

RESEARCH PAPER

Adaptation of the Modified Habitual Physical Activity Questionnaire (Baecke) to the portuguese population

Adaptação do Habitual *Physical Activity Questionnaire* (Baecke), versão modificada, para a população portuguesa

Adaptación del cuestionario Habitual *Physical Activity Questionnaire* (Baecke), versión modificada, para la población portuguesa

Maria Celeste Bastos Almeida*; José Luís Pais Ribeiro**

Abstract

Theoretical Framework: The use of questionnaires to assess physical activity has become widespread in recent years.

Objectives: To contribute to a modified version of the Habitual Physical Activity Questionnaire (Baecke) to the portuguese population; describe the linguistic adaptation process of the questionnaire and analyse its psychometric properties; assess the level of physical activity; and analyse the relationship between the socio-demographic variables and the level of physical activity.

Methodology: Items were independently translated and back-translated and a first version of the questionnaire was applied in a pilot study, resulting in a consensus version. The portuguese version was administered to a convenience sample, with 339 adults in the community, aged between 23 and 60 years, both female (69.9%) and male (30.1%).

Results: The portuguese version was found to have satisfactory psychometric qualities, which were identical to those of the original questionnaire. It is a short instrument, easily understood and well accepted by participants.

Conclusion: The application of this questionnaire allows for an initial assessment of the level of physical activity in leisure time to support the planning of interventions promoting physical activity.

Keywords: physical activity; exercise; questionnaires.

Resumo

Enquadramento: O uso de questionários para avaliar a atividade física generalizou-se nos últimos anos.

Objetivos: Contribuir para a adaptação à população portuguesa, do *Habitual Physical Activity Questionnaire*; descrever o processo de adaptação linguística e analisar as suas propriedades psicométricas; avaliar a atividade física e analisar as relações das variáveis sociodemográficas com a atividade física.

Metodologia: Tradução e retroversão dos itens, realizadas de forma independente, e uma primeira versão do questionário foi aplicada num estudo piloto, resultando numa versão de consenso. A versão portuguesa foi aplicada a uma amostra de conveniência, de 339 adultos da comunidade, com idades compreendidas entre os 23 e os 60 anos, do sexo feminino (69,9%) e do sexo masculino (30,1%).

Resultados: A versão portuguesa revelou possuir qualidades psicométricas satisfatórias e idênticas às do questionário original. É um instrumento curto, de fácil compreensão e bem aceite pelos participantes.

Conclusão: A aplicação deste questionário permite fazer um diagnóstico inicial em relação à atividade física no tempo de lazer para sustentar o planeamento de intervenções promotoras da atividade física.

Palavras-chave: atividade física; exercício físico; questionários.

Resumen

Marco contextual: El uso de cuestionarios para evaluar la actividad física se ha generalizado en los últimos años.

Objetivo: Contribuir a la adaptación para la población portuguesa del *Habitual Physical Activity Questionnaire* (Cuestionario de Baecke); describir el proceso de adaptación lingüística del cuestionario y analizar sus propiedades psicométricas; evaluar el nivel de actividad física, y analizar la relación de las variables sociodemográficas con el nivel de actividad física.

Metodología: La traducción y la traducción inversa de los ítems se realizaron de forma independiente, y una primera versión del cuestionario se aplicó en un estudio piloto, lo que dio como resultado una versión de consenso. La versión portuguesa fue administrada a una muestra de conveniencia, con 339 participantes, adultos de la comunidad con una edad comprendida entre 23 y 60 años ($M = 36$, $DT = 8,39$), del sexo femenino (69,9 %) y masculino (30,1 %), profesionales de la salud (57,5 %) y profesores (42,5 %).

Resultados: La versión portuguesa demostró que tiene propiedades psicométricas satisfactorias e idénticas a las del cuestionario original. Se trata de un instrumento breve, de fácil comprensión y bien aceptado por los participantes.

Conclusión: La aplicación de este cuestionario permite realizar una evaluación inicial sobre el nivel de actividad física en el tiempo libre para apoyar la planificación de las intervenciones de promoción de la actividad física en la población.

