RELIABILITY OF INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE – SHORT FORM IPAQ-SF FOR YOUNG ADULTS IN INDIA

Richa Hirendra Rai[1i]**,**
Mohd Asif[1]**,**
Nitika Malhotra[2]

[1]Assistant Prof,
Banarsidas Chandiwala Institute of Physiotherapy,
New Delhi, India
[2]Data Scientist, Data Scientist, Alqimi,
Gurgaon, India

Abstract:

Introduction: Amongst the various challenges India is facing as a developing country, one such grave challenge is the public health and nutritional transition. Non communicable disorders with serious health problems are taking its grip all over the world in terms of mortality, morbidity, disability and socio-economic losses. Physical activity has proved to either eliminate the risk or deter the chances of developing such grave conditions in the elite individuals who represent the future society. Thus, a consensus on valid and reliable tool for measuring physical activity internationally on the same platform is required. **Methodology**: 250 young adults who consented for the study, were of the Age between 18-25 years and those who could understand English language were distributed the questionnaires in Delhi with a 80% response rate. In addition to the normal IPAQ-SF questions, demographic data on Height weight was also collected. The IPAQ-SF was made to be filled on the basis of 7 days recall of physical activity and a repeat questionnaire was made to be filled by the same subjects after 7 days. **Result & Discussion**: Among the 200 young adults (males and females) in this study, the highest average MET expenditure is of 18 years old subjects. In the age range 18-21 most of the people are having score 3 in all age groups which shows that they are physically active in their lifestyle. Also, the Age wise average sitting time distribution shows the highest average sitting time is of 18 years old subjects. The test-retest reliability of MET mint/week before and after 7 days was evaluated using interclass correlation coefficient. ICC value is 0.638 hence the test is significant at -0.19 - 0.921 confidence intervals. Thus, the test is reliable. The Bland Altman plots showed limits of agreement between the PRE and 7 DAYS POST MET mint/week, range from -

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[1] Correspondence: email richahrai@gmail.com

552.3777 to 696.6326 METS. 95% values of the 7 DAYS POST MET were within the upper and lower limits of agreement. The test-retest reliability of MET score, before and after 7 days is evaluated using interclass correlation coefficient. ICC value is 0.725 hence the test is significant at -0.19 - 0.923 confidence intervals. The test-retest reliability of sitting time before and after 7 days is evaluated using interclass correlation coefficient. ICC value is 0.5199 hence the test is significant at -0.199 - 0.7596 confidence intervals. **Conclusions**: The IPAQ-SF proved to be a reliable tool to measure physical activity level and may be used as a tool in health promotion programs.

Keywords: reliability of international physical activity questionnaire, young adults, India

1. Introduction

Amongst the various challenges, India is facing as a developing country, one such grave challenge is the public health and nutritional transition -as Indians are moving away from traditional diets high in cereal and fiber to more western pattern diets high in sugars, fat and animal-source food (fast food culture) that are closely associated with different non communicable diseases (NCDs) seen in later years[1,2] Non communicable disorders with serious health problems and its precursors including mental health and other disorders and injuries, are thus on an increasing trend in the society amongst young people. It is not only taking a toll on the rich young resource of India but also taking its grip all over the world in terms of mortality, morbidity, disability and socio-economic losses. Physical activity has proved to either eliminate the risk or deter the chances of developing such grave conditions in the elite individuals who represent the future society.[3] Health policies are continuously struggling to find an integrated way to coordinate various approaches. Electronic gadgets would definitely prove to be more reliable, but looking at the robust population of India and the cost constraints, they are not suitable for epidemiological studies. Thus, a consensus on valid and reliable tool for measuring physical activity internationally on the same platform is required. Only few works have been conducted with the purpose to validate these instruments for the evaluation of the PAL and help to collect PA information for the previous 7 days regarding vigorous and moderate activity, walking and sedentary behaviour. Thus, these few studies may be susceptible to interviewer or respondent bias and presumptions. Thus it is the need of the day to prioritise health problems and to methodologically evaluate a PA questionnaire, in young adults in India for it's reliability.

