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Cross-Cultural study of adaptation and validation of Kannada version of self-administered leads assessment of Neuropathic symptoms and signs (S-LANSS) pain scale in chronic pain patients

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Abstract
The neuropathic pain in the General population ranges from 1 to about 18 %. There are many scales to measure the same but one commonly used in the S-LANSS pain scale. This pain scale helps to identify the neuropathic pain. This score is useful to identify the neuropathic pain and the best part about this is that there is absolutely no need for a clinical examination. This study puts in an effort to translate the above said scale into Kannada and find its efficacy

Keywords: Chronic pain, S-LANSS, Reliability, Validity

1. Introduction
Pain is a simple mechanism by which the body comes to know of the impending dangers. This seems to be very easy but it's very complex to understand. There are 4 basic elements which are involved they are a primary stimulus which is transduced to a nociceptive signal which reaches the central nervous system (spinal cord). These two includes the transmission of signals. Then comes the transformation or modulation of signal which decides the signal to ascend or descend. At last, comes the perception. So at each and every stage the pain can be checked and modulated. This is very complex. This is the key point which integrates cognitive and affective response[1]. Chronic pain can be described as a pain that is perceived for more than or equal to 6 months. They are divided into neuropathic and nociceptive. The later one happens when there is injury to the non - nervous tissue[2]. Whenever there is an injury to the somatosensory pathways then it is called as neuropathic pain and this is defined by international association for the study of pain (IASP) [3]. The neuropathic pain in the General population ranges from 1 to about 18 per cent [4].
Based upon the location, the neuropathic pain can be divided into central or peripheral. This depends on where the lesion is. Whether its in brain and spinal cord or whether its in the peripheral nervous system. Most common peripheral neuropathies are entrapment syndromes, radiculopathies, peripheral nerve injury, complex regional pain syndrome, metabolic disorders, infectious diseases etc and central neuropathies are malignancies, vascular lesions, inflammatory disorders and degenerative disorders [2].
The S-LANSS pain scale is highly used because of its high sensitivity and specificity. The area under the ROC curve is huge. The benefit of using this scoring system is it has the capacity to access the neuropathic pain without any clinical examination to be conducted. The score is of 24 points and if scored 12 then it can be identified as neuropathic pain. This scale has been translated in Turkish, Dutch, Spanish, French, Greek, Arabic and Malayalam populations [5].
According to various studies the prevalence of neuropathic pain in Karnataka population is ranging from 32%- 45%. Till now S-LANSS scale in Kannada language is not available. As neuropathic pain being more prevalent among Karnataka population and the diagnosis is essential for better treatment there is a strong need translate S-LANSS in to local Kannada language.

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2. Aim of the Study:
To translate S-LANSS scale into Kannada and to evaluate reliability and validity of it.

3. Methodology
Study design: Validation study

Study population: Subjects with chronic pain among Kannada speaking population.

Study setting: Srinivas College of Physiotherapy and Research Centre OPD, various Clinics in and around Mangalore.

Sampling technique: purposive sampling

Sample size: 60

Study duration: April 2019 – May 2020

Criteria For Selection:
Inclusion criteria: [5,6]
➢ Patients with chronic pain more than 3 months
➢ Patients above 18 – 55 years
➢ Both men and women
➢ Patients who are able to read kannada/ natives of Karnataka
➢ Patients with cancer of determinate origin

Exclusion criteria: [7]
➢ Trauma or dermatological conditions
➢ Patients with cancer of indeterminate origin
➢ Unstable medical/ psychological conditions
➢ Chronic alcoholism or drug abuse

Tester:
The Principal investigator will be a qualified physiotherapist and currently perusing master of physiotherapy degree in Musculoskeletal and Sports condition in Srinivas College of physiotherapy and research centre, Mangalore.

Procedure:
Subjects will be selected according to the selection criteria. Informed consent should be obtained from the subjects prior to the participation.

Cross Cultural Adaptation [8]
The guidelines for cross-cultural adaptation of the S-LANSS scale will be subjective questionnaire, the S-LANSS scale will be cross-culturally adapted into Kannada version of in S-LANSS scale six steps:

Step 1
Initial Translation to Kannada Language/ Forward Translation:
Initial translation of questionnaire will be done into Kannada language from original English version of S-LANSS scale.

