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Translation of SCIM IV into Gujarati: Improving Accessibility for Gujarati-Speaking Individuals with Spinal Cord Injury

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Abstract

Introduction: Spinal cord injury (SCI) is a severe neurological condition with profound effects on physical, psychological, and socioeconomic well-being. In Gujarat, SCI disproportionately affects young males in rural areas due to road traffic accidents and occupational hazards [3]. The Spinal Cord Independence Measure IV (SCIM IV) is a globally recognized tool for assessing functional independence in SCI patients. However, the absence of a validated Gujarati version limits its utility in regions where English proficiency is low. Given that Gujarati is spoken by over 60 million people worldwide, this study aimed to translate and linguistically validate SCIM IV into Gujarati to improve accessibility and clinical use.
Methods: The study followed MAPI Research Trust's standardized linguistic validation protocol. Steps included forward translation by two independent translators, reconciliation into Version 1 by an expert panel, backward translation for conceptual equivalence, cognitive debriefing with 10 Gujarati-speaking SCI patients and caregivers, and final proofreading by bilingual experts. Cultural and linguistic adaptations were made based on participant feedback and expert review.
Results: The forward translation addressed challenges related to complex medical terms, cultural context, and readability. Cognitive debriefing confirmed the clarity and relatability of items, leading to minor refinements. Backward translation showed strong conceptual consistency with the original SCIM IV. The final Gujarati version retained the intent of the original, using familiar terms such as "ગતિશીલતા સાધનો" (mobility aids) and "સ્વ-કાળજી પ્રવૃત્તિઓ" (self-care activities).

Proofreading ensured grammatical correctness, terminology consistency, and formatting accuracy. The final version was confirmed to be culturally appropriate and linguistically accurate for clinical use.
Conclusion: This study successfully produced a linguistically validated Gujarati version of the SCIM IV. It bridges a crucial gap in SCI assessment among Gujarati-speaking populations, enabling more accurate evaluation, better clinician-patient communication, and improved rehabilitation outcomes. Given the high burden of SCI in Gujarat [3], this tool is poised to enhance clinical practice, especially in rural and underserved areas. Future studies should focus on psychometric testing and large-scale field validation.

Keywords: Spinal cord injury, SCIM IV, Gujarati translation, linguistic validation, functional assessment, rehabilitation, India

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Introduction

Spinal cord injury (SCI) is a devastating neurological condition that results from trauma or disease affecting the spinal cord, leading to partial or complete loss of motor, sensory, and autonomic function below the level of the lesion. Globally, SCI presents a significant public health challenge due to its lifelong impact on individuals' physical independence, psychological well-being, and socioeconomic status. Most SCIs are caused by preventable incidents such as road traffic accidents, falls, and occupational injuries, particularly in lower- and middle-income countries [1].
In India, the incidence of SCI has been steadily increasing, with a higher prevalence observed in economically active age groups, especially among males residing in rural areas. Gujarat, one of India's most industrial and agricultural states, has shown a growing burden of SCI due to road accidents and unsafe work conditions in rural environments [2]. According to a recent epidemiological study conducted in Gujarat, SCI was found to disproportionately affect males aged 20–49 years, with road traffic accidents being the predominant cause. A total of 378 patients were analyzed based on the ASIA Impairment Scale (AIS), revealing that complete impairments (AIS Grade A) were more frequent in cervical injuries, while incomplete or minimal impairments (AIS Grade E) were common in thoracolumbar injuries. The study also emphasized occupational hazards and limited access to specialized rehabilitation in rural areas as contributing factors to poor outcomes [3].

