Cross-cultural adaptation of the ABILOCO: a measure of locomotion ability for individuals with stroke

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ABSTRACT

The ABILOCO, specific for adults with stroke, is a questionnaire for the assessment of locomotion ability. For the application with the Brazilian population, its cross-cultural adaptation is required. **Objective:** To translate the ABILOCO into the Brazilian-Portuguese language and adapt the questionnaire to the Brazilian culture. **Methods:** The process of cross-cultural adaptation followed standardized procedures and was conducted in five stages: translation, back-translation, synthesis of the translations, expert committee consultation, and testing of the pre-final version. The pre-final version was administered to 10 individuals with stroke, who were asked to interpret all of the items. **Results:** The cross-cultural adaptation process followed al of the recommended guidelines and minor modifications in two items were necessary to facilitate understanding. Satisfactory results were obtained during the test of the pre-final version, since there was not found any problem regarding the wording and clarity of the items or the objective of the questionnaire. **Conclusions:** The ABILOCO-Brazil showed satisfactory semantic, linguistic, cultural, and conceptual equivalence to be used within clinical and research contexts. Future studies should continue the process of validation of the questionnaire.

Keywords: Stroke, Locomotion, Cross-Cultural Comparison

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INTRODUCTION

Each year, approximately 800 thousand people undergo a new or recurrent cerebral vascular accident (CVE or stroke),[1] one of the main causes of disability in the world.[2]

These individuals present motor impairment and face changes in functionality that may interfere with activities of daily life and lead to some degree of dependence.[3,4] Among the activities of daily life, locomotion is an essential task for their social participation, and is considered the most disabling aspect after a stroke.[5]

Locomotion refers to an individual's ability to move effectively in their environment,[6] and it is classified in the Activity and Participation component of the International Classification of Functioning, Disability and Health (ICF).[7] Concerning this component, the ICF applies the qualifiers capacity, which refers to the individual's ability to perform a task or action in a standardized environment, and performance, which is related to what the individual can accomplish in their real-life context, that includes environmental factors and all aspects of the physical, social, and behavioral world.[7] Performance measures are usually assessed by questionnaires, that asks the patient about their day-to-day performance on the basis of their own perception.[8]

Although self-perceived measures are susceptible to sub or overestimation of the real performance, they have the advantage of revealing the average of performance over long periods, i.e. the measures does not refer solely to what the individual was able to perform during the test in a standardized environment.[9,10]

Among the instruments that are used to evaluate locomotion capacity, we highlight the ABILOCO, a questionnaire that was developed to evaluate the locomotion performance in the perspective of individuals with stroke, and which explores a representative range of locomotion activities[6] and meets the utility criteria proposed by Tyson & Connel.[11] Studies that have investigated ABILOCO measurement properties have found adequate values for concurrent validity, reliability, linearity and unidimensionality.[6,12,13] In addition, ABILOCO is the only available questionnaire that evaluates the locomotion ability by his own self-perception of performance, in which the scores are obtained with linear measurements, since it was originally developed under the Rasch model of measurement.[6]

The advantage of linear measurements is that they can offer results that are scientifically more robust and clinically significant by permitting correct inferences from direct inter or intra-individual comparisons.[10,14,15]

Although ABILOCO is an easy-to-apply assessment that includes important characteristics, such as a representative repertoire of linear activities and measures, this questionnaire is available only in the English and French languages. Thus, in order for ABILOCO to be applied in in Brazil, its cross-cultural adaptation is necessary.

OBJECTIVE

The objective of this study is to run the cross-cultural adaptation of the English version of ABILOCO to Portuguese-Brazil.

METHODS

This is an supplementary study that is part of a larger project, the *Predictors of Restriction in Social Participation of Chronic Hemiparesis*, which was approved by the institution's Ethics and Research Committee (CAAE: 06609312.0.0000.5149).

The ABILOCO is a questionnaire for evaluating the perception of locomotion performance that is specific for post-stroke adult individuals and contains 13 items regarding the individual's gait in different daily situations.[6] Ten different versions of the questionnaire are available, each with random sequence of the 13 items. The evaluator should select the next 10 orders for each new application, regardless of the individual to be evaluated, in order to avoid any learning effect.[16]

It is an interview in which the patients are asked to estimate their perceptions of difficulties.[6] During the assessment, a two-level scale is presented to individuals who are asked to rate their perceptions according to the scale of responses of "Impossible" or "Possible" (Impossible = 0; Possible = 1).

