Cronbach's alpha value of 0.746 and an ICC of 0.99. Internal consistency is considered good when the Cronbach's alpha coefficient exceeds 0.6, while an ICC above 0.80 indicates excellent agreement between raters. These results confirm that the DN4-Ina demonstrated a high degree of homogeneity. The high reliability of DN4-Ina likely stems from the questionnaire's simplicity and the examiners' comparable levels of education, competence, and understanding of DN4. The validity and reliability results of the DN4-Ina align with those of studies conducted in other languages, including Mandarin, Korean, Arabic, Czech, Persian, Turkish, Portuguese, and Dutch.[10] All reported Cronbach's alpha values exceeding 0.6 and ICC values above 0.80,[4,11,12] indicating that the DN4 questionnaire remains comprehensible even after translation into various languages, including Indonesian.

This study has certain limitations. The examined patients exhibited clear presentations of neuropathic pain; however, electrophysiological testing was not performed. Nevertheless, this does not compromise the validity of the translated scale.

In conclusion, the DN4-Ina questionnaire is a valid and reliable instrument for identifying neuropathic pain in Indonesian patients. All items demonstrated good validity and reliability, with strong consistency between different examiners. Certain terms were adjusted to suit Indonesian culture without altering their meaning. Overall, the DN4-Ina can be confidently implemented in clinical settings to facilitate the diagnosis of neuropathic pain.

Conflict of Interest
The authors affirm no conflict of interest in this study.

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