



Original Article

## Association between daily activities, process skills, and motor skills in community-dwelling patients after left hemiparetic stroke

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**Abstract.** [Purpose] The purpose of this study was to evaluate the relationships between daily activities, information processing, and motor skills in individuals with hemineglect after having a left hemiparetic stroke. [Subjects and Methods] The instrumental activities of daily living of 35 patients (22 male and 13 female; age:  $57.1 \pm 16.9$  years) with hemineglect after having a left hemiparetic stroke were assessed by using three clinical measurement tools, including activity card sorting, assessment of motor and process skills, and the modified Barthel Index. [Results] The results of the regression analysis indicated that the patients' processing skills in instrumental activities of daily living after having a left hemiparetic stroke were reduced. Participation in leisure and social activities was also affected as assessed by using the modified Barthel Index. [Conclusion] This study supports the clinical need for rehabilitation intervention after a left hemiparetic stroke to improve patients' processing skills and independence in performing activities of daily living.

**Key words:** Daily activity, Hemineglect, Skills

*(This article was submitted Jan. 25, 2016, and was accepted Mar. 12, 2016)*

### INTRODUCTION

Most stroke survivors display a degree of motor, sensory, perception, or language dysfunction<sup>1, 2)</sup>. These people have difficulty performing their occupations continually owing to their impairment even after returning to the community<sup>3, 4)</sup>. In particular, patients who have had a left hemiparetic stroke experience poorer rehabilitation outcomes, longer hospital admissions, and greater dependence on others in activities of daily living (ADL) than patients who have had a right hemiparetic stroke. This is thought to be due to neglect of the affected side. The specific factors underlying the negative outcomes caused by hemineglect have been reported previously<sup>5)</sup>. Hemineglect is a disorder that can reduce a person's ability to look, listen, or make movements toward one-half of their environment. Therefore, patients with hemineglect display a limited response to rehabilitation in the recovery of independent performance in daily activities, as well as social and leisure activities<sup>6)</sup>.

Patients who have a left hemiparetic stroke have also been shown to exhibit specific behavioral patterns due to motor and perception disabilities, thereby affecting their abilities to carry out many everyday tasks such as eating, reading, and getting dressed on the right side only<sup>7)</sup>. This hemineglect makes it difficult for patients to be involved in instrumental activities of daily living (IADL), recreational activities, and social roles when they transition from the rehabilitation setting to their communities. The purpose of this study was to examine the relationship of motor and processing skills with IADL in individuals who have hemineglect after a left hemiparetic stroke.

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**Table 1.** Demographic characteristics of the subjects

Characteristic	Right brain damage (n=35)	
Gender	Male	22
	Female	13
Age (years)		57.1 ± 16.9
Etiology	Hemorrhage	18
	Infarction	17
Onset period (months)		40.7 ± 27.5
Brunnstrom stage		4.1 ± 1.4
MMSE-K		27.0 ± 2.5

Data are presented as mean ± SD.

## SUBJECTS AND METHODS

Thirty-five patients who had had a left hemiparetic stroke participated in this study. The inclusion criteria for participation in this study were as follows: (1) community-dwelling adults who had had a stroke; (2) adults with hemineglect after having a left hemiparetic stroke; (3) adults who provided consent; (4) sufficient cognitive ability to understand and follow simple verbal instructions, as indicated by a Mini-Mental State Examination score of  $\geq 24$ ; (5) sufficient visual acuity to conduct the experimental process; and (6) absence of other neurological diseases other than stroke. All the participants were informed of the purpose and procedures of the study, after which signed consent was obtained. This study was conducted in accordance with the Interventional Ethical Guidelines and the Declaration of Helsinki. The local institutional review board approved the study.

In this study, three clinical measurement tools were used, including activity card sorting (ACS), assessment of motor and processing skills (AMPS), and a modified Barthel Index (MBI). A standardized protocol was implemented in a calm and organized therapy room. The ACS assessment by occupational therapists was designed to help patients describe their occupational histories and their social, instrumental, and leisure activities. The tool is composed of 89 photographs depicting the performance of various activities, including 20 instrumental activities, 35 low physical-demand leisure activities, 17 high physical-demand leisure activities, and 17 social activities, and allows for the calculation of the percentage of activity retained. The tool was previously validated for chronic stroke<sup>8</sup>. The AMPS is an observational assessment that allows for the simultaneous evaluation of motor and process skills, and their effect on the ability of an individual to perform complex or instrumental and personal activities of daily living. It comprises 16 motor and 20 processing skill items. Motor skills are the observable goal-directed actions people perform during ADL in order to move themselves or the task objects. Processing skills refer to the ability of an individual to logically sequence the actions related to the ADL over time<sup>9</sup>. The MBI is an easily administered 10-item tool for assessing self-care and mobility ADL. It takes approximately 5 to 10 minutes to complete if the observational method is used. A higher number is associated with a greater likelihood of being able to live at home with a degree of independence after hospital discharge. Low scores on individual items highlight areas of need. The maximum score is 100. The tool has proven reliability, validity, and utility<sup>10</sup>.

This study used assumptions for regression analysis to investigate the relationship between instrumental ADL, motor and process skills, and recreational activities. This study used SPSS version 17.0 for Windows (SPSS Inc., Chicago, IL, USA) in the data analysis. The statistical significance level was set at  $p < 0.05$ .

## RESULTS

Thirty-five participants with left hemiparetic stroke participated in this study (22 males, 13 females, aged 57.1 ± 16.9 years). Table 1 lists the demographic characteristics of all the study participants. Regression analysis after AMPS assessment indicates that left hemiparetic stroke affects processing skills. The MBI scores revealed that participation in leisure and social activities was affected (Table 2).

## DISCUSSION

Previous studies have reported that patients who have had a left hemiparetic stroke showed specific behavioral patterns due to motor and perception disabilities<sup>7</sup>. These behavioral patterns include the inability to orient or respond to stimuli on the side contralateral to the brain lesion. This specific behavioral pattern is associated with a greater risk of falls, longer stay in rehabilitation facilities, and poorer functional recovery. For this reason, these patients do not participate in IADL, leisure, or social activities. Therefore, stroke rehabilitation could influence their participation in IADL, leisure, and social activities.

The results of this study show that participation in IADL was affected by a reduction in the processing skills of AMPS

**Table 2.** Results of the analysis of the influencing factors of the recovery of functions after a left hemiparetic stroke in community-dwelling patients

Dependent variable	Independent variable	B	Standard error
IADL	Motor skill	1.659	1.809
	Process skill	-20.594	0.308*
	MBI	1.148	8.678*
Leisure	Motor skill	9.605	4.971
	Process skill	-1.978	5.077
	MBI	0.427	0.177*
Social participation	Motor skill	6.742	7.220
	Process skill	-11.471	7.374
	MBI	0.933	0.257*

\*p<0.05

and that participation in leisure and social activities affected the independence of daily living as assessed using the MBI. In other words, participation in IADL correlates with perceptual and cognitive functions, and participation in leisure and social activities affects independence.

A limitation of this study was that it did not evaluate the sensory or language functions associated with participation in IADL. Therefore, future research that evaluates various functions in patients who have had a left hemiparetic stroke will clarify the results of this study. Nevertheless, the results of this study have clinical implications for rehabilitation intervention because left hemiparetic stroke has been identified as a factor that affects processing skills and independent daily living.

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