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Reliability and validity of Gujarati version of physical activity questionnaire for children

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Abstract

Physical Activity Questionnaire for children (PAQ-C) is a reliable and valid tool that helps to measure physical activity in children. The purpose of the study was to translate, and find reliability and validity of the Gujarati version of PAQ-C. It was translated into Gujarati using forward-backward-forward method. Twenty children knowing English and Gujarati language completed the questionnaires. Concurrent validity was found by comparing both the versions. Mean total physical activity score for Gujarati version was 3.08 ± 0.77 and English version was 2.93 ± 0.73 . Spearman's correlation coefficient was used to assess the strength of association between both versions, $\beta = 0.79$, $p < 0.001$. The reliability of the translated Gujarati version of PAQ-C questionnaire was found using Pearson's correlation coefficients, $r = 0.934$. Gujarati version of PAQ-C has a good validity and reliability to be used in Gujarati elementary school for children aged 8–14 years from grade four to grade eight.

Keywords: Physical activity, validity, reliability, physical activity questionnaire for children

Introduction

Physical activity is defined as any bodily movement produced by skeletal muscles that result in energy expenditure. The energy expenditure can be measured in kilocalories. Physical activity in daily life can be categorized into occupational, sports, conditioning, household, or other activities^[1]. Physical activity can be categorized in a variety of ways. A commonly used approach is to segment physical activity on the basis of the identifiable portions of daily life during which the activity occurs. The simplest categorization identifies the physical activity that occurs while sleeping, at work, and at leisure^[2]. Regular physical activity (PA) and health-related physical fitness are key indicators of health outcomes^[3]. They are core contributors to health along with reducing the risk of developing diabetes, hypertension, and cardiovascular diseases^[4]. PA also improves emotion and stress control^[4].

To analyse physical activity data, there is no formal consensus on a 'correct' method for defining or describing levels of physical activity based on self-report population surveys.^[5] Various tools which measure physical activity include International Physical Activity Questionnaire (IPAQ). IPAQ is an instrument designed primarily for population surveillance of physical activity among adults. It has been developed and tested for use in adults (age range of 15-69 years)^[6]. The other tool is Physical Activity Questionnaire for children (PAQ-C) which is a reliable and valid tool that helps to measure physical activity in children^[7]. The PAQ-C is a self-administered, 7-day recall instrument and it was developed to measure physical activity among children aged 8–14 years from grade four to grade eight^[8]. The PAQ-C can be administered in a classroom setting and provides a summary of physical activity score derived from nine items, each scored on a 5-point scale^[8]. Self-report instruments (questionnaires, recall, diaries) provide a cost-effective and easy-to-use alternative to the expensive and burdensome objective measures, and can have acceptable validity depending on the self-report instrument^[9].

An expert panel recently ranked the Physical Activity Questionnaire for Children (PAQ-C) as one of very few self-report instruments that has acceptable validity, reliability and practicality for use in children^[9]. PAQ-C can be used in clinical research on school population. Many studies have validated this Physical Activity Questionnaire for children in different languages. Wang Jing Jing *et al.* validates the Chinese version of the Physical Activity Questionnaire for

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Children (PAQ-C) which has been identified as a potentially valid instrument to assess Moderate to vigorous physical activities (MVPA) in children among diverse racial group^[10]. *Nor Azian Mohd Zaki et al.* found the reliability and validity of the Physical Activity Questionnaire for Older Children (PAQ-C) In Malay Language^[11].

The Gujarati version is still not available. So this study was carried out to translate and culturally adapt PAQ-C. The study also aimed to find the reliability and validity of the Gujarati version of PAQ-C.

Materials and Methods

Permission from the authors of PAQ-C was obtained to translate the English version to Gujarati. Ethics approval was taken from the institutional review board. PAQ-C was translated into Gujarati from English according to the guidelines using forward-backward-forward method^[12].

For translations two independent translators who knew both English and Gujarati language were asked to participate. Both translators converted the original English version of PAQ-C Questionnaire into the Gujarati version. This was combined to one and the translated version of questionnaire was shown to the five expert committee members for their opinion. Expert committee included physiotherapists having specialty in Rehabilitation (3), Neurological (3) and Musculoskeletal (2) conditions. Changes suggested by these members were incorporated in the questionnaire and a consensus was reached at by the expert committee. The translators then converted the Gujarati Version into English version seeing that no word meaning has changed. At the end of a mutual consensus, a final Gujarati version of PAQ-C was obtained.