Activities not performed in the last three months are not punctuated and are entered as missing answers (signaled as a question mark). Activities not performed because they are very difficult should be scored as "Impossible".[6] At the end of the interview, responses should be submitted to the free online analysis service at www.rehab-scales.org[16] which converts the gross scores to a linear measure, by Rasch analysis.

After submitting the answers, an evaluation report is generated. In it, the individual's gait ability, with a 95% confidence interval, is placed on a continuous scale of locomotion ability defined in logits[16], which is a linear unit that expresses the individual's chances of success in a given item.[17] Since zero is conventionally defined as the average difficulty among the items, greater skills are placed to the right in the scale.[6]

The report also displays the items according to their difficulty. The top item "climbing stairs by placing each foot on the next step" is the hardest item and the item "walking less than five feet, indoors and leaning on the furniture" is the easiest item. This order of difficulty, also called calibration, was determined in the validation study of ABILOCO for post-stroke individuals.[6]

In the evaluation report, the patients responses are marked, but no markings are made on the missed answers (represented as question marks). Missed responses do not affect the estimated ability but reduce confidence in the measure.[16] Unexpected scores are highlighted in red and they may help diagnose atypical behavior of the patient or other co-morbidities. In addition to the graphical representation, the exact value of the locomotion ability measure, which should be used as the final score, is also presented in the report as "Patient measure".

Procedures

In order to carry out the cross-cultural adaptation, previous authorization from the authors of ABILOCO was requested and obtained. This process was developed in five stages, according to previous recommendations in the literature.[18,19]

Firstly, the questionnaire was translated from English into Portuguese-Brazil by two independent bilingual translators, whose mother language was Brazilian Portuguese, and whose main concern was the semantic, the cultural and the conceptual quality.

One of the translators was aware of the questionnaire assessed and the other was not. Then, a synthesis of the two translated versions was consensually compiled after the comparison of the original version both translated versions. The third stage, the back-translation, consisted of a back translation of the compiled version into English again.

Two back-translations were carried out by two independent bilingual translators whose first language (mother tongue) was English. These translators did not have access to the original questionnaire or prior knowledge of the study objectives. In the fourth stage, a committee of experts composed of three physiotherapists, an occupational therapist, a

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translator and a *back-translator*, discussed the clarity, relevance and equivalence among the translated and the back-translated versions, and the original version of the questionnaire to consolidate all versions a final pre-version, regarding semantics, idiomatic, cultural and conceptual equivalence.[20]

Finally, in the fifth and final stage, the understanding of the pre-final version, consolidated by the committee of experts, was applied in 10 post-stroke[10,21,22] patients recruited from the community by lists of previous research projects and contacts with professionals from Rehabilitation centers.

To be included in the study, the volunteers should meet the following criteria: age ≥20 years and at least three months of stroke onset; gait ability with or without auxiliary devices, regardless of speed; and at least 15% difference in muscle strength in the paretic lower limb (hip flexors and flexors / knee extensors), compared to the non-paretic limb,[23] and/or increase tonus of knee extensor muscles and / or plantar flexors muscles, identified by any score different than zero at the modified Ashworth scale.[24]

Patients with cognitive deficits identified by the cut-off points of the Mini Mental State Examination of 13 for illiterate, 18 for low and medium schooling, and 26 for high schooling status[25], ant those with verbal impairment or with any other skeletal or neuromuscular disability were excluded.

Before the ABILOCO application, all volunteers were invited to sign the Informed Consent Form and were assessed for eligibility criteria. Than, data were collected on the clinical and demographic characteristics of the participants to characterize the sample.

RESULTS

The cross-cultural adaptation fulfilled all the proposed recommendations.[18,19] The comparison between the original and the back-translated versions showed that most of the items remained unchanged or with few changes, which demonstrates adequate semantic equivalence between the versions.

During the preparation of the pre-final version, the committee of experts chose to add to the item "climbing stairs placing each foot on the next step" the term "alternating the feet", and examples of devices, such as "cane, walker, or tutor" in the item "walking more than five meters alone on a flat surface, without auxiliary device" to expand the understanding possibilities of the patients. The paired items

and their respective descriptions in English and Portuguese, after the considerations of the committee, are presented in Table 1.

The pre-final version was applied in 10 post-stroke individuals, with mean age of 63 ± 10 years and post-stroke evolution time of 49 ± 47 months. Six individuals had a paretic left side and the mean schooling of the sample was 8 ± 4 years. The maximum time of application of the questionnaire was five minutes, and the participants did not report any difficulty in understanding the items, which demonstrates the items clarity. Thus, the final version, called ABILOCO-Brazil, was established (Annex 1).

