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Determinants of Return to Home After Stroke: An Analysis Based on FIM Scores

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Abstract. [Purpose] In order to promote the return to home of stroke patients, a study based on admission and discharge FIM scores was conducted to identify the ADL-related factors influencing the discharge destination. [Subjects] A total of 256 stroke patients (141 males and 115 females) who stayed in hospital for more than a month were considered. Cases of recurrence or complications were excluded. [Methods] The patients' functional status was evaluated on admission and every month until discharge using the FIM scale. Patients discharged to home or care facilities were divided into three groups according to their total motor-FIM scores: good recovery, moderate recovery, or poor recovery. By comparison of admission and discharge FIM scores, the determinants of discharge to home were examined. [Results] In a multivariate logistic regression analysis considering the discharge destination of patients in the poor-recovery group as the response variable, three factors were identified as the determinants: toileting, length of stay, and age. [Conclusion] The results show improvement of toileting, length of stay, and age are the determinants of return to home after stroke. Further studies will be performed from diverse viewpoints such as the background of discharge to home.
Key words: Stroke, FIM, Discharge destination

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INTRODUCTION

The post-acute rehabilitation unit aims to provide patients with intensive rehabilitation services at an early stage in order to promote their ability to undertake activities of daily living (ADLs) and their return to home[1]. As the majority of stroke patients are aged, independence in ADLs is an important goal of rehabilitation. The rate of discharge from the post-acute rehabilitation unit to home was reported to be 70.9% at All-Japan Post-Acute Rehabilitation Unit Conference held in February 2010[2]. Preceding studies of factors influencing return to home have reported that independence in transfer, toileting, and getting on/off the toilet were predictive ADL-related factors for return to home[3]. Further, the presence of daytime and nighttime caregivers, a large number of family members, and the feasibility of temporarily staying at home during hospitalization have also been demonstrated to be important contributing factors[4–7].

In this study, the Functional Independence Measure (FIM) which is the most widely accepted ADL assessment measure instrument for stroke patients was used to investigate the determinants of return to home in relation to ADL-related factors. The FIM has been proven to be highly reliable and valid[8]. It consists of 18 items each of which is scored on a 7-point Likert scale: 13 motor items related to self-care, transfers, and locomotion; and 5 cognitive items related to comprehension, expression, and memory. According to a study conducted by Toshima et al. using the FIM scale to analyze the probability of discharge to home, indicators for return to home include a total discharge motor-FIM score of 70[1]. For the FIM-based prediction of discharge destination, the amount of time from stroke onset to the admission to the post-acute rehabilitation unit (onset-to-rehabilitation time), the difference between admission and discharge FIM scores (FIM gain), and the rate of discharge to home were evaluated[9–11]. However, there are some cases of discharge to care facilities despite a high FIM gain and to home despite a low FIM gain, and it is also necessary to investigate such cases. In addition, some

studies of factors influencing return to home in relation to ADLs[1,2] have reported that it is not practical to apply the ADL-related factors and prognosis methods established in preceding studies to other facilities[12], pointing out that the prediction of discharge destination is valid and useful only when data is restricted to a single facility[13]. According to these findings, an investigation of the ADL-related factors influencing the discharge destination based on the original data of each facility of both admission and discharge may be essential in the provision of rehabilitation services.

The objective of this study was to analyze the ADL-related factors influencing return to home based on the data of both admission and discharge, involving patients at a hospital where the average rate of discharge from the post-acute rehabilitation unit to home was moderate at 68.4%, and to classify them as discharged to home or to care facilities, in order to identify the determinants in the cases of discharge to care facilities despite a high FIM gain and to home despite a low FIM gain.

SUBJECTS AND METHODS

Subjects

Among stroke patients who were discharged during the period from April 1, 2005 to March 31, 2010, a total of 256 patients (141 males and 115 females) who stayed in hospital for more than a month were considered; cases of recurrence or complications were excluded. Patients' mean age was 70.0 ± 12.2 years; their mean time from stroke onset was 38.5 ± 21.5 days; and their mean length of stay was 115.7 ± 32.8 days. The number of patients discharged to home was 202, and to care facilities was 54.

