

International Physical Activity Questionnaire for Italian Elderly (IPAQ-EIT): reliability in an Italian sample

T. Iona¹, D. Masala¹, G. La Torre², A. Imbrogna³, A. Mannocci⁴

¹Department of Medical and Surgical Sciences, University of Magna Graecia, Catanzaro, Italy; ²Department of Public Health and Infectious Diseases, Sapienza University of Rome, Italy; ³Soccer Coach A.C. Virtus Fancavilla, Italy; ⁴Faculty of Economics, "Università Mercatorum", Rome, Italy

Abstract

Background. The aim of the paper was to perform an Italian version of the International Questionnaire of Physical Activity in the Elderly: IPAQ-EIT.

Methods. Adults with age over 64 years with normal neurological status and without difficulty in ambulation were enrolled in opportunistic way and on voluntary basis in different Italian regions.

Two independent researchers have translated the English version independently. The final IPAQ-EIT version was submitted twice, with an interval of one day between each administration (T0 and T1).

McNemar's Test was used to assess the agreement between qualitative variables; Wilcoxon Signed Ranks Test and Spearman correlation coefficients were used for continuous data. Cronbach's alpha was used as a measure of the internal consistency.

Results. Thirty-three questionnaires were collected at T0 and T1. 100% of response rate was obtained.

The Cronbach's alpha at T0 was $\alpha = 0.79$ and at T1 $\alpha = 0.84$. The Spearman's coefficient reported significant associations ($p < 0.001$) between the two administrations for all items. The test-retest analysis for two paired samples underlined for all items not significant differences.

Conclusions. The IPAQ-EIT short form shown an acceptable consistency, feasibility to administer and easy to combine with other questionnaires. It is an additional valid measuring tool for physical activity levels in the elderly. *Clin Ter 2022; 173 (6):546-550 doi: 10.7417/CT.2022.2480*

Key words: Elderly, physical activity, physical movement, questionnaire, reliability, tool

Introduction

The scientific literature has consolidated the multiple health benefits of regular physical activity across the lifespan (1,2) and in different context or status of populations' life (3,4). The World Health Organization (WHO) estimated that the global prevalence of physical inactivity among adults was

27.5% (5,6). Elderly people have a more sedentary lifestyle, spending more than 9.4 h in sedentary activities per day and in terms of prevalence, 60% of older adults reported sitting for more than 4 hr per day (7,8).

Physical inactivity has been identified as the fourth largest international mortality risk factor (9) and an important contributing factor to disability and poor health outcomes (10) in particular in the elderly. The lack of movement for long periods in the elderly (sedentary behaviour, SB) may affect function temporarily or permanently so as to increase joint stiffness and decrease neuronal input to the muscles making it difficult and discouraging to stand (11). Having a standardized easy tool common to all Countries in the world could be useful to compare and monitor the health in elderly people. The review of Harvey et al. highlighted that the assessment of SB is not standardized and that clarification is required to minimize uncertainty on the effect and dose response of specific behaviours and develop effective and targeted interventions (8). For this reason, the aim of the study was to translate and to validate an international validated tool easily assessing the level of physical activity in older adults for the Italian context. An International Consensus Group developed four long and four short forms of the International Physical Activity Questionnaire (IPAQ) instruments between 1997 and 1998 for adults (aged 18-65 years) (10). The versions were developed for use either in self-administration or telephone interviews. Two alternate reference periods were considered either the "last 7 days" or a "usual week" of recalled physical activity done and assessing the level of movement. At the beginning of the 2021 the IPAQ group have collected 25 validated translations (10) other than Italian (11,12). In 2015 an IPAQ for elderly people was published (IPAQ-E, available at www.ipaq.ki.se) (13,14) and in view of considerable success for IPAQ, the present paper aimed to translate, to adapt and to assess the reliability of the IPAQ-E in the Italian context (IPAQ-EIT).

This aim is contextualized in a program that has been in place for several years now to combat the hypokinesia diseases, through physical movement and particularly by examples of appropriate lifestyles in the elderly people. In particular, an initiative was conceived and implemented by

Correspondence: Prof. Alice Mannocci, Address: Universitas Mercatorum, Faculty of Economics, Piazza Mattei 10, Rome, 00186, Italy
Email: alice.mannocci@unimercatorum.it

two C.O.N.I. well-deserving associations: C.I.S.C.O.D. (Italian Sports Against Drugs Committee) and CO.NA.P.E.F.S. (National College of Physical Education Professors and Graduates in Motor Sciences). It is carried out as part of a larger “Survey on nutrition and culture over 65” project, proclaimed by Sport & Salute S.p.A.

