Evaluating the Siebens Model in Geriatric-Stroke Inpatient Rehabilitation to Reduce Institutionalization and Acute-Care Readmissions

David S. Kushner, MD,* Kenneth M. Peters, MS, CCC-SLP,† and Doug Johnson-Greene, PhD†

Background: The objective of the study is to evaluate the use of Siebens Domain Management Model (SDMM) in geriatric-stroke patients during inpatient rehabilitation (IR) to increase functional independence, and to reduce institutionalization and acute-care readmissions, which are quality indicators under the U.S. Affordable Care Act. *Methods:* In 2010 (preintervention), 66 stroke patients aged more than 75 years were admitted to an IR facility, on average, 8.8 days postacute care. In 2012 (postintervention), 58 patients aged more than 75 years were admitted to the same IR facility, on average, 5.0 days postacute care. SDMM intervention involved weekly adjustments of clinical care focused on potential barriers to discharge home. Functional Independence Measure (FIM) efficiency, length of stay (LOS), and disposition rates to community or home, acute care, and long-term care were compared pre- and postintervention within facility, and facility data were compared to national case-mix-group-adjusted data from the Uniform Data System for Medical Rehabilitation for both years (2010/2012). *Results:* Pre- and postintervention demographics and prestroke living support/setting were similar, but preintervention had on average 4 more days LOS in IR and 3.8 more days to IR onset. There were significantly more discharges to community in postintervention (79.3%) compared to preintervention (56.9%) (chi-square = 6.02, $P < .013$). The preintervention group did not significantly differ from 2010 national data whereas the postintervention/2012 group significantly differed from 2012 national data for higher FIM efficiency (t = −3.1, $P < .002$) and more discharges to community (chi-square = 19.7; $P < .0001$). From 2010 to 2012, there were 3.8 times more discharges to community (chi-square = 8535; $P < .0001$) and 6 times fewer acute-care dispositions postintervention than nationally (chi-square = 58.7; $P < .0001$). **Key Words:** Geriatrics—stroke—rehabilitation—functional outcome—discharge destination— clinical conferences—institutionalization—process assessment (health care).
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Nearly 800,000 strokes occur in the United States each year, resulting in direct and indirect annual costs of approximately $34 billion from lost productivity, medical complications, and institutional care.[1] The prevalence of Americans living with stroke is expected to gradually increase from the current 500-800 per 100,000 people as the U.S. population ages.[2] Two thirds of strokes occur in individuals aged more than 65 years.[3] The U.S. population aged more than 65 years is projected to more than double to 92 million by 2060, whereas the population aged 85 years or older will also increase by more than 2-fold to 14.1 million by 2040.[4] The expanding American geriatric population will put an increasing burden on health care services and costs including the costs related to medical complications and skilled nursing care in stroke patients. Hospital readmissions in new stroke patients may account for as much as 29% of the first year medical costs.[5] Geriatric institutional care represented one third of U.S. health care costs, accounting for $60 billion in 1991.[6] Since 1991, the costs for skilled nursing care have become increasingly expensive, appreciating by 4.4% alone between 2010 and 2011.[7] Geriatric-stroke patients are at risk for medical complications that may result in readmissions to acute-care hospitals[8] and/or risk for institutionalization.[9,10]

In an effort to control rising and potentially preventable costs for care in stroke patients, the Centers for Medicare and Medicaid Services (CMS) proposes to use 30-day hospital readmissions after ischemic stroke as part of the Hospital Inpatient Quality Reporting Program for payment determination beginning in 2016.[8] Furthermore, the prospective payment system (PPS), the system used by the CMS to reimburse health care facilities and providers, has compelled the national trend of shorter acute-care and inpatient rehabilitation (IR) lengths of stay (LOS) while also imposing penalties for discharges to locations other than home or community since 2002 for patients that include those with stroke.[11,12]

The Siebens Domain Management Model (SDMM) has been used as a health care management tool to improve patient outcomes in acute and postacute care by facilitating effective interdisciplinary team communication and collaboration.[9,10,13,14] In IR, SDMM provides a standard format for weekly interdisciplinary team conferences with the focus on a patient's medical, physical, cognitive, emotional, and social barriers to recovery and barriers to a community or home disposition. An association has been found between use of SDMM during IR and improved functional outcomes and dispositions to home or community in stroke and geriatric patients despite the national health care trend brought about by the PPS of shorter LOS for these patients in both acute and postacute care.[9,10] Geriatric-stroke patients in IR may be more at risk for acute-care readmissions and institutionalization than younger adult stroke patients with fewer comorbid medical conditions. Similarly, apart from stroke, geriatric patients in IR would include patients without permanent impairments in activities of daily living and mobility such as those admitted following joint replacements, fractures, or general medical deconditioning. Assessment of the SDMM intervention during IR in geriatric-stroke patients has not yet been done. The aim of this study was to evaluate SDMM impact on functional outcomes and rates of institutionalization and acute-care readmissions in geriatric-stroke patients.

Methods

Participants

This is a before-and-after observational study that included all IR geriatric-stroke patients admitted at a teaching hospital in 2010 and 2012. There were no exclusion criteria; all geriatric-stroke patients were included for the facility from the Uniform Data Systems for Medical Rehabilitation (UDSMR) Metrics Reports for the corresponding years. Geriatric-stroke patients were defined as any stroke patient aged more than 75 years who had ischemic and/or hemorrhagic hemisphere and brainstem/cerebellar strokes. In 2010 (preintervention), 66 patients were admitted to IR 8.8 days postacute care. In 2012 (postintervention), 58 patients on average were admitted 5.0 days postacute care. Case-mix-group (CMG) comorbidity tier severity was similar in both groups. Preadmission living setting and home social support status were similar in the two groups. A comparison summary of participant demographics, stroke type, and preadmission living setting and home social support status is given in Table 1. Facility data for both years were aggregate data provided by UDSMR, and no information was available regarding specific patients. UDSMR provided case-mix-adjusted national aggregate data to the facility case mix of patients for each year for national comparison groups in this study.

Procedure

Preintervention, postintervention, and national group outcome metrics were compared to assess the use of SDMM in geriatric-stroke IR. This study was approved by the hospital's Clinical Research Review Committee.

Intervention

The intervention implemented by mid-2011 involved weekly adjustments of IR care focused on potential barriers to discharge home per the SDMM framework of four domains including: (I) Medical/Surgical issues; (II) Mental Status/Emotions/Coping; (III) Physical Function; and (IV) Living Environment (© Hilary C. Siebens, MD, 2005) (Table 2). The SDMM was used with permission. These domains were discussed regularly at weekly interdisciplinary team meetings by the geriatric-stroke patient's case manager, physician, nurse, and therapists. All clinical staff were required by the IR facility to participate. There were