2. Methodology

250 young adults from south Delhi, who consented for the study, were of the Age between 18-25 years and those who could understand English language were

distributed the questionnaires in Delhi with an 80% response rate. Subjects were screened for the study on the basis of following criteria. Subjects with any musculoskeletal, neurological or systemic ailment which could affect the outcome of the study were excluded. In addition, only the participants with more than secondary school education were included, as they are supposed to have a potentially higher comprehension and recall ability. In addition to the normal IPAQ-SF questions, demographic data on height weight was also collected .The IPAQ-SF was made to be filled on the basis of 7 days recall of physical activity and a repeat questionnaire was made to be filled by the same subjects after 7 days. Data on 3 specific types of activity-in three domains and sitting of previous 7 days: moderate or vigorous, walking and sedentary behaviours was gathered using this questionnaire. Also, Frequency (measured in days per week) and duration (time per day) were collected specifically for each type of activity.

2.1 Statistical analysis

Data on self-reported physical activity was coded and scored according to IPAQ-SF guidelines. The METS-minutes per week of each domain was calculated by multiplying the weekly activity reported with the corresponding constant factor (3.3 for walking, 4.0 for moderate activities and 8.0 for vigorous activities reported) and then MET-mint were calculated for all. The total duration of the entire week was used in this calculation. Total scores were computed by summation of the duration (in minutes) and frequency (in days) of walking, moderate intensity and vigorous activity. [4] On the basis of the scoring three levels of physical activity is suggested for classifying population.
They are:
1. Inactive/Insufficiently active;
2. Minimally Active;
3. HEPA Active (Health Enhancing Physical Activity.[5]

3. Results

Data of 200 young adults (males and females) was finally analysed using R Studio 1.1.463.
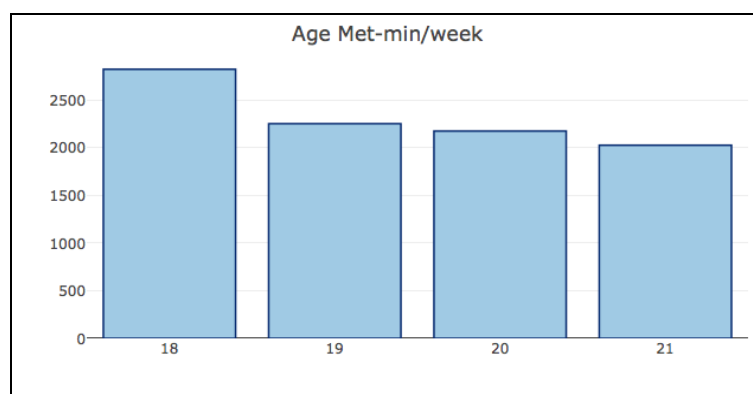
a. The above visualization is a bar-chart (Graph 1) representing average MET-min/week distribution of age of subjects. According to this highest average MET is of 18 years old subjects.
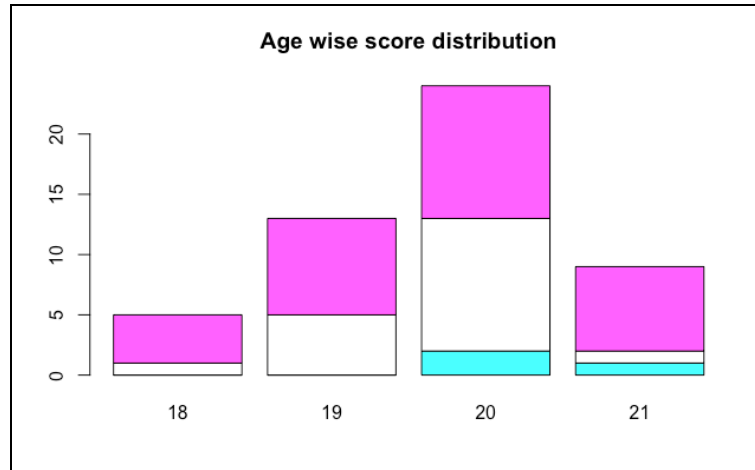

