

## RESEARCH ARTICLE



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## Validating of the Urdu version of international physical activity questionnaire (IPAQ-U) among Pakistani population

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### Abstract

**Background/objectives:** Physical inactivity is a primary risk factor for global mortality and a large percentage of population are sedentary. The International Physical Activity Questionnaire (IPAQ) is a self-reported mechanism for measuring physical activity and inactivity. The purpose of this cross-sectional study was to measure the reliability and validity of the short IPAQ-U among Pakistani adults. **Methods:** The study sample includes Pakistani male and female adults aged between 18 and 65 Years (M + SD 31.71 + 10.30), who were regular participating for the last six months in various physical activity and exercise. The total 386 participants were asked to complete the Urdu version of IPAQ short (male 60.6%, n = 234, and female 39.4%, n = 152). **Results:** The value of Spearman's coefficients correlation for Vigorous-intensity was showed good value of test-retest reliability and significantly correlated (male = 0.72), (female = 0.80), and (total sample = 0.73). While, moderate intensity was also significantly correlated (male = 0.69), (female = 0.76), and (total sample = 0.71). Walking significantly correlated (male = 0.56), (female = 0.82 (total sample = 0.59). Physical activity overall was significantly correlated (male = 0.74), (female = 0.42), (age 18-34 Years = 0.86), (age 35-50 Years = 0.78), (age 51-65 Years = 0.85) and (total sample = 0.90). **Conclusion:** In this population, the short IPAQ-U established acceptable instrument, the reliability and validity of the IPAQ-U was significant. While there were some limitations of the study regarding test-retest reliability and in classification, the IPAQ-U was a suitable tool for measuring level of physical activity.

**Keywords:** Adults; IPAQ; physical activity; reliability; validity

## 1 Introduction

Physical activity (PA) is crucial factor for maintaining physical and mental health<sup>(1)</sup> If PA not performing regularly can cause numerous risk factors such as high cholesterol, hypertension, and cardiovascular illnesses are also directly associated with physical inactivity<sup>(2-5)</sup>.

Researches supported that PA prevalence and measurement is essential for a healthy life<sup>(6-8)</sup>. The effect of PA on psychological and physical health has been well described in the literature<sup>(9)</sup>. Persons of different age groups can obtain spiritual, emotional, social, and physical benefits from PA<sup>(10)</sup>.

The World Health Organization (WHO) recommends for PA among adults aged 18-64 years engage in at least 150 minutes of moderate-intensity PA per week or minimum 75 minutes of vigorous-intensity PA or an equal of moderate and vigorous PA to achieve health benefits<sup>(11)</sup>. However, even a minimum of 15 minutes of PA per day can decrease mortality by 14%, potentially adding three years to life<sup>(12)</sup>. The main concern of professionals to overcome mentioning factors through increasing participation in PA and exercise (Frederick, & Morris, 2004). The importance and benefits of PA in the prevalence of PA in physical, psychological, and social aspects of life<sup>(13)</sup>. In low and middle income countries non-communicable diseases (NCDs) are the primary cause of mortality and disability<sup>(14)</sup>. Pakistan has the highest percentage incidence of NCDs in Asian countries<sup>(15)</sup>. In Pakistan, health status is a complex issue, about 50% of the population suffers from NCDs and there are approximately 80 million deaths due to NCDs<sup>(15)</sup>. According to Qureshi, Munir<sup>(16)</sup> the 81.0% did not do PA and about 50% spent were sedentary for three or more hours a day, geographically South Asian also spending sedentary life style<sup>(17)</sup>. Less than 50% of the population had a normal BMI. Therefore, detecting factors associated with participation in PA is necessary to promote PA<sup>(18)</sup>.

There is ongoing research to discover how to encourage greater participation in PA across the world's population<sup>(19,20)</sup>. PA has been studied in sports, physical education, health sciences, and exercise sciences in terms of physical, psychological and social aspects of life<sup>(13,21)</sup>. The major focus of this study is to extend the research for participation in PA among adults. Therefore, this study aimed to extend the current information and knowledge regarding the participation in PA. Apart with this also highlight the importance of understanding how to increase PA and help individuals to initiate and maintain PA into their lives. Moreover, health professionals such as physical education trainers acquire this new knowledge can develop effective programs to motivate people to participate in PA.

