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Translation, Cross Cultural Adaptation and Psychometric Validation of S-LANSS Questionnaire into Gujarati Language for Gujarati Speaking Population.

Dr Prashant Parmar[1], Sheth Jaini[2], Himanshu Raghav[3]
[1]*Assistant Professor at MMSPC, Amsaran, Kheda, Gujarat, India.*
[2,3] *Intern Students at MMSPC Amsaran, Kheda, Gujarat, India*

Corresponding Author: Parmar Prashant Natvarlal

ABSTRACT:

OBJECTIVE: *The Aim of The Study Is to Translate, Culturally Adapt and Psychometrically Validate S-LANSS Questionnaire into Gujarati Language for Gujarati Speaking Population.*

MATERIAL AND METHOD: *The Study Followed Established Protocols for Cross-Cultural Adaptation, Including Forward and Backward Translation of The Original Scale into Gujarati language. A Cross-Sectional Study Was Conducted with a Sample of 60 Patient' s (N=60) Suffering from Neuropathic Pain. Internal Consistency Was Evaluated Using Cronbach' s alpha and McDonald' s omega. Construct Validity Was Assessed Through Exploratory Factor Analysis (EFA), and Convergent Validity was Determined by Comparing S-LANSS Scores with The PAIN DETECT SCALE using Pearson' s correlation coefficient (r).*

RESULT: *The Gujarati Version Demonstrated Excellent Internal Consistency with a Cronbach' s alpha of 0.833 and a McDonald' s omega of 0.841. A Very Strong Positive Correlation was Found with the PAIN DETECT Scale (r = 0.898, p<0.001). Factor analysis Confirmed a Robust single-factor Structure with Factor Loadings Ranging from 0.502 to 0.780. The KMO Measure of Sampling Adequacy was 0.857, Indicating Excellent data Suitability.*

CONCLUSION: *The Gujarati Version of S-LANSS is a Reliable, Valid and Clinically Useful Tool for Screening and Stratifying Patients with Neuropathic Pain in Gujarati Speaking Population.*

Keywords: *Neuropathic Pain, Validation, S-LANSS Questionnaire, Gujarati Version, Cross Cultural Adaptation, Pain Measurement.*

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I. INTRODUCTION

Neuropathic pain is defined by the International Association for the Study of Pain (IASP) as pain arising as a direct lesion or disease affecting the somatosensory system. This definition emphasizes that neuropathic pain is distinct from nociceptive pain, as it originates from dysfunction or damage within the

nervous system itself rather than from activation of peripheral nociceptors. The somatosensory system includes peripheral nerve fibers, spinal cord pathways, and central brain structures responsible for processing sensory information, and impairment at any of these levels can lead to neuropathic pain. Clinically, neuropathic pain is characterized by a combination of positive symptoms such as burning sensations, electric shock-like pain, tingling, and hyperalgesia, along with negative symptoms such as sensory loss. Patients may also present with allodynia, where normally non-painful stimuli evoke pain, reflecting abnormal sensory processing. The IASP further highlights that neuropathic pain involves complex neurobiological mechanisms including peripheral sensitization, central sensitization, and maladaptive plasticity within the nervous system. These mechanisms contribute to the persistence and severity of symptoms, making neuropathic pain a chronic and often debilitating condition. Additionally, neuropathic pain is associated with significant physical, psychological, and social consequences, thereby affecting overall quality of life. Accurate identification and classification of neuropathic pain are therefore essential for effective clinical management and appropriate therapeutic interventions (1).

