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Cross Cultural Adaptation Of Physical Activity Questionnaire – Children And Adolescents In The Age Range Of 6 – 17 Years

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ABSTRACT

Background: Physical activity questionnaires (PAQs) are the most feasible methods to ensure accurate measurement of habitual physical activity in large sample epidemiological studies on the relationship between physical activity and health, on the fulfilment of recommendations or even on seeking an appropriate pattern of physical activity for maintaining health benefits. The PAQ-C was used to categorize children's physical activity levels in order to determine whether or not physical activity levels predict the presence of metabolic risk factors of type 2 diabetes and cardiovascular disease (CVD).
Aim of this study: This study aimed to bridge the gap by developing a Kannada version of the questionnaire, thereby facilitating better understanding and participation among Kannada-speaking children.
Methodology: 150 school going children aged 6 to 17 years were recruited based on selection criteria. Baseline characteristics of demographic data and outcome measures of IPAQ-C values were recorded through a tester of having BPT degree with more than clinical experience for further data analysis. Procedure of steps in cross cultural adaptation and translation of PAQ-C into Kannada language was adapted. IBM spss version 25.0 for windows was used for data analysis.
Results: Test-retest reliability ICC value was 0.74 for PAQ-C and 0.51 for PAQ-A, indicating moderate reliability. Spearman rank correlation for the Kannada PAQ-C was 0.864 for the PAQ-A was 0.872, that indicating strong validity.
Conclusion: This study results concluded that the Physical Activity Questionnaire – Children and Adult has high test and re-test reliability in cross culturally adapted and translated version of Kannada language. These findings endorse the suitability of using this tool for research involving Kannada-speaking children and adolescents. The translated Kannada version proves to be a dependable instrument for assessing physical activity levels in Kannada-speaking individuals.

KEYWORDS: Procedure of Cross cultural adaptation, Data Analysis and Results.

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INTRODUCTION

The Physical Activity Questionnaire (PAQ) is a widely used tool for assessing physical activity levels in different populations.1Physical activity questionnaires (PAQs) are the most feasible methods to ensure accurate measurement of habitual physical activity in large sample epidemiological studies on the relationship between physical activity and health, on the fulfilment of recommendations or even on seeking an appropriate pattern of physical activity for maintaining health benefits.2

There are numerous self-report questionnaires available to measure physical activity; however, the approach selected may vary depending on the age of the participants as well as the study's design and objectives.3 The kinds of activities evaluated and whether or not the length and/or intensity of the activity are questioned vary amongst questionnaires.4 Fewer physical activity questionnaires have been created to measure children's physical activity, despite the fact that many have been designed and validated for use with adults.5

Participation in physical activity at different levels is linked to both health advantages and/or dangers.[6] It is crucial that we have reliable instruments for evaluating physical activity at different ages as a result.[7] This becomes especially crucial when conducting longitudinal study, which may take several years.[8] A basic assessment of physical activity for children in grades 4–12 (about ages 8–20) is provided by the Physical Activity Questionnaire for Older Children (PAQ-C) and the Physical Activity Questionnaire

for Adolescents (PAQ-A).[9] The PAQ-C was used to categorize children's physical activity levels in order to determine whether or not physical activity levels predict the presence of metabolic risk factors of type 2 diabetes and cardiovascular disease (CVD).[10] The predictive power of body composition, physical inactivity, and cardiorespiratory fitness was also examined in this study.[11] For a wide range of chronic diseases, including obesity, diabetes mellitus, hypertension, and cardiovascular problems, physical inactivity is a substantial risk factor.[12] A number of diseases, including paediatric obesity and related health issues, can be effectively treated by increasing physical activity.[13] Therefore, measuring physical activity is a topic that interests researchers studying public health greatly.[14] To assess children's physical activity levels, a number of objective and subjective techniques have already been proposed.[15] The Canadian PAQ-C and PAQ-A self-report measures, developed by Kowalski et al., are reliable, affordable, and workable instruments for assessing youth physical activity.[16] As a matter of fact, these surveys have been employed to assess a variety of psychometric attributes, such as item and scale validity, construct validity, convergent validity, internal consistency, and sensitivity to gender and age variations.[17] PAQs were scored in accordance with Kowalski et al.'s instructions.[18] The PAQ-C questionnaire was first created for kids between the ages of 8 and 14.[19] It has nine questions that are structured to determine physical activity levels from low (score 1) to high (score 5) over the course of the last seven days, and a tenth question that looks for kids or teenagers who engaged in unusual activity the week before., Nevertheless, the final query was excluded from the summary activity score.[20]

In order to evaluate physical activity and obtain information about the nature and context of the exercise, self-report or proxy-report questionnaires are thought to be a practical and cost-effective method.[21] However, there are drawbacks to surveys as well, including the possibility of recollection bias and social desirability.[22] Therefore, a combination of the more objective measurements, like accelerometers and self-report questionnaires, seems to be the most promising for quantifying physical activity.[23]

This study aimed to bridge the gap by developing a Kannada version of the PAQ-C & A questionnaire, thereby facilitating better understanding and participation among Kannada-speaking children. This linguistic adaptation is crucial as it enhances the accuracy and reliability of data collection, ensuring that the questionnaire effectively captures the nuances of physical activity levels among Kannada-speaking children. The main aim of this study was to establish cross cultural adaptation of physical activity questionnaire- children and adolescents.The main objective of this study was to translate the physical activity questionnaire into Kannada language version and to find its psychometric properties.

