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ORIGINAL RESEARCH

Cross-cultural adaptation and measurement properties of the Brazilian version of the Exercise Preference Questionnaire_(stroke)



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Abstract

Background: The Exercise Preference Questionnaire (EPQ_(stroke)) captures exercise preferences and measures personal factors, that influence motivation and adherence to exercise in stroke subjects.

Objectives: To perform the cross-cultural adaptation of the EPQ_(stroke) into the Brazilian-Portuguese language and to evaluate its measurement properties.

Methods: The EPQ_(stroke) was cross-culturally adapted and primarily tested in 30 chronic stroke subjects. After the final version of the EPQ_(stroke)-Brazil was created, its test-retest reliability was verified, using Kappa indices and intra-class correlation coefficients (ICCs) ($n=50$), and internal consistency was verified using Cronbach's alpha coefficients ($n=101$). Construct validity was assessed using exploratory factor analysis ($n=101$), content validity using the content validity index (CVI) ($n=8$), and face validity using the rate of agreement regarding the clarity, wording, ability to answer the questions, and lay-out and style of the questionnaire with two groups, including individuals with stroke ($n=81$) and multidisciplinary health professionals ($n=32$).

Results: The pre-final version required revisions (items 9, 29, and 30) and, after another pre-test, it was shown to be appropriate. The Kappa indices ranged from 0.58 to 0.95; the ICCs from 0.35 to 0.93, and the Cronbach's alpha coefficient was 0.82 (0.768–0.869 CI), showing adequate internal consistency. The exploratory factor analysis and CVI confirmed the validity of the EPQ_(stroke)-Brazil. The rate of agreement was greater than 80% for both groups.

Conclusion: The EPQ_(stroke)-Brazil was found to be a valid and reliable measure for verifying exercise preferences of Brazilian individuals with stroke.

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Introduction

Stroke is an important condition for public health systems worldwide.¹ According to Billinger et al.,² physical inactivity is considered one of the main causes of stroke. Mortality after stroke has been decreasing,³ due to interventions such as control of cardiovascular risks and smoking and programs for hypertension support and prevention.³ In addition, it has been reported that the prevalence of stroke in individuals aged between 20 and 59 years, who practice adequate levels of physical activity, is low. Nevertheless, physical activity tends to decrease with increasing age,³ and previous findings revealed that 77% of individuals with stroke are sedentary or have low levels of physical activity.⁴

Recent studies^{5,6} suggested that regular physical activity promotes motor recovery, improves cardiorespiratory capacity, increases walking speed and balance, and prevents recurrent stroke. However, many individuals with stroke remain physically inactive. The lack of adherence to physical activity programs is a common problem for many populations, and individuals usually drop out before, achieving any benefits.^{5,7,8} Therefore, the identification of strategies to increase participation and adherence to physical activity programs after stroke becomes essential for the maintenance and improvement of physical function and quality of life of these individuals.

Various exercise preferences have been reported with different health conditions, such as breast cancer^{9,10} and elderly.¹¹ According to Banks et al.,¹¹ individuals with stroke prefer exercising in structured groups at the gym and community centers. Thus, exercise preferences appear to be related to factors, such as health conditions, life situations, and cultural and social differences.^{10,11}

In Brazil, exercise preferences in stroke survivors have not been described. Thus, given the absence of an instrument developed and/or adapted to the Brazilian-Portuguese language for the assessment of exercise preferences of stroke individuals, it is necessary to conduct the cross-cultural adaptation of the Exercise Preference Questionnaire – EPQ_(stroke). This process has some advantages, because it can produce a measure that can be applicable to different cultural contexts and used in international/multicentric studies. In addition, the financial costs and time consumption are lower, when compared to the development of new measures.^{12,13} Therefore, the aim of this study was to adapt the EPQ_(stroke) questionnaire to the Brazilian-Portuguese language and examine its measurement properties.

