Gender Differences in Stroke Recognition Among Stroke Survivors

CE 2.3 ANCC Contact Hours

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ABSTRACT

Background: Studies suggest that gender differences exist in the recognition of stroke warning signs. Poor recognition of stroke warning signs has been attributed to negative treatment-seeking behaviors, which can result in poor outcomes. **Objective:** The aim of this study was to examine gender differences in the recognition of traditional early warning signs of stroke and first action to initiate treatment in a sample of stroke survivors. **Methods:** We collected survey data to examine recognition of traditional stroke warning signs and appropriate first action to initiate treatment along with demographic (age, stroke age, education, usual source of care, and insurance) and clinical (health literacy and stroke knowledge) variables. **Results:** Seventy-one stroke survivors participated in this pilot study. Women in the sample were significantly older than men at time of stroke (62 years old vs. 55 years old; $p < .05$). The two groups did not differ in clinical variables. Recognition of traditional individual stroke warning signs ranged from approximately 60% to 90%. There were no significant gender differences in the recognition of individual warning signs. Women were more likely to recognize all five traditional warning signs compared with men (67% vs. 42%; $p = .04$). Similarly, 58% of female participants recognized all five traditional stroke warning signs collectively and would call 9-1-1 as a first action compared with only 29% of men ($p = .02$). **Conclusions:** Although women recognized traditional stroke warning signs more often than men, educational programs should emphasize both traditional and nontraditional stroke warning signs among women and address these differences with their healthcare providers.

Keywords: gender, stroke, warning signs

Literature Review

Stroke is one of the leading causes of disability in the United States, affecting approximately 795,000 individuals annually (Roger et al., 2012). Consequently, national public health campaigns have been designed to improve recognition of traditional early warning signs of stroke and to seek treatment urgently. Despite these attempts, stroke awareness in the U.S. population remains low (Centers for Disease & Prevention, 2008). Even more alarming, poor recognition of traditional stroke warning signs has even been reported among stroke survivors (Ellis & Egede, 2008). Unfortunately, limited stroke awareness has been linked to delays in seeking treatment for stroke and reductions in stroke-related outcomes (Moser et al., 2006).

An emerging issue related to the study of stroke awareness is the recent reports of gender differences in presentation with traditional stroke warning signs at stroke onset. For example, Lisabeth and colleagues found women presented with nontraditional stroke warning signs (pain, lightheadedness, and shortness of breath) more frequently than men (Lisabeth, Brown, Hughes, Majersik, & Morgenstern, 2009). Gender differences have also been reported in two large population studies (Jerath, Reddy, Freeman, Jerath, & Brown, 2011; Labiche, Chan, Saldin, & Morgenstern, 2002). These findings are important because women experience more strokes and are more likely to delay seeking urgent treatment at the onset of their stroke warning signs (Mandelzweig, Goldbourt, Boyko, & Tanne, 2006; Roger et al., 2012). Furthermore, studies have shown gender differences in stroke-related outcomes with women experiencing greater poststroke disability, which might be the result of delays in seeking treatment (Gargano, Reeves, & Paul Coverdell National Acute Stroke Registry Michigan Prototype, 2007; Lai, Duncan, Dew, & Keighley, 2005; Petrea et al., 2009).

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Understanding gender disparities in recognition of early stroke warning signs is important because evidence suggests that recognizing early warning signs is vital to seek urgent treatment. Similarly, current public health programs designed to improve stroke awareness only emphasize traditional early warning signs.

Study Objective and Conceptual Framework

Therefore, the objective of this pilot study was to examine gender differences in the recognition of traditional early warning signs of stroke and first action to initiate treatment for stroke in a sample of stroke survivors. We chose to complete this study with stroke survivors because they are at high risk for recurrent stroke. Brown and colleagues found that 11.8% of stroke survivors will experience a second stroke within 12 months (Brown, Lisabeth, Roychoudhury, Ye, & Morgenstern, 2005). Consequently, it is imperative that stroke survivors understand the warning signs of stroke given their high likelihood of experiencing a recurrent stroke. The study reported here was part of a larger study of poststroke outcomes. The larger study of poststroke outcomes was guided by an adapted conceptual model of barriers and mediators of health disparities (Cooper, Hill, & Powe, 2002). The model proposed that outcomes are influenced by specific patient-level variables (e.g., demographic characteristics, awareness, knowledge, health literacy, and social support). We hypothesized gender differences would not exist in stroke survivors because of their previous experiences with stroke.

Methods

The study was reviewed and approved by the appropriate institutional review board. Survey data were collected in 2008 from a convenience sample of stroke survivors recruited from outpatient clinics where participants were receiving follow-up care. Inclusion criteria were as follows: (1) age ≥18 years; (2) history of stroke within the past 2 years, confirmed by magnetic resonance imaging or computed tomograrphy report in record; and (3) ability to communicate in English. Exclusion criteria included the following: (1) coexisting neurological conditions or progressive disease (e.g., dementia, Parkinson disease, etc.) and (2) severe stroke sequelae (e.g., aphasia, vision loss, or hearing loss) that precludes completion of the study questionnaire.

