

ORIGINAL ARTICLE

Factors Associated With Home Discharge Among Veterans With Stroke



Jibby E. Kurichi, MPH,^a Dawei Xie, PhD,^a Barbara E. Bates, MD,^{b,c}
Diane Cowper Ripley, PhD,^{d,e} W. Bruce Vogel, PhD,^{f,g} Pui Kwong, MPH,^a
Margaret G. Stineman, MD^{a,h}

From the ^aCenter for Clinical Epidemiology and Biostatistics, University of Pennsylvania, Philadelphia, PA; ^bVeterans Affairs Medical Center, Albany, NY; ^cPhysical Medicine and Rehabilitation, Albany Medical College, Albany, NY; ^dDepartment of Veterans Affairs Health Services Research and Development/Rehabilitation Research and Development Rehabilitation Outcomes Research Center Research Enhancement Award Program North Florida/South Georgia Veterans Health System, Gainesville, FL; ^eDepartment of Health Outcomes and Policy, College of Medicine, University of Florida, Gainesville, FL; ^fVeterans Affairs Medical Center, Gainesville, FL; ^gDepartment of Health Outcomes and Policy, College of Medicine, University of Florida, Gainesville, FL; and ^hDepartment of Physical Medicine and Rehabilitation, University of Pennsylvania, Philadelphia, PA.

Abstract

Objective: To determine which patient-, treatment-, and facility-level characteristics were associated with home discharge among patients hospitalized for stroke within the Department of Veterans Affairs.

Design: Retrospective observational study.

Setting: Veterans Affairs facilities nationwide.

Participants: Veterans hospitalized for stroke during fiscal year 2007 to fiscal year 2008 (N = 12,565).

Intervention: Not applicable.

Main Outcome Measure: Discharge location after hospitalization.

Results: There were 10,130 (80.6%) veterans discharged home after hospitalization for acute stroke. Married veterans were more likely than nonmarried veterans to be discharged home (odds ratio [OR] = 1.23; 95% confidence interval [CI] = 1.11–1.35). Compared with veterans admitted to the hospital from home, patients admitted from extended care were less likely to be discharged home (OR = .04; 95% CI = .03–.07). Compared with those with occlusion of cerebral arteries, patients with intracerebral hemorrhage (OR = .61; 95% CI = .50–.74) or other central nervous system hemorrhage (OR = .78; 95% CI = .63–.96) were less likely to be discharged home, whereas patients with occlusion of precerebral arteries (OR = 1.36; 95% CI = 1.07–1.73) were more likely to return home. Evidence of congestive heart failure (OR = .85; 95% CI = .76–.95), fluid and electrolyte disorders (OR = .86; 95% CI = .77–.96), internal organ procedures and diagnostics (OR = .87; 95% CI = .78–.97), and serious nutritional compromise (OR = .49; 95% CI = .40–.62) during hospitalization remained independently associated with lower odds of home discharge. Longer hospitalizations and receipt of rehabilitation services while hospitalized acutely were negatively associated, whereas treatment on more bed sections and rehabilitation accreditation of the facility were positively associated with home discharge. Region exerted a statistically significant effect on home discharge.

Conclusions: We found sociological, clinical, and facility-level factors associated with home discharge after hospitalization for acute stroke. Findings document the importance of considering a broad range of characteristics rather than focusing only on a few specific traits during discharge planning.

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Stroke is a leading cause of death and disability in the United States,¹ and risk increases with age.² Approximately 795,000 people have a new or recurrent stroke annually,³ of whom more than 15,000 are veterans.⁴ Average hospital costs have increased almost 25% from 1997 to 2004, with stroke remaining a primary reason for hospitalizations.⁵ Approximately 10% of the patients with stroke need care in institutions after discharge from the hospital²; such can be quite expensive,^{6,7} and these costs have been steadily increasing.⁸ Most patients want to return home because they enjoy a higher quality of life at home compared with being institutionalized⁷ and they want to regain some sense of normalcy.⁹ With 10% of the patients suffering strokes recovering almost completely, 25% recovering with minor impairments, and 40% needing special care because of moderate to severe impairments, home discharge seems feasible for many stroke survivors depending on a number of characteristics.²

Studies have addressed outcomes that patients with stroke may have or programs that they may participate in, once discharged into the community after hospitalization. These include tele-rehabilitation,¹⁰ home rehabilitation programs,¹¹⁻¹³ postacute rehabilitation,^{11,13,14} home health care,¹⁵⁻¹⁸ falls prevention programs,¹⁹ outpatient visits,¹⁵ readmissions,¹⁴ and institutionalization.²⁰ It is important that patients, clinicians, and family members be aware of the factors that may lead to these events before hospital discharge to decrease the probability of readmission, assist with long-term recovery, and provide information to caregivers.²¹ Our study objective was to determine which patient-, treatment-, and facility-level characteristics were associated with home discharge among patients hospitalized for stroke within the Department of Veterans Affairs. We hypothesized that sociological factors, such as marital status and living location before hospitalization, and treatment-level factors, such as receipt of rehabilitation while hospitalized acutely, would be strongly associated with home discharge even after controlling for other confounders.