b. The above bar graph (Graph 2) representing distribution of age of subjects and MET score (as a % of whole). According to this maximum people with 3 score are of age 20 and for all age groups mostly subjects belong to score 3.
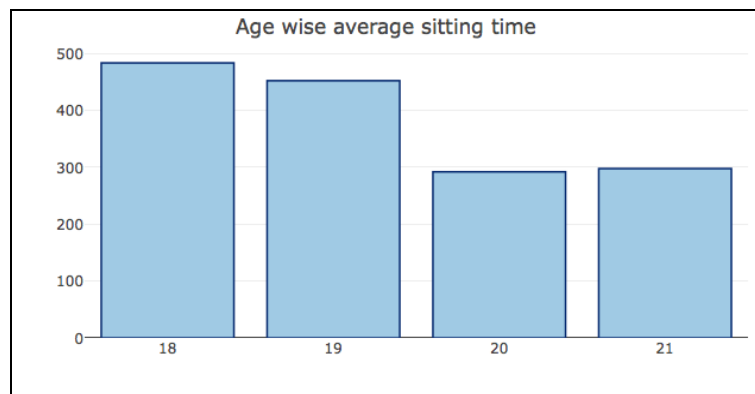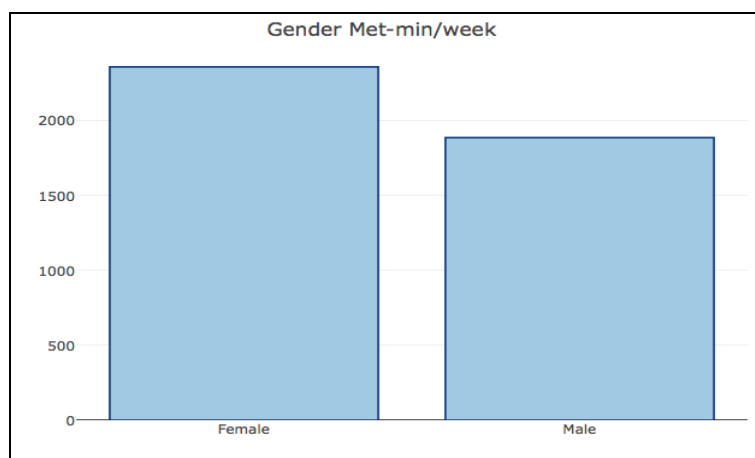

c. The above visualization is a bar-chart (Graph 3) representing average sitting time distribution of age of subjects. According to this highest average sitting value is of 18 years old subjects.
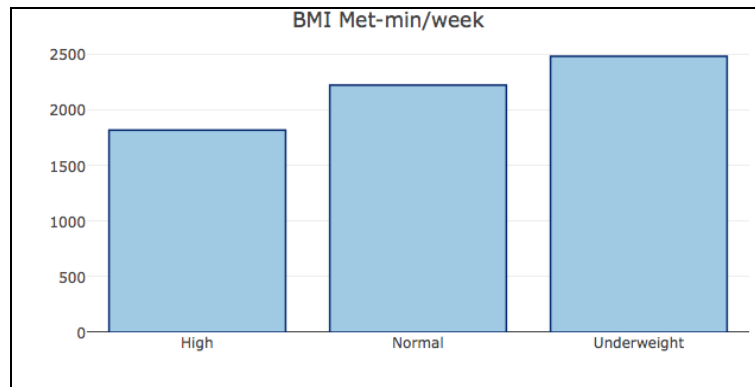
d. The above visualization is a bar-chart (Graph 4) representing average MET/min-week distribution of BMI of subjects. According to this highest average MET is of underweight subjects.
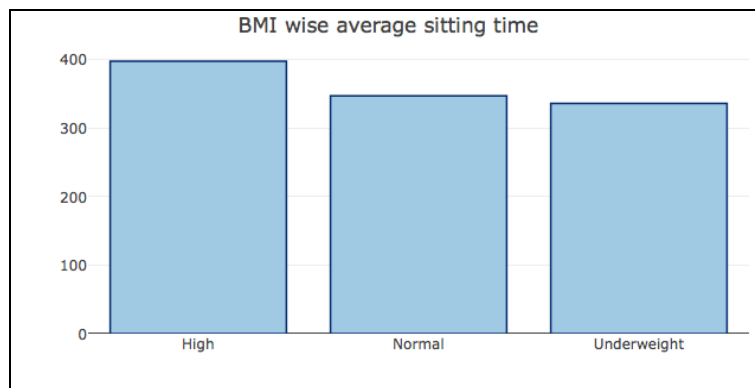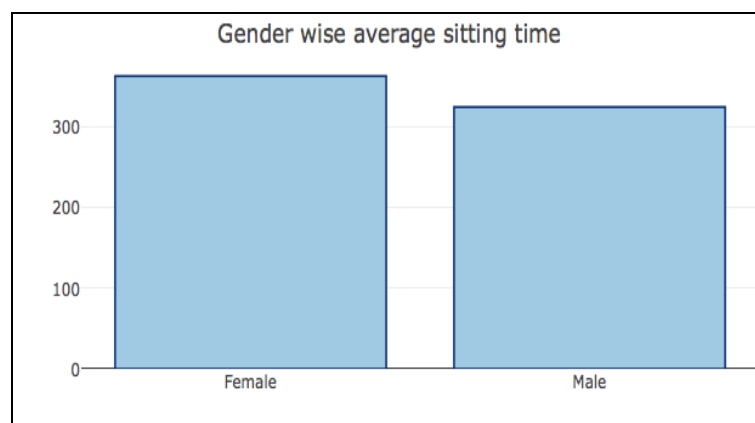

