Rev Saúde Pública 2011;45(2)

Gabriela de Barros Leite Domingues[I]

Maria Cecília Gallani[II]

Claudio Alexandre Gobatto[III]

Cinthya Tamie Passos Miura[I]

Roberta Cunha Matheus Rodrigues[II]

Jonathan Myers[IV]

Cultural adaptation of an instrument to assess physical fitness in cardiac patients

ABSTRACT

OBJECTIVE: To validate the content and to evaluate the reliability of the Veterans Specific Activity Questionnaire instrument, culturally adapted for use in the Brazilian population of cardiac patients.

METHODS: The instrument was translated and back-translated and subsequently analyzed by a committee of judges to evaluate its semantic-idiomatic and cultural equivalences. Physical activities were replaced when indicated in the instrument, but uncommon in the daily life of the target population. Another committee of specialists analyzed the metabolic equivalence of replaced activities. The proportion of agreement of evaluation of the judges was quantified by the Content Validity Index. The pre-test was performed in two stages (n1 and n2=15). Reliability was assessed using the test-retest (interval of 7-15 days, n = 50).

RESULTS: In the evaluation of semantic-idiomatic and cultural equivalences, items with a Content Validity Index < 1 were reviewed until consensus among the judges was obtained. The second committee found 100% of agreement in the analysis of metabolic equivalence between original and replaced activities. Test-retest analysis indicated a Kappa coefficient of agreement (k = 0.86; ($p<0.001$), suggesting temporal stability of the instrument.

CONCLUSIONS: The Brazilian version of the Veterans Specific Activity Questionnaire showed evidence of reliability, according to the temporal stability criterion and adequate cultural content.

DESCRIPTORS: Physical Fitness. Heart Diseases. Questionnaires. Evaluation, methods. Reproducibility of Results. Translations.

INTRODUCTION

Cardiovascular diseases (CVD) represent the main cause of death and incapacity worldwide,[28] and physical fitness is an important prognostic factor and independent predictor of mortality.[13,21] Different methods are used to measure the level of physical fitness, both in asymptomatic and symptomatic patients.

The cardiopulmonary exercise test,[27] a direct method and gold standard to evaluate physical fitness, is necessary and it enables maximum oxygen consumption ($VO_{2máx}$) to be measured. However, although the direct measure is more accurate and considered as the main clinical measure, its use is not viable in the entire population. Financial,[4] physical and time limitations, or yet the risk of occurrence of a cardiovascular event in patients with CVD, restrict the use of the direct method.[20] As an alternative to the effort test, indirect methods are frequently used, such as questionnaires and scales to assess aerobic fitness and

[I] Programa de Pós-Graduação em Enfermagem. Faculdade de Ciências Médicas (FCM). Universidade Estadual de Campinas (Unicamp). Campinas, SP, Brasil

[II] Departamento de Enfermagem. FCM-Unicamp. Campinas, SP, Brasil

[III] Faculdade de Educação Física. Unicamp. Campinas, SP, Brasil

[IV] VA Palo Alto Health Care System. Stanford University. Stanford, CA, USA

Correspondence:
Maria Cecília Gallani
Departamento de Enfermagem – FCM
R. Tessália Vieira de Camargo, 126
Cx. Postal: 6111
Cidade Universitária "Zeferino Vaz"
13083-887 Campinas, SP, Brasil
E-mail: ceciliag@fcm.unicamp.br

Received: 3/29/2010
Approved: 8/25/2010

Article available from: www.scielo.br/rsp

performance of movements that result in energy expenditure.[9,12] The low cost, the ease of use, and the amount of information make such instruments interesting for clinical practice and research.

The Veterans Specific Activity Questionnaire (VSAQ) was developed by Myers et al[20] (1994) and validated through the test of its correlation with maximum oxygen consumption.[19] This instrument is frequently used in studies conducted in North America to estimate aerobic fitness as an isolated or associated predictor of the prognosis of patients with CVD. The VSAQ has also been employed to optimize individual protocols for the effort test, to reach maximum response to exercise in a period of 8 to 12 minutes, as recommended by the American Heart Association.[24] Due to its applicability, this instrument was validated in other cultures, such as the Japanese population.[14]

