

Translation, Cross-Cultural Adaptation, and Validation of the Persian Version of Thailand Physical Activity Children Survey Questionnaire

Abstract

Background: According to the importance of physical activity in the child's physical and mental development and cognitive health, developing a valid, reliable, and comprehensive assessment tool for children's physical activity is mandated. The purpose of this study is the translation, cross-cultural adaptation, and validation of the Persian version of the Thailand Physical Activity Children Survey questionnaire to measure the level of physical activity in children aged between 6–9 years in Iran. **Methods:** This study consisted of three stages, first, the questionnaire translation into Persian language and modification of the sections according to the Iranian culture, then the evaluation of the questionnaire via a pilot study, and finally, assessing the reliability and validity of the tool. Participants of the pilot study were 250 healthy children, aged 6 to 9 years, meeting eligibility criteria, recruited through a stratified cluster sampling method from schools across Tehran. **Results:** The Persian version of the questionnaire demonstrated an acceptable content validity (Content Validity Index between 0.88-1). The test-retest reliability reported the Intra-Class Correlation coefficient in the acceptable range in all sections (between 0.71-1). Cronbach's alpha was reported 0.993, which indicated excellent internal consistency. **Conclusions:** According to the acceptable validity and reliability of the Persian version of the Thailand Physical Activity Children Survey for children aged 6–9 years, it is recommended in research and surveillance studies to determine the level of physical activity of children of that age group in Iran.

Keywords: Child, exercise, Iran, reproducibility of results, sedentary behavior, sports, sports equipment, surveys and questionnaires

Introduction

Physical activity (PA) during childhood and adolescence provides significant benefits for a child's physical, mental, and cognitive development.^[1] Engaging in physical activity programs during childhood is a golden opportunity to achieved active lifestyle habits.^[2] Based on the World Health Organization (WHO) guidelines, children and youth aged 5–17 years should engage in a minimum of 60 minutes of moderate to vigorous intensity daily physical activity.^[3] Prevalence of low physical activity in Iranian students, 34.11% among the children aged 7–18 years, in the fourth phase of a national surveillance program—entitled the Childhood and Adolescence Surveillance and Prevention of Adult Non-Communicable Disease (CASPIAN) study—during 2011-2012 in Iran,^[4] and 58.2%, (56.2% in boys and 60.4% in girls) in the fifth phase of the CASPIAN study in 2015 was reported.^[5]

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Moreover, a study proved the increasing prevalence of obesity among Iranian children and adolescents between 2003 and 2010.^[6] However, measuring physical activity in children is challenging. It is mandated to evaluate the physical activity level in children by a valid and reliable method. The main purpose is to determine current physical activity levels and evaluating the effectiveness of interventions for improving physical activity.^[7] Currently, various assessing tools are being used to measure the level of physical activity in children and adolescents.^[7] The most common methods used are self-expression questionnaires, interview methods, and objectives tools including pedometers, accelerometers, and heart rate monitors.^[7] Each method has its strengths and limitations. Finally, one of these tools should be selected based on the age of the target group, sample population, response rate, method of implementation, the time required, required physical activity, and accessory information and investments. In

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addition to measuring the duration of engaging in physical activity, the amount of time a child spends watching TV, playing computer games, and other sedentary behaviors also needs to be recorded and measured.^[8]

In 2016–2017, the National Institutes of Health of Thailand in collaboration with the University of Western Australia and developed the Thailand Physical Activity Children Survey (TPACS). This process was completed through modifying and translating the Australian physical activity questionnaire, Child and Adolescent Physical Activity and Nutrition Survey (CAPANS).^[9,10] This questionnaire consists of a comprehensive physical activity evaluation framework. The questionnaire examines the level of physical, exercise and sports activities, sedentary behavior, travel to school, recreational activities, environmental incentives and inhibitors, social, environmental, and physical activity facilities assessment.^[9-11] In Iran, other questionnaires have been designed separately to assess the level of physical activity at different ages, but there is no comprehensive questionnaire to measure the physical activity of children aged 6 to 9 years and related determinants. Accordingly, the purpose of this study is translation, cross-cultural adaptation, and validation of the Persian version of the Thailand Physical Activity Children Survey questionnaire (TPACS-SPQ-V6-9). TPACS-SPQ-V6-9 will be used to measure the level of physical activity in children aged 6–9 years in Iran.