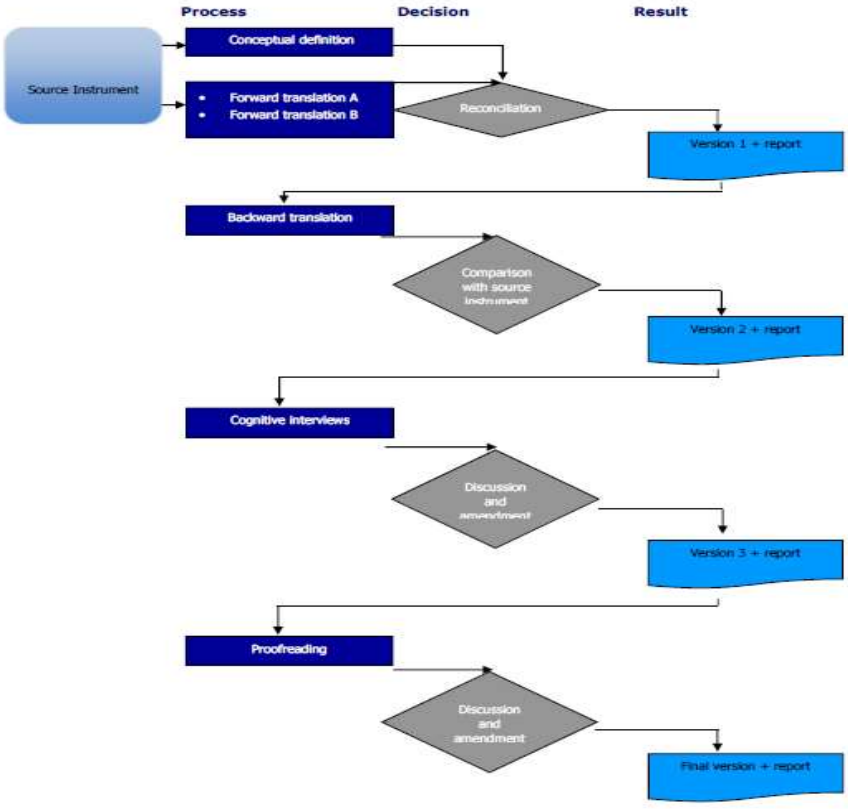
Effective rehabilitation following SCI requires comprehensive and culturally appropriate assessment tools. One such internationally recognized tool is the Spinal Cord Independence Measure IV (SCIM IV), which evaluates functional independence in activities of daily living, respiration and sphincter management, and mobility. However, the absence of a validated Gujarati version of SCIM IV limits its application among patients and clinicians who are more comfortable in the Gujarati language.Gujarati is the sixth most spoken language in India and ranks among the top 30 spoken languages worldwide, with over 60 million speakers, including large diaspora populations in the United States, United Kingdom, Canada, and parts of East Africa [4]. Given the linguistic and cultural importance of Gujarati, it is imperative to make medical assessment tools like SCIM IV accessible in the native language to enhance patient understanding, clinician-patient communication, and overall care outcomes.
This study focuses on the translation of the SCIM IV into Gujarati, aiming to bridge the language gap in SCI assessment and empower Gujarati-speaking individuals and healthcare professionals with an essential functional evaluation tool.

Need of the Study

The Spinal Cord Independence Measure (SCIM IV) is a globally recognized tool used to assess functional independence in individuals with spinal cord injury. However, it was developed in English and lacks a Gujarati version, making it difficult to use effectively in Gujarat, where many patients have limited English proficiency.
Using English-only tools in clinical settings can lead to misunderstandings, inaccurate assessments, and reduced patient engagement. Informal translations by clinicians during assessment are inconsistent and compromise the tool's standardization. A standardized Gujarati translation of SCIM IV is essential to ensure accurate evaluation, improve communication between patients and healthcare providers, and promote equitable rehabilitation practices in Gujarati-speaking regions.

Methodology:

This study followed a systematic process to translate the Spinal Cord Independence Measure (SCIM IV) into Gujarati, adhering to guidelines provided by the MAPI Research Trust.
1. Permission and Guidelines
Formal permission was obtained from the MAPI Research Institute, and the process followed the *"LV_Guidance_Academics Generic"* document for linguistic validation.



Flow Chart: Algorithm of the Linguistic Validation Process

2. Forward Translation

Two independent translators created separate Gujarati versions:

- One focused on medical accuracy.
- The other emphasized patient-friendly, culturally relevant language.

A reconciliation committee reviewed and merged both versions, ensuring conceptual accuracy, linguistic clarity, and cultural suitability.

3. Reconciliation (Version 1)

An expert panel compared both forward translations, resolving discrepancies in terminology, sentence structure, and cultural adaptation. A harmonized Version 1 was finalized.

4. Backward Translation

An independent bilingual translator, uninvolved in prior stages, translated Version 1 back into English. A comparison with the original SCIM IV identified discrepancies, which were resolved by expert consensus.

5. Cognitive Debriefing

Face-to-face interviews were conducted with 10 participants (SCI patients and caregivers) from varied demographics. Participants explained items in their own words, helping to refine unclear or culturally inappropriate terms.

6. Proofreading

A team of bilingual healthcare professionals and linguists conducted a final review for grammar, consistency, formatting, and medical accuracy. Necessary revisions were made to produce a clear, culturally appropriate final version.

Result:

Stage 1: Forward Translation

- Expert Review: 10 experts confirmed that the translation was culturally appropriate and retained the SCIM's original intent.
- Challenges and Solutions:
  - Complex medical terms were simplified.
  - Sentence structures were adjusted for natural Gujarati flow.
  - Cultural mismatches were resolved with relatable expressions.

Stage 2: Reconciliation

- A culturally relevant and linguistically accurate Version 1 was finalized.
- Readability improved for patients, caregivers, and professionals.
- Standard medical terms ensured consistency.
- Translation was thoughtfully adapted, not literal.
- A detailed record of changes was maintained for future validation.