Based on the findings of preceding studies that patients with an admission motor-FIM score of 60 or more became independent in most items in 2 to 4 weeks[14], and that those with a discharge motor-FIM score of 70 or more are able to return home[1], patients were divided into 3 groups: good recovery (Motor-FIM scores of 60 or more on admission and 70 or more on discharge), moderate recovery (59 or less on admission and 60 or more on discharge), and poor recovery (59 or less on admission and discharge). This study was conducted with the approval of the Epidemic and Clinical Research Ethics Committee of Fujita Health University.

Methods

The patients' ADL function was assessed on admission to the post-acute rehabilitation unit and every month until discharge using the FIM scale. Age, time stroke onset, the length of stay, and admission and discharge FIM scores of patients were compared among the groups of good recovery, moderate recovery, and poor recovery to identify, the determinants of return to home. The Mann-Whitney U Test was used for the statistical analysis.

To identify the determinants of return to home in each group, a multivariate logistic regression analysis was performed, considering the discharge destination (home or care facilities) as the response variable, and age, time from stroke onset, length of stay, and admission and discharge FIM scores of 18 items (Self-care: eating, grooming, bathing, dressing-upper body, dressing-lower body, toileting; Sphincter control: bladder management, bowel management; Transfers: Bed/chair/wheelchair, toilet, tub/shower. Locomotion: walk/wheelchair, stairs; Communication: comprehension, expression; Social cognition: social interaction, problem solving, memory) as explanatory variables. The statistical software used in this study was PASW Statistics 17.0 for Windows.

RESULTS

Mean age, time from stroke onset, and length of stay in each group were as follows: 66.5 ± 12.6 years, 32.9 ± 18.9 days, and 93.3 ± 26.2 days for the 97 patients of the good-recovery group, who were discharged to home ("good-recovery-home"); 81.0 ± 8.7 years, 36.6 ± 13.2 days, and 109.0 ± 30.8 days for the 7 patients of the good-recovery group, who were discharged to care facilities ("good-recovery-facilities"); 68.4 ± 10.1 years, 38.9 ± 21.9 days, and 133.7 ± 26.5 days for the 61 patients of the moderate-recovery group, who were discharged to home ("moderate-recovery-home"); 78.4 ± 12.1 years, 28.9 ± 12.8 days, and 118.6 ± 17.8 days for the 7 patients of the moderate-recovery group, who were discharged to care facilities ("moderate-recovery-facilities"); 69.6 ± 11.0 years, 46.3 ± 26.8 days, and 136.5 ± 44.0 days for the 44 patients of the poor-recovery group, who were discharged to home ("poor-recovery-home"); and 77.9 ± 11.2 years, 44.5 ± 18.9 days, and 120.2 ± 30.0 days for the 40 patients of the poor-recovery group, who were discharged to care facilities ("poor-recovery-facilities"), respectively. The rate of discharge to home was 93.3% in the good-recovery group, 89.7% in the moderate-recovery group, and 52.4% in the poor-recovery group.

In the comparison of the FIM scores of the good-recovery-home and good-recovery-facility groups, significant differences between groups were not observed on admission, but on discharge, there were significant differences in eating, toileting, bladder and bowel management, bed and chair transfers, and walk (Table 1). In the comparison between the moderate-recovery-home and moderate-recovery-facilities groups, significant differences between the groups were not observed on admission, but on discharge, there was a significant difference in social interaction (Table 2). In the comparison between the poor-recovery-home and poor-recovery-facilities groups, a significant difference was observed on admission, in toileting, bowel management, and bed transfer, while there were no significant differences on discharge (Table 3).