e. The above visualization is a bar-chart (Graph 5) representing average sitting score distribution of BMI of subjects. According to this highest average sitting score is of High BMI subjects.

f. The above visualization is a bar-chart (Graph 6) representing average MET-min/week distribution of gender of subjects. According to this highest average MET-min/week is of female subjects.

g. The above visualization is a bar-chart (Graph 7) representing average MET-Score genderwise (as a percentage of whole) of subjects. According to this highest MET score 3 is more in female subjects.


h. The above visualization is a bar-chart (Graph 8) representing average sitting time distribution of gender of subjects. According to this highest average sitting time is of female subjects.

4. Reliability Statistics and t-test
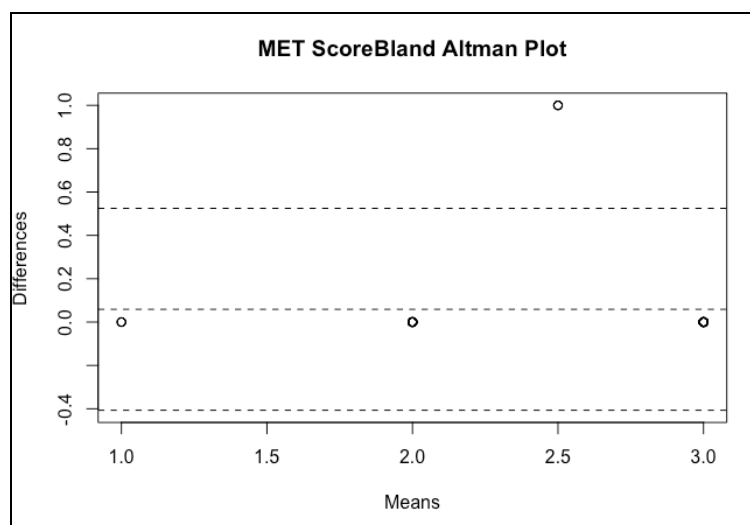
4.1 MET- mint/ week

The test-retest reliability of MET-mint/ week before and after 7 days was evaluated using interclass correlation coefficient. ICC value is 0.638 hence the test is significant at -0.19 - 0.921 confidence intervals. Thus, the test is reliable.
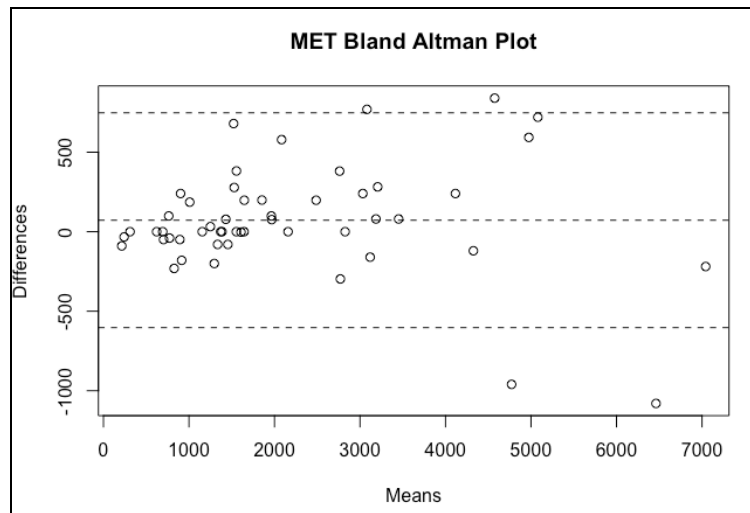
The Bland Altman plots (Graph 9) showed limits of agreement between the PRE and 7 DAYS POST MET range from -552.3777 to 696.6326 METS. 95% Values of the 7 DAYS POST MET were within the upper and lower limits of agreement.

4.2 MET score