The VSAQ is a short questionnaire, designed to determine the maximum level of daily physical activity according to the occurrence of cardiovascular symptoms, being originally applied to patients referred to the exercise test for clinical reasons. The VSAQ consists in a list of activities shown in progressive order, according to their Metabolic Equivalents of Task (MET).[19,20] In the study on VSAQ validation,[20] authors also observed that the inclusion of the patient's age in the VSAQ score improved the capacity to predict patient's exercise tolerance. Thus, authors proposed a nomogram to be applied according to the result obtained with the VSAQ score, which is expressed by the following equation: METs = 4.7 + 0.97 (VSAQ) – 0.06 (age). The equation reflects the relative weight of age and that of the VSAQ score to predict the capacity to perform physical exercises.[19]

The VSAQ is adequate for use by the entire multidisciplinary team in the regular follow-up of cardiac patients to assess their broader aspects, in addition to the clinical aspect, such as the impact of the disease on daily life and the level of exercise tolerance, on which interventions should be based.

This instrument was developed in the English language, in the context of the American culture. As the physical activity pattern of Brazilians is different from that observed in Americans, its application to the Brazilian context requires its cultural adaptation. This complex process involves stages, in addition to the translation of the instrument,[3] which consider the differences in health perception, cultural context and lifestyle of the population in question.[5,11]

The present study aimed to validate the content and to evaluate the reliability of the Veterans Specific Activity Questionnaire instrument, culturally adapted for use in the Brazilian population of cardiac patients.

METHODS

Before beginning the adaptation process, formal consent was obtained from the author of the original instrument. The cultural adaptation was comprised of four stages, according to the recommendations of Beaton et al[5] (2000) and Guillemin et al[11] (1993): cultural adaptation (translation and back-translation), content validity (assessment of semantic-idiomatic, cultural and metabolic equivalences), assessment of acceptability (pre-test) and assessment of instrument reliability, using the criterion of stability (test-retest).

The questionnaire was translated by three independent translators, who were native speakers of Portuguese and had a postgraduate degree in English-Portuguese translation, the Certificate of Proficiency in English by the University of Cambridge and/or experience in the translation of specialized periodicals on the subject of this study.

Only one of the translators was informed about the objectives of the instrument and the concepts implied to promote cultural and idiomatic equivalence. The remaining translators did not receive such information to extract unexpected meanings from the original instrument.[3,5,11] The three versions were compared by the translators and by the two first authors of the study until consensus was reached. This comparison aimed to facilitate the conceptual and literary translation simultaneously, in addition to guaranteeing the detection of errors and ambiguous interpretations among translators.[3,5]

The final version of the translation to the Portuguese language was back-translated to the original language by two other translators, who worked independently and did not participate in the first step.[3,11] These translators were bilingual speakers from the United States, fluent in the original language of the instrument, who were not aware of the concepts and purposes that supported the instrument and did not have an academic qualification in this area.[3,5,11] The step of back-translation aimed to review data and ambiguous interpretation in Portuguese, guaranteeing the quality of cultural adaptation of the instrument of study.[5,11]

Verifications of content validity, acceptability and reliability were performed in the university hospital, in cardiology outpatient clinics and in the exercise testing sector, situated in the city of Campinas, Southeastern Brazil, between August and October 2009. Participants had to have arterial hypertension, coronary artery disease and valvular heart disease, in an isolated or combined way, during outpatient follow-up, and at least one cardiovascular symptom had to be present. Patients with a record in medical charts or a report of cognitive deficit, given by the patient himself or someone accompanying him (cognitive or memory

impairment, induced by illicit substances, medications or neurological injuries/disorders), thus making it difficult for them to understand the instrument and responses to items, were excluded from this study. The instrument was always administered as an interview by the first researcher.

The content of the instrument was validated in two steps. The translated version was submitted to the committee of specialists to assess its semantic-idiomatic and cultural equivalence, followed by the quantification of content validity.[17] Aiming to guarantee the greatest possible representativeness of activities to be replaced, two samples of participants were consulted: one was asked to indicate the activities uncommon in their routine in the translated instrument, while the other was asked to complete a 24-hour activity recall in order to identify the activities performed on a daily basis by the target population. Once redesigned, this instrument underwent a new assessment by another committee of experts in the field of exercise physiology, who considered the metabolic equivalence of the activities included in the instrument, in addition to the conceptual equivalence.

