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Walden University

College of Health Sciences

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Jeanette Marie Higgins

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Walden University
2020

Abstract

Predictors of HIV Testing Among African American Men Who Have Sex with Men

by

Jeanette Marie Higgins

BS, Waynesburg University, 1985

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

August 2020

Abstract

Human immunodeficiency virus (HIV) infections affect more than 1.2 million people living in the United States and disproportionately affect African Americans (AA) men who have sex with men (MSM). The numbers of those who have HIV infections are likely higher due to lack of HIV testing by all individuals living at risk for HIV in the United States. Prior research has been inconclusive in determining the exact cause of the disparity among AA MSM. Therefore, the purpose of this quantitative secondary data study was to explore barriers to HIV testing within the AA MSM population. The sample for this study was a representative sampling from 2000-2016 from the national cross-sectional National Health and Nutrition Examination Survey of 344 African American men who have sex with men and had taken an HIV test. The theory used was the theory of stress, appraisal, and coping by Lazarus and Folkman. The research questions asked what variables (age, income, education status, depression, and access to health care) might be predictive of an HIV test result. Data analysis consisted of descriptive statistics, chi-square, Hosmer and Lemeshow chi-square, and logistic regression analysis. Results revealed that age, income, and educational status were predictive of an HIV test result among AA MSM. Implications for positive social change include using the results of this study to develop an HIV prevention program and train patient navigators on coping strategies for reducing stress and fear of appraisal (stigma) among AA MSM, encouraging them to seek HIV testing and possibly decreasing the incidence and prevalence of HIV among AA MSM.

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Dedication

I dedicate this dissertation to my husband, my children, and my parents. Without their understanding, love, patience, support, and encouragement this journey would never have reached completion.

Acknowledgments

First, I would like to express my sincere appreciation to my chair, Dr. Patrick Tschida, who was very patient with me throughout this journey. Also, I wish to thank my committee member, Dr. Daniel Li, who helped with suggestions for the methods, which were very helpful. Lastly, I wish to thank my URR, Dr. Ronald Hudak, for his patience and guidance throughout this endeavor.

Table of Contents

List of Tables vii

List of Figures viii

Chapter 1: Introduction to the Study 1

Background 1

Problem Statement 4

Purpose of the Study 5

Research Questions and Hypotheses 6

Research Question 1 6

Research Question 2 6

Research Question 3 7

Research Question 4 7

Research Question 5 8

Theoretical/Conceptual Framework 9

Nature of the Study 11

Definitions 12

Assumptions and Limitations 13

Significance 14

Implications for Social Change 14

Summary 15

Chapter 2: Literature Review 17

Introduction 17

Etiology of HIV 17
Origins of HIV 17
HIV as a Public Health Threat 18
African American MSM and HIV 20
Literature Search Strategy 22
HIV Stigma 22
Internalized, Perceived, and Experienced Stigma 24
Caregiver and Healthcare Provider Induced Stigma 24
Depression Resulting from HIV Stigma 25
HIV, Stigma, and HIV Testing 26
Treating HIV Stigma 27
Behavioral Ways to Address Stigma 28
Barriers to HIV Testing 29
HIV Stigma 30
Other Factors Preventing HIV Testing 30
Educational Status and HIV 31
Income Level and HIV 33
Access to Care and HIV 33
Mental Health and HIV 34
Summary 35
Chapter 3: Research Method 37
Research Study Design 37

Sample Design 38
Sample Size 38
Study Selection Criteria 39
Instruments and Scales 39
Why Use NHANES Data? 40
Research Questions and Hypotheses 41
Research Question 1 41
Research Question 2 41
Research Question 3 42
Research Question 4 42
Research Question 5 43
Selection of Variables for the Study 43
Dependent Variable 44
HIV Test 44
Independent Variables 44
Age 44
Access to Care 45
Educational Level 45
Income 45
Mental Health 46
Statistical Analysis 46
Threats to External and Internal Validity 47

Assumptions 47
Limitations 48
Bias 48
Confounding 49
Type I and Type II Errors 49
Ethical Concerns 49
Summary 49
Chapter 4: Results 51
Demographics 51
Research Questions and Hypotheses 52
Research Question 1 53
Research Question 2 53
Research Question 3 53
Research Question 4 54
Research Question 5 54
Statistical Testing 55
Data Analysis Procedure 56
Data Cleaning 56
Results 57
Research Question 1 57
Research Question 2 58
Research Question 3 60

Research Question 4 61
Research Question 5 62
Summary 65
Chapter 5: Discussion, Conclusions, and Recommendations 67
Influence of Independent Variables on HIV Test Results 69
Research Question 1 69
Research Question 2 69
Research Question 3 69
Research Question 4 70
Research Question 5 70
Interpretation of Findings 71
The Influence of Individual Socioeconomic Factors on HIV Testing 71
Research Question 1 71
Research Question 2 72
Research Question 3 72
Research Question 4 73
Research Question 5 74
Limitations of the Study 75
Implications for Social Change, Theory and Practice 75
Recommendations for Further Study 76
Recommendations for Practice 77
Conclusion 77

References 79

List of Tables

Table 1. List of Dependent and Independent Variables 41

Table 2. Demographics for African American MSM 52

Table 3. Logistic Regression for Age 58

Table 4. Logistic Regression for Income 59

Table 5. Logistic Regression for Educational Status 60

Table 6. Logistic Regression for Mental Health 61

Table 7. Logistic Regression for Access to Care 63

Table 8. Summary of Logistic Regression 64

List of Figures

Figure 1. Estimated new HIV diagnoses among most-affected subpopulations in the United States, 2014. 2

Figure 2. Depiction of the theory of stress, appraisal, and coping 11

Figure 3. African Americans with HIV are least likely to receive consistent medical care 21

Figure 4. Lifetime risk of HIV diagnosis among MSM by race/ethnicity 21

Figure 5. Age for African American MSM 57

Figure 6. Income for African American MSM 59

Figure 7. Educational status for African American MSM 61

Figure 8. Mental health for African American MSM 62

Figure 9. Access to care for African American MSM 63

Figure 10. New HIV diagnoses by ethnicity 67

Chapter 1: Introduction to the Study

Background

As of 2014, there are 955,081 individuals in the United States living with diagnosed human immunodeficiency virus (HIV) infection (Centers for Disease Control and Prevention, 2015). HIV disproportionately affects African American (AA) men who have sex with men (MSM; Centers for Disease Control [CDC], 2015). AA represent 44% of all new HIV infections as of 2014 (CDC, 2016. Of those newly diagnosed infections among AA, 73% were men and 26% were women (CDC, 2016). In the United States, 11,201 AA MSM were newly diagnosed with HIV in 2014 (CDC, 2016). HIV infection among AA MSM is a major public health concern because so many of this population are still being infected with HIV. Thirty one antiretroviral drugs (ARVs) are approved to treat HIV (National Institute of Allergy and Infectious Diseases [NIAID], 2012). As of 2014, AA MSM still had the largest number of new infections (10,100; CDC, 2017). The rates among the AA MSM aged 25 to 34 years old continued to rise while other age groups fell (CDC, 2017). There is no cure for HIV, and individuals treated with ARVs are still capable of transmitting the virus to others (CDC, 2015; NIAID, 2012).

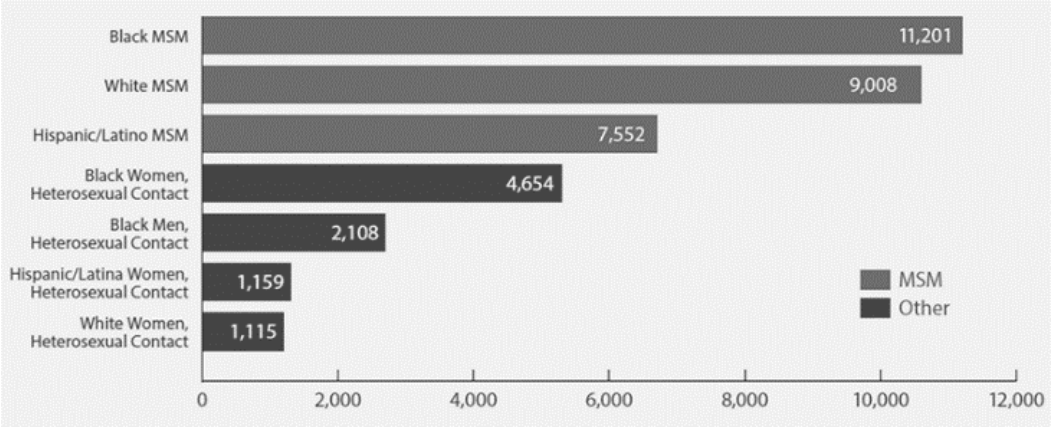

Figure 1. Estimated new HIV diagnoses among most-affected subpopulations most affected in the United States, 2014. Adapted from "HIV Among African American Gay and Bisexual Men," by the Centers for Disease Control. Retrieved from www.cdc.gov/hiv/group/msm

HIV can mutate once the virus enters the body, and this can lead to drug resistant HIV (AIDS Info, 2017). Resistant strains of HIV can develop more rapidly when individuals are not compliant with ARVs (AIDS Info, 2017; NIAID, 2010). ARVs prevent HIV from making copies and multiplying and when one skips doses of ARVs, and then HIV can make copies and mutate making the drugs less effective (AIDS Info, 2017). Drug resistant HIV is a major public health concern (Panichsillapakit et al., 2015; Swierzbinski, Khan, & Parenti, 2015; Victor Campos Coelho et al., 2015). Mascolini (2014) reported that more than 17% of ARV-naïve MSM in one study carried ARV resistant virus. The MSM under 30 years of age were close to a 19% prevalence of transmitting ARV resistant HIV to others (Mascolini, 2014).

Healthy People 2020 (USDHHS, 2015) is attempting to provide behavioral intervention services for disparate MSM populations. Healthy People 2020 (USDHHS,

2015) identified access to care as a way to address some of the disparities facing disproportionately affected populations. Quality health care can provide HIV testing, ARV therapy, screening, and treatment for other sexually transmitted diseases, mental health care, HIV prevention services, and other health care services (USDHHS, 2015). This study has the potential to impact HIV prevention programs.

Pre exposure prophylaxis (PrEP) is an effective biological way to reduce HIV infections in MSM populations by administering ARVs to MSM prior to them testing positive for HIV (CDC, 2013; Hoots et al., 2016; Mansergh, Herbst, Mimiaga, & Holman, 2015). Mansergh et al. (2015) reported that ARV PrEP is an effective means of reducing HIV infections in black and Latino MSM since 95% of the men had detectable levels of PrEP ARVs in their blood when tested. This in turn could reduce HIV infections for those MSM who may be bisexual and have partners of both sexes. Hoots et al. (2016) reported that PrEP usage was lower among AA MSM and lower among those with lower incomes and lower educational levels. PrEP is covered by many health insurance plans (Hoots et al., 2016). The 2014 CDC guidelines for PrEP-use suggest that MSM who are not infected with HIV should use PrEP if the MSM are having sex with an HIV-infected partner, are having condomless anal sex, are not monogamous, or have had a sexually transmitted disease within the last 6 months (Hoots et al., 2016).