These steps will be performed by two bilingual individuals whose native language is Kannada. One is the physician and other is the physical therapist with extensive clinical experience in musculoskeletal disorders, to perform an initial translation from English to Kannada.
Step 2

Synthesis:
A meeting will be held between the two translators and the research team to obtain a consensus on the translated version.
Step 3

Back Translation:
Back translation of preliminary S-LANSS scale in to English will be conducted by two native English speakers who are fluent in Kannada but had no any medical background and were blinded to the S-LANSS scale.
Step 4

Reviewer's Committee:
Committee of experts, including forward and back translators and a health professional and a language professional will develop the pre final version of S-LANSS scale with emphasis on Semantic, idiomatic, experimental and conceptual equivalence in relation to original back translated S-LANSS scale.
Step 5

Pilot Testing:
The pre final questionnaire will be administered to 10 subjects who were diagnosed with chronic pain. The interviewer will report on each respondents understanding the questionnaire items and making decision on them. As no further adaptation is indicated, the pre final and final S-LANSS scale will be identical. The main objective is to assess whether the translated questionnaire is understandable, the vocabulary is appropriate and also the expression is relevant for Kannada culture.
Step 6

Validation Study:
Test-retest reliability will be done; patient will be examined again after 7 days. So that person may not copy the same data as well as he/she will not forget. Convergent validity will be demonstrated by converging S-LANSS scale with LANSS scale. Both measures will be completed at same time.

4. Statistical Analysis:
Data was tabulated in Microsoft EXCEL computer software. Statistical analysis and descriptive data are coded and entered in to the software SPSS version 20.0 in windows. Shapiro-wilk test is used to find out the distribution of data as parametric or non- parametric. Test-retest reliability is tested by using interclass correlation coefficient and convergent validity is calculated with spearman correlation rank coefficient between S-LANSS scale and LANSS scale.
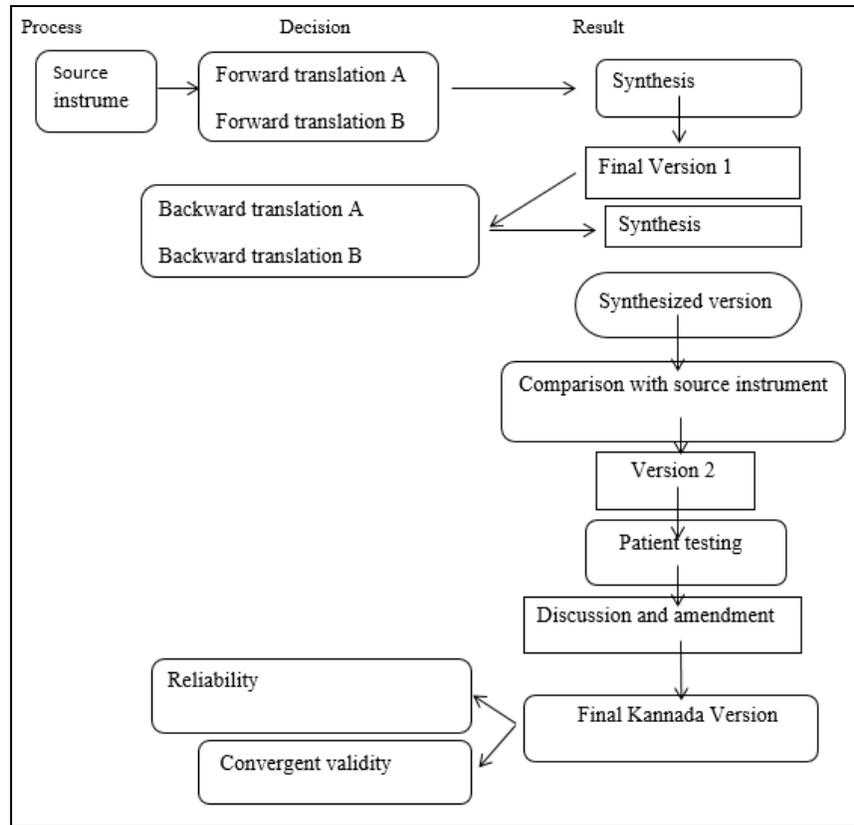
4.1 Translation Process

Fig. 1: Block diagram representing the Translation Process

4.2 Sample Size Estimation:

Formula for sample size calculation for validation study

$N = (z^2) \times 4\ (SD^2/d^2)$

Where, n= sample size

Z = statistic for level of confidence with 95% CI ±1.96

SD (standard deviation) = 10.2

d= 6.1

Estimated sample size is 47 with power 0.85

In our study sample size is n=60

5. Results

Table 1: Demographic data of Patients with Chronic Pain

Variables	Mean±SD
Age	41.43±7.85
Gender	1.5±.50
Height	162.0±8.57
Weight	61.23±8.99
BMI	22.98±3.02

Table 2: Descriptive statistics of S-LANSS at baseline and after 1 week and LANSS

	Mean±SD	P Value
SLANSS I	9.21±4.86	0.00
SLANSS II	9.2±4.74	0.00
LANSS	9.07±4.69	0.00