A multidisciplinary committee assessed the semantic-idiomatic and cultural equivalence of the instrument. This committee was comprised of bilingual individuals and specialists in the instrument's area of knowledge:[3] a nurse, experienced in research, teaching and healthcare in cardiology and in the use of measurement scales; a researcher-nurse with experience in the procedure of cultural adaptation of measuring instruments; a physical educator, with knowledge about exercise physiology; and one physiotherapist and physical educator, with experience in cardiology and physiology of exercise, in addition to the two first authors. Judges were informed about the measures and concepts implied and received an instrument to assess the VSAQ. The committee conducted the review and comparison among the final translations obtained: the original version, the unified Portuguese version, and the two back-translations, aiming to obtain an intelligible final version, with semantic-idiomatic and cultural equivalence.[3,10,11] Items were individually assessed, and for each of them, the semantic-idiomatic and cultural equivalences were evaluated as: 1 = not equivalent, 2 = impossible to assess equivalence without the item being reviewed, 3 = equivalent, although needing minor changes, and 4 = completely equivalent. In this step, the judges pointed out the activities culturally not compatible with the target population.

The instrument's content validity was quantified with the application of the Content Validity Index (CVI).[2,26] The CVI indicates the proportion of experts who deemed the item as content valid.[2] The criterion proposed by Lynn[17] (1986) was adopted to interpret representativeness of agreement indices, according to which all four judges must agree with an item's content validity (CVI = 1), considering a significance level of $p = 0.05$. The observation of a CVI ≤ 0.75 implies the automatic review of this item, because it means that at least one of the judges did not ratify its content validity. The items rated as "1" or "2" must be reviewed or eliminated.[2] The formula used to assess each item individually is represented below:[25]

$$\text{CVI:} \quad \frac{\text{Number of responses as "3" or "4"}}{\text{Total number of responses}}$$

The instrument's translated version was applied to 20 patients of the above mentioned outpatient clinic, on the day of their regular consultation in the cardiology outpatient clinic. The objective of this step was to identify which of the activities listed in the instrument were not common in their routine, aiming to replace them by other activities with the same metabolic equivalence.

A 24-hour recall was applied to 24 patients who had not participated in the previous steps to identify and include activities in the VSAQ that were more common in the Brazilian population. This recall was based on the methodology to investigate the dietary pattern (24-hour food recall) and consisted in obtaining verbal information about the physical activity pattern of the last 24 hours, including data on the type and duration of all physical activities performed on the previous day. This is a method which is usually well accepted by participants, with a short time of application and low cost, in addition to its not promoting changes in the behavior studied.[6] The recall was administered as an interview, and the researcher immediately recorded all activities reported by the patient, in a sequence and according to the times in which they were performed. Such records were written down on a lined sheet, where hours were specified. Patients were interviewed on different weekdays (Monday and Thursday) to assess common activities and their routine, both during the week and on weekends, except for holidays.

The sampling process in the steps of identification of culturally incompatible activities and 24-hour recall followed the criterion of consecutive enrollment of all individuals who showed all the inclusion criteria and none of exclusion, until saturation was reached, i.e. interviews were suspended when the information provided by new research participants was not relevant to the material already obtained, in the opinion of the researchers involved.[8]

Like all activities mentioned in the questionnaire, those selected from the 24-hour recall had their metabolic equivalences identified, according to Farinatti et al[7] (2003), Krause & Mahan[15] (1985) and McArdle et al[18] (2003).

Another committee of judges was formed to assess the instrument's conceptual and metabolic equivalence: two professionals experienced in physiology of exercise and one from the area of cardiology, with clinical experience.

This committee identified activities that were not common in the routine of patients and replaced them by others that were metabolically equivalent.[7,15,18]

The final version of the instrument underwent a pre-test with 15 patients to detect errors and to confirm that both the instrument's presentation and all questions were intelligible. Moreover, practical aspects of instrument application and the time of application were observed. After adjustments, this instrument was applied to a new sample (n = 15).

After the second pre-test, instrument reliability was assessed according to the criterion of stability (test-retest), with a reapplication of the instrument to a sample of 50 patients, in an interval of 7 to 15 days.

The data collected were entered into an electronic spreadsheet (2003 Excel software) and analyzed in the SAS program, version 9.1.3, for test-retest agreement analysis, using Kappa coefficient. A significance level of $p \leq 0.05$ was adopted.

This Project was approved by the Research Ethics Committee of the Faculdade de Ciências Médicas da Universidade Estadual de Campinas. All patients signed an informed consent form.