Methods

Participants of this study were healthy children aged 6 to 9 years. Participants were recruited through a stratified cluster sampling method from 22 regions across the schools of Tehran in Iran. Inclusion criteria consisted of the following items: aged between 6 to 9 years, no history of medical diseases, native Persian speaking children, and the desire to participate in the study. Exclusion criteria consisted of any musculoskeletal disorder limiting activity. Based on these criteria, 250 individuals were recruited in the study. The study was conducted between November 2019 and December 2019 in the schools of Tehran in Iran. Tehran University of Medical Sciences' ethical committee approved and supported this study (Ethics code: IR.TUMS.NI.REC.1398.042). All participants and their parents received complete information regarding the purpose of the study and parents signed informed consent.

TPACS-SPQ-V6-9^[12] is a modified version of the CAPANS, which was previously applied in the survey of Western Australian children between 2003 and 2008.^[9-11] Accelerometer data determined the validity of the original items.^[13] TPACS-SPQ-V6-9 is a physical activity questionnaire with five main sections; general information, evaluating physical activity (physical activity level, sports/exercise, recreation activities, travel to school, sedentary behavior, and physical education), students opinions toward physical activity, family and

peer support, and information regarding home and community environment.^[12] The TPACS-SPQ-V6-9 consists of questions according to physical activity (Q2.1 to Q2.3), exercise and sports activities (Q2.4.1 to Q2.4.21), recreational activities (Q2.5.1 to Q 2.5.12), screen time activities (Q2.6.1 to Q2.6.7), sitting down activities (Q2.7.1 to Q 2.7.7), means of transport (Q2.9.1 to Q 2.9.9), free time activities (Q2.10.1 to Q 2.10.4), student's opinions (Q 3.1.1 to Q3.2.4), family and peer support (Q4.1 to Q 4.4), home environment (Q5.1 to Q 5.3.7), and community environment and equipment (Q5.4.1 to Q5.4.7).^[12]

Three versions of TPACS are available based on age groups from 6 to 9 years, 10 to 13, and 14 to 17 years old children and adolescents.^[9,10] In this study, TPACS -V6-9 for 6–9 years old children was assessed. The process of establishing the validation and reliability of the TPACS- V6-9 consisted of three stages. The first stage consisted of translation of the questionnaire into the Persian language and modification of the sections according to the Iranian culture and tradition, the second stage consisted of the evaluation of the pre-final edition of the questionnaire via content and face validity and a pilot study, the third stage consisted of an assessment of reliability and validity of the ultimate translated version of the questionnaire to the Persian language.

We used the back-translation method to prepare the Persian version.^[14] Two English language experts translated the English version into Persian, at which point the phrases were translated based on their concept; they did not remove or change any item. One of the translators was a professional translator with no acquaintance to the subject matter of the project, and the other one was a sports medicine specialist who was aware of the project's purpose. In the next step, the translators began to integrate their translations after examining existing possible disparities and selected the closest phrases to the original text of the questionnaire and they prepared an integrated merged Persian version of the questionnaire. Then, to preserve the linguistic and conceptual equivalence, the Persian version was back-translated to English with the assistance of two native English language expert who had no background information about the questionnaire. Following that, an expert committee consisting of the two native translators, four sports medicine specialists, and two physical education experts, discussed the disparities between the English versions (the text of the original questionnaire and the text of the translated version). Following the review process, the expert committee minimized these differences. Finally, a pre-final Persian questionnaire was developed.

Content Validity Index (CVI) with the cooperation of the expert committee, determined content validity. For each question, CVI is defined as the ratio of replies ratings 3 and 4 to total replies (1 = not applicable, 2 = unable to assess without modification, 3 = applicable but requires

minor modification, 4 = highly applicable) via the expert panel. The misunderstanding index was applied to determine face validity. Following the completion of the questionnaire through a group of participants, an interview was conducted. We asked the participants to define their perceptions of each question. The misunderstanding Index is referred to the percentage of participants whose attained conception was dissimilar from the questions' real purpose.

Following the determination of content and face validity and assessing whether they were in the acceptable range, the final modified Persian version of the questionnaire was approved by the expert panel.

