



Original Article

## Factors affecting the quality of life of homebound elderly hemiparetic stroke patients with cognitive impairment

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**Abstract.** [Purpose] This study examined the quality of life of homebound elderly hemiparetic stroke patients with cognitive impairment and the factors affecting their quality of life. [Subjects and Methods] The subjects of the study were 17 home-based elderly hemiparetic stroke patients with cognitive impairment (8 males and 9 females, average age: 76.3 ± 10.5 years old). Their physical and psychological conditions, quality of life and other items were investigated. Nishimura's Mental State Scale for the Elderly was used for the cognitive impairment assessment. The Functional Independence Measure was used to assess activities of daily living, and the Japanese Quality of Life Inventory for the Elderly with Dementia was used to assess quality of life. [Results] The subjects' quality of life was affected by their cognitive impairment level and independence of activities of daily living. However, no correlations were observed between the quality of life of the homebound elderly hemiparetic stroke patients with cognitive impairment, age, gender or care-need level. [Conclusion] In order to improve the quality of life of homebound elderly hemiparetic stroke patients with cognitive impairment, assistance helping them to maintain their cognitive abilities and on-going rehabilitation for improving activities of daily living independence are required.

**Key words:** Homebound elderly hemiparetic stroke patients with cognitive impairment, Quality of life, Activities of daily living

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### INTRODUCTION

The Long-Term Care Insurance Report (interim report) issued by the Ministry of Health, Labour and Welfare (MHLW) in January 2016 reported that 6,046,800 people who are 65 years old or over now have certification of long-term care need<sup>1</sup>, and the figure is expected to continue to increase. According to the MHLW Report of Basic Research on Japanese Life 2013, cerebrovascular disorders (strokes) are the most common cause of disabilities that require care, accounting for 18.5%, followed by cognitive impairment (15.8%). The percentage for strokes increases as the care-need level increases. For people with the highest care-need, which is Level V, 34.5% became disabled due to strokes<sup>2</sup>. Strokes often have after-effects, leaving patients with differing severities of cognitive impairment and physical disability, significantly affecting their daily lives and their quality of life (QOL)<sup>3</sup>.

For homebound elderly hemiparetic stroke patients with cognitive impairment to live securely and stably at home, services considering their QOL, in addition to the provision of daily life improvements, are required. Although there are some reports in the literature concerning the QOL of home-based elderly hemiparetic stroke patients without cognitive impairment<sup>4</sup>,

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reports concerning patients with cognitive impairment are scarce.

This study looked at homebound elderly hemiparetic stroke patients with cognitive impairment, and investigated their physical condition and QOL. Factors affecting QOL were also examined and analyzed to discover whether elderly hemiparetic stroke patients can maintain their living at home after being discharged from institutions.

## SUBJECTS AND METHODS

The subjects of the study were 17 homebound elderly hemiparetic stroke patients with cognitive impairment (8 males and 9 females, average age:  $76.3 \pm 10.5$  years old). Using Nishimura's Mental State Scale for the Elderly (NM Scale), they were assessed as suffering from marginal, mild, moderate or severe cognitive impairment. The subjects were interviewed by asking questions about their QOL.

According to the ethical considerations of the study, the subjects were giving a written explanation of the purposes of the study starting that they could drop out at any time, even in the middle of an interview, that their data would be treated with anonymity to prevent personal identification, and that no information obtained would be disclosed to any third parties. Patient consent was obtained thereafter.

The items surveyed included the subjects' age, cognitive impairment, care-need level and ADL, and how such factors affected the subjects' QOL was also examined. To obtain accuracy, these evaluations were executed by a physical therapist, an occupational therapist and a care worker.

Nishimura's Mental State Scale for the Elderly (NM Scale)<sup>5</sup> was used to assess cognitive impairment. The NM Scale is a behavioral assessment scale for easily assessing elderly people's cognitive impairment levels, through observing the subjects' condition, behavior and ability to perform activities of daily living. The scores range from 0 to 50 points, and higher scores indicates higher cognitive abilities. Forty-eight to 50 points indicate normal, 43 to 47 points, marginal, 31 to 42 points, mild impairment, 17 to 30 points, moderate impairment, and 0 to 16 points, severe impairment.

The Functional Independence Measure (FIM)<sup>6</sup> was used to assess activities of daily living (ADL). This measure consists of 18 items in total: 13 mobility items and 5 communication and social cognition items. Based on the amount of care and assistance required, subject ADL performance is assessed on a scale of 1 to 7 for each item. Six or more points are awarded when no care or assistance from a care-giver is required, while 5 or less points are awarded when care or assistance is required. When a patient does not require any care or assistance, 6 or 7 points are given depending the time taken to perform the item, the subject's consideration of safety, and reliance on assistive devices. When a patient only requires supervision and encouragement from a care-giver, 5 points are given. Four or less points are given depending on the amount of care and assistance required. The maximum score is 126 points in total, meaning fully-independent, and the lowest possible score is 18 points, meaning total assistance is required.

The Japanese Quality of Life Inventory for the Elderly with Dementia (QOL-D)<sup>7</sup> was used for the QOL assessment. The QOL-D was developed to comprehensively measure the Quality of Life of the elderly with dementia through observation of their behaviors. The 24 QOL-related items are assessed on a scale of 0 to 3. The highest possible score is 72 points; the lowest possible score is 0 points. A higher score indicates higher QOL.

The Mann-Whitney U Test was used to assess how gender affects the QOL. To examine the correlations between the QOL-D results and subjects' age, NM Scale and ADL independence, Spearman's rank method was used. For statistical analysis, Stat Soft's statistical analysis software, STATISTICA, was used. A significance level of 5% was considered statistically significant.