Materials and methods

The present research was a reliability and internal validity study of a tool and it was carried out following the STROBE Statement check lists for observational studies as far as possible (15).

Translation and cultural adaptation

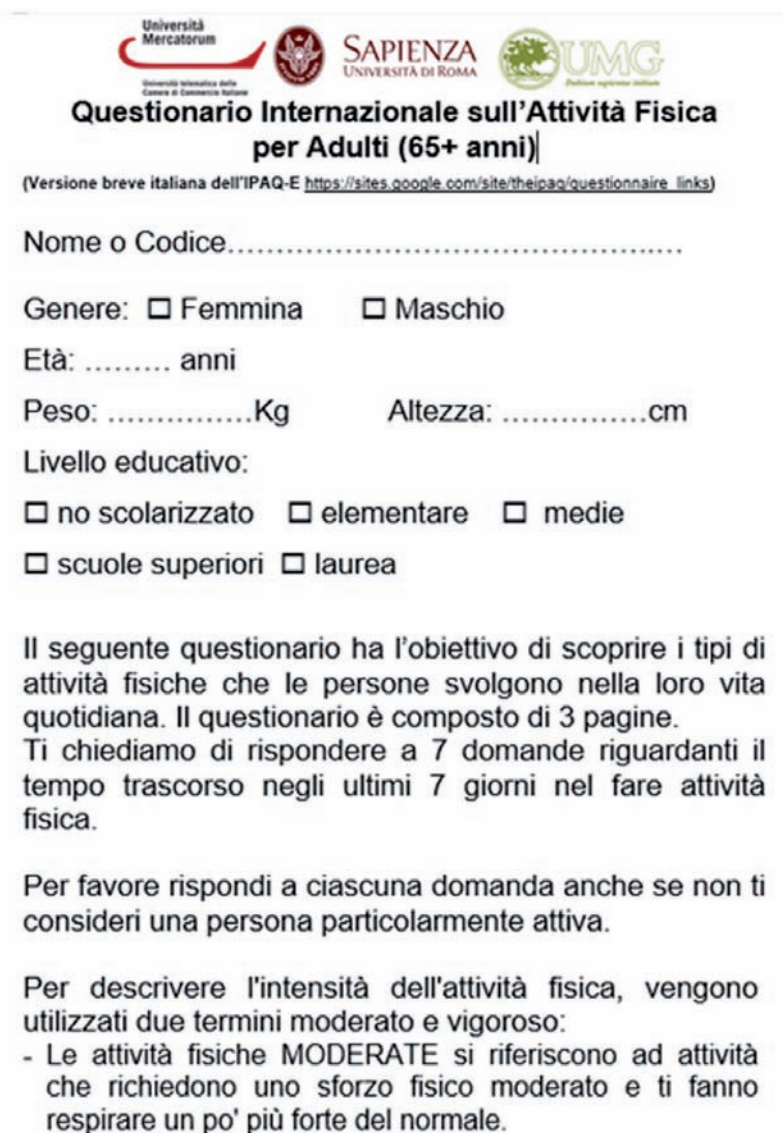
The English version of the short-format IPAQ-E for self-administration in elderly-people included: seven items


covering the last 7 days physical activity or sedentary information and five socio-demographic questions (Fig. 1). The permissions to modify the questionnaire was obtained in February 2021 from the IPAQ group, owner of the original questionnaire.

Two independent researchers have translated the English version independently and a comparison of the two drafts was conducted. The first draft of the IPAQ-EIT was tested on a small sample (N=6) in order to assess the comprehension of the items. The participants (n=6, 3 women, mean age 67 years) filled out the questionnaire, and their comments and questions were used in the development of the final IPAQ-EIT version.

The IPAQ-EIT questionnaires were submitted twice, with an interval of one day between each compilation (T0 and T1).

IPAQ-EIT scoring was performed by subscale: days per weekly, minute-day, or MET-Minute-week (MMS). METs were considered multiples of metabolic and MET-minute





Questionario Internazionale sull'Attività Fisica per Adulti (65+ anni)

(Versione breve italiana dell'IPAQ-E https://sites.google.com/site/theipaq/questionnaire_links)

Nome o Codice.....

