Reliability and Validity of the CONFbal Scale in Patients with Hemiparesis Following Stroke

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Abstract

Background: The 10-item CONFbal scale is a measure used to assess balance confidence in geriatric population. However, its measurement properties have not been studied in the poststroke population. Objectives: The objective of this study was to assess the reliability and validity of the CONFbal scale in poststroke patients. Methods: We did a cross-sectional study of 80 poststroke patients with hemiparesis attending the Neurology Outpatient Department, PSG Hospitals, Coimbatore. Participants completed the CONFbal scale and the activities-specific balance confidence (ABC) scale in a random order to assess balance confidence. Results: The Cronbach’s alpha for CONFbal scale was 0.894, which showed that the items of the scale were internally consistent. The Pearson correlation coefficient (r) for CONFbal and ABC scales was −0.702, which showed that there was a moderate association between the two scales. Conclusion: The CONFbal scale is a reliable and valid scale to assess balance confidence in poststroke patients.

Keywords: Balance confidence, CONFbal, reliability, stroke, validity

Introduction

Balance confidence is considered as “people’s conviction in their ability to engage in everyday functional tasks without losing their balance.” Balance confidence is a cognitive construct rather than an emotional, and it involves beliefs and self-appraisal. In geriatric population with balance or vestibular disease, decreased balance confidence in performing functional activities correlates with their balance performance, time span of vestibular symptoms, domains of quality of life, and visual impairments. Lajoie and Gallagher had demonstrated an association between balance confidence and balance performance in older adults living in the community, by comparing individuals with fear of falling demonstrating a decline in performance on gait and balance measures such as single-legged stance times, posturography, and the performance-oriented mobility assessment of balance than persons with balance impairments but no fear of falling. Myers et al. found a strong association between balance confidence which was measured by activities-specific balance confidence (ABC) scale and postural sway which was measured by posturography in static conditions in community-living older adults.

After stroke, balance confidence may be an important factor affecting self-efficacy for daily activities. Yiu et al. conducted a longitudinal study to assess the balance confidence in poststroke patients. They found that the higher level of anxiety and poor balance following stroke was associated with decreased balance confidence. They observed that stroke patients with greater depression and more impaired walking capacity had significant interaction with balance tests. Shah and Diwan stated that in assessing balance for stroke patients, balance confidence has to be included as an important factor because their results showed that balance confidence correlated with balance performance in stroke patients. A study has shown that after 6 months poststroke, balance confidence was able to predict the health-related quality of life independently, which in turn affects patients’ activity and participation. A secondary analysis by Torkia et al. concluded that balance

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confidence was a predictor of perceived physical function, recovery, and mobility irrespective of their balance capacity, walking capacity, and basic mobility after discharge from inpatient rehabilitation poststroke.[10]

Several studies have shown the importance of balance confidence in poststroke patients. Balance confidence being a cognitive construct needs a valid and reliable tool to measure in poststroke patients. Therefore, a scale which could be used in conjunction with other rehabilitation measures and provides specific measures of balance confidence managed by physiotherapists would be of value. The 10-item CONFbal scale is a measure used to assess balance confidence in geriatric population. Simpson et al. in their study of people with mobility problems found that the CONFbal scale was internally consistent (Cronbach’s alpha = 0.91) and had good test–retest reliability (intraclass correlation coefficient = 0.96 [95% confidence interval 0.92–0.98]).[1] In the same study, the CONFbal scores correlated well with postural instability index ($r=0.75$), previous mobility ($r=−0.76$), and perceived unsteadiness ($r=0.48$), which support its validity among people with mobility problems.[1]

However, the measurement properties of the CONFbal scale have not been tested in the poststroke population. Hence, we aimed to find the internal consistency and concurrent validity of the CONFbal scale in community-living poststroke patients. We hypothesized that this scale would be a reliable and valid measure to assess balance confidence in poststroke patients.

**Methods**

Ethical approval was granted by the Institutional Human Ethics Committee, PSG Institute of Medical Sciences and Research, Coimbatore, India. Informed consent was obtained from all participants.

**Participants**

In this study, convenience sampling method was used. All poststroke patients who visited the Neurology Outpatient Department of PSG Hospitals, Coimbatore, were screened for eligibility. They were included if they were between 40 and 60 years of age, able to communicate, comprehend study instructions, and ambulant with or without walking aids. Patients were excluded if they suffered from any vestibular disorder, visual deficits, or any other neurological or orthopedic problems that would affect their balance. Patients were also excluded if they had a mini-mental status examination score of <24. Patients who declined consent were also excluded from the study.

**Study procedure**

This study had a cross-sectional design. The first 80 poststroke patients who were eligible for this study were given two questionnaires one after the other, in a random order. One questionnaire was the CONFbal scale and the other questionnaire was the ABC scale to measure the balance confidence. The ABC scale is a widely used valid and reliable outcome scale to assess the balance confidence in poststroke patients. In this study, the ABC scale was used to validate the CONFbal scale. Instructions were given to participants regarding the procedure to complete the questionnaires. To verify comprehension, respondents read the instructions, and one administrator was present near the participant to help the participants complete the questionnaires. Each questionnaire was given in a separate sheet with questions and boxes to enter the score for each question. After completion by the participant, the administrator collected both the questionnaires, and data were analyzed.

**Statistical analyses**

Data were analyzed using the Statistical Package for the Social Sciences, (SPSS for Windows, Version 16.0. Chicago, SPSS Inc). Cronbach’s alpha of the CONFbal scale was calculated as a measure of internal consistency. Correlation between the CONFbal and ABC scale scores was done using Pearson correlation.