Methods

Exercise Preference Questionnaire – EPQ_(stroke)

The EPQ_(stroke) is a specific questionnaire designed to identify exercise preferences of stroke individuals, with the aim of planning the most appropriate exercise programs for these individuals.¹¹ It consists of 33 items, divided into three sections. The first contains three items that identify the frequency and type of current physical activity. The second consists of 22 items that assess the agreement of the individual regarding the following factors: (1) exercise with others;

(2) degree of structure of the exercise program; (3) independence; (4) location; and (5) exertion. Three items related to “like exercising,” “ability to participate in exercise programs,” and “preference for a particular period of the day for physical activity,” are added to this section. Finally, the third section contains five questions (four open) regarding exercise preferences. The questionnaire can be administered through interviews. It does not present a final score, since its goal is to examine the contextual factors related to physical activity.¹¹ Well-trained examiners administered the questionnaire.

Participants

The recruitment of the participants took place from January to October 2015. Community-dwelling individuals with stroke were recruited for both phases of the study (Phase I – cross-cultural adaptation and Phase II – analysis of the measurement properties). The participants’ contact details were obtained from the following sources: a list of subjects from previous research projects; referral from health professionals, friends, or relatives; rehabilitation records and fitness center units of the Unified Public Health System (SUS) of Belo Horizonte, MG, Brazil; out-patient physical therapy clinic of a local private university; and two local private physical therapy clinics.

The inclusion criteria consisted of: (1) clinical diagnosis of stroke for at least six months; (2) age ≥ 20 years; (3) ability to walk independently with or without assistive devices; and (4) absence of cognitive impairments, which were identified by the Mini-Mental State Examination scores^{14,15}; or (5) other neurological and musculoskeletal conditions not related to stroke. Individuals were excluded if they had communication difficulties that could prevent them from following instructions and answering the questionnaire.

Cross-cultural adaptation

The cross-cultural adaptation of the EPQ_(stroke) was authorized by the authors of the original instrument.¹² The process followed recommended guidelines^{13,16} and was carried-out in five stages. First, the EPQ_(stroke) was translated from English to the Brazilian-Portuguese language, independently, by two bilingual translators, whose native language was Portuguese. One of the translators was aware of the objective of the study and was an expert in the area of rehabilitation. Secondly, a synthesis of the translation was produced, followed by back translation, which was carried-out by two other bilingual translators, whose native language was English. None of the translators had access to the original version or information about the concepts of the questionnaire. Next, an expert committee, composed of one clinical physical therapist, two researchers in stroke rehabilitation, and one native English-speaking translator consolidated all versions and developed the pre-final version of the questionnaire. The purpose of this committee was to evaluate the clarity, relevance, and adequacy of the items, by verifying the conceptual, semantic (vocabulary and grammar), and cultural equivalences between the original and the pre-final version of the EPQ_(stroke).¹²

Finally, the pre-final version was administered to 30 individuals with stroke.¹⁶ After screening and providing informed consent, based upon previous approval by the Ethical Review Board of Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, MG, Brazil (CAAE 34921814.8.0000.5149), the participants were asked whether they understood the items of the questionnaire, with the following question: "how did you interpret/understand the question?". Participants were encouraged to explain what they understood.¹² It was established that, for the item to be considered of good understanding and culturally acceptable, a minimum of 80% of the participants should answer that they understood well the question.^{17,18}

Statistical analyses

Descriptive statistics, including measures of central tendency and dispersion, were computed for the clinical and sociodemographic data, using the SPSS for Windows (version 19.0) software.

Reliability

The test-retest and internal consistency reliabilities were tested with the final version of the EPQ_(stroke)-Brazil. For the test-retest reliability, 50 participants were assessed twice with an interval of no more than seven days between the assessments.²² Weighted Kappa statistics were used for the first two categorical items, and intra-class correlation coefficients (ICC_{2,1}) were calculated for the second-section items. Acceptable kappa coefficients should be at least 0.70¹⁹ and ICC values above 0.75 were indicative of "excellent" reliability, between 0.40 and 0.75 were indicative of fair to good reliability, and lower than 0.40, poor reliability.²⁰

Internal consistency describes the extent to which the items of a questionnaire are correlated with measures of the same construct. The internal consistency of the EPQ_(stroke)-Brazil was analyzed with 101 individuals with stroke, using Cronbach's alpha. Optimal values of internal consistency should be above 0.70.¹⁹

Validity

Construct, face, and content validities of the EPQ_(stroke)-Brazil were analyzed.

