Hindi Translation and Psychometric Evaluation of The Wheelchair User’s Shoulder Pain Index

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Abstract

Background: Wheelchair User’s Shoulder Pain Index has been translated to Hindi, validated, and used

Purpose: The purpose of this study is to translate the original English version of Wheelchair User’s Shoulder Pain Index into Hindi language and to assess its content validity, as an outcome for measuring shoulder pain in wheelchair users and its Hindi version is not available.

Materials and Methods: The translation was carried out in the accordance with the guidelines of the American Association of Orthopedics Surgeons. Content validity was evaluated through Qualitative (McKenzie and colleagues and Wallace) and Quantitative (Lawshe).

Results: The Content Validity of final scale constituting 15 items was good.

Conclusion: The result of this study indicates that Wheelchair User’s Shoulder Pain Index (WUSPI) is a valid tool for assessing shoulder pain in individuals with spinal cord injury (SCI) who use wheelchairs.

Keywords: Wheelchair Users Shoulder Pain Index, Pain, Spinal cord injury.
Introduction
The wheelchair is one of the most commonly used assistive devices for enhancing personal mobility, which is a precondition for enjoying human rights and living in dignity. About 10% of the global population, i.e. about 650 million people, have disabilities. Studies indicate that, of these, some 10% require a wheelchair.¹ The National Health Interview Survey on Disability reported in 1999 that more than 2.3 million individuals in the United States of America have disabilities requiring the use of a wheelchair.² Individuals in the United States Of America have disabilities requiring the use of a wheelchair.² Manual wheelchair users (MWCUs) are included within the disability groups of spinal cord injury (SCI), lower-limb amputation, stroke, multiple sclerosis, rheumatoid arthritis, spina bifida, poliomyelitis, and hip fracture, as well as other groups.² People with SCI rely on Assistive technology and especially their wheelchair, to engage in many of life’s activities.³ More than half of the 183,000 to 230,000 people with SCI in the United States are non-ambulatory and are presumed to use wheelchairs.⁴

SCI is an acute and devastating event, resulting in significant and permanent life changes for the injured individuals.⁵ The estimated incidence of SCI worldwide is between 11 and 53 cases per million inhabitants.⁶ In the Indian setup, as in most developing countries, very little is known about the exact incidence of spinal cord injuries however approximately 20,000 new cases of SCI are added every year and out of them 60-70% of them are illiterate, poor villagers.⁷ In India, approximately fifteen lac people live with spinal cord injury.⁸ Up to 78% of individuals with spinal cord injury have been reported to have shoulder pain, but most studies report a prevalence of about one-third in paraplegics and slightly higher numbers for quadriplegics.¹⁰ Prevalence rates of 46–59% have been reported at least 1 year post injury in tetraplegia and estimates of 30% to 73% among manual wheelchair users with paraplegia.¹¹,¹² Researchers have stated that MWCUs demonstrate degenerative injuries, impingement syndrome, rotator cuff tears, glenohumeral instability, avascular necrosis, acromioclavicular joint degeneration, and distal clavicle osteolysis.²,¹³,¹⁴ Many indices are available to measure generalized pain or functional impairment in individuals with chronic disabilities and regarding wheelchair functioning. However these do not measure shoulder pain and difficulty in wheelchair users. The Wheelchair User’s Shoulder Pain Index (WUSPI) was designed to measure shoulder pain in individuals who use wheelchairs and has been widely used in many studies. The Wheelchair User’s Shoulder Pain Index is a 15-item self-report instrument measuring shoulder pain during transfers, wheelchair mobility, self-care and general activities. The index demonstrates high internal consistency (Cranach’s alpha = 0.98). This tool
may be useful to both clinicians and researchers in documenting baseline shoulder dysfunction and for periodic measurement in longitudinal studies of musculoskeletal complications in wheelchair users.

Need and objectives of the Study:
A validated & reliable Hindi version of WUSPI will facilitate assessing the shoulder pain in individuals who use wheelchairs in Hindi speaking population and will increase the generalizability of wheelchair user’s shoulder pain index. It will also facilitate exchange of information in international studies & also for comparison of different research findings worldwide. Moreover, it will help in assessing pre and post treatment efficacy and will serve as a guide for therapist.

The objectives of the study was to translate the original English version of Wheelchair User’s Shoulder Pain Index in Hindi language and to find out the content validity of Hindi version of Wheelchair User’s Shoulder Pain Index.