METHODOLOGY:

After the ethical clearance was obtained from institute or university (04/PHT/EC/2024), official permission letter to the schools were sent. Importance and demonstration of this PAQ-C and PAQ-A questionnaire was providedfor the school authorities. 150 school going children and adolescents aged 6 to 17 years were recruited based on selection criteria. Participants having any systemic clinical conditions, children hospitalised in past 3-6 months due to any clinical illness and children with any severe musculoskeletal conditions that affect their physical activity were excluded in this study. Baseline characteristics of demographic data and outcome measures of PAQ-C and PAQ-A values were recorded through a tester of having BPT degree with more than clinical experience for further data analysis. IBM spss version 25.0 for windows was used for data analysis.

Procedure of Cross cultural adaptation:

To ensure the quality of adaptation this study followed the essential steps recommended:

STEP 1- Initial Translation/Forward Translation: The physical activity questionnaire for children was initially translated into Kannada from its original English version. The forward translation process involved two translators proficient in both English and Kannada languages. The first translator, with a medical background, was familiar with the concept being measured, while the second translator, with a non-medical background, was unaware of the concept being measured.

STEP 2- Synthesis: A meeting will be conducted between the two translators to obtain a consensus on the translated version of physical activity questionnaire for children , The two translated version would be compared and analysed until there would be a consensus regarding translation synthesis, resulting in formation of final synthesised version.

STEP 3- Back translation: The completed Kannada version will undergo back translation into English by two different professional translators who were not involved in the initial forward translation phase. These translators will be unaware of the concept explored in the questionnaire. From these two back-translated English versions, a final synthesized version will be developed. This final synthesized English version will then be compared with the original English version. Next, the final Kannada version of the Physical activity questionnaire will be collectively reviewed by a bilingual team. This team will include the four translators, one public health physician, and three physiotherapists. Their goal is to evaluate the need for cultural adaptation and refine the tool for use among Kannada-speaking patients. The final stage of adaptation will involve testing the pre-final version as a process check.

STEP 4- Reviewers committee: The synthesized Kannada version of the Physical activity questionnaire was subsequently reviewed by a bilingual team comprising a committee of experts, including both forward and back translators, a public health physician, and three physiotherapists. Their objective was to evaluate the need for cultural adaptation and refine it for use among Kannada-speaking children and adolescents who are familiar with the language. In the final stage of adaptation, emphasis was placed on achieving semantic, idiomatic, experimental, and conceptual equivalence with the original back-translated Physical activity questionnaire. This process ensured that the pre-final version accurately reflected the intended meaning and context of the questionnaire.

STEP 5- Pretesting: Cross-cultural adaptation was conducted by implementing the pre-final version of the Kannada version of Physical activity questionnaire on 150 children and adolescentswith 6-17 years of age. If there is no significant difference between the original version and the Kannada version of the Physical activity questionnaire, the pre-final and final indexes will match.

The primary objective is to evaluate whether the translated questionnaire is comprehensible and whether the vocabulary and expressions are relevant to Kannada culture.

Data Analysis and Results:

Komologrov – Smirnov statistical test was used to find the normal distribution of data. Data were not normally distributed. Hence, descriptive statistics were reported in median with interquartile range (IQR).

Participant Characteristics:

The demographic characteristics of the recruited participants are shown in Table 1. The median age of the sample was 11 years (IQR: 8–13), with an age range from 6 to 17 years. The median PAQ-C & A score for the total sample was 3.4 (IQR: 3.2–3.7), with scores ranging from 2.8 to 4.6.

Comparison Between Male and Female Participants:

Table 2 presents the comparison of age and PAQ-C & A scores between males (n = 69) and females (n = 81) using the Mann–Whitney U test. There was no statistically significant difference in age between males and females (p = 0.420). However, males demonstrated significantly higher PAQ-C & A scores (median: 3.7; IQR: 3.4–4.1) compared to females (median: 3.4; IQR: 3.1–3.5), with the difference being highly significant (p = 0.001***).

Physical Activity Levels of Participants:

Table 3 summarizes the distribution of physical activity levels in the total sample based on PAQ-C & A scores. The majority of participants (92%) were classified as having high physical activity levels (>3), while 8% demonstrated moderate activity levels (>2 to ≤3). No participants reported low physical activity levels.Among males (69), 98.55% demonstrated **high physical activity**, and only 1.45% fell into the **moderate activity** category. No males reported low activity levels.Among females (81), 86.42% were categorized as having **high physical activity**, while 13.58% demonstrated **moderate activity** levels. Similar to the male group, no participants were classified as having low physical activity.