Construct validity refers to the degree to which the items of a questionnaire are related to the theoretical construct being studied.²⁰ Factor analysis is a multivariate statistical method commonly used during the development and analysis of the measurement properties of instruments.^{11,19-21} This analysis aims to reduce the number of variables of a questionnaire or determine the correlation between them. Thus, it is used for the development of tools, that analyze the relationships between the number of common variables (factors).²¹ Therefore, each factor may be defined as the combination of the test items that could be grouped and define together part of the construct. For the present study, therefore, exploratory factor analysis was employed to verify the model. For this analysis, a sample of 100 individuals with stroke would be required.¹⁹

Content validity refers to the extent to which the construct of interest is represented by the items of the questionnaire.¹⁹ The literature recommends seven or more experts in the field for the evaluation of an instrument.^{20,22} An on-line version of the EPQ_(stroke)-Brazil was sent to eight Brazilian professionals with clinical and research experience in neurological rehabilitation. The experts independently assessed the relevance of the items of the questionnaire, using a four-point Likert scale (1 – not relevant, 2 – somewhat relevant, 3 – quite relevant, and 4 – highly relevant). To estimate the validity of each item, the Content Validity Index (CVI) was calculated by dividing the number of experts who rated either 3 or 4 by the number of experts.^{23,24} This ratio represents the proportion of agreement regarding relevance. According to Lynn,²⁵ items with CVI < 0.78 should be reviewed.

Face validity indicates that the instrument appears to be appropriate to the purpose of the study and the content area.²² This property evaluates the appearance of the questionnaire, regarding its usability, writing, overall style, formatting consistency, and clarity.^{20,26} For this analysis, stakeholders²⁷ are determined, i.e., representatives of the target population and/or professionals who will use the questionnaire. Thus, to examine the face validity of the EPQ_(stroke)-Brazil, 81 of the 101 individuals with stroke and 32 health professionals were asked to answer questions regarding: (1) clarity of the wording of the items; (2) the ability of the target population to answer the questions, and (3) presentation and lay-out of the questionnaire. This evaluation was performed using a four-point Likert scale (1 – strongly disagree, 2 – disagree, 3 – agree, and 4 – strongly agree). Finally, the rate of agreement was calculated.

Results

From a list of 235 individuals, 96 were excluded, due to incorrect contact information, refusal, health problems, and ineligibility. Of the 139 participants, who agreed to

Table 1 Characteristics of the participants.

Characteristic	n = 101
Age (yr), mean (SD)	62 (11.9)
Sex, women, n (%)	56 (54.9)
Time since stroke (month), mean (SD)	57 (66)
MMSE (0–30), mean (SD)	26 (3.1)
Participants from SUS (%)	65.3
Type of stroke, n (%)	Ischemic = 55 (53.9) Hemorrhagic = 20 (19.6) Do not remember = 26 (25.5)
Work status, n (%)	Retired due to health problems = 19 (18.6) Retired = 59 (57.8) Housewife = 3 (3) Pensioner = 2 (2) Unemployed = 1 (1) Work active = 17 (16.9)

SD, standard deviation; SUS, Unified Health System; MMSE, Mini-Mental State Examination.

Table 2 EPQ_(stroke)-Brazil.**Orientações**

- Este questionário é sobre os tipos de exercício que você gosta e não gosta de fazer.
 - Suas respostas vão nos ajudar a entender mais sobre os melhores tipos de programas de exercício para pessoas que sofreram AVC.
 - Por favor, responda honestamente – toda informação coletada é confidencial.
- O questionário não deve demorar mais que 15 minutos – obrigado pelo seu tempo

Perguntas

1. Você participa atualmente de um programa organizado de exercício?
2. Há quanto tempo você participa deste programa?
3. O que este programa inclui? Você pode marcar uma ou mais opções.