The test-retest reliability of MET score before and after 7 days was evaluated using interclass correlation coefficient. ICC value is 0.725 hence the test is significant at -0.19 - 0.923 confidence intervals. Thus, the test is reliable.

The Bland Altman plots (Graph 10) showed limits of agreement between the PRE and 7 DAYS POST MET Score range from -0.18 to 0.29 METS. 95% Values of the 7 DAYS POST MET Score were within the upper and lower limits of agreement.

4.3 Sitting time

The test-retest reliability of sitting time before and after 7 days was evaluated using interclass correlation coefficient. ICC value is 0.5199 hence the test is significant at -0.199 - 0.7596 confidence intervals. Hence, the test is reliable.
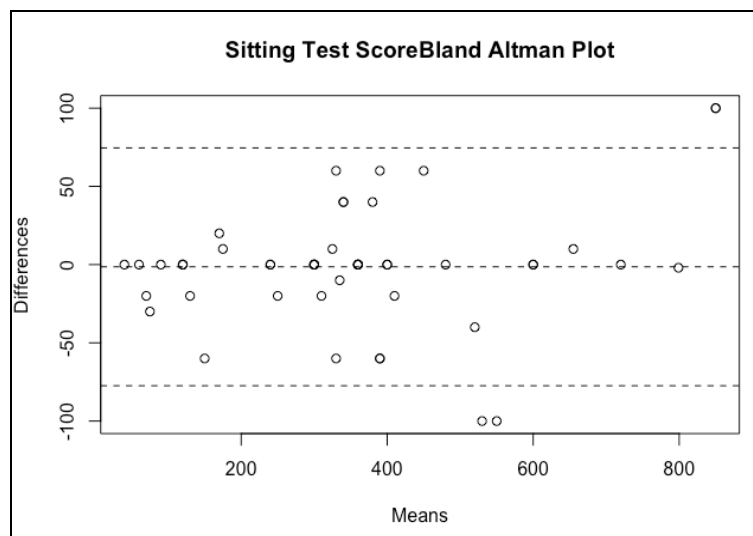
The Bland Altman plots (Graph 11) showed limits of agreement between the PRE and 7 DAYS POST Sitting Time range from --79.59 to 76.77. 95% Values of the 7 DAYS POST Sitting time were within the upper and lower limits of agreement. The magnitude of correlation may be interpreted as low (<0.40), moderate (0.40-0.59), substantial (0.60-0.79) and high (>0.80) associations.[6]

5. Discussion

The IPAQ was first published with its validation based on a 12-country sample, and the authors recommended using the short form which measured physical activity by self-report over the previous 7 days [4]. Since that time, more validation studies have been published for this short-form than for any other physical activity questionnaires.[7,8]

