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Cross-cultural adaptation of the International Physical Activity Questionnaire (IPAQ) for use in education

Medkulturna priredba mednarodnega Vprašalnika telesne dejavnosti (IPAQ) za rabo na področju izobraževanja

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Abstract

Background: Regular moderate and vigorous-intensity physical activity (PA) is very important for health promotion and prevention of diseases. Frequency and the amount of PA can be monitored with direct and indirect measurements; the former is more accurate than the latter, which is, on the other hand, easier to use and more cost-effective. One of the most commonly used indirect methods is a self-report International Physical Activity Questionnaire (IPAQ), which comes in short (SF) and long forms (LF). Despite its wide cross-cultural use, IPAQ has not yet been adapted for use in the Slovenian language. The main purposes of the study were to produce a reliable Slovenian version of IPAQ-LF for use in education.

Methods: A back-translation method involving four translators and one native English-speaking reviewer was used to adapt an IPAQ-LF questionnaire from English into the Slovenian language. The ease of use and comprehensibility of Slovenian IPAQ-LF was first pilot-tested on four teachers, then the reliability of a questionnaire was tested and retested on a sample of sixty-eight preschool and primary school teachers.

Results: Collected data were analysed with several statistical methods, and the results revealed a high degree of test-re-test reliability and internal consistency for both groups of teachers. Preschool teachers reported higher levels of moderate (1138±265 min/week vs. 870±1074 min/week) and vigorous-intensity (446±430 min/week vs. 106±157 min/week) PA as well as walking (996±337 min/week vs. 690±1173 min/week) than primary school teachers.

Conclusions: The study has proven that the Slovenian IPAQ-LF version is reliable for use in education.

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Izvleček

Izhodišča: Redna zmerna in visoko intenzivna telesna dejavnost je ključnega pomena za ohranjanje zdravja. Pogostnost in količino telesne dejavnosti posameznika lahko spremljamo z neposrednimi ali posrednimi meritvami, pri čemer so prve bolj natančne, slednje pa bolj poceni in enostavne za uporabo. Ena najpogosteje uporabljanih posrednih metod merjenja telesne dejavnosti je samoocenjevalni Vprašalnik telesne dejavnosti (IPAQ), ki obstaja v krajši (IPAQ-SF) in daljši (IPAQ-LF) obliki. Kljub pogosti rabi vprašalnika v številnih okoljih pa vprašalnik IPAQ še ni prirejen za uporabo v slovenskem prostoru. Namen študije je ustvariti zanesljivo slovensko različico vprašalnika IPAQ-LF za uporabo v izobraževanju.

Metode: Za priredbo vprašalnika IPAQ-LF v slovenščini smo uporabili metodo vzvratnega prevoda v angleščino, pri katerem so sodelovali 4 prevajalci in recenzent, ki je t.i. naravni govorec angleškega jezika. Uporabnost in razumljivost prevedenega vprašalnika smo preverili s pilotno študijo, v katero so bili vključeni 4 učitelji. Zanesljivost vprašalnika smo preverili z metodo notranje zanesljivosti in z metodo test-retest na vzorcu 68 vzgojiteljev in osnovnošolskih učiteljev.

Rezultati: Zbrane podatke smo analizirali s pomočjo več statističnih metod. Rezultati so pokazali visoko stopnjo notranje zanesljivosti vprašalnika in zanesljivosti, merjene z metodo test-retest. Vzgojitelji so v primerjavi z učitelji poročali o večji količini zmerne (1138±265 min/teden v primerjavi z 870±1074 min/teden) in visoko intenzivne (446±430 min/teden v primerjavi s 106±157 min/teden) telesne dejavnosti, kakor tudi hoje (996±337 min/teden v primerjavi s 690±1173 min/teden).

Zaključek: Študija je dokazala, da je slovenska oblika vprašalnika IPAQ-LF zanesljiva za rabo na področju izobraževanja.

