
ORIGINAL ARTICLE

Cross-Cultural Psychometric Assessment of the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) Pain Scale in the Portuguese Population

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■ Abstract

Background: Chronic pain is a well-known phenomenon. The differential diagnosis between neuropathic and nociceptive pain syndromes is a challenge. Consequently, assessment instruments that can distinguish between these conditions in a standardized way are of the utmost importance. The Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) is a screening tool developed to identify chronic neuropathic pain. The aim of this study was the Portuguese language translation, linguistic adaptation of the LANSS pain scale, its semantic validation, internal consistency, temporal stability, as well its validity and discriminative power.

Methods: LANSS Portuguese version scale was applied to 165 consecutive patients attending the pain clinic: 103 fulfilled the clinical criteria for the diagnosis of pain of

neuropathic origin and the remaining 62 fulfilled the criteria for nociceptive pain.

Results: The scale proved to be an internally consistent (Cronbach's alpha = 0.78) and reliable instrument with good test-retest stability ($r = 0.7$; $P < 0.001$). However, its validity and specificity with a cutoff point of ≥ 12 , for differentiating patients with neuropathic pain from those with non-neuropathic pain, had 89% sensitivity, 74% specificity, positive predictive value of 85%, and negative predictive value of 81%.

Conclusions: The Portuguese LANSS version pain scale properties lead us to the conclusion that such a cross-cultural version is a reliable and valid instrument for the differentiation of this type of pain. Its usage is recommended. ■

Key Words: LANSS, cross-cultural comparison, reliability, validity, neuropathic pain

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INTRODUCTION

Neuropathic pain definition was recently changed by International Association for the Study of Pain to "pain arising from a direct consequence of a lesion or disease

affecting the somatosensory system” either at peripheral or central level¹. Neuropathic pain occurs with an estimated prevalence of 3% to 8% of the general population. Diabetes is one of the major causes of peripheral neuropathic pain (NEP)².

Usually, its diagnosis relies on the patient’s medical history, physical examination findings, and screening questionnaires. In recent years, several questionnaires have been created and validated in different languages to discriminate types of pain. Even though diagnosis of NEP is not difficult, it takes time and demands special training. To facilitate this task, there are a number of diagnostic instruments, including the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS),³ which stand out for its suitability.

The aim of this study was to validate the cross-cultural psychometric characteristics of the LANSS. A Portuguese version of the LANSS was first developed through translation and back-translation and then used in a psychometric study with an analysis of its internal consistency, stability, validity, and discriminative power.

METHODS

The Leeds Assessment of Neuropathic Symptoms and Signs pain scale

The LANSS scale is a brief and easily applied instrument with 5 symptoms and 2 clinical signs. The LANSS pain scale is a semi-structured interview in which the patient is asked whether or not the description presented matches the pattern of pain felt during the past week.³ The original version was tested and validated in several settings with sensitivity between 82% and 91% and specificity ranging from 80% to 94% compared with clinical diagnosis.⁴

The interview comprises a total of 7 items grouped in 2 sections. The first section, Section A, is composed of 5 questions scored from 1 to 5, depending on the items, whenever the answer is affirmative and 0, if absent. The following descriptors are most frequently used by patients with this type of NEP: stings, electric shocks, changes in temperature/color of the skin, and others. It is the only neuropathic screening that tests autonomic changes.⁵

Section B refers to the physical examination, in which the sensorial characteristics of pain, such as allodynia and hyperalgesia, are explored by means of skin stimulation (skimming with cotton) and pin sting. The

score is 0 if the answer is negative and 5 or 3, depending on the question, if positive.

Therefore, the sum of all points obtained on the several items of both sections may vary between 0 and 24, and a cutoff point of 12 has been set as being indicative of a neuropathic mechanisms contribution.³

The LANSS Portuguese version was translated from the English edition adopting an algorithm regularly used in accordance with international recommendations, respecting its original structure. Two physicians, 1 pain specialist and 1 psychiatric, both fluent in English, made the translation to Portuguese.

Special attention was paid to the comprehensibility of the text, focusing on adopting words of most common use out of those available in the respective synonymic series, without loss of connotative equivalence. A draft of the translation was then assessed in small pilot studies, with a pool of 10 patients, where the interviewed subjects were asked to declare any doubts they may have had about the meaning of the items.

