Stroke Literacy, Behavior, and Proficiency in a South Florida Population

John A. Morren, MD, MBBS (Hons), and Efrain D. Salgado, MD

Background: Our goal was to assess stroke literacy, behavior, and proficiency in our South Florida service population. *Methods:* Data were obtained from the 2006 to 2010 Cleveland Clinic Florida annual "stroke prevention screening" questionnaires. "Stroke risk factor awareness" was attributed to participants correctly identifying at least 5 out of the 7 stroke risk factors presented. "Stroke symptom awareness" was assigned if one correctly selected all 5 listed stroke symptoms and not any of the 3 inappropriate responses. Participants had "stroke literacy" if they: (1) demonstrated stroke risk factor awareness; (2) demonstrated stroke symptom awareness; and (3) they correctly identified the brain as where a stroke occurs. To assess appropriate "stroke behavior," respondents had to choose "call 911 immediately" if one were to experience stroke symptoms. "Stroke proficiency" was attributed to individuals showing both stroke literacy and appropriate stroke behavior. *Results:* There were a total of 298 participants. Sixty-seven percent of participants correctly identified the brain as the organ where stroke occurs. Almost three-fourths (74.2%) demonstrated stroke risk factor awareness, 28.2% had stroke symptom awareness, 17.8% had stroke literacy, 87.9% declared appropriate stroke behavior, and 16.1% had stroke proficiency. *Conclusions:* Stroke behavior and stroke proficiency are useful novel concepts in stroke epidemiology. Although our South Florida community is relatively well-educated and affluent, there are tangible gaps in knowledge, attitudes, and behavior as it pertains to stroke, similar to that seen in less advantaged populations. We recommend intensified usage of the media with information provided by qualified health professionals in a variety of formats and languages appropriate to the ethnic and cultural diversities that define this population. **Key Words:** Cerebrovascular disease—education—educational campaigns—epidemiology—risk factors—stroke delivery—tissue plasminogen activator.

Stroke afflicts about 795,000 people in the United States per year. It is the third leading cause of death and the foremost cause of long-term disability in the nation.[1] When intravenous tissue plasminogen activator (IV tPA) was approved by the US Food and Drug Administration (FDA) in 1996, acute ischemic stroke treatment was better perceived as a medical emergency because a time-sensitive intervention that improved outcomes finally became available. IV tPA, used per the National Institute of Neurological Disorders and Stroke (NINDS) study protocol, increases the likelihood of minimal or no disability at 3 months by about 30%.[2]

The impact of this intervention is heavily contingent on the public's ability to correctly and promptly identify stroke features and then react appropriately by first calling emergency services (911). In this way, patients would have a higher chance of qualifying for IV tPA by presenting within 3 hours of symptom onset—the original time

From the Department of Neurology, Cleveland Clinic Florida, Weston, Florida.

Received November 13, 2011; revision received December 17, 2011; accepted December 17, 2011.

The participation of our statistician, Evelio Velis, MD, PhD, was made possible by research budgetary allocations from the Department of Neurology, Cleveland Clinic Florida.

Address correspondence to John A. Morren, MD, MBBS (Hons), Department of Neurology, Cleveland Clinic Florida, 2950 Cleveland Clinic Blvd, Weston, FL 33331. E-mail: morrenj@ccf.org.

1052-3057/$ - see front matter

doi:10.1016/j.jstrokecerebrovasdis.2011.12.007

window purported by the NINDS study data (which has since been extended to 4.5 hours).[3]

It was hoped that the prevalence of stroke awareness would show exponential growth concordant with improved clinical outcomes seen with IV tPA. However, available US data have shown that only about 2% to 5% of acute ischemic stroke patients receive IV tPA, mostly because of late arrival at hospital.[4,5] Studies also indicated that patients had briefer delays if they believed that they were having a stroke or at least perceived the symptoms to be serious.[6,7]

These issues have not escaped the attention of federal authorities. In fact, the US Department of Health and Human Services has declared in their objectives of Developing Healthy People 2020 to "increase the proportion of adults who are aware of the early warning symptoms and signs of a stroke and the importance of accessing rapid emergency care by calling 911."[8]