1 Introduction

Physical inactivity can alter a person's health for the worse. Worldwide study (1) reports that eliminating physical inactivity would remove between 6% and 10% of the major non-communicable diseases and increase life expectancy. By eliminating physical inactivity, the life expectancy of the world's population is estimated to increase by 0.68 years. For substantial health benefits, physical activity (PA) recommendations state that adults should regularly participate at least 150-300 minutes a week in moderate-intensity or at least 75-150 minutes a week in vigorous-intensity aerobic PA or an equivalent combination of moderate and vigorous-intensity activity throughout the week (2). Performing recommended levels of aerobic PA with muscle-strengthening exercises two (2) days per week is optimal against all-cause and cardiovascular disease mortality.

Progress in PA and global public health research in the past few decades has been observed with the increase in the number of countries with PA surveillance. In 2008, PA levels were analysed in 122 countries (3), and in 2016, in 168 countries, including 1.9 million participants worldwide (4). Ongoing PA surveillance allows for trend assessment of insufficient activity, identifying the PA problems, and delivering vital information for PA policies. However, reliable and valid measurement is essential to surveillance.

Several direct and indirect measurements have been developed to monitor PA and energy expenditure, including self-report methods, direct/indirect calorimetry, accelerometry, heart rate monitoring, pedometry, and direct observation (5). Direct PA measurements are generally considered more valid and accurate, as they calculate energy expenditure or actual movement characteristics. However, they present a higher degree of burden on both the participant and the researcher; these methods are also more expensive, intrusive, and time-consuming than indirect measurements (6,7).

Despite their lack of accuracy (6,7), self-report methods are still the most frequently used measurements for obtaining PA data. These methods are non-invasive and more versatile than direct measurements. They are also practical, easy to administer in large-scale cohort studies, and due to their low cost, also more affordable (8). The most widely used self-report methods for assessment of PA include questionnaires and PA records or diaries (5). Although self-report questionnaires rely on the participant's memory, they are preferred to PA records/diaries as they present a low burden to subjects and remain valid.

Recent reviews have documented 85 self-administered PA questionnaires for adults (8); nevertheless, not all of them are suitable for international comparison. The International Physical Activity Questionnaire (IPAQ) was developed and pilot-tested between 1998 and 1999 as an instrument for cross-national monitoring of physical activity and inactivity (9). The measurement properties were first tested in 2000, showing acceptable validity and reliability for monitoring physical activity

among 18- to 65-year-old adults in 12 countries (10). The IPAQ has become the most widely used and validated physical activity questionnaire, with two versions available: the 27-item long form (IPAQ-LF) and the 9-item short form (IPAQ-SF) (8). The IPAQ-LF consists of 27 questions, reflecting on the PA of a person within the last 7 days and dividing it into the following domains: 1) job-related; 2) transportation-related; 3) housework, house maintenance, and caring for the family; 4) recreation, sport, and leisure-time; and 5) time spent sitting. The IPAQ website supports cross-cultural use of the long version questionnaire in 18 different languages; no Slovenian translation has been validated yet.

The objectives of the present study were 1) to generate a reliable translation of IPAQ-LF for cross-cultural use in education, and 2) to examine the reliability of 7-day self-administered IPAQ-LF. Firstly, the prescribed back-translation method of the English IPAQ-LF was completed to ensure the quality of translation into Slovene language. Secondly, the clearness and comprehensibility of translated Slovenian IPAQ-LF text were verified by four (4) preschool and primary school teachers. Finally, a test-retest reliability assessment of the Slovenian version IPAQ-LF was conducted on a convenience sample of 68 teachers.

2 Methods

2.1 Translation

The back-translation method was used to adapt the English version of IPAQ and to achieve equivalence in meaning (11,12). Four bilingual translators and one monolingual reviewer were involved throughout the back-translation process.