In the multivariate logistic regression analysis considering the discharge destination of patients in the good-recovery and moderate-recovery groups as the response variable, none of the explanatory variables was identified as significant. On the other hand, in the analysis considering the discharge destination of patients in the poor-recovery group as the response variable, toileting (odds ratio=4.462), the length of stay (odds ratio=1.034), and age

Table1. Comparison of the FIM scores in the good-recovery-home and good-recovery-facility groups

	Admission			Discharge		
	Home	Facilities	P-value	Home	Facilities	p-value
Self-care: eating	6.6 ± 0.6	6.1 ± 0.9	0.1419	6.7 ± 0.6	6.1 ± 0.9	0.0255*
Self-care: grooming	6.4 ± 0.7	6.0 ± 0.0	0.2508	6.7 ± 0.6	6.1 ± 1.6	0.5597
Self-care: bathing	4.9 ± 1.1	4.9 ± 1.3	0.8124	5.4 ± 1.1	4.6 ± 1.0	0.0579
Self-care: dressing-upper body	6.3 ± 0.8	6.3 ± 0.8	0.8917	6.8 ± 0.5	6.9 ± 0.4	0.9661
Self-care: dressing-lower body	6.0 ± 0.9	5.7 ± 1.0	0.3193	6.5 ± 0.7	6.1 ± 0.4	0.0999
Self-care: toileting	5.9 ± 0.9	5.4 ± 0.8	0.1066	6.4 ± 0.7	6.0 ± 0.0	0.0287*
Sphincter control: bladder management	6.5 ± 0.8	6.1 ± 1.1	0.1748	6.8 ± 0.7	6.1 ± 1.1	0.0112*
Sphincter control: Bowel management	6.5 ± 0.7	6.3 ± 0.5	0.1856	6.7 ± 0.6	6.1 ± 0.4	0.0032*
Transfers: toilet	6.2 ± 0.8	5.9 ± 0.7	0.2410	6.6 ± 0.6	6.0 ± 0.0	0.0027*
Transfers: Bed/chair/wheelchair	6.0 ± 0.8	5.7 ± 0.5	0.2820	6.5 ± 0.6	6.0 ± 0.0	0.0164*
Transfers: tub/shower	4.9 ± 0.9	4.6 ± 1.0	0.4078	5.2 ± 0.8	5.0 ± 0.8	0.5481
Locomotion: walk/wheelchair	5.1 ± 2.2	5.7 ± 0.5	0.5790	6.4 ± 0.8	5.9 ± 0.4	0.0107*
Locomotion: stairs	2.0 ± 2.0	1.0 ± 0.0	0.1734	2.9 ± 2.5	1.0 ± 0.0	0.0529
Communication: comprehension	6.0 ± 1.3	5.6 ± 1.4	0.3559	6.1 ± 5.7	5.7 ± 1.5	0.5484
Communication: expression	6.0 ± 1.4	5.1 ± 2.0	0.2724	6.1 ± 1.3	5.1 ± 2.0	0.2206
Social cognition: social interaction	6.2 ± 1.2	6.1 ± 1.2	0.8330	6.3 ± 1.1	6.1 ± 1.2	0.6709
Social cognition: problem solving	5.4 ± 1.6	4.7 ± 1.3	0.1834	5.6 ± 1.6	4.9 ± 1.4	0.1498
Social cognition: memory	5.4 ± 1.6	4.7 ± 1.3	0.1903	5.6 ± 1.5	4.7 ± 1.3	0.0908

* $p<0.05$

Table2. Comparison of the moderate-recovery-home and moderate-recovery-facilities groups