Favor indicar de zero (0)% a cem (100)% o quanto você concorda com cada uma das afirmativas abaixo:

4. Gosto de fazer exercícios _____%
5. Sinto que sou capaz de participar de um programa de exercícios _____%
6. Prefiro fazer exercícios pela manhã _____%
7. Gosto de fazer exercícios em uma academia _____%
8. Gosto de fazer exercícios sozinho _____%
9. Gosto de fazer o mesmo tipo de exercício cada vez que pratico atividade física _____%
10. Gosto que alguém me mostre o que devo fazer quando faço exercícios _____%
11. Gosto de fazer exercícios em um centro de ginástica comunitário, como em academia da cidade _____%
12. Gosto de me sentir cansado após uma sessão de exercícios _____%
13. Gosto de fazer exercícios com a família ou amigos _____%
14. Gosto que minhas sessões de exercícios sejam planejadas (por exemplo, aula de hidroginástica) _____%
15. Gosto que outra pessoa organize minhas sessões de exercícios _____%
16. Gosto de fazer exercícios em um centro de reabilitação _____%
17. Gosto de fazer exercícios leves _____%
18. Gosto de fazer exercícios com outras pessoas com idade próxima a minha _____%
19. Gosto de ter instruções por escrito dos meus exercícios _____%
20. Gosto de ter flexibilidade para organizar minhas próprias sessões de exercício _____%
21. Gosto de fazer exercícios em casa _____%
22. Acho que fazer exercícios vai ajudar a evitar outros AVCs _____%
23. Gosto de me esforçar em uma sessão de exercício _____%
24. Gosto de fazer exercícios junto com outras pessoas que tiveram AVC _____%
25. Gosto que os exercícios façam parte das minhas atividades diárias (por exemplo, caminhar para fazer compras) _____%
26. Gosto de fazer exercícios ao ar livre _____%
27. Gosto de fazer exercícios com um grupo da minha comunidade _____%
28. Preocupo que o exercício possa causar outro AVC _____%
29. O que você gosta quando pratica exercícios?
30. O que você não gosta quando pratica exercícios?
31. O que lhe faz parar de fazer exercícios?
32. Relacione três tipos de exercícios favoritos:

Respostas

- () Sim () Não (se “não”, favor passar para a questão 4)
 () Menos de 1 mês () 1 – 6 meses () Mais de 6 meses
 () Caminhada () Aeróbica () Musculação
 () Natação () Yoga () Ciclismo
 () Outro (favor especificar)

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- () Caminhada () Hidroginástica () Golfe
 () Natação () Musculação () Boliche
 () Yoga () Pilates () Ciclismo
 () Academia () Outro (favor especificar)

FIM – Muito obrigado.

participate, 38 were excluded due to non-attendance ($n=20$) and ineligibility ($n=18$). Therefore, 101 individuals with stroke were included (56 women) with a mean age of 62 years and a mean time post-stroke ranging from six to 360 months. Their clinical characteristics are summarized in Table 1.

Cross-cultural adaptation

During the cultural adaptation process, some inconsistencies regarding the understanding of the following three items were identified: (9) "I like to do the same activity every time I exercise"; (29) "What do you like about exercise?" and (30) "What do you not like about exercise?" Since these items achieved less than 80% of comprehension, they were reviewed by the research group and replaced by others of the same concept, avoiding significant changes in the structure and properties of the questionnaire. These items were modified, as follows: (9) "I like to do the same type of exercise every time I perform physical activity"; (29) "What do you like when you perform exercises?" and (30) "What do you not like when performing exercises?" Once modified, they were submitted to a new pre-test and their equivalence was re-tested, until reaching the minimum of 80% of comprehension by the participants. Thus, the final version of EPQ_(stroke)-Brazil was established (Table 2).

The time taken to administer the EPQ_(stroke)-Brazil averaged 15 min. During application, clarification on how the individuals should answer the items of the second section was necessary. This section involves questions related to the percentage of agreement regarding the individual's exercise preferences. A numerical visual scale, ranging from 0% (I do not like it at all) to 100% (I like it very much) with intervals of 10%, was used to facilitate the responses.