According to this feedback, the translation of several items was reviewed and the final Portuguese version was then translated back into English by a bilingual colleague general practitioner who ignored the original edition. Comparing the translated version with the original English version indicated a good cross-cultural equivalence relative to the original instrument. Retesting of the patients was performed within 2 weeks by the same chronic pain clinician to evaluate the stability of the pain scale. The scale was always applied by the same investigator who was blind to the disease results of the LANSS score.

Population

One hundred sixty-seven patients attending our Pain Clinic were recruited for this study. The protocol was approved by the local Ethics Commission. The study was conducted between October 2008 and February 2009.

The diagnosis of nociceptive or NEP was initially made by the physician of the Pain Unit, based on clinical history, physical examination, and radiological and/or electrophysiological examinations. We included all patients with chronic pain greater than 3 months, nononcological patients without mixed pain presentation, patients over 18 years of age, native Portuguese, patients who were able to understand a simple questionnaire, and those who did not have any physical anomaly that might disturb the questionnaire applica-

tion (such as being blind or deaf). Written informed consent was obtained before the start of the study.

Instruments

The socio-demographic characteristics of the sample population were obtained through a brief questionnaire that contains questions related to the following aspects: age; gender; education; conjugal relationship; socioeconomic level; and familiar function (familiar APGAR).⁶

Visual Analog Scale

A subjective estimation of the intensity of pain during interview was achieved by the visual analog scale (VAS) technique.⁷ The VAS is a line representing pain of growing intensity, where the left extremity corresponds to “absence of pain” and the right corresponds to “the utmost pain.” The patient was asked to mark a cross on the line at the position that best describes the pain intensity felt during the past week in a scale from 0 to 100.

Statistical Analysis

The sample size was calculated considering the following rule: factor analyses are performed on adequate sample size if the sample size is higher than the highest criteria defined by Terwee CB: $7 \times$ number of items (7) of the questionnaire and > 100.8 .⁸ All continuous data were expressed by mean (standard deviation) and qualitative data by percentage. Two independent sample *t*-tests were used to compare both groups. Factor analysis for dichotomous data (latent trait model) was used to identify the dimensions of the LANSS scale. The internal consistency and stability were measure by the Cronbach's alpha coefficient⁹ and single intraclass-correlation (ICC). All data were analyzed by SPSS version 17 (IBM, Armonk, NY, USA).

RESULTS

Our sample includes 167 patients, of which 103 had a diagnosis of pain with a neuropathic component and 64 had a diagnosis of nociceptive pain. Six patients were excluded because of incomplete data. The mean age was 55.3 ± 13.4 years, of which 44 were men with NEP.

Table 1 shows the main socio-demographic characteristics of the sample and the type of pain experienced.

Table 1. General description of the sample

(N = 167)	Mean $\pm$ SD/%
Age (20–88 years)	55.31 $\pm$ 13.39
Socioeconomic level [Graffar] (1–25)	17.29 $\pm$ 04.15
Familiar function [APGAR] (0–10)	7.22 $\pm$ 03.50
Conjugal relationship (%)	S – 9.9 M – 74.1 D – 5.6 W – 10.5
Visual analog scale (0–100)	72.12 $\pm$ 24.51
Type of pain	
Oncological pain (%)	00.6%
Musculoskeletal pain (%)	26.1%
Inflammatory pain (%)	12.1%
Psychogenic pain (%)	1.2%
Neuropathic pain [n = 103] (%)	62.4%
Duration of pain (months)	52.51 $\pm$ 53.70

S – Single; M – Married/marital Living; D – Separated/divorced; W – Widow(er).

Table 2. Exploratory factor analysis and internal consistency of the LANSS scale

Scale	Item-total correlation	Cronbach's α if excluded the item	Factor loadings
LANSS – Total			
$\alpha = 0.773$			
Section A			
Thermal	0.33	0.774	0.674
Dysesthesia	0.39	0.767	0.747
Paroxysmal	0.49	0.746	0.864
Evoked	0.52	0.739	0.840
Autonomic	0.53	0.738	0.828
Section B	0.60	0.723	0.976
Allodynia			
Altered	0.60	0.721	0.976
PPT			

Table 3. Stability of the LANSS (Vr. Pt)

(N = 160)	Test Mean (SD)	Re-test Mean (SD)	ICC (95% CI)
LANSS	14.53 (7.17)	14.71 (7.00)	0.77 (0.70;0.83)

Neuropathic (62.4%), musculoskeletal pain (26%), and inflammatory (12.1%) were the most common types.

