Therapeutic Intensity and Functional Gains of Stroke Patients during Inpatient Rehabilitation

Hua Wang, PhD *, Michelle Camicia, MSN, CRRN *, Joseph Terdiman, MD, PhD **, Murali K Mannava, BS **, Steve Sidney, MD, MPH **, M. Elizabeth Sandel, MD *

* Kaiser Foundation Rehabilitation Center, Vallejo, CA; ** Kaiser Permanente Division of Research, Oakland, CA

Abstract

Objectives: To study the effects of therapeutic intensity on functional gain of stroke patients.

Setting: An inpatient rehabilitation hospital (IRH) in Northern California.

Participants: Three hundred sixty stroke patients discharged from the IRH in 2007.

Interventions: Average minutes of rehabilitation therapy per day, including physical therapy (PT), occupational therapy (OT), speech language therapy (SLT), and total treatment.

Main Outcome Measures: Functional gain measured by the Functional Independence Measure (FIM™), including activities of daily living, mobility, cognition, and total FIM™ score.

Results: The study sample had a mean age of 64.8 years, and was 57.4% male, and 61.4% white. The mean total daily therapy time was 190.3 minutes and the mean total functional gain was 26.0. A longer daily therapeutic duration was significantly associated with functional improvement (r=0.20, p<.001). Patients who received total therapy times < 3.0 hours per day had significantly lower total functional gain than those treated ≥ 3.0 hours. There was no significant difference in functional improvement between patients treated ≥ 3.5 hours and ≥ 3.5 hours per day. Intensity of PT, OT, and SLT treatment was also significantly associated with corresponding sub-scale functional gains. In addition, younger age, hemorrhagic stroke, earlier admission to IRH, and longer IRH length of stay were independent predictors of functional improvement.

Conclusions: The study demonstrated a significant relationship between therapeutic intensity and functional gain during IRH stay and showed treatment intensity thresholds for optimal functional outcomes for stroke patients in inpatient rehabilitation.

Key Words: Stroke, rehabilitation therapy, intensity, functional outcomes.

Introduction

Treatment intensity at an inpatient rehabilitation hospital (IRH) is commonly measured by total or mean therapeutic treatment time per day during the IRH stay. The Centers for Medicare and Medicaid Services (CMS) require adherence to "the 3-Hour Rule" for inpatient rehabilitation facilities, i.e., patients are to receive at least 3 hours of therapy at least 5 days per week, consisting of physical therapy (PT), occupational therapy (OT), and speech language therapy (SLT). This rule was determined by consensus of a group of experts who advised the Health Care Financing Administration, the forerunner of CMS.

In the current study, we examined the associations of types and intensities of therapeutic treatment with functional gains of stroke patients during an IRH stay. Dose-response effects of treatment intensity were also explored to provide evidence of thresholds for optimal functional outcomes.

Methods

The study sample consisted of 360 stroke patients who were discharged from a regional IRH in Northern California. Average daily treatment durations were obtained for PT, OT, SLT, and combined treatment. The ADL, mobility, cognition, and total FIM™ scores at IRH admission and discharge were collected. FIM™ score changes between IRH admission and discharge were the outcomes of the study. Patient characteristics and other covariate measures were also collected.

Descriptive statistics were provided for all explanatory and outcome measures under study. Unadjusted associations between exposure and outcome measures were first explored. General Linear Models were developed to examine the effects of treatment intensities and functional gains, controlling for confounding. A significance level of .05 was set for all the analyses.

Summary

We observed significant associations between rehabilitation therapy intensity and functional gains of stroke patients during IRH stay. Total daily therapy time of 3 hours (but not less than 3 hours and not greater than 3.5 hours) was associated with greater functional improvements. Physical therapy, occupational therapy, and speech language therapy contributed to improvement in specific sub-scales as well as overall functional improvement. Younger age, hemorrhagic stroke, earlier admission to IRH, and longer IRH stay were independent predictors for greater functional improvement. Evidence of treatment intensity thresholds for optimal functional outcomes is provided by this study.

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