ABSTRACT

Title of Thesis:	THE IMPACT OF SOCIOECONOMIC STATUS ON SERIOUS MENTAL ILLNESS AND CARDIOVASCULAR DISEASE AMONG AFRICAN AMERICANS
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Cardiovascular disease (CVD) tends to be more prevalent in individuals older than 18 years of age with serious mental illness (SMI) and CVD is the leading cause of death of African Americans in the United States. Socioeconomic status (SES) is a major confounder that distorts the association of SMI with CVD in the African American population. The goal of this study is to measure the relationship between SMI and CVD in middle and upper income level African Americans. To accomplish this goal the three specific aims are as follows: Aim 1: To measure the prevalence of CVD in the study population. Aim 2: To measure the prevalence of SMI in the study population. Aim 3: To measure the strength of the association between SMI and CVD in the study population. The study is a cross-sectional study using secondary data analysis from four merged 2015 National Health Interview Survey (NHIS) datasets.

THE IMPACT OF SOCIOECONOMIC STATUS ON SERIOUS MENTAL
ILLNESS AND CARDIOVASCULAR DISEASE AMONG AFRICAN
AMERICANS

by

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Disclaimer that analyses, interpretations, and conclusions are not to NCHS, which is responsible only for the initial data.

Table of Contents

List of Tables

Chapter 1: Introduction

Rationale

Cardiovascular disease (CVD) is more prevalent in individuals older than 18 years of age with serious mental illness (SMI) and people who fall into this category have a higher mortality rate compared to the general population (Robson & Gray, 2007). A SMI results from unpleasant feelings or emotions that impact an individuals' ability to function (Chronister, Chou, Kwan, Lawton, & Silver, 2015). According to the Office of Minority Health at the United States Department of Health and Human Services, African Americans are more likely to experience SMI compared to the general population ("Mental Health - The Office of Minority Health," 2017). African Americans are also disproportionately affected by CVD which is the leading cause of death for African Americans in the United States. Approximately 23.8% of deaths among African Americans are caused by CVD (*Heart Disease Facts & Statistics | cdc.gov*, 2017). SMI and CVD are associated with one another (Salleh, 2008) however, socioeconomic status (SES) is a major confounder that may distort the true association between SMI with CVD in the African American population. SES is a robust predictor of health in the U.S. because SES allows individuals the opportunity to access health resources (Robson & Gray, 2007; Williams & Collins, 2003). Individuals who do not use their health resources also tend to be impacted with a SMI (Robson & Gray, 2007). While the literature has highlighted the impact of SES on SMI and CVD, the focus has been on populations that have lower SES. However comparable research for individuals within strata of higher SES groups is limited. The

goal of the proposed research is to fill this gap by measuring the relationship between SMI and CVD among the SES gradient of African Americans using the General Adaptive Syndrome theory (GAS) (Jackson, 2014).

Research Question/Specific Aims

The main objective of this study is to examine the relationship between SMI and CVD within varying SES gradients among African Americans. The study will address gaps in the literature, which tends not to focus on middle and upper SES African Americans. There have been many studies that focused on health outcomes within other racial populations or lower SES African Americans, however few have been conducted on middle and upper SES African Americans who comprise a growing percentage of the total United States population and bear the burden of both SMI and CVD. Equally important the secondary objective of this research is to begin to shift the paradigm in the current research from utilizing race as an explanatory measure to utilizing mental illness as an explanatory measure, thereby potentially informing prevention strategies that improve mental illness that negatively impact health. Mental illness is stigmatized in the U.S., and in particular within the African American community. More importantly, mental health issues can impact anyone, regardless of a person's gender, race, or class. The study will attend to its' goals by addressing the following specific aims:

Specific Aim 1

To measure the prevalence of CVD within varying SES gradients among African Americans. We hypothesized that CVD will be more prevalent among the middle income compared to the upper income African Americans.

Specific Aim 2

To measure the prevalence of SMI, using the K6 score, within varying SES gradients among African Americans. We hypothesized that SMI will be more prevalent in the middle income compared to the upper income African Americans.

Specific Aim 3

To measure the strength of the association of SMI and CVD within varying SES gradients among African Americans. We hypothesized having an SMI as indicated by a high K6 score will be positively correlated with CVD within both middle and upper income African Americans compared to lower SES African Americans.

