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

Patrick Roberto Avelino¹, Iza Faria-Fortini², Marluce Lopes Basílio², Kênia Kiefer Parreiras de Menezes¹, Lívia de Castro Magalhães², Luci Fuscaldi Teixeira-Salmela²

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 all 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

¹ Physiotherapist, Federal University of Minas Gerais – UFMG. 
² Professor, Federal University of Minas Gerais – UFMG.

Mailing address:
Universidade Federal de Minas Gerais - Departamento de Fisioterapia
Profº Luci Fuscaldi Teixeira-Salmela
Av. Antônio Carlos, 6627
Belo Horizonte – MG
CEP 31270-901
E-mail: lfts@ufmg.br
Financial support: CNPq and FAPEMIG

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INTRODUCTION

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

Locomotion refers to an individual’s ability to move effectively in their environment, and it is classified in the Activity and Participation component of the International Classification of Functioning, Disability and Health (ICF). 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. Performance measures are usually assessed by questionnaires, that asks the patient about their day-to-day performance on the basis of their own perception.

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.

Among the instruments that are used to evaluate locomotion ability, 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 and meets the utility criteria proposed by Tyson & Connel. Studies that have investigated ABILOCO measurement properties have found adequate values for concurrent validity, reliability, linearity and unidimensionality. 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.

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.

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. 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.

It is an interview in which the patients are asked to estimate their perceptions of difficulties. During the assessment, a two-level scale is presented to individuals who are asked to rate their perceptions according to the scale of responses “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.” At the end of the interview, responses should be submitted to the free online analysis service at www.rehab-scales.org 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, which is a linear unit that expresses the individual’s chances of success in a given item. Since zero is conventionally defined as the average difficulty among the items, greater skills are placed to the right in the scale.

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.

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. Unexpected scores are highlighted in red and they may help diagnose atypical behavior of the patient or other comorbidities. 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.

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...
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-stroke10,21,22 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 in the number of knee extensor muscles and/or planter flexor 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 status25,26, ant those with verbal impairment or confabulation 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.16,17 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,16,17 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 alternative 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.23 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.19 Thus, the use of standardized pro-

Table 1. English and Portuguese items do ABILOCO

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

However, the methodology proposed by Beaton et al. and Wild et al. 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 will also be investigated for adequate use in clinical settings and in research.

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. 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-Brazilian is 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**

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Nome:______________________________________________________________

Você poderia estimar a sua capacidade para realizar as seguintes atividades? Impossível  Possível  F

1. Subir uma escada rolante sozinho.  
2. Pular com o pé não afetado.  
3. Subir escaladas colocando cada pé no próximo degrau (alternando os pés).  
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, tutu).  
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.