Demographic Characteristics

Demographic data were collected related to age, stroke age, gender, education, marital status, usual source of care, and insurance. Age was defined as age at the time of participation in the study, whereas stroke age referred to the participant's age at the time of their stroke. Two levels of education were created: <high school graduate and ≥high school graduate. Usual source of care was defined as having a primary care provider. Finally, insurance was defined as having insurance (private, Medicare, Medicaid) or no insurance.

This pilot study evaluates gender differences in the early recognition of classic stroke warning signs and the initiation of stroke treatment modalities.

Clinical Characteristics

Participants were administered a comprehensive survey in a quiet office or treatment room to obtain clinical data related to health literacy, stroke knowledge, recognition of traditional early warning signs of stroke, and first action to initiate treatment.

Health Literacy

This was assessed using the Rapid Estimate of Adult Literacy in Medicine (Bass, Wilson, & Griffith, 2003). The Rapid Estimate of Adult Literacy in Medicine is an eight-item instrument designed to rapidly screen patients for potential health literacy problems. Participants could receive a maximum score of 8 with scores of ≤6 indicating increased risk of poor literacy.

Stroke Knowledge

This was assessed with the Stroke Knowledge Test. The Stroke Knowledge Test is a 20-item test designed to measure knowledge and understanding of stroke, stroke risk, stroke risk factors, and stroke prevention practices (Sullivan & Dunton, 2004). One question related to stroke incidence was adapted to reflect the current incidence of stroke in the United States.

Recognition of Early Warning Signs of Stroke and First Action to Initiate Treatment

These were assessed using the Behavioral Risk Factor Surveillance System Stroke module (Centers for Disease Control and Prevention, 2010). Respondents indicated whether any of the following five traditional warning signs were an indication of an imminent stroke: (1) sudden confusion, trouble speaking or understanding; (2) sudden numbness or weakness of the face, arm, or leg, (3) sudden trouble seeing in one or both eyes; (4) sudden trouble walking, dizziness, and loss of balance or coordination; and (5) sudden headache with no known cause. Respondents were asked to answer either ''yes,'' ''no,'' or ''don't know/not sure,''

indicating whether they believed the warning sign was indicative of a stroke, they did not know, or they were not sure. Respondents were also asked ''If they thought someone was having a stroke, what was the first thing they would do?'' Respondents chose from a list of actions that included the following: (1) take the patient to the hospital, (2) tell them to call the doctor, (3) call 9-1-1, (4) call their spouse or family member, or (5) do something else.

Data Analysis

Descriptive statistics were calculated separately for men and women. We compared outcome variables by gender using a two-sample *t* test for continuous variables and Pearson's chi-square test of association for categorical variables. All hypothesis tests were two-sided, and $p < .05$ was considered statistically significant. All analyses were completed using IBM SPSS Statistics 20.0.

Results

The sample consisted of 71 stroke survivors. Forty-six percent of the sample was women, 80% had a high school education or greater, and 97% had a usual source of care. The mean age of the sample was 58 years, and women were significantly older than men (62 years old vs. 55 years old; $p < .05$). The two groups did not differ in health literacy and stroke knowledge scores (see Table 1).

Recognition of individual stroke warning signs ranged from approximately 60% to 90% for the total sample. Sudden headache of no known cause was the least likely recognized warning sign (62%), whereas sudden numbness or weakness of the face, arm, or leg was the most recognized (90%). Overall, there were no significant gender differences in the recognition of the five individual warning signs. However, only 50% of the sample recognized all five warning signs collectively. Women were more likely to recognize all five warning signs compared with men (67% vs. 42%; $p = .04$). Appropriate first action to initiate stroke treatment (call 9-1-1) was recognized by 79% of the total sample, and gender differences did not exist. Finally, gender differences existed in recognizing the complex stroke profile and appropriate first action (all five warning signs + call 9-1-1). Fifty-eight percent of the female participants recognized all five warning signs and would call 9-1-1 as a first action compared with only 29% of men ($p = .02$; see Table 2).

Conclusions

The objective of this pilot study was to examine gender differences in the recognition of traditional early warning signs of stroke and first action to initiate treatment for stroke in a sample of stroke survivors. Three key findings emerged in this pilot study. First, women were more likely to recognize all five warnings and call 9-1-1 as a first action. These findings are important because, although the women in our pilot study were able to recognize traditional warning signs, studies show that women are more likely to experience nontraditional warning signs and more likely to delay seeking treatment (>3 hours after onset of warning signs; Jerath et al., 2011; Labiche et al., 2002; Mandelzweig et al., 2006). Although the focus was not on delays in seeking treatment, 42% of women compared with 26% of men reported delaying seeking treatment for their stroke greater than 3 hours. Therefore, the relationship between recognition of traditional warning signs, nontraditional warning signs, and treatment-seeking behaviors is unclear.