The first two bilingual translators (MM, NK) were Slovenian citizens, one a university lecturer with more than a decade of experience in physical activity research, the other a university student (preschool education programme), specialising in PA measurements with the use of questionnaires. Both translators have passed the English competency exam at the Faculty of Sport, University of Ljubljana. They had independently translated original English long format IPAQ text into coherent Slovenian versions. In the second step, one of the translators (MM) and another bilingual teacher (JT) carried out forward translation reconciliation by comparing two translated texts, discussing the problematic items, and merging them into a single Slovenian questionnaire.

In the back-translation step, a bilingual teacher who participated in the previous step (JT) and a further bilingual translator (KB) separately translated Slovenian text into English without accessing the source version of the IPAQ. The first person (JT) is a researcher whose topics primarily include PA and sport, whereas the second person (KB) is considered a practiced translator in the field of sport. In step four, an expert (KB) has identified discrepancies between the newly generated English texts and merged them into a single document. In case of terminological differences, the text was compared with the Slovenian version, or the wording used more often was chosen.

The final step – back-translation review – was carried out by a native monolingual English reviewer (AN), who has previously been involved in physical activity research. He has compared the back-translated IPAQ (in English) with the IPAQ source version (also in English) and provided feedback on the equivalence of both texts.

A Slovenian version of the questionnaire was administered individually to a sample of two preschool teachers and two primary school teachers, who were subsequently interviewed about the questionnaire to verify its suitability for use in education.. Teachers had to provide comments to establish the reasons behind their responses, highlight any potential problems with terminology or understanding of the concept and determine the conceptual and linguistic equivalence of the questionnaire. At the end of the procedure, the final version of questionnaire was ready to be used on Slovenian preschool and primary school teachers.

2.2 Data collection

A link to the Slovenian IPAQ-LF version was distributed by email to 673 Slovenian preschool and primary school teachers. In the first measurement, 307 teachers clicked on the link, and 205 started to answer the questions, with 72 preschool and 60 primary school teachers completing the questionnaire. Out of these 132 teachers, 68 self-administered the questionnaire for the second time in less than 7 days from first measurement (Time range = 4-6 days; Mode = 5 days).

IPAQ questions were used to determine the frequency ("During the last 7 days, on how many days did you do ...") and the average amount ("How much time did you usually spend on one of those days doing …") of individual PA domains in which measured subjects participated for at least 10 minutes per day. Collected data for each PA domain were added to estimate the total time spent in job-related, transport-related, household-related, and leisure-time-related PA, as well as time reported sitting per day during the working week and at the

Table 1: Descriptive analysis of the socio-demographic data and reported activity levels.

Characteristics	Preschool n = 72		Primary school n = 60		Total N = 132	
	Mean (SD)	f (%)	Mean (SD)	f (%)	Mean (SD)	f (%)
Age (y)	37 (11)		44 (9)		40 (11)	
Women (number)		69 (96%)		39 (65%)		108 (82%)
Education (number)						
Bachelor's degree		45 (63%)		60 (100%)		105 (80%)
Upper-secondary vocational		27 (37%)		0 (0)		27 (20%)
Activity levels (min/week)						
Total PA	2 580 (687)		1 666 (2 156)		2 253 (1 461)	
Vigorous-intensity PA	446 (430)		106 (157)		324 (392)	
Moderate-intensity PA	1 138 (265)		870 (1 074)		1 042 (684)	
Walking	996 (337)		690 (1 173)		887 (761)	
Sitting (min/week)	2443 (1 888)		2273 (1 722)		2318 (1 753)	

Legend: SD – standard deviation; n/N – number; PA – physical activity.

weekend. The total weekly amount of vigorous PA was calculated by adding reported time spent in a week on all job-related and leisure-time-related vigorous PA. The total weekly amount of moderate PA was calculated by adding reported time spent in a week on all job-related, leisure-time-related, household-related PA, and time spent cycling to work. The total weekly amount of walking was calculated by adding reported time spent walking in all job-related, transportation-related, and leisure-time-related PA. Calculated values for vigorous PA, moderate PA, and walking were truncated to 180 minutes per the IPAQ scoring protocol (9).

