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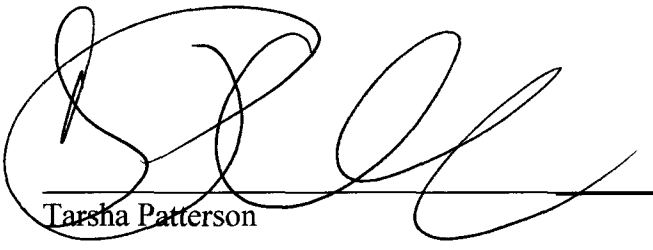

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HEALTH-RELATED LIFESTYLE CHANGES FOLLOWING STROKE

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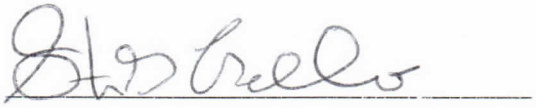

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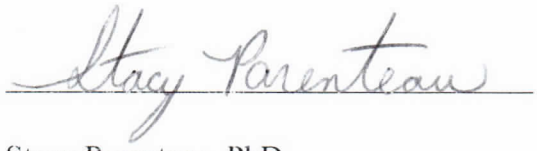

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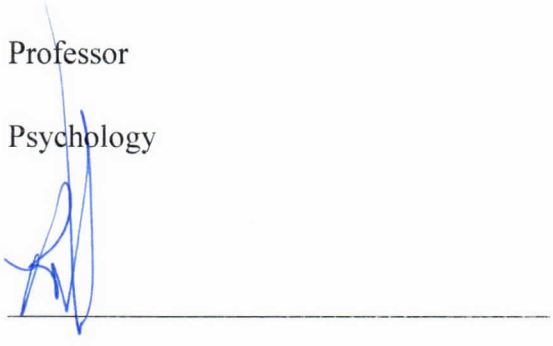

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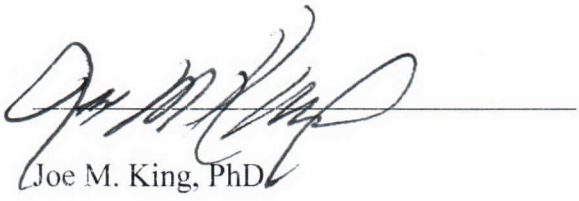

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Abstract

Stroke often has a variety of serious consequences that have the potential not only to follow an individual throughout his or her life but also to affect the lives of future generations. Depression and Post-Stroke Depression (PSD) are very prevalent, but often overlooked as contributing precursors and sequel lifestyle factors for stroke. Previous research has shown a relation between lifestyle factors and stroke risk (Alkadry, Wilson, and Nicholas, 2005; CDCb, 2012; NSA, 2013; NINDS, 2013). However, the majority of prior studies used convenience samples of individuals in medical settings, whereas this study uses a national, population-based survey, which gives a better prevalence estimation of stroke risk, lifestyle factors and depression. The goal of the present study was to investigate whether following stroke, survivors will show reductions in Body-Mass Index (BMI), alcohol consumption, smoking, and an increase in reported physical activity compared to individuals who have not suffered a stroke. Another goal of this study was to investigate the possible effects of depression on the lifestyle factors of individuals with and without a history of stroke. A sample consisting of 144, 800 individuals aged 40-99 years, who had previously responded to the 2006 Behavioral Risk Factor Surveillance System (BRFSS) questionnaire, was used to examine this correlation. The results did not support the hypothesis, and stroke survivors were less likely to have a normal BMI and exercise compared to individuals without a history of stroke. No significant differences in smoking and alcohol consumption were found between individuals with or without a history of stroke. Results also indicate no difference in race and stroke rate.

Acknowledgments

I would like to thank Dr. Steven LoBello for playing a vital role in my acceptance into the program and for welcoming me as a member of his laboratory. He has opened the doors of opportunity for me that never would have been opened otherwise. He refuses to take credit, but his generosity truly transforms lives. I am eternally gratefully for his mentorship, patience, and never-ending effort in completing this project. I would also like to thank the faculty and staff at Auburn University Montgomery for their guidance and support, without which this project would not have been possible.