Materials and Methods

Subjects
Patients with spinal cord injury using wheelchair as a primary means of mobility, used a wheelchair for atleast 1 year prior to their participation, able to read and understand Hindi, both males and females. Exclusion criteria: Patients who demonstrated inability for effective communication as a result of neurologic or psychiatric alterations, Subjects who refuse to participate. 30 patients were included in the translation phase. 10 patient in content validity phase. The study was approved by the Research Review and Ethical Committee of Indian Spinal Injuries Centre.

Procedure
The procedure was divided into two phases:

Phase I- Translation of the scale to Hindi language.
Phase II- Evaluation of the psychometric properties of Wheelchair User’s Shoulder Pain Index (WUSPI).

Prior to the initiation of Hindi translation process, due permission was taken from the author of original English version of Wheelchair User’s Shoulder Pain Index, Kathleen A. Curtis through an e-mail. An original copy of the latest English Wheelchair User’s Shoulder Pain Index and scoring instructions were e mailed by the author to the researcher.

Phase – I: Translation of the scale to the Hindi language.
The translation was carried in accordance with the guidelines of the American Association of Orthopedics Surgeons, permission to use the guidelines were also taken. The translation is a six step procedure consisting of translation, Synthesis, Back translation, Expert committee
review, Pretesting and Submission and approval of all written reports by developers / committee.

**Stage I: Initial Translation:**

In this step, the original English version of Wheelchair User’s Shoulder Pain Index (original language), was translated into Hindi (target language) by two bilingual translators (T1, T2) whose mother tongue was the target language i.e. Hindi and produced the two independent translations. According to the guidelines, the two translators belonged to different profiles or background. One of the translator was aware of the concepts of being examined in the questionnaire being translated, i.e. was from a medical or clinical background. The other translator was neither aware nor informed of the concepts being quantified and had no medical or clinical background. This is called naive translators. The author was contacted regarding few changes which would make the scale more cross-culturally adaptable and permission was granted from author and changes were done. Bio-data and consent was obtained from each. They were provided original English version of the questionnaire. Brief instructions were given to both the translators. Each translator gave a written report of the translations that they completed.

**Stage II: Synthesis of Translation:**

The two translators and the recording observer (researcher) synthesized the results of the translations working from the original questionnaire and the two translated versions (T1, T2). A synthesis of these translations were conducted (producing one common translation T12). Issues were discussed, consensus was reached and a synthesised version T12 was reached. Complete written documentation was done.

**Stage III: Back Translation:**

During this step of translation, the T12 version were back translated into the original language. The back-translations (BT1 and BT2) had to be done by two persons with the source language English as their mother tongue. Since this was not possible, with author’s permission two experts in English language were made back translators. Those two translators were neither aware or nor informed of the concepts being explored. Both the experts were without medical background as per the guidelines applied. Informed Consent and bio-data were obtained. The two back translations were compared with the original scale by the researchers of the study.

**Stage IV: Expert Committee:**

The composition of this committee is crucial to achievement of cross-cultural equivalence. The expert panel is comprised of all the forward translators (T1, T2), back translators (B1, B2), a health professional (orthopedic consultant with specialization in shoulder surgery), language
provincial (MA Hindi teacher), methodologists (Statistician) and the original developers of the questionnaire were in close contact. Expert committee’s role is to consolidate all the versions of the questionnaire and developed a pre-final version of the questionnaire for field testing. All the members of the research committee were given a booklet which outlined their role in the process. It includes the original English questionnaire, forward translations, synthesized version of forward translations and backward translations tables with written reports. The experts reviewed all the versions of the questionnaire and gave a written report of all the discrepancies, resolutions and rationale for coming to a decision. Decision was needed to be made to achieve equivalence between the (English) and target version; i.e. Hindi in four areas: Semantic Equivalence, Idiomatic Equivalence, Experiential Equivalence, Conceptual Equivalence.

Stage V: Test of the pre-final version:
The final stage of adaptation process is the pre-test. This field test of the new questionnaire seeks to use the pre-final version in subjects from the target setting. It was tested in 30 persons. Consent form was signed and patient information sheet was filled. Further, each subject completed the questionnaire and was interviewed to probe what he or she thought was meant by each questionnaire item and the chosen response. Both the meanings of the items and the responses would be explored. This ensured the adapted version retained its equivalence in an applied situation. Only three patients had difficulty in pronouncing Hindi word for “transfer” but were able to understand the meaning as alternative word was provided.

A report on the interviews conducted on patients was produced in English. It outlined the number of subjects interviewed, their age, and the time it took to complete the questionnaire, the difficulties encountered, the solutions suggested. As a result, a version of the questionnaire after pre-testing and making changes, which was considered to be as the final, was produced.