The role of socioeconomic factors and HIV in the AA MSM population has not been studied extensively. In a study by Diaz et al. (2015) among late presenters of HIV infection among MSM, AA MSM and Latin-American MSM with low educational attainment were found to be more likely to present late with HIV diagnoses. Age was also

found to be a factor for MSM to present late with an HIV diagnosis (Diaz et al., 2015). A PubMed search of socioeconomic status and HIV in AA MSM yielded only 17 articles. A common theme among the articles is access to care (Hussen, et al., 2013; Mayer et al., 2014; Tobin, Cutchin, Latkin, & Takahashi, 2013; Traeger, O'Cleirigh, Skeer, Mayer, & Safren, 2012).

The independent variables in this study were depression, age, educational status, access to health care, and income. Socioeconomic status was identified using income level and educational status. These socioeconomic factors are part of national health surveys. Finding socioeconomic factors to be predictive of obtaining an HIV test may make it possible to target prevention campaigns to the AA MSM or other populations found to be predictive using the same socioeconomic factors.

This study used the National Health and Nutrition Examination Survey (NHANES) datasets, which are a large national sample of the United States population. This study used the NHANES datasets for a 16-year period (2000-2016) to examine provider responses and health seeking behavior of AA MSM. The results of this study have the potential to make an impact on HIV prevention and HIV testing. Chapter 2 includes a more detailed discussion in addition to the literature review addressing the gap.

Problem Statement

HIV continues to disproportionately affect certain racial and ethnic groups more than others in the United States. This is a concern for public health. In the United States as of 2012, the CDC reported that 145,707 AA MSM are living with HIV (CDC, 2016). Twelve thousand sixty-nine AA MSM were diagnosed in 2013 with HIV and 5,804 AA

MSM were diagnosed with acquired immunodeficiency diseases (AIDS; CDC, 2016). Studies have shown that individuals may not seek HIV testing and treatment (Audet et al., 2013; Levy et al., 2014; Sekoni et al., 2012; Starks et al., 2013). The population most effected by not getting an HIV test in the United States is AA MSM (CDC, 2013; Levy et al., 2014). Therefore, it seems that specific factors have not been adequately identified, which may prevent African Americans from being tested for HIV (Schrager, Latkin, Weiss, Kubicek, & Kipke, 2014; Slater et al., 2013). HIV stigma may be one reason that AA MSM may not always get an HIV test; however, stigma may not be the only reason for not getting an HIV test. Either HIV stigma or other potential predictive factors preventing HIV testing need to be reduced within the AA MSM population in order to encourage the use of HIV precautions, HIV testing, and HIV treatment (Audet et al., 2013; Levy et al., 2014; Sekoni et al., 2012; Starks et al., 2013). Because other factors such as access to care may contribute to not getting an HIV test, these factors need to be identified. The research problem was that AA MSM are disproportionately affected by HIV/AIDS and more research is needed to examine possible additional factors that may prevent AA MSM from getting an HIV test. This research explored the other factors that may prevent the AA MSM population from obtaining an HIV test.

Purpose of the Study

This quantitative secondary data study examined the factors associated with not obtaining HIV tests in the AA MSM population using the theory of stress, appraisal, and coping by Lazarus and Folkman (1984). The incidence of HIV infection within the AA community was 12,069 per 100,000 as of 2013 (CDC, 2015). HIV stigma preventing

MSM from using safe sexual practices has been documented (Audet et al., 2013; Sekoni et al., 2012; Starks et al., 2013). More research needs to be conducted to find ways to identify predictors to reduce HIV stigma among minority populations to address this gap (Schrager et al., 2014; Slater et al., 2013). Socioeconomic factors and cultural norms could be used as part of community-based intervention programs to reduce HIV stigma in order to promote safe sexual practices and to encourage HIV testing, as found by Stephenson (2009).

Research Questions and Hypotheses

The research questions asked what variables (age, income, education status, depression, and access to health care) may be predictive of obtaining an HIV test.

Research Question 1

Is age predictive of taking an HIV test for African American (AA MSM?

Null Hypothesis 1 (H_o1): Age will not be predictive of taking an HIV test for AA MSM.

Alternative Hypothesis 1 (H_a1): Age will be predictive of getting an HIV test for AA MSM.

Descriptive statistics, chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of age as the independent variable with the hypothesis. In the logistic regression model, age was used as a predictor variable.

Research Question 2

Is income predictive of taking an HIV test among AA MSM?

Null Hypothesis 2 (H_o2): Income will not be predictive of getting an HIV test for AA MSM.

Alternative Hypothesis 2 (H_a2): Income will be predictive of getting an HIV test for AA MSM

Descriptive statistics, chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of income as the independent variable with the hypothesis. In the logistic regression model, income was used as a predictor variable to test both the research question and the hypothesis.

Research Question 3

Will educational status be predictive of having an HIV test among AA MSM?

Null Hypothesis 3 (H_o3): Educational status will not predictive of getting an HIV test for AA MSM.

Alternative Hypothesis 3 (H_a3): Educational status will be predictive of getting an HIV test for AA MSM.

Descriptive statistics, chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of educational status as the independent variable with the hypothesis. In the logistic regression model, educational status was used as a predictor variable.

Research Question 4

Will depression be predicative of taking an HIV test among AA MSM?

Null Hypothesis 4 (H_o4): Depression will not be predictive of taking an HIV test for AA MSM.

Alternative Hypothesis 4 (H_a4): Depression is predictive of getting an HIV test for AA MSM.

Descriptive statistics, chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of depression as the independent variable with the hypothesis. In the logistic regression model, depression was used as a predictor variable to test both the research question and the hypothesis.

Research Question 5

Will access to healthcare be predicative of having an HIV test for AA MSM?

Null Hypothesis 5 (H_o5): Access to healthcare will not be predictive of taking an HIV test for AA MSM.

Alternative Hypothesis 5 (H_a5): Access to healthcare will not be predictive of taking an HIV test for AA MSM.

Descriptive statistics, chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of access to healthcare as the independent variable with the hypothesis. In the logistic regression model, access to healthcare was used as a predictor variable to test both the research question and the hypothesis. Multiple logistic regression analyses were performed to incorporate the five categorical predictor variables (age, income, educational attainment, mental health, and access to care) and one dichotomous binary outcome variable (taking an HIV test) to address the research questions. Any potential confounders such as age were adjusted for in the statistical analyses. These results of this study may influence HIV prevention and testing in the future. Chapter 3 discusses the methods and the control for the analysis in greater depth.

Theoretical/Conceptual Framework

The theory of stress, appraisal, and coping by Lazarus and Folkman (1984) was used for this quantitative secondary data study. Stress has been defined as the resulting state within a living organism resulting from an interaction with an unpleasant stimuli (Lazarus & Folkman, 1984). Lazarus and Folkman (1984) do not consider stress to be a single variable. A disease such as AIDS would not be considered to be in itself stressful; however, because being exposed to HIV may lead to AIDS, it may be considered to be threatening or harmful and could then be defined as a stressor. Psychological response to stress has been further defined as "coping" (Lazarus & Folkman, 1984). The subjective judgement of the event is used to define the stressor (Lazarus & Folkman, 1984).

Lazarus and Folkman (1984) defined coping as a match between the appropriate amount/type of coping applied to the stressor in question. Cognitive appraisal has been used to categorize an event and any significance on one's well-being from the said event (Lazarus & Folkman, 1984). Lazarus and Folkman (1984) defined cognitive appraisal as primary, secondary, and reappraisal. In a stressful situation, primary appraisal would result from a threat, loss/harm, or a challenge (Lazarus & Folkman, 1984). Secondary appraisal would take in to account the goals of the individual and would evaluate the benefits of the coping strategy used by the individual (Lazarus & Folkman, 1984). Reappraisal would take in to account any new information for an evaluation of the coping strategies used by the individual (Lazarus & Folkman, 1984). Lazarus and Folkman (1984) discuss that coping is the result of a match with the changeability of the environment between the stressor and the form of coping used by the individual.

Stigma from HIV has resulted in self-isolation as the main coping mechanism for AA MSM (Audet et al., 2013). The levels of HIV stigma cannot always be truly assessed. A theory such as the theory of stress, appraisal, and coping could be beneficial to determine the levels of HIV stigma and to identify more effective ways of coping, rather than self-isolating. Those who isolate themselves are less likely to obtain HIV tests (Audet et al., 2013).

This theory supports that how one copes with health outcomes has a direct effect on one's overall health (Lazarus & Folkman, 1984). Positive outlooks were found to be linked to longer mortality in patients with illnesses (Lazarus & Folkman, 1984). Patients who self-isolated and were depressed had shorter survival rates than those who had more social networks (Lazarus & Folkman, 1984). It is possible that patients with positive outlooks who do not self-isolate may be more likely to seek an HIV test.

Cognitive, personal characteristics, and situational factors influence appraisal (Lazarus & Folkman, 1984). The cognitive appraisal process is comprised of primary, secondary, and reappraisal. Vulnerability is related to cognitive appraisal (Lazarus & Folkman, 1984). Personal factors involve what is best for one's well-being, framing what the event means, and forming a basis for deciding on the best outcome (Lazarus & Folkman, 1984). Vulnerability and personal control will play roles in the personal factors of appraisal (Lazarus & Folkman, 1984).

AA MSM are vulnerable to HIV stigma and may not seek HIV testing out of fear of appraisal. Situational factors are first determined by unusualness, predictability, and uncertainty then by "imminence, duration, and temporal uncertainty" (Lazarus &

Folkman, 1984, p. 83). AA MSM may use situational factors when deciding to be HIV tested. If AA MSM feel vulnerable, then they may not have a sense of personal control, which may lead to the fear of appraisal preventing AA MSM from seeking an HIV test.

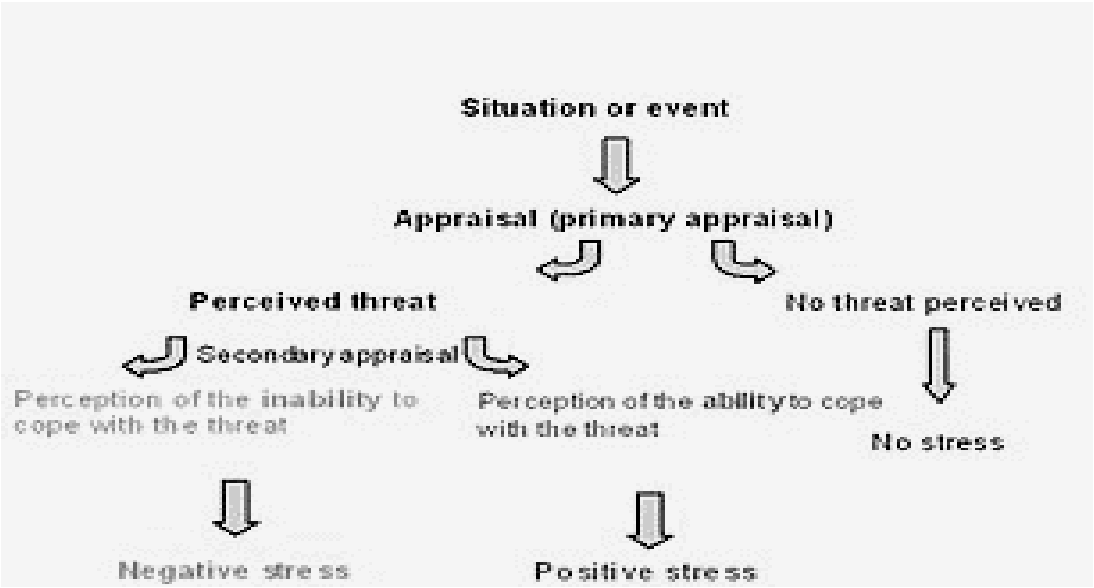

Figure 2. Description of the theory of stress, appraisal, and coping by Lazarus & Folkman (1984). Adapted from https://ivanity.wordpress.com/tag/family/. Copyright 1984 with Springer Publishing Company.