DISCUSSION

In the present study, the cross-cultural adaptation of the ABILOCO to the Portuguese-Brazil was performed. This is a questionnaire to evaluate the perception of gait performance, specific for post-stroke individuals. The process of cross-cultural adaptation fulfilled all the recommendations proposed by the literature,[18,19] and only minor additions of two items were necessary to enable a better understanding.

During the application of the pre-final version in the target population, one of the decisions of the committee of experts was to include the term "alternating feet" in the item "climbing stairs by placing each foot on the

next step". This increase was suggested in order to facilitate the understanding of the item by the patients.

In the Portuguese language, describing only "climbing stairs by placing each foot on the next step" does not clearly specify the alternate pattern proposed by the original questionnaire. Thus, the more detailed description of this item was intended to enable a better understanding of the item and avoid errors in the estimation of the difficulty when executing the movement.

In addition, in the item "walking more than five meters alone, indoors, on a flat surface, without an auxiliary device", some examples of such devices were included, such as cane, walker, tutor, since individuals might not understand the meaning of auxiliary devices.

In cross-cultural adaptation studies, it is recommended that the questionnaire is applied to the target population, the fifth stage, in which the understanding of the pre-final version is analyzed in a sample of at least five individuals.[19] Moreover, demographic data, clinical and origins of the patients are important for their characterization and consequent generalization of the results.[26-28]

The process of cross-cultural adaptation to the country or region in which the questionnaire will be used is critical, as there may be important differences between definitions, beliefs and behaviors from one culture to another.[18] Thus, the use of standardized pro-

Table 1. English and Portuguese items do ABILOCO

	English version	Portuguese-Brazil version
1.	Going up an escalator alone	Subir uma escada rolante sozinho
2.	Hopping on the healthy foot	Pular com o pé não afetado
3.	Going up stairs, putting each foot on the next step	Subir escadas colocando cada pé no próximo degrau (alternando os pés)
4.	Walking backwards	Andar para trás
5.	Striding over an object with the paretic foot first	Dar um passo largo sobre um objeto com o pé afetado primeiro
6.	Striding over an object with the healthy foot first	Dar um passo largo sobre um objeto com o pé não-afetado primeiro
7.	Walking more than five meter alone, indoors, on flat ground without assistive device	Andar mais de cinco metros sozinho, dentro de casa, em superfície plana, sem dispositivo auxiliar (bengala, andador, tutor)
8.	Walking with the help of a person who guides but does not support	Andar com a ajuda de outra pessoa que o guia, mas não o sustenta
9.	Walking less than five meters with the help of a person to support	Andar menos de cinco metros com a ajuda de uma pessoa para apoio
10.	Walking while holding a fragile object (such as full glass)	Andar enquanto segura um objeto frágil (como um copo cheio)
11.	Walking less than five meters alone, without the help or supervision of a person	Andar menos de cinco metros sozinho sem ajuda ou supervisão de uma pessoa
12.	Turning and walking in a narrow space	Girar/virar e andar em um espaço estreito
13.	Walking less than five meters, indoors, holding pieces or furniture	Andar menos de cinco metros, dentro de casa, apoiando nos móveis

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cedures and the use of internationally recognized criteria make this process reliable.

However, the methodology proposed by Beaton et al.[18] and Wild et al.[19] only guarantees the visual and content validity of the adapted version. Other measurement properties such as construct validity and reliability should be investigated. Furthermore, once it is an evaluation instrument that aims to follow the evolution of the patient, its responsiveness should also be investigated for adequate use in clinical settings and in research.[26-29]

Finally, ABILOCO-Brazil also created the 10 random orders of the questionnaire, according to the original version. Additionally, it is important to note that because it is a measure constructed according to the Rasch model of measurement, the use of raw scores is not recommended. Therefore, the answers should be submitted to the online analysis, that is free of charge and available at www.rehab-scales.org.[16] This analysis allows the transformation of raw scores into linear measures, by the Rasch analysis, like the original version.

CONCLUSION

The cross-cultural adaptation process of ABILOCO to Portuguese-Brazil are aligned with procedures recommended by the literature. The results of this process indicated an adequate degree of semantic, conceptual and cultural equivalence, with only additions in two items in the translated version, in relation to the original version. Thus, these findings demonstrated that ABILOCO-Brazil showed an adequate questionnaire to evaluate the perception of locomotion performance of post-stroke patients, what allows this questionnaire to be an alternative to be incorporated in clinical protocols for evaluation and follow-up of these individuals.