Stage VI: Submission of Documentation to the Developers or Coordinating Committee for Appraisal of the Adaptation Process:
The final stage in the adaptation process was submission of all reports and forms to the developers of the instrument or the committee keeping track of the translated version. The following step was carried out as a means for the original developers to verify that the recommended stages were followed, and the reports seem to be reflecting this process well. In effect it is a process audit, with all the steps followed and necessary reports followed.

Phase II – Evaluation of the psychometric properties of the Wheelchair Users Shoulder pain Index
Content Validity: Content validity was evaluated through Qualitative and Quantitative methods.
For qualitative review criteria given by McKenzie and colleagues\textsuperscript{16} and Wallace et al were used for Quantitative review Content Validity Ratio Method by Lawshe\textsuperscript{17} was used.

Establishment of a Panel of experts to evaluate the questionnaire:

The panel of experts or jury of experts is the initial and critical step in establishing the content validity. In this step, 10 experts were approached of which 2 were spine surgeons, 2 were physiotherapist, 2 were occupational therapist, 1 was assistive technologist, 1 was peer counsellor, 1 was psychologist, 1 was orthopaedic surgeon\textsuperscript{16} and also 10 patient with same inclusion and exclusion criteria as in patient testing. The experts were experienced in dealing with spinal cord injury patients. The experts were invited via face to face contact, covering letter was provided and all the participants were explained about the purpose of the study. Their consent for participation in the validation phase along with their demographics and experience details were obtained.

Quantitative reviews on questionnaire components:

After the completion of qualitative review, all the members of the expert panel were asked to quantitatively evaluate the final Hindi version of the questionnaire. Lawshe’s method was used to evaluate content validity. The panel of experts were asked to rate the appropriateness of the 10 items of the scale by stating whether each item was “essential”, “useful but not essential,” or “not necessary”. After receiving each expert’s ratings, values were entered into a Microsoft excel spreadsheet and the researcher sums up the resources marked for each item, by each panel number. The Content Validity Ratio (CVR) was calculated by applying the formula developed by C.H. Lawshe (1975).

\[
\text{CVR} = \frac{(N_e - N/2)}{(N/2)}
\]

CVR- CVR value of the i th measurement item
Ne- number of experts rated on item as essential
N- total no. of experts in the panel.

The calculated CVR was then compared to the levels required for statistical significance.
Hindi Translation of The Wheelchair User’s Shoulder Pain Index

**Instrument**
The WUSPI is a valuable tool that can be used to detect and monitor upper extremity musculoskeletal complications in wheelchair users. It provides unique information, in that it measures pain across a variety of functional activities which are specific to wheelchair users. The Wheelchair User's Shoulder Pain Index is a 15-item self-report instrument measuring shoulder pain during transfers, wheelchair mobility, self care and general activities. The index demonstrates high internal consistency (Cronbach's alpha = 0.98).

**Results:**
Demographic Data for internal consistency: For the content validity evaluation, total of 10 subjects were sampled with mean age of 34.28 years. Total number of subjects were 10, out of which there are 7 males and 3 females. Out of them 8 were paraplegic and 2 were quadriplegic.

Content validity: The content validity ratio was calculated for each item according to the formula given by C.H. Lawshe method. As mentioned in methodology, at significance level of p = 0.05, the item having content ratio more than 0.42 were retained. In total, no item was found to be content wise invalid out of initial 15 items. Thus, the final scale constituting 15 items was having good content validity.

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<tr>
<th>Item number(N)</th>
<th>CVR</th>
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<tbody>
<tr>
<td>1</td>
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<td>2</td>
<td>0.9</td>
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Key : CVR = Content Validity Ratio, N = Item number. When all say "essential," the CVR is computed to be 1.00

**Discussion**
The aim of the study was to translate original English Wheelchair User’s Shoulder Pain Index

**Statistical Analysis**
Content validity: Content validity refers to the degree to which the items of the data collection instrument ‘are a representative sample of the universe of content and / or behaviour of the domain being addressed’. Demographics of the sample taken with spinal cord injury were calculated using Microsoft excel 2013. Content Validity of Hindi wheelchair user’s shoulder pain index was calculated using the Content Validity Ratio Formula given by C.H. Lawshe.
Hindi Translation of The Wheelchair User’s Shoulder Pain Index

The Wheelchair User’s Shoulder Pain Index (WUSPI), a shoulder pain index designed to measure the severity of shoulder pain associated with functional activity in individuals who use wheelchairs. This instrument is able to detect even small levels of shoulder pain, in a way that is practical and relevant to this population and their health care consultants.

Translation procedure given by American Association of Orthopedics Surgeons was followed, which involved two forward translation, two backward translation and pretesting.