Nature of the Study

The nature of this study was quantitative. Quantitative research is consistent with studies that test theories. This quantitative study helped to identify specific factors that lead to HIV stigma in the AA MSM population. The theory of stress, appraisal, and coping by Lazarus and Folkman (1984) was used to form the basis of the study. This quantitative cross-sectional survey research design used the theory of stress, appraisal, and coping (Lazarus & Folkman, 1984) to determine if there are differences in getting an

HIV test in the AA MSM population related to age, socioeconomic status, educational level, and social support to determine if HIV stigma would prevent the AA MSM from seeking an HIV test. Secondary data was used from the 2000-2016 NHANES collected by the CDC (2016).

Descriptive analysis was conducted on the categorical variables. Means and standard deviations were calculated. Logistic regression analyses were conducted to determine the association between the dependent variable and the independent variables. Correlation coefficients were used to determine statistical significance. The correlation coefficient was used to determine if HIV testing could be predicted from the set of independent variables.

Definitions

Access to care: derived from the sample person questionnaire section. The questions ask if one has employer provided insurance, Medicare/Medicaid, none, and if insurance covers prescriptions (CDC, 2015).

Education levels: less than a high school education (less than 9th grade), high school diploma (9–12 years), some college, and college graduate or above (CDC, 2015).

Household income: taken from family income data (CDC, 2015). The majority of NHANES households were single family and the rest were multifamily households (CDC, 2015).

HIV infection: a positive anti-HIV in the laboratory tests reported to the CDC laboratories for the blood samples collected from the NHANES (CDC, 2011). Blood was

tested using an enzyme-linked immunoassay (ELISA) to detect antibody to HIV and a western blot assay was done as confirmation of positive ELISA tests (CDC, 2011).

Men who have sex with men: "reported sexual behavior between men" (CDC, 2015).

Mental health: defined using question PFQ.063 from the NHANES survey with a response of 14 for depression/anxiety/mental health problem.

Assumptions and Limitations

Public health is attempting to address health disparities that disproportionately affect populations as outlined in Healthy People 2020 (USDHHS, 2015). Identifying sociodemographic variables that may be predictive of getting an HIV test is very important for reducing HIV stigma, which has been reported to increase risky sexual behaviors (Audet et al., 2013; Sekoni et al., 2012; Starks et al., 2013). Studies have shown that AA MSM can change their behaviors to reduce the risk of HIV through proper education (CDC, 2013; Mansergh et al., 2015). Health insurance and access to care have been found to promote HIV prevention and HIV testing (Hussen, et al., 2013; Mayer et al., 2014; Tobin et al., 2013; Traeger et al., 2012). Therefore, I assumed that with sufficient sample size, certain socioeconomic variables would be predictive of getting an HIV test.

An advantage of this study was that I was able to use secondary data consisting of a large representation of the United States population. This facilitates generalization of the results to the population under study. Secondly, the HIV testing data were collected

and standardized increasing the validity of the results. Thirdly, NHANES oversamples the African American population to ensure fair representation (CDC, 2015).

Limitations of the study were few. Limitations were that the NHANES excludes institutionalized individuals, incarcerated individuals, active duty military members, and any citizens living outside of the continental 50 states (Mirel et al., 2013). Homeless and mentally ill individuals were potential sub-populations of AA MSM who may be affected by HIV which were not be surveyed as part of the NHANES survey. This survey was a cross-sectional study, which means the results could not be used for causation, but may still be predictive of the general population being surveyed.

Significance

AA MSM are disproportionately affected by HIV stigma (Audet et al., 2013, August; Kako & Dubrosky, 2013; Young et al., 2011). The factors contributing to not obtaining an HIV test within the AA MSM population need to be identified and addressed (Schrager et al., 2014). Effective measures to clearly identify the factors preventing getting HIV tests have been lacking in the literature (Audet et al., 2013; Levy et al., 2014; Schrager et al., 2014; Sekoni et al., 2012; Starks et al., 2013).

Implications for Social Change

Identifying specific factors within the AA MSM population that prevent this population from being tested for HIV (a) may reduce money spent for health care, (b) may reduce the number of new HIV cases, (c) may reduce the number of deaths that result from HIV/AIDS complications, and (d) may reduce the number of disability cases resulting from HIV/AIDS complications. This research may be good for social change

within this population to identify predictors that could be used to promote health education programs within the AA MSM community to promote condom use and getting tested for HIV. Identifying socioeconomic factors or even lack of access to care can be used to design programs to promote easier access to HIV testing for this population. The research may also make a case for using patient navigators to help AA MSM find care for HIV and to stay in treatment.

Summary

HIV infection among AA MSM is a main public health concern with the increasing number of newly acquired HIV infections each year for this specific demographic population. Existing studies have shown that AA MSM are disproportionately affected by HIV. Some studies have looked at factors contributing to this disparity; however, the studies have not conclusively identified predictive socioeconomic factors that will increase the rates of HIV testing among AA MSM. This study looked at a national representation of AA MSM throughout the United States who participated in the NHANES surveys from 2000 to 2016 to identify predictors for getting HIV tests among AA MSM in the United States. I anticipated identifying specific factors that would increase being HIV tested among AA MSM. I hope to make a case for using patient navigators to link AAMSM to HIV prevention, HIV testing, and HIV treatment.

Chapter 2 begins with the etiology of HIV as a disease, the origins of HIV, HIV as a public health threat, and the disproportionate way AA MSM have been affected by HIV. Chapter 2 includes the literature review addressing the gap of lack of access of care for AA MSM and the need for patient navigators to link them to proper services. HIV

stigma and the types of HIV stigma are discussed in Chapter 2. The discussion of stigma was important to explain that although HIV stigma exists, HIV stigma may not be the sole contributor to AA MSM not seeking HIV testing or treatment. Socioeconomic factors are discussed in Chapter 2 that may be barriers to HIV testing and HIV education.

Chapter 3 details the methodology that was used in the study in addition to the study design and the justification of the study design. The study used NHANES data from 2000-2016, rather than 2004-2016 as originally planned, as part for a cross-sectional quantitative design. The use of multiple logistical regression analysis and chi-square analysis is discussed in Chapter 3. Multiple logistic regressions were used to analyze and to minimize the effect of any confounding variables. Potential bias and any possible ethical considerations are discussed.

Chapter 2: Literature Review

Introduction

The purpose of this research was to examine the factors that may prevent AA MSM from getting an HIV test. This research examined the impact of age, access to care, and other potential socioeconomic barriers to HIV testing among AA MSM. Chapter 2 examines the research both past and present along with any gaps in the literature. This helps to align the theory with the independent variables in terms of getting an HIV test. Chapter 2 ends with a discussion of the factors and their involvement in HIV testing for the AA MSM.

Etiology of HIV

HIV is a retrovirus spread through body fluids and it attacks one's immune system including the CD4 T-cells primarily (CDC, 2016). Left untreated, HIV depletes the body of CD4 positive T-cells, which are an important defense for fighting diseases and infections (CDC, 2017; National Institute of Allergy and Infectious Diseases [NIAID], n.d.). HIV is the virus that causes AIDS (CDC, 2015; NIAID, n.d.). Cancers and opportunistic infections may occur when one's body has been depleted of CD4 T-cells (CDC, 2017; NIAID, n.d.).

Origins of HIV

HIV is believed to have come from chimpanzees in Central Africa (CDC, 2017). As early as the late 1800s, the virus may have crossed over from chimpanzees to humans (CDC, 2017). Over many years, the HIV virus slowly spread from Africa to all other

parts of the world (CDC, 2017). The HIV virus is known to have existed in the United States as early as the mid to the late 1970s (CDC, 2017).

On June 5, 1981 in Los Angeles, California, the first AIDS case was reported in a MSM (CDC, 2017). The CDC (2017) reported that this case was the start of the AIDS epidemic in the United States. On July 3, 1981, 26 MSM in New York and California were diagnosed with Kaposi's sarcoma and pneumocystis pneumonia (CDC, 2017). Both diseases had been found to be associated with AIDS in MSM (CDC, 2017). The CDC (2017) reported in March 1983 that the majority of the cases of AIDS had been among MSM, hemophiliacs, Haitians, and intravenous drug users. Very early on, MSM were disproportionately affected by HIV/AIDS.

HIV as a Public Health Threat

There is no known cure for HIV (CDC, 2016). This makes HIV a threat to public health. The CDC (2016) reports that 50,000 new cases of HIV are reported annually in the United States and another 1.2 million are infected with HIV as of 2012. Left untreated, HIV progresses to AIDS (CDC, 2016). In 2012, 13,712 individuals died of AIDS in the United States (CDC, 2016). The CDC (2017) reports that if the trends continue, one in two AA MSM will be diagnosed with HIV. The disease can be controlled using ARVs (CDC, 2016). Life expectancy for those living with HIV has increased greatly due to ARVs (CDC, 2016). The medications do have side effects, which may result in non-compliance with the medications. Many AA do not trust the health care system, which results in AA not using ARVs (Gaston, Guitierrez, & Nisanci, 2015).

Researchers need to increase HIV testing, treatment, and compliance with medications to prevent the spread of HIV.

HIV continues to disproportionately affect certain racial and ethnic groups more than others in the United States. This is a concern for public health. In the United States as of 2012, the CDC reported that 145,707 AA MSM were living with HIV (CDC, 2016). Twelve thousand sixty-nine AA MSM were diagnosed in 2013 with HIV and 5,804 AA MSM were diagnosed with AIDS (CDC, 2016). Studies have shown that individuals may not seek HIV testing and treatment (Audet et al., 2013; Levy et al., 2014; Sekoni et al., 2012; Starks et al., 2013). The population most effected by not getting an HIV test in the United States is AA MSM (CDC, 2013; Levy et al., 2014). Therefore, specific factors have not been adequately identified, which may prevent AA from being tested for HIV (Schrager et al., 2014; Slater et al., 2013). HIV stigma may be one reason that AA MSM that this population may not always get an HIV test; however, stigma may not be the only reason for not getting an HIV test. Either HIV stigma or other potential predictive factors preventing HIV testing need to be reduced within the AA MSM population in order to encourage the use of HIV precautions, HIV testing, and HIV treatment (Audet et al., 2013; Levy et al., 2014; Sekoni et al., 2012; Starks et al., 2013). Because other factors such as access to care may contribute to not seeking an HIV test, these factors need to be identified. The research problem was that AA MSM are disproportionately affected by HIV/AIDS and more research is needed to examine possible additional factors that may prevent AA MSM from getting an HIV test. This research explored the other factors that may prevent the AA MSM population from obtaining an HIV test.

