

BRIEF REPORT

Reproducibility of the ABILOCO Questionnaire and Comparison Between Self-Reported and Observed Locomotion Ability in Adult Patients With Stroke

Gilles D. Caty, MD, Emilie Theunissen, MD, Thierry M. Lejeune, MD, PhD

ABSTRACT. 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;90:1061-3.

Objectives: To test the reproducibility of the ABILOCO questionnaire. To validate the patient self-reporting method and the third-party assessment of the stroke patients' locomotion ability by a treating physical therapist.

Design: Prospective study.

Setting: University hospital.

Participants: Adult stroke patients (N=28; 59±13y). The time since stroke ranged from 3 to 253 weeks.

Interventions: Not applicable.

Main Outcome Measure: The ABILOCO questionnaire.

Results: The results of patient self-assessment and the results of the third-party assessments by the physiotherapists at a 2-week interval were highly correlated (intraclass correlation coefficient [ICC]=.77 and ICC=.89, respectively). The results of the patient self-assessment and the third-party assessment by the physical therapist were both well correlated to assessment by an independent medical examiner who observed the patient during the 13 ABILOCO activities (ICC=.69 and ICC=.87, respectively).

Conclusions: The use of ABILOCO as a self-reporting questionnaire is a valid and reproducible method for assessing locomotion ability in patients with stroke in daily clinical practice and research.

Key Words: Locomotion; Outcome assessment (health care); Questionnaires; Rehabilitation; Stroke.

© 2009 by the American Congress of Rehabilitation Medicine

THE ABILOCO IS a recently developed 13-item Rasch-built questionnaire¹ for evaluating locomotion ability in adult patients with stroke. The questionnaire's linearity, unidimensionality, invariance, and concurrent validity have already been demonstrated.¹ The objectives of the present study were 2-fold: first, to test the reproducibility of ABILOCO, and second, to validate (1) the patient self-reporting method and (2) the third-party assessment by the treating physical therapist of the locomotion ability of the patient with stroke.

METHODS

Participants were recruited in 3 physical medicine and rehabilitation services, where they were receiving rehabilitation care on an inpatient or an outpatient basis. They gave their written, informed consent for participation, and the study protocol was approved by the local ethics committee. Included patients (>20y) must have had a stroke at least 3 months previously to avoid a change in locomotion ability between assessments. Patients displaying other pathologies with potential effects on locomotion ability, patients confined to a bed or wheelchair, or patients who recovered a normal gait without any noticeable disturbances were excluded from the study. In contrast with the initial study,¹ patients with aphasia or other cognitive disorders were not excluded.

The patients' locomotion abilities were evaluated using the ABILOCO questionnaire (appendix 1). The patient's ability to perform each of the 13 featured activities was rated as possible or impossible. The activity is rated not applicable if it was not performed in the 3 months prior to the assessment. The protocol included 2 interviews. At the first interview (t_0), the patient's personal data and clinical features (MMSE, date and type of stroke) were recorded. The patient and the treating physical therapist then filled out ABILOCO independently. If the patient presented cognitive disorders and had trouble filling out the questionnaire independently, the investigator helped the patient complete the questionnaire in the form of an interview. At the second interview performed 2 weeks later (t_1), the patient and the physiotherapist filled out the ABILOCO again. A 2-week period was selected to prevent the subject from remembering the responses. Next, 1 independent medical examiner (a medical doctor) asked the patient to perform each of the 13 activities and assessed whether the patient was capable or incapable of doing so.

Each raw score was then converted into a linear measurement in logits using a Rasch analysis,¹ taking into account the unperformed activities (analysis available at <http://www.rehab-scales.org>). In particular, the observation by the medical doctor of the item "Going up an escalator alone" was not possible in 9 patients because of the lack of an escalator close to the assessment site.

The reproducibility of the ABILOCO questionnaire was tested by comparing, on the one hand, the patient's locomotion ability estimated at t_0 and t_1 by the patient, and, on the other hand, the ability estimated at t_0 and t_1 by the physical therapist. The validity of the self-assessment and third-party assessment was studied by comparing the locomotion ability assessed by the patient (self-assessment) and by the physical therapist (third-party assessment) with that evaluated by the medical doctor.

List of Abbreviations

ICC	intraclass correlation coefficients
MMSE	Mini-Mental State Examination

From the Physical Medicine and Rehabilitation Department, Université catholique de Louvain, Brussels, Belgium.

No commercial party having a direct financial interest in the results of the research supporting this article has or will confer a benefit on the authors or on any organization with which the authors are associated.

Reprint requests to Thierry M. Lejeune, MD, PhD, Université catholique de Louvain, Cliniques universitaires Saint-Luc, Physical Medicine and Rehabilitation Department, Avenue Hippocrate 10, B-1200 Brussels, Belgium, e-mail: thierry.lejeune@uclouvain.be.