Literature Review

African Americans and SES

There is a new reality for African Americans in the United States. According to the US Census, the number of African American middle and upper income households has been steadily increasing since 1969 (Bureau, 2016). Even though many African Americans have achieved middle income status, their collective history of wealth is shorter and less stable due to suppressive systems from the past (Dana, 2002; Thomas, 2015). The literature indicates that SES has multiple effects on health, with

3

the higher SES being associated with better health outcomes. One example of the relationship between SES and health comes from the National Longitudinal Mortality Study, which reports that greater levels of both income and education are associated with lower rates of mortality (Williams & Collins, 2003). In addition, middle SES individuals regardless of race, typically report they have private insurance and that they routinely visit their healthcare providers (Becker & Newsom, 2003). However, the literature also states that a disproportionate number of African Americans in the United States are considered lower in SES (Bureau, 2016; Snowden, 2017; Williams & Collins, 2003). Income which is normally used as a proxy for SES has been associated with variations in the distribution of disease, and it continues to be a robust determinant of variations in the rates of diseases (Williams & Collins, 2003). However many scholars studying the African American middle class have built on Du Bois's ideas for SES, which are a combination of education level completed, occupational prestige, income, and self-employment (Hunt & Ray, 2012).

African Americans and SMI

Much of the research focused on understanding of the psychological functioning of African Americans has been declining over the years (Sandra, 1992). Research interest in the association between SES and SMI has also been declining over time, but recent findings continue to demonstrate a powerful role for SES on SMI (Williams & Collins, 2003). SMI is routinely and inaccurately diagnosed among African Americans due to clinician's bias (Snowden, 2017). One method to correctly screen for SMI's would be through the K6 scale. The K6 scale has been validated in

minority samples (R. C. Kessler et al., 2003). It was developed for the United States

National Health Interview Survey (NHIS) to detect clinically significant nonspecific

distress; meaning the K6 scale has the ability to classify cases of SMI from non-cases

(R. C. Kessler et al., 2003).

Chronic stress, SMI, and CVD association

Chronic stress is a form of stress which results from continuous feelings of

hopelessness or despair. Chronic stress and SMI are positively associated (Salleh,

2008). Often, chronic stress results from a series of factors such as SES and/or

feelings of helplessness ("Fact Sheet: Health Disparities and Stress," 2017). Chronic

stress is found to be associated with many diseases like CVD (Ronald C. Kessler,

1979; Salleh, 2008). People with SMI's have higher morbidity and mortality rates of

chronic diseases than the general population (Jones et al., 2004; Robson & Gray,

2007).

General Adaption Syndrome Theory

There is some understanding of how aspects of SES may operate in conjunction with

race to influence health (Adler & Ostrove, 1999; N. Krieger, Williams, & Moss,

1997). However, race or SES does not provide a full conceptualization for

understanding differences in health outcomes. One method to tease out this

relationship is to ground it within a theoretical framework like the General Adaption

Syndrome theory (GAS). GAS theory states that an event that threatens an organism's

wellbeing, a stressor, leads to a three-stage bodily response (Jackson, 2014). GAS

theory can be used to understand how potential stressors like SES and race can be associated with SMI and CVD; specifically looking at the third phase of the theory called "exhaustion" where disease may occur. The mechanisms through which SES and race may interact can cause "exhaustion" in individuals over the course of their lifetimes. And as the theory states once an individual is within the "exhaustion" stage they are more susceptible to chronic diseases, such as CVD (Jackson, 2014).

Healthcare access

Due to a large segment of the population being lower in SES, many African Americans do not have the access to treatments, such as mental health services because they cannot afford them (Snowden, 2017). However, income may not be the only factor in determining utilization of healthcare services. Cultural competency in healthcare providers plays a role in the healthcare access among African Americans. African Americans report more satisfaction with healthcare when their healthcare providers employ a participatory and inclusive style of decision making (Joseph R. Betancourt, Alexander R. Green, J. Emilio Carrillo, & Owusu Ananeh-Firempong, 2003). When healthcare providers lack these qualities many African Americans may choose to use more appealing healthcare services found in churches, families, or friends in their community (Dana, 2002). This behavior could be one of the reasons there is differing health outcomes for African Americans from the general population.

Reasons for differing health outcomes

Differing health outcomes may occur due to differences in quality of care, reduced access to healthcare, and or socioeconomic status (Nancy Krieger, Chen, Waterman, Rehkopf, & Subramanian, 2011). Differences in quality of care can partially be attributed to providers and patients having different cultural backgrounds (Dana, 2002). Healthcare access can be a cause of health disparities for African Americans even with similar socioeconomic status as their Caucasian counterparts (Joseph R. Betancourt et al., 2003). In America examining differing health outcomes is usually met through addressing either class or race, but not both simultaneously (Kawachi, Daniels, & Robinson, 2005).