To assess the reliability and validity of the translated version, the questionnaire was then put forward to children. Both male and female children from grade four to eight in the age group from eight to fourteen years of age, knowing both English and Gujarati language and willing to participate in the study were included. Children, who were identified by teachers having reading problems, who reported on the PAQ-C that sickness or other events, prevented them from doing regular activity and children's not willing to participate in the study were excluded. The participants were randomly identified from the community and explained the study. Informed assent was taken from the children. Questionnaire was filled by twenty children fulfilling the inclusion criteria.

Data was analyzed for content, meaning, wording, format, ease of administration and scoring. A simple random technique by lottery method was used to determine the order of administration of both questionnaires. An interval of one day was kept between the administrations of two questionnaires. To check the reliability of the translated Gujarati version of PAQ-C questionnaire it was administered to the children's by three different therapist's i.e A, B, C on first visit and participants had to answer the questionnaire for Inter rater reliability. The questionnaire was collected by the therapist to maintain the record and on the next day the same previous children's again given the Gujarati version of PAQ-C questionnaire only by therapist A for intra-rater reliability.

Statistical analysis

For statistical analysis SPSS version 16 was used. Spearman's correlation coefficients were used to assess the strength of association between the measures of both the versions. Concurrent validity was found by comparing the English version of PAQ-C with Gujarati version of PAQ-C.

Results and Discussion

Pearson's correlation coefficients were used to assess the strength of association of Gujarati version of PAQ-C. Concurrent validity and inter-intra reliability was found. The present study was conducted to find the validation of Gujarati version of physical activity questionnaire for children (PAQ-C). A strong positive correlation between the English and Gujarati version of PAQ-C $r=0.79$, $p<0.001$ was seen. The reliability was also found to be good.

Few changes were made in the questionnaire. Few games were changed according to the playing conditions and also according to those games which are played more frequently in India and which differ from the western country. The games are shown in table 7 which are being replaced by original games.

A study done by Wang Jingjing and Pitkethaly Amanda Jane among Chinese children had also changed the games name according to their playing conditions 'ice skating' changed to 'In-Line skating' and 'football' to 'soccer' and uncommon activities were removed like 'street hockey' and 'ice hockey'^[10]. Overall, the PAQ-C was found to have acceptable measurement properties.

In this study we found the PAQ-C in Gujarati language provided reliable estimates of physical activity among older children. Our findings of standardised Cronbach alpha $\alpha = 0.716$ suggest PAQ-C had good internal consistency and the result was consistent with other studies^[10]. Croker *et al.* reported the internal consistency of the PAQ-C scores using coefficient alpha were $\alpha = 0.79$ and $\alpha = 0.89$ for first and second assessments; 1 week apart, respectively.^[11] Evidence was provided that supported the PAQ-C as a reliable and valid measure of general physical activity levels in children during the school year. The PAQ-C was relatively stable over the one-week assessment period (males, $r = 0.75$ and females, $r = 0.82$ Kathleen and colleagues conducted a study in 210 children at age 11 years old also found a good internal consistency ($\alpha = 0.72$) of PAQ-C and suggested it can be used during the school year and the summer vacation^[13].

The test-retest reliability correlation coefficients in the present study was 0.94 which is showing strong positive correlation than the original PAQ-C studies that have found test re-test correlations ranging from 0.75 to 0.82 among 83 students aged 9-14 years old^[11].

Nor Azian Mohd Zaki et al. did a study on Reliability and Validity of the Physical Activity Questionnaire for Older Children (PAQ-C) In Malay Language^[15]. The PAQ-C was translated into Malay language using forward and backward translation^[15]. The evaluation of the psychometric properties included internal consistency, test-retest reliability and criterion validity. Reliability of PAQ-C (M) was determined using Cronbach alpha and intra-class correlation coefficient (ICC). The PAQ-C (M) was administered twice in one week interval to assess test-retest reliability. The internal consistency of PAQ-C (M) assessment calculated in this study was $\alpha = 0.75$ and $\alpha = 0.77$ for assessments one and two, respectively. The ICC between individual items of PAQ-C (M) was 0.59 to 0.91, indicating moderate to good correlation^[15].

Based on the result in this study, Pearson's correlation coefficient was found to be 0.94 which showed that the Gujarati version of PAQ-C had strong correlation and a valid tool to measure Physical Activity in Gujarati students in elementary school.