0003-9993/09/9006-0075\$36.00/0

doi:10.1016/j.apmr.2008.12.008

Correlations between the variables were measured using ICCs²⁻⁴ (SPSS version 15.0).^a The ICC can consider the extent of the relative discrepancies between the evaluations and gives the proportion of variance attributable to between-group differences. The effect of aphasia, sensory neglect, and MMSE on the validity of ABILOCO self-assessment was studied using a 2-factor, repeated-measures analysis of variance.

RESULTS

Twenty-eight patients with stroke (13 men, 15 women; mean age, 59 ± 13 y; time since stroke, 33 ± 58 mo) participated in the study. Sixteen patients displayed left-side hemiplegia (of whom 4 had sensory neglect), and 12 displayed right-side hemiplegia (of whom 8 had aphasia). The median for the MMSE was 10.5 (range, 6–30).

The correlation between the locomotion ability self-assessed by the patient at t_0 and t_1 is shown in figure 1A. The ICC was .77, and the Bland-Altman value (mean $\pm$ SD) was 0.2 ± 3.5 logit. The correlation between the patient locomotion ability assessed by a physical therapist at t_0 and t_1 is shown in figure 1B. The ICC was .89, and the Bland-Altman value was $.08 \pm 2$ logit.

The correlation between the locomotion ability self-assessed by the patient and assessed by the medical doctor is shown in figure

1C. The ICC was .69, and the Bland-Altman value was $.02 \pm 3.5$ logit. The correlation between the patient locomotion ability assessed by a physical therapist and assessed by the MD is shown in figure 1D. The ICC was .87, and the Bland-Altman value was $-.03 \pm 2.2$ logit.

Aphasia, sensory neglect, and MMSE did not have significant effects on the validity of the ABILOCO self-assessment ($P = .71$, $P = .57$, and $P = .47$, respectively).

DISCUSSION

This study validates the self-report method of the ABILOCO questionnaire and shows its reproducibility.

Self-assessment questionnaires validated by Rasch analysis have several advantages relative to observational measurement and thus are increasingly used in a range of pathologies.⁵⁻⁷ Such questionnaires (1) can be completed easily, quickly, and cheaply, (2) enable assessment of a patient's activity and participation limitations in a real-life context, and (3) allow regular evaluation of a large number of subjects over the course of a rehabilitation program (whether on an inpatient or outpatient basis). In contrast, hospital-based performance tests evaluate the patient's maximum capacity at a given moment in an artificial environment; the results of such tests depend on the patient's motivation and may not always reflect the activities that the patient performs