RESULTS

The proportion of agreement among specialists is shown in Table 1. The 11 items that showed CVI < 1 (totaling 17 activities, because more than one activity was emphasized in certain items) were reviewed, according to suggestions made by judges and subsequently approved by the author of the instrument.

Table 2 points to changes made in the instrument after the first assessment of semantic-idiomatic and cultural equivalences.

In the pre-test, nine activities were pointed out by patients as uncommon and replaced by others obtained from the 24-hour recall.

In the assessment of conceptual and metabolic adequacy of activities, the second committee of judges chose to attribute the lowest metabolic equivalence to four activities that showed distinct MET attributions in the three researched compendiums. There was 100% agreement among judges in terms of the metabolic equivalence of replaced activities. All replacements made are shown in Table 3.

The two pre-tests that followed were applied to two distinct samples, which showed systemic arterial hypertension (83.0%), acute coronary syndrome (46.0%) and myocardial revascularization (43.0%), either in an isolated or combined way.

The sample of the first pre-test, comprised of 15 patients, was characterized by the predominance of

Table 1. Proportion of agreement among specialists, in terms of semantic-idiomatic and cultural equivalences for each item and respective Content Validity Indices. Campinas, Southeastern Brazil, 2009.

Question	Judge1		Judge2		Judge3		Judge4		CVI	
	SI Eq	Eq CUL	Eq SI	Eq CUL	Eq SI	Eq CUL	Eq SI	Eq CUL	Eq SI	Eq CUL
Presentation	4	4	4	4	4	4	4	4	1	1
1 MET	4	4	4	4	4	4	4	4	1	1
2 METs	4	4	4	4	4	4	4	4	1	1
3 METs	3	4	3	4	2	2	4	3	0.75	0.75
4 METs	4	4	3	1	2	2	4	4	0.75	0.5
5 METs	4	4	4	1	4	4	4	4	1	0.75
6 METs	4	1	4	1	4	1	4	1	1	0
7 METs	4	4	3	3	4	3	4	4	1	1
8 METs	4	4	4	1	4	4	4	4	1	0.75
9 METs	4	3	3	3	4	4	4	4	1	1
10 METs	4	4	3	4	4	3	4	4	1	1
11 METs	4	2	3	3	2	2	4	1	0.75	0.25
12 METs	3	-	3	4	3	3	4	4	1	0.75
13 METs	4	3	3	-	3	4	4	4	1	0.75

METs: Metabolic Equivalents of Task; SI Eq: Semantic-Idiomatic Equivalence; CUL Eq: Cultural Equivalence; CVI: Content Validity Index.

Table 2. Changes made to the instrument, according to metabolic equivalences and activities. Campinas, Southeastern Brazil, 2009.

METs	Activity without SI Eq	Change after assessment	Activity without CUL Eq	Change after assessment	Activities without SI and CUL/MET Eq
3	Surface/ To walk slowly	Flat surface/ To walk slowly	To use a vacuum cleaner	Activity excluded	3
4	Work	Perform jobs	To perform light garden work: mowing, pushing lawn mower	Activity excluded	2
5	-	Without changes	To wash a car	Activity excluded	1
6	-	Without changes	To play golf and carry clubs	Activity excluded	1
7	-	Without change	To carry 60 pounds	To carry 30 Kg	1
8	-	Without changes	To move heavy furniture around	Activity excluded	1
10	-	Without changes	To run six miles	To run 10.2 Km/h	1
11	Downhill	Activity excluded	To carry wood/ Skiing downhill	Activities excluded	3
12	To run continuously, at ground level, 8 min per mile 8 min/mile	Activity excluded	Skiing downhill	To run on flat surface	2
13	-	Without changes	Rowing competitively	Activity excluded	2

METs: Metabolic Equivalents of Task ; SI Eq: Semantic-Idiomatic Equivalence; CUL Eq: Cultural Equivalence; CVI: Content Validity Index

the female sex (73.0%), mean age of 59.9 (SD = 9.9) years, mean level of education of 4.8 (SD = 3.4) years, mean monthly per capita income of US$ 396.00 (SD = 452.00), and monthly family income of US$ 990.00 (SD = 679.00) (Table 4).

The first pre-test evidenced that the statement of the Brazilian version was not intelligible to some patients. In addition, it was difficult to interpret the level of intensity of certain activities to associate speed in km/h with the rhythm of the walk or run. Thus, the statement was re-written and the intensity of activities began to be described as: slow, fast, very fast and extremely fast or mild, moderate and vigorous effort. After these changes, the second pre-test was conducted.