This thesis is in loving memory of my grandmamma, Mary Foster Haney; aunt, Hattie Mae Haney; sister, Rosa Evans; and cousin, Claude Haney, who never tired of answering my questions as a little girl and all of whom invested their time, love, patience, understanding, and guidance, and instilled a sense of tenacity in me to complete this thesis. I stand on the shoulders of their sacrifices, hopes, dreams, and aspirations. Last, but not least, I would like to thank my mother and children for their sacrifices and encouragement that have turned my dreams into a reality so that I can help others to do the same. To James and Earnest, this thesis would not have been possible without your patience and generous support. James, Angel, Princess, Precious, and Abraham are all the driving force behind this thesis. Michael Patterson, you are our family's future! This thesis symbolizes a stone in the bucket of your future achievements.

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List of Abbreviations

BDI	Beck Depression Inventory
BMI	Body Mass Index
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control
DSM-IV	*Diagnostic and statistical manual of mental disorders (*4th ed., text revision)
NINDS	National Institute of Neurological Disorders and Stroke
NSA	National Stroke Association
PHQ-8	Patient Health Questionnaire-8 Depression Scale
PHQ-9	Patient Health Questionnaire-9 Depression Scale
PSD	Post Stroke Depression
W.H.O.	World Health Organization

Health-Related Lifestyle Changes Following Stroke

Cerebrovascular disease, commonly known as stroke, is the second most common cause of death globally (The World Health Organization W.H.O., 2012). Stroke strikes frequently without warning, devastating the lives of survivors and their families. According to the Centers for Disease Control (CDC) (2012a), stroke is a principal cause of disability and the third most common cause of death in the United States, after cardiovascular disease and cancer respectively (CDC, 2005; Pan et al., 2011). It is estimated that stroke occurs every 40 seconds in the United States and kills approximately 130,000 Americans annually, accounting for 1 of every 19 deaths (CDCa, 2012).

Stroke occurs when blood flow to the brain is interrupted or when a blood vessel ruptures in the brain, causing segments of the brain to die (CDCa, 2012; National Institute of Neurological Disorders and [NINDS], 2013; National Stroke Association [NSA], 2013). When brain cells in the affected area die, the individual may lose abilities such as speech, memory, and movement, which were controlled by that area of the brain. Of the known risk factors for stroke, some are modifiable and some are nonmodifiable (NINDS, 2013; NSA, 2013). Whereas nonmodifiable stroke risk factors are treatable, modifiable stroke risk factors are mostly preventable through knowledge and effective management (Alkadry, Wilson & Nicholas, 2005).

Nonmodifiable risk factors include race/ethnicity, heredity, gender, and age. According to the NINDS (2013), Caucasians, Asian-Americans, and Native Americans have similar stroke incidences and mortality rate, which differ from those of African-Americans. Being African American is reported to be the number one risk factor for

stroke (NINDS, 2013; NSA, 2013). Compared to Caucasians, African Americans have an almost 50% increase in risk of having a first stroke (NINDS, 2013). African Americans also tend to experience first strokes at younger ages and are more likely to become disabled as a result of stroke (NSA, 2013). Of interest, although African Americans are twice as likely to die from stroke as Caucasians, they are nevertheless much less likely to receive tPA, the only stroke treatment approved by the Food and Drug Administration (NSA, 2013).

Both gender and heredity are also significant nonmodifiable stroke risk factors. Although men have a 1.25 times greater risk of experiencing stroke, women who suffer strokes are more likely to die than men (NINDS, 2013). According to the National Stroke Association (2013), survey results indicate that while the majority of women are more concerned about dying from breast cancer, they are unaware that they are two times more likely to die from stroke each year. Notably, half of all African-American women will die as a result of heart disease or stroke (NSA, 2013). A final nonmodifiable stroke risk factor is age. The National Stroke Association (2013) reports the risk of stroke doubles for every decade that an individual lives past the age of 55. Additionally, individuals over 65 years of age account for two-thirds of all strokes and are seven times more likely to die from a stroke than younger individuals (NINDS, 2013). Stroke also tends to run in some families (NINDS, 2013). Heredity increases the likelihood of certain individuals having a stroke due to a family history and predisposition of such conditions as diabetes and heart disease (CDC, 2005; NINDS, 2013).

