National Women’s Knowledge of Stroke Warning Signs, Overall and by Race/Ethnic Group

Heidi Mochari-Greenberger, PhD; Amytis Towfighi, MD; Lori Mosca, MD, PhD

Background and Purpose—Recognition of stroke warning signs may reduce treatment delays. The purpose of this study was to evaluate contemporary knowledge of stroke warning signs and knowledge to call 9-1-1, among a nationally representative sample of women, overall and by race/ethnic group.

Methods—A study of cardiovascular disease awareness was conducted by the American Heart Association in 2012 among English-speaking US women ≥25 years identified through random-digit dialing (n=1205; 54% white, 17% black, 17% Hispanic, and 12% other). Knowledge of stroke warning signs, and what to do first if experiencing stroke warning signs, was assessed by standardized open-ended questions.

Results—Half of women surveyed (51%) identified sudden weakness/numbness of face/limb on one side as a stroke warning sign; this did not vary by race/ethnic group. Loss of/trouble talking/understanding speech was identified by 44% of women, more frequently among white versus Hispanic women (48% versus 36%; P<0.05). Fewer than 1 in 4 women identified sudden severe headache (23%), unexplained dizziness (20%), or sudden dimness/loss of vision (18%) as warning signs, and 1 in 5 (20%) did not know 1 stroke warning sign. The majority of women said that they would call 9-1-1 first if they thought they were experiencing signs of a stroke (84%), and this did not vary among black (86%), Hispanic (79%), or white/other (85%) women.

Conclusions—Knowledge of stroke warning signs was low among a nationally representative sample of women, especially among Hispanics. In contrast, knowledge to call 9-1-1 when experiencing signs of stroke was high. (Stroke. 2014;45:1180-1182.)

Key Words: healthcare disparities ■ stroke ■ women

Stroke is the third leading cause of death among women in the United States.1 The aftermath of stroke is significant among women survivors. It is estimated that 31% of will need help caring for themselves, 16% will require institutional care, and 7% will have an impaired ability to work.2 Each year ≈55 000 more women than men have a stroke; this has been attributed to the average life expectancy being greater for women versus men coupled with the highest stroke rates occurring in the oldest age groups.1 Recent nationally representative data also show a rise in stroke prevalence among middle-aged women not seen among their male counterparts, underscoring the need for better understanding of stroke in women of all ages.3

Women from racial/ethnic minority backgrounds experience a disproportionate stroke burden; black women have an incident stroke risk almost twice as high as white women.1 Stroke risk factor prevalence may be higher among Hispanic women.1,4,5 Historically, knowledge of stroke warning signs has been lower among racial/ethnic minorities compared with whites.5,6,8 The ability to recognize stroke warning signs at their onset is associated with more rapid access to emergency care which may result in decreased stroke-related morbidity and mortality.9-11 Addressing gaps in women’s knowledge related to stroke warning signs may be a key initial step toward improving outcomes and reducing disparities. Current metrics are required to assess levels of knowledge and educational needs of women in the United States.

In 2012, the American Heart Association commissioned a national survey to determine women’s cardiovascular disease awareness, including knowledge related to stroke warning signs.12 The purpose of this study was to evaluate contemporary knowledge of stroke warning signs and intent to call 9-1-1 first if warning signs occur, overall and by race/ethnic group, among this nationally representative sample of women.

Methods

We conducted a cross-sectional survey of women in the United States aged ≥25 years. The study sample comprised the 1205 telephone respondents who participated in the 2012 American Heart Association National Women’s Tracking Survey (methods previously published).12 Briefly, potential respondents were contacted via telephone using random-digit dial technology. Surveys were administered (August 28 to October 5, 2012) by, and data were analyzed by, representatives from Harris Interactive, New York, NY. The survey was in English and took ≈10 minutes. Participants were asked standardized categorical questions to collect demographic data; they self-categorized their race/ethnic group as white, black, Hispanic, or other (Asian/Pacific Islander, Native American/Alaskan Native, mixed race/ethnicity,
Survey questions related to stroke warning signs, and what to do first if stroke warning signs occur, were unaided (open-ended, survey published online)^12; responses were collected, and then categorized. Data were weighted using the US Census Bureau March 2011 Current Population Survey to reflect the composition of the US population of English-speaking women aged ≥25 years based on age, education, income, race/ethnicity, and region. Differences of proportion by race/ethnic group were analyzed using $\chi^2$ statistics. Statistical significance was set at $P<0.05$.

**Results**

The demographic and medical history characteristics of respondents have been published previously. Hispanic respondents were more likely than whites to be in the youngest age group (25–34 years; 22% versus 11%). Blacks were more likely than whites to have a history of diabetes mellitus (19% versus 12%). Both black and Hispanic respondents were more likely than whites to have a household annual income <$35,000 (39% and 34% versus 22%).