African American MSM and HIV

AA MSM continue to be disproportionately affected by HIV, with 10,600 newly diagnosed HIV infections in 2014 (CDC, 2016). Young AA MSM (aged 13-24) accounted for 92% of the new HIV infections in the MSM population (CDC, 2016). Many reasons have been reported for the increase in AA MSM aged 13 to 24 years. Responses stated by interviewees were that they (a) were unaware of their HIV status, (b) were not aware of risk for HIV, (c) lacked access to care (see Figure 3), (d) lacked health insurance, (e) had higher rates of sexually transmitted diseases (STDs), and (f) they feared not having confidentiality (CDC, 2016).

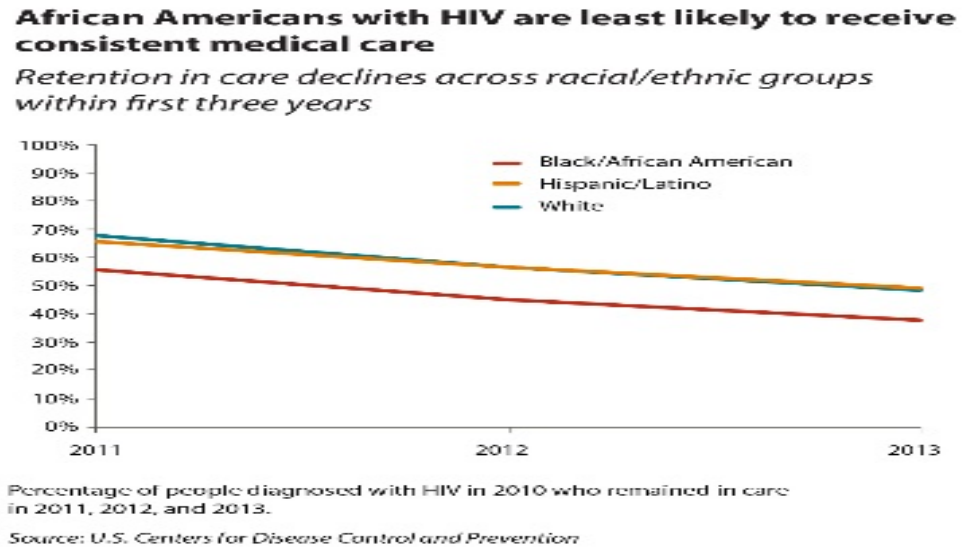

Figure 3.0 African Americans with HIV are least likely to receive consistent medical care. Adapted from "HIV Among African American Gay and Bisexual Men," by the Centers for Disease Control. Retrieved from www.cdc.gov/hiv/group/msm

The CDC (2017) reports that if the trends continue, one in two AA MSM will be diagnosed with HIV.

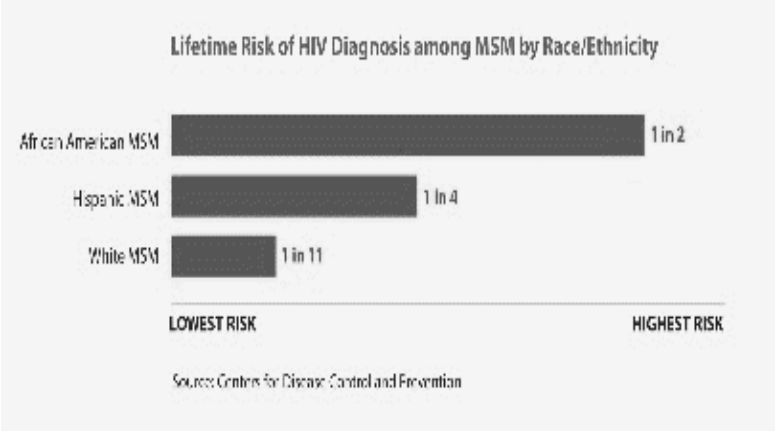

Figure 4.0 lifetime risk of HIV diagnosis among MSM by race/ethnicity. Adapted from "HIV Among African American Gay and Bisexual Men," by the Centers for Disease Control. Retrieved from www.cdc.gov/hiv/group/msm

Literature Search Strategy

I searched PubMed and Medline for articles for the literature review for AA MSM. An initial search on HIV tests yielded 73 articles. A second PubMed search resulted in eight articles for HIV testing, stigma, and AA MSM as the keywords. There were seven PubMed articles for HIV stigma, access to care, and AA MSM. Medline returned 19 articles from 1999 to 2016 for HIV stigma, and HIV test; however, when AA MSM was added, there were no articles found. Searching from 2010 to 2016 for HIV stigma and access to care yielded 57 articles and only one article when AA MSM were added.

HIV Stigma

A literature review by Majahan et al. (2008) found 390 articles about HIV stigma in a PubMed search. The majority of the articles (239) dealt with stigma assessment,

others (76) dealt with theory, and a few (19) articles dealt with psychometric measurements. Some articles (32) dealt with ways to reduce stigma, and an additional number of articles (24) dealt with policies (Mahajan et al., 2008).

HIV stigma is still hard to define (Mahajan et al., 2010). Mental illness has been found to correlate with HIV stigma (Mahajan et al., 2010). Ugarte et al (2013) found fear of HIV transmission to be associated with someone with HIV (ranged from 0.67 to 0.82 on the stigma scale) and shame (.82 to 0.84).

The majority of those living with HIV (98%) expressed concerns of HIV stigma (Sekoni et al., 2012). Less HIV stigma has been found in those with higher levels of educational attainment (p=0.018) (Sekoni et al., 2012). Sekoni et al. (2012) found ethnicity correlated with increased levels of HIV stigma (p=0.043). Age (p<0.001, -0.02, -0.01 CI) was found to be associated with HIV stigma and who related to a "Top" (p<0.01, -0.43, -0.12 CI) sexual role (Starks et. al., 2013). Starks et al. (2013) found internalized homonegativity at a level of α=0.95 and anticipated HIV stigma was at a level of α=0.94. These results showed a positive association of anticipated stigma with internalized stigma (Starks et al., 2013). Starks et al. (2013) discovered higher levels of anticipated stigma were found in younger men. Racial differences were found with black men reporting lower levels of anticipated stigma than did white males (Stark et al., 2013). The association between HIV stigma and sexual roles revealed that a top sexual role had a B= -0.04, $p \leq 0.05$ and a versatile role of B= -0.02, $p \leq 0.05$ with internalized homophobia of B= 0.01, $p \leq 0.01$ (Starks et al., 2013).

Internalized, Perceived, and Experienced Stigma

People living in Tennessee with HIV were found to display internalized, perceived, and experienced HIV stigma (Audet et al., 2013). HIV stigmatization left these individuals to feel isolated, uncomfortable, and fearful due to HIV stigmatization (Audet et al., 2013). The majority of those who were HIV positive used self-isolation as a way to cope (Audet et al, 2013). Audet et al. (2013) found education about HIV did not decrease the amount of HIV stigma in the community. Audet et al. (2013) discussed that more coping mechanisms other than self-isolation can be utilized for dealing with HIV stigma. Many were fearful of disclosing their HIV status which made it difficult to truly assess the level of HIV stigma within this population (Audet et al., 2013). HIV stigma may prevent individuals from using HIV protection or from taking an HIV test.

Caregiver and Healthcare Provider Induced Stigma

Caregivers of HIV positive individuals may contribute to HIV stigma. A study of 1,480 caregivers from the community and 192 caregivers from institutional settings was done by Messner et al. (2010). Messner et al. (2010) reported the majority of the caregivers (over 25%) admitted to HIV stigma by not allowing their child to play with an HIV positive child and by refusing to care for a relative with HIV. Policies need to be developed to address this need for HIV positive individuals and their caregivers. Many individuals already face stigmas based on their solitary status in addition to being HIV positive (Messner et al., 2010).

Attitudes of health care providers have a great impact on those with HIV. Sison et al. (2013) found southern states such as the state of Mississippi have had great racial

disparities for HIV infection in the United States. Financial reimbursement issues prevented the majority of providers from offering HIV testing even though the providers understood the importance of HIV testing (Sison et al., 2013). As found by Sisson et al. (2013), the most common reasons for linking patients to HIV treatment were insufficient treatment and care services.

Depression Resulting from HIV Stigma

Older Adults with HIV (ROAH) study exhibited symptoms of major depression (CES-D ≥ 23) in a study by Starks et al. (2010). The variance in depression (42%) was significantly related to increased HIV-associated stigma, increased loneliness, decreased cognitive functioning, reduced levels of energy, and being younger through multivariate modeling by Starks et al. (2010). Kingori et al. (2013) found felt HIV stigma in 183 of the males and 128 of the females in a study of 370 participants. Kingori et al. (2013) used the PHQ-9 questionnaire and the coefficient of alpha was 0.702 to measure the depression of the study subjects.

Audet et al. (2013) found that the majority (75%) of those living in Tennessee with HIV had fear of status disclosure and had self-isolated themselves as a means of coping. Depression can result from self-isolation. Physical and mental health may be negatively impacted as a result of self-isolation (Audet et al., 2013). Dinos et al. (1994 as cited in Audet et al., 2013) reported other illnesses have been found to be associated with mental health issues. Often those living with HIV internalize the stigma and this leads to depression and mental health problems (Roberts & Miller, 2004 as cited in Kingori et al., 2013).

HIV, Stigma, and HIV Testing

Studies have not conclusively shown reasons for HIV stigma among AA MSM (Maulsby et al., 2014; Quinn et al., 2015; St. Lawrence et al., 2015). St. Lawrence et al. (2015) found that AA MSM are aware of HIV testing and access to care. More research is needed to learn why the AA MSM are aware of HIV testing; however, many chose not to have the testing done. What are the underlying reasons for AA MSM not getting tested for HIV? Stigma, incarceration, and medical mistrust, and internalized homonegativity may all play a role in AA MSM being reluctant to seek HIV testing (Maulsby et al., 2014; Quinn et al., 2015; St. Lawrence et al., 2015).

HIV positive individuals may internalize, anticipate, or enact stigma (Audet et al., 2013). HIV stigma may also be "… anticipated stigma, enacted stigma, …felt stigma, symbolic stigma, instrumental stigma, among others" (Wright et al., 2007; as cited in Kingori et al., 2013, p. 481, para. 2; see also Goffman, 1963; Major & O'Brient, 2005; Alonzo, and Reynolds, 1995; Herek and Capitanio, 1998; Link & Phelen, 2001; Stein & Li, 2008; Visser et al., 2008). Fee (2013) stated that HIV stigma has resulted from fear of the disease itself. Turan, Hatcher, Weiser, Johnson, Rice, and Turan, (2017) reported that HIV-related stigma may lead to stigmatized minority populations from seeking HIV treatment. CD4 counts and viral load measurements have been reported to be predictive of HIV stigmatization and less favorable patient outcomes (Turan et al., 2017).

Poorer patient outcomes have resulted from HIV stigma (Audet et al., 2013). As reported by Kako and Dubrosky (2013), HIV stigma has had a negative impact on overall patient care. HIV knowledge has an inverse relationship with HIV transmission of HIV

(Castro & Farmer, 2005; Fortenberry, McFarlane & Bleakley, 2002; Garcia et al., 2008; Herek, Capitanio & Widaman, 2002; Kalichman & Simbayi, 2003; Nyblade, 2006, as cited in Ugarte et al., 2013, p. 165, para 3). AA MSM may fear disclosure preventing them from seeking care.