Genere: Femmina Maschio

Età: anni

Peso:Kg Altezza:cm

Livello educativo:

no scolarizzato elementare medie

scuole superiori laurea

Il seguente questionario ha l'obiettivo di scoprire i tipi di attività fisiche che le persone svolgono nella loro vita quotidiana. Il questionario è composto di 3 pagine. Ti chiediamo di rispondere a 7 domande riguardanti il tempo trascorso negli ultimi 7 giorni nel fare attività fisica.

Per favore rispondi a ciascuna domanda anche se non ti consideri una persona particolarmente attiva.

Per descrivere l'intensità dell'attività fisica, vengono utilizzati due termini moderato e vigoroso:

- Le attività fisiche MODERATE si riferiscono ad attività che richiedono uno sforzo fisico moderato e ti fanno respirare un po' più forte del normale.

Fig. 1. First page of the questionnaire IPAQ_EIT (available from the corresponding author on request).

production rate a multiplying the METs of an activity by the minutes during which it was carried out (16,17). It is the system used by researchers, clinicians, and practitioners to identify and prescribe physical activities, particularly those rated to be of moderate intensity.

Selection of the sample

Adults with age over 64 years with normal neurological status and without difficulty in ambulation were enrolled in opportunistic way and on voluntary basis in two Italian regions (Latium and Calabria). The recruitment process started on April until May 2021. 30 subjects and with a 10% increase was the size of the sample studied. The subjects enrolled came from two different realities: elderlies who lives in alms-house and in their home.

Statistics

In order to assess the agreement, McNemar's Test was used for qualitative dichotomic variables, Wilcoxon Signed Ranks Test and Spearman correlation coefficients for continuous data.

In addition, for checking whether any item was not consistent with the rest of the scale, and could thus can be discarded, a reliability analysis was performed. Cronbach's alpha was computed to measure the internal consistency of all items and considering if one item was deleted. In order to assess the internal consistency, the item number 1 inversely related to the other items was been inverted in the computation.

The item-total correlation adding and eliminating items one at a time was performed too.

The level of significance was set at $p < 0.05$. The software used to analyse data was SPSS 25.00 for Windows.

Ethical approval

The Italian legislation currently regulates only observational studies on medicinal products, leaving the conduction of other observational studies without a normative reference (18,19).

Results

Translation and cultural adaptation

The process of translation from the English version into Italian language had consider to adapt the activity examples according to the comments of the participants in the pilot group for each description of intensity levels. Moreover, during the pilot testing, we received negative reactions from the participants regarding the order of the questions. Originally, the question order was from vigorous to light activities (i.e. vigorous, moderate, walking and sitting). The IPAQ-EIT has a reversed order of the items.

Reliability

Thirty-three questionnaires were submitted at T0 and T1. 100% of response rate was obtained.

Table 1 illustrates the descriptive statistics concerning socio-demographic information. Respondents were mainly female (64%, $n=21$), the mean age of the sample was 73.5 (SD= 6; min=65 and max=89) and 42% have a secondary school degree.

Table 2 shown the items of the questionnaire, the distribution of the answers and the possible significant differences between T0 and T1. The correlation analysis using Spearman's coefficient reported a significant association ($p < 0.001$)

Table 1. Statistical description and univariate analysis (test of the answers according) of socio-demographical variables at T0 vs T1 (absolute frequencies and percentage).

Qualitative Variables		T0 N (%)	p ^a
Gender	Male	21 (63)	0.999
	Female	12 (33)	
Educational level	Primary school	3 (9.1)	0.999
	Secondary school	9 (27.3)	
	High secondary school	14 (42.4)	
	University Degree	7 (21.2)	
Quantitative variables		Mean (SD)	p ^b
Age		73.5 (6.0)	0.999
Weight (kg)		69.8 (11.6)	0.999
High (cm)		163.1 (8.0)	0.999

a: p-value of McNemar's test T0 vs T1 data.

b: p-value of Wilcoxon Signed Ranks Test T0 vs T1 data.

Table 2. Statistical description and univariate analysis (test of the answers according) of IPAQ-E items at T0 and T1.

