ORIGINAL ARTICLE

PASHTO TRANSLATION, VALIDITY AND RELIABILITY OF LEEDS ASSESSMENT OF NEUROPATHIC SYMPTOMS AND SIGNS (LANSS) IN SPINAL CORD INJURY PATIENTS

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ABSTRACT

Objective: The aim pf this study was to translate to translate English version of Leeds assessment of Neuropathic symptoms and signs (LANSS) pain scale into Pashto language and to determine the validity and reliability of Pashto version of LANSS pain scale in spinal cord injury patients.

Material & Methods: LANSS was translated from original language into Pashto and then back translated to English. It was reviewed by ten physical therapy experts for face and content validity. The scores of the Pashto version of the LANSS were studied in a sample of 113 spinal cord injury patients having pain from Pashto speaking region, Khyber Pakhtunkhwa, Pakistan. Comparison between Pashto LANSS and DN4 Questionnaire score was done to check for concurrent validity. Intra-class correlation coefficient, Cohen's kappa agreement and internal consistency were estimated to check the reliability of Pashto version of LANSS.

Results: For a p-value of <0.01, the overall mean score of Pashto-LANSS was higher in patients suffering from neuropathic pain. The ICC score for Pashto-LANSS was 0.76, kappa value 0.76 and Cronbach's alpha 0.83 indicating significant scores. The results of Pearson's correlation showed significant correlation between Pashto-LANSS and DN4.

Conclusion: Pashto LANSS is a reliable and valid tool to identify neuropathic pain in SCI patients. Pashto version of LANSS can be used in differentiating neuropathic pain from nociceptive pain in people with spinal cord injury (SCI).

Keywords: LANSS, Neuropathic pain, DN4 Questionnaire, Spinal cord injury, Pashto version of LANSS (Pashto-LANSS).

This article may be cited as: Khan H, Baig MO, Obaid S, Haleem MH. Pashto Translation, Validity And Reliability Of Leeds Assessment Of Neuropathic Symptoms And Signs (Lanss) In Spinal Cord Injury Patients. J Med Sci 2024 january;32(1):53-58

INTRODUCTION

The Leeds Assessment of Neuropathic Sign and Symptoms (LANSS) is an assessment tool for screening of neuropathic pain. It has a high support based on current evidence to separate neuropathic pain from a non-neuropathic pain. [1] Various researchers have translated LANSS into multiple languages and validated it. It is used in multiple conditions like complex regional pain syndrome, diabetes, cancer, radiculopathies and SCI. [2-5] LANSS was a very sensitive instrument and specific to measure the neuropathic components of a pain patient across all languages. Average Positive Predictive value (93.7%) showed that the instrument was an effective instrument in the determination of components of LANSS questionnaire that marked out neuropathic pain components. [6]

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Date Received: 07/06/2023
Date Revised: 30/11/2023
Date Accepted: 04/03/2024

The most important and frequently occurring secondary complication after spinal cord injury (SCI) is pain. [7] Pain is experienced by about half to two thirds of SCI patients.[8] It negatively affects rehabilitation outcomes and quality of life. [9,10] International Association for Study of Pain classified pain after SCI into nociceptive pain and neuropathic pain. [11] Neuropathic pain occurs as a result of injury to the nerve itself. It includes abnormal sensations like tingling, burning, electric-shock like, cold, piercing, pins and needles, squeezing, sharp, itchy and/or shooting pain. [12, 13] The wide range of signs and symptoms and lack of validated diagnostic criteria make it difficult to diagnose a neuropathic pain. [14]

Researchers in the UK developed the Leeds Assessment of Neuropathic Signs and Symptoms (LANSS) assessment tool to overcome this challenge. It consists of 7 yes/no items with a score linked to it. 5 of the 7 items

are self-reported and 2 require clinical evaluation. A score of ≥ 12 out of 24 indicates neuropathic pain. It has a sensitivity of 83% and specificity of 87% allowing it to detect neuropathic pain in 85% of patients. LANSS is translated to various languages including Turkish, Spanish, Swedish, Portuguese and Chinese Mandarin. [5, 15, 16]

According to Center for Languages of the Central Asian Region, 40 million people speak the language Pashto. 27 million reside in Pakistan particularly in the province Khyber Pakhtunkhwa. But no Pashto version of neuropathic screening tool is available, to the best of our knowledge. Neuropathic pain occurs in 48.6% of spinal cord injury patients in KPK, Pakistan. [17] This necessitate the translation of a tool to assess neuropathic pain. We translated the LANSS scale into Pashto and assessed it for validity and reliability in spinal cord injury patients. We investigated the validity and reliability of P-LANSS in the assessment of neuropathic pain in people with SCI.