In the second pre-test, the modified instrument was applied to other 15 patients, of which 53.0% were males, with a mean age of 56.5 (DP = 12.4) years, mean level of education of 6.0 (DP = 4.3) years, mean monthly per capita income of US$ 735.00 (DP = 707.00), and monthly family income of US$ 1,245.00 (DP = 1,132.00) (Table 4).

In this, patients responded to the instrument without difficulties, and five minutes were necessary for its application on average.

For the assessment of reliability of the final instrument (Attachment), the criterion of temporal stability was considered, with the use of the test-retest. This instrument was applied to 50 patients (Table 4) and re-applied in an interval of seven to 15 days. An index of agreement between the test and re-test of $k = 0.86$ ($p < 0.001$) was observed, evidencing the temporal stability of the Brazilian version of the VSAQ.

DISCUSSION

The adequacy of the Brazilian version of the VSAQ was assessed both in the perspective of specialists in the area of health and in that of the target population, seeking the greatest possible representativeness of activities for the population of interest. This step indicated 26 activities, which were not common in the routine of the target population, although compatible with the original instrument. This would compromise the instrument's capacity to more accurately assess the intensity of the activity during which the cardiovascular symptom occurs.

In the study on VSAQ adaptation to the Japanese culture, the stage of cultural equivalence was not performed.[14] After the application of the Japanese version, it was observed that the activities included between 5 and 8 METs were not even once indicated by the patients; in addition, although certain patients had responded that they were not able to perform some group activities between 09-12 METs, they identified activities of 13 METs as possible to be performed. This range of intensity included activities such as dancing and car washing, common in the Western-American lifestyle, although not frequent in the Japanese

Table 3. Activities that were culturally incompatible with the study population and respective replacements. Campinas, Southeastern Brazil, 2009.

METs	Activity included	Original activity excluded
1 MET	To watch television, while lying down or sitting, to use a computer or to speak on the telephone	–
2 METs	To wash, iron or hang clothes. To wash dishes, change bedding, take the garbage out, water plants, sew by hand, dry oneself while standing. To walk from one's home to the car or bus. To carry and put away groceries (light effort)	–
3 METs	To wash a car, to wash windows, to clean the garage, to carry a small child of approximately 7 kg (light effort)	–
4 METs	To sweep the garage, sidewalk or the area outside the home, to care for a disabled adult or elderly person, to ride a bicycle	To paint/ light carpentry jobs
5 METs	To walk while carrying a weight of 0.5 to 7 kg uphill	–
6 METs	To clean one's home, to swim, to walk at a fast pace, to move heavy furniture around	Heavy carpentry jobs/ to cut the grass with manual tools
7 METs	To play soccer informally, to run or to swim at a slow speed, to carry groceries while going upstairs	To perform heavy garden work
9 METs	To run at 8.3 km/h, to walk uphill carrying a weight of 20 kg.	To jump rope/ to saw wood
10 METs	To play soccer competitively, to carry a weight of 22 to 34 kg uphill	To ride a bicycle uphill/ to carry wood
11 METs	To run 11 km/h, to swim freestyle with vigorous effort	–
12 METs	Stationary cycling with vigorous effort, to carry a weight > 34kg uphill	–
13 METs	To run at approximately 13 km/h	–

METs: Metabolic Equivalents of Task. Aiming at a better distribution of the number of activities on each MET level, certain activities (from the original instrument) were only excluded, while others were replaced by different activities, compatible with the population.

population. Kojima et al[14] concluded that activities ≥ 5 METs should have been modified for greater adequacy to the Japanese culture. In the present study, items not compatible with the Brazilian culture were replaced in the step of cultural adaptation, seeking to prevent the problem of underestimation or overestimation of the group of activities representing different MET levels.

As the instrument aims to estimate the physical fitness of participants, the accuracy of equivalence in METs of activities is essential. Thus, another essential step of the study was the assessment of metabolic equivalence of all activities to be replaced.

Metabolic equivalence, however, is not simple. Certain activities emphasized in the 24-hour recall showed different metabolic equivalences. The majority of activities show METs measured in laboratory or field studies; other activities have MTEs estimated according to similar activities.[1] Moreover, there are variations in sex, age and physical fitness level which account for the variability of energy expenditure.[23] Thus, the committee of judges considered the target population of the Brazilian version of the VSAQ to establish the final value of metabolic equivalence of activities in which there was a disagreement of METs. In this

Table 4. Distribution of individuals interviewed in the first Pre-Test (n=15), second Pre-Test (n=15) and Test-Retest (n=30), according to personal attributes. Campinas, Southeastern Brazil, 2009.