Modifiable risk factors fall into two categories: lifestyle behavioral risk factors and medical risk factors. Lifestyle behavioral risk factors can often be changed, whereas

medical risk factors can usually be treated or managed with medications. According to the National Stroke Association (2013), managing modifiable risk factors can reduce the incidence of stroke by as much as 80%. In addition, Myint, Luben, Wareham, Bingham, and Khaw (2009) report such lifestyle factors as smoking cessation, increasing physical activity and moderate alcohol consumption have all been associated with a considerable lower risk of subsequent stroke. Several medical conditions increase the likelihood of stroke. High blood pressure, high cholesterol level, heart disease, and diabetes are the major medical diseases that carry an increased stroke risk (CDC, 2005; NINDS, 2013; NSA, 2013). Approximately 49% of the United States' population has at least one of these risk factors, and a large proportion of the population has multiple risk factors (CDC, 2005; CDCa, 2012).

Modifiable stroke risk factors in the behavioral lifestyle category include Body Mass Index (BMI), physical activity, diet, smoking, and alcohol consumption. Lawrence, Kerr, Watson, Jackson, and Brownie (2009) indicate the association between obesity, which is defined as a BMI of 30 or more, and increased stroke risk has been well established. Physical activity is another modifiable stroke risk factor, and inactive individuals are 25% to 30% more likely to experience a stroke than their more active counterparts (Lawrence et al., 2009). Moreover, Holmgren, Gosman-Hedstrom, Lindstrom, and Wester (2010) argue moderate to high levels of physical activity have been associated with a diminished risk of stroke. Conversely, these researchers also report, according to the Cochran Review on Physical Fitness Training for stroke survivors, physical activity has not been shown to improve stroke survivors' quality of life. Alcohol, on the other hand, has been reported to have both a positive and negative

impact on stroke risk (Lawrence et al., 2009; NSA, 2013). Research suggests heavy drinkers who consume more than two drinks a day increase their stroke risk by 50%, whereas individuals who consume one drink a day may reduce their stroke risk (NSA, 2013).

The most lethal and modifiable stroke risk factor is tobacco use because it hardens and constricts arteries, thickens the blood, and reduces the amount of oxygen in the blood (CDC, 2012a; Lawrence et al., 2009; NSA, 2013). Tobacco use, including second-hand smoke, contributes to one in every five strokes in the United States (CDC, 2012b) and is a stand-alone risk factor for stroke that has the ability to linger in the body for five years after individuals stop smoking (CDCb, 2012).

Extensive research has shown the possible associations between lifestyle factors and stroke risk. The purpose of this current study is to investigate the hypothesis that stroke survivors will show reductions in BMI, alcohol consumption, and smoking and increased reported physical activity compared to individuals who have not suffered a stroke. In other words, post-stroke respondents will evidence healthier lifestyles compared to respondents who have not suffered a stroke. Therefore, this study compares lifestyle behaviors such as BMI, physical activity, smoking, and alcohol consumption while controlling for the possible cofounding effects of depression, age, income, race/ethnicity, education, and employment in a national, population-based sample of individuals with and without a history of stroke.

One line of research dealing with stroke investigates possible factors that affect or interfere with modifying lifestyle factors after stroke. Depression is thought to be one of these factors (Bour, Rasquin, Limburg, & Verhey, 2010; Broomfield et al., 2010;

Lawrence et al., 2009; NSA, 2013; Pan et al., 2011; Paolucci, 2008). Therefore, another goal of this study is to investigate the possible effects of depression on lifestyle factors of individuals with and without a history of stroke. Thus, it is necessary to review the current literature pertaining to this relationship.

Depression is the most common mental disorder (Murray & Lopez, 1997) and is also a modifiable risk factor for stroke, whether it is a precursor or a sequela of stroke (Alkadry, Wilson, & Nicholas, 2005; Broomfield et al., 2010; Pan et al., 2011; Paolucci, 2008). Depression is the strongest predictor of quality of life (Paolucci, 2008) and mortality in stroke survivors (Naess, Lunde, Brogger, and Waje-Andreassen, 2010). In this regard, depression may be related to poor health behaviors such as smoking, poor compliance with medication, inadequate eating habits, physical inactivity, and increased alcohol or drug intake, which are all associated with an increased incidence of stroke (Alkadry, Wilson, & Nicholas, 2005; Holmgren, Gunilla-Hedstrom, Lindstrom, & Wester, 2010; Pan et al., 2011). This finding suggests that depression may lead to poor adherence to medication and changes in modifiable stroke risk factors.