	Admission			Discharge		
	Home	Facilities	P-value	Home	Facilities	p-value
Self-care: eating	5.6 ± 0.8	5.6 ± 0.5	0.9390	6.3 ± 0.7	6.0 ± 0.6	0.2076
Self-care: grooming	4.9 ± 1.2	5.1 ± 0.9	0.6519	6.2 ± 0.7	6.3 ± 0.5	0.8227
Self-care: bathing	3.2 ± 0.8	3.1 ± 0.9	0.8098	4.3 ± 0.8	4.3 ± 0.8	0.7713
Self-care: dressing-upper body	2.3 ± 1.1	2.3 ± 1.0	0.6784	3.0 ± 1.2	3.0 ± 1.3	0.8188
Self-care: dressing-lower body	4.0 ± 1.2	4.3 ± 1.3	0.5526	6.0 ± 0.7	6.1 ±0.9	0.7372
Self-care: toileting	3.1 ± 1.2	3.3 ± 1.5	0.7627	5.6 ± 0.6	5.6 ± 0.5	0.8141
Sphincter control: bladder management	4.7 ± 2.0	4.4 ± 2.0	0.5663	6.5 ± 1.1	6.3 ± 1.0	0.3983
Sphincter control: Bowel management	4.7 ± 2.0	4.4 ± 1.5	0.3236	6.4 ± 0.6	6.4 ± 0.5	0.8527
Transfers: toilet	4.1 ± 1.0	4.0 ± 1.3	0.9396	5.7 ± 0.5	5.7 ± 0.8	0.9260
Transfers: Bed/chair/wheelchair	4.3 ± 0.9	4.3 ± 1.0	0.9384	5.7 ± 0.6	5.9 ± 0.7	0.5581
Transfers: tub/shower	3.2 ± 1.1	3.6 ± 1.1	0.4432	4.7 ± 0.6	4.4 ± 0.5	0.3425
Locomotion: walk/wheelchair	1.5 ± 1.3	2.4 ± 1.9	0.0879	4.4 ± 1.9	5.0 ± 1.8	0.2297
Locomotion: stairs	1.0 ± 0.0	1.0 ± 0.0	1.0000	1.3 ± 1.1	1.0 ± 0.0	0.4351
Communication: comprehension	5.6 ± 1.3	4.7 ± 1.1	0.2002	5.9 ± 1.0	5.1 ± 1, 2	0.0936
Communication: expression	5.0 ± 1.7	5.4 ± 1.6	0.4162	5.4 ± 1.5	5.7 ± 1.7	0.4404
Social cognition: social interaction	5.9 ± 1.2	5.3 ± 0.8	0.0821	6.2 ± 0.9	5.4 ± 0.8	0.0319*
Social cognition: problem solving	4.9 ± 1.7	4.6 ± 1.1	0.6073	5.4 ± 1.5	4.7 ± 1.3	0.2077
Social cognition: memory	5.1 ± 1.4	4.6 ± 1.3	0.3172	5.7 ± 1.3	5.3 ± 0.8	0.1840

* $p<0.05$

(odds ratio=0.921) were identified as significant explanatory variables. The success rate was 76.2%.

DISCUSSION

As the discharge destination of stroke patients depends on diverse factors including lesion size and location, paralysis, sensory impairment, time after stroke onset, dependence, and support from family members, patient stratification is an important approach[15]. In this study, patients were classified as discharged from the post-acute rehabilitation unit to home or to care facilities, and divided into groups according to their motor-FIM scores, considering an admission motor-FIM score of 60 or more and a discharge motor-FIM score of 70 or more as a criterion for returning home, to examine the factors associated with the probability of discharge to home.

Nagai et al. reported that patients with an admission motor-FIM score of 60 or more become independent in most items in 2 to 4 weeks[14]. Similar results were obtained in this study for patients of the good-recovery group with an admission motor-FIM score of 60 or more. Further more, as reported by Sawada et al., patients with higher admission FIM scores require ADL training and improvement of

Table 3. Comparison of the poor-recovery-home and poor-recovery-facilities groups

