

# Self-care self-efficacy, religious participation and depression as predictors of poststroke self-care among underserved ethnic minorities

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## Abstract

Underserved ethnic minorities have multiple chronic disease risk factors, including tobacco, alcohol and substance use, which contribute to increased incidence of stroke. Self-efficacy (self-care self-efficacy), religious participation and depression may directly and indirectly influence engagement in post stroke self-care behaviors. The primary aim of the present study was to investigate the effects of self-care self-efficacy, religious participation and depression, on tobacco, alcohol and substance use in a sample of largely ethnic minority, underserved stroke survivors (n=52). Participants previously recruited for a culturally tailored secondary stroke prevention self-care intervention were included. The treatment group received three stroke self-care sessions. The usual care group completed assessments only. Both groups were included in these analyses. Main outcome measures included tobacco, alcohol and substance use. Self-care self-efficacy, religious participation and depression were also assessed. Logistic regression analyses, using self-efficacy, religious practice and depression as the referents, were used to predict binary outcomes of tobacco, alcohol and substance use at 4-weeks post-stroke. Higher depression and self-care self-efficacy were associated with reduced odds of smoking and substance use. Greater participation in religious activities was associated with lower odds of alcohol use. We can conclude that incorporating depression treatment and techniques to increase self-care self-efficacy,

and encouraging religious participation may help to improve stroke self-care behaviors for underserved and low socioeconomic status individuals. Results are discussed in the context of stroke self-management.

## Introduction

Stroke is the second leading cause of death in the United States,<sup>1,2</sup> and the leading cause of serious disability.<sup>3</sup> Annually approximately 795,000 Americans have an initial stroke, and one in four experiences a recurrent stroke within five years.<sup>4,5</sup> Recurrent stroke is associated with increased risk of morbidity and mortality and greater healthcare costs than first stroke.<sup>6-8</sup> Socioeconomic and racial disparities are associated with increased risk for stroke, with underserved individuals being more likely to experience poor functional outcomes and death from recurrence.<sup>9-13</sup>

Stroke-prevention efforts use evidence-based methods to modify health behaviors that reduce risk of stroke, including healthy diet; moderate physical activity; medication adherence; and decreased tobacco, alcohol and substance use. While tobacco, alcohol and substance use are less widely studied, research suggests that social disadvantage contributes to and reinforces these health risk behaviors.<sup>14-16</sup> Tobacco use is the greatest preventable cause of stroke and death.<sup>17,18</sup> Underserved individuals are more likely to smoke and die from tobacco-related morbidity than others, yet they are less likely to receive assistance with smoking cessation.<sup>19,20</sup> Regular heavy alcohol consumption also increases risk for ischemic stroke;<sup>21</sup> and substance use and abuse, especially cocaine use, causes ischemic stroke and intracranial hemorrhage.<sup>22,23</sup> Underserved individuals report alcohol dependence and negative health consequences associated with drinking,<sup>15,24</sup> and high rates of cocaine and heroin use.<sup>25,26</sup> Despite high engagement in negative stroke-related health behaviors and higher-than-average rates of initial and recurrent stroke, underserved stroke survivors are less likely than others to receive secondary stroke-prevention services.<sup>27</sup> Effective programs incorporating risk reduction for alcohol, tobacco and substance use that target underserved individuals are needed. They should include psychosocial and cultural factors, such as self-care self-efficacy, religion, and depression, which influence engagement in secondary stroke-prevention programs.

Self-care self-efficacy, religious participation and depression influence engagement in health behaviors.<sup>28-30</sup> Self-care self-efficacy has been referred to as confidence in one's abilities to perform self-management tasks required to effectively manage chronic disease. Building self-care self-efficacy lays the

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foundation for improvements in chronic disease self-care. Higher levels of self-efficacy are associated with greater mobility, engagement in activities of daily living and quality of life than lower levels among stroke survivors.<sup>31</sup>

Religious participation may also promote health behavior engagement. Church-based health-promotion programs have increased adoption of self-care behaviors among chronically ill individuals, including increased fruit and vegetable consumption, physical activity and smoking cessation.<sup>28</sup> Further, praying improves coping skills and quality of life in chronically ill populations.<sup>32-34</sup> Giaquinto and colleagues found that strong religious beliefs insulated stroke sur-

vivors from emotional distress.