The study design was approved by the local ethics committee (OPV-2018-S1-SK12, 5.10.2018).

2.3 Data analysis

Intraclass correlation coefficients (ICCs) with 95% confidence intervals were calculated to assess test-retest reliability. A two-way mixed-effects model based on single-rating and absolute agreement was employed. ICC reliability values were viewed as poor (below 0.50), moderate (0.50-0.74), good (0.75-0.89), and excellent (0.90 or above) (13).

Internal consistency was tested with the calculation of Cronbach's alpha with values considered as satisfactory (0.7-0.79), good (0.80-0.89) and excellent (0.90 or above) (14,15).

A Mann-Whitney test for independent samples was used to examine the differences in reported PA levels between preschool and primary school teachers.. Statistically significant differences between the parameters were indicated when p < 0.05. All the collected data were analysed using IBM SPSS programme version 27.0 (IBM Corp., Armonk, NY, USA).

3 Results

3.1 Demographics

One hundred and thirty-two participants aged between 21 and 61 years ($M = 40$; $SD = 11$) were included in the study (Table 1). The convenience sample comprised 72 preschool teachers (assistant and core practitioner) and 60 primary school teachers. Collectively, participants represented a wide range of age, education, and activity levels (duration x frequency per week).

At the time of the study, all primary school teachers and 63% of preschool teachers held a bachelor's degree. The reported age difference and gender distribution are similar to the population data (16).

Preschool teachers reported higher total PA level ($U = 2\ 881$, p-value < .001, $r = .66$) than primary school teachers, as well as higher level of vigorous PA ($U = 2\ 486$, p-value < .001, $r = .43$), moderate PA ($U = 2\ 461$, p-value < .001, $r = .42$) and walking ($U = 2\ 828$, p-value < .001, $r = .63$).

3.2 Translation validity

A comparison of the forward translations from the source showed 22 differences between the two Slovenian IPAQ texts (see Table 4 in Appendix), and the reviewers had to make several terminological reconciliations of problematic items to arrive at the final text in the Slovenian language. A comparison of back translations from the amended IPAQ version in the Slovenian language revealed a similar pattern as in the forward translation, both in number (21) and distribution of differences in the two English texts.

3.3 Reliability assessment

One hundred and thirty-two participants (preschool teachers n = 72, primary school teachers n = 60) completed the questionnaire and were included in the internal consistency assessment. Out of these 132 participants, 68 completed the IPAQ twice and were included in a test-retest reliability assessment of the questionnaire (preschool teachers n = 24, primary school teachers n = 44). A similar or smaller sample has been used in other studies to assess test-retest reliability (19,20).

Internal consistency was found as good for total PA and all individual PA domains (Cronbach alpha ≥ 0.800) (Table 2).

A high degree of test-retest reliability was found between the two measurements (Table 3). Total PA indicates good reliability (ICC = 0.855, 95% CI = 0.769–0.911). The single measurement ICCs for the PA domains (from 0.792 to 0.931) with 95% confidence intervals (from 0.675 to 0.958) indicates good to excellent reliability with all $p < 0.001$, suggesting statistically significant agreement between the first and second measurement.

Table 2: Internal consistency of reported activity levels for 132 teachers that completed the International Physical Activity Questionnaire.

	Cronbach's alpha
Total PA	0.850
Job-related PA	0.833
Transportation-related PA	0.834
Household-related PA	0.837
Leisure-time-related PA	0.800
Sitting	0.841

Legend: PA – physical activity.