The Figure illustrates women’s knowledge of stroke warning signs. Approximately half of women surveyed (51%) identified sudden weakness/numbness of face or limb on one side as a stroke warning sign, and this did not vary by race/ethnic group (Table 1). Loss of/trouble talking or trouble understanding speech was identified by 44% of respondents and more frequently among white versus Hispanic women.

Fewer than 1 in 4 women identified sudden severe headache (23%), unexplained dizziness (20%), or sudden dimness, loss of vision, often in 1 eye (18%) as warning signs. One in 5 women did not know 1 stroke warning sign; this did not vary by race/ethnic group.

Women were asked “If you thought you were experiencing signs of a stroke or “brain attack,” what is the first thing you would do?” The majority of women (84%) said that they would call 9-1-1 first and this did not differ among white, black, or Hispanic women (Table 2).

**Discussion**

In this nationally representative sample of women, knowledge of stroke warning signs was low, especially among Hispanics. In contrast, knowledge to call 9-1-1 was high and did not differ by race/ethnic group. These data suggest that women are aware of what to do when experiencing signs of stroke, but at least half would not be able to recognize the signs should they occur.

Although we cannot exclude the possibility that the observed race/ethnic differences were because of chance or because of differences in respondent characteristics, the results from this study are consistent with historic data that have documented low knowledge of stroke warning signs among women in the United States, especially in Hispanic versus white women.6,8

![Figure. 2012 national women’s knowledge of stroke warning signs.](image)

**Table 1. National Women’s Knowledge of Stroke Warning Signs by Race/Ethnic Group**

<table>
<thead>
<tr>
<th>Response (Unaided)</th>
<th>White [a]</th>
<th>Black [b]</th>
<th>Hispanic [c]</th>
<th>Other [d]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudden weakness/numbness of face or limb on one side</td>
<td>52</td>
<td>55</td>
<td>46</td>
<td>47</td>
</tr>
<tr>
<td>Loss of/trouble talking or trouble understanding speech</td>
<td>48^4</td>
<td>44^4</td>
<td>36</td>
<td>27</td>
</tr>
<tr>
<td>Sudden severe headache</td>
<td>24</td>
<td>24</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Unexplained dizziness</td>
<td>19</td>
<td>21</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>Sudden dimness, loss of vision, often in 1 eye</td>
<td>19</td>
<td>14</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>Do not know</td>
<td>18</td>
<td>19</td>
<td>25</td>
<td>24</td>
</tr>
</tbody>
</table>

All values are weighted percentages. Superscript letter denotes significant differences in columns for race/ethnic groups at $P<0.05$. 
Interpretation of race/ethnic differences in knowledge may be limited by the inclusion of English-speaking participants only. The data highlight a knowledge gap specifically related to stroke warning signs. Effective clinical counseling strategies and public awareness campaigns, such as the American Heart Association/American Stroke Association Spot a Stroke FAST (Face Drooping, Arm Weakness, Speech Difficulty, Time to call 911) campaign, are needed to reach diverse populations of women.

Sources of Funding
This study was supported, in part, by the National Institutes of Health (K24HL076346; PI Dr Mosca).

Disclosures
None.

References

Table 2. Women’s First Response to Stroke Warning Signs Overall and by Race/Ethnic Group

<table>
<thead>
<tr>
<th>Response (Unaided)</th>
<th>Overall</th>
<th>White [a]</th>
<th>Black [b]</th>
<th>Hispanic [c]</th>
<th>Other [d]</th>
</tr>
</thead>
<tbody>
<tr>
<td>If you thought you were experiencing signs of a stroke or brain attack, what is the first thing you would do?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Call 9-1-1</td>
<td>84</td>
<td>85</td>
<td>86</td>
<td>79</td>
<td>85</td>
</tr>
<tr>
<td>Call your spouse or family</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Go to the hospital</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Call your doctor</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Do not know</td>
<td>3</td>
<td>2</td>
<td>5a</td>
<td>5</td>
<td>7a</td>
</tr>
</tbody>
</table>

All values are weighted percentages. Superscript letter denotes significant differences in columns for race/ethnic groups at P<0.05.
National Women's Knowledge of Stroke Warning Signs, Overall and by Race/Ethnic Group
Heidi Mochari-Greenberger, Amytis Towfighi and Lori Mosca

*Stroke.* 2014;45:1180-1182; originally published online March 19, 2014; doi: 10.1161/STROKEAHA.113.004242

*Stroke* is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2014 American Heart Association, Inc. All rights reserved.
Print ISSN: 0039-2499. Online ISSN: 1524-4628

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://stroke.ahajournals.org/content/45/4/1180

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in *Stroke* can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to *Stroke* is online at:
http://stroke.ahajournals.org//subscriptions/