Chapter 2: Research Design and Methods

Data source and Population

The 2015 National Health Interview Survey (NHIS) is a source of information on the health of the United States civilian non institutionalized population. The NHIS is conducted in a face-to-face interview format and is a major data collection program of the National Center for Health Statistics (NCHS). To increase sampling efficiency, the NHIS survey developers used multistage sampling techniques to select the sample. The rationale for this format is due to the fact that costs of interviewing a large simple random sample of households and groups would be expensive and run the risk of being too distributed for meaningful information to be collected.

The first stage of the 2015 sample design contains a sample of 428 primary sampling units (PSUs) drawn from nearly 1,900 geographically defined PSUs. PSUs could consist of a county, a metropolitan statistical area, or a small group of contiguous counties.

Two types of second-stage units are used within a PSU called "area segments" and "permit segments". Area segments are defined geographically. Permit segments are housing units constructed after the 2000 census. The permit segments are defined using lists of building permits issued in 2000. The sampling frame consists of two non-overlapping parts called the "area frame" and the "permit frame".

The NHIS oversamples the Black, Hispanic, and Asian populations to increase the precision of estimates. Lastly, Black, Hispanic, or Asian persons aged 65 years or older have an increased chance of being selected in the sample adult (Statistics, 2015).

Family income will be used to classify individuals into their SES. After merging the datasets the sample adult weight variable was used for the study sample weight. The sample adult weight needs to be used for individual person analyses such as K6 score. According to Pew Research Center in order to determine who falls in the middle SES category one needs to find the median income for a population ("The American Middle Class Is Losing Ground," 2015). After finding the median income within a population, double the value to find the ceiling of middle SES category and floor of the high SES category. Then to create the floor of middle SES category and ceiling of low SES category multiply by 2/3 of the median income for a population. Lastly to account for family size in the SES, use the household income divided by the square root of the family size (Richard & Rakesh, 2014). The Census states the median household income in America during 2015 was $56,516 (Bureau, 2017). Thus socioeconomic status classifications within the study for low, middle, and high socioeconomic status are as follows: $0-$34,000, $35,000-$99,000, and $100,000 respectively. Each classification corresponds to selections within the questionnaire. Within the National Health Interview Survey there were five categories a family's household income could place in: $0 - $34,999, $35,000 - $49,999, $50,000 - $74,999, $75,000 - $99,999, or $100,000 and over.

Study Design

The proposed study will be a cross-sectional study using secondary data analysis of four merged 2015 National Health Interview Survey datasets.

The questions may be answered "yes" or "no". A yes to any of these questions

determines if an individual has cardiovascular disease.

Coronary heart disease

Ever been told you had coronary heart disease?

Heart attack

Ever been told you had a heart attack?

Heart condition/disease

Ever been told you had a heart condition/disease?

Angina pectoris

Ever been told you had angina pectoris?

Exposure Variables

Each of the questions will be coded on a scale: "All the time", "Most the time",

"Some of the time", "A little of the time", "None of the time".

The K6 score is a summation score based on the six exposure questions. An

individual exposure question can range in value from 0-4; with 0 equaling "None of

the time" to 4 equaling "All the time". The K6 score ranges from 0-24; a score of 13

or above means an individual has some serious mental health issue (SMI).

Nervous

During the past 30 days how often did you feel nervous?

Hopeless

During the past 30 days how often did you feel hopeless?

Restless/fidgety

During the past 30 days how often did you feel restless/fidgety?

Cheers

During the past 30 days how often did you feel so sad nothing cheers you up?

Effort

During the past 30 days how often did you feel everything was an effort?

Worthless

During the past 30 days how often did you feel worthless?

Confounders

The variables included in the analysis will be socioeconomic status (low, middle class, upper class), access to healthcare (yes, no), healthcare utilization (yes, no).

Data Analysis

We conducted univariate analytics to confirm that the variables SMI and SES had a normal distribution. We checked the K6 scores to confirm that they had a normal distribution and concluded they were not normally distributed. The SMI variable,

which was derived from the K6 score, and the CVD variable were both coded as binary categorical variables.