Conversely, symptoms of depression are associated with poor self-care practices and chronic disease outcomes.<sup>35,36</sup> Comorbid depression among stroke survivors is well-documented and the most commonly occurring psychiatric condition poststroke.<sup>37</sup> Post stroke depression interferes with stroke rehabilitation, putting patients at risk for chronic depression,<sup>38</sup> associated with increased disability, greater cognitive impairment and poorer rehabilitation outcomes than in non-depressed stroke survivors.<sup>38-40</sup> The effects of poststroke depression have not been widely studied among underserved and/or ethnic minority stroke survivors. Further, little attention has been devoted to examining how self-care self-efficacy, religious participation and depression impact tobacco, alcohol and substance-use stroke risk factors in this population.

This study investigated whether self-care self-efficacy, religious participation and depression influence tobacco, alcohol and substance use among underserved individuals following initial stroke. On the basis of outcomes from other studies,<sup>31,35,41</sup> we hypothesized that self-care self-efficacy, religious participation and depression would predict alcohol, tobacco and substance use. We expected patients with high levels of self-care self-efficacy or religious participation to be less likely to consume tobacco, alcohol or illicit substances than those with low levels. Conversely, we expected that a high level of depression would be associated with increased consumption of tobacco, alcohol and substances.

## Materials and Methods

This study used data from a randomized controlled pilot study that examined effects of a secondary stroke-prevention self-care intervention among underserved, mostly ethnic minority stroke survivors.<sup>42</sup> Appropriate Institutional Review Board approval was obtained. In the original study, respondents were assigned to the treatment, Secondary Stroke Prevention (STOP), or Usual Care (UC) group. The STOP group received three stroke self-care sessions, goal setting coaching and a program booklet. The UC group received only the baseline and four-week follow-up assessments. Both groups were used for these analyses.

### Sample

All participants (n=52) from the original study were included in this study. The sample consisted of underserved and mostly ethnic minority participants receiving care in a stroke intensive care unit of a large county hospital. Participants met the following criteria: i) age over 18 years; ii) a confirmed diagnosis of stroke, evidenced by a primary International

Classification of Diseases, Ninth Edition code for stroke in the medical record or demonstrated neurological impairment associated with transient ischemic attack or ischemic attack; iii) ability to provide informed consent; iv) preparation for discharge home; v) telephone access for follow-up sessions and/or assessment; and vi) absence of serious coexisting psychiatric or physical illnesses precluding participation in the intervention, as judged by the treating physician.

### Procedures

Eligible participants were approached in the hospital at bedside by a research assistant to discuss study objectives and complete a consent form. Participants who gave consent and met criteria were administered a Mini-Mental Status Exam to determine cognitive ability. Those scoring  $\leq 24$  were excluded,<sup>43</sup> as they were considered cognitively unable to participate. Participants meeting all inclusion criteria were randomly assigned, using block randomization, to either the treatment (STOP) or UC group before receiving baseline measures. Randomization was concealed until exposure to the intervention and was performed by an independent statistician. The researcher was blind to the assigned study condition during the intervention period. A research assistant conducted assessments. Participants were not compensated.

### Description of the intervention

Participants in the intervention group received three 30- to 45-minute cognitive behavioral therapy-focused self-care sessions, the first after the baseline assessment in the acute care setting, and the remaining two bi-weekly via telephone over four weeks postdischarge. Participants received a detailed workbook containing information about signs and symptoms of stroke, primary and secondary stroke risk factors, behavioral strategies for reducing recurrence of stroke and resources for assistance with stroke-prevention adherence behaviors, along with dietary and exercise tracking forms. Treatment was provided by a health educator with a bachelor's degree in health education and several years' experience conducting chronic illness self-care education sessions. Treatment components included self-monitoring, problem solving, goal setting, cognitive restructuring, social support, stimulus control, stress management and relapse prevention. A brief overview of each topic was provided.