MATERIALS AND METHODS

The data was collected from Paraplegic Center Peshawar after approval of IRB letter number 21678 and research ethical committee of Riphah International University, letter number RIPHAH/RCRS/REC/Letter-01035. The study was registered with www.clinicaltrials.gov number NCT05059405. Subjects of age 18-60 years, male and female, who had complete or incomplete spinal cord injury for ≥ 3 months at or below the level of thoracic spine and having a history of pain after SCI were included in this study. Subjects with diabetes and other neurological and congenital diseases like multiple sclerosis, Guillian barre syndrome, spina bifida and tumors etc. were excluded. Sample size was calculated to be 113 subjects calculated through online ICC formula (18, 19). Before participating, informed consent was obtained from subjects.

The translation process followed the WHO's Guidelines on Translation and Adaptation of Instruments to ensure linguistic and cultural equivalence between the English version and the translated versions, involved two bilingual individuals- an experienced neurological physical therapist and a Pashto language professor- whose native language was Pashto, translated the English LANSS into Pashto LANSS (P-LANSS). [20] Back translation of P-LANSS into English was carried out by another pair of bilingual, a physical therapist and an English language professor, with no knowledge of original version of LANSS. Finally, a committee of experts compared the backward translated version with the original LANSS and refined the P-LANSS to avoid any major differences.

The content and face validity of P-LANSS was assessed as a result of which a final version of P-LANSS was developed. Two different physical therapists collected data in the first and second week using P-LANSS and DN4 at the spinal cord injury (SCI) survivors. Convergent validity was demonstrated by converging P-LANSS with DN4.

The SPSS version 22 software was used to perform statistical analysis. To elaborate the demographics and Spinal cord injury characteristics of the participants, as well as the findings of the study, descriptive statistics were applied. To establish convergent validity, the relationship between the DN4 and P-LANSS total scores was assessed using the Pearson correlation coefficient. Concurrent validity was assessed by comparing P-LANSS and DN4 questionnaire scores from study visit 1. Content validity was assessed using Item-content validity Index (I-CVI). Internal consistency was assessed using Cronbach's α coefficient. Interrater reliability was tested using k-coefficient and was analyzed using two-way mixed model of the intra-class correlation coefficient (ICC). An ICC of more than 0.6 was regarded as good reliability, between 0.5 and 0.6 was regarded as moderate reliability, and less than 0.5 referred to poor reliability. For P-LANSS visit 1 and 2, the ICC coefficient was calculated for overall score of the P-LANSS Questionnaire. To examine the agreement among different items, Cohen Kappa agreement analysis was used, as the answers to the questions in P-LANSS were binomial.

RESULTS

One hundred and thirteen subjects participated in the study with mean age in years (32.04 ± 11.33) having pain after SCI. All the participants had paraplegia (motor complete =102, motor incomplete =11, ASIA A= 102, ASIA B =5, ASIA C =4, ASIA D =2). Pertaining to the level of SCI, 82% of the patients had thoracic level SCI and 18% had lumbar level SCI. In our study the most common causes of SCI were road traffic accident and fall from height which were 39 (34.5%).101(89%) of the SCI patients had no previous history of diseases. 105(92.9%) of the patients had 3 months to 15 years of duration after the injury. As shown in the study results, n=87 (78.8%) of the SCI patients had neuropathic pain diagnosed through DN4 Questionnaire and Pashto-LANSS. n=26 (23.1%) of the study population had non neuropathic (NNeP) or nociceptive pain. Table 1 shows demographics and frequency of pain. Inter-assessor reliability of the P-LANSS was good