Palabras clave: actividad física; ejercicio físico; cuestionarios.

* Adjunct Teacher, Porto Nursing College, 4700-072, Porto, Portugal [cbastos@esenf.pt]. Address for correspondence: Escola Superior de Enfermagem do Porto, Rua Dr. António Bernardino de Almeida, 4700-072 Porto, Portugal.

** Associate Professor with aggregation, Faculty of Psychology and Educational Sciences, University of Porto, 4200-135, Porto, Portugal [jlp@fpce.up.pt].

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Introduction

Physical activity is considered to play an important role in health. Meta-analytic studies demonstrate its benefits in preventing chronic diseases (Kruk, 2007), reducing the risk of cardiovascular diseases (Li & Siegrist, 2012), and preventing and treating high blood pressure (Barengo, Gang, & Tuomilehto, 2007). It is also a protective factor of vascular dementia (Aarsland, Sardahaee, Anderssen, & Ballard, 2010).

The low prevalence of physical activity was reported, in 2008, in a study conducted by the World Health Organization in 51 countries (Guthold, Ono, Strong, Chatterji, & Morabia, 2008) and an international study on the prevalence of physical activity covering 20 countries (Bauman et al., 2009). Furthermore, there is evidence of differences in the level of physical activity according to gender (Bauman et al., 2009; Hirsch et al., 2010; Palacios-Ceña et al., 2011), marital status (Palacios-Ceña et al., 2011; Sobal & Hanson, 2010; Yu et al., 2011) and educational level (Baecke, Burema, & Frijters, 1982; Yu et al., 2011).

Already in 1995, the Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) presented the national recommendations for the type and amount of physical activity needed (Haskell et al., 2007). However, the growing interest in promoting physical activity was triggered mainly by the proposal of the World Health Organization: *Global Strategy on Diet, Physical Activity and Health* (WHO, 2004), which conveyed the need to promote physical activity in everyday life and across the various settings where it occurs (for example, at home, in the workplace, at school, in the community) as the main strategy for reducing the risk of chronic non-communicable diseases.

Background

Physical activity is a multidimensional behaviour involving several variables and also a complex and not easily measured behaviour (Aarsland et al., 2010). Although physical activity and physical exercise are often used with the same meaning, their definition is conceptually different. Physical activity is defined as any bodily movement produced by the skeletal

muscles that results in energy expenditure above resting level, and includes all activities of daily living, such as occupational, sport, household or leisure activities (Caspersen, Powell, & Christenson, 1985). Physical exercise is a more specific type of physical activity, which may be regarded as a subcategory, because it encompasses an activity that is planned, structured and repetitive that is expected to improve physical fitness (Caspersen et al., 1985).

Sport is another term often associated with physical activity and physical exercise, and lacking a consensual definition. Acknowledging the difficulty of conceptualisation, which goes beyond the scope of this research study, we consider that, for the purpose of this work, sports may include a more organised and regulated activity, oriented towards competition or not, and also more informal scheduled and regular sport activities. Therefore, we aim at covering a broader side of sports as a human activity that can be performed by the population in general and not restrict it to an area of the institutionalised social activity, oriented towards competition.

Several methods to assess physical activity are referred to in the literature; however, in epidemiological studies or studies with high numbers of participants, questionnaires are the methods of choice (Hertogh, Monninkhof, Schouten, Peeters, & Schuit, 2008). Despite the limitations of these methods, questionnaires imply lower costs and are easier to use (Ono et al., 2007). Furthermore, their linguistic and cultural adaptation allows for the comparison between different populations.

Among several questionnaires, the *Habitual Physical Activity Questionnaire* (Baecke, Burema, & Frijters, 1982), often designated as *Baecke Questionnaire*, is a short and easy-to-use instrument (Ono et al., 2007), which allows comparing participants in terms of physical activity and, simultaneously, identifying behaviours that may be changed to increase the level of physical activity. That was the reason for choosing this questionnaire for this study.