All items showed a strong factor loading with the first factor (ranged from 0.67 to 0.98 – Table 2). The Cronbach's alpha value was 0.77 for the total LANSS score and only the thermal item, if deleted, increased the internal consistency.

Regarding stability, 160 patients (7 patients missing the retest) were retested within 15.2 ± 4.6 days and the scores showed high stability (ICC = 0.77) (Table 3).

Table 4 shows a comparison of the 2 groups according to the presence of a neuropathic component. Both groups were relatively homogeneous in terms of socioeconomic level, but the mean age in the NEP group was significantly higher than that in the group with nociceptive pain (NOP) (NEP 57.1 ± 13.9 vs. NOP

Table 4. Comparative analysis between groups with neuropathic and non-neuropathic pain

	Neuropathic pain (mean $\pm$ SD)	Non- neuropathic pain (mean $\pm$ SD)	<i>P</i>
Age (years)	57.14 $\pm$ 13.91	52.27 $\pm$ 11.99	0.023
Socioeconomic level [Graffar]	16.87 $\pm$ 4.32	17.98 $\pm$ 3.78	0.096
Familiar function [APGAR]	7.74 $\pm$ 3.25	6.37 $\pm$ 3.75	0.015
Visual analog scale	67.18 $\pm$ 25.68	80.32 $\pm$ 20.08	0.001
LANSS	18.62 $\pm$ 5.10	8.74 $\pm$ 5.73	0.001

52.3 $\pm$ 12 years, $P = 0.023$). Patients with NEP complained less about intense pain according to VAS from 10 to 3 ($P = 0.001$) and experienced better familiar relationship and activities of daily routine ($P = 0.015$).

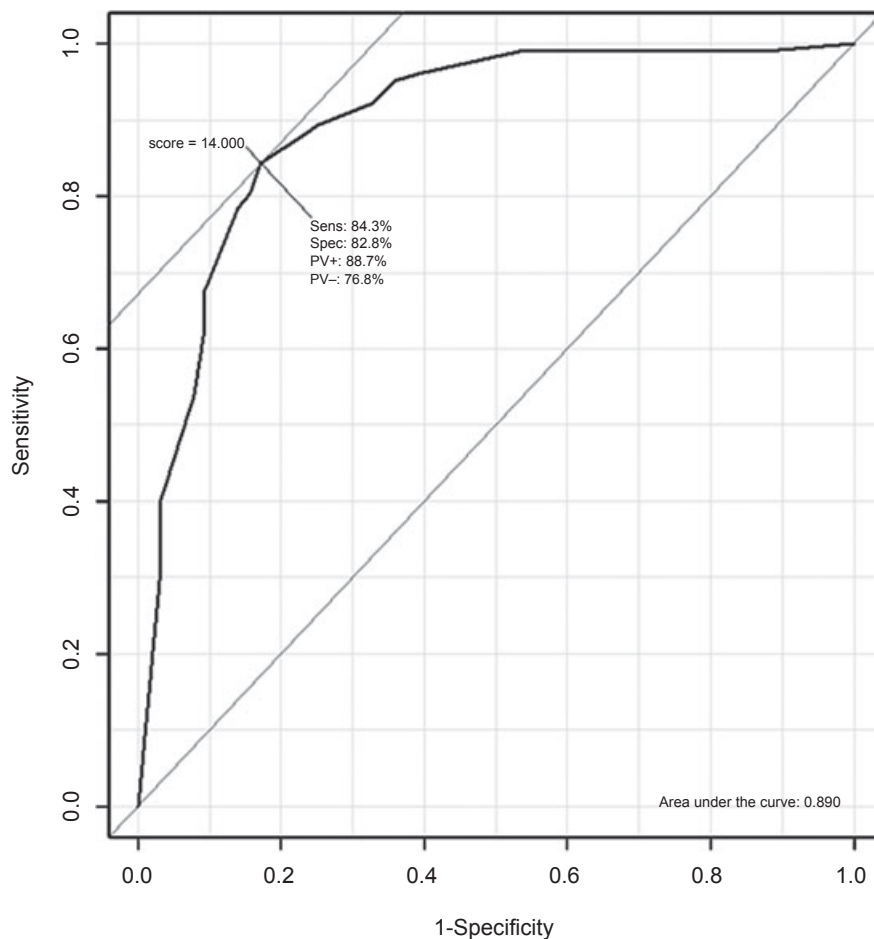
Regarding the validity of the scale, using a cutoff ≥ 12 , we obtained a sensitivity of 89% and specificity of 74%, as well as overall classification of 84%, with positive predictive value of 85% and negative predictive value of 81%. If we use ROC curve analysis (Figure 1), the best cutoff point was 14, but the overall classifica-