Robinson et al. (2013) found that HIV+ AA MSM who self-reported their HIV status were more likely to identify as homosexual (AOR=3.1 95% CI=1.0, 9,5, *p*=.045), to be disabled (AOR=2.4,95%CI=1.1, 5.4, *p*=.026), and to report less homonegativity than HIV-negative AA MSM (AOR=0.7, 98%CI 0.6, 0.9, *p*=.006). In the cross-sectional study by Robinson et al. (2013), HIV-positive MSM were more likely than AA MSM who were HIV-negative to report using condoms (AOR=2.1, 95% CI 1.1, 3.9, *p*=0.018), to respond that they did not engage in sex with casual partners (AOR=4.7, 95% CI=1.6, 13.8, *p*=.005), to respond that they had sex with an HIV-positive monogamous partner (AOR=20.9, 95% CI=6.6, 66.0, *p*=.001), and to respond that they had casual sex with an HIV-positive partner (AOR=6.6, 95% CI=2.9, 17.1, *p*<.001).

Treating HIV Stigma

Routine care needs to incorporate ways to reduce or to eliminate HIV stigma (Kako & Dubrosky, 2013). Kako and Dubrosky (2013) stated that HIV positive individuals have been considered to be different from HIV negative individuals. Kenyans who were HIV positive were ostracized and excluded from the community (Kako & Dubrosky, 2013). Importantly, Nattabi et al. (2012) found HAART treatment has been found to reduce HIV stigma in some settings. Possibly more education about routine care may help to reduce HIV stigma.

There are several ways one can help to reduce stigma. Ways to counteract stigma can be by not disclosing one's HIV status until one is comfortable, practicing one's faith, talking to people, self-comfort, and to have a support network (Kako & Dubrosky, 2013). Stigma may be reduced by using HIV questionnaires. Kingori et al. (2013) found that using a questionnaire reduced HIV stigma. Slater et al. (2009) used the theory of stress, appraisal, and coping by Lazarus and Folkman (1984) and found that life expectancy among older HIV positive men was correlated to ARV adherence and quality of life factors.

Behavioral Ways to Address Stigma

Behavioral changes can be used to combat HIV stigma and to increase HIV testing. A major role can be played by the community in reducing HIV stigma (Stephenson. 2009). Stephenson (2009) found that behavior and economics are two factors that influence HIV stigma in a community. Community-based interventions can be developed once there is an understanding of the HIV perceptions within the community (Stephenson, 2009). Funding for more HIV educational programs that focus on behavioral changes may help to reduce HIV stigma and to increase HIV testing among AA MSM.

According to Kako and Dubrosky (2013), cultural needs have an important role in planning HIV stigma prevention programs. Including one's cultural beliefs may help to build trust and reduce some of the stigma. (Kako & Dubrosky 2013). Culture and community are often intertwined with one another (Kako & Dubrosky 2013). Often HIV

interventions have been tailored to the individual rather than to the community (Kako & Dubrosky, 2013).

Barriers to HIV Testing

Barriers to HIV for AA MSM are lack of peer support, perceptions regarding HIV testing, stigma, anxiety combined with substance abuse, and lack of HIV knowledge (Washington, D'Anna, Meyer-Adams, & Malotte, 2015). Internalized homonegativity was a common theme for AA MSM in their reluctance to test for HIV (Quinn et al., 2015; Rigmor, Weatherburn, Ross, & Schmidt, 2015; Zellner et al., 2015). Anxiety and depression may prevent AA MSM from seeking HIV testing (Li et al., 2015). Li et al. (2015) reported that enacted stigma may prevent people living with HIV (PLWHIV) from seeking care. Fear of disclosure and depression can prevent AA MSM from being tested for HIV (O'Leary et al., 2014). AA MSM have a deep cultural and religious belief system that may influence how comfortable AA MSM may feel about being tested for HIV.

Saleh et al. (2016) found that AA MSM in lower socioeconomic groups have barriers to HIV testing. Basic needs of food, shelter, and clothing can take priority over HIV testing and sexual behavior promotion in lower income populations without a strong social support network. Cultural and racial issues need to be considered as part of a social support system for AA MSM. Feelings of distress, alienation, and stress may be felt by AA MSM without a strong social support system (Saleh et al., 2016). Lack of a social support system can have either protective or risk factors for the AA MSM (Saleh et al, 2016). Lacking strong support networks may lead to AA MSM to feel vulnerable and at risk which could cause the AA MSM to avoid risky sexual relationships in a protective

manner or this may lead to feeling isolated and the AA MSM may seek a risky relationship (negative risk factor) (Saleh et al., 2016).

HIV Stigma

Self-perceived HIV risk seems to play an important role in MSM using condoms (Mimiaga et al., 2013). Mimiaga et al. (2013) reported that some view condoms as a sign of promiscuity. Obtaining condoms and decreased sensation from using condoms were barriers reported for condom usage among the MSM studied by Mimiaga et al. (2013). Loneliness was found to lead to an increase in sexual risk behaviors among MSM (Hubach et al., 2015).

Other Factors Preventing HIV Testing

Stigma alone may not be the sole reason that AA MSM are not seeking HIV testing. There may be additional socioeconomic (SES) factors that may prevent AA MSM from seeking testing. Much of prior research for MSM has focused on institutionalized stigma and structural homophobia and mostly on Caucasian MSM (Buttram & Kurtz, 2014). Buttram and Kurtz (2014) discussed how AA MSM might face greater structural homophobia which may lead to poorer social networks. Socioeconomic disconnection was found as a risk factor for increased HIV infection among younger MSM (Gayles, Kuhns, Kwon, Mustanski, & Garofalo, 2016). AA MSM (23.3%) were found to be the most socioeconomically disconnected by Gayles et al. (2016). Gayles et al. (2016) defined socioeconomic disconnection as not working and not in school. AA MSM have faced additional isolation due to inadequate social support systems and fear of

going against cultural and religious beliefs if one discloses one's HIV status or sexual orientation (Buttram & Kurtz, 2014).

Bisola et al. (2013) saw differences in HIV testing, HIV knowledge, and amount of stigma between blacks born in the United States and Non-United States born blacks in a study in Massachusetts. United States born blacks in their study were more likely to report having a recent HIV test (55.6% versus 41.9%, $p<0.0001$; Bisola et al., 2013). There were differences in HIV knowledge between United States born blacks and Non-United States born blacks in the study by Bisola. Bisola et al. (2013) reported that 61.8% of the United States born blacks had a high knowledge score for HIV compared to 49.1% of the Non-United States born blacks. HIV stigma testing scores for high levels of stigma were 44.4% and 57.7% respectively for United States born blacks and for Non-United States born blacks as reported by Bisola et al. (2013). Individual as well as cultural aspects should be considered to help reduce stigma. Educational status, income level, access to care and mental health may be additional factors to consider.

Educational Status and HIV

Educational status and HIV of AA MSM yielded six articles in a PubMed search of articles published in the last five years. Lower educational status was found to be associated with incidence of HIV infection among AA MSM (Buttram & Kurtz, 2014; Diaz et al., 2014; Gant, Gant, Song, Willis, & Johnson, 2014; Hampton et al., 2012; O'Leary, 2014; Jemmott III, Stevens, Rutledge, & Icard, 2014). Buttram and Kurtz (2014) reported that AA MSM had lower high school completion rates than Caucasian MSM (82.4% vs. 92.8%; $p = .003$). College completion rates for AA MSM and

Caucasian MSM were found to be even more significant of a difference between the two populations of MSM (14.8% vs. 40.0%; $p < .000$) (Buttram & Kurtz, 2014).

Seeking HIV testing and disclosure of HIV status were linked to educational levels in AA MSM (Buttram & Kurtz, 2014; Diaz et al., 2014; Gant, Gant, Song, Willis, & Johnson, 2014; Hampton et al., 2012; O'Leary, Jemmott III, Stevens, Rutledge, & Icard, 2014). Gant et al (2014) conducted a study using data from National HIV Surveillance System and the US Census Bureau's American Community Survey and found that higher HIV diagnosis rates correlated with lower educational levels in both AA MSM (RR:2.75) and non-MSM (RR:4.90). Underhill et al. (2015) reported that educational levels were low among the MSM (high school completed=28%, some college=24.4%, and completed college=28%). Only 12% of the participants were AA MSM and the results for education were not broken down by race/ethnicity by the authors of the study (Underhill et al., 2015).

Robinson et al. (2013) found differences in educational levels between HIV positive and HIV-negative AA MSM in both Boston and Minneapolis-St. Paul. Mean differences were observed between the HIV-negative and the HIV-positive for completing grade 12 or higher (mean=106 versus 122), for completing grade 12 or GED (mean=76 versus 126), and for completing less than grade 12 (35 vs 54) for the AA MSM (Robinson et al., 2013). Similar correlations in lower levels of educational status were observed in the United States blacks and the Non-United States blacks in the study done by Bisola et al. (2013). The completion of grade 12 and some college was 64.7% (United

States blacks) versus 53.9% (Non-United States blacks; Bisola et al., 2013). A lack of HIV education may be contributing to lower levels of HIV testing.

Income Level and HIV

AA MSM tend to have lower levels of income. Poverty has been associated with increased prevalence of HIV (Gant et al., 2014). The prevalence odds ratio for HIV diagnosis for AA MSM versus non-MSM of those below poverty level was 0.81 (95% CI 0.75-0.87), $p<0.0001$; Gant et al., 2014). Gant et al. (2014) explained this discrepant difference in findings as to the lack of HIV testing for AA MSM at lower poverty levels. Levy et al. (2014) discussed that the role that poverty plays on HIV testing has not been well studied or well understood. Robinson, Galbraith, Swinburne Romine, Zhang, and Herbst (2013) reported a positive correlation between poverty levels and HIV risk. There have been other studies that have not found this same correlation between low income and HIV infection (Robinson et al., 2013). More research needs to be conducted to compare poverty levels of AA MSM and HIV infection risk.

Robinson et al. (2013) found that HIV+ AA MSM who self-reported their HIV status were more likely to identify as homosexual (AOR=3.1 95% CI=1.0, 9.5, p=.045), to be disabled (AOR=2.4,95%CI=1.1, 5.4, p=.026), and to report less homonegativity than HIV-negative AA MSM (AOR=0.7, 98%CI 0.6, 0.9, p=.006).

Access to Care and HIV

A PubMed search on access to care, HIV, and AA MSM yielded six articles. Levy et al. (2014) found insufficient evidence regarding access to care for AA MSM since the authors located so few studies for these keywords. Interestingly, Levy et al. (2014) found

that AA MSM were willing to use PrEP, however, unwilling physicians, high cost, and ineffective culturally competent messages were reasons stated as to why AA MSM may not be able to receive PrEP. The CDC (2017) reported that PrEP use may prevent almost 20% of new HIV infections. Underhill et al. (2014) discussed that many AA MSM have a mistrust of healthcare providers which limits their access to care. Many MSM reported negative experiences when disclosing a homosexual relationship to the provider (Underhill et al., 2014).

