

# Comparisons of social interaction and activities of daily living between long-term care facility and community-dwelling stroke patients

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**Abstract.** [Purpose] This study was conducted to compare the correlation between social interaction and activities of daily living (ADL) between community-dwelling and long-term care facility stroke patients. [Subjects and Methods] The Subjects were 65 chronic stroke patients (32 facility-residing, 33 community-dwelling). The Evaluation Social Interaction (ESI) tool was used to evaluate social interaction and the Assessment of Motor and Process Skills (AMPS) measure was used to evaluate ADL. [Results] Both social interaction and ADL were higher in community-dwelling than facility-residing stroke patients. There was a correlation between ESI and ADL for both motor and process skills among facility-residing patients, while only ADL process skills and ESI correlated among community-dwelling patients. In a partial correlation analysis using ADL motor and process skills as control variables, only process skills correlated with ESI. [Conclusion] For rehabilitation of stroke patients, an extended treatment process that combines ADL and social activities is likely to be required. Furthermore, treatment programs and institutional systems that can improve social interaction and promote health maintenance for community-dwelling and facility-residing chronic stroke patients are needed throughout the rehabilitation process.

**Key words:** Activities of daily living, Social interaction, Stroke

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## INTRODUCTION

Stroke is an important disease in an aging society because it is one of the major causes of mortality and disability and results in complex long-term functional problems in many areas<sup>1)</sup>. Stroke patients have difficulties with social interaction in social activities and activities of daily living (ADL) as a result of various limitations such as physical and mental problems, decreased quality of life and functioning<sup>2)</sup>, and communication impairment.

It is critical for stroke patients to maintain social interaction in ADL and social activities<sup>3)</sup>. Stroke patients have low social cognition scores related to social interaction compared to normal individuals<sup>4)</sup>, and 57.9% of chronic stroke patients who have resided in facilities or the community for more than one year after an acute phase have social interaction problems<sup>5)</sup>. It is consistently reported that stroke patients' relationships with friends and family weaken and they undergo changes within society including areas such as the

workplace<sup>6)</sup>. Based on the results of their study of community-dwelling chronic stroke patients who had been discharged from hospital for more than one year after disease onset, Mudzi et al.<sup>7)</sup> reported that stroke patients also experience many limitations to community participation and engaging in leisure activities. These limitations are associated not only with ADL (e.g. food preparation and household chores), but also with interpersonal interactions. Thus, stroke patients require social cognition that includes social interaction, and this affects both interpersonal relationships and quality of life<sup>8)</sup>.

The World Health Organization (WHO) defines successful rehabilitation as social relationships, active participation, and return to the community<sup>9)</sup>. In order to successfully rehabilitate chronic stroke patients residing in long-term facilities or the community through return to the community, social interaction as well as both physical and mental balance are needed<sup>5)</sup>. Therefore, this study was conducted to compare the correlation of social interaction and activities of daily living (ADL) in community-dwelling and long-term care facility patients after stroke.

This study provides basic data for the study of issues of social functioning and participation of patients who have difficulties with ADL and social participation after stroke, and explores intervention strategies.

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**Table 1.** Subjects' general characteristics (n = 65)

Variables		Facility-residing stroke patients (n=32)	Community dwelling stroke patients (n=33)
Gender	Male/Female (%)	28/4 (87.5/12.5)	28/5 (84.8/15.2)
Stroke occurrence	Once/Twice (%)	25/7 (78.1/21.9)	26/7 (78.8/21.2)
Affected side	Left/Right (%)	23/9 (71.9/28.1)	15/18 (45.5/54.5)
Guardian status	Present/Absent (%)	19/13 (59.4/40.6)	29/4 (87.9/12.1)
Age (years)		71.6±6.81	66.4±7.53
Education duration (years)		8.75±4.68	11.42±3.60
Onset period (years)		7.22±5.21	8.85±4.48

Data are expressed as M±SD

## SUBJECTS AND METHODS

The study, subjects were 32 stroke patients admitted to a long-term care facility and 33 community-dwelling stroke patients. The purpose of the study was explained to the subjects and their guardians, and the participants voluntarily signed consent forms prior to their participation. This study was approved by the Daejeon Health Science College Institutional Review Board and followed the ethical principles set forth in the Declaration of Helsinki.

The inclusion criteria were: chronic stroke at least one year prior to the study and residence in either a long-term care facility or the community. Information on stroke patients' characteristics was obtained from medical records and interviews with patients' primary care provider. The subjects' general characteristics are presented in Table 1.

In this study, the Evaluation Social Interaction (ESI) tool was used to examine the social interaction level. Developed by Fisher and Grisword in 2008, the ESI was designed for use by occupational therapists assessing of patients' quality of social interaction when participating in the natural environment<sup>10</sup>. Specifically, the ESI evaluates social interaction through observation of conventional social partners and actual social exchanges, and can be used to assess any individual over the age of 2. Additionally, the ESI observes two social interactions desired and requested by individuals, and records the intended purposes of social partners, environmental characteristics, and social interactions. The intended purpose of a social interaction is classified into 1 of 6 types, which are measured on a 4-point scale and include 27 possible kinds of technical social interaction items. The ESI converts the attained ordinal scale scores indicating the quality of social interactions into an interval scale through Mani-Faceted Rasch (MFR) analysis, and the measured values are expressed as logit values. The reliability of the ESI, as determined by Cronbach's  $\alpha$  coefficient, indicates was reported as 0.94.