IPAQ-E questionnaire items (unit of measure)	T0 Mean (SD)	T1 Mean (SD)	P ^a
1. During the last 7 days, how much time did you spend sitting during a day? (minutes per day)	459.39 (181.3)	447.66 (181.7)	0.267
2.0 During the last 7 days, on how many days did you walk for at least 10 minutes at a time? (days per week)	5.3 (2.2)	5.1 (2.4)	0.593
2.1 How much time did you usually spend walking on one of those days? (minutes per day)	97.4 (91.5)	95.8 (108.7)	0.527
3.0 During the last 7 days, on how many days did you do moderate physical activities like gardening, cleaning, bicycling at a regular pace, swimming or other fitness activities. (days per week)	3.3 (2.8)	3.3 (2.9)	0.705
3.1 How much time did you usually spend doing moderate physical activities on one of those days? (minutes per day)	90.2 (122.8)	88.5 (111.9)	0.779
4.0 During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, heavier garden or construction work, chopping woods, aerobics, jogging/running or fast bicycling? (days per week)	1.1 (1.9)	1.0 (1.9)	0.414
4.1 How much time did you usually spend doing vigorous physical activities on one of those days? (minutes per day)	22.4 (36.5)	16.7 (29.3)	0.109

a: p-value of Wilcoxon Signed Ranks Test for paired samples T0 vs T1 scores.

Table 3. Item-total correlation and variability of Cronbach's alpha if one item was deleted.

IPAQ-E questionnaire items	Corrected Item-Total Correlation		Cronbach's Alpha if Item Deleted	
	T0	T1	T0	T1
1. During the last 7 days, how much time did you spend sitting during a day?*	0.050	0.104	0.543	0.626
2. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?	0.541	0.569	0.265	0.452
2.1 How much time did you usually spend walking on one of those days?	0.379	0.609	0.027	0.135
3. During the last 7 days, on how many days did you do moderate physical activities like gardening, cleaning, bicycling at a regular pace, swimming or other fitness activities.	0.622	0.615	0.261	0.450
3.1 How much time did you usually spend doing moderate physical activities on one of those days?	0.274	0.419	0.069	0.269
4. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, heavier garden or construction work, chopping woods, aerobics, jogging/running or fast bicycling?	0.477	0.656	0.266	0.453
4.1 How much time did you usually spend doing vigorous physical activities on one of those days?	0.293	0.450	0.202	0.396

*with the sign changed

between the first and the second questionnaire for all items. The test-retest analysis for two paired samples underlined for all items did not have significant difference.

The reliability analysis was shown in Table 3 if one item was deleted. The Cronbach's alpha computed considering all items at time interval T0 (first submission) was $\alpha = 0.79$ and at time T1 (second submission) $\alpha = 0.84$ (data not shown).

Discussion

The key results on reliability reported an internal consistency between acceptable ($\alpha = 0.79$) and good level ($\alpha = 0.84$) in accordance with Fayers and Machin (13). Concerning on the feasibility the tool resulted to have easy and quick administration, and correct interpretation of the items by the elderly adults respondents. Also in Rubio Castañeda et

al. the total internal consistency for scoring was moderate calculating the Cronbach's alpha, it may be because in this questionnaire very different areas of activity are measured and the items considered could enter into competition, since if you dedicate time to engaging in moderate physical activity is not perform a high / vigorous and vice versa (20).

Whereas this study had several limitations. Firstly, the choice of an opportunistic sample, maybe a random sample could support better the results obtained. This sample could have determined a possible selection bias on the results. The sample size is so very big, and the "validation and reliability", the test-retest analysis could be not robust, because the guidelines recommended using a sample size as large as possible, but given the variation in the types of used questionnaire, there are no absolute rules for the sample size needed to validate a questionnaire (21). Moreover, although the sample size was comparable to numerous other test-retest

reliability studies (22), small sample sizes have the limit of creating some instability in the alpha coefficients and results must be interpreted with caution.

Although there are these critical aspects and a cautious overall interpretation was recommended on the results, the study can be considered in accordance with similar studies (13,20,23). This aspect gives support validity to the Italian version of the IPAQ-EIT.

In conclusion, the validity of the IPAQ-EIT short form was demonstrated, this had an acceptable consistency and resulted feasible to administer and handy to combine with other questionnaires. Therefore, the IPAQ-EIT short form seems worthwhile to use as a tool for measuring physical activity levels in the elderly.

Funding details

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Disclosure statement

The authors report there are no competing interests to declare.

Author contribution

Study conceptualization and design: T.I., A.M.; Data collection: A.M., A.I., T.I.; Data analysis and interpretation: T.I., A.M., G.L.T.; Literature research: T.I.: D.M.; First draft: A.M., A.I., T.I., D.M.; Supervision: Revision and approval of final draft by all the authors.