Table 1: Descriptive statistics of participants (n=150)

Demographic parameters	Median (IQR)	Range
Age (years)	11 (8, 13)	6 to 17
PAQ-C & A	3.4 (3.2, 3.7)	2.8 to 4.6

Table 2: Comparison of age and PAQ-C& A of male and female recruited (n=150) by Mann-Whitney U test

Demographic parameters	Male (n=69)	Female (n=81)	p-value*
Age (years)	11 (8, 14)	11 (8, 13)	0.420
PAQ-C & A	3.7 (3.4, 4.1)	3.4 (3.1, 3.5)	**0.001*** **

Table 3: Distribution of physical activity levels based on PAQ-C & A scores among the recruited (n=150)

Physical activity levels	PAQ-C & A	Frequency (n)	Percentage (%)
Low physical activity	≤ 2	0	0
Moderate physical activity	>2 to ≤ 3	12	8
High physical activity	>3	138	92

Table 4: Test-retest reliability of PAQ-C & PAQ-A

Physical activity levels (Score)	PAQ-C 1st Session	PAQ-C 2nd Session	Cronbach's Alpha (α)	ICC	ICC (95%CI)
Moderate physical activity: (>2 to ≤ 3)	6 (4, 6.8)	5 (4. 6)	**0.852**	0.743	0.626 to 0.827
High physical activity: (>3)	3 (2, 4)	3 (2, 3)	**0.682**	0.517	0.337 to 0.661

Test-retest reliability ICC value was 0.74 for PAQ-C and 0.51 for PAQ-A, indicating moderate reliability.

The PAQ-C and PAQ-A were cross culturally adapted and translated into Kannada language. There were no significant disparities in the interpretation, as the questionnaire failed to contain elements that could differ immensely among diverse cultures. Additionally, both patients and healthcare professionals found all questions and responses to be suitable and easy to understand without any modifications needed. Additionally, test - retest reliability, concurrent validity was assessed, ensuring a thorough evaluation of the psychometric characteristics of this PAQ-C and PAQ-A.

PAQ-C and PAQ-A 1st session and 2nd session does not follow normal distribution. Hence, values are expressed in geometric mean with 95% confidence interval.

Table 5: Concurrent validity of PAQ-C & PAQ-A

Questionnaire	Values	Spearman's rho	p-values
PAQ-C	6 (4, 6.4)	0.864	**0.001*** **
PAQ-A	6 (4, 5.9)	0.872	**0.001*** **

Spearman rank correlation for the Kannada PAQ-C was 0.864 for the PAQ-A was 0.872, that indicating strong validity.

DISCUSSION:

The primary objective of our study was to translate the PAQ-C & A from English to Kannada and assess its psychometric properties within the Kannada-speaking population. This endeavour holds significant importance as it aligns with the global practice of tailoring reliable and valid clinical assessment tools for diverse linguistic and cultural communities, with the aim of improving patient care through evidence-based approaches.

The Kannada version of the PAQ-C & A was designed to evaluate and categorize individuals with low physical activity levels based on their age and diminished physical strength, while also considering psychosocial factors. Despite the original questionnaire being translated into several languages, such as Spanish, French, German, Portuguese, Chinese, Japanese, Italian, Arabic, Dutch, Hindi, Bengali, Swahili, and Urdu, there has been no adaptation specifically tailored for the Karnataka population until now.

Thoroughly assessing how well an original questionnaire matches up with its adapted version is crucial before using instruments designed for one cultural setting in another. This is because various populations have different understandings, beliefs, and actions shaped by their culture. When adapting across cultures, it's vital to focus on making sure the meanings of terms match rather than strictly sticking to their literal translations. This helps ensure that the concepts are accurately expressed within the new population. To ensure the questionnaire was useful, it needed to show reliability and validity, along with sensitivity and specificity. While cross-cultural adaptation and semantic equivalence are vital initial steps in validating a questionnaire, they're the first step. The final presentation of the PAQ-C & A needs to undergo testing for its structure and internal consistency, as well as assessments for convergent and divergent validity.

Our research yielded valuable insights into the demographic characteristics, concurrent validity, and test-retest reliability of the Kannada-translated PAQ - C & A.

CONCLUSION:

This study results concluded that the Physical Activity Questionnaire – Children and Adult has high test and re-test reliability in cross culturally adapted and translated version of Kannada language. These findings endorse the suitability of using this tool for research involving Kannada-speaking children and adolescents. The translated Kannada version proves to be a dependable instrument for assessing physical activity levels in Kannada-speaking individuals.

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Author 1: Conceptualized the study, involved in formal analysis, designed methodology, wrote the original draft, and administered the project.
Author 2: Conceptualized the study; investigated the study; wrote the original draft; wrote, reviewed, and edited the manuscript; and supervised the project.
Author 3: Involved in formal analysis, collected data, designed methodology, and investigated the data.
Author 4: Involved in formal analysis, collected data, and investigated the data.
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