Variable	First Pre-Test			Second Pre-Test			Test-Retest		
	%	Mean (SD)	Median (IQR)	%	Mean (SD)	Median (IQR)	%	Mean (SD)	Median (IQR)
Sex									
Female	73			47			50		
Male	27			53			50		
Age (years)		59.9 (9.9)	57.0 (16.0)		56.5 (12.4)	60.0 (16.0)		60.0 (12.6)	61 (17)
Level of education (years)		4.8 (3.4)	4.0 (3.0)		6.0 (4.3)	5.0 (5.0)		4.6 (3.5)	4.0 (2.5)
Monthly per capita income (US$)		1.4 (1.6)	1.0 (2.0)		2.6 (2.5)	2.0 (2.0)		2.3 (1.7)	2.0 (2.0)
Monthly household income (US$)		3.5 (2.4)	3.0 (4.0)		4.4 (4.0)	3.0 (3.0)		3.6 (2.3)	3.0 (3.0)

SD: standard-deviation; IQR: Interquartile range (Quartile 75- Quartile 25)

population, the aerobic physical fitness is limited by the cardiovascular symptoms during the efforts,[23] resulting in less energy expenditure when compared to other populations, which are aimed at activities shown in other studies. Thus, the consensus reached was to use the lowest metabolic equivalence for each activity.

The adoption of simple and objective language is key to enable the wide use of the instrument in different educational strata. Consecutive adjustments were necessary until the language used in the statement was intelligible to participants, without the need to give additional explanations for the instrument to be completed.

With regard to reliability, the Brazilian version of the VSAQ showed evidence of temporal stability, given that kappa values between 0.6 and 0.8 are considered to be very good agreement.[16]

This adaptation of the VSAQ for its administration as an interview expands the scope of patients to which the instrument can be applied, surpassing the limits of the deficit in reading and writing abilities.

In the Brazilian context, different validated instruments assess the routine performance of physical activities and consider their frequency, duration and intensity. These instruments enable individuals to be classified as either active or sedentary, on different levels. In its turn, the VSAQ assesses the physical fitness of individuals when performing different routine activities, evidencing the level of limitation through the symptom. This is an original tool which can be used with the instruments of routine physical activity pattern, with great applicability in the context of cardiac rehabilitation, for example.[22]

Thus, it can be concluded that the Brazilian version of the VSAQ passed all stages of cultural adaptation process, obtaining relevant support for its content validity, according to the criterion of semantic-idiomatic, cultural and metabolic equivalences. In addition, there was strong evidence of reliability, according to the stability criterion, which enables the confirmation of the importance of continuing the validation process of the Brazilian version of the VSAQ.