Reliability

Test-retest reliability was considered poor to excellent²⁸ for the items of the first and second sections. The Kappa indices ranged from 0.58 to 0.95 and the ICCs from 0.35 to 0.93. The third section was not evaluated because it includes only open questions. The results are shown in Table 3.

The internal consistency was appropriate, since the analysis showed acceptable Cronbach's alpha value of 0.82 (0.768–0.869 CI).

Validity

Exploratory factor analysis was used to identify the factors associated with the exercise preferences. Sample adequacy was assessed, using the Kaiser-Meyer-Olkin (KMO) index. Bartlett's test of sphericity was used to verify whether the correlation matrix was an identity matrix. To determine the appropriate number of factors, Kaiser's rule (eigenvalues > 1) was applied. Then, the commonality of each variable was evaluated using as exclusion criteria values <0.5.²⁹ For the factor extraction, the method of principal components with Varimax orthogonal rotation was used.

The exploratory factor analysis of the EPQ_(stroke)-Brazil revealed that the total explained variance was 60.6%. The

Table 3 Test-retest reliability of the EPQ_(stroke)-Brazil ($n=50$).

Items	Reliability	
	Kappa (95%CI)	ICC (95%CI)
1	0.95* (0.84–1.00)	
2	0.58* (0.45–0.74)	
3	–	–
4		0.71* (0.54–0.82)
5		0.62* (0.43–0.77)
6		0.79* (0.65–0.87)
7		0.65* (0.45–0.78)
8		0.63* (0.42–0.76)
9		0.41** (0.15–0.61)
10		0.35** (0.08–0.56)
11		0.80* (0.67–0.88)
12		0.54* (0.32–0.71)
13		0.70* (0.53–0.81)
14		0.61* (0.41–0.76)
15		0.35** (0.08–0.56)
16		0.87* (0.79–0.92)
17		0.64* (0.45–0.79)
18		0.67* (0.50–0.70)
19		0.69* (0.52–0.81)
20		0.49* (0.25–0.67)

ICC, intra-class correlation coefficient; CI, confidence interval.

* $p < 0.001$.

** $p < 0.006$.

KMO index was 0.73 and Bartlett's test rejected the null hypothesis that the correlation matrix was generated from a population identity one ($p < 0.0001$). According to the Kaiser's rule (eigenvalues > 1.0), the number of established factors was seven. Items 19 and 9 showed communalities <0.5, which indicated the possibility of exclusion of those items.²⁹ The pattern matrix is given in Table 4, using 0.5 as the cut-off value for factor loading. Each factor was grouped, according to the following characteristics: Factor 1 – presence of instructions/planning; Factor 2 – ability to perform physical exercises; Factor 3 – exercise with family/friends – program flexibility; Factor 4 – exercises in fitness centers – people of similar age; Factor 5 – exercises alone; Factor 6 – exercises in fitness centers – people with stroke; and Factor 7 – Routine.

For the face validity analysis, 81 of the 101 stroke individuals were asked to describe the clarity, easiness to respond, and formatting of the questionnaire. Similarly, 32 health professionals, including physical therapists ($n=21$), occupational therapists ($n=2$), physical educators ($n=7$), psychologists ($n=1$), and speech therapists ($n=1$) were asked whether they agreed with the above described criteria. The frequency of agreement was higher than 80% for both stroke individuals and professionals (Table 5).

The EPQ_(stroke)-Brazil was sent to eight Brazilian experts for the content validity analysis. Items 6 (CVI=0.65), 11 (CVI=0.75), 14 (CVI=0.75), 15 (CVI=0.75), and 18 (CVI=0.75), showed lower CVI values, than those recommended.²⁵ However, these items were considered of little relevance only by two of the eight experts.

Table 4 Factor analysis loadings used to derive the seven data-driven factors of the EPQ_(stroke)-Brazil.