Also only one study has validated the IPAQ-SF against doubly labeled water and despite the high cost, this criterion remains the recommended standard for studies comparing energy expenditure. In the only study using doubly labeled water as the criterion measure, the validity of the IPAQ-SF was assessed by categorizing participants into insufficiently active, sufficiently active, and highly active based on their IPAQ-SF scores. The total energy expenditure (TEE) and physical activity level (PAL) (both measured using doubly labelled water) were then compared across the three categories. TEE and PAL in the highly active participants were significantly higher than that of the

other two groups, and the authors concluded that highly active participants could be correctly identified, and distinguished from inactive participants using the IPAQ-SF, but other discrimination was poor.[7,9]

Also studies have shown that although Correlations between sections of the IPAQ-SF for vigorous activity or moderate activity level/walking and an objective standard showed even greater variability (-0.18 to 0.76), yet several reached the minimal acceptable standard.[7]

Among the 200 young adults (males and females) in this study, the highest average MET expenditure is of 18 years old subjects. In the age range 18-21 most of the people are having score 3 in all age groups which shows that they are physically active in their lifestyle.

Also, the Age wise average sitting time distribution shows the highest average sitting time is of 18 years old subjects.

In terms of being normal weight and activity pattern or energy expenditure, it has been noted that the subjects with normal and underweight BMI are more physically active than the ones with high BMI. And the ones with highest average sitting time are those having High BMI.

Also, females have highest average MET-min/week energy expenditure than male subjects. This was contrary to the studies in other countries like Bhutan where they found out that overall females were more inactive than males. In 2007 national sample (conducted in 15 out of 75 districts) reported that overall inactivity was only 5.5% (Males 5.2%, Females 5.9%). [10] Also on the other hand, in support of ours the other studies have also demonstrated Males (14.6% and 38.5%) to be more inactive than females (8.7% and 24.7%). They also demonstrated inactivity of urban adults was 35.2% and higher than rural adults (27.6%) showing the effect of urbanisation. Female gender, age, urban-living, Muslim ethnicity (Sri Lankan Moor), tertiary education, obesity, diabetes, hypertension and metabolic syndrome all significantly increased odds of being inactive. As the females grow, the Cultural expectations may restrict the participation of women in certain forms of physical activity in some religious and ethnic groups in the region. The traditional role of South Asian women in taking care of household work and supporting extended family members may limit the time available for them to engage in physical activity, in particularly leisure time physical activities. Low physical activity is one of the contributing risk factors for the higher obesity levels seen among Asian Indians .[10]

The test-retest reliability of MET before and after 7 days was evaluated using interclass correlation coefficient. ICC value is 0.638 hence the test is significant at -0.19 - 0.921 confidence intervals. Thus, the test is reliable.

The Bland Altman plots showed limits of agreement between the PRE and 7 DAYS POST MET mint/week, range from -552.3777 to 696.6326 METS. 95% Values of the 7 DAYS POST MET were within the upper and lower limits of agreement.

The test-retest reliability of MET score, before and after 7 days is evaluated using interclass correlation coefficient-ICC value is 0.725 hence the test is significant at -0.19 - 0.923 confidence intervals.

The test-retest reliability of sitting time before and after 7 days is evaluated using interclass correlation coefficient-ICC value is 0.5199 hence the test is significant at -0.199 - 0.7596 confidence intervals.

The magnitude of correlation may be interpreted as low (<0.40), moderate (0.40-0.59), substantial (0.60-0.79) and high (>0.80) associations.[6]

The results of our study are consistent with the previous IPAQ reliability studies which reported ICC > 0.65. [4,6] Studies have also found the Questionnaire to have good test-retest reliability and satisfactory criterion validity for adults and a suitable instrument for monitoring habitual PA and could provide a useful data for international comparison purposes. [6,8,11]

Thus looking at the discussions of all studies one comes to the conclusion that the IPAQ SF is proposed to be a possible standard questionnaire for comparing the results of diverse populations (adults and children). Also the results of our study endorses that it is a reliable test, so can be used to study in different regions at different periods of time for intra and inter regional comparison of data [6,12]

6. Conclusions

The IPAQ_SF proved to be a reliable tool to measure physical activity level and may be used as a tool in health promotion programs.

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