REFERENCES

1. Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, et al. Heart disease and stroke statistics--2015 update: a report from the American Heart Association. Circulation. 2015;131(4):e29-322. DOI: http://dx.doi.org/10.1161/CIR.0000000000000152

2. Alonso de Leciñana M, Gutiérrez-Fernández M, Romano M, Cantú-Brito C, Arauz A, Olmos LE, et al. Strategies to improve recovery in acute ischemic stroke patients: Iberoamerican Stroke Group Consensus. Int J Stroke. 2014;9(4):503-13. DOI: http://dx.doi.org/10.1111/ijs.12070

3. Carr J, Shepherd R. Neurological rehabilitation. Optimizing motor performance. London: Churchill Livingstone; 2010.

4. Pereira CF, Lemos MM, Benvenuto MC, Fonseca GA. Enfoque sobre pesquisa prospectiva no AVC. Med Reabil. 1993;34(36):9-13.

5. Pollock A, St George B, Fenton M, Firkins L. Top 10 research priorities relating to life after stroke – consensus from stroke survivors, caregivers, and health professional. Int J Stroke. 2014;9(3):313-20. DOI: http://dx.doi.org/10.1111/j.1747-4949.2012.00942.x

6. Caty GD, Arnould C, Stoquart GG, Thonnard JL, Lejeune TM. ABILOCO: A rasch-built 13-Item questionnaire to assess locomotion ability in stroke patients. Arch Phys Med Rehabil. 2008;89(2):284-90. DOI: http://dx.doi.org/10.1016/j.apmr.2007.08.155

7. CIF: Classificação Internacional de Funcionalidade, Incapacidade e Saúde. São Paulo: Edusp; 2003.

8. Lemmens RJ, Timmermans AA, Janssen-Potten YJ, Smeets RJ, Seelen HA. Valid and reliable instruments for arm-hand assessment at ICF activity level in persons with hemiplegia: a systematic review. BMC Neurol. 2012;12:21. DOI: http://dx.doi.org/10.1186/1471-2377-12-21

9. Penta M, Tesio L, Arnould C, Zancan A, Thonnard JL. The ABILHAND questionnaire as a measure of manual ability in chronic stroke patients: Rasch-based validation and relationship to upper limb impairment. Stroke. 2001;32(7):1627-34. DOI: http://dx.doi.org/10.1161/01.STR.32.7.1627

10. Basílio ML, Faria-Fortini I, Magalhães LC, Assumpção FS, Carvalho AC, Teixeira-Salmela LF. Cross-cultural validity of the Brazilian version of the ABILHAND questionnaire for chronic stroke individuals, based on Rasch analysis. J Rehabil Med. 2016;48(1):6-13. DOI: http://dx.doi.org/10.2340/16501977-2044

11. Tyson S, Connell L. The psychometric properties and clinical utility of measures of walking and mobility in neurological conditions: a systematic review. Clin Rehabil. 2009;23(11):1018-33. DOI: http://dx.doi.org/10.1177/0269215509339004

12. Lee WJ, Park GY, Han ZA, Kim HW, Cho SU, Oh SJ, et al. Korean Version of the ABILOCO Questionnaire in the Assessment of Locomotion in Hemiplegic Stroke Patients. Ann Rehabil Med. 2013;37(1):72-81. DOI: http://dx.doi.org/10.5535/arm.2013.37.1.72

13. Caty GD, Theunissen E, Lejeune TM. Reproducibility of the ABILOCO questionnaire and comparison between self-reported and observed locomotion ability in adult patients with stroke. Arch Phys Med Rehabil. 2009;90(6):1061-3. DOI: http://dx.doi.org/10.1016/j.apmr.2008.12.008

14. Arnould C, Vandervelde L, Batcho CS, Penta M, Thonnard JL. Can manual ability be measured with a generic ABILHAND scale? A cross-sectional study conducted on six diagnostic groups. BMJ Open. 2012;2(6):1-9. DOI: http://dx.doi.org/10.1136/bmjopen-2012-001807

15. Grimby G, Tennant A, Tesio L. The use of raw scores from ordinal scales: Time to end malpractice? J Rehabil Med. 2012;44(2):97-8.