Bova, Nnaji, Woyah, and Duah (2016) conducted a study looking at access to health care, HIV related stigma, and HIV testing attitudes of African born men participating in the African American Cup soccer tournament. The African American Cup tournament is an annual soccer tournament used to promote HIV awareness in the hope to increase HIV testing and safe health practices. In 2009, it was reported that in the United States there were over 1.5 million African born immigrants (Bova, Nnaji, Woyah, & Duah, 2016). Most participants in the study by Bova, Nnaji, Woyah, and Duah (2016) had access to care with only one participant without insurance or access to care.

Mental Health and HIV

Searching in PubMed for mental health, HIV, and AA MSM yielded two articles. Lack of social support systems has a positive correlation with unprotected sex among AA MSM (Saleh, van den Berg, Chanbers, & Operario, 2016). Fear of HIV disclosure can lead to depression and affect AA MSM's health (Audet, 2013; Saleh, van den Berg, Chanbers, & Operario, 2016). Treating for depression in HIV-positive patients experiencing internalized stigma related to antiretroviral adherence treatment (ART)

association has been found to improve ART compliance in these patient populations (Turan et al., 2017). Robinson et al. (2013) reported in their cross sectional study of HIV positive AA MSM were reporting the use of more mental health services (AOR=1.2, 95% CI=1.0, 1.5, *p*=.054). Optimism was found by O'Leary et al. (2014) to be one of the factors predictive of lower HIV prevalence among AA MSM.

AA MSM with lack of social support can become psychologically vulnerable (Saleh et al., 2016). A convenience sampling of AA MSM by Saleh et al. (2016) discussed how lower SES and race were linked to sexual related high risk behaviors and social support in their study. Not having social support for AA MSM may be associated with feelings of isolation, psychological distress, and stress (Saleh et al., 2016). Choices between basic needs over sexual health behaviors and practices would be made by the AA MSM placing this population at a greater risk of poorer mental health and a greater risk of HIV infection (Saleh et al., 2016).

Summary

Further research is needed to get to the root of HIV stigma and the possible predictive factors either contributing to HIV stigma or the predictive factors leading to increased HIV infection among AA MSM other than HIV stigma. Research has not conclusively shown what causes HIV stigma in AA MSM (Maulsby et al., 2014; Quinn et al., 2015; St. Lawrence et al., 2015). There may be other SES factors contributing to HIV stigma or other SES factors contributing to risky sexual behavior for AA MSM. More studies are needed to learn how to reduce internalized homonegativity felt by AA MSM (Quinn et al., 2015; Rigmor, Weatherburn, Ross, & Schmidt, 2015; Zellner et al., 2015).

Lack of peer support may be a common factor for many of the AA MSM (Kako & Dubrosky, 2013; Saleh et al., 2016; Tobin et al., 2014; Washington et al., 2015). Resilience factors may buffer the effects of HIV prevention strategies (O'Leary et al., 2014). O'Leary et al. (2014) identified several factors pertaining to AA MSM that may act as resilience factors: sexual nondisclosure, alcohol use, drug use, lower frequency of HIV testing, and higher rates of sexually transmitted infections. The theory of stress, appraisal, and coping by Lazarus and Folkman (1984) may be used to identify factors predictive of HIV testing for AA MSM. Patient navigators could be used to help AA MSM navigate the health care system to receive HIV education, HIV testing, and HIV precautions. AA MSM may have a fear of appraisal and a lack of coping needed to obtain an HIV test. Peer support could be provided by patient navigators for those AA MSM who may lack the necessary support to be HIV tested and to practice safe sexual practices.

In Chapter 3, I discuss the study design, the research methods, sample design, sample size, the study selection criteria, instruments and scales used, variables used, the confounding, bias, and limitations of the study.

Chapter 3: Research Method

This chapter outlines a review of the methods used for this research. I used a cross-sectional population-based research design study to determine if there was an association between socioeconomic variables, access to care, and/or mental health status, and whether or not AA MSM seek an HIV test. Issues found from the literature review include access to care, stigma associated with HIV testing, and an unclear association linking socioeconomic variables to AA MSM and HIV testing. Areas addressed in the chapter include the study design, sampling strategy, instrumentation, data collection procedures, data management, and data analysis. I describe the research setting used for collecting the data. The chapter concludes with a description of how I protected the ethical rights of the study participants.

Research Study Design

The research for this study was secondary data analysis using quantitative data collected from 2000-2016 as part of the NHANES study (CDC, 2015). The NHANES study is a cross-sectional study, which cannot show causation; however, it was understood that a possible association between the variables could be found. The participants for the study were randomly chosen because the NHANES study is a national questionnaire comprised of an individual questionnaire, clinical laboratory data, and physical examination results for each participant. The individual survey is self-reported. The various methods of collection added to the validity of the data.

The NHANES survey is a national population based, cross-sectional design used to assess the health and nutritional health of adults and children in the United States every

two years (CDC, 2014). Chronic diseases, sexual practices, psychological measurements, laboratory testing, and socioeconomic variables in addition to other measures are collected as part of the NHANES survey, which is comprised of about 5,000 individuals per survey (CDC, 2014). To increase reliability, AA, the elderly, and Hispanics are over sampled (CDC, 2014).

Sample Design

The representative sampling includes non-institutionalized individuals from all 50 states in the United States (Johnson, Dohrmann, Burt, & Mohadjer, 2014; Mirel et al., 2013). The selection of subjects for 2000 to 2016 was based on the U.S. Census from November 1998 (Johnson et al., 2014). The sample size was selected based on "…probabilities proportionate to a measure of size (PPS)" (see Johnson et al., 2014, p. 4). There were four stages to the sample design for selecting the individuals (Johnson et al., 2014). A total of 27,631 individuals was selected to participate in the 2000 to 2016 NHANES survey, 20,491 individuals were interviewed, and 19,644 people were examined (see Johnson et al., 2014).

Sample Size

The required sample size for conducting a logistic multiple regression analysis was determined using a priori analysis with G Power 3.1.9.2 (see Faul, Erdfelder, Buchner, & Lang, 2009). The research question involving socioeconomic variables used multiple logistic regression because the dependent variable was dichotomous. The dependent variable of having an HIV test was 1 for yes and 2 for no. Age, educational level, access to care, mental health, and income were the additional independent

variables. Using G-power (Faul et al., 2009), I determined that the estimated sample size needed for the multiple logistic regression was 316 using an effect size of 0.25, an alpha of 0.05, and 80% power for the five predictor variables.

Study Selection Criteria

NHANES serological HIV tests results, sexual behavior questionnaire results, and mental health questionnaire answers are available for individuals aged 20 to 69 years old. The survey results for those aged 14 to 17 years of age are protected and are not available for public use. This criterion limits the study to those between the ages of 20 to 69 years of age. Missing results and responses of "don't know" were excluded from this study. The data included demographic data, HIV tests, sexual behavior, access to care data, and mental health data from the 2000 to 2016 NHANES surveys (CDC, 2014).

Instruments and Scales

Analysis of secondary quantitative data was used for this study using NHANES surveys from 2000 through 2016. The NHANES datasets are on the CDC webpage at http://www.cdc.gov/nchs/nhanes.htm. The NHANES surveys started in the 1960s as a study of different populations and different health topics of interest which evolved in to a continuous program of monitoring health, nutrition, diseases, and behaviors in 1999 (CDC, 2014). The interview portion of the survey consists of socioeconomic, dietary, demographic, and health related questions (CDC, 2014). Trained health professionals did the examination portion of the testing and that portion consists of physiological, dental, medical, and laboratory test results (CDC, 2014). Data from these surveys were used to determine disease prevalence, to set health standards, to determine risk factors for

diseases, and to set health policies (CDC, 2014). A sample person questionnaire and a family interview was given in the individual's home by a screener (CDC, 2014). Equipped mobile centers are located throughout the country to perform the health measurements (CDC, 2014). Advanced computer systems with servers were used to collect and the store the data securely. Computer assisted and audio computer assisted interviews were provided on the mobile centers to provide privacy for answering questions of a sensitive nature (CDC, 2014). Touch screen computers equipped with electronic pens were used to collect the data and the data is transmitted within 24 hours (CDC, 2014). The CDC (2014) did pre-tests to ensure validity and reliability and quality assurance checks were built in to the computer systems.

Why Use NHANES Data?

NHANES survey data is a national probability population survey data that has been in existence since the 1960s. The survey used demographic data, examination data, and laboratory data to assess both health risks and health behaviors of the population, which added to the validity of this dataset (CDC, 2014). Data about demographics, HIV tests, sexual behavior, mental health, and access to care are included in the datasets, which made the NHANES data appropriate for this study. Table 1 lists the dependent and independent variables for this study.

Table 1

List of Dependent and Independent Variables. NHANES 2000 to 2016

HIV Test	Age Income Educational Level Mental Health Access to Care

Research Questions and Hypotheses

As stated in Chapter 1, the research questions asked what variables (age, income, education status, depression, and access to health care may be predictive of obtaining an HIV test.

Research Question 1

Is age predictive of taking an HIV test for AA MSM?

Null Hypothesis 1 (H_o1): Age will not be predictive of taking an HIV test for AA MSM.

Alternative Hypothesis 1 (H_a1): Age will be predictive of getting an HIV test for AA MSM.

Descriptive statistics, chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of age as the independent variable with the hypothesis. In the logistic regression model, age was used as a predictor variable.

Research Question 2

Is income predictive of taking an HIV test among AA MSM?

Null Hypothesis 2 (H_o2): Income will not be predictive of getting an HIV test for AA MSM.

Alternative Hypothesis 2 (H_a2): Income will be predictive of getting an HIV test for AA MSM.

Descriptive statistics, chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of income as the independent variable with the hypothesis. In the logistic regression model, income was used as a predictor variable to test both the research question and the hypothesis.

Research Question 3

Will educational status be predictive of having an HIV test among AA MSM?

Null Hypothesis 3 (H_o3): Educational status will not predictive of getting an HIV test for Aa MSM.

Alternative Hypothesis 3 (H_a3): Educational status will be predictive of getting an HIV test for AA MSM.

Descriptive statistics, chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of educational status as the independent variable with the hypothesis. In the logistic regression model, educational status was used as a predictor variable.

Research Question 4

Will depression be predicative of taking an HIV test among AA MSM?

Null Hypothesis 4 (H_o4): Depression will not be predictive of taking an HIV test for AA MSM.

Alternative Hypothesis 4 (H_a4): Depression is predictive of getting an HIV test for AA MSM.

Descriptive statistics, chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of depression as the independent variable with the hypothesis. In the logistic regression model, depression was used as a predictor variable to test both the research question and the hypothesis.

Research Question 5

Will access to healthcare be predicative of having an HIV test for AA MSM?

Null Hypothesis 5 (H_o5): Access to healthcare will not be predictive of taking an HIV test for AA MSM.

Alternative Hypothesis 5 (H_a5): Access to healthcare will be predictive of taking an HIV test for AA MSM.

Descriptive statistics, chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of access to healthcare as the independent variable with the hypothesis. In the logistic regression model, access to healthcare was used as a predictor variable to test both the research question and the hypothesis.