The Assessment of Motor and Process Skills (AMPS) measure was used to evaluate ADL. The AMPS is a standardized measure developed for the purpose of qualitatively assessing an individual's task performance in daily life. The AMPS is a performance evaluation of IADL ability. Unlike global IADL scales, the potential for gender bias is reduced in the AMPS because all clients perform tasks that are familiar, practiced, and perceived as relevant to their

daily lives. The client is allowed to choose, from a subset of appropriately challenging tasks that he or she has had experience of performing, which tasks he or she would like to do for the purposes of the assessment. Each AMPS task is calibrated on the same linear scale, and the final motor and process ability measures are adjusted for the difficulty of the tasks performed. It is an international evaluation tool that provides ADL data subjects ranging in age from 2–100. For the administration of AMPS, subjects are first interviewed by a therapist and then select and perform the 2–3 daily living tasks that they determine are the most meaningful. The primary characteristic of the AMPS measure is that it does not simply evaluate damage to cognitive or physical functions but also observes performance on a total of 36 ADL tasks related to motor skills (16 items) and process skills (20 items) as well as evaluating goal-oriented behaviors<sup>11</sup>. Scores range from 1–4 points (maximum 4 points, minimum 1 point), and when values are entered in the AMPS program, the computer software converts the original scores into an interval scale. Following the conversion of measured values into an interval scale, the program presents total ADL values as a vertical graph as well as providing separate graphs for motor and process skills. The results of the measured motor and process skills can be interpreted in two ways. First, the level of independence in the community can be predicted. Specifically, when motor skill capacity is 2.0 logit and process skill capacity is 1.0 logit or higher, the subject is judged to be able to maintain community living without help<sup>12</sup>. In terms of the AMPS test-retest reliability, when two tasks were performed, the reliabilities of motor skills and process skills were reported to be  $r = 0.91$  and  $r = 0.85$ , respectively; when one task was performed, the respective results were  $r = 0.81$  and  $r = 0.71$ .<sup>13</sup> Thus, higher reliability was achieved when two tasks were performed. In the present study, subjects performed two tasks.

Data analyses were conducted using SPSS version 18.0. Subjects' general and clinical characteristics were calculated with descriptive statistics using frequency analysis, and between-group differences in social interaction and ADL were analyzed using the t-test. Pearson's correlation analysis was also performed to examine the correlation between social interaction and ADL. ADL motor and process skills were analyzed separately by conducting a partial correlation analysis. The level of statistical significance was chosen as 0.05.

**Table 2.** Comparison of social interaction and ADL

	Variables	Facility-residing stroke patients (n=32)	Community dwelling stroke patients (n=33)
Social interaction	ESI	0.37±0.54	0.64±0.58*
ADL	Motor skills	-0.09±1.04	0.70±0.89**
	Process skills	-0.37±0.59	0.27±0.48***

Data are expressed as M±SD; \*p<0.05; \*\*p<0.01; \*\*\*p <0.001; ESI: evaluation social interaction

**Table 3.** Correlation between social interaction and ADL

		ESI on facility-residing stroke patients (n=32)	ESI on community dwelling stroke patients (n=33)
ADL	Motor skills	0.47**	0.19
	Process skills	0.70***	0.53**

Date are expressed as M±SD ; \*p <0.05; \*\*p <0.01; ESI: evaluation social interaction

**Table 4.** Partial correlations calculated after individually controlling ADL for motor and process skills

		ESI
ADL	Motor skills	-0.20
	Process skills	0.57***

Data are expressed as M±SD ; \*\*\*p < 0.001; ESI: evaluation social interaction

## RESULTS

This study compared social interaction and ADL between long-term care facility and community-dwelling stroke patients. There was a statistically significant between-group difference in social interaction. Specifically, social interaction was shown to be higher for community-dwelling than long-term care facility stroke patients, indicating that community-dwelling stroke patients have better social interaction. A comparison of ADL between the groups showed a statistically significant difference in both motor and process skills. Additionally, community-dwelling patients had a higher average score than long-term care facility patients, suggesting that community-dwelling patients have higher ADL capacity (Table 2).

Correlation analysis of social interaction and ADL of long-term care facility-residing stroke patients revealed a statistically significant positive correlation between social interaction and both ADL motor and process skills. In contrast, in the same analysis of community-dwelling stroke patients, the correlation between ADL motor skills and ESI scores was not significant, while process skill scores positively correlated with ESI scores (Table 3). Therefore, it is likely that the ADL skills of long-term care facility patients increase as social interaction increases, and that the process skills of community-dwelling stroke patients increases as social interaction increases.

