Translation and Cross-Cultural Adaptation of Spinal Cord Independence Measure version III in Hindi Language

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Abstract

Background: The Spinal Cord Independence Measure (SCIM III) specifically assesses individuals with spinal cord injuries. Objectives: The objective of this study was to translate the SCIM-III into Hindi language to make it available for use in large Indian Hindi speaking population in their native language. Methods: The SCIM III was translated into the Hindi version with a forward–backward translation and made ready for application by a translation committee. The tool was then reviewed by a review committee to check the translation. Then, pilot testing was done, where patients’ responses and comments were noted. A sample of 10 patients was recruited for the pilot testing. Results: The scale was translated into Hindi by the liberal and literal methods. Translation and replacement of the words was done in discussion with professional translator in Hindi language and expert committee. After forward–backward translation and clinical review submitting the final version and then pilot study was done on 10 patients (7 males and 3 females) of spinal cord injury. The mean age is 27.1 years and mother tongue of all the patients was Hindi (100%). Conclusion: The Hindi version of the SCIM III is easy and understandable to the large Hindi speaking Indian population.

Keywords: Backward translation, forward translation, pilot testing, SCI, SCIM

INTRODUCTION

Spinal cord injury (SCI) is a medically complex and life disrupting condition associated with permanent disability and decreased life expectancy that carries a high risk of morbidity and mortality.[1,2] There are an estimated 2.5 million people living with SCI worldwide, with more than 130,000 new injuries reported each year.[3] SCI is the most disruptive and traumatic event that can occur in anyone’s life.[4] It is a life changing disease. Spinal cord injury encompasses damage to the spinal cord from traumatic and nontraumatic causes.[5] Injuries due to trauma have rapidly been increasing in number worldwide, particularly in low- and middle-income countries such as India. One of the common causes is motor vehicle accident. Other causes of SCI are community violence to recreational activities and workplace-related injuries.[6,7] As per the report of Spinal Injuries Management New Delhi, estimated incidence in India is 20 per million per year populations and approximately 20,000 new cases of SCI are added every year; 60–70% of them were illiterate, poor villagers.[8] A SCI is a highly disruptive event and requires a considerable coping process.[9]

The management SCI is complex. People with SCI require not only initial medical care and rehabilitation but also ongoing access to wheelchair-friendly environments and appropriate homecare and financial support.[10] The measurement of disability is an important part of assessment and management. Appropriate outcome measures help to determining patient’s disability and impairment, choice of therapy, and degree of change over time. The clinical significance of an outcome measure must be easy to complete and score, valid, reliable, and responsive.[11]

The Spinal Cord Independence Measure (SCIM) scale has been designed specifically for patients with spinal cord lesions (SCLs) to evaluate their performance regarding daily activities and assess their function.[12] SCIM focuses on the ability of performing basic everyday tasks and takes into consideration the economic burden of disability as well as the impact of disability on the patient’s overall medical condition and comfort.[13] The SCIM scale version 3.0 is a clinician-rated instrument comprised of 19 key areas across three subscales including: “self-care” (6 items), “respiration and sphincter management” (4 items), and “mobility” (9 items). Each item of the scale is scored and weighted differently, but all are summed to a total possible score of 100, with a high score indicating independence in most ADL. The SCIM has been largely adopted and endorsed by the international SCI community as the most appropriate measure of independence for people with SCI. The SCIM-III has been translated and validated in multiple languages.[14,15]
Translation is not the same as cross-cultural adaptation. Translation may simply involve a single person translating the questionnaire from one language to another. In contrast, cross-cultural adaptation involves a team including translators, health professionals who would normally use the questionnaire, and researchers with an understanding of clinimetrics. The process of cross-cultural adaptation includes initial translation, synthesis, back translation, expert committee review, pilot testing of the draft translation, and psychometric evaluation. The process is designed to achieve equivalence between the original and translated versions with respect to language and also equivalent experiences of daily life. Most questionnaires that a physiotherapist used to assess treatment outcomes were originally developed in the English language which limits its usage in non-English speaking countries and different culture.[16] Therefore, the aim of this study is to translate the commonly used SCIM-III scale into Hindi language for availability to a large Hindi speaking population of India.

