Validity and reliability of Gujarati version of Physical Activity and Disability Survey

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Abstract

Background: According to WHO, it has been shown that only 38% of adults with a disability meet the international recommendations for Physical activity (PA) compared to 49% in those without disability. As the aging process itself is associated with a decline in overall functioning, this increases the risk of lower rates of PA in later life. Knowledge on PA is scarce in India due to various reasons, one of which being lack of valid and reliable tool of assessment. Physical activity and disability survey (PADS) is an internationally accepted tool for measuring PA in subjects with chronic disabilities. However, for an accurate measurement, its local linguistic versions are highly recommended. Gujarati translated version of PADS is unavailable at the moment and hence the study was undertaken. Methods: Institutional Ethics Approval was obtained from IEC. Translation and cross cultural adaptation of PADS was done in Gujarati language as per WHO guidelines.8 subject experts reviewed the translated version for content and face validity. Mutual consensus was determined at 80% agreement among them. **Statistical analysis:** ICC and Cronbach's alpha of the translated version was also determined in subjects with neurological conditions. Results: Gujarati version of PADS was found to be valid. The ICC value for test-retest reliability was found to be (0.71–0.79) 0.75, with values varying between 0.65 and 0.75 for subscales. Conclusion: Gujarati version of PADS is a valid and reliable tool and can be used across neurological conditions to determine their level of PA.

Keyword: physical activity, Gujarati-PADS, validity, reliability

Introduction

Physical activity constitutes a core component in the promotion, prevention and management of health as well as in overall physical and psychological well-being. Physical Activity (PA) is defined as any bodily movement produced by skeletal muscles that require energy expenditure. [1] Regular physical activity improves overall health and fitness, and reduces ones risk of chronic diseases. Physical inactivity (insufficient physical activity) is one of the leading risk factor for non-communicable diseases (NCD) and death worldwide.[2] According to the World Health Organization (WHO), PA of 150 minutes per week or as moderate to vigorous PA a minimum of 30 min per day most days of the week is the recommended guideline.[3] The recommendations for PA comprise able-bodied persons as well as those with disabilities, even though there is limited evidence associated with the benefits of PA in certain disability

groups. [4] It has been shown that only 38% of adults with a disability meet the international recommendations for PA compared to 49% in those without disability. [5] In persons 65 years of age and older, only 15% of those with a disability met the recommendations for PA compared to 26% of those without a disability. [6] As the aging process itself is associated with a decline in overall functioning, this increases the risk of lower rates of PA in later life. With an increasing number of people around the world aging with a disability, there is a need to better understand the level of PA among specific groups and diagnoses in order to promote a healthy and active life-style.

A range of methods or techniques have been used to assess physical activity, consisting of self-reported measures, pedometers and accelerometers, direct observation systems, heart rate monitors, indirect calorimetry. Measuring PA behavior is a complex task however, and no single measure of physical activity is capable of capturing the entire range of dimensions and/or behaviors that encompass physical activity. However, consistent with the literature in measuring physical activity among individuals without disabilities, self-reports were found to be one of the most commonly used forms of assessing physical activity among individuals with disabilities. [7] Among the number of self-reports used, there were three especially designed for individuals with disabilities: (a) the Physical Activity and Disability Survey (PADS), (b) the Physical Activity Recall Assessment for People with Spinal Cord Injuries (PARA-SCI), and (c) the Physical Activity Scale for Individuals with Physical Disabilities (PASIPD). The Physical Activity and Disability Survey (PADS)[8] was one of the first questionnaires developed but was validated for participants with a wide range of disabilities ranging from stroke to type-2 diabetes, and subsequently, a revised version (PADS-R) in persons with neurological

conditions. [9] PARA-SCI was specifically developed and evaluated for people with spinal cord injury (SCI). PASIPD was developed in people with both visual and auditory disabilities, its implementation in people with locomotor impairment and SCI means it could be considered sensitive to persons who use wheelchairs. [10] However it calculates score in MET values which have been assigned to activities based on oxygen consumption in healthy individuals and hence such values are unlikely to be meaningful in people with disabilities, making PADS the most promising scale with good psychometric properties in a previous validation study (test–retest reliability: ICC ranged from 0.83 to 0.95).

PADS is a 31-item self-report questionnaire developed to provide a measure of the day-to-day level of PA in people with disabilities and chronic health conditions. This version of the PADS has primarily been used within the National Center of Physical Activity and Disability where it was developed. The PADS was developed as a semi-structured interview, but has also been used as a questionnaire. The score is calculated based on the time respondents spend doing activities multiplied by an intensity rating of that activity. Higher scores indicate higher levels of activity and negative scores can be obtained for sedentary behavior, such as long periods of sleeping, sitting or lying. The original PADS has displayed good psychometric properties and good test-retest reliability in persons with disabilities and chronic health conditions such as stroke, multiple sclerosis and diabetes. [8] However, for an accurate measurement, its local linguistic versions are highly recommended. Knowledge on PA is scarce in India due to various reasons, one of which being the uncertainty of validity and reliability of the existing PA assessment tools. Gujarati translated version of PADS is unavailable at the moment and hence

the aim of the study was to determine a validity and reliability of Gujarati version of PADS.