Extensive research has also shown that Post-Stroke Depression (PSD) is a well-documented sequela of stroke experienced by approximately one-third of stroke survivors (Alkadry, Wilson, & Nicholas, 2005; Paolucci, 2008; Broomfield et al., 2010; Holmgren, et al., 2010). Bour, Rasquin, Limburg, and Verhey (2010) found that elderly stroke survivors with PSD are more likely to develop cognitive impairment and 20% of people with PSD will eventually develop dementia. Post Stroke Depression has also been shown to increase disability levels, as stroke survivors with PSD give up early on physical

rehabilitation programs because of hopelessness and apathy (Broomfield et al., 2010). However, there are interventions and lifestyle modifications that can improve the quality of life for stroke patients with depression.

Method

Participants

All 144,800 participants were selected from the Behavioral Risk Factor Surveillance System (BRFSS) of 2006. This study limited the sample to people 40 and older to look at a cohort that would be more vulnerable to stroke. Multiple imputations were used to replace missing values, and five data sets in total were generated. All statistics generated for describing the sample demographics and analyzing data for hypothesis testing were based on the combined sample of 724,539 participants. The current study was limited to adult participants between the ages of 40-99 years with and without a history of stroke in those states that administered the Patient Health Questionnaire-9 (PHQ-8) depression scale. The weighting and sampling procedures, including the BRFSS data sets, are available to the public for download at CDC's website (CDC, 2006). The sample's mean age was 59.6 years with a standard deviation of 12.6 years. Table 1 provides a summary of demographic information for the survey respondents.

Materials and Procedures

This study used the 2006 BRFSS survey because of the large number of states that administered the optional Anxiety and Depression module, which included the PHQ-8 depression scale. The BRFSS is an annual random digit dialing telephone survey conducted in the 50 United States, District of Columbia, and the territories of U.S. Virgin

Islands, Puerto Rico, and Guam under the guidance of the Centers for Disease Control (CDC, 2006). The BRFSS data have been used at both the state and federal levels to measure health behaviors since 1984. Trained interviewers collect data from non-institutionalized adults between the ages of 18 and 99 years using a probability sampling of households with landline and cell phones. However, in 2006 only individuals with landline phones were interviewed.

The PHQ-8, which is a standardized and validated eight-item instrument used to measure depression is highly correlated with and comparable to the Patient Health Questionnaire-9 (PHQ-9) depression scale. Both the PHQ-8 and the PHQ-9 are denoted as the "benchmark" to screen depression in adults in medical situations (Kroenke et al., 2009). When the PHQ-8 was first released, Kroenke, Spitzer, and Williams (2001) established criterion and construct validity based on a number of studies. The PHQ-8 questionnaire is based on the 9- item criteria from the Diagnostic and Statistical Manual of Mental Disorders Text Revision Edition. The PHQ-8 was modified to make it comparable to other questions in the BRFSS Depression and Anxiety Section by measuring depression symptoms in the 14 days prior to the administration of the survey (CDC, 2006). The difference between the PHQ-8 and PHQ-9 is the PHQ-8 omits the questions pertaining to suicide and self-injurious thoughts. These items are dropped because telephone interviewers are unable to provide appropriate intervention if an individual acknowledges contemplating suicide. Removing these questions does not affect the validity or reliability of the PHQ-8 (Kroenke & Spitzer, 2002).

The eight questions of the PHQ-8 ask participants how many days in the past 14 were the following depressive symptoms experienced: (1) little interest or pleasure in doing things; (2) felt down, depressed, or hopeless; (3) trouble falling asleep or staying asleep or sleeping too much; (4) felt tired or had little energy; (5) poor appetite or ate too much; (6) felt bad about yourself or that you were a failure or had let yourself or your family down; (7) trouble concentrating on things; and (8) moved or spoken so slowly that other people could have noticed or the opposite being so fidgety or restless that you were moving around a lot more than usual (CDC, 2006). For each item, the intensity rate choices range from 0 to 14 days for each symptom (CDC, 2006).

Measurement of Stroke and Covariates

In the 2006 BRFSS, the question related to stroke inquired if a doctor, nurse, or other health professional ever indicated that the individual had a stroke (yes-no). Leisure time physical activity was indicated as any physical self-reported activity or exercise during the past 30 days not related to work (yes-no). The self-reported height and weight data were used to calculate the BMI. The BMI was then arranged into three categories of healthy (< 25), overweight (25-30), and obese (≥ 30). Smoking was categorized as smoking every day, some days, or not at all. Alcohol consumption was defined as the average daily alcohol consumption of participants in the past 30 days on the days when they drank (ranged from 0 – the number of drinks). Age was reported in years. Annual income was classified into five categories: less than $15,000; $15,000 to less than $25,000; $25,000 to less than $35,000; $35,000 to less than $50,000; and $50,000 or more. Race/ethnicity was classified into five categories: White, Black, Other,

Multiracial, and Hispanic. Education was classified into six categories: no education, elementary, some high school, high school graduate, some college or technical school, and college graduate. Employment was classified into eight categories: employed for wages, self-employed, out of work for more than 1 year, out of work for less than 1 year, a homemaker, a student, retired, and unable to work.