Despite household-related PA (ICC = 0.792, 95% CI = 0.675–0.871) and leisure-time related PA indicating good consistency through time, their CI show a 95% chance that reliability could be moderate. Excellent reliability was revealed for the job-related PA (ICC = 0.908, 95% CI = 0.851–0.944), transportation-related PA (ICC = 0.931, 95% CI = 0.887–0.958), and time spent sitting (ICC = 0.919, 95% CI = 0.868–0.951).

4 Discussion

4.1 Translation validity

The majority of identified differences in the source's forward translations were in the instructive part of the text. Thus, the form and a content of the questionnaire title had to be rewritten and several discrepancies between contents in the two texts had to be clarified by reviewing the original English IPAQ text. Out of four parts

Table 3: Test-retest reliability statistics of reported activity levels for 68 teachers that completed International Physical Activity Questionnaire twice.

	Intraclass correlation coefficients (95% confidence intervals)		*p* value
Total PA	0.855	(0.769 – 0.911)	< 0.001
Job-related PA	0.908	(0.851 – 0.944)	< 0.001
Transportation-related PA	0.931	(0.887 – 0.958)	< 0.001
Household-related PA	0.792	(0.675 – 0.871)	< 0.001
Leisure-time-related PA	0.817	(0.711 – 0.887)	< 0.001
Sitting	0.919	(0.868 – 0.951)	< 0.001

Legend: PA – physical activity.

of the questionnaire, the first part revealed the highest number of discrepancies, making the reconciliation much easier for the rest of the text after being clarified. As such, the expression *work* was selected over *job* in the title of the first part and was then used three more times in the same context, whereas the term *intensity* was chosen over the term *effort* and was used 17 additional times throughout the entire questionnaire; these changes have been each counted as a single discrepancy. Another two examples of such reconciliation were *travel* instead of *transportation* and *from one place to another* instead of *from point A to point B*; both differences were identified and used several more times in the second part of the questionnaire. In the last two parts of the questionnaire, mainly grammatical and stylistic modifications had to be performed in addition to minor reconciliation of contents.

Almost half of the discrepancies between back translations and the amended IPAQ version in the Slovenian language were identified and reconciled in the instructive part of the questionnaire, the first one again resolving the form and content of the questionnaire title. Furthermore, in the instructive part, a decision was made on some key terms, which indicated their further use throughout the rest of the questionnaire. To list but a few examples, the use of terms *housework* was chosen over *domestic chores*, *free time* was used instead of *leisure time*, and *from one point to another* instead of *from point A to B*. A typical example was the use of the term *transportation* instead of *commuting*, which appeared in the first part of the questionnaire and then twice more in the other parts, thus solely accounting for a quarter of the remaining discrepancies in the text while resolving the correct titles in the last three parts represented half of the remaining discrepancies in the text.

The review of the final version of back-translated English text, which a native English speaker carried out, showed that only minor grammatical corrections were needed. The actual comment of the native reviewer was that "*… your version reads much better than the original…*".

After confirming the content validity of the Slovenian translation with the review of the back-translated English version, the Slovenian version of the questionnaire was sent to two preschool teachers and two primary school teachers for pilot testing. As the aim of the study was to generate a reliable translation of the IPAQ for use in education, the translated questionnaire was tested to examine whether it is understandable for use in education. Teachers selected for pilot testing had no comments regarding terms and concepts comprehension in

the text. One of the comments was: "I did not find any shortcomings, unclear parts, questions in the questionnaire. I think it is perfectly translated, clearly defined, and vivid; consequently, the respondent knows what a particular question is asking of her/him. Even when the answer to a question is NO (i.e., did not perform certain tasks/activities…), it is clearly marked where to continue." Another teacher commented: "The questionnaire was very clear and well-defined. It is easy to understand how to skip a particular question". From the received responses it can be concluded that there is a high degree to which IPAQ measurements are relevant to teachers for assessing their level of PA.