Neuropathic pain represents a significant component of chronic pain conditions within the general population and has been increasingly recognized as a major public health concern. Epidemiological evidence indicates that a notable proportion of adults experience symptoms suggestive of neuropathic pain, although prevalence estimates vary depending on diagnostic criteria and assessment methods. The burden of neuropathic pain extends beyond physical discomfort, as it is often associated with reduced functional capacity, sleep disturbances, and diminished quality of life. Individuals with neuropathic pain frequently report more severe pain intensity compared to those with non-neuropathic pain, leading to greater disability and healthcare utilization. Furthermore, neuropathic pain is commonly linked with psychological comorbidities such as anxiety and depression, which can further complicate its management and outcomes. The condition also imposes a considerable socioeconomic burden due to increased medical costs and loss of productivity. Variability in reported prevalence highlights the importance of reliable screening and diagnostic tools to accurately identify neuropathic pain in both clinical and community settings. Improved recognition and assessment of neuropathic pain are therefore essential to enhance treatment strategies and reduce its overall impact on individuals and healthcare systems (2).

Neuropathic pain is often associated with various clinical conditions including diabetic neuropathy, post-herpetic neuralgia, spinal cord injury, and nerve trauma, highlighting its diverse etiological background. The heterogeneity in presentation and mechanisms makes diagnosis and management particularly challenging. Furthermore, neuropathic pain is frequently accompanied by emotional and psychological disturbances such as anxiety, depression, and sleep disorders, which can exacerbate the overall burden of the condition (3). This significantly impacts patients' quality of life, daily functioning, and social participation. The complexity of neuropathic pain mechanisms necessitates accurate assessment and classification to guide effective treatment strategies. However, due to variability in clinical presentation and lack of a single definitive diagnostic test, standardized screening tools play a crucial role in identifying neuropathic pain in both clinical and research settings (3).

Accurate identification of neuropathic pain is essential for appropriate treatment planning, as it requires different management strategies compared to nociceptive pain (4). However, differentiation between neuropathic and nociceptive pain remains challenging in clinical practice due to overlapping features and variability in patient presentation (5)

To facilitate the identification of neuropathic pain, several validated screening tools have been developed, including the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) and its self-administered version, the S-LANSS questionnaire (6). The S-LANSS questionnaire is a simple, reliable, and easy-to-administer 7-item self-report tool that does not require clinical examination and can be used in both clinical and research settings (7). It has demonstrated good psychometric properties, including high sensitivity and specificity, in distinguishing neuropathic pain from nociceptive pain (8). Due to its clinical usefulness, the S-LANSS questionnaire has been translated and culturally adapted into

various languages such as Turkish, Greek, Persian, Spanish, and Korean (9), Cross-cultural adaptation of health-related questionnaires is essential to maintain concept equivalence, good accuracy, and cultural relevance when used in various populations (10). Standardized guidelines recommend a systematic process involving forward translation, backward translation, expert committee review, pre-testing, and cognitive debriefing to ensure the quality of translation (11).

Despite the availability of S-LANSS in multiple languages, there is currently a lack of a validated Gujarati version, which limits its use among Gujarati-speaking populations. Considering the wide use of Gujarati language in India, particularly in Gujarat, the absence of a culturally adapted and validated screening tool for neuropathic pain creates a gap in both clinical assessment and research. Therefore, there is a need to translate, cross-culturally adapt, and validate the S-LANSS questionnaire into Gujarati to ensure accurate identification and effective management of neuropathic pain in this population.

II. METHODOLOGY

Translation and Cross-Cultural Adaptation

The original English version of the S-LANSS questionnaire was translated into Gujarati following internationally accepted guidelines for cross-cultural adaptation of self-report measures (Beaton et al., 2000). The process included:

1. Forward translation by two bilingual translators fluent in Gujarati and English.
2. Synthesis of translations into a single version.
3. Backward translation into English by two independent translators blinded to the original questionnaire.
4. Expert committee review to resolve discrepancies and ensure semantic, idiomatic, experiential, and conceptual equivalence.
5. Pre-testing on 10 participants to assess clarity, comprehension, and cultural relevance.