	Admission			Discharge		
	Home	Facilities	P-value	Home	Facilities	p-value
Self-care: eating	4.0 ± 1.7	3.5 ± 1.7	0.0880	4.8 ± 1.3	4.4 ± 1.4	0.1347
Self-care: grooming	3.5 ± 1.7	3.0 ± 1.5	0.0946	4.1 ± 1.5	3.7 ± 1.7	0.2423
Self-care: bathing	2.0 ± 0.8	1.9 ± 1.0	0.6211	2.2 ± 0.9	2.3 ± 0.9	0.7872
Self-care: dressing-upper body	2.3 ± 1.1	2.3 ± 1.0	0.6426	3.0 ± 1.3	2.9 ± 1.3	0.7321
Self-care: dressing-lower body	1.6 ± 0.8	1.6 ± 0.8	0.9431	2.2 ± 1.2	2.1 ± 1.2	0.6685
Self-care: toileting	1.8 ± 1.0	1.4 ± 0.7	0.0092*	2.7 ± 1.4	2.4 ± 1.3	0.1694
Sphincter control: bladder management	2.4 ± 1.6	2.2 ± 1.7	0.1482	3.4 ± 1.8	3.3 ± 1.8	0.6660
Sphincter control: Bowel management	2.7 ± 1.9	2.0 ± 1.9	0.0259*	3.5 ± 2.0	3.2 ± 2.1	0.3542
Transfers: toilet	2.7 ± 1.4	2.1 ± 1.3	0.0541	3.7 ± 1.5	3.1 ± 1.7	0.0800
Transfers: Bed/chair/wheelchair	3.0 ± 1.3	2.4 ± 1.3	0.0434*	4.0 ± 1.2	3.4 ± 1.4	0.0544
Transfers: tub/shower	2.0 ± 1.1	1.9 ± 1.1	0.5327	2.8 ± 1.1	2.4 ± 1.1	0.1137
Locomotion: walk/wheelchair	1.7 ± 1.3	2.0 ± 1.6	0.4846	2.6 ± 1.7	3.0 ± 1.8	0.3381
Locomotion: stairs	1.0 ± 0.0	1.0 ± 0.0	1.0000	1.0 ± 0.0	1.0 ± 0.0	1.0000
Communication: comprehension	4.1 ± 1.5	3.7 ± 1.4	0.2114	4.3 ± 1.5	3.9 ± 1.3	0.2421
Communication: expression	3.8 ± 1.9	3.7 ± 1.7	0.7841	4.0 ± 1.9	3.9 ± 1.7	0.7834
Social cognition: social interaction	4.2 ± 1.7	4.0 ± 1.7	0.6127	4.4 ± 1.6	4.1 ± 1.8	0.5056
Social cognition: problem solving	2.8 ± 1.8	2.4 ± 1.4	0.3536	2.9 ± 1.8	2.5 ± 1.4	0.3147
Social cognition: memory	3.2 ± 1.7	2.7 ± 1.4	0.2063	3.6 ± 1.8	2.9 ± 1.5	0.0663

* $p<0.05$

environmental conditions in consideration of the possibility of discharge to home[16]. The necessity of initiating rehabilitation training at the time of admission for patients with an admission motor-FIM score of 60 or more, focusing on their daily living after discharge, has been suggested.

With regard to the influence of cognitive function on the probability of return to home, a significant difference between the groups of discharge to home and care facilities was observed only in social interaction on discharge for the moderate-recovery group. The cognitive-FIM scores were higher for patients discharged to home than for those discharged to care facilities in all 3 groups. The results of a multivariate analysis performed by Shiraishi et al. to evaluate changes in ADLs demonstrated that dementia significantly hinders improvement in ADLs[17]. Similarly, Yokota et al. reported that patients with a total cognitive-FIM score of 20 or less showed extremely slight improvement in their motor-FIM scores[18]. In addition, Oshima et al. reported that patients with a total motor-FIM score of 50 or less and a cognitive-FIM score of 20 or less on discharge are unlikely to return home[19]. Based on these findings, the probability of return to home may be predictable by accurately evaluating cognitive function at the time of admission to the post-acute rehabilitation unit or during the sub-acute period.

In the multivariate logistic regression analysis considering the discharge destination as the response variable to identify the determinants of return to home in the poor-recovery group, toileting, the length of stay, and age were identified as significant explanatory variables. In the study of Yoshida et al., independence in toileting largely contributed to the 79% rate of return to home[9]. Regarding the association between the discharge destination and toileting on discharge, Kondo et al. reported that the rate of return to home was 90% for patients who were independent in the use of portable toilets, but only 50% for the non-independent group[20]. These findings suggest that improved toileting contributes to the probability of return to home even when the highly required ability to walk is not regained. Additionally, the results suggest that the training of self-excretion using a commode chair is especially important if the rehabilitation goal is to be discharged to home. The result that the length of stay was identified as a significant variable may not demonstrate an association between the length of stay and the probability of discharge to home[3], but the necessity of time for discharge arrangements. There are various opinions about age, and there have been some studies examining its influence on discharge destination[21–23]. In this study, a younger age was linked to a higher probability of discharge to home, suggesting age is one of the key factors for the consideration of discharge destination.