Two studies have been published during the peer-review process of the present article, both using IPAQ-SF in the psychometric assessment (17,18). One of them (18) did not include an assessment of physical activity items and assessed solely sedentary behaviour, which in IPAQ is represented with two questions only. The other study (17) compared the validity and reliability of Slovenian versions of three most frequently used PAQs in the EU, one of them also being IPAQ-SF, which was not published as an open access file.

4.2 Reliability assessment

In one of the most recent studies (17), internal consistency for IPAQ-SF was rather low (Cronbach alpha = 0.297). Interestingly, it was improved when sedentary behaviour items were removed from calculation (Cronbach alpha = 0.685) but never exceeded > 0.800 as in the present study. These results indicate that IPAQ-LF is a better tool for assessing PA and sedentary behaviour in terms of internal consistency than the IPAQ-SF.

In the abovementioned study on IPAQ-SF (17), test-retest reliability was examined with Spearman's rank correlations. The results showed low to moderate reliability for PA of different intensity (Spearman's ρ = 0.461 – 0.648) and high reliability for sedentary behaviour (Spearman's ρ = 0.808).

5 Conclusion

The present study generated a reliable translation of the 7-day self-administered IPAQ into Slovenian language for cross-cultural use in education and confirmed that overall IPAQ-LF is a reliable tool for PA assessment in teachers. Based on this, Slovenian IPAQ-LF version has acceptable reliability for assessing PA among Slovenian teachers.

Total physical activity and all its domains showed

good internal consistency and good to excellent test-retest reliability. The authors would suggest an additional use of activity diaries or record-keeping for the household-related PA and leisure-time-related PA. Presumably, these areas of PA vary more from one week to another than the other domains. Providing an additional source of information could contribute to more reliable results over time as respondents tend to overreport PA and underreport sedentary behaviour (17). Additionally, the authors would like to emphasize the importance of cleaning the data correctly by removing the missing and out-of-range values per the IPAQ scoring protocol before conducting analyses.

Conflict of interest

None declared.

Appendix

Table 4: Number of revisions in sections of the International Physical Activity Questionnaire during the translation steps.

IPAQ Section	Step 1 (Translation)	Step 2 (Back translation)	Step 3 (Pilot testing)	Total
Instructions	7	9	0	16
Job-related PA	5	4	0	9
Transportation-related PA	2	3	0	5
Household-related PA	1	1	0	2
Leisure-time-related PA	4	2	0	6
Time spent sitting	3	2	0	5

Legend: PA – physical activity; IPAQ – International Physical Activity Questionnaire.

References

1. Lee IM, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT; Lancet Physical Activity Series Working Group. Effect of physical inactivity on major non-communicable diseases worldwide: an analysisof burden of disease and life expectancy. Lancet. 2012;380(9838):219-29. DOI: 10.1016/S0140-6736(12)61031-9 PMID: 22818936

2. World Health Organization. WHO guidelines on physical activity and sedentary behaviour. Geneva: World health organization; 2020.

3. Hallal PC, Andersen LB, Bull FC, Guthold R, Haskell W, Ekelund U, et al. Global physical activity levels: Surveillance progress, pitfalls, and prospects. Lancet. 20182;380(9838):247-57. DOI: 10.1016/S0140-6736(12)60646-1 PMID: 22818937

4. Guthold R, Stevens GA, Riley LM, Bull FC. Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysisof 358 population-based surveys with 1·9 million participants. Lancet Glob Health. 2018;6(10):e1077-86. DOI: 10.1016/S2214-109X(18)30357-7 PMID: 30193830

5. Ndahimana D, Kim EK. Measurement Methods for Physical Activity and Energy Expenditure: a Review. Clin Nutr Res. 2017;6(2):68-80. DOI: 10.7762/cnr.2017.6.2.68 PMID: 28503503

6. Kowalski K, Rhodes R, Naylor PJ, Tuokko H, MacDonald S. Direct and indirect measurement of physical activity in older adults: a systematicreview of the literature. Int J Behav Nutr Phys Act. 2012;9(1):148. DOI: 10.1186/1479-5868-9-148 PMID: 23245612