16. Rehab-scales [homepage on the Internet]. Louvain-la-Neuve: Université Catholique de Louvain; c2007 [cited 2016 Jul 22]. Available from: http://www.rehab-scales.org/

17. Bond TG, Fox CM. Applying the Rasch Model: Fundamental measurement in the human sciences. New York: Routledge; 2010.

18. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self report measures. Spine. 2000;25(24):3186-91. DOI: http://dx.doi.org/10.1097/00007632-200012150-00014

19. Wild D, Grove A, Martin M, Eremenco S, McElroy S, Verjee-Lorenz A, et al. Principles of Good Practice for the Translation and Cultural Adaptation Process for Patient-Reported Outcomes (PRO) Measures: report of the ISPOR Task Force for Translation and Cultural Adaptation. Value Health. 2005;8(2):94-104. DOI: http://dx.doi.org/10.1111/j.1524-4733.2005.04054.x

20. 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: http://dx.doi.org/10.1016/0895-4356(93)90142-N

21. Lima RCM, Teixeira-Salmela LF, Magalhães LC, Gomes-Neto M. Propriedades psicométricas da versão brasileira da escala de qualidade de vida específica para acidente vascular encefálico: aplicação do modelo Rasch. Rev Bras Fisioter. 2008;12(2):149-56. DOI: http://dx.doi.org/10.1590/S1413-35552008000200012

22. Saliba VA, Magalhães LC, Faria CD, Laurentino GE, Cassiano JG, Teixeira-Salmela LF. Cross-cultural adaptation and analysis of the psychometric properties of the Brazilian version of the Motor Activity Log. Rev Panam Salud Publica. 2011;30(3):262-71. DOI: http://dx.doi.org/10.1590/S1020-49892011000900011

23. Faria CDCM, Teixeira-Salmela LF, Nadeau S. Predicting levels of basic functional mobility, as assessed by the Timed "Up and Go" test, for individuals with stroke: discriminant analyses. Disabil Rehabil. 2013;35(2):146–52. DOI: http://dx.doi.org/10.3109/09638288.2012.690497

24. Gregson JM, Leathley M, Moore AP, Sharma AK, Smith TL, Watkins CL. Reliability of the Tone Assessment Scale and the modified Ashworth scale as clinical tools for assessing poststroke spasticity. Arch Phys Med Rehabil. 1999;80(9):1013-6. DOI: http://dx.doi.org/10.1016/S0003-9993(99)90053-9

25. Bertolucci PH, Brucki SM, Campacci SR, Juliano Y. The Mini-Mental State Examination in a general population: impact of educational status. Arq Neuropsiquiatr. 1994;52(1):1-7. DOI: http://dx.doi.org/10.1590/S0004-282X1994000100001

26. Mokkink LB, Terwee CB, Patrick DL, Alonso J, Stratford PW, Knol DL, et al. The COSMIN checklist for assessing the methodological quality of studies on measurement properties of health status measurement instruments: an international Delphi study. Qual Life Res. 2010;19(4):539-49. DOI: http://dx.doi.org/10.1007/s11136-010-9606-8

27. Mokkink LB, Terwee CB, Knol DL, Stratford PW, Alonso J, Patrick DL, et al. The COSMIN checklist for evaluating the methodological quality of studies on measurement properties: a clarification of its content. BMC Med Res Methodol. 2010;10:22. DOI: http://dx.doi.org/10.1186/1471-2288-10-22

28. Mokkink LB, Terwee CB, Patrick DL, Alonso J, Stratford PW, Knol DL, et al. The COSMIN study reached international consensus on taxonomy, terminology, and definitions of measurement properties for health-related patient-reported outcomes. J Clin Epidemiol. 2010;63(7):737-45. DOI: http://dx.doi.org/10.1016/j.jclinepi.2010.02.006

29. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, et al. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol. 2007;60(1):34-42. DOI: http://dx.doi.org/10.1016/j.jclinepi.2006.03.012

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ABILOCO: Uma Medida de Habilidade de Locomoção
Versão em Português. Ordem 1

Nome:_____

Você poderia estimar a sua capacidade para realizar as seguintes atividades?	Impossível	Possível	?
1. Subir uma escada rolante sozinho.			
2. Pular com o pé não afetado.			
3. Subir escadas colocando cada pé no próximo degrau (alternando os pés).			
4. Andar para trás.			
5. Dar um passo largo sobre um objeto com o pé afetado primeiro.			
6. Dar um passo largo sobre um objeto com o pé não afetado primeiro.			
7. Andar mais de cinco metros sozinho, dentro de casa, em superfície plana, sem dispositivo auxiliar (bengala, andador, tutor).			
8. Andar com a ajuda de outra pessoa que o guia, mas não o sustenta.			
9. Andar menos de cinco metros com a ajuda de uma pessoa para apoio.			
10. Andar enquanto segura um objeto frágil (como um copo cheio).			
11. Andar menos de cinco metros sozinho sem ajuda ou supervisão de uma pessoa.			
12. Girar/virar e andar em um espaço estreito.			
13. Andar menos de cinco metros, dentro de casa, apoiando nos móveis.			