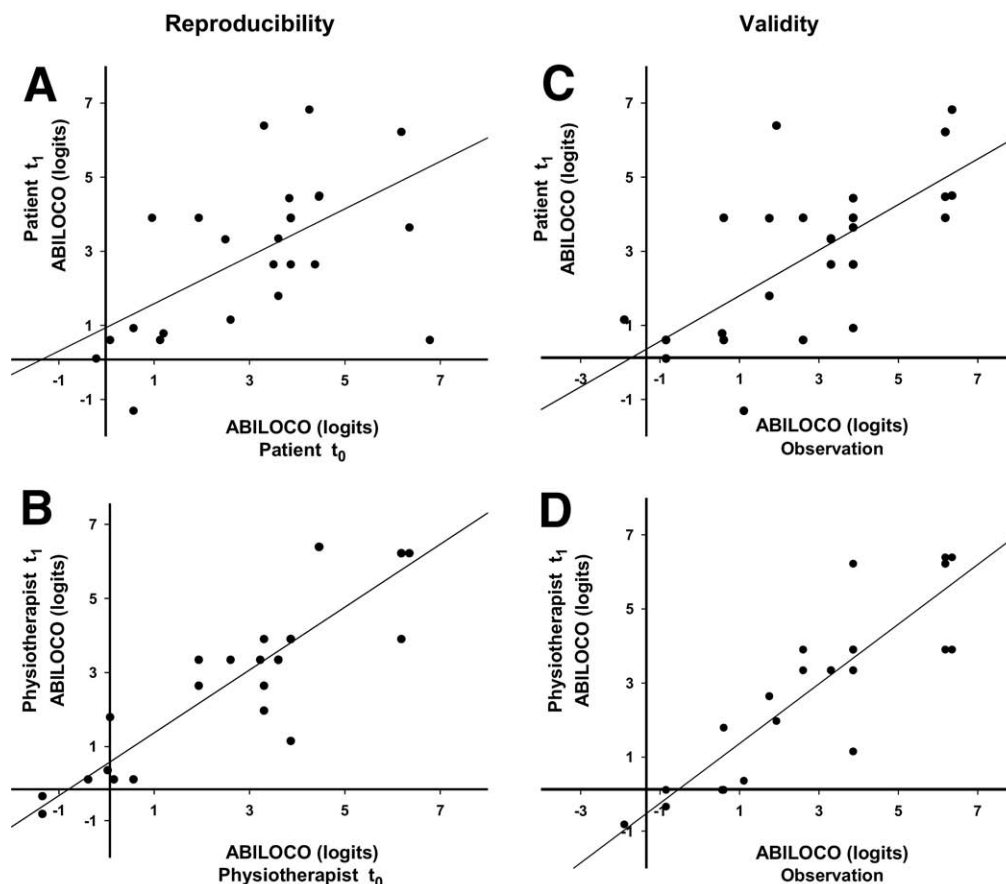


Fig 1. The patients' locomotion capacities evaluated using the ABILOCO questionnaire are expressed in logits. Each point represents the results obtained for 1 patient, with a linear regression adjusted to fit the data. (A) The correlation between the locomotion ability self-assessed by the patient at t_0 and t_1 . (B) The correlation between the patient locomotion ability assessed by a physical therapist at t_0 and t_1 . (C) The correlation between the locomotion ability self-assessed by the patient and assessed by the medical examiner. (D) The correlation between the patient locomotion ability assessed by a physical therapist and assessed by the medical examiner.

regularly in the personal environment.¹ There are few literature data on patients' self-assessment capacities; most work has sought to validate self-assessment and has looked at performance of activities of daily living, with variable results.⁸⁻¹⁰

Limited stroke-associated cognitive disorders (aphasia, sensory neglect) do not appear to have a significant impact on the validity of self-assessment with the ABILOCO questionnaire, but completing the questionnaire may require the aid of another person. When the severity of cognitive disorders precluded the

self-assessment, the evaluation by the physical therapist was also valid. In the future, it would also be interesting to test the validity of assessment by a caregiver.

CONCLUSIONS

The use of ABILOCO as a self-reporting questionnaire is a valid and reproducible method for assessing locomotion ability in patients with stroke in daily clinical practice and research.

APPENDIX 1: THE ABILOCO QUESTIONNAIRE

Could You Estimate Your Ability to Realize the Following Activities?		Impossible	Possible	?
1	Walking while holding a fragile object (such as a full glass).			
2	Walking with the help of a person who guides but does not support.			
3	Striding over an object with the paretic foot first.			
4	Walking more than 5 meters alone, indoors, on flat ground without assistive device.			
5	Turning and walking in a narrow space.			
6	Striding over an object with the healthy foot first.			
7	Walking less than 5 meters with the help of a person to support.			
8	Walking backwards.			
9	Walking less than 5 meters alone without the help or supervision of a person.			
10	Going up stairs putting each foot on the next step.			
11	Walking less than 5 meters, indoors, holding onto pieces of furniture.			
12	Going up an escalator alone.			
13	Hopping on the healthy foot.			

References

- Caty GD, Arnould C, Stoquart GG, Thonnard JL, Lejeune TM. ABILOCO: a Rasch-built 13-item questionnaire to assess locomotion in stroke patients. *Arch Phys Med Rehabil* 2008;89:284-90.
- Shrout P, Fleiss J. Intraclass correlations: uses in assessing rater reliability. *Psychol Bull* 1979;86:420-8.
- McGraw K, Wong S. Forming inferences about some intraclass correlation coefficients. *Psychol Methods* 1996;1:30-46.
- Nickerson C. A note on a concordance correlation coefficient to evaluate reproducibility. *Biometrics* 1997;53:1503-7.
- Caty GD, Detrembleur C, Bleyenheuft C, Deltombe T, Lejeune TM. Effect of simultaneous botulinum toxin injections into several muscles on impairment, activity, participation and quality of life among stroke patients presenting with a stiff-knee gait. *Stroke* 2008;39:2803-8.
- Vandervelde L, Van den Bergh PY, Goemans N, Thonnard JL. ACTIVLIM: a Rasch-built measure of activity limitations in children and adults with neuromuscular disorders. *Neuromusc Disord* 2007;17:459-69.
- Durez P, Fraselle V, Houssiau F, Thonnard JL, Nielens H, Penta M. Validation of the ABILHAND questionnaire as a measure of manual ability in patients with rheumatoid arthritis. *Ann Rheum Dis* 2007;66:1098-105.
- Wijlhuizen GJ, Ooijendijk W. Measuring disability, the agreement between self evaluation and observation of performance. *Disabil Rehabil* 1999;21:61-7.
- Owens PL, Bradley EH, Horwitz SM, et al. Clinical assessment of function among women with a recent cerebrovascular event: a self-reported versus performance-based measure. *Ann Intern Med* 2002;136:802-11.
- Sinoff G, Ore L. The Barthel activities of daily living index: self-reporting versus actual performance in the old-old (≥ 75 years). *J Am Geriatr Soc* 1997;45:832-6.

Supplier

- SPSS Inc, 233 S Wacker Dr, 11th Fl, Chicago, IL 60606.