The *Habitual Physical Activity Questionnaire* (HPAQ) has been used with different populations and its psychometric qualities have been recognised to assess the level of habitual physical activity in adult men (Florindo & Latorre, 2003), in the elderly (Hertogh et al., 2008) and in women with hip disorders (Ono et al., 2007). In Portugal, no version of the

questionnaire has ever been published in a scientific journal that described the adaptation process of the instrument to the portuguese population. That is the reason for conducting this study, so as to facilitate and standardise the use of the instrument at a national level. Thus, this study aims at contributing to the development of future research and intervention studies on physical activity and its promotion. The purpose of the study was to adapt the HPAQ (sport and physical activity in leisure time subscales) to the portuguese population, using a sample of adults from the community. The aims of the study were: to describe the translation and linguistic adaptation process of the questionnaire and analyse its psychometric properties. It also aimed at assessing the level of physical activity and analysing the relationship between the socio-demographic variables and the level of physical activity.

Table 1
Socio-demographic characteristics of the sample

Variables		nº	%
Gender	Female	237	69.9
	Male	102	30.1
Marital status	Unmarried	109	32.1
	Married	230	67.9
Profession	Health care professionals	195	57.5
	Teachers (from pre-school to secondary education)	144	42.5

Data collection tools

Participants answered the portuguese version of the HPAQ under study, which was designed by Baecke, Burema, and Frijters (1982), and also a demographic questionnaire. The HPAQ is a self-administered questionnaire, consisting of 16 items, which aims at assessing the habitual physical activity over the last 12 months in three different areas: physical activity at work, sport during leisure time and physical activity during leisure time excluding sport. Given that the three areas can be assessed separately, our study only included sport during leisure time (PA-sports) and physical activity during leisure time excluding sport (PA-leisure). Physical activity at work was not included, because that would have increased the number of items, lengthening the final questionnaire. Considering that this work is part of a more extended study on motivation and health behaviours, we aimed at a short

Methodology

Exploratory, descriptive and cross-sectional study.

Sample

Convenience sample consisting of 339 adults from the community: health care professionals and teachers, residents in the area of Porto and municipalities of Santa Maria da Feira and Oliveira de Azeméis (district of Aveiro). Participants were aged between 23 and 60 years ($M = 35.92$; $SD = 8.39$) and had completed their higher education studies. With respect to marital status, only two categories were considered: unmarried (including single, widowed and divorced/separated participants) and married (including participants who were either married or in a non-marital relationship). Table 1 shows the socio-demographic characteristics of the sample.

questionnaire, that allowed comparing participants and, at the same time, identifying behaviours that could be changed in order to promote physical activity. On the other hand, the sample of this study consisted of people whose occupational physical activities were very similar. The questionnaire was composed of 8 items, divided into two dimensions:
1 - PA-sport (4 items) - aimed at assessing the level of physical activity in sports or the scheduled physical exercise during leisure time.
2 - PA-leisure (4 items) - aimed at assessing the level of physical activity during leisure time excluding sport (for example, walking or cycling). All answers were scored on a 5-point scale, with the exception of the question on sports. The higher the score of each item, the higher the level of physical activity. Each of the two groups or dimensions of physical activity have a partial index. The total level

of physical activity is calculated by the sum of both partial values.

In the original study, the PA-sport was subdivided into three levels of intensity, according to the type of sport activity: low level, for activities such as billiards, sailing, bowling and golf (energy expenditure of 0.76 MJ/h); middle level, for activities such as badminton, cycling, dancing, swimming and tennis (energy expenditure of 1.26 MJ/h); and high level, for activities such as boxing, basketball, football, rugby and rowing (energy expenditure of 1.76 MJ/h) (Baecke et al., 1982).

In this study, sport intensity followed the Compendium of Physical Activities by Ainsworth et al. (2000), it was based on energy expenditure and expressed in

MET (metabolic equivalent). This was in line with the validation study of the same questionnaire for the Brazilian population carried out by Florindo and Latorre (2003). Three levels of intensity were considered: low intensity (MET <3), moderate intensity (3 to 6 METs) and vigorous intensity (> 6 METs). The PA-sport index, as in the original study, was calculated by combining sport intensity, weekly frequency and proportion of regular practice over the year.

The final version of the questionnaire, following the linguistic adaptation process, as well as the formulas for calculating the partial index of both dimensions and the total index of physical activity are shown in Figure 1.