Statistical Analysis and Models

The design is a binary logistic regression. Statistical Analysis Software (SAS) version 9.1, proc surveylogistic module, a program specifically designed to work with complex survey data and design effects was used to analyze the data. The study included missing values on the PHQ-8 items and other explanatory variables in the model. Several covariates were also included in the model to control for their potentially confounding effects. Significant covariates included age, income, employment. Proc Imputation was used to impute missing values for predictor variables and covariates, but not the outcome variable stroke history. The imputation procedure created five data sets. Each data set was analyzed separately using the proc surveylogistic module. Stratification and clustering were used to account for the design effects in the data sets. In addition, the analyses were weighted to better estimate population values. Weighting corrects for possible sampling biasing factors such as non-response (telephone was not answered in the household), non-coverage (no telephone in household), number of adult residents in the household, probability of a telephone number being randomly selected, and the number of telephones in the household and is included in the BRFSS data (CDC, 2006). An alpha level of 0.05 was used to reject all null hypotheses.

Results

This study included 144, 800 participants. The multiple imputation of 5 data sets generated missing values, which yielded an effective sample of 724,539 participants. Table 1 summarizes the weighted demographic characteristics. Table 2 presents the adjusted odds ratio for stroke rate and covariates. The model fit is significantly better than the null model using the likelihood ratio test ($p < .0001$). The hypothesis that stroke survivors will show reductions in BMI, alcohol consumption, smoking, and increased reported physical activity compared to individuals who have not suffered a stroke was not supported.

Results indicate stroke risk increases about 4% for every year a person ages. Compared to participants without a history of stroke, participants with a history of stroke were less likely to have a normal BMI, and were less likely to exercise (Table 2). There were no significant differences in smoking and average alcohol consumption between participants with a stroke history and participants without a history of stroke.

Another aim of this study was to evaluate the specific influence of depression on lifestyle factors in stroke and non-stroke individuals. The results indicate that participants with a history of stroke were more likely to be depressed than participants without a history of stroke. Individuals with a history of stroke compared to individuals without a history of stroke were more likely to report an annual income of less than $15,000 and were less likely to be self-employed. Stroke survivors were also more likely to be unemployed or retired than individuals without a history of stroke. There were no significant differences between participants with a stroke history and participants without a stroke history in regard to race.

Discussion

The goal of this study was to determine if stroke survivors were more likely to have a reduction in alcohol consumption, smoking, and BMI and an increase in physical activity compared to individuals without a history of stroke. Based on a national, population-based study, participants with a history of stroke do not differ from those without a history of stroke with regard to smoking and alcohol consumption. Maintaining healthy lifestyle factors has been associated with decreased stroke risk and an inverse relationship between the number of healthy lifestyle indicators and stroke risk has also been reported (Alkadry, Wilson, & Nicholas, 2005). However, according to this study, participants with a history of stroke were less likely to engage in physical exercise and have a normal BMI than non-stroke individuals. The finding that stroke survivors did not report improvements in lifesytle factors might be attributed to their limited physical abilities post stroke or as a result of experiencing depression.

Another aim of this study was to evaluate the specific influence of depression on lifestyle factors in stroke and non-stroke individuals. Researchers have investigated the role of depression and quality of life (Pan et al., 2011; Paolucci, 2008) and have shown a depressed mood is the most significant predictor of a stroke survivor's quality of life (Pan et al., 2011; Paolucci, 2008). Both stroke survivors with a history of depression prior to stroke (Naess, Brogger, and Waje-Andreassen, 2010) and stroke survivors with PSD (Broomfield et al., 2010) are less motivated to participate in rehabilitation programs.

