

Psychometric Properties of Hindi Version of Physical Activity Recall Assessment for People with Spinal Cord Injury

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Abstract

Objectives: The most widely used type of physical activity measure is the self-report survey. Of the available self-report physical activity measures, the vast majorities were developed for use in the general population and typically focus on measuring participation in recreational and sport activities. As a result, the existing self-report measures are insufficiently sensitive to measure very low intensity activities that might account for the bulk of daily energy expenditure among people with SCI. The content of these measures also fails to capture activities that are part of SCI lifestyle. 'Physical Activity Recall Assessment for People with Spinal Cord Injury' [PARA-SCI] was published in August 2005. PARA-SCI is a measure of physical activity for individuals with SCI who use a wheelchair as their primary mode of mobility. It has been translated in various languages, thus the aim of the study is to study the psychometric properties of Hindi version of physical activity recall assessment-SCI.

Methods: PARA SCI was translated in phase 1 of the study and the reliability and validity of the instrument was done

Results: There was significant correlation observed in test –retest reliability and Vo₂ max calculated by 12 minute wheelchair test correlated with the subcomponent of PARA SCI

Conclusion: The Hindi version of PARA-SCI is a reliable and valid instrument

Keywords: *Spinal Cord Injury, Physical Activity Recall Assessment - Spinal Cord Injury, Activity Daily Living, Leisure time physical activity.*

Introduction

The spinal cord is the major conduit through which motor and sensory information travels between the brain and body. Spinal cord injury (SCI) affects conduction of sensory and motor signals across the site(s) of lesion(s), as well as the autonomic nervous system.¹

The incidence as well as the prevalence of SCI has been on the rise with the incidence rate being estimated to be from 15-40 cases per million world-wide. The number of people sustaining SCI has increased over the past 3 decades.¹

Persons with SCI face unique health challenges throughout their life and their injury dissociate the normally well integrated homeostatic responses of body system known to accompany physical activity. Depending upon level and type of cord lesion, persons

with SCI are the most physically deconditioned of all humans. The physical activity limitation comes with secondary impairments like loss of cardio-respiratory and muscular function, metabolic and systemic dysfunctions.

Assessment of cardio respiratory fitness in persons with SCI requires specialized knowledge of both Exercise-Testing (ET) procedures and unique physiology that ensures SCI. ET modalities for these individuals commonly employed over the ground wheelchair propulsion on a treadmill or wheelchair rollers, cyclical arm ergometry and variations of electrically stimulated exercise. The mode commonly used in ET of person with SCI is the arm crank ergometer. It follows the same general protocols for as normals, but here as the VO₂ peak is dependent on level of SCI, lower intensity loads are applied than those used in standard exercise testing.³⁾

Exercise training has been shown to reduce pain and depression too among people with SCI.^(5,6) There is evidence that among persons with SCI, physical activity is associated with positive changes in disease risk factors such as triglyceride levels⁷, body fat⁸ and insulin resistance.⁹

However, the specific activity types, durations, and intensities that produce these health outcomes have not yet been established within the SCI population. The lack of such information makes it virtually impossible to develop physical activity guidelines for the SCI population, and study in this area has been impeded by the lack of a valid and reliable self-report measure of physical activity for people with SCI.

The most widely used type of physical activity measure is the self-report survey. However, independent ambulation is uncommon among people with SCI and most of their energy expenditure is accounted for by activities of daily living and passive leisure activities.

As a result, the existing self-report measures are insufficiently sensitive to measure very low intensity activities that might account for the bulk of daily energy expenditure among people with SCI. The content of these measures also fails to capture activities that are part of this population's lifestyle.¹⁰

An SCI-specific physical activity measure would help researchers to fill a number of voids in the SCI and physical activity literature. In particular, a measure that assesses the performance of specific activities and their associated intensities would facilitate collection of epidemiological data necessary to develop health-promoting, physical activity prescription guidelines for people with SCI. An SCI-specific measure would also allow researchers to develop and test activity-enhancing interventions for the SCI population.

'Physical Activity Recall Assessment for People with Spinal Cord Injury' [PARA-SCI] was published in August 2005. PARA-SCI is a measure of physical activity for individuals with SCI who use a wheelchair as their primary mode of mobility. PARA-SCI is widely used, it is already present in 13 other language Chinese, Czech, Dutch, English, French, German, Greek, Italian, Portuguese, Punjabi, Swedish, Spanish, Russian.