In Forward Translation phase (stage 1), the author was contacted for item 8 ‘putting on pants’ and item 9 ‘putting on a t shirt or pullover’ to add similar words for pants and t shirt in order to make it cross culturally acceptable here in India and after taking permission from the author additional words for pants and t shirt were added.

In another item, meaning of the item ‘putting on a button down shirt’ in the questionnaire was clarified from the author as there was an issue whether it meant putting button of the shirt from top to bottom or putting the lower button of the shirt, in reply the author had stated that it meant that the front of the shirt opens from top to bottom.

Before starting the stage of synthesis (stage 2) the author was mailed to enquire the meaning of the item ‘not performed’ as it was not clear whether it meant it was not applicable or whether the person has not done the activity. The author replied that it is intended to account for those people who either are unable or choose not to do various activities that are included in the index and "not applicable" is slightly different in meaning, but to most people who complete the index it would mean the same thing. The meaning was conveyed to the translators and suitable steps were taken.

In Expert committee (Stage 4) few changes were suggested by the expert panel members to make the meaning of the questions more appropriate before starting with the pretesting of the questionnaire. In instructions one of the experts suggested to replace the word for ‘box’ with a more appropriate word in hindi. Issue was discussed with all the panel members and suitable changes were done. Also, In item 5 the word ‘chair’ was replaced as in first hand it came the English word for chair in hindi so alternative synonym for chair in hindi was searched for and finalized and In item 6 ‘pushing up ramps or inclines outdoors’ the hindi word for ‘up’ was changed for a clearer understanding. Moreover, to get a clear insight into the meaning of word ‘transfer’ the hindi word given by both the translators for the word transfer were kept in final questionnaire.

Before the starting of pre testing stage a set of questions were framed and were mailed to the author who gave the guidelines for translation to use them as a part of pretesting for probing. Permission was granted from the author to use them as a part of pretesting. In addition the author of the original scale were contacted whether the patients to be taken should have the complaint of shoulder pain and if yes is it only subjective as the patients tells verbally or any criteria was to be used to diagnose it. The author confirmed that any wheelchair user could be taken, with or without pain in your study. The scale was 100% self reported shoulder pain during functional activities. The patients do not have to report pain to complete the instrument.

In Stage 5 (patient testing) 30 patients were interviewed to probe about what they thought was meant by each questionnaire item and their response. Both the meaning of the items and responses were explored. Each subject completed the questionnaire, and was asked to put it in his/her own words. Also patients were asked to report any difficult words encountered and provide alternatives or suggestions for them if found. Only three patients had difficulty in pronouncing Hindi word for “transfer” but were able to understand the meaning as alternative word was provided.
The Content Validity evaluation phase was divided into two phases, Qualitative and Quantitative phase. In this step, 10 experts were taken, of which 2 were spine surgeons, 2 were physiotherapist, 2 were occupational therapist, 1 was assistive technologist, 1 was peer counsellor, 1 was psychologist, 1 was orthopaedic surgeon and also 10 patient with same inclusion and exclusion criteria as in patient testing were taken to establish content validity.

In Qualitative Review one of the expert suggested to change the word for ‘loading’ in item 4. Experts were contacted about the issue and replied that it was relevant as the word was appropriate. After a detailed discussion the expert was convinced with the word provided.

Some experts suggested to add items like long sitting in wheelchair, self care activities related to bowel and bladder, hindi word for week in the title, floor to chair transfer, tying/Removing shoes, question on social activity, playing activities as well as morning grooming like toothbrushing as it is a teen scale. Author was e-mailed for the same issue and replied that instrument has the existing items and we can't add more. It was validated and tested with those items, so we cannot add any others. In addition for the self care activity regarding bowel and bladder author replied that they tested a number of items prior to establishing the instrument and that was not one that ever ranked in high priority is causing shoulder pain.

The Quantitative Review involved calculating content validity ratio (CVR) was using Lawshe’s method in which all the 20 experts had to rate each of the 10 items as “essential”, “useful but not essential” or “not necessary”.

**Conclusion:**

Hindi version of The Wheelchair Users Shoulder Pain Index is a valid tool for assessing shoulder pain in individuals with spinal cord injury (SCI) who use wheelchairs.

**Limitations of the study:**

Sample population for the phase I and II were mainly taken from Delhi, Uttar Pradesh, Punjab, Assam, Bihar and Haryana.

**Future recommendations:** Establishing criterion, test-retest and concurrent validity of the Hindi version of Wheelchair Users Shoulder Pain Index. To find out the utility of Hindi version of Wheelchair Users Shoulder Pain Index in other populations like poliomyelitis, amputation, cerebrovascular accidents, and multiple sclerosis.

**References**

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