1. Prática desporto ou exercício físico programado?	Intensidade ligeira: < 3 METS (0,76)				
Sim	Intensidade moderada: ≥ 3 e ≤ 6 METS (1,26)				
Não	Intensidade vigorosa: > 6 METS (1,76)				
Se sim, qual o desporto que pratica mais frequentemente?	Intensidade: 0,76 – 1,26 – 1,76				
Quantas horas por semana? < 1h; 1-2h; 2-3h; 3-4h; > 4h	Tempo: 0,5 – 1,5 – 2,5 – 3,5 – 4,5				
Quantos meses por ano? < 1; 1-3; 4-6; 7-9; > 9	Proporção: 0,04 – 0,17 – 0,42 – 0,67 – 0,92				
Se pratica um segundo desporto. Qual o desporto que pratica?	Intensidade: 0,76 – 1,26 – 1,76				
Quantas horas por semana? < 1h; 1-2h; 2-3h; 3-4h; > 4h	Tempo: 0,5 – 1,5 – 2,5 – 3,5 – 4,5				
Quantos meses por ano? < 1; 1-3; 4-6; 7-9; > 9	Proporção: 0,04 – 0,17 – 0,42 – 0,67 – 0,92				
Cálculo do item 1: desporto 1 (intensidade x tempo x proporção) + desporto 2 (intensidade x tempo x proporção)	1 0	2 0,01 < 4	3 ≥ 4 < 8	4 ≥ 8 < 12	5 ≥ 12
2. Em comparação com outras pessoas da sua idade, considera que a atividade física que realiza nos tempos livres é:	1 muito menor	2 menor	3 igual	4 maior	5 muito maior
3. Por dia, quantos minutos costuma andar a pé ou de bicicleta (para ir e vir do trabalho, da escola ou fazer compras)?	1 < 5m	2 5 a 15m	3 15 a 30m	4 30 a 45m	5 > 45m
4. Nos tempos livres, com que frequência costuma transpirar (devido às atividades que realiza?)	1 nunca	2 raramente	3 algumas vezes	4 frequentemente	5 muito frequentemente
5. Nos tempos livres, com que frequência costuma praticar desporto ou exercício físico programado?	1 nunca	2 raramente	3 algumas vezes	4 frequentemente	5 muito frequentemente
6. Nos tempos livres, com que frequência costuma ver televisão?	1 nunca	2 raramente	3 algumas vezes	4 frequentemente	5 muito frequentemente
7. Nos tempos livres, com que frequência costuma andar a pé?	1 nunca	2 raramente	3 algumas vezes	4 frequentemente	5 muito frequentemente
8. Nos tempos livres, com que frequência costuma andar de bicicleta?	1 nunca	2 raramente	3 algumas vezes	4 frequentemente	5 muito frequentemente

Fórmulas de cálculo:

$$\text{Índice de Desporto (AF-desporto)} = (I_1 + I_2 + I_4 + I_5) / 4$$

$$\text{Índice de Lazer (AF-lazer)} = [I_3 + (6 - I_6) + I_7 + I_8] / 4$$

$$\text{Atividade Física Habitual Total} = \text{AF-desporto} + \text{AF-lazer}$$

Figure 1. Questionário de Atividade Física Habitual modificado (índice AF-desporto e AF-lazer).

Procedures

After receiving the authors' authorisation to use the questionnaire, the english version was translated into portuguese by two independent translators and back-translated by a third translator.

Then, two researchers (Ph.Ds. in the area of health sciences) and one health care professional (nurse specialist at a Community Care Unit - *Unidade de Cuidados à Comunidade*) compared and analysed the differences between the various versions and drew up a preliminary version of the questionnaire.

The preliminary version was applied in a pilot study to people from the community so as to assess the clarity of the instructions/questions and identify possible difficulties in answering it. A heterogeneous sample in terms of gender, level of education and profession was selected to adapt the questionnaire to the general population, regardless of their socio-economic and educational level. The sample of the pilot study was composed of 10 participants of both genders, with different levels of education and aged between 24 and 56 years.