It is alarming that while almost 33% of stroke survivors develop PSD, it is grossly undiagnosed and treated (Alkadry, Wilson, & Nicholas, 2005). In reality, only a small percentage of survivors are diagnosed and even fewer are treated in clinical practice

(Paolucci, 2008). However, treatment for PSD may improve a stroke survivor's outcome (Naess, Brogger, and Waje-Andreassen, 2010) and there are interventions and lifestyle modifications that can improve the quality of life for stroke patients with depression (NSA, 2013). Bour, Rasquin, Limburg, and Verhey (2010) performed a two year longitudinal study, which results indicate that while depression after stroke is associated with cognitive decline, cognitive decline has also been shown to be reversible in individuals who have recovered from depressive symptoms.

The findings of this study indicated no difference between the race of participants who reported a history of stroke. This was a surprising discovery and inconsistent with the findings of well-established studies (CDC, 2005; CDCb, 2012; NINDS, 2013 & NSA, 2013). To the researcher's knowledge, this is the first time this finding has been reported. This inconsistent finding might be attributed to the type of data examined by this study. Prior studies have compared lifestyle behaviors amongst stroke survivors. However, few studies have used national, population-based surveys, which give a better estimate of prevalance compared to other types of studies. The majority of other studies use convenience samples of individuals in medical settings, which could distort prevalence estimates of different racial groups (Alkadry, Wilson, & Nicholas, 2005; Bour et al., 2010; Pan et al., 2011).

There are several limitations of this study. First, BRFSS is a cross-sectional survey, which limits the ability to draw causal inferences. Second, a difficulty exists when investigating relationships between stroke and healthy lifestyle factors in a cross-sectional study. Consequently, it is unclear whether stroke survivors engaged in healthy lifestyle behaviors prior to the incidence of stroke. Third, because the BRFSS data are

centered on self-reported information, it is subject to recall and self-reporting biases. Consequently, individuals with a history of stroke may be more likely to report that they participate in healthy lifestyle factors. However, according to Nelson et al. (2000), numerous studies have shown that the BRFSS questions have good to excellent validity. Finally, due to its limited examination of modifiable risk factors, the BRFSS does not provide a medical history or indicate if individuals had other established stroke risk factors such as a genetic compontent or family history of stroke. Survivors' stroke might be attribitual to the increased stroke risk that appears to run in some families (NINDS, 2013), whereby heredity may have increased the likelihood of certain individuals having a stoke due to family history and dispositon of such conditions as hypertension, diabetes, and heart disease that commonly co-exist with stroke (CDC, 2005; NSA, 2013; NINDS, 2013).

A possible viable research stream should examine the role of depression in the prevention of first-time stroke and recurrent stroke due to the potential to save lives and reduce healthcare costs. According to the CDCb (2012), the annual prevalence rate for stroke is almost 800,000; this figure is projected to continue to rise as the global population ages despite both improvements in prescription drugs to control hypertension and decreased tobacco use (Lawrence et al., 2009). Of those 800,000, approximately 610,000 are incidences of new stroke and the remaining are attributed to recurrent stroke-- that is one in four are recurrent stokes (CDCa, 2012). Stroke recurrence is common and approximately 3% of stroke survivors have an increased risk of experiencing another stroke inside thirty days after their initial stroke (NINDS, 2013). Moreover, 33% of stroke survivors will go on to have a subsequent stroke inside two years (NINDS, 2013).

According to the NINDS (2013), stroke recurrence is the single most common factor that kills or severely disables stroke survivors. Non-fatal stroke is also a leading cause of severe disability and long-term care (CDC, 2008) in the United States, with an annual combined indirect and direct estimated cost of $38.6 billion (Alkadry, Wilson, & Nicholas, 2005; CDCa, 2012; Pan et al., 2011).

In summary, for physicans to provide the best possible care, they should explore what role depression contributes to the incidence of stroke and survivors' rehabiliation to find ways to help prevent stroke and improve the quality of life for survivors. It is unclear if the unemployment rate of stroke survivors is due to retirement age or disability resulting from the stroke. Stroke survivors' continued increase in BMI might be attributed to a physical impairment as a result of stroke, which might limit their mobility. The finding that stroke survivors did not report reductions in alcohol consumption and smoke usage might be due to a sense of hopelessness as a result of experiencing depression. More research to aid in the prevention of stroke should address the treatment of depression, which will likely increase medication adherence and improve the quality of life of stroke survivors. Also, finding no difference, in regard to race and stroke incidence, in who is at risk for stroke is significant because more national-based population studies may need to investigate stroke, depression, and lifestyle factors as oppossed to using convience samples.

