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Original Research

Correlates of physical function among stroke survivors: an examination of the 2015 BRFSS

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ABSTRACT

Objectives: To identify the characteristics of stroke survivors with poor physical function.
Study design: Cross-sectional.
Methods: Secondary data analyses were performed with the 2015 Behavioral Risk Factor Surveillance System data set. Unadjusted and adjusted logistic regressions were employed to determine the correlates of poor physical function in stroke survivors. Self-reported difficulty with walking and stairs was used as a proxy for physical function. Characteristics such as age, race, sex, difficulty doing errands alone, difficult dressing or bathing alone, health care coverage, time since last routine checkup, and reported financial difficulty with regard to health care access were examined as contributing factors to physical function.
Results: Approximately half of all stroke survivors reported having difficulty with walking and stairs (50.3%). As expected, the odds of reporting difficulty with walking and stairs were higher among stroke survivors aged 40 years and above ($p < 0.0001$). Interestingly, black/African American and multiracial respondents had higher odds of reporting difficulty with walking and stairs than whites, whereas Hispanic respondents had lower odds of reporting difficulty with walking and stairs than whites ($p < 0.0001$). Further analyses revealed that the disparity of physical function was preserved ($p < 0.0001$) after adjusting for age, race, sex, education level, family income, marital status, employment status, health insurance status, affordability of healthcare, and length of time from last doctor's visit.
Conclusions: There were racial/ethnic disparities in physical function. Specifically, blacks/African Americans had a 5.6% increase in the odds of reporting difficulty with walking and stairs than whites. Moreover, Hispanics reported significantly fewer problems than whites. Overall, similar sociocultural patterns in non-stroke and stroke populations were observed in this study.

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Introduction

Stroke remains one of the major public health burdens in the United States (US), accounting for nearly 800,000 cases per year, and it is the major cause of disability among adults.[1] A major barrier to recovery is a lack of access to services that could support exercise that can otherwise promote mobility and overcome disability.[2]

Physical function refers to an individual's capacity to perform daily personal living tasks like walking, feeding, and bathing,[3] evaluated in terms of the independent performance of those tasks.[4] Factors like age, initial stroke severity, duration of hospitalization, functional level of discharge in terms of motor function and ambulation affect the extent of physical function after stroke.[5] This underscores the need to not solely focus on physical function as a single entity in post-stroke interventions, but to sometimes take a holistic approach to improving physical function and other affected abilities.

Motor-cognitive interventions—which refer to dual tasks involving concurrently mobility and cognition—have been shown to significantly improve physical function of stroke survivors.[6] The dual-tasking exercises may explain why Hispanic stroke survivors who regularly attended local religious services or were ambulant were less likely to experience declines in physical function compared with others who did not attend religious services or were not ambulant.[7] However, this is presumably not the main evidence that motor-cognitive interventions improve physical function of stroke survivors. Specifically, factors such as social support networks or selection bias could contribute to the reported improvement of physical function in Hispanic stroke survivors.[6]

Stroke survivors with physical function impairment are at risk for decreased quality of life, especially depression, in part due to decreased social participation.[8,9] Furthermore decreased quality of life increases the risk of additional medical complications such as reduced functional outcomes and heightened risks of diabetes, hypertension, and other mobility-related conditions.[8,10] A study[8] found that factors that increased social isolation, e.g. advanced age, being a housewife, inability to work due to disability, or simply reduced social activity most strongly affected quality of life. In general, another study[11] found that post-stroke cognitive deficit and cardiovascular risks are significantly associated with long-term depressive symptoms and reduced quality of life.

While stroke can in principle affect anyone, and will remain a perennial public health issue,[12,13] demographically, blacks/African Americans in the US are at greater risk and die more often of stroke than whites.[14] This stroke disparity is also observed between women and men, with a higher stroke prevalence reported among women than men.[15] Understanding the barriers associated with stroke-related issues for these minorities can shed light on how to address the disparity through changes in health care policy and practices.

As the prevalence of stroke survivors with mobility impairments continues to escalate, studies examining factors that predict physical function are increasingly needed. Therefore, the purpose of this study was to identify characteristics of stroke survivors with poor physical function.

Methods

Data sources and analysis

The 2015 Behavioral Risk Factor Surveillance System (BRFSS) data set was used for secondary data analyses, with a sample size of 425,681 non-institutionalized adults. The BRFSS is a health-related telephone survey that collects non-institutionalized adult (aged 18 years and older) interviews annually on health-related risk behaviors, chronic health conditions, and use of preventive services in the US. The data set is a collaborative project between all fifty US states and the District of Columbia, Guam, and Puerto Rico.[16] The 2015 data were mostly collected in a similar way via either landline or cellular telephone. However, the landline telephone interviews included random selection of adults within the households, whereas the cellular telephone interviews directly contacted adults who own a cellular telephone. In consequence, the response rates reflect these two routes of data collection, namely 48.2% for landline interviews and 47.2% for cellular interviews.[17]

Data are shown as n (%). Unadjusted and adjusted logistic regressions were performed to determine predictors of poor physical function as defined by self-reported difficulty with walking and stairs. This outcome variable—'difficulty with walking and stairs'—was selected because most functional assessment instruments inquire about being physically able to climb stairs.[18] Therefore, 'difficulty with walking and stairs' was used as a proxy for physical function in this study. Factors of physical function investigated included age, race, sex, difficulty doing errands alone, difficult dressing or bathing alone, health care coverage, time since last routine checkup, and reported financial difficulty with regard to health care access. Unadjusted and adjusted analyses were performed on only those who reported having a stroke. All analyses were weighted using BRFSS-derived sampling weights. Odds ratios and 95% confidence intervals are reported. Statistical significance is defined as $P < 0.05$. All data management and analysis was performed using SAS software, Version 9.4 (SAS Institute, Inc., Cary, NC).

Results

Table 1 shows the characteristics of the BRFSS sample. A total sample size of 425,681 non-institutionalized US adults indicated that 95.8% (408,032 individuals) did not have a prior stroke compared with 4.2% (17,649 individuals) had a prior stroke. All selected characteristics, i.e. demographics, health care access, and difficulty dressing or ambulating alone yielded significant relationships with our outcome variable, 'difficulty with walking and stairs'.

Difficulty with walking and stairs in respondents without stroke

For respondents without stroke, only 16.0% reported difficulty with walking and stairs, whereas 84.0% reported no difficulty with walking and stairs. Overall, the percentages of the