### Measures

Information concerning participants' gender, age, race, income, education and comorbid health conditions was gathered, using a researcher-developed questionnaire and the medical records.

### Dependent variables

Items from the US Behavioral Surveillance Survey were used to assess tobacco,<sup>44</sup> alcohol and substance use. The Behavioral Risk Factor Surveillance System was developed by the CDC to track health conditions and risk behaviors. Tobacco, alcohol and substance use were measured separately, using single items to assess whether participants had smoked any cigarettes, consumed any alcoholic beverages or taken any illicit substances during the past seven days. Binary response options were coded zero (*no*) and one (*yes*). The subscales have good reliability and criterion validity,<sup>45,46</sup> and have been cross-culturally tested and validated among racial/ethnic minorities and chronically ill participants.<sup>47,48</sup>

### Independent variables

#### Self-care self-efficacy

Self-care self-efficacy was assessed using the Chronic Disease Self-Efficacy Scale.<sup>49</sup> It contains 10 subscales measuring participants' confidence in their abilities to perform specific self-care tasks. The six-item self-care self-efficacy subscale was used in this study. It measures participants' confidence in their abilities to manage chronic-disease-related symptoms (*e.g., How confident are you that you can do the different tasks needed to manage your health condition to reduce your need to see a doctor?*). Response options range from one (*not at all confident*) to 10 (*completely confident*) with higher scores indicating greater self-efficacy. Cronbach's alpha for the current study was 0.80.

#### Religious participation

A modified version of the Private Religious Practice subscale of the Brief Multidimensional Measures of Religiousness/Spirituality was used to assess religious participation.<sup>50</sup> We used the subscale to assess frequency of participants' privately practiced religious behaviors (*e.g., Within your religious or spiritual tradition, how often do you meditate?; How often do you watch or listen to religious programs on TV or radio?*). Response options range from one (*never*) to eight (*more than once a day*). Cronbach's alpha was 0.75 among our participants and has been found psychometrically adequate in study participants similar to the current sample population.<sup>51</sup>

#### Depression

Depression was assessed using the Brief Symptom Inventory depression subscale.<sup>52</sup> Participants responded to this five-item subscale by indicating how much they were distressed by depressive symptoms (*e.g., feeling blue*) during the past seven days, including today. Responses ranged from zero (*not at all*) to four (*extremely*). The depression sub-

scale has good psychometric properties; Cronbach's alpha for the current study was 0.79. It has also demonstrated construct validity among participants with medical conditions and been used among ethnic minorities in a medical setting.<sup>53,54</sup>

### Data analysis

Frequency distributions were calculated to describe participants' sociodemographic characteristics and score ranges for criterion and outcome variables. Three separate logistic regression analyses, using self-care self-efficacy, religious participation and depression scores at baseline, were used to predict binary outcomes of tobacco, alcohol and substance use at four weeks. Model 1 examined tobacco outcomes, and models 2 and 3 examined alcohol and substance-use outcomes, respectively. Treatment condition and baseline scores for tobacco, alcohol and substance use were entered as covariates. Race/ethnicity, age, gender and education were not used because there were no significant between-group differences on these variables. Self-care self-efficacy, religious participation and depression were used as predictor variables. Statistical tests used adjusted odds ratios with 95% profile-likelihood confidence.

Variance inflation factor and tolerance statistics were examined in conjunction with logistic regression analyses to examine issues of multicollinearity. Multicollinearity was not an issue for any domains (all variance inflation factors <10 and all tolerances >0.10). There were no outliers in the data. All analyses were conducted using SPSS Version 18.

## Results

Table 1 summarizes participants' demographic characteristics. The sample included 52 underserved, first-episode stroke survivors. Most were men (n=32; 60%). Fifty-seven percent were African American (n=30), with a mean age of 54±10.64 (range 28-84). More than half earned less than \$10,000 a year (n=29; 55.3%).

### Descriptive and Pearson product analysis

Descriptive statistics revealed that, at baseline, 23 participants (43%) used tobacco products, 25 (46%) drank alcohol, and 39 (72%) used illicit substances. Overall, participants endorsed high levels of self-care self-efficacy

(8.3±1.1; range 1-10). Participants also frequently engaged in religious participation (6.3±1.2; range 1-8), such as watching or listening to religious programs on TV or radio. Participants endorsed a high number of depressive symptoms (3.5±0.75; range 0-4), including feeling lonely.