Selection of Variables for the Study

Selection of the study variables was based on the variables collected as part of the NHANES survey. The covariate of age was based on research evidence of age being a factor for HIV testing. Survey interview data was used to collect demographic variables such as age, educational level, and income. Simple descriptive statistics such as means, proportions, and standard deviations were reported as appropriate. HIV test data was obtained on the mobile units using either the Synthetic Peptide Enzyme Immunoassay (EIA) by Genetic Systems or the Bio-Rad test (CDC, 2014). Positive tests were tested

induplicate using the Genetics System HIV-1/HIV-2 Peptide EIA (CDC, 2014). Confirmatory testing of positive results was performed using the Western Blot Assay (CDC, 2014). Sexual behaviors, mental health, and access to care results were collected from the NHANES questionnaire surveys (CDC, 2014).

Dependent Variable

HIV Test

HIV tests were preliminarily performed by ELISA testing and were confirmed by Western Blot assays (CDC, 2014). Quality assurance and quality control protocols have met the 1988 Clinical Laboratory Improvement Act (CDC, 2014). If the EIA is negative then the test is coded as negative (CDC, 2014). Positive tests were confirmed by Western Blot and if found to be positive then they were recorded as positive (CDC, 2014). The dependent variable of having an HIV test included just those individuals' most recent HIV test, whether positive or negative.

Independent Variables

Age

Age was determined by the birthdate given by the survey respondents. Participants were limited to those aged 20 to 69 years of age. No response or "don't know" was excluded from the data. Age was represented using three groups for a nominal categorical variable with 20 to 29 years old, 30 to 64 years old, and 65 years old and above.

Access to Care

Access to care data was collected using the hospitalization and access to care NHANES survey (CDC, 2014). Questions asked were where do you go for care, what places do you go for care, have you been seen by a doctor, how long has it been since seen by a doctor, have you been hospitalized, and have you talked to a mental health professional within the past 12 months (CDC, 2014). A Computer-Assisted Personal Interview System was used with built-in consistency checks to reduce errors (CDC, 2014). This categorical variable was represented using the nominal scale of two groups: one has access to care and two does not have access to care.

Educational Level

Educational level was obtained from the NHANES demographic survey (CDC, 2014). The nominal variable for education consisted of less than ninth grade, ninth through 11th grade, high school graduate, some college, and college graduate or above were the categories used. Refused to answer, "don't know," and/or missing data were all excluded from the results.

Income

Income was calculated from income/wages, retirement, social security, disability, survivor pension, supplemental income, etcetera. (CDC, 2014). Poverty level was determined by incomes falling 185% below poverty level (CDC, 2014). Refusing to answer or no response was not included in the data for this study. Income was a categorical variable expressed on the nominal scale $0 to $19,999, $20,000 to $44,999, $45,000 to $74,499, $75,000 to $99,999, and $100,000 and above.

Mental Health

Mental health was scored based on the questions such as have little interest in doing things, feeling down, depressed, hopeless, trouble sleeping or sleeping too much, feeling tired or little energy, poor appetite or overeating, feeling bad, trouble concentrating, moving/speaking too slow/too fat, wanting to die, or difficulties (CDC, 2014). Depression was measured using the Patient Health Questionnaire (PHQ-9) which consisted of nine questions about depression over a 2-week period (CDC, 2014). Non-responses or "don't know" were excluded from the study. Depression was used as a categorical variable of two groups with one group is depressed and second group is not depressed.

Statistical Analysis

Inferential and descriptive analysis was done on the NHANES date due to the cross-sectional design. Descriptive analysis was done on the data. Means and standard deviations were calculated. Logistic regression analyses were done to determine the association between the dependent variable and the independent variables. Power was not a concern given the sample sizes used as part of the NHANES surveys.

Statistical analysis was performed using SAS-Callable SUDDAN, Release 11.0.1 for the original NHANES data (CDC, 2014). Reference tables include variable names. Codebooks, documentation, and data files were used for validity and accuracy. Files were imported from the CDC website found at http://www.NCHS.gov (CDC, 2014). All data was merged into the Statistical Package for Social Sciences (SPSS) version 25 using the

SEQID number. Independent, dependent, and covariate variables will be used for descriptive analysis. Forward stepwise regression was used for age as the covariate.

Threats to External and Internal Validity

Creswell (2009) discussed that threats to external and internal validity can occur during the research process. The CDC (2013) has documented that the NHANES survey has been used for more than 40 years showing good construct validity for this survey. External validity can affect our ability to draw correct inferences from the sample data to other populations and settings (Creswell, 2009). The sample size of the NHANES survey helped to minimize the threats to external validity due to narrow sample sizes. This study included surveys over a number of years to help to minimize affects to external validity due to history and treatment (see Creswell, 2009).

Selection and testing are two common considerations for internal validity in a research study (Creswell, 2009). The NHANES survey data helped to minimize these two threats to internal validity. The study participants for NHANES are randomly selected and the same instruments are used for the testing for the study participants.

Assumptions

An assumption is that HIV stigma may prevent AA MSM from being tested for HIV. Stigma can be difficult to measure using a secondary dataset. Access to care is another assumption that may prevent AA MSM from getting an HIV test. These assumptions are important if they can be identified so that variables predictive of HIV stigma and access to care are identified. Suggestions for HIV testing can be made to

improve the rate of HIV testing for AA MSM in the future if predictors for the assumptions can be identified that are predictive of AA MSM seeking an HIV test.

Limitations

Due to the cross-sectional nature of the study causality was not be able to be determined. Participants aged 20 to 69 years of age who were AA MSM were not included in the study. Only non-institutionalized individuals were included which may bias the study since institutionalized and incarcerated people were not included as part of the study.

Bias

Selection and information bias were both potential sources of bias. Selection bias was minimized due to NHANES being a random cross-sectional random sampling of the population. Four stages of sampling are used as part of the NHANES survey process (CDC, 2012). Primary Sampling Units of Stage 1 consisted mainly of individual counties throughout the United States (CDC, 2012). Three secondary sampling units consisting of random sampling were performed (CDC, 2012). A numerical sample weight was assigned to each individual (CDC, 2012). Non-response bias can be a valid concern for surveys. Reasons if known for non-response will need to be reported and addressed to explain reasons for a response not being provided for the survey questions. Information bias such as self-reporting may be a concern; however, with NHANES there were confirmatory tests, which minimized the self-reporting bias. NHANES laboratory tests confirmed HIV testing results.

Confounding

Age was assessed as a possible confounder. Multivariate analysis was conducted. Potential confounders were identified through multivariate analysis.

Type I and Type II Errors

An alpha of 0.05 was used to control for Type I errors. A large sample size was used. Type II errors were minimized using large sample sizes.

Ethical Concerns

Walden University Institutional Review Board (IRB) approval (03-28-18-0340114) was granted to the NHANES survey. By law, the IRB ensures that all laws and protections are followed for patient protection. Rigorous review ensures that patient confidentiality will be ensured throughout the research process. All participants were required to provide written consent. Personal identifiers were excluded from this study. The IRB approval number for the NHANES surveys which was used in this study was 2011-17 (CDC, 2012). This study did not require informed consent because the dataset is public domain.

Summary

A cross-sectional based design was used for this data using the NHANES 2000 to 2016 dataset. A literature review was done to identify appropriate dependent, independent, and covariate variables for the study. Descriptive statistics and multiple logistic regression were used to analyze the data in this study. The associations between the independent variables and the dependent variable were performed along with any potential confounding of covariates. Confounding variables identified through logistic

regression were adjusted in the analyses. Statistical models were used to test for association. Chapter 4 discusses the results and the analysis of the data for this study.

Chapter 4: Results

The purpose of this research was to examine possible socioeconomic barriers to HIV testing. This research examined the influence of age, income, education status, depression and access to health care factors towards HIV testing among AA MSM. This chapter presents the data collected in the terms of the research questions. The first part of this chapter begins with the demographics of the sample, followed by the hypothesis statements and testing of the hypotheses. A description of the data analysis, data cleaning procedures, and the results follow.

Demographics

The 2000 to 2016 NHANES surveys were a cross-sectional survey which sampled a total of 71,053 individuals in the United States. This was a change from the original reported timeframe in Chapter 3 of 2004 to 2014. The change was needed to increase the sample size of AA MSM. A total of 344 AA MSM responded to the surveys. Only 5.6% of the AA MSM had an HIV test result reported as part of the NHANES survey. The predicted sample size was 316 using G-power (Faul et al., 2009).

The ages of the AA men who have sex with men ranged from 20 to 59 years of age (see Table 2). Incomes of less than $30,000 were reported by 17.4% of the AA MSM (see Table 2). The educational level for AA MSM was 34.3% had some college, 28.8% were at least a high school graduate, 20.6% had completed ninth to tenth grades, 14.8% completed college or above, and only 1.9% had completed less than ninth grade of their education (see Table 2). The depression score for the AA MSM were all listed as 20.1%

depressed and 69.9% as not depressed (see Table 2). Access to health care for the AA MSM was 1.2% had no access to healthcare (see Table 2).

Table 2

Demographics for African American MSM

Demographic	NHANES Sample	SD
Age in Years		0.46
20 to 29	87 (28.2%)	
30 to 64		
Income		1.37
$0 to $9,999	10 (4.2%)	
$10,000 to $19,999	15 (6.4%)	
$20,000 to $29,999	16 (6.8%)	
$30,000 to $49,999	38 (16.1%)	
$50,000 to $74,999	84 (35.6%)	
$75,000 and above	73 (30.9%)	
Educational Status		0.95
Less than 9th Grade	4 (1.9%)	
9th to 11th Grade	40 (11.6%)	
12th Grade	99 (28.8%)	
Some College	118 (34.3%)	
College and above	51 (14.8%)	
Mental Health		0.16
Feeling Down/Depressed	69 (20.1%)	
Not Down/Depressed	274 (79.9%)	
Access to Care		0.11
Has Routine Place for Care	340 (98.8%)	
No Routine Place for Care	4 (1.2%)	

Research Questions and Hypotheses

The research questions and hypotheses presented below were developed based on current HIV testing literature for AA MSM.

Research Question 1

Is age predictive of taking an HIV test for AA MSM?

Null Hypothesis 1 (H_o1): Age will not be predictive of taking an HIV test for AA MSM.

Alternative Hypothesis 1 (H_a1): Age will be predictive of getting an HIV test for AA MSM.

Descriptive statistics including frequencies and percentages, Chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of age as the independent variable (age) with the hypothesis. In the logistic regression model age was used as a predictor variable to test this research question and hypothesis.

Research Question 2

Is income predictive of taking an HIV test among AA MSM?

Null Hypothesis 2 (H_o2): Income will not be predictive of getting an HIV test for AA MSM.

Alternative Hypothesis 2 (H_a2): Income will be predictive of getting an HIV test for AA MSM.

Descriptive statistics (frequencies and percentages), Chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of income as the independent variable with the hypothesis. In the logistic regression model income was used as a predictor variable to test both the research question and the hypothesis.

Research Question 3

Will educational status predictive of having an HIV test among AA MSM?

Null Hypothesis 3 (H_o3): Educational status will not predictive of getting an HIV test for AA MSM.

Alternative Hypothesis 3 (H_a3): Educational status will be predictive of getting an HIV test for AA MSM.

Statistical analysis for this research question and hypothesis included descriptive statistics (frequencies and percentages), Chi-square, and Hosmer and Lemeshow chi-square to test the goodness of fit of educational status as the independent variable with the hypothesis. In the logistic regression model educational status was used as a predictor variable.