**Materials and Methods**

The SCIM version III is a self-reported 19-item scale to assess functional independence in SCI population developed by Catz et al. 2007 at the Loewenstein Rehabilitation hospital (LRH). The SCIM version III takes approximately 15–20 min to administer. The original version was in English language. For the cultural adaptation and linguistic validation of the SCIM III into Hindi, a prior permission was obtained from the original questionnaire’s developers and the copyright’s owners.

The translation of the SCIM-III into Hindi was done by the guidelines of MAPI Research Institute’s Methodology. The MAPI Research Institute’s guidelines are accepted and widely used procedure for translation, which is also similar to the guidelines given by Beaton et al. (2000) for cross-cultural adaptation of self-report measures. Recommended by MAPI, the cross-cultural adaptation was done in five stages: translation, synthesis, back translation, expert committee review, and pilot testing; final version was checked to ensure that original meaning was attained. The translation was done by two independent forward translators, one of them is a native speaker of the Hindi language and the other one is a fluent speaker of the source (English) language (professional from the medical background). The two translators worked independently, so that neither would influence the other’s translation. The professional from the medical background was familiar with the aims and constructs being assessed by the instrument, whereas the native speaker of the Hindi language had no prior knowledge of the instrument’s objectives. Translation was followed by the production of report by the translators explaining the translation procedure. The two forward translated scale were then reconciled and the committee (consists of a researcher and two health care professionals) decided on which translation was more equivalent to the original meaning and appropriate for Hindi speakers. A single reconciled Hindi version was obtained thereafter. After that, a backward translation of the reconciled language version into the source (English) language was obtained by one professional translator who had no prior knowledge of scale and other by the fluent speaker in the target (Hindi) language who had familiar with scale. The backward translated version was compared with the original SCIM 3.0 by the multidisciplinary team leading to the production of the second reconciled version in Hindi. Similarly, during this process, translation discrepancies and linguistic issues arose, and modifications were made accordingly, followed by the production of report. To obtain feedback from experts in medical field, relevant feedbacks from three physiotherapists and one medical professional who understand the subject matter of the research and are fluent in both English and Hindi languages were obtained and incorporated into the second reconciled Hindi version of SCIM 3.0. After taking feedback from health care and medical professionals, necessary change in the reconciled translation was done to establish a prefinal version of scale in Hindi language followed by a report explaining the changes done in the scale.

To assess the clarity, appropriateness of wording, and acceptability of the translated questionnaire, testing of the prefinal version on a sample size 10 of spinal cord-injured patients was done. The cognitive testing was to ensure that the final Hindi version was understandable, acceptable, and the language used was simple and appropriate for the intended future users of the questionnaire. This preliminary test was done by face-to-face interviews to acquire remarks and suggestions on the Hindi scale from interviewees. After some essential revisions, the third reconciled Hindi version was produced based on the results obtained from the clinicians’ review and respondents’ feedback.

Thus, the final version of SCIM version 3.0 in Hindi language was created for assessing functional independence in an Indian spinal cord-injured population. Flowchart of procedure of Methodology is shown in Figure 1.

**Results**

There were two ways of translating the words, liberal and literal methods. A consensus was reached by expert committee to use appropriate words that can be easily understood by Hindi speaking patients. When prefinal version was finalized, the influence of English and different interstate variations on prosaic spoken Hindi Language was taken into consideration. According to the title SCIM, it was translated to “Rid ki Hadi ka Swavalamban swatantra Mapak” as agreed by the translation committee.

**Domains description**

There was no difficulty seen in translating the three sentences describing the domains, i.e. self-care, respiration and sphincter management, and mobility.

**Terms and reflexion in the items**

Culturally sufficient equivalents had to be found for the following terms and expressions which were identified as problematic by the committee as described in Table 1.
Most of the reflexion used within items cannot be rendered to “literal translation” in Hindi and they were subjected to culturally acceptable linguistic equivalents. Respondents easily comprehend the meaning of the expressions when they were alternatively stated as the phrases as illustrated in Table 2.

**Pilot study**

In the pilot study, which was done on 10 spinal cord-injured patients (7 males and 3 females), the mean age of spinal cord injured patient was 27.1 years. Four patients out of ten face problem in understanding “Antnirwas Nalika,” “Sphincter,” and “Mal” word of question number 1, 6, and 7, respectively. They felt this problem because of their illiteracy and poor social background. As the questionnaire was simple and straightforward, there was no major problems observed in administration by the researcher but raised concern on some of the terms used in the items. The respondents provided some suggestions and a consensus were reached, and we retained the items by providing supplementary explanatory sentences as previously discussed under the “Terms and reflexion within the items.” The instrument was found to be easily conceivable, simple, clear, and appropriate for the evaluation of independence in daily living activities among spinal cord-injured survivors.