Methods

Permission was sought from the original authors of PADS (Professor James Rimmer) and thereafter the process of translation of PADS was initiated. Upon translation, many items were identified to have caused cultural hindrances and hence a cross cultural adaptation process was also initiated, wherein components likely to differ based on cultural grounds in India, were adapted.

Translation

Various organizations have proposed recommendations for translating health status instruments. WHO steps for translation were employed for translating PADS, as described in figure 1. In the first stage original English version of PADS was translated into two independent Gujarati literal translations by one Gujarati physiotherapist familiar with English and one native English speaker, both independent of each other. The translator's work was reviewed by other bilingual natives, who had no prior knowledge of PADS. Without having seen the original version, two Gujarati translators then translated the questionnaire back into English, and synthesized into one version in the second stage. The original version and the back-translated version of the tool were then compared, and few difficulties which were identified on comparison were resolved with mutual discussion with forward and backward translators. Further to adapt the translated version to the Indian culture, a focus group composed of two Physiotherapists and a proofreader familiar with both English and Gujarati drafted the final translation to minimize any differences from the original English version.
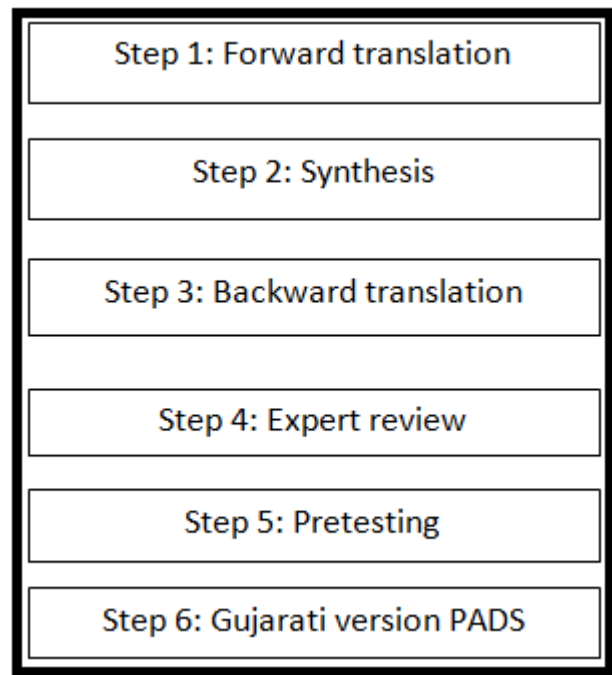

Figure 1. WHO steps of translation[11]

Cross cultural adaptation

The preliminary work done for translation identified a few activities in the PADS that the study population was unlikely to participate in (such as tennis, swimming, hiking, boating, horseback riding and basketball), for either cultural or socioeconomic reasons. Hence these were substituted for others (hockey, yoga, archery, kabaddi and cricket) that are done more routinely and are similarly intensive.

Protocol

This study was a cross sectional survey conducted at C.M Patel College of Physiotherapy, Gandhinagar, India over duration of 2 months. Study was approved by the Institutional Ethics Committee (IEC-CMPP/01/2017-18). 20 participants with chronic neurological conditions between 50-65 years of age, having adequate cognition, who visited Physiotherapy department during two visits approximately two days apart were included, and those with clinical depression or other psychiatric problems were excluded. All the participants were informed about the study and its objective, and those willing were only

included. Baseline data collection included subject demographics (age, gender, marital status, education, number of years living in Gujarat) and presence of co-morbid conditions. The validity and reliability of translated and culturally adapted version of PADS was then determined.

Statistical Analyses:

Data analyses was performed using IBM-SPSS version 20.00. Level of significance was kept at 5%. Face and content validity of the PADS was evaluated by members of the expert committee (n=8) having experience of 22.5 ± 1.5 years, and was further evaluated through qualitative analysis of the pretest interviews. The internal consistency of the PADS-Gujarati was examined by Cronbach's alpha (α) and to measure test-retest reliability, the Intra-class Correlation Coefficient (ICC) was calculated and the scale was considered stable with an ICC of > 0.70. Readings were documented one first occasion and seven days later.

Results

9 females and 11 male participants, between 55.6 ± 8.3 years were included in the study. The demographic characteristics of the participants are shown in Table 1. It was determined that activities given as examples in some of the questions in which physical activities were been asked, were not routinely performed in Indian culture and hence these activities were replaced by those requiring same intensities and performed more commonly in the Indian society. The modified questions are described in table 2.