7. Adamo KB, Prince SA, Tricco AC, Connor-Gorber S, Tremblay M. A comparison of indirect versus direct measures for assessing physical activity inthe pediatric population: a systematic review. Int J Pediatr Obes. 2009;4(1):2-27. DOI: 10.1080/17477160802315010 PMID: 18720173

8. van Poppel MN, Chinapaw MJ, Mokkink LB, van Mechelen W, Terwee CB. Physical activity questionnaires for adults: a systematic review of measurement properties. Sports Med. 2010;40(7):565-600. DOI: 10.2165/11531930-000000000-00000 PMID: 20545381

9. International Physical Activity Questionnaire. Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ): Short and Long Forms: November 2005. S.l.: IPAQ; 2019 [cited 2019 Nov 6]. Available from: http://www.ipaq.ki.se/scoring.pdf.

10. Craig CL, Marshall AL, Sjöström M, Bauman AE, Booth ML, Ainsworth BE, et al. International physical activity questionnaire: 12-country reliability and validity. Med Sci Sports Exerc. 2003;35(8):1381-95. DOI: 10.1249/01.MSS.0000078924.61453.FB PMID: 12900694

11. Su CT, Parham LD. Generating a valid questionnaire translation for cross-cultural use. Am J Occup Ther. 2002;56(5):581-5. DOI: 10.5014/ajot.56.5.581 PMID: 12269514

12. Geisinger KF. Cross-Cultural Normative Assessment: Translation and Adaptation Issues Influencingthe Normative Interpretation of Assessment Instruments. Psychol Assess. 1994;6(4):304-12. DOI: 10.1037/1040-3590.6.4.304

13. Koo TK, Li MY. A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for ReliabilityResearch. J Chiropr Med. 2016;15(2):155-63. DOI: 10.1016/j.jcm.2016.02.012 PMID: 27330520

14. Butts MM, Michels LC. The sources of four commonly reported cutoff criteria: what did they really say? Organ Res Methods. 2006;9(2):202-20. DOI: 10.1177/1094428105284919

15. Nunnally JC. Psychometric theory. 2nd ed. New York: McGraw-Hill; 1978.

16. Statistical office of the Republic of Slovenia. Annaual Report. Ljubljana: Sistat; 2015 [cited 2021 May 10]. Available from: https://pxweb.stat.si/sistat/sl/Podrocja/Index/192/izobrazevanje.

17. Meh K, Sember V, Đurić S, Vähä-Ypyä H, Rocha P, Jurak G. Reliability and validity of slovenian versions of ipaq-sf, gpaq and ehis-paq for assessingphysical activity and sedentarism of adults. Int J Environ Res Public Health. 2021;19(1):430. DOI: 10.3390/ijerph19010430 PMID: 35010686

18. Meh K, Jurak G, Sorić M, Rocha P, Sember V. Validity and reliability of ipaq-sf and gpaq for assessing sedentary behaviour inadults in the european union: A systematic review and meta-analysis. Int J Environ Res Public Health. 2021;18(9):4602. DOI: 10.3390/ijerph18094602 PMID: 33926123

19. Van Holle V, De Bourdeaudhuij I, Deforche B, Van Cauwenberg J, Van Dyck D. Assessment of physical activity in older Belgian adults: validity and reliabilityof an adapted interview version of the long International Physical Activity Questionnaire(IPAQ-L). BMC Public Health. 2015;15(1):433. DOI: 10.1186/s12889-015-1785-3 PMID: 25928561

20. Macfarlane D, Chan A, Cerin E. Examining the validity and reliability of the Chinese version of the InternationalPhysical Activity Questionnaire, long form (IPAQ-LC). Public Health Nutr. 2011;14(3):443-50. DOI: 10.1017/S1368980010002806 PMID: 20939939