The potential for partial correlation between ADL and social interaction was examined by individually controlling ADL motor and process skills. When process skills were controlled, there was a non-significant correlation between motor skills and ESI scores ( $r = 0.20$ ). In contrast, there was a strong correlation between process skills and ESI scores when motor skills were controlled. These results indicate that ADL process skills are correlated highly with ESI (Table 4).

## DISCUSSION

This study compared and analyzed the differences of ADL and social interaction between facility-residing and community-dwelling stroke patients.

Our study results show that the community-dwelling patients had better ADL process and motor skills than the patients residing in long-term care facilities. In a study of elderly patients (age 65), it was reported that the long-term care facility-residing patients had a higher level of ADL than those receiving home care<sup>14</sup>). However, consistent with the findings of the present study, So and Kim<sup>15</sup>) reported that the ADL of elderly persons in nursing facilities was lower than that of community-dwelling elderly individuals. Stroke patients who reside in the community after discharge have been reported to have a higher level of dependence depending on age than at the time of discharge and may experience difficulties with ADL<sup>16</sup>). Additionally, although the physical function of these patients improves upon returning to home, the challenge of limited participation persists<sup>17</sup>). Therefore, community-based social activities are a critical element in preventing functional dependence<sup>18</sup>). The stroke patients who participated in this study were also frequently involved in community programs (e.g., local community centers) after discharge. In contrast, long-term care facility stroke patients experience loss of independence and life segregated from family, society, and daily living, which may increase their level of depression and decrease their quality of life<sup>19</sup>).

Our study results indicate that community-dwelling stroke patients have higher social interaction than facility-residing stroke patients. Schroll et al.<sup>20</sup>) claimed that about half of elderly facility-residing persons interact with other people, and Hubbard et al.<sup>21</sup>) stated that facility residents who have cognitive impairments also pursue social interaction with others. However, Nolan et al.<sup>22</sup>) reported that elderly facility-residing patients that engage in or do very little over a long period of time have very low social interaction

and levels of social activities. Patients who have decreased cognitive function, such as that associated with stroke, can subsequently experience behavior and social interaction changes within the residential environment<sup>23</sup>). Furthermore, facility-residing elderly patients are reported to feel social loneliness for a longer time period<sup>21</sup>) and have higher social disengagement than community-dwelling elderly patients<sup>15</sup>). Hence, it is likely that facility-residing stroke patients have increased difficulties with social interaction.

In the present study, most of the community-dwelling stroke patients used community-based welfare facilities, and such use of, or access to community facilities is a crucial factor in predicting stroke patients' social interaction<sup>24</sup>). Specifically, community-dwelling stroke patients who live with their families can move to other places with the help of their guardians, and their level of local community be consequently higher<sup>25</sup>). In addition, community-dwelling stroke patients who live with their families have higher social interaction than facility-residing patients, and this seems to have affected the results of the present study.

In this study, there was a correlation between ADL and social interaction. In the case of community-dwelling elderly persons, maintenance of physical function and risk of impairment are reported to decrease according to their level of social interaction<sup>26, 27</sup>). Likewise, stroke patients who have a large social network show faster and more extensive functional recovery than individuals isolated from society<sup>28</sup>). Further supporting the results of this study, Jeon et al.<sup>29</sup>) found that social network formation with family, neighbors, and friends becomes better when the instrumental ADL level is more independent, and stroke patients' social interaction is strongly associated with functional recovery in areas such as ADL<sup>30</sup>).

In particular, of facility-residing stroke patients our study results demonstrate that both process skills and motor skills significantly correlated with social interaction, and that only process skills correlated highly with social interaction among community-dwelling stroke patients. This indicates that, for community-dwelling stroke patients, ADL process skill level has a substantial effect on social interaction. Additionally, Yoon et al.<sup>31</sup>) reported that executive intelligence, which is a higher level of cognitive intelligence than basic intelligence, affects stroke patients' ADL process skills, indicating that community-dwelling stroke patients largely use process skills associated with higher-level cognition such as participation and problem-solving without assistance from guardians or assistants.

The present study also showed that social interaction is influenced by process rather than motor skills. In fact, the cognition level is known to have many effects on ADL and social activities<sup>32-34</sup>), and this study confirmed that high-level cognition function plays an important role.

Despite the high correlation between social activities and ADL<sup>30</sup>), chronic stroke patients have potential limitations on participation within their surrounding environment. A study evaluating activities, participation, and quality of life at 6 months and again at 2 years after stroke showed that, stroke patients' general functioning, social activities and social interaction were lacking compared to ADL<sup>25</sup>). Therefore, stroke patients likely require an extended form

of treatment that combines ADL and social activities. Furthermore, treatment programs based on residential-type and institutional systems should attempt to improve the social interaction that is needed to promote community-dwelling and facility-residing chronic stroke patients' health maintenance throughout the rehabilitation process.

## ACKNOWLEDGEMENT

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