Table 1. Demographics of participants and outcome measures	
Variables	Mean ± SD
Mean Age of participants (Years)	55.6 ± 8.3
Height (cms)	165.2 ± 10.4
Weight (kgs)	63.5 ± 7.2
Body mass index (kg/m2)	23.1 ± 3.6
Conditions	Number (%)
Stroke	10 (50%)
Parkinsonism	05 (25%)
Post-polio syndrome	05 (25%)

Validity

For face and content validity, an expert panel of 8 professionals, consisting of neurologists, orthopedics as well as physiotherapists, having experience of 22.5 + 1.5 years was included. The correlation co-efficient of each subscale as well as total score as determined using spearman's correlation is shown in table 3.

Table 2. Cross cultural adaptation results of PADS	
Original PADS	Cross-cultural adaptation (Gujarati version)
Endurance activities	
Examples include hiking, boating, skiing, dancing and sports activities	Examples include playing any sport such as cricket, kabaddi, hockey, dancing, swimming
Non-endurance activities	
Activities like boating, softball and horseback riding	Activities like archery, power lifting, shooting
General activity	
Outdoor household activities such as gardening	Outdoor household activities such as grocery shopping

Table 3. PADS subscale and total score correlation co-efficient	
Scale	Correlation co-efficient (*r*)
1. Exercise	0.69
2. Leisure time	0.72
3. Therapy	0.75
4. General	0.71
5. Employment	0.67
6. Wheel chair users	0.58
Total	0.78

Reliability

PADS was found to have good internal consistency as measured by Cronbach's alpha of 0.84. Correlation of the various subheadings with the overall score was found to be between 0.4 to 0.7. The ICC value for test-retest reliability was found to be (0.71–0.79) 0.75 at the confidence interval of 95%, which suggests substantial level of test-retest reliability. The ICC values of subheadings vary between 0.65 and 0.75 (Table 4).

No.	Scale	*r* co-efficient	ICC	95% CI
1.	Exercise	0.72*	0.65	0.62 – 0.68
2.	Leisure time	0.71*	0.73	0.70 – 0.76
3.	General	0.79*	0.69	0.66 – 0.72
4.	Therapy	0.69*	0.78	0.75 – 0.81
5.	Employment	0.75*	0.72	0.69 – 0.75
6.	Wheelchair users	0.76*	0.69	0.66 – 0.72
7.	Total	--	0.75	0.72 – 0.78

Table 4. Test-retest reliability, correlations of Gujarati version- PADS

*p<0.05, suggesting significant correlation

Discussion

In this study, PADS was translated into Gujarati language, and its validity and reliability was assessed in 20 participants with chronic neurological conditions. Results of the study suggest good psychometric properties of Gujarati PADS, which makes it a valid and reliable tool for research and practice.

Kayes et al conducted a study to evaluate the reliability, validity and acceptability in patients of multiple sclerosis of PADS and reported a high ICC values of 0.92 (95% confidence interval (CI) 0.88, 0.98).[9] The ICC values are identified as fair for <0.40, moderate for 0.40–0.59, substantial for 0.60–0.79, and excellent for ≥0.80.[12] In the present study, ICC values were found to be substantial (0.75, CI: 0.71–0.79). The mean age of participants in this study was 55.6 ± 8.3 years, as compared to median age of 54 years (range 27-76) in the study by Kayes et al. Previous study and this study both used a time interval of 7 days between the test measurements. However, the acceptability of such questionnaires may be low in countries like India due to lack of awareness, attention and varied perspectives related to the outcome.

The internal consistency of the PADS-Gujarati was examined by Cronbach's alpha (α) and was estimated to be 0.84. Cronbach's alpha (α) should be at least 0.7 as an indicator of the satisfactory homogeneity of the items within the total scale.[12] This, further emphasizes upon the internal consistency of Gujarati PADS to be strong, suggesting it to be a useful means to establishing physical activity in chronic neurological conditions.

Anens et al conducted a study using Swedish version of PADS in adults with multiple sclerosis, however the study lacks report on psychometric properties of the translated version used.[13] Winberg et al also used translated Swedish version of PADS to determine PA in people with late effects of polio and to assess the relationship between PA, life satisfaction and various sociodemographic factors.

Gujarati and original versions of PADS showed strong correlation overall as well as in subscales, suggesting validity of Gujarati version being similar to that of original PADS. Kayes et al concluded validity of the PADS was poor when using total activity counts on the accelerometer as a criterion measure. However, criterion validity of Gujarati version of PADS was not assessed in the present study and could be one of the limitations of the study.

Also, Gujarati version of PADS is likely to the similar limitations as that of any other self-reported questionnaire, i.e. recall bias, but owing to other psychometric properties being sound, it provides an appropriate measure for use in epidemiological studies exploring physical activity in people experiencing disability, where large samples inhibit the use of objective measures of physical activity such as pedometers, accelerometers owing to their costs and availability.

Conclusion

Gujarati version of the PADS is a valid and reliable measuring tool for the Gujarati population for the purpose of evaluating the physical activity levels of chronic disabling conditions. This scale can be of great use to clinicians and researchers in evaluating and managing the physical activities of the chronic neurological conditions in Gujarat.

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