This study may provide an opportunity to decrease physical inactivity in occupational and domestic hours and increase leisure time activities in walking, cycling, and sports activities. There are a number of methods for measuring PA such as indirect calorimetry test, direct observation and objective methods, for example a pedometer, accelerometer, and heart rate monitor; and another is a subjective method including activity diaries and questionnaire<sup>(22,23)</sup>. However, usually, the questionnaire used in large scale epidemiological studies because of a low cost and comparative ease of calculating energy expenditure<sup>(24)</sup>.

There is a variety of questionnaires for measuring PA have been developed<sup>(25,26)</sup>. The International Physical Activity Questionnaire (IPAQ) was established as a self-reported questionnaire for the measurement of PA and previously validated in 12 countries<sup>(26)</sup>. The IPAQ is good instrument that can be used internationally to measure PA for different population<sup>(26)</sup>. The IPAQ has good reliability and validity in different types of populations, but within Asia, only the Japanese and Hong Kong population was studied<sup>(26,27)</sup>. In addition, research conducted on Japanese addressed total PA and not validated IPAQ in terms of moderate to vigorous activity differences<sup>(26)</sup>. The other two validation types of researches conducted in Hong Kong but there result shows insignificant findings<sup>(27,28)</sup>. Therefore, this research conducted to measure the reliability and validity of the short IPAQ-U moderate to vigorous PA in Pakistani population. In this study evaluated the validity of the IPAQ-U in Pakistan (National Language Urdu). Previous literature shows that only one study has observed the validity of the long version of IPAQ in Urdu language and focused on the behavioral risk factors of non-communicable diseases (NCDs)<sup>(29)</sup>. Therefore, additional studies on the IPAQ-U are needed. While evaluating PA among adults, separate assessment is also desirable for the different age groups and different living style population. The aim of this study is to evaluate the validity of the short IPAQ in the Urdu version among Pakistani adults.

## 2 Method

The current study used a cross-sectional research design to evaluate the validity of the IPAQ-U. The data were gathered from the Pakistani community (South Punjab) and all adults of different age groups, who regularly participating for the last six months in different types of PA and exercise. Prior to data collection, the IPAQ was translated from the original language (English) to Urdu (local language), using backward translation based on Brislin's model<sup>(30)</sup>. The ethics approval was obtained from the UM research ethics committee of the University of Malaya, Malaysia.

### Translate Procedure

The translation of IPAQ into Urdu language was created by different independent bilingual experts of both languages (English and Urdu). Forward and backward translation method was used. More specifically, the original scale was translated from English to Urdu by two experienced bilingual experts. One of the translators is working as assistant professor in the department of psychology and is experienced in translating health psychology and physical education questionnaires. He is aware of the purpose and the concepts applied in the questionnaire. The second translator is also serving as assistant professors in the department of Pharmacy, and he worked on Physical activity with the peoples of diabetes, and he has command of both language and was uninformed about the purpose of the study.

After that, the three experts from the areas of Physical Education, Sports Sciences, and Sports Science Education reevaluated and discussed the difference in translation and resolved inconsistencies in the questionnaire. The back translation of the Urdu version into English was done by two independent bilingual translators. They are working as assistant professors, one from the department of Psychology and the second translator has English background and is experienced in translating from the department of Education, The Islamia University of Bahawalpur, Pakistan. Both translators were not affiliated with the study to ensure comparability and meaning equivalence. Using the different versions, the researcher has created the IPAQ-U. The independent teams of professionals have revised the created version. In general, for the Urdu version, at this stage, the minor differences between the different translations were corrected. Then, experts were asked to assess the questionnaire form the students of the department of Sports Sciences whether the contents of the questionnaire are culturally appropriate to the Pakistani population. The final version of the IPAQ-U short was distributed to the master students and were asked to answer the questions and comment. After that, the result of the pilot study analyzed and calculated reliability that was sufficient up to the standard level and no need for more modification.