Some participants assigned a meaning of competition and/or supervised training to the word *sports*, while excluding activities such as walking, jogging or other scheduled and regular physical exercises carried out individually or in group, though without supervision. Hence, it became necessary to better clarify its meaning. In that sense, we choose to use the expression *scheduled sport or physical exercise* instead, because it is more comprehensive and appropriate to our linguistic and cultural reality. In relation to the word *leisure*, some participants pointed out that the expression *free time* was easier to understand. The questionnaire was then reviewed again by two researchers, resulting in a final consensus version.

The request to collect data in a (Nursing) higher education institution of Porto and two school clusters (from pre-school education to secondary education) in the Municipalities of Santa Maria da Feira and Oliveira de Azeméis (district of Aveiro) was formalised. Health care professionals working in different institutions in these cities were also individually contacted.

Ethical-legal considerations

After the institutions' authorisation and the participants' voluntary acceptance for participation, the latter were explained the purpose of the study, and

the confidentiality of their statements was ensured. The code of conduct of the Declaration of Helsinki was followed, as well as the ethical aspects underlying the scientific practice of the University of Porto.

Results

Data were analysed using the Statistical Package for Social Sciences (SPSS 19.0): analysis of the factor structure, internal consistency and convergent validity of the scale items. The levels of total physical activity, sport activity and leisure time physical activity excluding sport were also assessed and the groups were compared. Parametric statistical tests were used, because they are more robust and their sample size is closer to normal distribution, which is an essential requirement for use.

Factor structure analysis

The eight items of the questionnaire were subjected to the Principal Components Analysis (PCA), using the Quartimax rotation method and following the same procedure as the authors of the original questionnaire to facilitate the comparison of results.

The inter-item correlation matrix showed the presence of several coefficients with values equal to or greater than 0.30. The KMO value was 0.83 and the statistical significance of the Bartlett's sphericity test was $p = 0.000$. Using the Quartimax rotation method and component loading values greater than or equal to 0.50, the PCA revealed the presence of two components with eigenvalues > 1 , thus explaining 56.58% of the total variance. The component loading values found in both the current study and the original study (with a sample of 306 Dutch participants aged between 20 and 32 years) were similar in some items. The results of both studies are shown in Table 2.

When comparing both studies, differences were more evident in item 8 (*During your free time, how often do you cycle?*), which in the current study scored below the value found in the original study (less 0.28), and item 3 (*How many minutes do you walk and/or cycle per day...*), which in our study scored above the value found in the original study (more 0.15). The amount of explained variance was not comparable as all three subscales were considered in the original study, while this study only considered two subscales (PA-sport and PA-leisure).

Table 2

Component structure of the items in the current study and the study by Baecke, Burema and Frijters (1982)

Items in the current study and their correspondence in the original study	Components	
	1 PA-sport	2 PA - leisure
1 corresponds to item 9	0.83 (0.86)	
2 corresponds to item 10	0.82 (0.78)	
4 corresponds to item 11	0.68 (0.59)	
5 corresponds to item 12	0.88 (0.87)	
3 corresponds to item 16		0.65 (0.50)
6 corresponds to item 13		0.57 (0.52)
7 corresponds to item 14		0.61 (0.72)
8 corresponds to item 15		0.51 (0.79)
Total variance (56.58%)	42.65%	13.93%
Eigenvalues	3.41	1.12

Note: the values of the current study are in **bold** and the values of the original study are in parentheses

Reliability Analysis

Internal consistency was assessed using the Cronbach's alpha. The values obtained were 0.78 for the PA-total, 0.83 for the PA-sport subscale and 0.54 for the PA-leisure subscale. It was not possible to compare these values to the ones found in the original study, because the authors did not present those results.

The value for the PA-leisure subscale was low, so we calculated the inter-item correlation and obtained very low values for item 6 (between 0.07 and 0.12). The other inter-item correlations varied between 0.26 and 0.41. If item 6 had been deleted (*During your*

free time, how often do you watch TV), the internal consistency would have improved ($\alpha = 0.61$).