Table 1: Heart Rate HR Comparison between Experimental and Control Groups

		N	%
Gender	Female	28	24.8
	Male	85	75.2
Marital status	Single	52	46.0
	Married	61	54.0
Literacy level	No formal education	23	20.4
	Primary level Education	27	23.9
	Middle level of education (upto class 8th)	35	31.0
	Matric level	10	8.8
	FA or FSc level	9	8.0
	Bachelor or Master level of education	9	8.0
Cause of spinal cord injury	Road Traffic accident	39	34.5
	Fall from Height	39	34.5
	Hit by falling object	9	8.0
	Fire arm injury	23	20.4
	Earth Quake victim	3	2.7
Duration after spinal cord injury	3 months	8	7.1
	> 3 months to 15 years	105	92.9
Previous history of diseases	No history of diseases	101	89.4
	Hypertensive	5	4.4
	Hepatitis	4	3.5
	Cardiovascular diseases	3	2.7
Level of spinal cord injury	Thoracic	93	82.3
	Lumbar	20	17.7
Frequency of NeP	Assessed by rater 1	89	78.8
Frequency of NeP	Assessed by rater 2	85	75.2
Frequency of NNeP	Assessed by rater 1	24	21.2
Frequency of NNeP	Assessed by rater 2	28	24.8
Mean diagnosed NeP	Assessed by rater 1 and rater 2	87	76.9
Mean diagnosed NNeP	Assessed by rater 1 and rater 2	26	23.1

SD=Standard deviation, N=number, %=percentage, NeP = Neuropathic pain, NNeP = Non-neuropathic pain

Table 2: Inter-rater Reliability of the P-LANSS

N	ICC	95%CI
All Questions	0.76	0.605-0.791
Q1	0.624	0.497-0.724
Q2	0.615	0.487-0.718
Q3	0.473	0.317-0.604
Q4	0.577	0.440-0.688
Q5	0.421	0.257-0.561
Q6	-0.58	-0.239-0.127
Q7	0.133-	0.52-0.309-

N=number of question, ICC=Intra class correlation coefficient, CI=Confidence interval

Table 3: Kappa agreement between P- LANSS Scores

	Visit 1; Rater 1 versus Visit 1; Rater 2		Visit 1; Rater 1 versus Visit 2; Rater 1	
Question	Kappa agreement	p value	Kappa agreement	p value
Q 1	0.62	<0.001	0.98	<0.001
Q 2	0.61	<0.001	0.97	<0.001
Q 3	0.47	<0.001	0.97	<0.001
Q 4	0.55	<0.001	0.96	<0.001
Q 5	0.43	<0.001	0.94	<0.001
Q 6	0.43	<0.001	1	<0.001
Q 7	0.03	<0.001	1	<0.001

for participants with having motor complete and incomplete SCI, when examined for all items and independently for each question (Table 2).

At study visit 1, the inter-class correlation values between rater 1 and rater 2's overall P-LANSS scores revealed acceptable inter rater reliability. When analyzed for subscales, the Cohen's Kappa agreement ranged from 0.03 to 1.0, with the lowest values for item 7 of rater 2 and highest values of item 1 to 7 of rater 1 (Table 3).

Inter-class correlation between P-LANSS total scores at study visit 1 and 2 was 1.0, ($p < 0.001$) suggesting highly significant test-retest reliability. Regarding stability, 113 patients were retested within 7 days and the scores showed high stability (ICC = 0.76) (Table 4).

The Cronbach's alpha coefficients for all questions was (> 0.83) for both raters which shows a significant internal consistency (Table 5).

Suitability of the P-LANSS (KMO value = 0.577) and the significance of the adopted procedure (Bartlett's test with a value of 194.496, $P < 0.001$) hence the factor analysis could not be performed because Bartlett's test of sphericity was highly significant and KMO measure of sampling adequacy was 0.577.

DISCUSSION

The author investigated the validity and reliability for the assessment of neuropathic pain in patients with SCI of the P-LANSS. Hence the original LANSS was translated for the validity and reliability purpose into the Pashto language first. P-LANSS showed good concurrent validity and revealed adequate reliability. When used for assessment of general items and individually for each item on patients with both complete and incomplete SCI, P-LANSS showed good inter-rater reliability. The kappa agreement between study visits was high for all seven items and significant for both raters. The kappa agreement value ranged from 0.03 to 1.0 with the lowest value for item no.7 of rater 2 and highest value for item no.1 of rater 1.