Expert Panel Members

NO.	Designation	Specialty	Experience
1	**Linguist / Translation Expert (Gujarati) Professor**	**M.A., B.ed, M.ed in Gujarati**	**5 years**
2	**Orthopedic Surgeon (Gujarati)**	**M.S.(Orthopaedics)**	**10+ years**
3	**Two independent English Teacher**	**B.A., M.A., B.ed in English**	**5+ years**
4	**Physiotherapist / Rehabilitation Expert**	**MPT in Neuro-PT**	**8+ years**
5	**Librarian**	**M.L.I.Sc.**	**18+ years**
7	**Layman people Gujarati**	**SSC Pass**	**-**

Study Design and Setting:

Participants : A total of 60 participants aged between 32 and 55 years were recruited. Inclusion criteria were: (1) self-reported chronic pain lasting more than three months, (2) clinical suspicion of neuropathic pain, and (3) ability to read and understand Gujarati. Exclusion criteria included acute pain conditions, psychiatric illness interfering with questionnaire completion, and refusal to participate. Participants completed the Gujarati S-LANSS and the Pain DETECT questionnaire during structured interviews. Demographic data (age, gender, occupation) were recorded. Ethical approval was obtained, and informed consent was secured from all participants.

Data Collection: This was a cross-sectional validation study conducted in three major market areas of Ahmedabad (Kalupur, Naroda, and Maninagar). The study population comprised fruit and vegetable vendors, a group with high prevalence of musculoskeletal and neuropathic pain due to prolonged standing and repetitive physical activity.

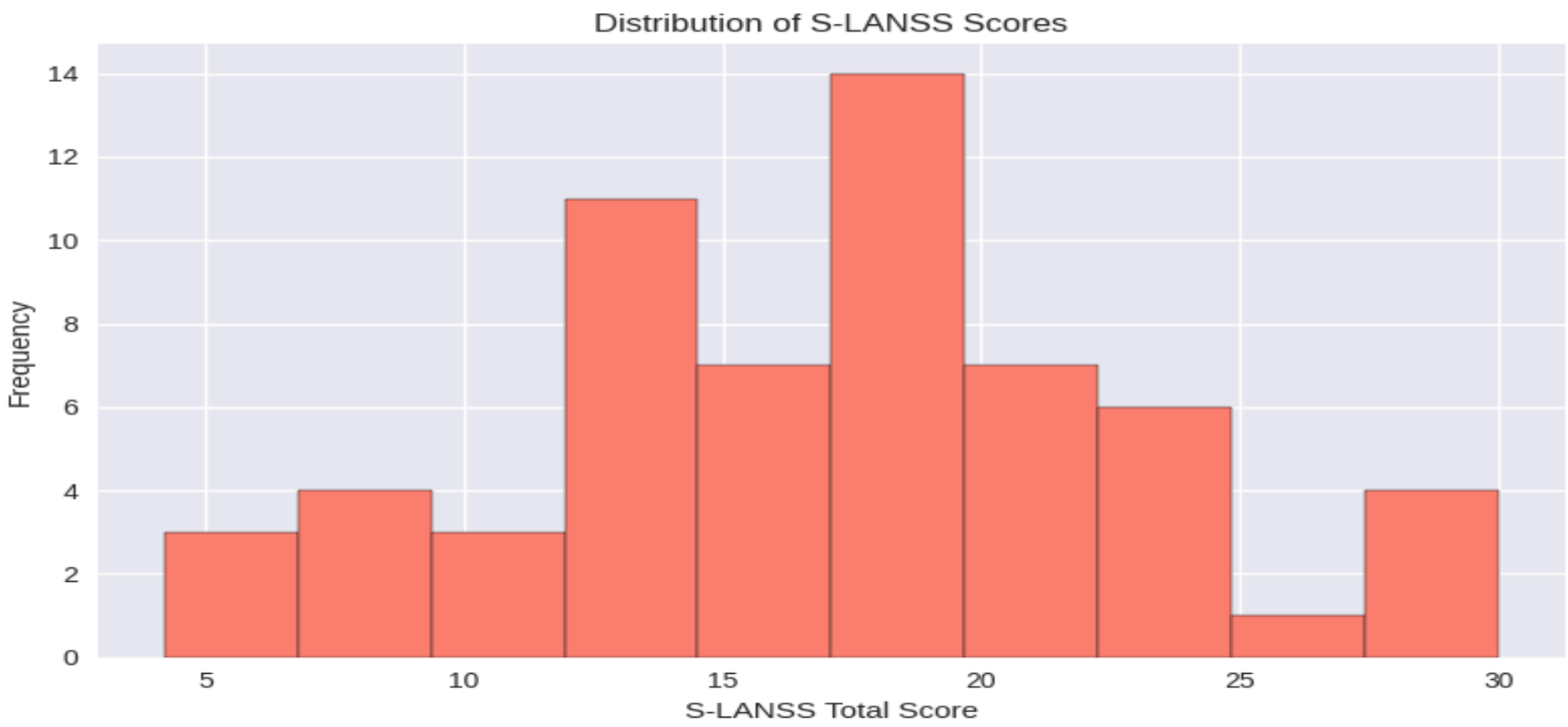
Statistical Analysis: Statistical Analysis was performed by JASP Software. (v0.96.0) (12)