### Participants

The total of 386 adults (male 60.6%,  $n = 234$ , and female 39.4%,  $n = 152$ ) aged between 18 to 65 Years ( $M + SD 31.71 + 10.30$ ) who engaged in a various PA were invited for gathered data. Participants were employed based on various sports and non-competitive PA in organized and recreational sports like a club, yoga, gym exercise, sports, racquet sports, team sports, swimming, jogging, walking, and exercise. They were selected from various sports clubs, fitness centres, and recreational parks in Pakistan. In the confirmatory factor analysis (CFA), a large number of sample size usually produced stable solutions and replicable. The recommended sample (literature supported) for factor analysis is not less than 300 participants, and the subject to the variables<sup>(31)</sup>.

### Measures

**Demographic Information Form:** Participants were asked the following demographic information form: gender, age, type of sports, and how many days a week engaged in PA.

**International Physical Activity Questionnaire (IPAQ)**<sup>(26)</sup>: The 7-item of IPAQ short was used to measure the PA level of participants and it is based on the days and minutes per day of doing PA in the past 7 days<sup>(32)</sup>. IPAQ assessed three types of PA, walking, moderate, and vigorous intensity activity. METs is a worth of metabolic equivalent of task an extensive range of PA that considered as low, moderate, and vigorous energy expenditure. PA is calculated based on the energy expenditure by moderate and vigorous intensity and sitting time. Energy expenditure is shown as metabolic equivalents multiplied with time duration and week ( $METs * minutes * week$ ). The equation used to calculate IPAQ score is walking MET (walking minutes \* days \* 3.3) + moderate MET (moderate minutes \* days \* 4.0) + vigorous MET (vigorous minutes \* days \* 8.0)<sup>(33)</sup>. Total PA is a categorized as low activity in less than 600 MET per week; moderate activity is 600 – 3000 MET per week; and vigorous activity is above 3000 MET per week<sup>(33)</sup>. IPAQ shows good reliability and validity<sup>(32,34)</sup>.

### Data Collection

The convenient sample technique was adapted, prior to data collection the demographic information was gathered from the participants. Data collection was conducted in November 2018 to January 2019 among Pakistani adults aged between 18 and 65 years. The participants were briefed regarding the study before data collection. The information sheet and IPAQ-U questionnaire were distributed to the participants. The total 450 questionnaires were distributed, and the response rate is 85.7% by 386 were returned to the researcher. So, the sample comprised 386 questionnaires with complete answers.

## 3 Results

This Table 2 demonstrated the gender significant differences in PA (vigorous activity, moderate activity, walking & sitting time). While, the mean score of the IPAQ-U in PA (vigorous activity, moderate activity, and walking) was significantly higher among male participants as compared to female participants. While, the sitting time was higher among female than male respondents.

The Table 3 demonstrated the age (group) significant differences in PA (vigorous activity, moderate activity, walking & sitting time). While, the mean score of in PA (vigorous activity, moderate activity, walking) was significantly higher among 18-34 years age of respondents as compared to 35-50 years and 51-65 years age of respondents. While, the sitting time was higher among

**Table 1.** Demographic Characteristic of Population

N = 386	
Age (Years), M + SD	31.71 + 10.30
Age Group (N, %)	
18-34 Years	259(67.1)
35-50 Years	91(23.6)
51-65 Years	36(9.3)
Gender (N, %)	
Male	234(60.6)
Female	152(39.4)
Vigorous (M + SD)	(MET) 521.82 + 494.09
Moderate (M + SD)	(MET) 696.71 + 371.67
Walking (M + SD)	(MET) 1615.56 + 702.34
Sitting Time (Hours) (M + SD)	9.30 + 2.31
Physical Activity Level (M + SD)	2834.09 + 1144.01
Physical Activity Group (N, %)	
Minimum Active	220 (57%)
Active	166 (47%)