The knowledge of stroke symptoms and risk factors was ascribed the term "stroke literacy" by Willey et al[9] in 2009. The limited data available to date have shown a variably poor level of stroke literacy in various communities.[9,10] The Centers for Disease Control and Prevention (CDC) analyzed data from the 2005 Behavioral Risk Factor Surveillance System (BRFSS) survey and revealed that only 16.4% of respondents were able to correctly identify all 5 stroke symptoms presented, recognize an incorrect symptom, and distinguish the need to call 911. Moreover, significant disparities were observed by race/ethnicity, sex, and education level.

For more than 7 decades, stroke ranked fourth among the leading causes of death in Floridians. In 2007, stroke fell to the fifth leading cause of mortality in the state.[11] As health care providers in the isolated state below America's "stroke belt," more information on stroke awareness needs to be obtained before we can plan interventions aimed at relieving the burden of stroke seen locally.

The primary objective of our study was to assess stroke literacy in the catchment area of our community hospital, a primary stroke center in Weston, Florida. Mainly because it is a tertiary care hospital in a border zone location, our facility receives patients seeking emergency services not only from native Broward county but also from adjacent Miami-Dade and Palm Beach counties. According to the 2010 US Census Bureau, the populations of these counties were 1,748,066, 2,496,435, and 1,320,134, respectively.[12] We had also set out to assess what we termed "stroke behavior" as it pertains to calling emergency services (911) immediately once stroke features are recognized. An extension of these objectives was the evaluation of what we coined "stroke proficiency"—seen in individuals who had both stroke literacy and appropriate stroke behavior.

Methods

The data were obtained from interviewee-administered questionnaires used at the annual "stroke prevention screening" event held between 2006 and 2010 at the Cleveland Clinic Florida, Weston campus. The questionnaire was mostly de novo; however, some questions were modified from those used in the BRFSS surveys. Attendees participated on a voluntary basis without compelling need for written consent. Our hospital's director of research did not identify issues requiring formal institutional review board evaluation. Invitations to the event were made to the general public via advertisements in local television and regional newsprint. All attendees participated in the questionnaire, which was integrated into the screening activities offered. The study investigators were on site to provide any clarification of the questions needed, and this was done in a standardized manner to prevent external bias influencing responses.

Inclusion criteria included all attendees who were willing to participate in the Cleveland Clinic Florida annual "Stroke Prevention Screening" events between 2006 and 2010. Exclusion criteria included those who previously participated in the annual screening event within the sampling period (2006-2010) and participants who were not from the South Florida area and were unlikely to access health care locally.

The questionnaires obtained demographic data, including age, sex, ethnicity, address, and highest level of education. Multiple response questions were also asked pertaining to the knowledge of specific stroke signs, symptoms, and risk factors.

For the purposes of the study, "stroke risk factor awareness" was attributed to participants who correctly identified all 3 risk factors (previous stroke or transient ischemic attack [TIA], smoking, and being overweight/obese) presented in the 2006 to 2009 questionnaires or at least 5 out of the 7 risk factors (additionally: physical inactivity, excessive alcohol use, diabetes, and hypercholesterolemia) presented in the 2010 questionnaire. In addition, the source of preparticipation stroke information was documented and respondents indicated whether or not they wanted more information about stroke.

Participants were asked to select where in the body a stroke originates. In addition, they were given a list of common symptoms from which they had to choose those consistent with a stroke or TIA. Correct responses referred to sudden hemisensory loss/hemiparesis, visual loss, aphasia, unexplained severe headache, and gait dysfunction/imbalance/incoordination. Incorrect responses presented were chest pain, shortness of breath, and fatigue or exhaustion. Participants were considered as having "stroke symptom awareness" only if they correctly selected all 5 listed symptoms and not any of the 3 inappropriate responses.

For the purpose of our study, participants were considered as having stroke literacy if they had 3 elements: (1) stroke risk factor awareness; (2) stroke symptom awareness; and (3) if they correctly identified the brain as where a stroke occurs.