**Descriptive Statistics**

Table 3 shows the distribution of male and female and their mean and standard deviation (SD) of age in the sample. Out of the total sample, 80% was male and 20% was female. The mean and SD of age for male was 26.1 ± 8.40 years and for female was 31 ± 9.89 years, respectively. The total mean and SD of a sample was 27.1 ± 8.37 years. Table 4 described the distribution of sample according to the educational qualification, mother tongue, and physiotherapy treatment in terms of percentage and frequency. One patient (10%), four patients (40%), and five patients (50%) were basic, intermediate, and highly qualified, respectively. The mother tongue of sample was Hindi and their distribution in sample was 100%. The 90% patients were taking physiotherapy treatment and 10% were not taking any treatment.

**Discussion**

SCI has widespread consequences for many body functions including the bowel and bladder, respiratory, cardiovascular, and sexual function.[13]

Table 1: Description of Replacement of Words done in Hindi SCIM

| Word            | Hindi Literal meaning* | Replacement* |
|-----------------|-------------------------|--------------|
| Spinal cord     | Meruraju                | Rid ki haddi |
| Bowel           | Anat                    | Mal/poti (faeces) |
| Bladder         | Thaliee                 | mutrashay/pisahab (urine) |
| Parenteral      | Aantretar               | Anya sadhan se bhohan karna (brought food into the body through injection, indwelling catheter) |
| Grooming        | alankaran               | Sajna-sawarna (the activity of getting dressed) |
| Sphincter       | sankochakpeshi          | Sphincter    |

* Hindi literal meaning and replacement was done in discussion with professional translator in Hindi Language and expert committee

Table 2: Description of Alternative items Statement used in Hindi SCIM

| Item No. | Item Statement (original) | Alternative statement* | Hindi meaning of alternative Statement |
|----------|----------------------------|------------------------|----------------------------------------|
| 1        | Needs parenteral           | Aantretar (brought food into the body through injection, indwelling catheter) | Anyesadhan se bhohan karna |
| 2 A      | adaptive devices or in a specific setting | Anukuli upkaran ya vishesh setting | Anukul upkarmo se ya ekvishessamayojan |
| 3 A      | clothes without buttons, zippers or laces | Batan, zipper lase pahanana | Bina batan ka kapara zipper ya lase |
| 5        | Requires tracheal tube     | Trachial tube kijarurat | Swasnali tube kiaavaksakhtahotothai |
| 11       | locking wheelchair, lifting footrests, removing and adjusting armrests, | Wheelchair ko band karna, paydan ko uthana, arm rest ko hatana | Wheel chair ko lock karna, paydal ko hatana, bahu-padhan ko hatana aur thik karna |
Short- and long-term complications in patients with SCI cause significant disability and diminish functional abilities. It is particularly important to evaluate patient’s functional status and objectively assess treatment effectiveness in rehabilitation medicine.\(^1\) Use of standardized tools for measuring the effectiveness of clinical interventions is widely accepted as a prerequisite for good clinical practice and for the provision of evidence-based health care. There is a tendency in rehabilitation medicine to move toward quality of life measures; there is still an overall agreement that skills involved in self-care and mobility are basic to higher levels of functioning, and improvement of these abilities is likely to have considerable impact on the patients’ level of handicap and health-related quality of life. Therefore, the development and refinement of reliable, valid, user-friendly, standardized ability rating scales is of major importance.\(^1\) Most of the measures are developed in English language, which limited their universal acceptance due to different cultures and language. Therefore, cultural adaptation of QOL instruments using standard procedures is becoming increasingly important in different countries and across different cultures. This is to ensure the optimal transfer of the original message and measuring what is intended to be measured.\(^1,16,19\)