It is self report physical activity measure for people with SCI. The assessment is completed using a semi-structured interview protocol. It aims to measure

frequency, type, intensity, duration of physical activity performed by persons of SCI who use wheelchair as their primary mode of mobility. It utilizes 3 day recall and can be used in paraplegia and tetraplegia, and is designed to capture three categories of physical activity: first Leisure time physical activity (LTPA) that one chooses to do during free time, such as playing sports or working out at the gym. Activities of Daily Living (ADL) that are part of one's daily routine, such as personal hygiene, household chores, work-related activity, passive leisure activity. And Cumulative activity: The combination of LTPA and lifestyle activity.²

The English version of PARA-SCI is a valid and reliable measure.⁽¹⁰⁾ This type of self report instruments are able to access the fundamental dimensions of physical activity (i.e., frequency, intensity, type, duration) and can be easily administrated to large segments of population relatively easily and inexpensively. Given these advantages, it has played a crucial role in generating epidemiological data used to formulate physical activity prescriptions and guidelines for general populations. But till date there is no Hindi scale available for the same. So this study deals with the psychometric properties of Hindi version of physical activity recall assessment-SCI.

WORK PLAN

Study Centre – Indian Spinal Injury Centre, Institute of Rehabilitation Sciences, New Delhi. India

Study design – Methodological study

Sample size – 100

PROCEDURE OF STUDY-

First of all permission for Hindi translation from the author of "PHYSICAL ACTIVITY RECALL ASSESSMENT –SCI", Kathleen Martin Ginis was taken through an e-mail.

Procedure consist of following two phases

- 1) Translation of instrument to Hindi language.
- 2) Psychometric Evaluation of Hindi version of PARA-SCI instrument.

PHASE 1 – Translation Phase

Forward translation

As per the procedure, two translators were recruited for forward translation; having there native

Hindi language speakers bilingual in English. They were provided with the original English version of questionnaire and was asked to independently translate it in Hindi language avoiding any technical language. Hence first phase of translation gave us two Hindi version of PARA-SCI questionnaire English version. This two versions were combined to form a single Hindi translated PARA-SCI questionnaire.

Backward translation

It involves English translation of Hindi translation obtained from forward translation this step again required two translators who had translated the Hindi version, without having any access to original English version of questionnaire. As per the procedure, the back translation was checked against original English version of PARA-SCI questionnaire and their accuracy was determined.

The scale was reviewed by the expert review committee. The comments and suggestion of the review committee was then sent back to the translators for corrections into the next intermediate Hindi version of the scale.

After repeating this process several times the final translate Copy had then used for pilot study.

PHASE 2- Psychometric evaluation- Test retest reliability and validity of scale was established.

Test retest reliability

The PARA-SCI scores are calculated by assessing the LTPA, ADL and Cumulative activity where, Leisure time physical activity (LTPA) that one chooses to do during free time, such as playing sports or working out at the gym. Activities of Daily Living (ADL) that are part of one's daily routine, such as personal hygiene, household chores, work-related activity, passive leisure activity. And Cumulative activity: The combination of LTPA and lifestyle activity.

Test retest reliability was done by administrating the questionnaire to SCI patients with in a gap of seven days as the questionnaire is a three days recall questionnaire.

Construct validity –

The convergent validity of a physical activity scale is typically indicated by demonstrating expected relationships between the scale scores and measures of

physical fitness.

Inclusion criteria-

- Subjects with traumatic spinal cord injury of duration more than 3months.
- Age -18-60 years.
- Subject should understand Hindi.
- Subject should be a case of traumatic spinal cord injury below T1-L5 level.
- Subject should be able to propel manual wheelchair.

Exclusion criteria-

- Subjects diagnosed with any systemic/psychiatric illness, any infectious disease.
- Subjects having any neurological impairment which might hamper his/her participation in the study.
- Subjects diagnosed with any kind of visual or vestibular deficits.
- Subjects with memory deficit.
- Professional wheelchair sportsperson.

Physical Fitness-

Muscle strength - Muscle strength was assessed to determine the maximal load that could be lifted in one repetition (1RM) for chest press (unilaterally) and biceps curl (unilaterally). Tests was terminated at the participant's point of fatigue.

Attainment of 1RM confirmed by participants indication that their last lift was "heavy intensity" activity, as defined by the PARA-SCI activity intensity classification system.

Aerobic fitness – The 12 min wheelchair performance test for cardio respiratory endurance.

