Original Article

Having More Daughters Independently Predicts Home Discharge in Stroke Patients Admitted to Inpatient Rehabilitation Ward

Shiau-Fu Hsieh [a, b *], Kuo-Liong Chien [b, c], Chu-Hao Weng [d], Yi-Ping Chiang [a]

[a] Department of Physical Medicine and Rehabilitation, MacKay Memorial Hospital, Taipei, Taiwan, [b] Institute of Epidemiology and Preventive Medicine, College of Public Health, National Taiwan University, Taipei, Taiwan, [c] Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan, [d] Department of Urology, MacKay Memorial Hospital, Taipei, Taiwan

S U M M A R Y

Background: The predictors for failure of home discharge after post-acute inpatient stroke rehabilitation need investigation.
Methods: With this retrospective case-control study conducted in a stroke rehabilitation unit in one tertiary hospital, data of 297 eligible stroke patients regarding patient demographics, family information, disease and function were collected. The primary outcome was failure of home discharge.
Results: One hundred and eighteen of 297 stroke patients (mean age 63 years, 37% women) failed to discharge home, including 109 admitted to rehabilitation hospitals and 9 to long-term care facilities. An inverse trend existed between numbers of daughters and the risk of failure of home discharge: having three or more daughters significantly lowers the risks for poor discharge destination (adjusted odds ratio, 0.23, 95% confidence interval, 0.07—0.72; test for trend, p = 0.002).
Conclusion: Having more daughters independently predicts home discharge after post-acute inpatient stroke rehabilitation.
Copyright © 2017, Taiwan Society of Geriatric Emergency & Critical Care Medicine. Published by Elsevier Taiwan LLC. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

Discharge disposition is a health issue at the participation level and an important health outcome which increasingly gathers attention.[1] For stroke patients, the first and crucial disposition happens after discharge from post-acute inpatient rehabilitation ward. Failure to return home may compromise the quality of lives of stroke patients and families.[2] Understanding its predicting factors helps health professionals to provide counseling and helps policy makers in improving case referral and long term care systems.

Previous studies identified social support and committed caregivers as important protecting factors for good functional and discharge outcomes.[3] Among committed caregivers, spouses are best-recognized.[4] While children might be similarly important on disabled parents' care, their influences are less understood. Daughters are proved to take more responsibility than sons in direct caregiving for disabled parents.[5] Asian families tend to

depend more on informal caregiver support than other ethnic groups and therefore are more suitable for studying such effects.[6]

We hypothesized that stroke patients with more daughters are less likely to suffer a poor discharge outcome after post-acute inpatient rehabilitation. Having daughters may be an independent protective factor.

2. Methods

2.1. Study design and participants

In this retrospective case-control study, we collected data of consecutive patients of the rehabilitation ward in a tertiary hospital in Taipei, Taiwan between July 2011 and December 2013. Patients were included if they were in their first post-acute inpatient rehabilitation program of the latest stroke. The post-acute phase was defined as within 90 days from stroke onset. Patients with concomitant or history of traumatic brain injury, subarachnoid hemorrhage, brain tumor or other brain lesions were excluded. Meanwhile, patients were excluded if referral to medical or neurologic services happened during hospitalization.

2.2. Stroke diagnosis and rehabilitation program

Neurologists and neurosurgeons confirmed patients' diagnosis, stroke classification and severity based on guidelines.[7] An experienced rehabilitation team provided intensive inpatient post-acute stroke rehabilitation, including structured physical, occupational, speech/swallowing therapies at a frequency of 8−15 sessions per week. Extra practice was encouraged. Length of stay was restricted by the Taiwan National Health Insurance to be shorter than 30 days. Rehabilitation doctors individualized rehabilitation goals based patients' prognosis. Patients and families decided discharge disposition after counseling with rehabilitation doctors.

2.3. Outcome data and potential predictors

Discharge disposition was coded into 'failure of home discharge' and 'home discharge'. Failure of home discharge included discharge to other rehabilitation hospitals and to long-term care facilities.

Four categories of potential predictors were collected,[8] including:

1) patient factors: age, gender, length of stay, 2) disease factors: stroke type, stroke severity, with cognitive impairment or not, having aphasia or not, 3) functional status: functional ability on admission and at discharge, and 4) social and environmental factors: years of formal education, having a job or not, needing financial support or not, having stairs at home or not, living with families or not, being married or not, having children or not, number of children, number of daughters, and number of sons.