In the next stage, 250 individuals, who met the eligibility criteria completed the final version. To determining test-retest reliability, 50 participants were randomly selected from the total number of participants and were requested to complete the questionnaire at a two-week interval. Intra-class Correlation Coefficient (ICC) was determined for assessing test-retest reliability. Cronbach's alpha was used to examine the internal consistency. Questions that

address the reliability problem in each dimension of internal consistency or reliability were modified and appropriate decisions were made by an expert panel. Construct validity was determined via determining correlations among physical activity, sedentary behavior, travel to school, and physical education questions of TPACS-V6-9 (Q 2.1 to Q2.3, Q2.9.1, Q2.9.2, Q2.11, and Q2.12) and physical activity section of the World Health Organization Global School-based Student Health Survey (WHO-GSHS) questionnaire.^[15,16]

Statistical analysis

Spss. 24 software was used to examine the data. The reliability of the questionnaire in terms of internal consistency was assessed using Cronbach's alpha. The minimum acceptable value for Cronbach's alpha index was 0.70.^[17] ICC was used to measure test-retest reliability. The ICC was considered desirable when larger than 0.70.^[17] Pearson's Correlation Coefficients were applied to determine the construct validity. For approving content validity of the questionnaire with an expert committee with eight members, a minimal of 0.875 as CVI was desired.^[18]

Table 1: Intra class correlation coefficient for the sections of the Thailand physical activity children survey - version 6-9

| | Intra Class Correlation coefficient | Confidence interval 95% |
|--|-------------------------------------|-------------------------|
| Section 2 | | |
| Physical activity Q2.1-Q2.3 | 0.710 | 0.642-0.767 |
| Exercise and sport activities Q2.4.1-Q2.4.21 | 0.993 | 0.970-0.997 |
| Recreational activities Q2.5.1-Q 2.5.12 | 0.995 | 0.991-0.998 |
| Screen time activities Q2.6.1-Q2.6.7 | 1.0 | 1.0-1.0 |
| Sitting down activities Q2.7.1-Q 2.7.7 | 1.0 | 1.0-1.0 |
| Means of transport Q2.9.1-Q 2.9.9 | 0.981 | 0.975-0.985 |
| Free time activities Q2.10.1-Q 2.10.4 | 0.995 | 0.991-0.998 |
| Section 3* | | |
| Student's opinions Q 3.1.1-Q3.1.8 | 0.899 | 0.878-0.917 |
| Student's opinions Q3.2.1-Q3.2.4 | 0.792 | 0.747-0.831 |
| Section 4** | | |
| Family and peer support Q4.1-Q 4.4 | Not applicable | |
| Section 5*** | | |
| Play at home Q 5.1 | 0.976 | 0.971-0.981 |
| Sport equipment at home Q5.2.1-Q5.2.11 | 0.947 | 0.937-0.956 |
| Equipment at bedroom or around your sleeping area Q5.3.1-Q Q5.3.7 | 0.954 | 0.944-0.962 |
| Community facilities Q5.4.1-Q5.4.7 | 0.975 | 0.970-0.980 |

*Section 3: Student's opinions toward physical activity. **Section 4: Family and Peer Support. ***Section 5: Home and Community Environment

Results

In this study, 250 students (50.9% girls, 49.1% boys), with the mean age of 7 ± 0.4 years and a mean BMI of 19 ± 3.9 kg/m², were recruited in the pilot stage. According to the expert's opinion questions from the physical activity and sports section of the original TPACS-V 6-9 regarding husky, softball, wood ball, rattan ball, Petanque, Thai boxing, Thai boxing, sea boxing, swordplay, and fencing (Thai or international) were omitted and replaced with traditional Iranian sports and games, since the mentioned sports are not performed in Iran. Also, in the recreational activities section, the question about Thai dance was removed and replaced with traditional dances.

The content validity of the questionnaire was determined as per the CVI. Experts panel were requested to review each item and announce their opinion. Based on the Ayre *et al.*^[18] study, the proportion of agreement required for the expert panel consisting of eight experts is 0.875. The CVI was reported between 0.88-1 in all sections, which is in the acceptable range. Face validity of the modified Persian version of the TPACS-V6-9 questionnaire was evaluated via the Misunderstanding Index, which was less than 20% in all sections.

ICC was used to measure test-retest reliability. As presented in Table 1, this coefficient for each domain was between 0.71–1 in all sections, which is in the acceptable range.^[17]

For determining the internal consistency, Cronbach's alpha was calculated based on data obtained from the 250 students. Cronbach's alpha was reported 0.993 in the physical activity section, which indicates appropriate internal consistency.^[17] Evaluation of construct validity indicated correlations between physical activity, sedentary behavior, physical education, and travel to school questions of the TPACS-V6-9 and physical activity section of WHO-GSHS questionnaire ($r = 0.72$, P .value = 0.005, $r = 0.6$, P .value = 0.008, $r = 0.4$, P .value = 0.03, $r = 0.5$, P .value = 0.01), respectively.