Equipment required- 400 m running track, marking cones, recording sheets and stop watch.

Procedure – place markers at set intervals (i.e.) at every 50 m to aid measuring the completed distance. Participant wheel around track for 12 min, and the distance covered was recorded.

Scoring – Recorded the completed distance to the nearest 100 meters.

Calculate VO2 max from following formula:

$$\text{VO2 max} = (29.623 * \text{Distance}) - 10.916 = \text{mg/kg/min}$$

Data analysis –

Correlation was computed between the scores of PARA-SCI and muscular strength and cardio respiratory endurance. Factor analysis was done for validity.

Result

In first phase, The final synthesized version was reviewed by the committee members and the author and a final Hindi version of physical activity recall assessment for spinal cord injured people was obtained

In phase two, the participants were interviewed twice with a gap of seven days with the instrument and simultaneously the aerobic capacity and muscular strength was also measured to correlate it with PARA-SCI scores. The number of patients recruited was 40. (Table 1.1 Mean, S.D.)

Test retest reliability

Test retest reliability was tested with a gap of seven days with the scores of subscales of day 1 was compared with day 7 with pearssons correlation .Here day 1 ADL

was significantly correlating with ADL (r >00.00) and LTPA (r >00.00) and with cumulative (r > 0.028) of day7. LTPA of day 1 was significantly correlating with ADL(r >00.00) and LTPA(r >0.00) only. There was an over lapping in assumption of physical activity division by patients which has affected the results. Where the cumulative activity of day 1 was significantly correlating with cumulative activity(r >00.00) and ADL (r >0.022).

Convergent validity

The convergent validity of a physical activity scale is typically indicated by demonstrating expected relationships between the PARA-SCI scores and measures of physical fitness.

The convergent validity Pearson’s method was used. PARA-SCI scores were correlated with chest press, biceps curl, vo2 max where the chest press was significantly correlated with biceps curl(r >0.00), distance (r >0.041) and vo2 max (r >0.041).here a negative correlation was found of chest press with LTPA (r >0.010) as due to overlapping of the physical activity subscales. (patients were confused for physiotherapy inactive an passive sessions where it should lie in ADL or LTPA.)

Biceps curl was significantly correlated with distance (r >0.006) and vo2 max (r >0.006). Distance was correlated with vo2 max (r >0.00).ADL was correlated with LTPA (r >0.00) and Cumulative (r >0.018).

TABLE 1.1- The Mean and S.D. were calculated. The number of patients recruited was 40.

	SCI (TOTAL)	TETRAPLEGICS	PARAPLEGICS
AGE(years) (MEAN ±S.D.)	29.30±9.00	32.45±10.27	28.10±8.35
GENDER (M:F)	5.25:1	4.5:1	3.8:1
MODE OF INJURY	T= 46 NT=4	T= 11 NT=0	T=25 NT=4

Discussion

The objective of study was to establish the psychometric properties of Hindi version of physical activity recall assessment-SCI. The physical activity recall assessment (PARA-SCI) has been proposed as an essential measure for assessing SCI patients or a self reporting survey but till date there is no Hindi scale available for the same.

The whole study was done in two phases. Where in phase one, we have obtained the Hindi translated copy, which was reviewed by the expert review committee. The comments and suggestion of the review committee was taken and sent back to the translators for corrections. After repeating this process several times the final translate Copy was used for pilot study.

In phase two, Test retest reliability and validity of scale was established by administrating the questionnaire to SCI patients with in a gap of seven days. The convergent validity of a physical activity scale was typically indicated by demonstrating expected relationships between the scale scores and measures of physical fitness.

Limitations of Study-

- Overlapping was seen in ADL and LTPA activities as physiotherapy comes as a daily routine and active and passive physiotherapy both are part of routine.
- For assessing aerobic capacity instead of 12 min wheelchair test instrument gas analyzer could have been used.
- Cannot assess the physical activity of high cervical quadriplegics with AIS- A.
- Because of field method used to assess the aerobic capacity, minimum of 300 meters the patient should be able propel wheelchair as below that score the VO₂ max value was going in negative.

Future Recommendations

- Other Psychometric properties in subscales of quadriplegics and paraplegics can be done and factor analysis using the age groups can be done.
- Study can be carried out on a large population.

Ethical Clearence- Taken from Institutional Ethics

Committee, ISIC, NEW-DELHI

Source of Funding- N/A

Conflicts of Intrest- Nil

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