Item	Factor						
	1	2	3	4	5	6	7
I like someone showing me what to do when I exercise	0.673						
I like my exercise sessions to be planned (e.g., water aerobics class)	0.759						
I like someone else to organize my exercise sessions	0.744						
I think exercise will help prevent further stroke	0.509						
I like to work hard when I exercise	0.473						
I like to make exercise part of my daily activities (e.g., walk to shops)	0.505						
I like to exercise		0.774					
I feel I am able to participate in an exercise session		0.698					
I like to exercise at a gym		0.760					
I like to exercise with family or friends			0.744				
I like to do gentle exercise			0.530				
I like to have written instructions for my exercise			0.432				
I like the flexibility of organizing my own exercise sessions			0.636				
I like to exercise at a rehabilitation center				-0.793			
I like to exercise with other people of similar age				0.550			
I like to exercise outdoors				0.666			
I like to exercise in a community group				0.556			
I like to exercise alone					0.613		
I like to feel tired after an exercise session					0.665		
I like to exercise at home					0.670		
I like to exercise at a community fitness center						0.511	
I like to exercise with other people who have had a stroke						0.667	
I worry that exercise might cause another stroke						0.703	
I prefer to exercise in the morning							0.751
I like to do the same activity each time I exercise							0.601

Factor 1, presence of instructions/planning; Factor 2, ability to perform physical exercises; Factor 3, exercises with family/friends – program flexibility; Factor 4, exercises in fitness centers – people of the same age; Factor 5, exercises alone; Factor 6, exercises in fitness centers – people with stroke; and Factor 7, routine.

Discussion

The purpose of the present study was to cross-culturally adapt the EPQ_(stroke) to the Brazilian-Portuguese language and evaluate its measurement properties. The EPQ_(stroke)-Brazil evaluates exercise preferences and allows the measurement and comparison of self-reported preferred exercises of Brazilian stroke individuals. Moreover, it may contribute to the development of clinical guidelines and public health policies, for the assessment of the effectiveness of therapeutic interventions, and for the implementation of preventive actions for this population.

The methodology followed recommended guidelines,¹⁶ to guarantee an appropriate version of the questionnaire, regarding the cultural aspects of the population and equivalence to the original Australian version. To ensure a representative sample, participants were recruited from public and private health services, although most of the participants were from the Unified Health System. It is important to note that the inclusion of participants from public and private services did not result in significant differences regarding the difficulties in understanding the items of the questionnaire and the participants' responses. The EPQ_(stroke)-Brazil showed to be reliable and valid for the assessment of exercise preferences in adult individuals with stroke.

The EPQ_(stroke)-Brazil is the first specific questionnaire available in Brazil for the assessment of exercise preferences of individuals with stroke. Its original version published by Banks et al.¹¹ is available in English. The primary aim of the creators was to develop the questionnaire and explore the exercise preferences of individuals with stroke and controls in Australia. Therefore, the measurement properties of the original version have not been reported. However, recently, Bonner et al.³⁰ employed factor analyses to identify a factor structure in exercise preferences, to provide a framework for item reduction. The reduction process yielded a 13-item version, called Stroke Exercise Preference Inventory (SEPI-13), whose original factor structure was maintained.

The test-retest reliability of the EPQ_(stroke)-Brazil, which was assessed by the Kappa index for the first section (0.58 and 0.95) and ICC for the second section ($0.35 \leq \text{ICC} \leq 0.93$), was acceptable. Only the items 10 (0.34; $p < 0.006$) and 15 (0.34; $p < 0.006$), which are related to planning and instructions, showed poor reliability. For all the other items, test-retest reliability coefficients ranged from fair to excellent reliability. Difficulties in adhering to pre-setting exercises may be related to personality, expectations regarding the results, and perceived ability to perform exercises,⁷ as well as different levels of disability.³¹

Table 5 Frequency of agreement regarding the clarity, ability to answer the items, and formatting of the EPQ_(stroke)-Brazil.

