

Factors Associated with Delays in Seeking Treatment for Stroke Care in Veterans

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Background: Our objective was to examine the association between delay in seeking treatment (DST) for stroke care and demographic and clinical characteristics variables in a sample of veterans. **Methods:** We used survey data from 100 veterans with a diagnosis of stroke who were receiving poststroke care at a Veterans Affairs (VA) Medical Center in the southeastern United States to evaluate the relationship between DST and key sample demographic and clinical characteristics. We used backward stepwise logistic regression models to assess the independent association between DST and demographic and clinical variables. **Results:** We found that stroke survivors reporting DST were more likely to be black (56.4% versus 32.8%; $P = .02$) and younger at the time of stroke onset (58.1 years versus 63.7 years; $P = .02$). In backward stepwise logistic regression models, being black was an independent predictor of DST (odds ratio [OR] 2.76; 95% confidence interval [CI], 1.04-7.30; $P = .04$) in this veteran population. **Conclusions:** Race appears to be a key factor associated with an increased likelihood of delays in seeking urgent stroke care in veterans. Future studies need to further examine the complex sociodemographic profile of patients who are most likely to delay seeking care for stroke and to develop interventions to reduce the impact of DST. **Key Words:** Stroke—delays seeking treatment—veterans.

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Early intervention for stroke can substantially improve long-term outcomes. Unfortunately, many patients fail to arrive at medical facilities in a timely fashion, thereby limiting their opportunities to take advantage of medical treatments and reduce the likelihood of poststroke disability. Delays seeking treatment (DST) for stroke care have been attributed to a wide range of demographic and clinical variables.¹⁻⁵ A review of DST in patients with acute coronary syndrome and stroke by Moser et al² found that a range of social, cognitive, and emo-

tional factors frequently contributed to DST among individuals seeking care for stroke. These factors included, but were not limited to, living alone, familiarity with the warning signs of stroke, identity of the person identifying the symptoms (patient versus witness), knowing someone who previously had a stroke, nocturnal onset of symptoms and distance to the hospital. Consequently, the exact causes of DST remain poorly understood overall and appear somewhat unique to different population groups.

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Among those requiring timely stroke care are US veterans who receive services at US Department of Veterans Affairs (VA) facilities. The VA estimates that approximately 15,000 veterans are hospitalized each year for stroke at a cost of approximately \$40 million.⁶ VA facilities are interested in understanding how to best facilitate urgent care for stroke as a mechanism to reduce costs and improve outcomes. To facilitate urgent care and optimal stroke outcomes, we must first understand the specific patient characteristics most likely to result in DST. Therefore the objective of this pilot study was to identify the independent association between DST and key sample demographic and clinical variables in a sample of veterans. We hypothesized that clinical variables (stroke knowledge, health literacy) and race/ethnicity would be associated with DST.

Research Design and Methods

Study Sample

We recruited a sample of veterans with a diagnosis of stroke (International Classification of Diseases, Ninth Revision, codes 430-438, excluding codes 433.1 and 435.9) who were being seen at VA facilities in the southeastern United States. Our recruitment targeted a VA Medical Center (VAMC) and its associated community-based outpatient clinics (CBOCs) located in South Carolina and Georgia. Participants for the project were veteran stroke survivors who were able to provide information about their treatment-seeking behaviors after their onset of stroke. Inclusion criteria were (1) age 18 years or older, (2) history of stroke within the past 2 years confirmed by magnetic resonance imaging or computed tomography report in record and (3) ability to communicate in English. Exclusion criteria were (1) coexisting neurologic conditions or progressive disease (eg, dementia, Parkinson disease) and (2) severe stroke sequelae (eg, aphasia, vision loss, or hearing loss) precluding completion of the study questionnaire.

To identify stroke survivors, we elicited assistance from VA primary care providers, who sent a letter explaining the study to potential participants. The letter provided information about the study, explained the study requirements and clarified that only subjects meeting certain eligibility criteria would be able to participate. Subjects agreeing to participate were seen at their usual VA facility (VAMC or CBOC), where they provided written consent to participate in the study. The study was approved by the local university institutional review board and local VA research and development committees.

Study Data

All participants completed a comprehensive survey, which consisted of the following measures:

Demographic information on age, age at time of stroke (stroke age), race (white versus black), sex, education, income, marital status, insurance other than VA insurance, and regular visits to a physician were collected.

Health literacy was measured with the Rapid Estimate of Adult Literacy in Medicine Revised (REALM-R) which is an 8-item instrument designed to rapidly screen patients for potential health literacy problems.⁷

Depression was measured with the Patient Health Questionnaire (PHQ-9), which is a brief questionnaire that scores each of the 9 Diagnostic and Statistical Manual of Mental Disorders, fourth edition criteria for depression as "0" (not at all) to "3" (nearly every day). PHQ-9 scores of 5, 10, 15, and 20 represent mild, moderate, moderately severe, and severe depression, respectively.⁸

Stroke knowledge was assessed using the Stroke Knowledge Test (SKT), which is a 20-item measure of stroke-related knowledge.⁹

Primary Outcome Measure

The primary outcome measure for the study was DST. DST was reported in hours from onset of symptoms to receiving treatment at a health care facility. For this study, DST was categorized as less than or equal to 3 hours versus more than 3 hours. Data were collected by self-report.

Statistical Analyses

STATA, version 11.2 (StataCorp LP, College Station, TX) was used for all statistical analyses. To evaluate the relationship between DST and the demographic variables, we performed 3 sets of analyses. First, we described the demographic characteristics of our sample. The characteristics of the study sample were described using proportions for categorical variables and means and standard deviations (SD) for continuous variables. Second, we compared the characteristics of the sample for those seeking treatment 3 hours or sooner versus those seeking treatment after 3 hours using chi-square statistics for categorical variables and independent sample *t* tests for continuous variables. Age and stroke age were treated as both a continuous variable and categorical variables (<60 years, 60-69 years, 70 years and older). Education (less than or equal to a high school education, some college, college graduate), sex (male versus female), income (<\$25,000, \$25,000 or more, not reported), marital status (married versus not married), and insurance status (VA insurance only versus other insurance), and regular physician visits (yes versus no) were treated as categorical variables. Health literacy, depression, and stroke knowledge were treated as continuous variables.

Third, we used backward and forward stepwise logistic regression to determine the independent association of DST and the sample demographic and clinical characteristics. We used a cutoff of *P* less than .20 for inclusion of candidate variables in the multivariate analyses.

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