Abstract. [Purpose] This study aimed to investigate the relationship between balance function and community participation in stroke survivors. [Subjects and Methods] Sixty-three patients diagnosed with hemiparetic stroke participated in this study (36 males, 27 females, aged 58.6 ± 15.2 years). The participants were assessed for balance function and their level of participation in the community, using activity card sorting and the Berg Balance Scale. A regression analysis was used to identify the influence of balance function on instrumental activities of daily living and leisure and social activities. [Results] The results of the regression analysis indicated that balance function measured by using the Berg Balance Scale affected community participation of patients with hemiparetic stroke. Participation in instrumental activities of daily living and leisure and social activities was affected by balance function. [Conclusion] This study provides useful information for designing efficient programs and identifying their effectiveness for enhancement of community participation in stroke survivors.

Key words: Balance, Participation, Stroke

INTRODUCTION

Of patients who survive a stroke, 39% report ongoing problems with independent participation in community activities. This limitation in community participation has been identified as one of the most debilitating consequences of a stroke. Only 50% of stroke survivors regain the ability to walk in the community. Most stroke survivors have impaired cognitive and motor ability. These patients have difficulty participating at work, home, and in the community, due to impaired balance function or motor ability. Balance function is necessary to most stroke patients for independent living in the community and performing associated tasks.

Based on the conceptual framework of the International Classification of Functioning, Disability and Health (ICF), participation is considered a highly complex function. A recent study reported various factors that affect community participation of patients with stroke. Despite various assessment tools reported in the literature, there is a lack of studies on the relationship between specific balance function and community participation. There are several assessment tools to measure balance function, including the Berg Balance Scale (BBS), which is the most commonly used assessment tool across the continuum of stroke rehabilitation. The BBS is an objective measure of balance abilities, and measures both static and dynamic aspects of balance. The test has also been used to identify and evaluate balance impairment in the elderly.

A previous study suggested that the BBS has strong reliability, validity, and responsiveness to change. Furthermore, the test is easy to administer without the need for expensive equipment or prolonged assessment time. It has excellent predictive validity for important outcomes such as discharge disposition. This study aimed to develop an appropriate treatment plan for specific balance function, in order to enhance community participation in patients with hemiparetic stroke.
SUBJECTS AND METHODS

Sixty-three patients with hemiparetic stroke participated in this study. The inclusion criteria were as follows: (1) diagnosis of stroke, with onset 1 month or more before the study; (2) adult living in the community; (3) 19 or more points on the Mini-Mental State Examination-Korean version (MMSE-K) and (4) absence of hearing impairment. All participants were informed of the purpose and procedures of this study, and signed a consent form. The local institutional review board approved the study.

This study evaluated 3 clinical measurement tools, including the BBS and Korean-Activity Card Sorting (K-ACS), following standardized administration methods in a calm and organized therapy room. The MMSE-K is used to select participants who can perform cognitive functions, according to a previous study targeting normal cognitive function in stroke patients. The BBS is used to assess static and dynamic balance ability in adults. The test is designed around a 14-item objective measure, with the score for each item ranging from 0–4. Scores are determined by the participant’s ability to perform the assessed activity. The item scores are summed and the maximum score is 56\(^1\). The BBS has strong reliability and validity, and the test is useful and easy to use in the clinic. The K-ACS, which is picture-based, examines the occupational participation level, and gathers information on social, instrumental, and leisure activities. The assessment tool is composed of photographs depicting the performance of various activities in several different environments. The tool is reported to have excellent criterion validity in chronic stroke\(^2\). This study analyzed the specific items on the BBS and K-ACS. The dependent variables were the specific items on the K-ACS and the independent variables were the specific items on the BBS.

This study used assumptions for regression analysis to investigate the relationship between participation and specific balance functions. SPSS for Windows version 17.0 (SPSS Inc., Chicago, IL, USA) was used for data analysis. The statistical significance level was set at \(p<0.05\).

RESULTS

Sixty-three patients with stroke participated in this study (36 males, 27 females, and aged 58.6 ± 15.2 years). Table 1 lists the demographic characteristics of the study participants. The results of the regression analysis indicated that specific balance functions affect community participation in stroke patients. The BBS results showed that the action with the greatest effect on community participation on the K-ACS is standing with one foot in front of the other (Table 2).

DISCUSSION

In this study, we aimed to provide appropriate treatment plans for specific balance function, in order to enhance community participation in patients with hemiparetic stroke. The results of the regression analysis indicated that balance function affected participation in IADLs and leisure and social activities in the community among patients with hemiparetic stroke.

The BBS is the most common test used to assess postural control in daily living in people with stroke. The BBS is a representative tool for fall prediction in the elderly, and measures balance ability. This tool is widely used, it is objective and reliable, and is able to evaluate overall and item-by-item static and dynamic balance abilities\(^3,4\). In other words, participa-

| Characteristic | Subjects |
|----------------|----------|
| Gender         | Male: 36  Female: 27 |
| Age (years)    | 58.6 (20–96) |
| Etiology       | Hemorrhage: 22 Infarction: 41 |
| Affected side  | Right: 17 Left: 46 |
| Onset period (months) | 33.4 (1–160) |
| MMSE-K         | 26.4 (19–30) |
| K-ACS(%)       | IADL: 45.9 ± 39.3 Leisure participation: 70.7 ± 57.5 Social participation: 54.0 ± 29.5 |
| BBS*           | 24.8 ± 16.1 |

Data are mean (range), mean ± standard deviation

*Total score of BBS
tion in IADLs was correlated with perceptual and cognitive function, and participation in leisure and social activities was affected at an independent level. Therefore, this study statistically evaluated the correlation between participation and skills for daily living at an independent level.

Standing with one foot in front of the other was the specific balance function that most affected participation in IADLs and leisure and social activities. This measurement requires the participant to place one foot directly in front of the other, with the feet in tandem, and hold the position for 30 seconds[11). This balance function requires higher equilibrium and balance skills. Higher balance skills are used automatically for participation in IADLs and leisure and social activities in the community. Therefore, stroke rehabilitation should emphasize this specific balance function.

Limitations of this study are as follows. First, the number of participants was too small to generalize the results to a larger population of patients with stroke. Second, this study did not consider sensory or language function impairments associated with stroke. Further studies with more participants are necessary to evaluate various factors affecting community participation.

Nevertheless, the results of this study provide useful information for designing efficient programs and identifying their effectiveness for enhancement of community participation in patients with stroke.

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