Enhancing the Effectiveness of Community Stroke Risk Screening: A Randomized Controlled Trial

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Stroke risk factors are routinely assessed in community screening programs; however, the rate of patient follow-up for health care once risk factors are identified is known to be low. This study was conducted to test the effectiveness of a brief behavioral telephonic intervention in an ongoing community stroke prevention screening program on health care seeking for stroke risk. A total of 227 participants with 2 or more stroke risk factors were randomly allocated to either an attention control arm or a behavioral intervention arm. The control group received standard information on risk and advice, whereas the intervention group received a brief Health Belief Model telephonic intervention designed to motivate care-seeking. The effect of treatment on the participants who completed a health care visit for stroke risk concerns was assessed using logistic regression. Cox survival analysis was used to compare time to physician visit between the 2 groups. Participants in the intervention arm were 1.85 times more likely to visit a primary care physician than controls. At 3 months, 69.2% of subjects in the intervention arm and 52.9% of those in the controls arm reported a new primary care visit after screening ($P = .02$), with 56.0% in the intervention arm and 38.4% in the control arm reporting a primary care visit specifically to discuss the stroke screening results ($P < .01$). Our data indicate that the brief, low-cost, motivational intervention effectively promoted adherence to screening advice and merits further testing. **Key Words:** Risk factors—follow-up care—health prevention programs—stroke belt—patient education—health behaviors.

Stroke is a leading cause of death and disability in the United States, affecting more than 700,000 Americans annually.[1-3] The population variation in stroke risk is considerable, as evidenced geographically by a prominent "stroke belt" in the southeastern United States[4] and by a higher incidence in lower-income and otherwise disadvantaged groups.[5-7] Prevention of stroke and related cardiovascular disease (CVD) requires a multifaceted public health approach, including community programs that promote risk factor awareness and surveillance, access to timely and effective treatment to control or decrease risk, and adherence to treatment plans.[8]

Despite the key role of stroke risk factor detection in addressing population risk, little is known about the effectiveness of systematic community screenings in reducing stroke or stroke risk. A primary concern is the rate at which individuals may follow up their results by seeking advice or treatment from a health care professional to guide further care. Many individuals screened at-large in communities may have either poor or no regular access to care, have inadequate motivation, or face barriers to accessing assistance with implementing or maintaining

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Received August 4, 2009; accepted February 5, 2010.

Dr. Anderson received support from an unrestricted educational grant from A.T. Williams Oil Company (Winston-Salem, North Carolina).

All other authors have no conflict of interest.

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1052-3057/$ - see front matter

doi:10.1016/j.jstrokecerebrovasdis.2010.02.002

prescribed lifestyle changes needed to reduce risk. Community stroke and CVD risk screening programs typically do not provide support for subsequent steps, such as helping an at-risk individual access medical care, but instead deliver standard patient education, relying on the person's own predisposition to seek assistance for risk factors.

Not surprisingly, follow-up from stroke risk screenings is known to be low.[9,10] Theories on health behavior[11-15] and evidence from practice-based interventions[16] suggest that patient awareness of risk alone is insufficient to yield a behavioral response. Cognitive support, such as clarifying the prevention message, promoting self-efficacy and motivation to take action, and maintenance, are more likely to succeed.[11-17] A practical question in this regard is whether or to what extent behavioral interventions simplified to meet the constraints of volunteer community screening programs have merit in motivating participants to seek assistance for risk factor control. Building on an earlier report by DeLemos et al[9] that reported generally low follow-up rates from community stroke risk screening, we tested a brief behavioral telephonic intervention in a region of the stroke belt in North Carolina designed to encourage care-seeking after risk factor identification.

Methods

This was a randomized study of participants of an ongoing community stroke risk screening program conducted by the North Carolina Stroke Association (NCSA) from 2005 through May 2006. The NCSA protocol disseminated to host communities a brief self-reported risk factor screening tool including methods and training for collecting data on height, weight, body mass, blood pressure, lipids (total cholesterol), nonfasting glucose, suspected neck bruits, and suspected heart rhythm abnormalities. NCSA screening communities were selected based on evidence of excessive incident stroke rates and the presence of a community advocate organization to host the screening program. The study protocol was approved by the Wake Forest University Human Subjects Board, and informed consent and a HIPAA waiver were obtained from all participants.

Those eligible for this study were individuals with 2 or more of stroke risk factors at screening (total cholesterol >200 mg/dL, nonfasting blood glucose >125 mg/dL, hypertension [blood pressure >145/90 mm Hg], transient ischemic attack (TIA)-like symptoms [eg, self-reported sudden onset of unilateral numbness or paralysis lasting 24 hours]), or a current smoker, who reported having some form of health insurance and making a primary health care visit within the previous year. After completing informed consent, participants were randomized to either the attention control arm or the behavioral telephonic intervention arm. Those in both groups received 1-month and 3-month telephone calls to assess risk perception, intention to seek assistance for stroke risk, any health care services accessed since stroke screening, and whether services were accessed for stroke risk. Those in the intervention arm also received a theory-based motivational intervention during the 1-month follow-up call.

Behavioral Intervention

The theoretical foundation for the health behavior intervention was drawn from the Health Belief Model (HBM),[15,17] which was chosen for its focus on preventive health actions.[17] As shown in Figure 1, the likelihood of a patient visit to a physician (box G) is hypothesized to be influenced by at least 4 factors: (1) *health motivation*, a generalized degree of concern about and interest in health; (2) *susceptibility,* beliefs regarding the individual's vulnerability to contracting a given illness or condition, such as stroke (box A); (3) *severity,* including perceptions regarding the potential threat posed by stroke (box A); and (4) *benefits and costs*, the cost-benefit ratio of perceived barriers versus perceived benefits of action—in this context, the benefit of seeking assistance from a physician to modify stroke risk (box E).[18] Later, Rosenstock et al[19] recommended the inclusion of self-efficacy (box F), the degree to which an individual feels that he or she can successfully follow advice or a prescribed action to lower risk. Participants randomized to the HBM intervention underwent an assessment of beliefs regarding stroke risk factors and susceptibility (eg, importance and benefit of reducing stroke risk), and perceived efficacy (eg, barriers) in seeking assistance with stroke risk factors. After reviewing the participant's beliefs and perceived barriers regarding stroke risk and seeking of health care services, the study counselor provided individualized education on susceptibility to stroke risk and attempted to reinforce the participant's beliefs regarding the benefit of seeking a physician's advice and assistance on decreasing stroke risk. The study counselor sought to assist the participant with problem solving to reduce barriers to accessing care, such as suggesting solutions to transportation problems, finding alternate locations for primary care in the participant's community, and reinforcing that stroke risk is a valid reason for seeking primary care.

Statistical Analyses

The effect of treatment assignment on the primary study outcome of the proportion with self-reported health care visits and stroke risk factor modification was assessed by logistic regression. Cox survival analysis was used to compare the time to reported physician visits in the 2 groups. The proportional hazards assumption was checked by examining statistical interactions with follow-up for exposure and covariables in a model; nonsignificant hazard ratios were found, implying no violation of the proportional hazards assumption.