Table 2 presents correlations among study measures. No significant positive associations between demographic, independent and outcome variables were found. Self-care self-efficacy was significantly negatively correlated with all health-behavior variables (tobacco, P<0.012; alcohol, P<0.026; substance use, P<0.021). Tobacco use was significantly negatively correlated with alcohol (P<0.026) and substance use (P<0.013).

### Logistic regression analyses

Logistic regression analyses examined predictive effects of self-care self-efficacy, religious participation and depression on tobacco, alcohol and substance use at four weeks poststroke. Three separate logistic regressions were performed, with alcohol, tobacco and substance use as dependent variables and self-care self-efficacy, religious participation and depression simultaneously as independent variables. Table 3 presents results of the analyses.

**Table 1. Sample characteristics at baseline.**

| Characteristics                   | (N=52)        |
|-----------------------------------|---------------|
| Age mean (SD)                     | 53.53 (10.65) |
| Gender (% male)                   | 60            |
| Race                              |               |
| African American                  | 57.4%         |
| Hispanic                          | 17.0%         |
| White                             | 15.1%         |
| Other                             | 10.5%         |
| Education                         |               |
| <High school                      | 28.3%         |
| High school                       | 28.2%         |
| >High school                      | 43.5%         |
| Income                            |               |
| <10,000                           | 55.3%         |
| 10,000-20,000                     | 21.4%         |
| >20,000                           | 23.3%         |
| Religion                          |               |
| Christian                         | 88.7%         |
| Jehovah's witness                 | 1.9%          |
| Seventh-day adventist             | 1.9%          |
| Other                             | 5.7%          |
| Health behavior variables (% yes) |               |
| Tobacco use                       | 42.6          |
| Alcohol use                       | 46.3          |
| Substance use                     | 72.2          |
| Predictor variables mean (SD)     |               |
| Self-care self-efficacy           | 8.0 (5.28)    |
| Religious participation           | 6.3 (4.2)     |
| Depression                        | 4.5(5.5)      |

SD, standard deviation.

**Table 2. Correlations between demographic, predictor and health behavior variables.**

|                           | 1     | 2     | 3     | 4      | 5     | 6     | 7       | 8    | 9 |
|---------------------------|-------|-------|-------|--------|-------|-------|---------|------|---|
| 1 Age                     | 1     |       |       |        |       |       |         |      |   |
| 2 Gender                  | 0.23  | 1     |       |        |       |       |         |      |   |
| 3 Education               | 0.07  | 0.01  | 1     |        |       |       |         |      |   |
| 4 SC self-efficacy        | -0.10 | 0.15  | 0.20  | 1      |       |       |         |      |   |
| 5 Religious participation | -0.30 | -0.24 | -0.28 | -0.17  | 1     |       |         |      |   |
| 6 Depression              | 0.03  | -0.03 | 0.17  | 0.02   | 0.16  | 1     |         |      |   |
| 7 Tobacco use; yes        | 0.02  | 0.10  | 0.16  | 0.82** | -0.01 | 0.17  | 1       |      |   |
| 8 Alcohol use; yes        | 0.31  | -0.08 | -0.02 | -0.59* | -0.04 | -0.21 | -0.56*  | 1    |   |
| 9 Substance use; yes      | -0.29 | 0.10  | 0.01  | -0.61* | -0.45 | -0.39 | -0.80** | 0.37 | 1 |

SC, self care. \*P<0.05, \*\*P<0.01.