Stroke severity was assessed with the National Institute of Health Stroke Severity (NIHSS) Score by neurologists and neurosurgeons at first evaluation.[9] The Cog-4 Scale composited item 1b, 1c, 9, 11 of the NIHSS scale to represent cognitive function in acute stroke.[10] Functional status was scored using the Barthel index (BI) on admission and before discharge.[11] Primary care nurses collected social factors data during admission interviews. We further categorized patients based on the number of their daughters and sons.

2.4. Statistical analysis

Participants with missing data of primary outcome were excluded, while participants with missing data for other variables remained in the analysis. Descriptive analyses of the overall population and of patient groups according to numbers of daughters were presented. The Chi-squared test or the Student's t-test was selected as appropriate. Correlations between variables were checked. We used the Cochran−Armitage test for trend for the trend between numbers of daughters/sons and rates of failure of home discharge. Simple logistic regression was performed with failure of home discharge as the dependent factor. In multiple logistic regressions, the model 1 adjusted for age and sex. In model 2, the association was adjusted for age, sex and function at discharge. In model 3, other important factors were added. P values <0.05 were considered to be statistically significant. With the significance level set at 0.05 and power at 0.90 and the effect size of 3.9 for patients with caregivers living together to return to home, we estimated the required sample size was 202.[12] Analyses were performed with SAS version 9.1 (SAS Institute, Cary, NC). Institutional Review Board of the research hospital approved the study.

3. Results

One hundred and eighteen of 297 patients (39.7%) failed to discharge home after post-acute inpatient rehabilitation, including 109 patients subsequently admitted to other hospitals, and 9 admitted to long-term care facilities (Fig. 1). The age of patients was 63.1 ± 13.4 years, and 37.4% of them were women. The median of
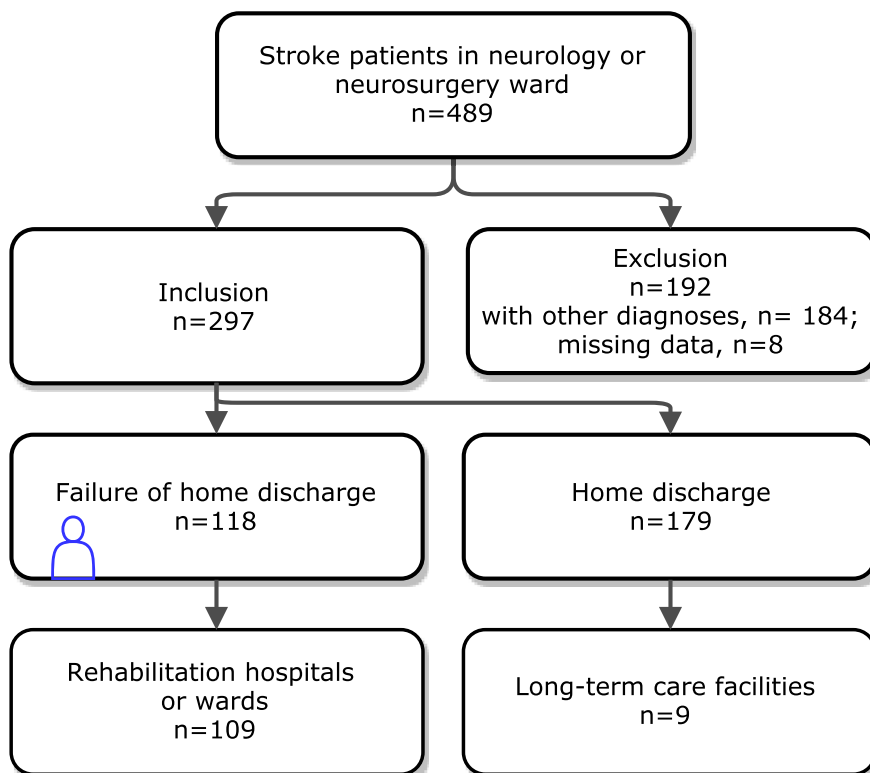

Fig. 1. Flowchart of patients.