Discrepancies and Final Decisions (Summary)

Item/Concept	Final Translation	Rationale
Mobility aids	ગતિશીલતા સાધનો	Technically accurate and widely understood
Self-care activities	સ્વ-કાળજી પ્રવૃત્તિઓ	Clinically and commonly accepted
Difficulty	મુશ્કેલી	More natural term
Walking independently	સ્વતંત્ર રીતે ચાલવું	Aligned with original intent
Communication device	સંચાર સાધન	Technically appropriate
Toileting assistance	શૌચાલય માટે સહાય	Medically relevant
Transferring to bed	ખાટ પર સ્થાનાંતરણ	Clinical alignment
Feeding oneself	સ્વતંત્ર રીતે ખાવું	Natural and precise
Use of wheelchair	વ્હીલચેરનો ઉપયોગ	Standard usage
Dressing	કપડાં પહેરવા	Commonly used
Bathing independently	સ્વતંત્ર રીતે નહાવવું	Consistent with intent
Climbing stairs	સીડીઓ ચઢવી	Context-appropriate phrasing

Item/Concept	Final Translation	Rationale
Pain intensity	દુખાવાની તીવ્રતા	Clinically common term
Social participation	સામાજિક ભાગીદારી	Culturally relevant
Standing balance	ઊભા રહેવાની સમતુલતા	Simple and accurate
Hand function	હાથની કાર્યક્ષમતા	Descriptive and clinical
Turning in bed	બેડમાં વળવું	Natural phrasing
Cognitive abilities	જ્ઞાનાત્મક ક્ષમતા	Matches original
Household activities	ઘરકામ પ્રવૃત્તિઓ	Familiar term
Energy levels	ઊર્જા સ્તર	Common terminology
Sitting balance	બેસવાની સમતુલતા	Linguistically clear
Transfer to wheelchair	વ્હીલચેર પર સ્થાનાંતરણ	Accurate clinical term
Light physical activities	હળવી શારીરિક પ્રવૃત્તિઓ	Inclusive term
Heavy physical activities	ભારે શારીરિક પ્રવૃત્તિઓ	Consistent with source
Positioning in bed	બેડ પર સ્થિર થવું	Simplified and clear
Using public transport	જાહેર વાહન વાપરવું	Common phrase
Managing personal hygiene	વ્યક્તિગત સ્વચ્છતા જાળવવી	Clinically appropriate
Skin protection	ત્વચાનું રક્ષણ	Matches context
Emotional well-being	ભાવનાત્મક સુખાકારી	Accurate translation
Fatigue management	થકાવટનું સંચાલન	Concise and clinical

Stage 3: Backward Translation
- Confirmed that the Gujarati version retained conceptual accuracy.
- Minor discrepancies were discussed and resolved.
- Final version ready for further validation.

Stage 4: Cognitive Debriefing
- Participants found the content clear and relatable.
- Minor changes made to improve natural phrasing.
- Examples added for clarity where needed (e.g., grooming, dressing, assistive devices).
- Revised terms ensured cultural sensitivity and improved understanding.

Stage 5: Proofreading
- Final quality check completed.
- Spelling, grammar, and punctuation errors corrected.
- Consistency in terminology and phrasing ensured.
- Gujarati SCIM now linguistically accurate, culturally appropriate, and ready for use.

Discussion:

The linguistic validation of the Spinal Cord Independence Measure (SCIM IV) into Gujarati marks an important step in addressing the communication and cultural barriers faced by spinal cord injury (SCI) patients in Gujarat. Given the high prevalence of SCI in the region—particularly among males aged 20–49 years due to road traffic accidents and occupational hazards in rural areas as identified by Jaynesh Vandra et al. [3]—the need for culturally adapted assessment tools is critical.

The translation process ensured that key clinical concepts were retained while making the tool accessible to native Gujarati speakers. Challenges encountered during translation, such as conveying medical terminology in commonly understood Gujarati, were effectively addressed through expert consensus and cognitive debriefing with patients and caregivers. The final Gujarati version demonstrates both conceptual and linguistic equivalence with the original SCIM IV.

This aligns with the findings of Jaynesh Vandra et al. [3], who emphasized that limited access to specialized rehabilitation services in rural Gujarat further exacerbates the long-term disability outcomes for SCI patients. By providing a standardized Gujarati version of SCIM IV, healthcare professionals can conduct more accurate functional assessments, ultimately leading to improved rehabilitation planning and patient engagement.
Furthermore, the successful adaptation of SCIM IV into Gujarati sets a precedent for translating other vital medical assessment tools into regional languages, enhancing inclusivity and health equity in linguistically diverse populations.

Conclusion:

This study successfully translated and linguistically validated the SCIM IV into Gujarati, addressing a significant gap in the assessment and rehabilitation of spinal cord injury patients in Gujarat. The Gujarati version is culturally appropriate, clinically accurate, and easily understood by both healthcare providers and patients. It holds potential for widespread application in clinical, research, and community settings where English proficiency is limited.
Considering the epidemiological burden of SCI in Gujarat—where most affected individuals are young, male, and from rural backgrounds [3]—this tool can enhance functional evaluation, improve patient-provider communication, and support better rehabilitation outcomes. Future studies should focus on psychometric validation (reliability and construct validity) and field testing across larger and more diverse SCI populations to strengthen its clinical utility.

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