Table 3: Interclass Correlation Coifficient

ICC	Significance
.994	.00
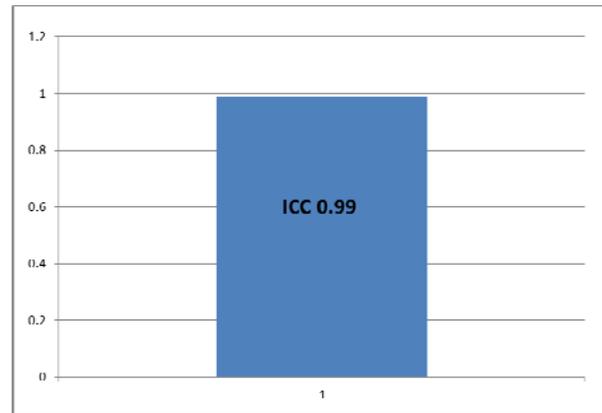
Fig 2: Test–Retest Reliability

Table 4: Spearman Correlation Cofficient

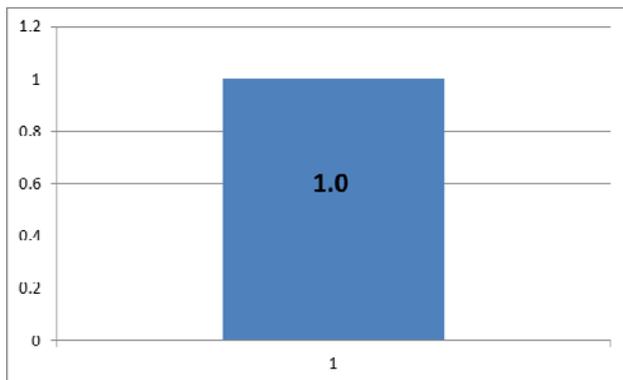| Component	Correlation Coiefficient
SLANSS	1.00
LANSS	.980

Fig 3: Convergent Validity

6. Discussion
This study aimed to cross culturally adapt the Kannada version of S-LANSS scale and to test the psychometric properties of the Kannada version of S-LANSS SCALE in patients with chronic back pain and neck pain.

In this study total 60 patients who fulfilled the inclusion criteria were participated. S-LANSS questionnaire was given twice with one week interval to measure the test-retest reliability. The interclass correlation coefficient is 0.994 which reveals the high test-retest reliability of S-LANSS scale. Convergent validity was measured by administering LANSS scale by a therapist after the patient has completed S-LANSS SCALE. The association between both values are measured using spearman correlation coefficient and the value has come as 1 which indicates the positive correlation between both values.

Author of the scale Michael I Bennett and colleagues conducted a clinical validation study to find out the properties of S-LANSS scale. They have used Neuropathic pain questionnaire to find out convergent validity of S-LANSS. The association has been found to be significant. They have also found out that the scale has high specificity and sensitivity, 80% and 78% respectively. Internal consistency and discriminant validity were also confirmed.

In previous studies, Spanish version S-LANSS found out that the scale is valuable for classifying patients with chronic pain (95% CI, 0.66-0.76). They have used ID-pain questionnaire to compare S-LANSS scale to find out the convergent validity and the correlation value was 0.734 (p<0.01).This is reflecting an appropriate level of convergent validity.

Test retest reliability of Turkish version of S LANSS was good in chronic pain patients (ICC= .74, p> 0.05).They also have found out the convergent validity of S-LANSS scale by comparing it with the gold standard diagnosis and the correlation coefficient was r.0.97 which is fairly high for a self-assessment tool.

S-LANSS scale has been found to a valid and reliable tool for differentiating the neuropathic and nociceptive pain with significant sensitivity and specificity in other Arabic, Greek, Malayalam versions also.

It was found that S-LANSS scale is equivalent to those in the original version. Neuropathic pain is a global burden; studies revealed that neuropathic pain greatly affects physical and mental health as well as the social and daily lives of those with this condition. According to the recent studies prevalence of developing neuropathic pain in common musculoskeletal conditions is also very high. Proper diagnosis of neuropathic pain is essential for the better treatment.

S-LANSS scale is highly acceptable, easily understandable and was found suitable for self-administration. It required around 5-6 min. for filling up; hence it seems to be appropriate in routine clinical practice and research purpose. The result showed that it was possible to translate this functional status questionnaire into other languages without losing psychometric properties of the original English version.

7. Limitation of the Study
Our study was conducted among chronic pain patients with low back pain and neck pain with duration of more than 3 months. None of the other patients with pain more than 3 months were not included even though the studies are proving there will be neurologic involvement in chronic pain patients.

8. Conclusion
This study provides us with the evidence that the Kannada version of S-LANSS scale is a reliable and valid measure to assess neuropathic pain in Kannada-speaking patients with chronic neck pain and back pain. Hence, it can be used to assess neuropathic pain among Kannada speaking population with chronic pain.

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