Methods

This study was approved by the institutional review boards at the University of Pennsylvania, Philadelphia, PA; the Samuel S. Stratton Veterans Affairs Medical Center, Albany, NY; and the University of Florida, Gainesville, FL; and received approval from the Research and Development Committees in Albany and the North Florida/South Georgia Veterans Health System in Gainesville.

Source of data

Data were merged from Veterans Health Administration administrative databases used to track health care utilization of veterans. The databases included the Patient Treatment Files (PTF) (main includes demographic and comorbidity information for the entire hospitalization, bed section contains comorbidity information

related to specific services patients were treated on, procedure encompasses details regarding procedures while hospitalized), 2 outpatient care files (contains information obtained during outpatient visits), the extended care file (includes information from long-term care facilities), the Functional Status Outcomes Database (details the type of rehabilitation received), and the Beneficiary Identification Record Locator System death file (includes death date).²²⁻²⁵

Study sample

There were 14,773 patients with a stroke diagnosis hospitalized in Veterans Affairs Medical Centers with discharge dates between October 1, 2006, and September 30, 2008. We used a modified version of the high sensitivity algorithm for stroke to identify patients hospitalized for acute stroke²⁶ on the basis of specific *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)* diagnostic codes being present in either the primary diagnosis field of the patients' PTF main or one or more PTF bed section record(s), which indicates that stroke was the main reason for hospitalization. The diagnoses and their corresponding *ICD-9-CM* codes included occlusion, embolism, or stenosis of the cerebral arteries (434.01, 434.11, 434.91), occlusion or stenosis of the precerebral arteries (433.01, 433.11, 433.21, 433.31, 433.81, 433.91), intracerebral hemorrhage (431.xx, 432.xx), subarachnoid hemorrhage (430.xx), and acute, but ill-defined cerebral vascular disease (436.xx). Patients with transient cerebral ischemia (435.xx) were included only if there was additional evidence of stroke indicating either hemiplegia or hemiparesis (342.xx), or 1 or more of the above stroke codes were present in secondary diagnostic fields. The following were excluded from the analyses: 1136 veterans not meeting our modified stroke algorithm, 2 patients hospitalized for more than 1 year, 294 cases having evidence of a previous stroke based on 1 or more of the above-mentioned *ICD-9-CM* codes in the PTF, outpatient care files, extended care file, or Functional Status Outcomes Database during the year before the stroke hospitalization admission date, and 776 patients who died in hospital. Thus, 12,565 patients were analyzed.

Variables

Patient-level factors included age (<60, 60-69, 70-79, ≥80), sex, marital status (married, not married), and living location before hospitalization (home, hospital, extended care).

Stroke type was grouped into 6 mutually exclusive and exhaustive categories. If there was evidence suggesting several stroke types, bleeds and central nervous system (CNS) involvement were coded first, followed by occlusive and precerebral disease. Classification was as follows: intracerebral hemorrhage, subarachnoid hemorrhage, other and nonspecified CNS hemorrhage, occlusion of cerebral arteries, occlusion or stenosis of precerebral arteries, and acute but ill-defined including transient cerebral ischemia. Stroke type was classified by the clinician authors and on the basis of *ICD-9-CM* codes from the high-sensitivity algorithm for stroke.²⁶

We used the Elixhauser comorbidity measure.²⁷ *ICD-9-CM* codes from the outpatient care files and extended care file from 1 year before the stroke hospitalization and from the PTF main and bed-section files from 1 year before and during the stroke hospitalization were used to obtain diagnostic information. Diagnostic codes for hemiplegia and hemiparesis (see codes

List of abbreviations:

CARF	Commission on Accreditation of Rehabilitation Facilities
CI	confidence interval
ICD-9-CM	International Classification of Diseases, Ninth Revision, Clinical Modification
PTF	Patient Treatment Files
CNS	central nervous system
OR	odds ratios

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