Patterns and Predictors of Depression Treatment among Stroke Survivors with Depression in Ambulatory Settings in the United States

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Goal: Despite the importance of treating depression, little is known regarding the current practice pattern of depression treatment among older adults with stroke and depression. We used national survey data from ambulatory settings to examine the depression treatment patterns and predictors among stroke survivors in the United States (US). *Materials and Methods:* We used a cross-sectional study design by pooling multiple-year data (2005-2011) from the National Ambulatory Medical Care Survey and the outpatient department of the National Hospital Ambulatory Medical Care Survey. Older adults (age ≥50 years) with stroke and depression constituted the final study sample. Depression treatment defined as antidepressant use with or without psychotherapy was the dependent variable in this study. All analyses adjusted for the complex survey design of the datasets to obtain nationally representative estimates. *Findings:* The overall depression treatment was observed in 47.32% of the study sample, mainly driven by antidepressant use alone. An overwhelming majority used selective serotonin reuptake inhibitors (77% of overall antidepressant use), and sertraline was the most prescribed antidepressant (30.5% of overall antidepressant use). Gender, race or ethnicity, region of residence, number of medications recorded at the sampled visit, and number of chronic conditions were significantly associated with depression treatment. *Conclusion:* According to this nationally representative sample, approximately 1 in 2 stroke survivors with depression received depression treatment in ambulatory care settings in the US. Appropriate interventions should be developed to optimize depression treatment. **Key Words:** Stroke—depression—older adults—ambulatory care settings—antidepressants—psychotherapy.
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Introduction

Stroke is a common cause of mortality and morbidity including cognitive and functional disability, and also leads to high financial burden (estimated to be $33.6 billion per year) in the United States (US).[1] Stroke survivors often experience various physical and mental comorbidities, with depression being one of the most common psychiatric complications of stroke.[2] Prevalence of depression among stroke survivors varies depending on the population and methods used to tally, but epidemiological studies have shown depression to be prevalent among one third of stroke survivors.[3] Therefore, poststroke depression should be closely monitored among stroke survivors as it has a

significant impact on patients' quality of life.[4] The American Heart Association and American Stroke Association guidelines recommend treating patients with poststroke depression with antidepressant therapies.[5] Moreover, a randomized controlled trial of depressed stroke patients found that antidepressant therapy combined with psychotherapy reduced depression more than antidepressant therapy alone (Mitchell 2009). Despite recommendations from the American Heart Association and American Stroke Association for depression treatment among stroke survivors, to the best of our knowledge, there is no study examining the current practice patterns of depression treatment in this vulnerable population in the ambulatory care settings in the US. Such information would help improve understanding of depression treatment choices among stroke survivors, and help ensure optimal intervention and utilization of limited resources. Therefore, this study used national survey data to examine the patterns and predictors of depression treatment among older stroke survivors in the US.

Materials and Methods

Study Design

This is a cross-sectional study that pooled multiple-year data (2005-2011) from National Ambulatory Medical Care Survey (NAMCS) and the outpatient department (OPD) of the National Hospital Ambulatory Medical Care Survey (NHAMCS). The University of Arizona Institutional Review Board determined that this study does not require human subjects review.

Data Source

NAMCS and NHAMCS provide nationally representative estimates regarding ambulatory medical care service utilization during visits to nonfederally employed, office-based physicians and outpatient departments of noninstitutional, general, and short-stay hospitals in the US.[7] The National Center for Health Statistics of the Centers for Disease Control and Prevention conducts NAMCS and NHAMCS data collection annually. These cross-sectional survey data provide weights, for each visit, which are used to obtain national-level estimates. Each physician–patient encounter or visit serves as the basic sampling unit for both NAMCS and NHAMCS data.

NAMCS uses a multistage probability design where the first probability sample is drawn from primary sampling units (PSUs) such as counties, groups of counties, county equivalents, or towns and townships within ambulatory care practice settings. In the next stage, probability sampling is conducted among practicing physicians in each of the PSUs. In the final stage, the patient visits within the yearly practices of sample physicians are selected following a two-step process: (1) the complete physician sample is divided into 52 random subsamples of approximately equal size, and each of these subsamples is randomly assigned to the 1 week of the 52 weeks of the survey year, then (2) the physicians select a systematic random sample of visits during the assigned week. The NAMCS data collection form collects a wide range of information including patient characteristics, physician characteristics, physicians' diagnoses, prescribed pharmacotherapy, and the delivery of therapeutic services. A maximum of 3 diagnoses codes and 8 prescription medications could be recorded for each visit.

Data collection for NHAMCS is conducted in nonfederal and noninstitutional hospitals throughout the US. Again, to collect a nationally representative sample, a multistage probability sampling design is used to collect data from visits to outpatient and emergency departments of the hospitals.[7] The different stages of NHAMCS data collection include selection of probability samples of PSUs, hospitals from each PSU, some or all outpatient and emergency departments from hospitals, and patient visits within these departments. The final sampling stage of NHAMCS data collection is similar to the NAMCS process. The present study used only the OPD portion of the NHAMCS as the medical care provided in these settings is similar to the care provided in office-based, ambulatory care settings. The clinical nature of the OPD visits was collected using a data collection tool similar to NAMCS.

Study Population

Older adults (age ≥50 years) with stroke and depression constituted the study sample. Ambulatory visits that involved stroke diagnosis were identified by using the International Classification of Diseases, Ninth Revision, Clinical Modification, of 430.xx-438.xx.[8] Depression was identified in visits where the patient answered "yes" to the question "Regardless of the diagnoses written...does the patient now have: depression?" Since 2005, this item has been added to identify 14 chronic conditions (including depression) to supplement chronic–disease-related ambulatory visits, and the robustness of using this variable is described elsewhere.[9]

Dependent Variable

Depression treatment defined as antidepressant use with or without psychotherapy was the dependent variable for this study. Generic drug codes and Multum Lexicon codes were used to identify antidepressant use. To achieve appropriate relative standard error, we combined antidepressants into selective serotonin reuptake inhibitors (SSRIs) and other antidepressants. The variable