**Results**

A total of 80 poststroke hemiparetic patients who met the study criteria participated in this study. The participants’ characteristics are presented in Table 1. The mean (range) age was 53 (43–57) years; 53 patients were male and 27 patients were female. Of the 80 participants, 11 patients were using walking aids for walking, and the remaining 69 patients were not using any walking aid. A total of eight patients had a history of fall poststoke [Table 1].

As shown in Table 2, the CONFbal scale had a high Cronbach’s alpha value of 0.894. As shown in Table 3, on Pearson’s correlation analysis, there was a strong negative association between the CONFbal and the ABC scores with a coefficient ($r$) of $−0.702$ ($P=0.01$). This means that when the score in ABC scale increased the score in CONFbal scale decreased. Figure 1 shows the scatterplot between CONFbal score and ABC score. It shows that the relationship between the CONFbal scale and

| Table 1: Characteristics of study participants ($n=80$) |
|-----------------------------------------------|
| **Variables** | **Observation** |
| Age (mean) | 43-57 years (53 years) |
| Gender (%) | Male 53 (66.25) |
| | Female 27 (33.75) |
| Side of lesion (%) | Right 31 (38.75) |
| | Left 49 (61.25) |
| Type of lesion (%) | Infarct 67 (83.75) |
| | Hemorrhage 13 (16.25) |
| Using walking aids (%) | Yes 11 (13.75) |
| | No 69 (86.25) |
| History of falls (%) | Yes 08 (10) |
| | No 72 (90) |
ABC scale was linear. Table 4 shows the Cronbach’s alpha value if each item of the questionnaire was deleted. The deletion of the first question increased the Cronbach’s alpha value to 0.903. The value of Cronbach’s alpha ranged from 0.903 to 0.871 if the individual items were deleted from the scale. Essentially, the calculated values of Cronbach’s alpha lay in the region of acceptable values (0.7–0.9), suggesting little to no redundancy and sufficient homogeneity across items.

**Discussion**

This study was done on 80 poststroke hemiparetic participants to find out the internal consistency and validity of the CONFbal scale to assess balance confidence. The Cronbach’s alpha of 0.894 indicated that set of 10 items in this scale measure a single, unidimensional construct balance confidence and showing the scale to be internally consistent. A Pearson’s correlation coefficient (r) of −0.702 showed that there was a moderate negative correlation between CONFbal scale and ABC scale. Botner et al. found that the ABC scale was internally consistent with a Cronbach’s alpha of 0.94 and had a positive linear correlation with both the Berg Balance Scale ($\rho = 0.36, P < 0.001$) and gait speed ($\rho = 0.48, P < 0.001$) in poststroke patients. In our study, a strong association with the ABC scale suggests that the CONFbal scale is a valid measure to assess balance confidence in poststroke patients. Interpretation of the scatterplot showed that the majority of the patients in this study had a higher level of balance confidence.

**Conclusion**

The CONFbal scale is a reliable and valid tool to measure balance confidence in poststroke patients.

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**Conflicts of interest**

There are no conflicts of interest.

**References**

1. Simpson JM, Worsfold C, Fisher KD, Valentine JD. The CONFbal scale: A measure of balance confidence – A key outcome of rehabilitation. Physiotherapy 2009;95:103-9.
Regan, et al.: The psychometric properties of CONFbal scale in post stroke patients

2. Marchetti GF, Whitney SL, Redfern MS, Furman JM. Factors associated with balance confidence in older adults with health conditions affecting the balance and vestibular system. Arch Phys Med Rehabil 2011;92:1884-91.

3. Lajoie Y, Gallagher SP. Predicting falls within the elderly community: Comparison of postural sway, reaction time, the Berg Balance Scale and the Activities-Specific Balance Confidence (ABC) Scale for comparing fallers and non-fallers. Arch Gerontol Geriatr 2004;38:11-26.

4. Myers AM, Powell LE, Maki BE, Holiday PJ, Brawley LR, Sherk W, et al. Psychological indicators of balance confidence: Relationship to actual and perceived abilities. J Gerontol A Biol Sci Med Sci 1996;51:M37-43.

5. Yiu J, Miller WC, Eng JJ, Liu Y. Longitudinal analysis of balance confidence in individuals with stroke using a multilevel model for change. Neurorehabil Neural Repair 2012;26:999-1006.

6. Shah ZR, Diwan SJ. Association between confidence in balance and actual balance performance in stroke patients. Int J Health Sci Res 2014;4:83-8.

7. Salbach NM, Mayo NE, Robichaud-Ekstrand S, Hanley JA, Richards CL, Wood-Dauphinee S, et al. Balance self-efficacy and its relevance to physical function and perceived health status after stroke. Arch Phys Med Rehabil 2006;87:364-70.

8. Jönsson AC, Lindgren I, Hallström B, Norrving B, Lindgren A. Determinants of quality of life in stroke survivors and their informal caregivers. Stroke 2005;36:803-8.

9. Almborg AH, Ulander K, Thulin A, Berg S. Discharged after stroke – Important factors for health-related quality of life. J Clin Nurs 2010;19:2196-206.

10. Torkia C, Best KL, Miller WC, Eng JJ. Balance confidence: A Predictor of perceived physical function, perceived mobility, and perceived recovery 1 year after inpatient stroke rehabilitation. Arch Phys Med Rehabil 2016;97:1064-71.

11. Portney LG, Watkins MP. Foundations of Clinical Research: Applications to Practice. 3rd ed. Upper Saddle River: Prentice-Hall; 2009.

12. Botner EM, Miller WC, Eng JJ. Measurement properties of the activities-specific balance confidence scale among individuals with stroke. Disabil Rehabil 2005;27:156-63.