The Spanish LANSS has good reliability with Cronbach and Guttman split-half coefficients between 0.68 and 0.71 and a kappa coefficient for inter-rater agreement of 0.70 and intra-class correlation coefficients between 0.77 and 0.92. Specificity is 89.4% and positive predictive value is 91.1%. Validity is good with a kappa coefficient of 0.70 (CI 95% 0.59–0.81; $p < 0.0001$) and area under the curve 0.929 ($p < 0.0001$). [21] Cultural validation in China was highly reliable with Cronbach's alpha coefficients and Guttman half coefficients for internal consistency being 0.824 and 0.842, respectively. It has good face validity and high content validity with sensitivity being 80.0% and specificity 97.1%, and a positive predictive value of 96.9% and negative predictive value of 82.9%. [22] Cronbach's alpha was revealed to be acceptable for the Greek version (0.65), while a significant correlation was observed compared to the "gold standard" diagnosis (0.79, $P = 0.01$). [23]

Total scores of DN4 questionnaire and the total scores of LANSS questionnaire were compared for Neuropathic and Non-neuropathic pain where total scores of DN4 questionnaire were highly correlated with LANSS. [5] Similar to that current study also, compared P-LANSS with DN4 and found a strong positive correlation. The patients with NeP had a considerably higher mean of overall score of the tool, indicating that P-LANSS had discriminative potential.

The author used the same cut off score for NeP diagnosis as used in the original version of LANSS i.e ≥12. [1] We found P-LANSS to be slightly less sensitive and less specific than the original LANSS. P-LANSS is linguistically appropriate for use in Pashto speaking SCI patients revealing high test-retest reliability. It is simple to administer and can be a helpful tool in clinical settings with culturally varied population.

The current study used internal consistency analysis to check the reliability of P-LANSS which approached the accepted value of 0.83 and succeeded to pass it. The Greek version of the LANSS questionnaire found similar results (23). The Cronbach's value of the P-LANSS for all items is 0.83, indicating acceptable and significant internal consistency. Compared to the other studies, Cronbach's value for Spanish LANSS is 0.68, 0.67 for Brazilian Portuguese, 0.78 for Portuguese versions, 0.84 for Turkish and 0.82 for Chinese Mandarin versions. [3, 7 15, 16, 18]

The major and only limitation of this study is that there was no gold standard method to test the sensitivity and specificity of the P-LANSS such as detailed case history, clinical examination and further investigations if needed; this was not feasible as the time-frame for the study and resources were limited.

CONCLUSIONS

We concluded that even in northern Pashtun living areas where culture and norms play a big role in expressing pain, the Pashto version of LANSS can identify individuals with neuropathic pain from those with nociceptive pain. In current study data was provided signifying that the Pashto-LANSS could also be used by the SCI patients

Table 4: Stability of the P- LANSS

Test Mean (SD)	Re-test Mean (SD)	ICC (95% CI)
1.716(0.452)	1.68 (0.504)	0.76(0.605-0.791)

SD=standard deviation

Table 5: Internal Consistency of the P-LANSS Version

P-LANSS	Rater 1	Rater 2
All Questions	1.0	0.830
Q 1	1.0	0.766
Q 2	1.0	0.76
Q 3	1.0	0.642
Q 4	1.0	0.738
Q 5	1.0	0.626
Q 6	1.0	0.064
Q 7	1.0	0.03

P-LANSS =Pashto LANSS, α=alpha coefficient

themselves who can read and understand Pashto. They can diagnose their pain to be neuropathic or nociceptive through Pashto LANSS.