Discussion

The TPACS-SPQ-V6-9 questionnaire has been validated and used in Thailand and other countries.^[9-11] In this study, the Persian version of the TPACS-SPQ-V6-9 was applied and evaluated. The results obtained from the present research indicated acceptable validity and appropriate reliability of the Persian version of the TPACS-SPQ-V6-9 questionnaire.

One of the most important features that should be considered in choosing a tool is the appropriate quality of the translated version, which is always emphasized by experts. We should avoid ambiguous and uncommon words and phrases in designing a questionnaire. The clear text in the original versions of this tool will enable translators to translate the original versions of the tools fluently. In the present study, the desired and satisfactory quality of the translation and equivalence process was confirmed through

face validity. The content validity was assessed through an expert panel. CVI was calculated between 0.88-1, which is appropriate.

Moreover, the TPACS-SPQ-V6-9 is a comprehensive questionnaire assessing physical activity, opinion toward physical activity, environment facilities, support of family, and extra information about determinants influencing physical activity. Researchers and policy-makers applying the TPACS-SPQ-V6-9 will develop a complete analysis of the current situation of physical activity. The TPACS-SPQ-V6-9 provides physical activity stakeholders with individual-level and environmental-level information, which could be a road map for future planning.

The TPACS questionnaire has three versions for different age groups—6 to 9 years, 10 to 13 years, and 14 to 17 years old children and adolescents.^[9,10] The complexity of the questions in each version of the questionnaire is proportional to the mental capability of children in recalling events based on the three age groups. This version of the questionnaire for the age group of 6–9 years consists of the simplest questions according to the frequency and amount of time spent on physical activities. Children at this age may have difficulty retrieving this information.^[12] In a study by Amornsriwatanakul *et al.*,^[10] the test-retest analysis of the three versions of the TPACS questionnaire based on age groups, indicated adequate reliability (agreement = 33.3-100%, ICC = 0.34-0.85, Kappa = 0.15-1%). In general, Kappa and ICC levels were stronger in the older age group than in the younger group.^[9] In a study by Piya-amornphan *et al.*,^[19] 521 children aged 6 to 9 years were recruited in the study from 34 schools in southern Thailand. Using the TPACS-SPQ-V6-9, the results indicated a positive correlation between time spent with the family and friends, and duration of active play ($r = 0.485$, $P < 0.001$). Support and presence of family and friends encourage children of all age groups to participate in physical activity.^[19]

The TPACS-SPQ-V6-9 (12) is a modified version of the CAPANS. The CAPANS was initially developed and used in the survey of Western Australian children in 2003 and 2008.^[9-11] Physical activity variables used in CAPANS had significant correlation with accelerometer data ($r = 0.40$, $P < .001$). Appropriate reliability of the CAPANS was reported (ICC = 0.77). Acceptable ICC in 38% of variables evaluating the frequency and 27.5% of variables evaluating duration was reported.^[9] The difference in Kappa and ICC values between the CAPANS and the TPACS is probably due to the required changes in response scales, the sequence of sections, content, and translation.^[9]

The results of the present study showed that the adapted Persian version of the TPACS-SPQ-V6-9, has sufficient face validity, content validity, and reliability. It is suggested that this questionnaire can be used to measure the level of physical activity of children aged between 6 to 9 years in the Iranian population.

The Persian version of the TPACS-SPQ-V6-9 assesses different domains including the level of physical activity, exercise and sports activities, sedentary behavior, travel to school, recreational activities, environmental incentives and inhibitors, social, environmental, and physical activity facilities.

Limitations

The limitation of the study was that evaluating the construct validity of all domains and questions of the TPACS 6-9 was not possible, since an alternative questionnaire for all questions of the TPACS 6-9 is not available. However, the face and content validity were assessed.

Conclusions

Our findings show that the Persian version of the TPACS-SPQ-V6-9 questionnaire is acceptable for determining the level of physical activity in children aged 6 to 9 years. We suggest using the TPACS-SPQ-V6-9 questionnaire in future research studies to determine the PA level of 6–9-year-old Iranian children. This evaluation frame would be useful for future international comparisons and planning.

Declaration of informed consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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