Second, we found that the recognition of individual warning signs was surprisingly low. Recognition of individual stroke warning signs ranged from approximately

TABLE 1. Demographic and Clinical Characteristics of Sample by Gender

Demographic Characteristic	All (*N* = 71)	Male (*n* = 38)	Female (*n* = 33)	*p*
Stroke age, mean (*SD*)	57.04 (12.40)	43.03 (13.53)	60.52 (10.01)	.02
Age, mean (*SD*)	58.28 (12.59)	55.18 (13.71)	61.85 (10.26)	.02
Education, %				.37
<high school	19.7	23.7	15.2	
≥high school	80.3	76.3	84.8	
Usual source of care, % yes	97.2	100	93.9	.12
Insurance, % yes	83.1	81.6	84.8	
Clinical Characteristic				
Health literacy, mean (*SD*)	5.00 (3.16)	4.62 (3.20)	5.44 (3.10)	.28
Stroke knowledge, mean (*SD*)	10.69 (3.15)	10.84 (3.31)	10.50 (3.01)	.65

TABLE 2. Recognition of Warning Signs of Stroke and First Action to Call 9-1-1

Stroke Warning Signs and First Action	All (N = 71), %	Male (n = 38), %	Female (n = 33), %	p
Sudden confusion, trouble speaking or understanding	87.3	84.2	90.0	.40
Sudden numbness or weakness of the face, arm, or leg	90.1	93.9	86.8	.32
Sudden trouble seeing in one or both eyes	73.2	68.4	78.8	.33
Sudden trouble walking, dizziness, loss of balance or coordination	88.7	84.2	93.9	.20
Sudden headache with no known cause	62.0	52.6	72.7	.08
Knowledge of all five warning signs	53.5	42.1	66.7	.04
Call 9-1-1 as first action	78.9	73.6	81.8	.57
Knowledge of all five warning signs and to call 9-1-1 as first action	42.3	28.9	57.6	.02

60% to 90%. These findings are substantially lower than previously reported results among a national sample of individuals without a history of stroke, individuals at risk for stroke, and stroke survivors. Ellis and Egede found that recognition of individual warning signs among stroke survivors ranged from approximately 80% to 95% (Ellis & Egede, 2009). This is of major concern given our participants' history of stroke, high risk for recurrent stroke, and the expectation that they would recognize warnings signs at a higher rate.

Third, less than half of the sample recognized all five traditional warning signs and would call 9-1-1 as a first response. This is concerning because stroke survivors must understand and recognize the complex stroke profile, particularly among women. For example, Gargano and colleagues found that female stroke survivors had lower functional recovery and poor quality of life at 3 months after stroke onset (Gargano et al., 2007). Similarly, Lai and colleagues found that women were less likely to achieve independence in activities of daily living and instrumental activities of daily living (Lai et al., 2005). Thus, recognizing stroke warning signs could be vital to early stroke awareness and intervention.

Despite these interesting findings, this pilot study is not without limitations. First, this pilot study consisted of a relatively small convenience sample recruited from one location, which limits its generalizability to other geographical areas. Future studies should be designed to examine this issue in a larger national sample. Second, use of closed-ended question used to identify stroke-related awareness may have influenced responses because open-ended questions tend to yield more accurate response rates. Third, we did not directly consider other relevant variables, such as health literacy, education, and socioeconomic status, all of which are known to influence knowledge outcomes. Fourth, women in this study were significantly older than men. This is not surprising as women who experience stroke tend to be older than men (Roger et al., 2012). However, having a sample more balanced in both age and gender is required to adequately examine true differences. Fifth, the study did not examine recognition of ''nontraditional'' stroke warning signs common in women. Future studies should be designed to address this issue in stroke survivors.

Implications for Neuroscience Nurses

According to the National Institute of Neurological Disorders and Stroke report ''Advancing the Study of Stroke in Women,'' better education is desperately needed to improve recognition of stroke warning signs in women (Bushnell et al., 2006). Educational programs should be designed to ensure that women at risk for stroke understand both traditional and nontraditional stroke warning signs. Neuroscience nurses can play an important role as they have historically been involved in primary and secondary stroke prevention programs for both men and women. Over time, they have taken on even greater roles in short- and long-term stroke management and stroke care coordination (Summers et al., 2009). Many are currently leaders of public educational campaigns about stroke prevention, the recognition of early warning signs of stroke, and the importance of calling 9-1-1 as a first action, all of which are critical to the successful delivery of acute therapies (Summers et al., 2009). Others are called to educate other health professionals about prehospital and hospital management issues and best practices for stroke care (Summers et al., 2009). Maintenance of these roles will be important going forward. For example, neuroscience nurses will be needed to support patients with stroke risk factor management strategies to decrease their likelihood of stroke and stroke-related impairments (American Association of

Neuroscience Nurses, 2008). They will also be needed to lead the development of targeted educational programs to improve awareness of stroke warning signs and urgent treatment-seeking behaviors in high-risk groups.

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