J.D. Manchola-Gonzalez *et al.* did a study on the validation of the PAQ-C questionnaire to assess physical activity in

Spanish older children after translating questionnaire into Spanish language. Reliability of the test-retest questionnaire PAQ-C, was evaluated on 72 children aged between 8 and 14 years. Measurements were taken at three different stages: before the physical education class (M1), 2 hours after the lecture (M2) and one week later (M3). Reliability was calculated using the intra class correlation coefficient (ICC) while the internal consistency by Cronbach's α coefficient. The intraclass correlation coefficient (ICC) was found to be 0.848 between M1 and M2 with a confidence interval higher than 0.7, indicating a good reliability. The results also showed an internal consistency with a Cronbach α of 0, 83. The physical activity questionnaire PAQ-C demonstrated good reliability when evaluating physical activity in Spanish older children [14].

A limitation of the present study was that the activity level of Indian games is not known.

Table 1 shows data of members of therapists Age, gender, years of experience.

Table 1: Data of members of therapists

Therapists	ABC
Age(years)	24.5±0.3
Gender(M/F)	2(F)/1(M)
Years of experience	2

Table 2 shows the data of expert committee members Age, Gender, years of experience

Table 2: Data of expert committee members

Age (years)	41.25±4.77
Gender (M/F)	5(F)/3(M)
Years of experiences	7.75±1.16

Table 5: PAQ-C item wise and total score correlation co-efficient of Gujarati version

	Item	r value
1.	Physical activity in your spare time in past 7 days	0.692
2.	In the last 7 days, during your physical education (PE) classes, how often were you very active (playing hard, running, jumping, throwing)?	0.67
3.	In the last 7 days, what did you do most of the time at recess?	0.78
4.	In the last 7 days, what did you normally do at lunch (besides eating lunch)?	0.89
5.	In the last 7 days, on how many days right after school, did you do sports, dance, or play games in which you were very active?	0.71
6.	In the last 7 days, on how many evenings did you do sports, dance, or play games in which you were very active?	0.88
7.	On the last weekend, how many times did you do sports, dance, or play games in which you were very active?	0.89
8.	Which one of the following describes you best for the last 7 days?	0.94
9.	Mark how often you did physical activity (like playing sports, games, doing dance, or any other physical activity) for each day last week.	0.91
	Total	0.934

Table 6 showing the Internal consistency of each item in Gujarati PAQ-C where Cronbach's alpha was $\alpha = 0.716$.

Table 6: Internal consistency of each item in Gujarati PAQ-C

Item	Corrected item total correlation	Correlation co-efficient if item deleted
1	0.877	0.561
2	0.689	0.694
3	0.68	0.697
4	0.435	0.707
5	0.40	0.708
6	0.34	0.711
7	0.50	0.706
8	0.25	0.727
9	0.843	0.686

Table 3 showing the demographic data of children's participated in the study

Table 3: Demographic data of children's

Variable	Mean± SD
Age (years)	12.75±1.29
Gender (M/F)	12(M)/8 (F)

Table 3 shows the mean total physical activity level (PAL) score for Gujarati version and English version.

Table 3: Mean total physical activity level (PAL) score for Gujarati version and English version.

Version	Mean (kcal/kg)	SD
English version	2.73	0.73
Gujarati version	3.08	0.77

Table 4 shows the correlation between English and Gujarati version which is a strong positive correlation between both English as well as Gujarati version of PAQ-C

Table 4: Correlation between English and Gujarati version

Correlation coefficient	p-value
0.79	<0.001

Table 5 shows item wise and total score correlation coefficient of Gujarati version of PAQ-C. There are total nine items in scale and each item has its own r value and total of all the nine items were taken where r value is 0.934 which showed a strong positive correlation co-efficient of Gujarati version of PAQ-C.

The assessment of test-retest reliability for PAQ-C between the first and second administrations is calculated which is 0.934. Reliability coefficient using average-measure intra-class correlation coefficient (ICC) total score of PAQ-C was 0.935 which is considered strong correlation. The test-retest between individual items showed that PAQ-C had well to strong correlation with ICC value between 0.824 to 0.982.

Table 7: Games which are being replaced by original games

Original games	Replaced with
Ice skating	Seven stone
Cross country skiing	Ice-water
Ice hockey	Kabbadi

Conclusion

The Gujarati version of PAQ-C [PAQ-C (G)] is a valid and reliable tool for measuring the physical activity level in Gujarati elementary school population.

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