The variables included at first were SMI, SES, Sex, Age, Health insurance, and Access to medical care. We checked if the variables we correlated with CVD first, then we checked whether they were intercorrelated with one another. Variables that were not correlated with CVD were not included in the final adjusted model (i.e. Health insurance, Access to medical care). Sex was also not correlated with CVD but remains due to it's the importance within the literature. After the univariate analyses, we conducted logistic regression analyses unadjusted and then adjusted for age and sex. We derived odds ratios and 95% confidence intervals. The analysis was run in SAS 9.4 using survey commands and DOMAIN statements to output results for our selected population.

Human Subjects

The proposed study was submitted to and reviewed by the University of Maryland Institutional Review Board for approval. The study will utilize secondary data and none of the data will be linked to specific participants.

Chapter 3: Results

Table 1 details the exclusion criteria for the study sample of African Americans. The remaining sample size was 3635 African Americans.

Table 1: Guide to determining sample from 2015 NHIS		
	Actions	**Current number of African Americans in sample**
Step 1	Import Person dataset	14242
Step 2	Import Sample Adult dataset	18915
Step 3	Import Family dataset	18915
Step 4	Import Household dataset	18915
Step 5	Deleting African Americans 18 years old and under	11453
Step 6	Deleting African Americans with incomplete K-6 score data	4349
Step 7	Deleting African Americans with incomplete SES data	3686
Step 8	Deleting African Americans with incomplete CVD data	3673
Step 9	Deleting African Americans with incomplete health insurance and health access data	3635

Table 2 shows the sample demographics. The analytic sample was comprised of

55.3% female with an average age of 49 years old. Roughly 4% of the sample had an

SMI, while 9.3% of the sample had CVD. Forty six percent of African Americans

were considered low SES, 38.8% were considered middle SES, and 20.6% were

considered high SES.

Table 2: Sample Demographics of African American Respondents within 2015 NHIS			
	Frequency	**Percentage**	**Standard Error**
Sex			
Male	1412	44.7	0.20
Female	2223	55.3	0.20
Age			
19-39	1208	33.2	0.20
40-59	1305	35.9	0.17
60-79	947	26.1	0.10
80+	175	4.8	0.03
SMI			
No	3501	96.4	0.31
Yes	134	3.6	0.05
CVD			
No	3207	90.7	0.29
Yes	428	9.3	0.09
Family Income			
$0 - $34,999	1475	39.6	0.14
$35,000 - $49,999	450	12.6	0.08
$50,000 - $74,999	574	16.7	0.09
$75,000 - $99,999	387	10.0	0.07
$100,000 and over	749	21.1	0.10
Education			
Less than High School	349	9.6	0.07
High school graduate	717	19.7	0.10
Some college, no degree	1228	33.8	0.13
Bachelor's degree (BA, BS, AB, BBA)	784	22.1	0.10
Master's, professional, or doctoral degree	557	15.0	0.09

Table 3 displays results participants who had CVD by their SES category. The

majority of the sample who reported CVD were classified in the low SES category.

According to the Chi Square test (not shown) there is a statistically significant relationship between CVD and SES (X^2 =7.07, p<0.0291). The results from the Chi-Square test for the relationship between SMI by SES were not statistically significant (p<0.4243).

Table 4 displays results for participants who had CVD by their SMI classification. A majority of the sample reported that they did not have a SMI. The Chi Square test results for CVD by SMI, which are not displayed in the table, were statistically significant (X^2 =9.28, p<0.0023).

Table 3: Weighted Frequency of SES by CVD, N = 3635				
SES	**Has CVD**	**Frequency**	**Percent**	**Standard Error**
Low	*No*	1374	38.0	1.06
	Yes	210	4.8	0.46
	Total	1584	42.7	1.11
Mid	*No*	1154	33.3	1.06
	Yes	148	2.9	0.30
	Total	1302	36.2	1.07
High	*No*	679	19.4	0.94
	Yes	70	1.6	0.30
	Total	749	21.1	0.95
Total	*No*	3207	90.7	0.68
	Yes	428	9.3	0.68
	Total	3635	100	

Table 4: Weighted Frequency of SMI by CVD, N = 3635				
SMI	**Has CVD**	**Frequency**	**Percent**	**Standard Error**
No	*No*	3100	87.8	0.77
	Yes	401	8.6	0.60
	Total	3501	96.4	0.45
Yes	*No*	107	2.9	0.41
	Yes	27	0.7	0.19
	Total	134	3.6	0.45
Total	*No*	3207	90.7	0.68
	Yes	428	9.3	0.68
	Total	3635	100	

Table 5 shows the logistic regression results for individuals with CVD in either the middle or high SES categories. Neither middle nor high SES categories were statistically significantly associated with CVD in the adjusted model. There was an inverse association between being in the low SES category with having CVD. Those diagnosed with a SMI had 2.10 times the odds of having CVD compared to those without an SMI diagnosis.