tion was 83.7%, compared with 84% with a cutoff of 12, which is similar.

The diagnostic concordance rate between the clinical diagnosis and the LANSS scale was 83.7% (kappa = 0.66) IC 95% (0.54–0.77), which is consistent with the original study, kappa 0.65³.

DISCUSSION

Leeds Assessment of Neuropathic Symptoms and Signs is a screening tool to differentiate neuropathic from nociceptive pain, tested and validated in different settings.⁵ Previous translations to Spanish,¹⁰ Brazilian,¹¹ and Turkish¹² were validated. Our study aims to assess whether the Portuguese LANSS is able to screen and diagnose the probability of an existing neuropathic component in the complaints of a specific patient with chronic pain according to the clinical diagnosis. The discriminative power of the LANSS pain scale was not tested in patients with mixed pain in the present study because there are no means of assessing, in such cases,

**Figure 1.** ROC curve to detect neuropathic pain using LANSS scale.

the relative weight of the contribution of each of the components, which is similar to the original study.

Our results with a Cronbach's alpha of 0.77 in the item reliability analysis show excellent internal consistency of the scale, and the repeatability of results with the scale supports its test-retest stability, showing that it is a strong and reliable instrument, as it has been obtained by the Brazilian Portuguese,¹¹ Turkish,¹² and Spanish¹⁰ studies. The sensitivity /specificity of 84/83%, as well as the diagnostic concordance rate between the clinical diagnosis and the LANSS scale (83.7-Kappa = 0.66), are similar to the original LANSS study.³ We would like to stress that our sample is bigger than previous studies, although it was performed in only 1 chronic pain center.

We tried to evaluate the best cutoff for sensitivity and specificity to discriminate neuropathic from nociceptive pain in Portuguese patients, through the use of ROC curve analysis. Using the cutoff value of 12, we obtained sensitivity quite similar to the cutoff of 14. (We determined that the cutoff > 14 has a sensibility of 84.3% and a specificity of 82.8% to discriminate between the 2 pain components). In the original report, the cutoff best discriminative power was 12.

In a Spanish¹⁰ version of LANSS, validated in a population from the center and south of the Iberian Peninsula, the authors observed a sensitivity of 81.8% and a specificity of 89.4% to the original 12 cutoff. The result of ROC curve analysis suggests that a different cutoff might be explained by pain intensity or cultural differences, as our sample is from the Northern Portuguese population with a slightly different cultural background.

Regarding the intensity of pain, we also evaluated the VAS in our sample. The higher VAS score in non-neuropathic patients suggests that they had a more intense pain, differing from the Brazilian Portuguese,¹¹ study, where the VAS is similar between groups. In evaluating the familiar function, we found that neuropathic patients had a significantly higher score and better family support. This could explain the lower VAS in the neuropathic group although we did not find any other studies evaluating this parameter in neuropathic patients.

One limitation of our study was the use of the instrument in only 1 chronic pain unit, in a major hospital with a referring area of 2 million patients, and in a national neuromodulation center.

We did not evaluate the quality of life and the effect of pain in the sleep quality; however, we evaluated the familiar function (APGAR) that is significantly higher in

the NEP group, as well as VAS. We found an inverse relationship between APGAR and VAS in both groups that could be explained by the better familial support. This seems to be a new finding as it was not previously evaluated in any NEP scale study.

Therefore, the Portuguese version of the LANSS is a reliable instrument to assess pain with a neuropathic component and to differentiate it from nociceptive pain, for use by a nonpain specialist. The Portuguese version should be used with a cutoff score ≥ 12 , clearly suggestive of a neuropathic contribution to the pain. Consequently, its use is advised as a screening tool to be used in clinical practice.

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