Analysis of the convergent validity of the items in the scale

The correlation between each item and its subscale was always higher than the correlation between each item and the subscale to which it did not belong. The results are shown in Table 3. All items had correlation values with their subscale and the total scale higher than 0.40, except item 6 (value of correlation with total scale: 0.25), which had already shown weaknesses in the internal consistency analysis.

Table 3

Correlation of the items with the subscales and the total scale

Items	PA-sport	PA-leisure	PA-total
Item 1	0.82**	0.30**	0.69**
Item 2	0.84**	0.34**	0.72**
Item 3	0.31**	0.73**	0.57**
Item 4	0.72**	0.39**	0.67**
Item 5	0.89**	0.51**	0.84**
Item 6	0.05	0.43**	0.25**
Item 7	0.41**	0.71**	0.63**
Item 8	0.43**	0.70**	0.64**

**Significant correlation for $p < 0.01$

Descriptive analysis and group comparison

The indices for physical activity in sports ($M = 2.62$; $SD = 0.81$; Min. = 1.00; Max. = 4.75), physical activity during free time or leisure time ($M = 2.68$; $SD = 0.62$; Min. = 1.50; Max. = 5.00) and total

physical activity ($M = 5.29$; $SD = 1.23$; Min. = 2.75; Max. = 9.25) were calculated. Taking into account the maximum values, results suggest that participants showed moderately low mean values, which were all below the mid-point of the different subscales.

The mean physical activity in sports for the total sample was moderately low, with t-test results for one sample indicating that it had statistical significance ($t(338) = -8.65, p = 0.000$). The mean physical activity during leisure excluding sport was also moderately low, with t-test results for one sample indicating that it had statistical significance ($t(336) = -9.40, p = 0.000$).

We tried to analyse possible differences between groups according to the various socio-demographic variables, using the student's t-test for independent samples. Table 4 shows the descriptive measures according to gender, marital status, and profession.

Table 4
Descriptive measures according to the socio-demographic variables

		PA- sport		PA-leisure		PA-total	
		M	SD	M	SD	M	SD
Gender	Female	2.45	0.74	2.64	0.61	5.09	1.19
	Male	3.00	0.82	2.76	0.63	5.77	1.20
Marital Status	Unmarried	2.85	0.85	2.72	0.57	5.57	1.18
	Married	2.50	0.76	2.66	0.64	5.17	1.24
Profession	Health	2.60	0.85	2.72	0.66	5.33	1.32
	Education	2.63	0.74	2.62	0.56	5.25	1.09

Discussion

In the process of translation and linguistic adaptation of the questionnaire, the guidelines regarding the translation/back-translation of the items were followed and the questionnaire was applied in a pilot study, with review by professionals and researchers in the area of health sciences to better clarify the language and adjust to the sociocultural reality. After data collection, the psychometric properties of the questionnaire were analysed. Through the Principal Component Analysis, two distinct components were found in the habitual physical activity were found, which is in line with the original study. The first component related to playing sports during leisure time included items 1, 2, 4 and 5. The second component related to physical activity during leisure time excluding sport included items 3, 6, 7 and 8. The values found for internal consistency and validity in this study were acceptable, given the number of items. However, the weakness revealed by item 6 (*to watch TV during free time*) should be highlighted. Since this item referred to a sedentary

lifestyle and not to the practice of physical activity, including it did not seem theoretically coherent. However, as none of the studies consulted mentioned that aspect, the item was still kept in the questionnaire. The physical activity of the participants included in our study was moderately low. This result was consistent with the low levels of physical activity found in other studies (Guthold et al., 2008; Kruk, 2007), thus reflecting a global problem which institutions with responsibilities in the health domain, in the different countries and worldwide, are looking to solve. When comparing the means of both physical activity subscales, *i.e.* the means of the study carried out by Baecke, Burema, and Frijters (1982) and that of the current study, the results found were similar, although the groups were different in terms of age. We expected to find lower physical activity levels in our sample, since the literature suggests a decrease in physical activity during leisure time with age (Hirsch et al., 2010) and participants in the study of Baecke et al. (1982) were aged between 20 and 30 years, while participants in our study were aged between 23 and 60 years.