Table 5: Odds ratio of Unadjusted and Adjusted Model, N = 3635		
	Unadjusted OR (95% CI)	**Adjusted OR (95% CI)**
SMI		
No	**Referent**	**Referent**
Yes	1.77 (1.08-3.00)	2.10 (1.21-3.64)
SES		
Low	**Referent**	**Referent**
Middle	1.04 (0.82-1.33)	1.02 (0.80-1.30)
High	0.88 (0.64-1.17)	0.88 (0.65-1.20)

*Adjusted Models controlled for age and sex

Chapter 4: Discussion

This study found there was a statistically significant relationship between CVD and the SES categories overall (p<0.0291). Interestingly according to Table 3, SES had an association with CVD. However upon further analysis of the full logistic regression model in Table 5, neither middle nor high SES were found to be statistically significant to CVD. We reject the null hypothesis that CVD and SES were independent. Table 3 states that CVD decreased in frequency as SES increased, which means that CVD was more prevalent in the middle SES population than in the high SES population in our study. Additionally according to the Chi Square test, not shown, we report that SMI and SES were independent from one another (p<0.2386) and as such we found no relationship between SMI and SES. It can be noted that as SES increased as SMI decreased.

Some of the results from the study were consistent with findings from the literature, namely that overall CVD and SES have a relationship with one another (Salleh, 2008). Conversely when determining which SES groups were correlated to CVD we found a statistically significant negative association with SES overall. This may mean that there is reason to believe that individuals in the lowest SES suffer from CVD more so than their higher SES counterparts. This notion that CVD impacts individuals over a SES gradient is consistent with the literature (Kawachi et al., 2005; National Center for Health, 2016). Lastly even though SMI and SES were not correlated, SMI appeared in all SES levels, so there is a possibility that no matter what SES category individuals find themselves apart of everyone has their own stresses to deal with.

Strengths and Limitations

This study will hopefully add to the literature a more dynamic picture of the issues

African Americans face in different socioeconomic levels besides low SES, because

among African Americans there is great SES diversity. According to the Surgeon

General mental health issues are stigmatized within the African American community

(2001). As such the more information researchers can learn about how mental illness

impacts different subpopulations the better able they can construct future studies

(Ronald C. Kessler, 1979; Williams & Collins, 2003). Another strength of the study is

that it tests the K6 scale in the African American community since the K6 scale is

constantly undergoing refinement in minority populations (R. C. Kessler et al., 2003).

We conducted a Cronbach's alpha on the K6 scale and it resulted in a standardized

Cronbach's coefficient alpha of 0.85. The K6 scale is a relatively robust means of

determining whether individuals have an SMI. Lastly, a major strength of the study is

that the NHIS is one source of information on the health of the civilian non-

institutionalized population of the United States. Importantly, since the NHIS over

samples minority populations, it is a good source to help determine issues that affect

minority populations. A limitation of the study is due to the nature of a cross sectional

study it is impossible to determine any temporal effects in the associations. Another

limitation is that the questions only go back in time a month from the interview,

which means participants may not recall the correct information to present to the

interviewer. Also due to the nature of the family income question, any and all

individuals who reported they are in the max income category had to be placed in the

high SES category for our study. The max category for family income is a limitation

because if income cannot be determined precisely, the amount of family members living in the house cannot influence the per capita calculation.

Public Health Significance

The overarching aim of this study was to advance a model to better understand the effects the SES gradient had on African Americans' health outcome. So in doing our research we corroborated some of what the literature already notes, namely that SES and CVD are associated. Also despite in our study SMI and SES lacked an association that does not necessarily mean there is no association in reality. Hopefully other researchers in the future could design studies to better explore the effects of SES on SMI in African Americans and other populations. Our study focused only on African Americans but they are not the only population that could benefit from this type of research. Other populations like Native Americans deal with SES and CVD issues on an even higher occurrence than African Americans (Bureau, 2017). Thus the more that researchers can learn about what potential aspects of having a SMI or what specific features of SES influence health, the better we can reduce high risk populations of their disease burden. Reducing the overall population of its disease burden is a step to a healthier America (Rose, 1981).

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