**Table 3. Logistic regression analyses.**

|                         | Model 1<br>Tobacco use | Model 2<br>Alcohol use | Model 3<br>Substance use |
|-------------------------|------------------------|------------------------|--------------------------|
| Step 1: covariates      | OR (95% CI)            | OR (95% CI)            | OR (95% CI)              |
| Treatment condition     | 0.18 (0.08-0.44)       | 0.19 (0.18-0.46)       | 0.27 (0.06-0.60)         |
| Baseline tobacco use    | 0.02 (0.01-0.02)       | -                      | -                        |
| Baseline alcohol use    | -                      | 0.60 (0.04-0.16)       | -                        |
| Baseline substance use  | -                      | -                      | 0.17 (0.10-0.64)         |
| Step 1: predictors      |                        |                        |                          |
| Self-care self-efficacy | 0.34 (0.06-0.56)*      | 0.22 (0.18-0.42)       | 0.31(0.06-0.59)*         |
| Religious participation | 0.27 (0.04-0.53)       | 0.40 (0.02-0.47)*      | 0.26(0.24-0.97)          |
| Depression              | 0.50 (0.12-0.82)*      | 0.06 (0.02-0.77)       | 0.38(0.09-0.67)*         |

OR, odds ratio; CI, confidence interval. \*P<0.05.

### Tobacco use

Model 1 examined tobacco use at four weeks. After controlling for group assignment and pretreatment health behaviors, self-care self-efficacy and depression were uniquely associated with post-treatment behavior. Self-care self-efficacy significantly predicted tobacco use (OR=0.34; 95% CI: 0.06-0.56, P=0.040). For every unit increase in self-care self-efficacy, participants were 64% less likely to use tobacco four weeks poststroke. Depression also significantly predicted tobacco use (OR=0.50; 95% CI: 0.12-0.82, P=0.016) post-stroke. For every unit increase in depression, participants were 50% less likely to use tobacco four weeks poststroke.

### Alcohol use

Model 2 examined alcohol-use outcomes. Few variables were predictive of alcohol use. After controlling for group assignment and pretreatment behaviors, only religious participation predicted alcohol use poststroke (OR=0.40; 95% CI: 0.02-0.47, P=0.042). Participants frequently engaging in religious activities had 60% decreased odds of drinking alcohol four weeks poststroke.

### Substance use

Model 3 examined substance-use outcomes. Findings for substance use were similar to those reported for tobacco use. After controlling for group assignment and pretreatment behaviors, self-care self-efficacy significantly predicted substance use (OR=0.31; 95% CI: 0.06-0.59, P=0.039). For every unit increase in self-care self-efficacy, participants had 69% decreased odds of reporting substance use. Depression also significantly predicted substance use (OR=0.38; 95% CI: 0.09-0.67, P=0.019). For every unit increase in depression, participants were 62% less likely to use illicit substances four weeks poststroke.

## Discussion and Conclusions

This study contributes to and extends the stroke literature by investigating the rarely studied stroke risk factors of tobacco, alcohol and substance use among underserved, largely minority stroke survivors with a high risk of recurrent stroke. The effects of self-care self-efficacy, religious participation and depression on alcohol, tobacco and substance use were examined. Significant predictive relationships were found, providing important information concerning risk and protective factors impacting self-care behaviors of underserved stroke survivors. This preliminary evidence can be used to develop and enhance secondary stroke-

prevention programs to reduce risk of recurrent stroke.

Self-care self-efficacy and depression were associated with tobacco and substance use in this group of underserved, largely ethnic minority stroke survivors. Those with high levels of self-care self-efficacy were less likely to use tobacco and substances than those with low levels. Findings that self-efficacy is lower among underserved groups, including women, less well-educated participants, those of advanced age and those with multiple comorbidities,<sup>55-57</sup> underscore the need to target self-care self-efficacy in vulnerable populations. Chronic disease self-management programs have been associated with increased disease-specific self-care self-efficacy through engagement in health behaviors.<sup>58</sup> Further, individuals with high self-efficacy benefit more from substance-abuse treatment and are more likely to quit on their own than substance users with low self-efficacy, who are more likely to reject or discontinue treatment.<sup>59,60</sup> Increases in self-efficacy also positively influence future abstinence from tobacco use.<sup>61</sup> These findings, however, were based on studies primarily with White participants. Our findings suggest that poststroke interventions targeting improving tobacco and substance use among underserved, mostly minority individuals, should incorporate a focus on self-care self-efficacy. They should incorporate techniques to improve various aspects of self-care self-efficacy, including performance of self-management tasks, patient-provider communication and healthcare decision-making to maximize success and achieve optimal outcomes.