In the questionnaire's validation study conducted in Brazil by Florindo and Latorre (2003), the means of physical activity were clearly higher in all areas when compared to the means of our study. However, samples were not comparable in terms of gender, age and cultural context, since the sample of this study included only male subjects aged between 27 and 37 years ($M = 32.6$).

In our study, men had a higher level of physical activity than women, which is consistent with the results found in 17 of 20 countries in an international study on the prevalence of physical activity (Bauman et al., 2009) and other studies with elderly people (Hirsch et al., 2010; Palacios-Ceña et al., 2011). In the study by Baecke et al. (1982), men had significantly higher levels of physical activity than women only in sports. The higher level of physical activity shown by men may be related to their time availability and gender roles and stereotypes. There is evidence of an uneven distribution of family responsibilities and a distribution of household tasks which leaves women with less free time (Poeschl, 2010).

As for the higher values of physical activity among unmarried participants than married participants, the same result was referred to in the studies by Palacios-Ceña et al. (2011), and Sobal and Hanson (2010). According to Sobal and Hanson (2010), the amount and type of physical activity during leisure time may be related to the demands of marital roles and the implicit norms on the type of activity depending on the marital identity. However, this association between marital status and physical activity was not always found (Yu et al., 2011). It should be noted that the way in which marital relationships are associated with physical activity or not is still poorly analysed and an important aspect to consider is the type of activity assessed (Sobal & Hanson, 2010).

With regard to the level of education, studies suggest an association between physical activity and a higher level of education (Baecke et al., 1982; Yu et al., 2011). This association could not be compared in this sample since all participants had a higher education degree. We believe that the homogeneity of the sample regarding the level of education and profession was a limitation of our study. In future studies, it would be appropriate to use more heterogeneous samples. In further studies, the participants' high level of education could compromise the application of the questionnaire to people with different socioeconomic

and educational levels. However, the pilot study using its initial version in 10 participants with different levels of education allowed for the discussion and assessment of expressions, thus facilitating the use of the instrument in the general population.

Conclusion

The assessment of the level of physical activity only comprised the activity during leisure time, including sport activities or others. Occupational activities were not assessed. This choice was made because we believe that the potential for change of behaviours is essentially related to activities performed during free time and not so much to work activities.

We believe that the objectives proposed for this study were achieved, particularly the description of the translation and linguistic adaptation process of the questionnaire, analysis of the psychometric properties of the questionnaire, and assessment of the participants' level of physical activity, by comparing groups according to their socio-demographic variables.

After the translation/adaptation process of the HPAQ, the version used proved to be a short, easy-to-understand and well-accepted instrument by the participants. The questionnaire had an acceptable factor structure, internal consistency and convergent validity.

In relation to differences between groups, significant differences were found in the gender and marital status variables, with men and unmarried participants showing higher levels of physical activity.

Following this first adaptation process, the application of the questionnaire to a wider and heterogeneous sample may be more enlightening in the sense of improving its use and contributing to the identification of intervention strategies that promote physical activity behaviour change.