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Table 1

Weighted Demographic Characteristics of Combined Samples

N=724539		
Model Variables	N	Weighted Percent
Ever Diagnosed with Stroke		
Yes	34,944	4.36
No	687,241	95.35
Don't Know/Not Sure	2,354	0.29
Sex of Participants		
Women	448,378	52.75
Men	276,161	47.25
Race		
White	564,249	71.05
African American	63,197	9.02
Other Non-Hispanic	29,809	4.64
Multi-racial Non-Hispanic	16,060	1.79
Hispanic	51,224	13.50
Do you now smoke cigarettes every day, some days, or not at all?		
Every day	367,580	51.36
Some days	97,347	13.18
Not at all	28,396	4.21
Don't Know/Not Sure	231,216	31.25
Three Categories of Body Mass Index (BMI)		
Neither overweight nor obese	253,441	33.21
Overweight	277,689	39.11
Obese	193,409	27.68
Education		
Never attended school or only kindergarten	1,455	0.42
Grades 1 through 8 (elementary)	33,178	5.61
Grades 9 through 11(some high school)	51,982	7.35
Grade 12 or GED (high school graduate)	225,690	28.36
College 1 year to 3 years (some college or technical school)	186,493	25.55
College Graduate (4 years or more)	225,741	32.71

Table 1 Continued

Weighted Demographic Characteristics of Combined Samples

N=724539		
Model Variables	N	Weighted Percent
Income		
Less than $15,000	101,312	12.33
$15,000-$25,000	131,197	16.32
$25,000-$35,000	108,169	13.65
$35,000-$50,000	123,798	16.14
$50,000 or more	260,063	41.56
Employment Status		
Employed for wages	293,517	44.12
Self-employed	70,092	10.05
Out of work for more than one year	12,243	1.88
Out of work for less than one year	11,524	2.05
A homemaker	53,740	7.69
A student	2,730	0.40
Retired	225,427	26.52
Unable to work	55,266	7.29
Physical activity or exercise in the past 30 days other than regular job		
Had physical activity or exercise	521,167	72.5
No physical activity or exercise	203,372	27.5

Table 2

Logistic Regression for Relationship of Stroke to Lifestyle Variables and Model Covariates (Adjusted Odds Ratios and 95% Confidence Intervals)

Variable	Adjusted Odds Ratio	95% Confidence Interval
Smoking		
None	--	--
Some Days	1.13	.93 - 1.37
Every Day	1.14	1.00 - 1.29
Unknown	.81	.74 - .90
PHQ-8 Depression		
	1.01	1.00 - 1.01
Body Mass Index		
Obese (BMI ≥ 30)	--	--
Overweight (25 ≤ BMI< 30)	.96	.89 - 1.03
Normal BMI (BMI < 25)	.92	.84 - .99
Exercise		
No	--	--
Yes	.91	.85 - .96
Drinking Days		
	.97	.92 - 1.03
Employment		
Unable to work	--	--
Retired	1.25	10.5 - 1.51
Student	.67	.27 - 1.66
Homemaker	.96	.77 - 1.19
Unemployed < 1 year	.89	.59 - 1.33
Unemployed > 1 year	1.47	1.09 - 1.99
Self-Employed	.59	.47 - .75
Employed	.59	.48 - .71
Race/Ethnic Identity		
Hispanic	--	--
Multiracial	1.11	.82 - 1.49
Other	1.26	.99 - 1.59
Black	1.02	.87 - 1.19
White	.97	.86 - 1.09

Table 2 Continued

Logistic Regression for Relationship of Stroke to Lifestyle Variables and Model Covariates (Adjusted Odds Ratios and 95% Confidence Intervals)

Variable	Adjusted Odds Ratio	95% Confidence Interval
Annual Income		
$50,000 and above	--	--
$35,000 - $49,999	.95	.83 - 1.08
$25,000 - $34,999	1.08	.96 - 1.21
$15,000 - $24,999	1.07	.96 - 1.19
Less than $15,000	1.27	1.12 - 1.44
Education		
College Education or more	--	--
Some College or Technical School	1.03	.79 - 1.34
HS Graduate or GED	1.04	.79 - 1.35
Grade 9 -11	1.09	.83 - 1.43
Grade 1 -8	1.25	.90 - 1.72
Less than 1st Grade	.70	.21 - 2.36
Age		
	1.04	1.03 - 1.05