- Descriptive statistics were calculated for age and S-LANSS scores.
- Reliability analysis included Cronbach' s α for internal consistency and item-rest correlations for individual item reliability.
- Construct validity was assessed using Pearson correlation between S-LANSS and Pain DETECT scores.
- Exploratory Factor Analysis (EFA): Kaiser-Meyer-Olkin (KMO) test and Bartlett' s test were performed to assess sampling adequacy. Promax rotation was applied.
- Confirmatory Factor Analysis (CFA): Conducted using DWLS estimator to confirm the factor structure. Model fit was evaluated using chi-square test, factor loadings, and residual variances

III. FINDINGS & RESULTS

1. Descriptive Statistics:

	Age	**S-LANSS Total D1**
Valid	60	60
Missing	0	0
Mean (arithmetic)	42.75	17.45
Std. Deviation	6.390	5.426
Shapiro- Wilk	0.966	0.977
P-value of Shapiro- Wilk	.089	.309
Minimum	32.00	1.000
Maximum	55.00	30.00



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2) Reliability: Cronbach' s α = 0.833 (95% CI: 0.758– 0.908)

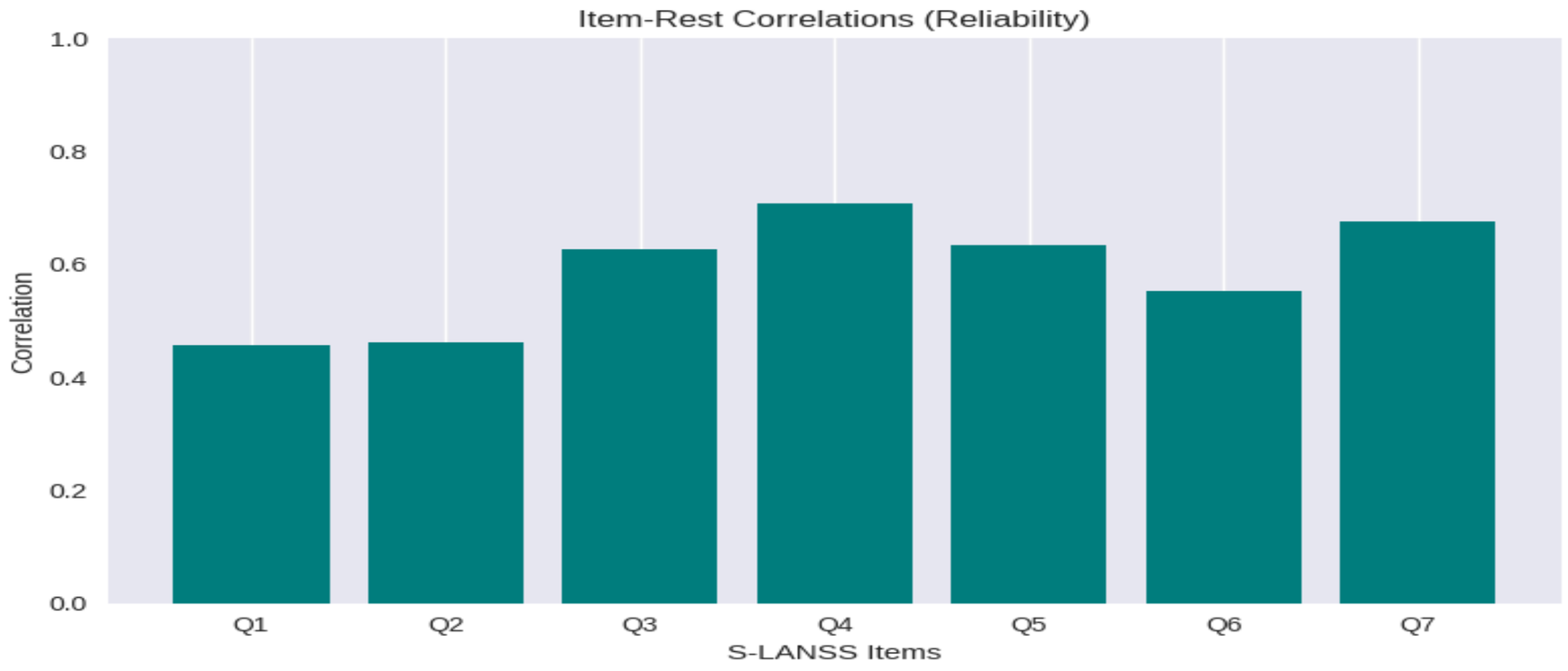
Item-rest correlations ranged from 0.456 to 0.707, indicating moderate to strong item reliability.

[Table 2.1] Frequentist Scale Reliability Statistic

				95%CI
Coefficient	**Estimate**	**Std. Error**	**Lower**	**Upper**
Cronbach's α	**0.833**	**0.038**	**0.758**	**0.908**