Variable	Individuals with stroke (n = 81)	Health professionals (n = 32)
<i>Clarity, n (%)</i>		
Strongly disagree	0 (0)	0 (0)
Disagree	2 (2.5)	2 (6.3)
Agree	32 (39.5)	17 (53.1)
Strongly agree	47 (58)	13 (40.6)
<i>Ability to answer the items, n (%)</i>		
Strongly disagree	0 (0)	0 (0)
Disagree	6 (7.4)	5 (15.6)
Agree	33 (40.7)	20 (62.5)
Strongly agree	42 (51.9)	7 (21.9)
<i>Formatting, n (%)</i>		
Strongly disagree	0 (0)	0 (0)
Disagree	9 (11.1)	4 (12.5)
Agree	32 (39.5)	17 (53.1)
Strongly agree	40 (49.4)	11 (34.4)

The internal consistency of the EPQ_(stroke)-Brazil was confirmed by the Cronbach's alpha value of 0.82 for the 22 items of the second section. Although Banks et al.¹¹ did not analyze other measurement properties during the development of the questionnaire, they found a Cronbach's alpha value of 0.75. The value found in the present study indicates good internal consistency of the adapted version. Therefore, these results demonstrated that the EPQ_(stroke)-Brazil is reliable for use with Brazilian individuals with stroke.

Construct validity was assessed by investigating factor communality through exploratory factor analysis, since the original version of the EPQ_(stroke) had captured these characteristics. The adapted version found seven factors, one more than the original version. The distribution of the items, according to the factors, showed variations between the original and the adapted versions, but this variability could be explained by cultural differences and the characteristics of the participants. Banks et al.¹¹ compared the emergence of factors between two different groups: individuals with stroke and healthy elderly subjects. Variability between the emergency of factors was explained by differences in activity levels and quality of life, which were lower in individuals with stroke, compared to the elderly group. On the other hand, the acceptable emergence of seven factors in the EPQ_(stroke)-Brazil could be explained by the difference in the time since stroke of the participants of the present study, which had a wider range.

The exploratory factor analysis showed that, out of the 22 items of the second section, two had communality <0.5.²⁹ Initially, the explained variance was 60.6%. Therefore, the communality analysis of the items indicated the exclusion of the items 9 (0.48) and 19 (0.47). By extracting the item 19, which showed less communality, the explained variance increased to 61.8%. By extracting the item 9, the explained variance increased to 63.3%. Each item extracted from the main matrix brought little change of the total explained variance of the adapted version. This result may reflect the low educational levels of the participants in the present study, which are characteristics of the majority of the elderly population, also reported in other cross-cultural adaptation

studies.^{32,33} Some possible considerations may justify the presence of items with low communality. These items may have been influenced by life situations and/or cultural and social differences, beliefs about health and physical activity; perceived needs and capacities; expectations regarding the results, personality, feelings, lifestyle, and contextual factors. Therefore, these items with low communality were not extracted. However, cautious should be taken when interpreting the answers to these items within clinical contexts.

The content validity analysis showed five somewhat relevant items in the experts' opinions (items 6, 14, and 15). These results may reflect the particular characteristics of the rehabilitation services and the provision of physical activity for this population. For instance, professionals, who offer this type of service only in one period of the day, may find it irrelevant to answer the item 6. Similarly, private professionals, who treat only one person per hour, may find irrelevant to answer item 14. However, only two of the eight experts considered these items irrelevant. This judgment may have been influenced by the time and organization of the activities, in accordance with the availability of the health care network services.

Regarding face validity in the professionals' opinions, the items of the questionnaire were clear and adequate to the capacity of the target population to answer the questions. The same was reported by the individuals with stroke.

The construct and content validity analyses indicated that not all the items of the EPQ_(stroke)-Brazil combined to measure the construct or content in the experts' opinions. These items could be eliminated; however, they are important for the description of exercise preferences in the context of personal factors of the International Classification of Function, Disability, and Health. Considering the clinical applications in future studies, the behavior of these items should be monitored, to determine whether the problems observed in the present study will persist. If this occurs, the possibility of reviewing and/or eliminating those items should be considered.

Conclusion

The cross-cultural adaptation of the EPQ_(stroke) to the Brazilian-Portuguese language was carried-out satisfactorily. The EPQ_(stroke)-Brazil showed to be both reliable and valid for assessing the exercise preferences of Brazilian Portuguese-speaking individuals with chronic stroke. These findings support the use of this questionnaire to provide a better understanding of exercise preferences and increase the adherence of individuals with stroke to exercise programs.

Conflicts of interest

The authors declare no conflicts of interest.

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