REFERENCES

1. Ainsworth BE, Haskell WL, Whitt MC, Irwin ML, Swartz AM, Strath SJ, et al. Compendium of Physical Activities: an update of activity codes and MET intensities. *Med Sci Sports Exerc*. 2000;32(9):S498-516. DOI:10.1097/00005768-200009001-00009
2. Alexandre NMC. Validade de Conteúdo nos processos de construção e adaptação de instrumentos de medidas. *Cienc Saude Coletiva* [Internet]. 2009[citado 2010 mai] Disponível em: http://www.cienciaesaudecoletiva.com.br/artigos/artigo_int.php?id_artigo=4830
3. Alexandre NMC, Guirardello EB. Adaptación cultural de instrumentos utilizados en salud ocupacional. *Rev Panam Salud Publica*. 2002;11(2):109-11. DOI:10.1590/S1020-49892002000200007
4. Arena R, Myers J, Williams MA, Gulati M, Kligfield P, Balady GJ, et al. Assessment of functional capacity in clinical and research settings: a scientific statement from the American Heart Association Committee on Exercise, Rehabilitation, and Prevention of the Council on Clinical Cardiology and the Council on Cardiovascular Nursing. *Circulation*. 2007;116(3):329-43. DOI:10.1161/CIRCULATIONAHA.106.184461
5. Beaton DE, Bomcardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-reports measures. *Spine*. 2000;25(24):3186-91. DOI:10.1097/00007632-200012150-00014
6. Cavalcante AAM, Priore SE, Franceschini CC. Estudos de consumo alimentar: aspectos metodológicos gerais e o seu emprego na avaliação de crianças e adolescentes. *Rev Bras Saude Matern Infant*. 2004;4(3):229-40. DOI:10.1590/S1519-38292004000300002
7. Farinatti PTV. Apresentação de uma Versão em Português do Compêndio de Atividades Físicas: uma contribuição aos pesquisadores e profissionais em Fisiologia do Exercício. *Rev Bras Fisiol Exerc*. 2003;(2):177-208.
8. Fontanella BJB, Ricas J, Turato ER. Amostragem por saturação em pesquisas qualitativas em saúde: contribuições teóricas. *Cad Saude Publica*. 2008;24(1):17-27. DOI:10.1590/S0102-311X2008000100003
9. Gibelin P. An evaluation of symptom classification systems used for the assessment of patients with heart failure in France. *Eur J Heart Fail*. 2001;3(6):739-46. DOI:10.1016/S1388-9842(01)00206-9
10. Guillemin F. Cross-cultural Adaptation and Validation of Health Status Measures. *Scand J Rheumatol*. 1995;24(2):61-3. DOI:10.3109/03009749509099285
11. Guillemin F, Bombardier C, Beaton D. Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. *J Clin Epidemiol*. 1993;46(12):1417-32. DOI:10.1016/0895-4356(93)90142-N
12. Hallal PC, Dumith SC, Bastos JP, Reichert FF, Siqueira FV, Azevedo MR. Evolução da pesquisa epidemiológica no Brasil: revisão sistemática. *Rev Saude Publica*. 2007;41(3):453-60 DOI:10.1590/S0034-89102007000300018
13. Hu G, Tuomilehto J, Borodulin K, Jousilahti P. The joint associations of occupational, commuting, and leisure-time physical activity, and the Framingham risk score on the 10-year risk of coronary heart disease. *Eur Heart J*. 2007;28(4):492-8. DOI:10.1093/eurheartj/ehl475

14. Kojima S, Da-Hong W, Tokumori K, Sakano N, Yamasaki Y, Takemura Y, et al. Practicality of Veterans Specific Activity Questionnaire in Evaluation of Exercise capacity of Community-Dwelling Japanese Elderly. *Environ Health Prev Med*. 2006;11(6):313-20. DOI:10.1007/BF02898022

15. Krause MV, Mahan LK. Alimentos, nutrição e dietoterapia. São Paulo: Roca; 1985.

16. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977;33(1):159-74. DOI:10.2307/2529310

17. Lynn MR. Determination and Quantification of Content Validity. *Nurs Res*. 1986;35(6):382-5. DOI:10.1097/00006199-198611000-00017

18. McArdle WD, Katch FI, Katch VL. Fisiologia do Exercício: energia, nutrição e desempenho humano. 5. ed. Rio de Janeiro: Guanabara Koogan; 2003.

19. Myers J, Bader D, Madhavan R, Froelicher V. Validation of a specific activity questionnaire to estimate exercise tolerance in patients referred for exercising testing. *Am Heart J*. 2001;142(6):1041-6. DOI:10.1067/mhj.2001.118740

20 Myers J, Do D, Herbert W, Ribisl P, Froelicher V. A nomogram to predict exercise capacity from a specific activity questionnaire and clinical data. *Am J Cardiol*. 1994;73(8):591-6. DOI:10.1016/0002-9149(94)90340-9

21. Myers J, Prakash M, Froelicher V, Do D, Partington S, Edwin J. Exercise capacity and mortality among men referred for exercise testing. *N Engl J Med*. 2002;346(11):793-801. DOI:10.1056/NEJMoa011858

22. Nowak Z, Plewa M, Skowron M, Markiewicz A, Kucio C, Osiadło G. Paffenbarger Physical Activity Questionnaire as an additional tool in clinical assessment of patients with coronary artery disease treated with angioplasty. *Kardiol Pol*. 2010;68(1):32-9.