[Table 2.2] Frequentist Individual Item Reliability Statistics

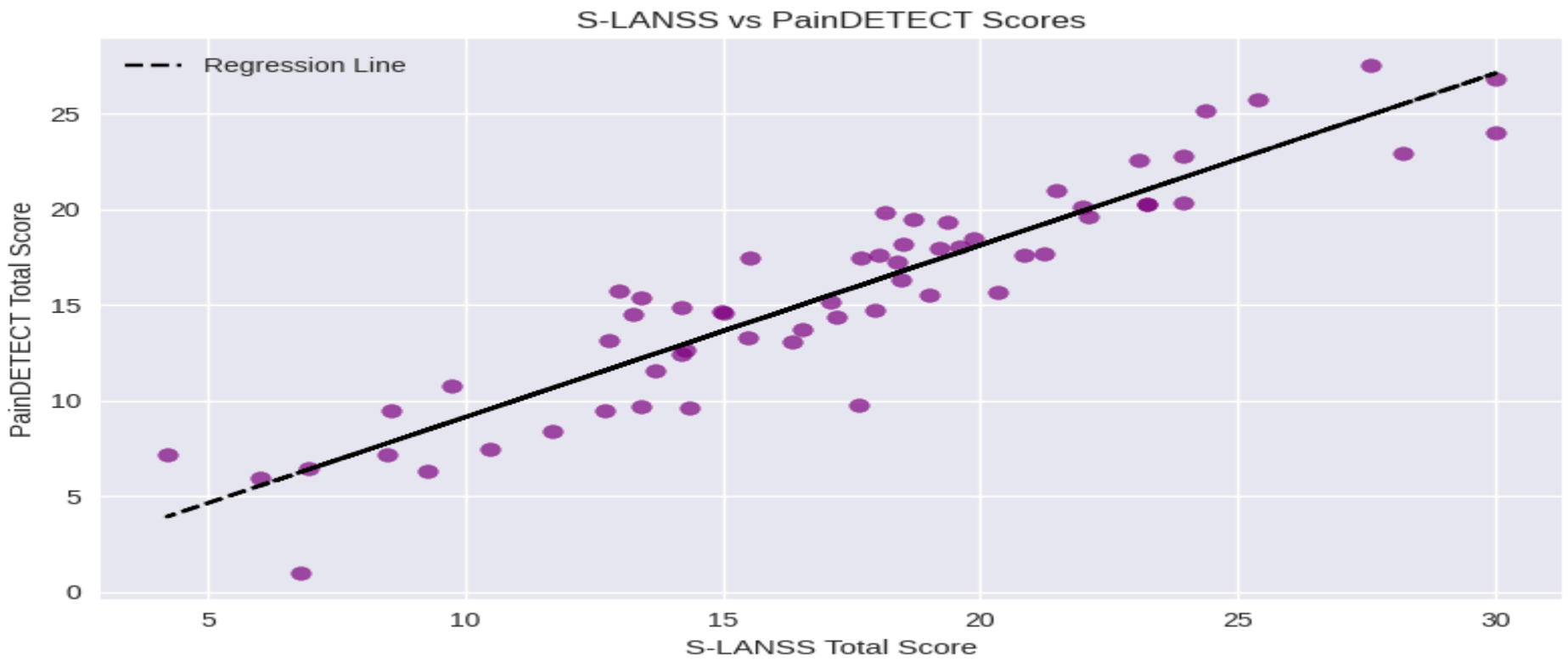
	Item-rest correlation		
Item	**Estimate**	**Lower 95% CI**	**Upper 95% CI**
SLANSS_Q1	0.456	0.229	0.636
SLANSS_Q2	0.462	0.236	0.641
SLANSS_Q3	0.628	0.445	0.761
SLANSS_Q4	0.707	0.552	0.815
SLANSS_Q5	0.634	0.452	0.765
SLANSS_Q6	0.552	0.347	0.707
SLANSS_Q7	0.676	0.509	0.794



3) Correlation: Pearson correlation between Gujarati S-LANSS and Pain DETECT scores: r = 0.898, p<.001, confirming strong convergent validity. One-factor solution with eigenvalue = 3.334, explaining 47.6% of variance. Factor loadings ranged from 0.517 to 0.823, supporting Unidimensionality

Pearson's Correlations:

		Pearson's r	p
S-LANSS Total D1	Pain DETECT Total	0.898	< .001



[3.1 Graph] S-LANSS Total D1 vs. Pain DETECT Total

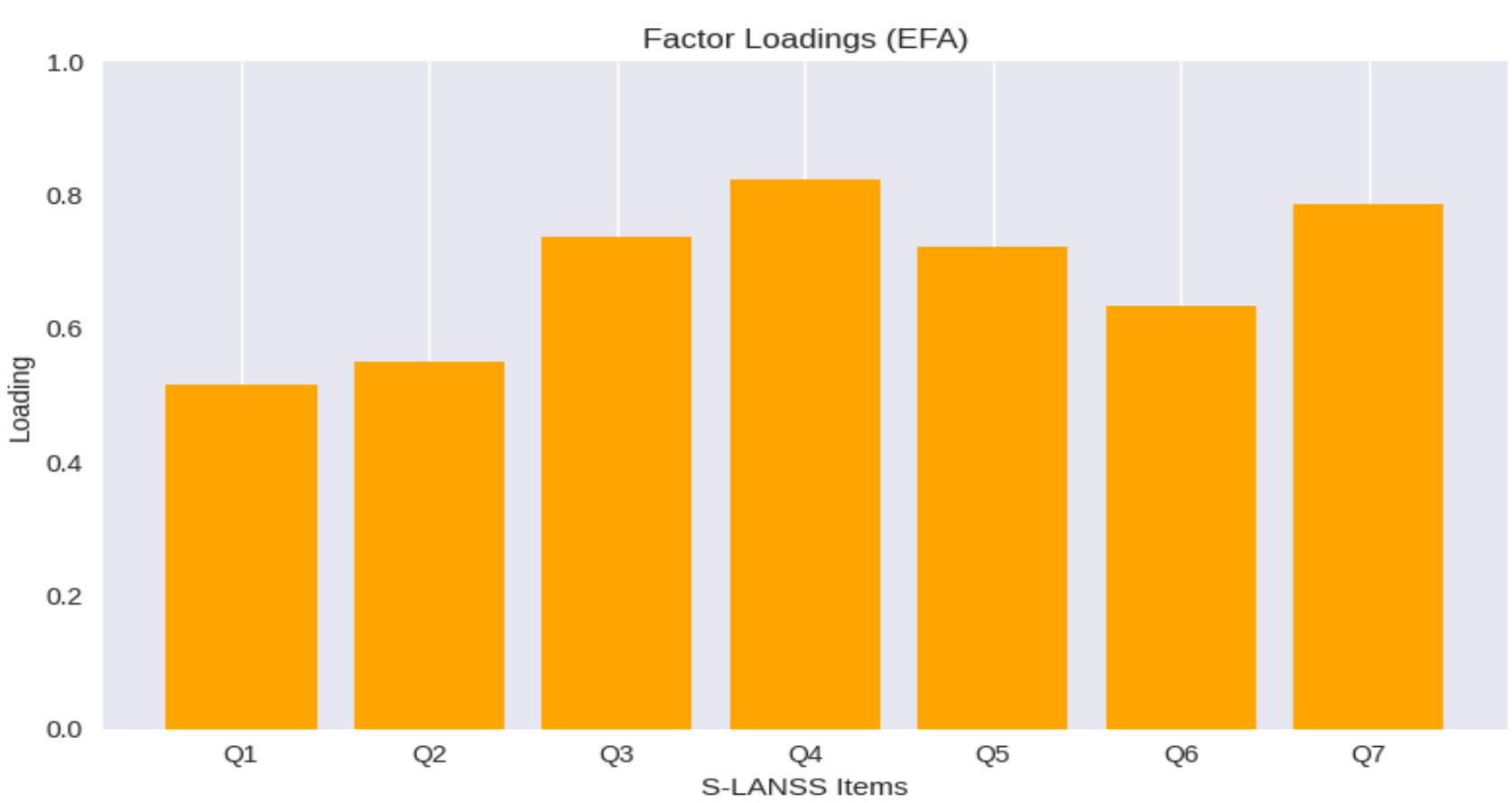
[3.2 Table] Kaiser-Meyer-Olkin Test

MSA	
Overall MSA	0.856
SLANSS_Q1	0.877
SLANSS_Q2	0.795
SLANSS_Q3	0.804
SLANSS_Q4	0.869
SLANSS_Q5	0.899
SLANSS_Q6	0.930

KMO = 0.856, indicating sampling adequacy.

	Value	df	p
Model	14.732	14	.397

[3.3 Table] Chi-Squared Test



IV. DISCUSSION

The Gujarati S-LANSS demonstrated strong internal consistency and validity. Cronbach’ s α exceeded the acceptable threshold of 0.7, confirming reliability. Item-rest correlations indicated good homogeneity. The strong correlation with Pain-DETECT supports convergent validity. Factor analysis confirmed a unidimensional structure consistent with the original English version. CFA results further validated the model fit, supporting the robustness of the adapted instrument.

This adaptation ensures that the S-LANSS can be effectively used in Gujarati-speaking populations, particularly in community and clinical settings. The findings align with previous validation studies in other languages, reinforcing the global applicability of the Gujarati S-LANSS.

Convergent validity was established through a high correlation with Pain DETECT, a widely validated neuropathic pain screening tool. This finding suggests that the Gujarati S-LANSS effectively captures neuropathic pain characteristics consistent with established measures.