Our findings also show that individuals with high levels of depression were 50% less likely to use tobacco than those with lower levels and 69% less likely to use illicit substances. While these findings were contrary to our initial hypotheses, mean levels of depression were high across our sample, consistent with literature demonstrating increased prevalence of affective symptoms among individuals post-stroke.<sup>62</sup> Further, participants may have been more likely to abstain from tobacco and substance use, given the relatively short four-week follow-up period. Self-care self-efficacy may also be a more meaningful indicator of engagement in health risk behaviors than depression in this population. In a study investigating the relationship between cardiac self-efficacy and health status, having low self-efficacy was associated with greater risk of poor health status than having depressive symptoms.<sup>57</sup> While these associations require further research, depression management is essential in poststroke treatment for everyone, especially underserved individuals who smoke or use substances. It may improve outcomes of stroke self-management and/or smoking-cessation and substance-abuse programs, especially long term.

Interestingly, religious participation was

related to alcohol use. Participants who frequently participated in religious practices were less likely to use alcohol than those who did not or infrequently participated. Approximately 89% of participants endorsed having a Christian faith, and most indicated attending church services and praying frequently. Previous research has shown that African American men who defined religion as important in their lives were less likely to engage in frequent heavy drinking,<sup>63</sup> while infrequent church attendance has been associated with current smoking and daily drinking among African American men.<sup>64</sup> Likewise, among inner-city African American and Hispanic emergency care patients, religious participation increased the odds of abstaining from alcohol use.<sup>65</sup> In our study, substance and alcohol use had different predictors, suggesting the necessity of different approaches to treatment. There may be something unique about alcohol dependency and abstinence warranting inclusion of a spiritual approach, as in Alcoholics Anonymous.

Our findings have important implications for clinical practice, policy and health education. As standard practice, healthcare professionals should assess stroke patients for alcohol, tobacco and substance use, and provide basic education concerning these risk factors for recurrent stroke. Stroke treatment should be integrative and tailored, based on the risk factor (e.g., substance versus alcohol use). A one-size-fits-all approach to poststroke self-management is ineffective, given the variability in factors impacting abstinence from tobacco, substance and alcohol use among underserved individuals. Tailoring secondary stroke-prevention treatments can increase success and reduce risk among groups with the highest risk factors.

Similarly, participation in spiritual or religious practices may improve outcomes and encourage abstinence, especially among those with alcohol-use disorders. Religiosity is rarely assessed or discussed by clinicians in a medical setting. However, it appears that religiosity can be a strong motivator for alcohol abstinence. For underserved individuals, especially, with religious or spiritual inclinations, engagement in such activities should be encouraged and integrated into stroke self-care education.

Depression screening and treatment should also be incorporated into behavioral stroke self-care programs pre and post-treatment for those with tobacco and substance use. Depressive symptoms should be monitored as patients proceed through rehabilitation, and referrals for depression treatment should be provided when needed. Mental health professionals could work collaboratively with medical providers to develop strategies to improve underserved patients' physical and mental

health symptoms that are barriers to effective self-care.<sup>66</sup> An integrated approach to care should address physical and mental health, especially in medically complex, high-risk patients. Our findings also suggest that interventions should help patients build self-care self-efficacy to prevent stroke recurrence among tobacco and substance users.

Our study makes a significant contribution to the literature by examining understudied stroke risk factors among a high-risk group; however, it has limitations. Our small sample size may have precluded detection of significant relationships among study variables. Additionally, our dichotomous measure of alcohol, tobacco and drug use did not allow ascertainment of quantities used or duration of use. Additionally, we were unable to examine long-term change in alcohol, tobacco and drug use. Finally, it is not possible to generalize our results to other chronic disease patients or stroke survivors of different races or ethnicities.

Further research should examine whether these relationships can be generalized to other chronic conditions and racial and ethnic groups. Additionally, associations should be assessed longitudinally in response to treatment outcomes. The impact of additional psychosocial variables should be examined together with these variables to optimally improve treatment outcomes in clinical practice.

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