References

- Ramírez Varela A, Cruz GIN, Hallal P, et al. Global, regional, and national trends and patterns in physical activity research since 1950: a systematic review. *Int J Behav Nutr Phys Act* 2021; 18(1):5
- Mannocci A, D'Egidio V, Backhaus I, et al. Are There Effective Interventions to Increase Physical Activity in Children and Young People? An Umbrella Review. *International Journal of Environmental Research and Public Health* 2020; 17(10):3528
- Mannocci A, Masala D, Mipatrini D, et al. The relationship between physical activity and quality of life in prisoners: a pilot study. *J Prev Med Hyg* 2015; 56(4):E172–5
- Masala D, Mannocci A, Unim B, et al. Quality of life and physical activity in liver transplantation patients: results of a case-control study in Italy. *Transplant Proc* 2012; 44(5):1346–50
- WHO World Health Organization. Global recommendations on physical activity for health. Genève: WHO; 2010
- Mendis S, World Health Organization. Global status report on noncommunicable diseases 2014
- Gomes M, Figueiredo D, Teixeira L, et al. Physical inactivity among older adults across Europe based on the SHARE database. *Age Ageing*. 2017; 46(1):71–7
- Harvey JA, Chastin SFM, Skelton DA. How Sedentary are Older People? A Systematic Review of the Amount of Sedentary Behavior. *J Aging Phys Act* 2015; 23(3):471–87
- Craig CL, Marshall AL, Sjöström M, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc* 2003; 35(8):1381–95
- IPAQ Research Committee. Downloadable questionnaires - International Physical Activity Questionnaire [Internet]. Available on: https://sites.google.com/site/theipaq/questionnaire_links
- Mannocci A, Di Thiene D, Del Cimmuto A, et al. International Physical Activity Questionnaire: Validation and assessment in an Italian sample. *Italian Journal of Public Health*. 2010; 7(4):369–76
- Mannocci A, Bontempi C, Colamesta V, et al. Reliability of the telephone-administered international physical activity questionnaire in an Italian pilot sample. *Epidemiology Biostatistics and Public Health* 2014; 11(1):e8860–9
- Machin D, Fayers P. Quality of life: the assessment, analysis and interpretation of patient-reported outcomes [Internet]. Hoboken, N.J.: Wiley; 2013. Available on: <http://rbdigital.oneclickdigital.com>
- Hurtig-Wennlöf A, Hagströmer M, Olsson LA. The International Physical Activity Questionnaire modified for the elderly: aspects of validity and feasibility. *Public Health Nutrition* 2010;13(11):1847–54
- von Elm E, Altman DG, Egger M. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: Guidelines for reporting observational studies. *International Journal of Surgery* 2014; 12(12):1495–9
- Byrne NM, Hills AP, Hunter GR, Metabolic equivalent: one size does not fit all. *Journal of Applied Physiology* 2005; 99(3):1112–9
- Ainsworth BE, Haskell WL, Whitt MC, et al. Compendium of physical activities: an update of activity codes and MET intensities. *Med Sci Sports Exerc* 2000;32(9 Suppl):S498–504.
- AGENZIA ITALIANA DEL FARMACO. Linee guida per la classificazione e conduzione degli studi osservazionali sui farmaci. [Internet] 2008. Available on: <https://www.gazzettaufficiale.it/eli/id/2008/03/31/08A02109/sg>
- Petrini C, Fiori G, Gussoni G, et al. The increasing need for a new Italian legislation to facilitate execution of observational studies assuring ethics and the highest standards of scientific and methodological quality. Editorial. *Ann Ist Super Sanita* 2020; 56(3):257–9
- Rubio Castañeda FJ, Tomás Aznar C, Muro Baquero C. [Validity, Reliability and Associated Factors of the International Physical Activity Questionnaire Adapted to Elderly (IPAQ-E)]. *Rev Esp Salud Publica* 2017;91:e201701004.
- Tsang S, Royse C, Terkawi A. Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine. *Saudi Journal of Anaesthesia*. 2017; 11(5):80
- Green J, Young J. A test-retest reliability study of the Barthel Index, the Rivermead Mobility Index, the Nottingham extended Activities of Daily Living Scale and the Frenchay Activities Index in stroke patients. *Disability and Rehabilitation* 2001; 23(15):670–6
- Tomioka K, Iwamoto J, Saeki K, et al. Reliability and Validity of the International Physical Activity Questionnaire (IPAQ) in Elderly Adults: The Fujiwara-kyo Study. *J Epidemiol* 2011; 21(6):459–65