## RESULTS

In the assessment of ADL independence of the homebound elderly hemiparetic stroke patients with cognitive impairment, the subjects' total FIM scores ranged from 21 to 120 points (average:  $72.9 \pm 34.8$ ), indicating that some subjects required total assistance and some were nearly fully-independent. Regarding care-need levels, 1 subject was classified as assistance-need Level I, 3 subjects as care-need Level I, 3 subjects as care-need Level II, 2 subjects as care-need Level III, 5 subjects as care-need Level IV, and 4 subjects as care-need Level V. The assessment of cognitive impairment levels found that 6 subjects were at the marginal level, 4 subjects were at the mild impairment level, 2 subjects were at the moderate impairment level, and 5 subjects were at the severe impairment level.

No statistically significant correlation was found between the QOL-D and the gender of the homebound elderly hemiparetic stroke patients with cognitive impairment. Likewise, no statistically significant correlations were found between the QOL-D and age or care-need level. However, QOL-D showed significant correlations, with statistical, with the NM Scale and ADL independence.

A highly significant positive correlation was found between the QOL-D and cognitive abilities of the homebound elderly hemiparetic stroke patients with cognitive impairment. The higher the cognitive abilities were, the higher the QOL-D ( $r=0.81$ ,  $p<0.01$ ).

A moderately significant positive correlation was found between the QOL-D and total FIM scores of the homebound elderly hemiparetic stroke patients with cognitive impairment. The higher the ADL independence was, the higher the QOL

**Table 1.** Correlation coefficient of the QOL of homebound elderly hemiparetic stroke patients with cognitive impairment and independence in ADL

FIM*	QOL-D*	
	Self-care	0.45
Movement item	Excretion control	0.60*
	Transfer	0.63**
	Locomotion	0.84**
Cognition item	Communication	0.84**
	Social cognition	0.80**
Total		0.69**

\*\*p<0.01, \*p<0.05

\*The Functional Independence Measure (FIM) was used for the ADL assessment.

\*The Japanese QOL Inventory for the Elderly with Dementia (QOL-D) was used for the QOL assessment.

( $r=0.69$ ,  $p<0.01$ ) was. Regarding the correlations between the QOL-D and FIM items, higher independence of urination control, transfer (from bed to chair, wheelchair to toilet seat, etc.), movement (from a room/place to another room/place), communication and social cognition items were associated with higher QOL (Table 1). However, independence of self-care did not show a correlation with QOL-D.

## DISCUSSION

Strokes are the most common cause of disabilities that require care, and often cause after-effects, leaving patients with differing severities of cognitive impairment and physical disability. For home-based elderly hemiparetic stroke patients with cognitive impairment to live securely and stably at home, services considering their QOL are required. This study examined the QOL of homebound elderly hemiparetic stroke patients with cognitive impairment, and analyzed and examined factors affecting the QOL. The results indicate that patients' age, gender and care-need level do not directly affect their QOL; however, their cognitive impairment level and ADL independence do affect their QOL.

Our previous study, reported that the QOL of home-based elderly hemiparetic stroke patients without cognitive impairment was significantly higher when ADL independence was high, and improving ADL independence was required to improve the QOL of homebound elderly hemiparetic stroke patients without cognitive impairment<sup>4</sup>). In the present study, patients with cognitive impairment were the subjects, and a moderately significant correlation was found between their QOL-D and total FIM scores. Take together, the two studies indicate that improving ADL independence is required for the improvement of the QOL of homebound elderly hemiparetic stroke patients regardless of whether they have cognitive impairment or not. As for the correlations between the QOL-D and FIM items, higher independence of urination control, transfer (from bed to chair, wheelchair to toilet seat, etc.), movement (from a room/place to another room/place), communication and social cognition items were associated with higher QOL (Table 1). However, independence of self-care did not show a correlation with QOL-D. Improving ADL independence is, of course, important. In addition to this, enabling patients to use the toilet independently, which is important for their dignity, and improves their mobility and activity<sup>8</sup>), through use of assistive devices, is also required. For homebound elderly hemiparetic stroke patients with cognitive impairment, improving communication skills, such as listening to and understanding other people and expressing their intentions so that other people can understand them, is also required for the improvement of their QOL.

Concerning the correlations between the QOL-D and cognitive impairment, Kamata et al.<sup>7</sup>) reported that the QOL-D scores decrease as cognitive impairment becomes severer. In this study, the QOL-D of the home-based elderly stroke patients with cognitive impairment correlated with their NM Scale scores. The QOL-D was lower when the NM Scale scores were low, showing the same tendency as that reported by Kamata et al<sup>7</sup>). That is, in order to improve the QOL of such patients, the maintenance and improvement of their cognitive abilities are required. Physical therapy interventions, such as exercise interventions, including aerobic exercise, and movement interventions, including practicing easy movements, are reported to be effective at maintaining and improving cognitive abilities<sup>9, 10</sup>). Therefore, in order to improve the QOL of homebound elderly hemiparetic stroke patients with cognitive impairment, physical therapy interventions, including exercise and movement practice, for the maintenance and improvement of patients' cognitive abilities are important.

The results of this study suggest that, in order to improve the QOL of homebound elderly hemiparetic stroke patients with cognitive impairment, preventing stroke recurrence, paying attention to patients' cognitive abilities, understanding patients holistically, assisting patients to maintain their cognitive abilities, and conducting on-going rehabilitation to improve ADL independence are required.

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