**Table 2.** Gender differences on Physical Activity Level (Vigorous, Moderate, Walking & Sitting Time) (N=386)

Variables	Male (n = 234)		Female (n = 152)		t	p	95% CI	
	M (MET)	SD	M (MET)	SD			LL	UL
Vigorous	613.46	530.07	264.00	225.70	7.82	.00	261.72	437.20
Moderate	770.57	385.62	488.93	224.26	8.45	.00	216.16	347.11
Walking	1704.78	693.96	1364.55	666.10	5.21	.00	212.00	468.46
Sitting Time/hour	9.01	2.22	10.13	2.34	-5.25	.00	-1.55	-.70
Physical Activity	3088.81	1128.03	2117.48	848.18	9.62	.00	773.03	1169.61

**Table 3.** Age (Group) differences on Physical Activity (Vigorous, Moderate, Walking & Sitting Time) (N=386)

Variables	18-34 Years (n = 259)		35-50 Years (n = 91)		51-65 Years (n = 36)		F	p
	M (MET)	SD	M (MET)	SD	M (MET)	SD		
Vigorous	659.38	523.06	259.60	237.63	80.00	130.38	59.37	.00
Moderate	774.97	380.55	572.08	289.90	334.55	183.12	36.79	.00
Walking	1764.57	699.25	1354.77	605.47	1032.00	473.52	33.95	.00
Sitting Time/hour	8.91	2.24	9.91	2.20	11.21	2.06	23.99	.00
Physical Activity	3198.93	1081.96	2186.45	837.83	1446.55	561.66	88.91	.00

51-65 years age of respondents than 18-34 years and 35-50 years age of respondents.

The results of the [Table 4](#) showed the test-retest reliability for the IPAQ-U. The test-rest reliability was assessed the period of three months. The value of Spearman’s coefficients correlation for Vigorous was showed good value of test-retest reliability and significantly correlated (male = 0.72), (female = 0.80), (age 18-34 Years = 0.72), (age 35-50 Years = 0.81), (age 51-65 Years = 0.77) and (total sample = 0.73). While, the value of Spearman’s coefficients correlation for moderate was also revealed good test-retest reliability and significantly correlated (male = 0.69), (female = 0.76), (age 18-34 Years = 0.68), (age 35-50 Years = 0.80), (age 51-65 Years = 0.76) and (total sample = 0.71). The value of Spearman’s coefficients correlation for Walking was found a good test-retest reliability and significantly correlated (male = 0.56), (female = 0.82), (age 18-34 Years = 0.57), (age 35-50 Years = 0.65), (age 51-65 Years = 0.80) and (total sample = 0.59). The value of Spearman’s coefficients correlation for Siting time was revealed a good test-retest reliability and significantly correlated (male = 0.66), (female = 0.63), (age 18-34 Years = 0.83), (age 35-50 Years = 0.43), (age 51-65 Years = 0.88) and (total sample = 0.65). The value of Spearman’s coefficients correlation for

**Table 4.** Reliability (test-retest) coefficients for the IPAQ-U

Variables	Male	Female	18-34 Years	35-50 Years	51-65 Years	Total Sample
	R	R	r	r	r	r
Vigorous	0.72	0.80	0.72	0.81	0.77	.73
Moderate	0.69	0.76	0.68	0.80	0.76	.71
Walking	0.56	0.82	0.57	0.65	0.80	.59
Sitting Time	0.66	0.63	0.83	0.43	0.88	.65
Physical Activity	0.74	0.42	0.86	0.78	0.85	.90

r=Spearman's coefficients correlation

overall Physical activity was confirmed a good test-retest reliability and significantly correlated (male = 0.74), (female = 0.42), (age 18-34 Years = 0.86), (age 35-50 Years = 0.78), (age 51-65 Years = 0.85) and (total sample = 0.90).

### 4 Discussion

The development of the short IPAQ-U is an important step in determining participation in PA among the Urdu-Speaking Population. In this study, the original version of IPAQ has been found to be reliable and valid, that stable across time-based on previous researches<sup>(26,35,36)</sup>. Among the questionnaires that measure of participation in PA among adults, IPAQ is considered as a wider range of PA than most questionnaires because it is based on experiential identification of the IPAQ. Furthermore, IPAQ related to the key PA framework and IPAQ measures PA across recreational and lifestyle PA, as well as a competitive sport<sup>(36,37)</sup> Therefore, we translated the original English version of IPAQ short into the Urdu version to appropriate the local population where Urdu is the most common and well understand language.