The Gujarati adaptation retained the single-factor structure observed in the original English version, confirming conceptual stability across languages." The EFA revealed a single factor explaining nearly half of the variance, while CFA confirmed the adequacy of the model fit. These findings support the robustness of the Gujarati adaptation.

The study' s methodological rigor—employing forward and backward translation, expert committee review, and pre-testing—ensured semantic, idiomatic, and cultural equivalence. This process minimized the risk of misinterpretation and enhanced the questionnaire' s relevance for Gujarati speakers. The inclusion of a diverse expert panel, ranging from linguists to clinicians, added depth to the adaptation process, ensuring both linguistic accuracy and clinical applicability.

The choice of fruit and vegetable vendors as the study population provided a unique occupational context. This group is particularly vulnerable to musculoskeletal and neuropathic pain due to prolonged standing and repetitive physical activity. The successful validation in this community-based sample demonstrates the tool' s applicability in real-world settings, beyond controlled clinical environments. However, the occupational specificity of the sample may limit generalizability, and future studies should include broader and more diverse populations to strengthen external validity.

The findings are consistent with validation studies conducted in other languages, such as Turkish, Greek, and Spanish, which also reported strong reliability and validity. This cross-cultural consistency reinforces the global applicability of the S-LANSS and highlights its adaptability across diverse linguistic and cultural contexts. By filling the gap in Gujarati, the present study contributes to equitable access to validated pain assessment tools, supporting both clinical practice and research in India.

Despite its strengths, the study has limitations. The relatively small sample size (n = 60) restricts the statistical power and may not fully capture the heterogeneity of neuropathic pain presentations. Additionally, the focus on a single occupational group may introduce bias, as pain characteristics could differ in other populations. Future research should aim to validate the Gujarati S-LANSS in larger, more heterogeneous samples, including patients with varied Etiology of neuropathic pain such as diabetic neuropathy, post-herpetic neuralgia, and spinal cord injury. Longitudinal studies could also assess the instrument' s sensitivity to change over time, further establishing its utility in monitoring treatment outcomes.

The study population of fruit and vegetable vendors provided a unique context, highlighting the applicability of the tool in community-based occupational groups. The successful adaptation ensures that clinicians and researchers can reliably use the Gujarati S-LANSS for neuropathic pain screening in diverse settings.

Strengths

- Rigorous translation and adaptation process.
- Comprehensive psychometric evaluation including reliability, validity, EFA, and CFA.
- Community-based sample reflecting real-world applicability.

Limitations

- Relatively small sample size (n = 60).
- Restricted to a specific occupational group, which may limit generalizability.
- Future studies should include larger and more diverse populations.

V. CONCLUSION

The Gujarati S-LANSS questionnaire has proven to be a reliable, valid, and culturally appropriate tool for screening neuropathic pain. Its strong internal consistency, robust convergent validity, and confirmed unidimensional structure make it a psychometrically sound instrument suitable for both clinical and community settings. The rigorous translation and adaptation process ensured linguistic and cultural relevance, while the validation results aligned with findings from other international adaptations, reinforcing its global credibility.

Clinicians and researchers in Gujarat now have access to a standardized, self-administered screening tool that facilitates early identification of neuropathic pain. This is particularly important given the chronic and debilitating nature of neuropathic pain, which often requires distinct management strategies compared to nociceptive pain. The availability of the Gujarati S-LANSS will enhance diagnostic accuracy, support stratified care approaches, and ultimately improve patient outcomes.

While the study provides a strong foundation, future research should expand validation efforts to larger and more diverse populations, ensuring broader applicability. Incorporating longitudinal designs could further establish the instrument' s responsiveness to treatment interventions. Nevertheless, the present study marks a critical step toward improving neuropathic pain assessment in Gujarati-speaking populations, bridging a significant gap in clinical practice and research.

DECLARATIONS

Ethical Approval: Approved.

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Conflict of Interest: The authors declare no conflict of interest.

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