Unfortunately, there is no tool specifically for Hindi speaking spinal cord-injured population in India which measures functional independence. Thus, in the present study, linguistic validation of SCIM 3.0 in Hindi language was done. The SCIM scale was designed specifically for patients with SCLs and is the only comprehensive ability rating scale for this patient population. SCIM focuses on the ability of performing basic everyday tasks and takes into consideration the economic burden of disability as well as the impact of disability on the patient’s overall medical condition and comfort. Cha et al. (2007) has suggested that if the patient finds difficulty to understand some words of direct translation of the scale for a cross-cultural, closely similar words of the target language to be found, which solves the vocabulary problems. Similarly, for better understanding, syntax of the language can be modified by deleting or adding words or phrases according to the need of the target language. Conceptual equivalence is dealt with testing the scale on small sample size patients and changing the items according to local needs.\(^20\)

In the present study, the cross-cultural adaptation of SCIM 3.0 in Hindi language was carried out in agreement with universally accepted guidelines. The processes involved consultations and collaborations with professional translators in source and target language, health care professionals, people from the medical background, and the MAPI institute, France. This supports the consistency of a strict translation method to ensure “vocabulary equivalence, idiomatic equivalence, and grammatical syntactical equivalence.” The original questionnaire was culturally adapted to the western countries but in comparison certain difficulties were faced during translation considering the cultural adaptation of our Indian society. Various concerns were raised during translation process of SCIM 3.0 in Hindi language pertaining to various literal and liberal issues including the appropriateness of some of the words used.

The stages of forward and backward translation processes allowed essential changes to be made when some words, phrases, or terms had a particular meaning in English but relatively different meaning in Hindi. When only one or two translators were responsible for the translation, the social and cultural biases had minimized, which may occur during translation. This procedure results in maintaining the content validity of the questionnaire. During the translation procedure, we had changed some of the words according to the needs and understanding of the patients. The main difficulties were faced particularly in the item number 1, 2A, 3A, 5, and 11 of the questionnaire as described in Table 2. Also, the same difficulties were seen in some words of the original scale, which have literal meaning in Hindi. Therefore, to make the scale more compressible and culturally adaptable according to Indian society, alternative statements were used instead of those items.

To ensure conceptual equivalence and the credibility of the translation procedures utilized, all the raised concerns and problems encountered during these processes were consulted with experts in linguistics and the original developers (MAPI). In addition, the source of measurement errors was minimized,

| Table 3: Distribution of sex in a sample and their comparison of age (in years) |
|---------------------------------|-----------------|-----------------|-----------------|
| Sex        | Frequency | Percentage (%) | Mean Age (in Years) | ± SD (Age) |
|-------------|-----------|----------------|---------------------|------------|
| Male        | 8         | 80%            | 26.1                | ±8.40      |
| Female      | 2         | 20%            | 31                  | ±9.89      |
| Total       | 10        | 100%           | 27.1                | ±8.37      |

| Table 4: Demographic details of patients |
|------------------------------------------|----------------|-----------------|-----------------|
| Parameters                               | Number of Individuals (n) | Percentage (%) | Total (%) |
| Educational qualification                | Illiterate | 0               | 0%             | 100%        |
|                                          | Basic      | 01              | 10%            |             |
|                                          | Intermediate | 04              | 40%            |             |
|                                          | High       | 05              | 50%            |             |
| Mother tongue                            | Hindi      | 10              | 100%           |             |
| Physiotherapy Treatment                  | Yes        | 9               | 90%            |             |
|                                          | No         | 1               | 10%            |             |
which was introduced by translation process through pilot testing of the translated tool on 10 spinal cord-injured patients and cognitive interviewing via detection of question items, terms, or reply options that were either difficult to understand or misconceived by the respondents.

Therefore, the Hindi version of SCIM 3.0 will provide valuable information in deciding functional and goal-based treatment according to Indian perspective. It will be also useful in estimating the ability of the patient, which represents the same level of dependence regardless of the country of the patient and improve the quality of life in spinal cord-injured survivors.

**CONCLUSION**

The present study has concluded that the self-reported Hindi version of SCIM 3.0, a spinal cord injury specific outcome measure, is an easy and understandable instrument for Hindi speaking Indian spinal cord-injured survivors.

**FUTURE SCOPE OF THE STUDY**

- To find the reliability and validity of the translated Hindi version of SCIM 3.0.
- Study can be done on larger and heterogeneous spinal cord injured population.
- Study can be done to observe the effects of a particular item of each domain total scores to further validate the scale.

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**Conflicts of interest**

There are no conflicts of interest.

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