REFERENCES

1. Bennett M. The LANSS Pain Scale: the Leeds assessment of neuropathic symptoms and signs. Pain. 2001 May 1;92(1-2):147-57.
2. Garoushi S, Johnson MI, Tashani OA. Translation and cultural adaptation of the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) pain scale into Arabic for use with patients with diabetes in Libya. Libyan Journal of Medicine. 2017;12(1).
3. Barbosa M, Bennett MI, Verissimo R, Carvalho D. Cross-Cultural Psychometric Assessment of the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) Pain Scale in the Portuguese Population. Pain Practice. 2014 Sep;14(7):620-4.
4. Türkel Y, Türker H, Demir İA, Bayrak AO, Onar MK. Validation of self report version of the Leeds Assessment of Neuropathic Symptoms and Signs score for identification of neuropathic pain in patients from northern Turkey. Adv Clin Exp Med. 2014; 23(4):599-603.
5. Unal-Cevik I, Sarioglu-Ay S, Evcik D. A comparison of the DN4 and LANSS questionnaires in the assessment of neuropathic pain: validity and reliability of the Turkish version of DN4. The Journal of Pain. 2010 Nov 1;11(11):1129-35.
6. Fagbohun TR. Systematic Review On The Psychometric, Reliability And Validity Properties Of Translated Neuropathic Pain Screening Tools (DN4, LANSS AND PDQ) 1 JANUARY 2005–19 JULY 2019. International Journal of Medicine and Medical Research. 2021;7(1):51-67.
7. Schestatsky P, Félix-Torres V, Fagundes Chaves ML, Câmara-Ehlers B, Mucenic T, Caumo W, Nascimento O, Bennett MI. Brazilian Portuguese validation of the Leeds Assessment of Neuropathic Symptoms and Signs for patients with chronic pain. Pain Medicine. 2011 Oct 1;12(10):1544-50.
8. Van Gorp S, Kessels AG, Joosten EA, Van Kleef M, Patijn J. Pain prevalence and its determinants after spinal cord injury: a systematic review. European Journal of Pain. 2015 Jan;19(1):5-14.
9. Jensen MP, Chodroff MJ, Dworkin RH. The impact of neuropathic pain on health-related quality of life: review and implications. Neurology. 2007; 68(15):1178-82.
10. Ullrich P, Jensen M, Loeser J, Cardenas D. Pain intensity, pain interference and characteristics of spinal cord injury. Spinal Cord. 2008; 46(6):451-5.
11. Bryce TN, Biering-Sørensen F, Finnerup N, Cardenas D, Defrin R, Lundeberg T, et al. International spinal cord injury pain classification: part I. Background and description. Spinal cord. 2012; 50(6):413-7.
12. Widerström-Noga EG, Felipe-Cuervo E, Broton JG, Duncan RC, Yezierski RP. Perceived difficulty in dealing with consequences of spinal cord injury. Archives of physical medicine and rehabilitation. 1999; 80(5):580-6.
13. Treede R-D, Jensen T, Campbell J, Cruccu G, Dostrovsky J, Griffin J, et al. Neuropathic pain: redefinition and a grading system for clinical and research purposes. Neurology. 2008; 70(18):1630-5.
14. Siddall P. Management of neuropathic pain following spinal cord injury: now and in the future. Spinal cord. 2009; 47(5):352-9.
15. Yucel A, Senocak M, Orhan EK, Cimen A, Ertas M. Results of the Leeds assessment of neuropathic symptoms and signs pain scale in Turkey: a validation study. The Journal of Pain. 2004; 5(8):427-32.
16. Pérez C, Gálvez R, Insausti J, Bennett M, Ruiz M, Rejas J. Linguistic adaptation and Spanish validation of the LANSS (Leeds Assessment of Neuropathic Symptoms and Signs) scale for the diagnosis of neuropathic pain. Medicina clinica. 2006; 127(13):485-91.
17. Zeb A, Arsh A, Bahadur S, Ilyas SM. Spinal cord injury due to fall from electricity poles after electrocution. Pakistan Journal of Medical Sciences. 2019; 35(4):1036.
18. Li J, Feng Y, Han J, Fan B, Wu D, Zhang D, et al. Linguistic adaptation, validation and comparison of 3 routinely used neuropathic pain questionnaires. Pain Physician. 2012; 15(2):179.
19. Walter S, Eliasziw M, Donner A. Sample size and optimal designs for reliability studies. Statistics in medicine. 1998; 17(1):101-10.
20. World Health Organization. WHO| Process of translation and adaptation of instruments. WHO website.

21. Pérez C, Gálvez R, Insausti J, Bennett M, Ruiz M, Rejas J. Adaptación lingüística y validación al castellano de la escala LANSS (Leeds Assessment of Neuropathic Symptoms and Signs) para el diagnóstico diferencial del dolor neuropático. Medicina clínica. 2006 Oct 1;127(13):485-91.

22. Li J, Feng Y, Han J, Fan B, Wu D, Zhang D, Du D, Li H, Lim J, Wang J, Jin Y. Linguistic adaptation, validation and comparison of 3 routinely used neuropathic pain questionnaires. Pain Physician. 2012;15(2):179.

23. Batistaki C, Lyrakos G, Drachtidi K, Stamatiou G, Kitsou MC, Kostopanagiotou G. Translation, Cultural Adaptation, and Validation of Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) and Self-Complete Leeds Assessment of Neuropathic Symptoms and Signs (S-LANSS) Questionnaires into the Greek Language. Pain Practice. 2016 Jun;16(5):552-64.

Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Khan H	✓	×	✓	×	✓	×
Baig MO	✓	✓	×	✓	✓	×
Obaid S	✓	×	×	✓	×	×
Haleem MH	✓	×	✓	×	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethical Approval:

This Manuscript was approved by the Ethical Committee of Riphah College of Rehabilitation Sciences, Islamabad Vide No. RIPHAH/RCRS/REC/01035. Dated: 26 06 2021

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