This is the first study in Pakistan to assess the reliability and validity of the IPAQ-U in National language of Pakistan among adults. Some studies on IPAQ described reliability coefficients is greater than 0.70, with ICCs of 0.87 in Japan mean age 33.8 years<sup>(38)</sup>, 0.84 in Chinese mean age 65.2 years<sup>(39)</sup>, 0.87 in Greece aged 19-29 years<sup>(40)</sup>. In some studies low-reliability correlation was described ICCs of 0.30 to 0.62 in Norwegians mean age 32.4 years<sup>(41)</sup>, 0.54 in Swiss mean age 46.5 years<sup>(42)</sup>, and 0.14 to 0.58 in eight European countries age 18-65 years<sup>(43)</sup>. According to Bernstein and Nunnally<sup>(44)</sup> minimum coefficient is required 0.70 to confirm sufficient reliability. Therefore, the reliability of the current study is sufficient correlation, overall was significantly correlated (male = 0.74), (female = 0.42), (age 18-34 Years = 0.86), (age 35-50 Years = 0.78), (age 51-65 Years = 0.85) and (total sample = 0.90).

To our knowledge, this is one of the few studies in Asia that validated physical activity questionnaires among adults. Furthermore, the drop-out ratio of our study was very low only 10 respondents did not return the questionnaires. There are also several limitations of our study that need to be considered in the future. The sample size of our study was limited and the only adults who regularly participating for the last six months in different types of PA and exercise were recruited in the study. They were selected from different sports clubs, fitness centres, and recreational parks in Pakistan. Although, the participants were divided into three age groups of both genders and different social economic status with the different educational, professional background. The accelerometer can use for movement monitor that has the capacity to catch the intensity of PA. The accelerometer can be provided the frequency and time duration of PA to attain a good estimate of energy expenditure and has been suggested for objective measures for validating questionnaires or study designs of PA<sup>(45,46)</sup>. It is also used to validation of PA questionnaires for national surveys for example England Physical Activity Questionnaire and the BRFSS<sup>(47,48)</sup>.

The IPAQ tool experienced many stages of development and testing, concluding in several countries' reliability and validity study. Another research in Sweden used IPAQ long among 46 individuals and establish a correlation for total PA with BMI p-0.25 and total PA with aerobic fitness assessed p-0.21 using a treadmill walking test<sup>(49)</sup>. Moreover, IPAQ short is suitable for survey to assess the qualitative preference. It shows that some participants found the long version of IPAQ questionnaires problematic to answer, the data are copying and can provide reliable assessments for last 7 days of PA. This study has expressed the reliability and validity of PA can composed by using IPAQ instrument in various countries. The results are encouraging and recommended that the IPAQ-U is ready for use to measure the PA level. The World Health Organization (WHO), the WHO Mega Country Project and the European Union for developing international health monitoring projects are probable to adapt the IPAQ short version for the surveillance system.

## 5 Conclusion

The short version of IPAQ-U in the present sample comprises of 7 questions for measuring last 7 days moderate to vigorous PA. Based on the results it is established that the IPAQ-U could be used for regional and national prevalence health-related PA studies. The short form of IPAQ is convenient to regulate, and there is no difference between the reliability and validity of long and short forms of IPAQ. This study expressed that the validity of the IPAQ-U can be used for collecting PA data from various part of the country. For future research, the participation on health-related PA can use the IPAQ-U to measure the level of PA for engaging in any type of leisure and planned PA. The IPAQ-U had acceptable reliability and validity that can be used in large epidemiological studies especially for the measuring of moderate to vigorous PA.

### Authors' Contributions

Principal author Muhammad Badar Habib conceived the idea, designed the project and wrote the manuscript. The other authors were contributed in the translation of the questionnaire and helped in writing the manuscript. All authors read and approved the final manuscript.

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