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References

- Aarsland, D., Sardahace, F. S., Anderssen, S., & Ballard, C. (2010). Is physical activity a potential preventive factor for vascular dementia? A systematic review. *Aging & Mental Health*, 14(4), 386-395. doi:10.1080/13607860903586136
- Ainsworth, B. E., Haskell, W. L., Whitt, M. C., Irwin, M. L., Swartz, A. N. N. M., Strath, S. J., ... Leon, A. S. (2000). Compendium of physical activities: An update of activity codes and MET intensities. *Medicine & Science in Sports & Exercise*, 32(9 Suppl.), S498-S516.
- Baecke, J. A., Burema, J., & Frijters, J. E. (1982). A short questionnaire for the measurement of habitual physical activity in epidemiological studies. *The American Journal of Clinical Nutrition*, 36(5), 936-942. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/7137077>
- Barengo, N., Hu, G., & Tuomilehto, J. (2007). Physical activity and hypertension: Evidence of cross-sectional studies, cohort studies and meta-analysis. *Current Hypertension Reviews*, 3(4), 255-263. doi:10.2174/157340207782403890
- Bauman, A., Bull, F., Chey, T., Craig, C. L., Ainsworth, B. E., Sallis, J. F., ... Pratt, M. (2009). The International prevalence study on physical activity: Results from 20 countries. *The International Journal of Behavioral Nutrition and Physical Activity*, 6(21), 1-11. doi:10.1186/1479-5868-6-21
- Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports*, 100(2), 126-131. Retrieved from <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1424733&tool=pmcentrez&rendertype=abstract>
- Florindo, A. A., & Latorre, D. O. (2003). Validação e reprodutibilidade do questionário de Baecke de avaliação da atividade física habitual em homens adultos. *Revista Brasileira Medicina Esporte*, 9(11), 121-128.
- Guthold, R., Ono, T., Strong, K. L., Chatterji, S., & Morabia, A. (2008). Worldwide variability in physical inactivity a 51-country survey. *American Journal of Preventive Medicine*, 34(6), 486-494. doi:10.1016/j.amepre.2008.02.013
- Haskell, W. L., Lee, I. M., Pate, R. R., Powell, K. E., Blair, S. N., Franklin, B. A., ... Bauman, A. (2007). Physical activity and public health: Updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Circulation*, 116(9), 1081-1093. doi:10.1161/CIRCULATIONAHA.107.185649
- Hertogh, E. M., Monninkhof, E. M., Schouten, E. G., Peeters, P. H. M., & Schuit, A. J. (2008). Validity of the Modified Baecke Questionnaire: Comparison with energy expenditure according to the doubly labeled water method. *International Journal of Behavioral Nutrition and Physical Activity*, 5(30), 1-6. doi:10.1186/1479-5868-5-30
- Hirsch, C. H., Diehr, P., Newman, A. B., Gerrior, S. A., Pratt, C., Lebowitz, M. D., & Jackson, S. A. (2010). Physical activity and years of healthy life in older adults: Results from the cardiovascular health study. *Journal of Aging and Physical Activity*, 18(3), 313-334. Retrieved from <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3978479&tool=pmcentrez&rendertype=abstract>
- Kruk, J. (2007). Physical activity in the prevention of the most frequent chronic diseases: An analysis of the recent evidence. *Asian Pacific Journal of Cancer Prevention*, 8(3), 325-338. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/18159963>
- Li, J., & Siegrist, J. (2012). Physical activity and risk of cardiovascular disease-a meta-analysis of prospective cohort studies. *International Journal of Environmental Research and Public Health*, 9(2), 391-407. doi:10.3390/ijerph9020391
- Ono, R., Hirata, S., Yamada, M., Nishiyama, T., Kurosaka, M., & Tamura, Y. (2007). Reliability and validity of the Baecke physical activity questionnaire in adult women with hip disorders. *BMC Musculoskeletal Disorders*, 8(61). doi:10.1186/1471-2474-8-61
- Palacios-Ceña, D., Alonso-Blanco, C., Jiménez-García, R., Hernández-Barrera, V., Carrasco-Garrido, P., Pileño-Martínez, E., & Fernández-de-Las-Peñas, C. (2011). Time trends in leisure time physical activity and physical fitness in elderly people: 20 year follow-up of the Spanish population national health survey (1987-2006). *BMC Public Health*, 11(799). doi:10.1186/1471-2458-11-799
- Poeschl, G. (2010). Desigualdades na divisão do trabalho familiar, sentimento de justiça e processos de comparação social. *Análise Psicológica*, 28(1), 29-42.
- Sobal, J., & Hanson, K. (2010). Marital status and physical activity in US adults. *International Journal of Sociology of the Family*, 36(2), 181-198. doi:10.2307/23028828
- World Health Organization (2004). *Global strategy on diet, physical activity and health*. Geneva, Switzerland: Author. Retrieved from www.who.int/dietphysicalactivity/strategy/eb11344/strategy_english_web.pdf
- Yu, G., Renton, A., Wall, M., Estacio, E., Cawley, J., & Datta, P. (2011). Prevalence of low physical activity and its relation to social environment in deprived areas in the London Borough of Redbridge. *Social Indicators Research*, 104(2), 311-322. doi:10.1007/s11205-010-9745-x