23. Piña IL, Apstein CS, Balady GJ, Belardinelli R, Chaitman BR, Duscha BD, et al. Exercise and Heart Failure. A Statement From the American Heart Association Committee on Exercise, Rehabilitation, and Prevention. *Circulation*. 2003;107(8):1210-25. DOI:10.1161/01.CIR.0000055013.92097.40

24. Thompson PD, Franklin BA, Balady GL, Blair SN, Corrado D, Estes NA, et al. Exercise and acute cardiovascular events placing the risk into perspective: a scientific statement from American Heart Association Council and Nutrition, Physical Activity, and Metabolism and the Council on Clinical Cardiology. *Circulation*. 2007;115(17):2358-68. DOI:10.1161/CIRCULATIONAHA.107.181485

25. Tilden VP, Nelson CA, May BA. Use of qualitative methods to enhance content validity. *Nurs Res*. 1990;39(3):172-5. DOI:10.1097/00006199-199005000-00015

26. Waltz CW, Bausell RB. Nursing research: design, statistics and computer analysis. Philadelphia: Davis; 1981.

27. Wasserman K, Hansen JE, Sue D, Whipp BJ, Casaburi R. Principles of exercise testing & interpretation: including pathophysiology and clinical applications. 3 ed. Philadelphia: Lippincott Williams & Wilkins; 1999.

28. World Health Organization. World Health Statistics. [cited 2010 Dec] Available from: http://www.who.int/whosis/whostat/EN_WHS10_Full.pdf

---

The authors declare that there are no conflicts of interest.

ANNEX

Brazilian version of the Veterans Specific Activity Questionnaire

This questionnaire aims to assess your capacity to perform common daily activities. Below, several daily activities with an increased level of effort and difficulty necessary to perform them will be shown. After identifying the activities, think carefully and indicate the first activity that, if performed for a certain period of time (few minutes), causes great tiredness, breathlessness, chest pains, or the need to stop due to exhaustion. If you do not usually perform some of these activities, try to imagine what it would be like to do them.

1 MET - To eat and get dressed. To watch television while lying down or sitting. To work, while sitting: writing, typing or speaking on the telephone.

2 METs - To wash, iron or hang clothes. To cook, wash dishes, change bedding, take the garbage out, water plants, sew by hand. To take a shower and dry yourself, while standing. To walk from your home to the car or bus. To walk down eight steps (one flight of stairs). To go shopping (in a supermarket, in a shopping mall). To carry and put away groceries (light effort).

3 METs - To walk slowly (4km/h) on a flat surface for one or two blocks (carrying objects weighing 10 kg or less or not). To perform light/moderate jobs: car washing, window washing, cleaning the garage, sweeping the floor, carrying a small child of approximately 7 kg (light effort).

4 METs - To perform light jobs in the garden (for example, gathering grass or tree leaves and putting them in bags). To sweep the garage, sidewalk or area outside the home. To care for a disabled adult or elderly person (for example, to help one to bathe). To ride a bicycle to work or for leisure (< 16 km/h).

5 METs - To dance socially (fast). To walk, on a flat and hard surface, at a fast pace (6.5 km/h). To walk uphill carrying a weight between 0.5 and 7 kg (for example, a pack of rice of 5 kg).

6 METs - To clean your home. To swim in a lake, ocean or river. To walk (7 km/h) on a flat and hard surface, at an extremely fast pace. To move heavy furniture around.

7 METs - To walk uphill. To play soccer informally. To run (7.5 km/h) or swim, at a low speed, light to moderate effort. To carry groceries upstairs. To carry a weight of approximately 30 kg (one child).

8 METs - To run at 8 km/h, moderately, on a flat surface (7.5 min.km-1), to walk upstairs fast. To carry groceries and moderate weights (7 to 18 kg) while walking upstairs.

9 METs - To ride a bicycle at a moderate speed. To run at 8.3 km/h (7.1 min. km-1). To walk uphill with a weight of 20 kg.

10 METs - To swim at a fast pace, vigorous effort. To ride a bicycle uphill. To run at 10 km/h (6.2 min. km-1). To play soccer competitively. To carry a weight of 22 to 34 kg uphill.

11 METs - To ride a bicycle at a fast and continuous speed. To run at 11 km/h (5.3 min. km-1) or to run on a field (irregular terrain with slopes). To swim freestyle at a fast speed (70m/min), with vigorous effort. To carry a heavy weight (a child) uphill, for up to two flights of steps.

12 METs - To run at a fast and continuous speed (on a flat surface, for 2 km, in < 10 minutes or 12 km/h). Stationary cycling (250 W), very vigorous effort. To carry a weight heavier than 34 kg uphill.

13 METs - To perform any competitive activity, including those that involve running at full speed (very fast), intermittently. To run at approximately 13 km/h (4.6 min.km-1). To run, row or ride a bicycle competitively..