In this research, we examined the discharge outcome from the perspective of age, days from stroke onset, length of hospital stay and FIM. In the future, we will examine discharge destination from the perspective of family structure or the availability of house remodeling. However, the project will be more difficult than the evaluation of the ADL of stroke patients by FIM score.

REFERENCES

1) Toshima M, Nishitani M, Hagiwara R: Factors affecting length of stay and discharge destination in patients with acute ischemic stoke. Rehabilitation Medicine, 2001, 38: 268–276.
2) National recovery period Riha Ward Liaison Council: Survey report on the present and future of recovery rehabilitation ward. Tokyo, 2010, pp32.
3) Umemoto Y: Factors that affect recovery Riha Ward home return – FIM From study –. Aichi Occupational Therapy, 2008, 16: 33–36.
4) Asakawa I, Imura S, Usuda S, et al.: Factors influencing post rehabilitation outcomes of cerebrovascular accident patients with lower than 90 points on the FIM in a convalescence rehabilitation ward. Physical Therapy Science, 2008, 23: 545–550.
5) Goto K: The examination of the factor about the home return of patients with cerebrovascular disorder in the convalescent rehabilitation ward. Aichi

physical therapy official journal of a scientific society, 2008, 20: 42–43.
6) Niki R: A medical social condition for patients with stroke to leave the hospital at home. General rehabilitation, 1983, 11: 895–899.
7) Uematsu K: A conditions for aged stroke patients in order to discharge to home. Rehabilitation Medicine, 2002, 39: 396–402.
8) Mizuno K, Ota T: Outcome metrics in rehabilitation. – FIM, Barthel Index – . clinical rehabilitation, 2005, 14: 174–179.
9) Yoshida K, Takada T: Evaluation of outcome in stroke patients by convalescence rehabilitation start time using the motor FIM. Stroke, 2006, 28: 396–402.
10) Yavuzer G: Rehabilitation of stroke patient: Am J Phys Med Rehabil, 2001, 80: 250–255.
11) Inouye M: Predicting models of outcome statified by age after first stroke rehabilitation, Japan.Am J Phys Med Rehabil, 2001, 80: 586–591.
12) Handa T: Learning of evidence based medicine in physical therapy –cerebral vascular disease–. Physical Therapy, 2003, 30: 493–498.
13) Goto S, Kitagawa A, Taka K: Prediction of functional independence measure in a sub-acute cerebrovascular accident patient at the time of a discharge-external validity and comparison with the targeted value by the staff. General Rehabilitation, 2008, 36: 275–281.
14) Nagai S, Okuyama Y, Sonoda S, et al.: Time course analysis of FIM motor items by severity on admission of post-stroke hemiplegia patients. Physical therapy sciences, 2010, 25: 1–6.
15) Saitoh E: A stroke. Naoichi Chino, et al.: It is the second edition a rehabilitation resident manual. Medical study, Tokyo, 2001, pp218–227.
16) Sawada Y, Suzuki Y, Maruo Y, et al.: Factors influencing outcomes for stroke rehabilitation patient. Physical Therapy Science, 2009, 24: 659–663.
17) Shiraishi N, Matsubayashi Y, Tanaka N, et al.: Changes in ADL of stroke of stroke patiente in a convalescent rehabilitation ward. Physical Therapy, 2005, 32: 361–367.
18) Yokota N, Nagasaka M, Honma H, et al.: The change of the FIM between admission and one-week after admission in patients with stroke. General Rehabilitation. 1998, 26: 281–285.
19) Oshima T: Approach and proposal for improvement of home return rate in our recovery period rehabilitation ward. Journal of Clinical Rehabilitation, 2003, 12: 205–210.
20) Kondo K: Evidence of the medical reform and rehabilitation medicine. Rehabilitation Medicine, 2006, 43: 651–657.
21) DeJong G, Branch LG: Predicting the stoke patient's ability to live independently. Stroke, 1982, 13: 648–655.
22) Nakamura K, Araki S, Niki R, et al.: The effect of the social life factor which gives it to the home return of patients with cerebrovascular disease.Public Health, 1989, 53: 427–432.
23) Isagoda A, Nakamura R: Factors of family influencing the discharge placements of the stroke patients. General Rehabilitation, 1993, 21: 57–61.