

Rehabilitation Characteristics in High-Performance Hospitals after Acute Stroke

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Background: Rehabilitation characteristics in high-performance hospitals after acute stroke are not clarified. This retrospective observational study aimed to clarify the characteristics of high-performance hospitals in acute stroke rehabilitation. *Methods:* Patients with stroke discharged from participating acute hospitals were extracted from the Japan Rehabilitation Database for the period 2006-2015. We found 6855 patients from 14 acute hospitals who were eligible for analysis in this study after applying exclusion criteria. We divided facilities into high-performance hospitals and low-performance hospitals using the median of the Functional Independent Measure efficiency for each hospital. We compared rehabilitation characteristics between high- and low-performance hospitals. *Results:* High-performance hospitals had significantly shorter length of stay. More patients were discharged to home in the high-performance hospitals compared with low-performance hospitals. Patients in high-performance hospitals received greater amounts of physical, occupational, and speech therapy. Patients in high-performance hospitals engaged in more self-exercise, weekend exercise, and exercise in wards. There was more participation of board-certified physiatrists and social workers in high-performance hospitals. *Conclusions:* Our data suggested that amount, timing, and type of rehabilitation, and participation of multidisciplinary staff are essential for high performance in acute stroke rehabilitation. **Key Words:** Activities of daily living—aged—stroke—quality indicator—pay for performance.

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Introduction

Rehabilitation is clinically significant in the management of patients with acute stroke, and the rehabilitation of such patients has been a major focus in rehabilitation and physical medicine, as well as other fields of medical science.¹ The beneficial effects of acute stroke rehabilitation have been confirmed in numerous clinical investigations.^{2,3} Furthermore, the American Heart Association and the American Stroke Association guidelines for the management of stroke also emphasize the significance of acute stroke rehabilitation.⁴

A previous study reported that the quality of poststroke rehabilitation was related to the participation of physicians registered as rehabilitation specialists, conference execution rate, amount of exercise per day, and self-exercise.⁵ Another study reported that the quality of

poststroke acute care was related to hospital ownership, payer distribution, volume of patients with stroke, team communication, physician involvement, location, management practices, and payment system.⁶ We focused on variations of rehabilitation programs as a characteristic of each facility. Rehabilitation characteristics are changeable compared with other facility characteristics. A previous cohort study using the Uniform Data System for Medical Rehabilitation Database did not show any significant rehabilitation characteristics associated with functional gain.⁷ If the significant rehabilitation characteristics in each hospital are clarified, these characteristics could be used as quality indicators of rehabilitation in each hospital.

In this retrospective observational study, we aimed to clarify the characteristics of high-performance hospitals in acute stroke rehabilitation.

Materials and Methods

This study was approved by the Institutional Review Board of the Japanese Association of Rehabilitation Medicine. The requirement of informed patient consent was waived because the data used for analysis from the association's database were anonymized.

Data Sources and Patient Samples

The Japan Rehabilitation Database was established using financial support from the Ministry of Health, Labour and Welfare of Japan. Comprehensive clinical data were accumulated for rehabilitation in patients discharged from participating hospitals from January 2006 to September 2015. The Japan Rehabilitation Database contains exclusively voluntary samples, not random samples, and contains unique identifiers for stroke patient data. Baseline data were collected at admission by rehabilitation staff, whereas time-dependent variables and data on outcomes were collected at discharge. Data were submitted to the Japan Association of Rehabilitation Database where the data were extracted and sent to us. All personal data were coded and any related personal identification information was deleted.

In this study, we included patients with acute stroke from the database. We excluded patients who were admitted to hospitals with fewer than 10 patients registered in the database, were not admitted within the day after onset, or had missing data on Functional Independence Measure (FIM) scores.

Variables

The following data were extracted from the database and sent to us for analysis: number of patients in each hospital, FIM score (range, 18 [totally dependent]–126 [totally independent])⁸ on admission and discharge, length of stay, days from onset, amount of physical therapy (PT), amount of occupational therapy (OT), amount of speech

therapy (ST), participation of board-certified physiatrist, self-exercise without medical staff, weekend exercise, exercise in wards with nurse or family, prescription of leg brace, and participation of social worker. FIM efficiency was calculated as (FIM score on discharge – FIM score on admission)/length of stay in days. FIM gain was calculated as (FIM score on discharge – FIM score on admission).⁸

Helping patients gain mobility—particularly, walking function—is the principal aim in PT for stroke. Patients start to practice walking at an early stage, if necessary, with the prompt selection and prescription of appropriate leg braces to facilitate the recovery of lower limb and trunk motor function.⁹ OT for stroke, facilitation training of the paralyzed arm is continued while the patient also receives activities of daily living (ADLs) training. In some cases, OT also involves rehabilitation of cognitive function such as memory, attention, and executive function.⁹ ST for stroke is commonly offered for language disorder and swallowing disorder.⁹ Self-exercise should be performed with the instruction of a therapist, nurse, or physician. Self-exercise was found to supplement formal therapy by repeating the activity or motion and varied in terms of content and load. Furthermore, although the details were not clear for every acute hospital, a survey of some facilities indicated that self-exercise was planned under the guidance of a therapist with the primary focus on standing training, transfer training, and gait training.¹⁰ Weekend exercise is rehabilitation therapy provided by therapists on Saturdays and Sundays. Weekend rehabilitation is usually provided at the discretion of the attending physician based on their prescription of rehabilitation therapy and the setup of rehabilitation therapy services.¹¹

In this context, social work encompasses a wide range of care including counseling, cooperation with other support services, providing information (e.g., advice on accessing benefits, contact details of medical doctors, and self-help groups), and help with obtaining housekeeping or nursing support (such as support with personal care and medication for secondary prevention).¹² A board-certified physiatrist is one who has acquired the required skills and knowledge for certification by a governing board.¹

Statistical Analysis

We divided facilities into high-performance and low-performance hospitals using the median of the FIM efficacy of each hospital. Rehabilitation characteristics were compared between high-performance and low-performance hospitals using the chi-square test for categorical variables and unpaired *t*-test for continuous variables. The SPSS 19.0 software (IBM SPSS Inc., Armonk, NY) was used for all analyses, and statistical significance was set at $P < .05$.

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