Research Question 4

Will depression be predicative of taking an HIV test among AA MSM?

Null Hypothesis 4 (H_o4): Depression will not be predictive of taking an HIV test for AA MSM.

Alternative Hypothesis 4 (H_a4): Depression is predictive of getting an HIV test for AA MSM.

Descriptive statistics, chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of depression as the independent variable with the hypothesis. In the logistic regression model depression was used as a predictor variable to test both the research question and the hypothesis.

Research Question 5

Will access to healthcare be predicative of having an HIV test for AA MSM?

Null Hypothesis 5 (H_o5): Access to healthcare is not predictive of taking an HIV test for AA MSM.

Alternative Hypothesis 5 (H_a5): Access to healthcare is predictive of taking an HIV test for AA MSM.

Descriptive statistics (frequencies and percentages), Chi-square, and Hosmer and Lemeshow chi-square were used to test the goodness of fit of access to healthcare as the independent variable with the hypothesis. In the logistic regression model access to healthcare was used as a predictor variable to test both the research question and the hypothesis.

Statistical Testing

In this research study, the statistical testing used included (a) descriptive statistics, including both frequencies and percentages of all five independent variables (see Table 2); (b) chi-square and Homer and Lemeshow chi square goodness of fit tests which compares the outcome of the likelihood of the independent variables rather than estimating the chance; and (c) multiple logistic regression was used to test the research hypotheses (see Table 7). The independent variables of age, income, education status, depression score, and access to healthcare were used in the multiple regression analysis as predictor variables. The dichotomous outcome variable of having an HIV test was the dependent variable. All five of the predictor variables were age, income, educational status, mental health, and access to care. Chapter 4 discusses rejecting hypotheses and any significant relationships amongst variables here.

Data Analysis Procedure

In this research study, inferential statistics were used to formulate conclusions from the NHANES African American men who have sex with men sample population. The software package used for the data analysis was the Social Sciences (SPSS), version 25.0 to code and to compile the scores and summarized values where appropriate. Descriptive statistics such as percentages and frequencies were tabulated for the demographic variables in Table 2. Binary logistic regressions were used to test the five research questions and their associated hypotheses. Multiple logistic regressions were used to test each of the five independent variables of age, educational status, income level, depression score, and access to healthcare for the African American men who have sex with men. All of the data was screened for any missing data. An alpha level of .05 was used in the research study.

Data Cleaning

All data was screened prior to analysis for any missing results. Missing data for cases was removed from the sample population prior to data analysis. Cases were selected based on AA MSM. If there were multiple occurrences of the same sequence number appearing in the dataset, the very last occurrence was used to increase the odds that the participant had an HIV test reported. A total of 344 AA MSM were included in the study (n=344).

Results

Research Question 1

Is age predictive of taking an HIV test for AA MSM? The results to this research question in regard to age being predictive of African American men who have sex with men of taking an HIV test are as follows:

Age. The independent variable of age for the participants were between the ages of 20 to 59 years of age for the African American men who have sex with men. AA MSM between the ages of 20 to 29 years old were 1.2 times as likely to take an HIV test (OR=1.2, p=0.8) than those AA MSM aged 30 years and older (OR=0.68, p=0.4). Figure 5 summarizes the results for age.

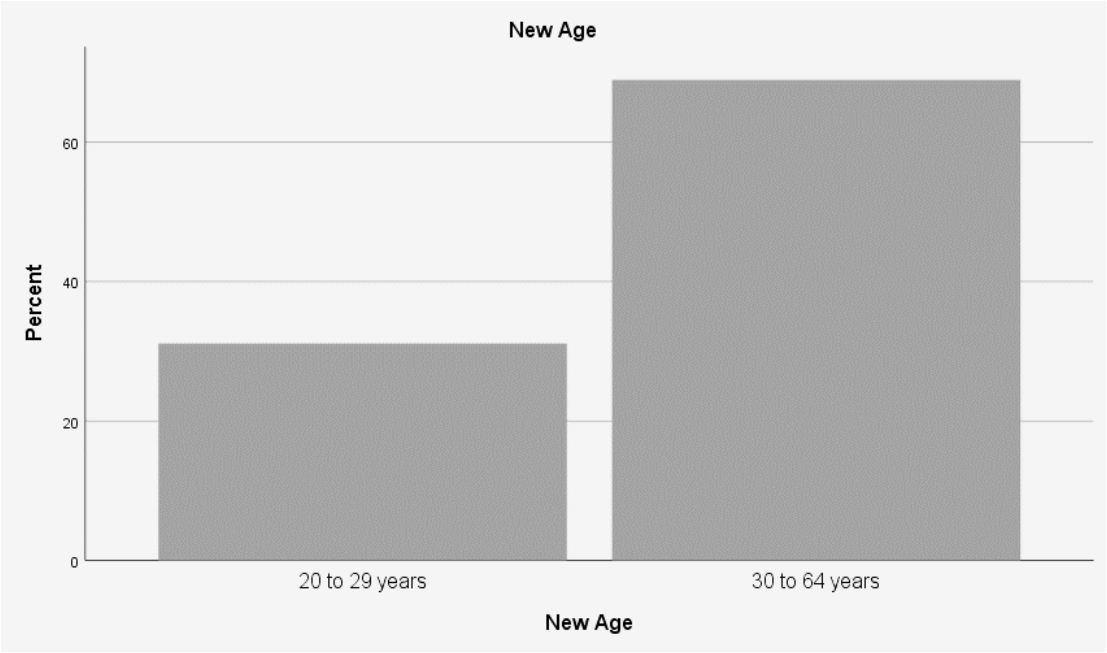

Figure 5 Age for African American MSM.

The results related to age are summarized in Table 3.

Table 3

Logistic Regression for Age

Model	Variable Level	B	S.E.	Wald	df	Sig.	Exp(B)	95% CI for Exp(B)	
Step 1	Age								
	Age (20 to 29)	0.178	0.575	0.096	1	0.757	1.196	0.387	3.687
	Age (30 to 64)	-0.382	0.449	0.725	1	0.395	0.682	0.283	1.645

Research Question 2

Is income predictive of taking an HIV test among AA MSM? The results as to if income is predictive of taking an HIV test are as follows:

Income. The independent variable of income for the participants ranged between $0 to $9,999, $10,000 to $19,999, $20,000 to $29,000, $30,000 to $49,999, $50,000 to $74,999, and $75,000 and above. AA MSM making $30,000 to $49,999 were 1.5 times more likely to have an HIV test result (OR=1.5, p=0.6) than those making $75,000 and above (OR=0.4, p=0.4). African American MSM making $20,000 to $29,000 were 1.2 times more likely to have an HIV test result (OR=1.2, p=0.9) and those making $50,000 to $74,000 were 0.7 times likely to have an HIV test result (OR=0.7, *p*=0.7). African American MSM making $0 to $9,999 (OR=0, p=0.5) and $10,000 to $19,999 (OR=0.2, *p*=0.2) were not as likely to have an HIV test result. This was an interesting finding considering that the cumulative percent for those AA MSM making $30,000 to $49,999 was only 16.1%. Figure 6 shows that two higher levels income were found greater than $49,999. AA MSM making $20,000 to $29,000 were the group next most likely to have an HIV test result. AA MSM earning $20,000 to $29,000 had a cumulative percent of only 6.8%.

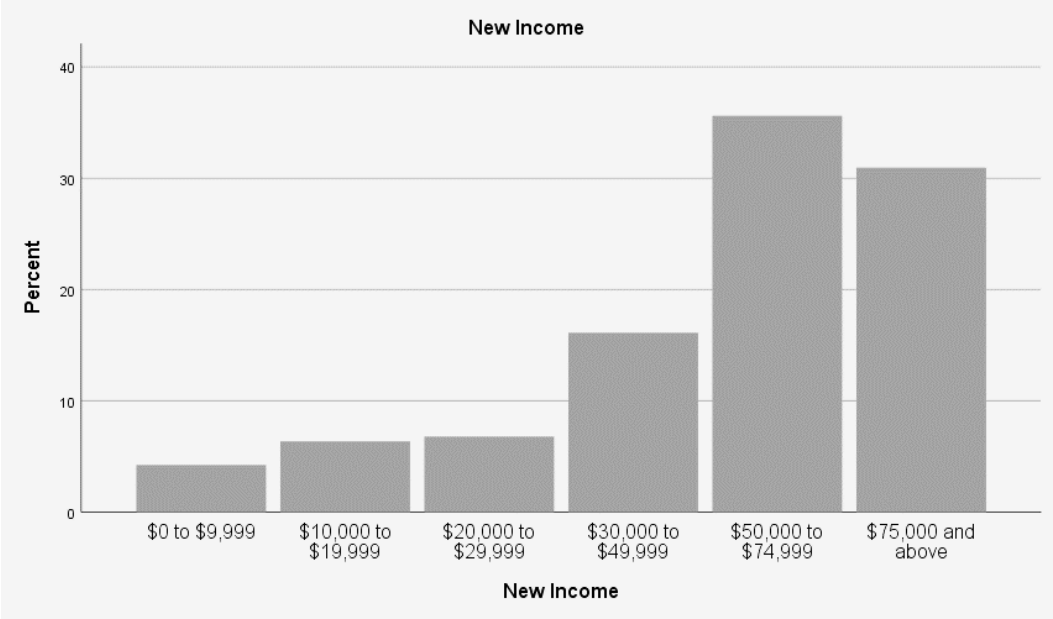

Figure 6 Income for African American MSM

Income is summarized in Table 4.

Table 4

Logistic Regression for Income

	Income	B	S.E.	Wald	df	Sig	Exp(B)	95% CI for Exp(B)	
Step 1	$ 0 to $9,999	0	0	3.207	4	0.524	0	0	0.000
	$10,000 to $19,999	-1.674	1.299	1.661	1	0.198	0.188	0.015	2.392
	$20,000 to $29,999	0.172	0.938	0.034	1	0.855	1.187	0.189	7.471
	$30,000 to $49,999	0.374	0.784	0.227	1	0.634	1.453	0.312	6.758
	$50,000 to $74,999	-0.297	0.689	0.186	1	0.666	0.743	0.193	2.867
	$75,000 and above	-0.969	1.168	0.688	1	0.407	0.379	0.038	3.746

Research Question 3

Will educational status be predictive of having an HIV test among AA MSM? The results for if educational attainment was predictive of having an HIV test result for AA MSM are as follows:

Educational status. The independent variable for educational status ranged from less than ninth grade and through eleventh grade, high school graduate (Grade 12), some college, and college graduate and beyond. AA MSM who completed some college were 1.5 times more likely to have an HIV test result (OR=1.5, p=0.6) than those who were high school graduates (OR=1.2, *p*=0.9). Higher levels of educational attainment were not more likely to result in the AA MSM in having an HIV test result since college graduates and above were only 0.7 times likely to have an HIV test result (OR=0.7, *p*=0.7). AA MSM only completing grades up to 11th grade were not very likely to have an HIV test result (OR=0.2, *p*=0.2). The results for educational status for the AA MSM are summarized in Table 5.

Table 5
Logistic Regression for Educational Status

	Educational Status	B	S.E.	Wald	df	Sig	Exp(B)	95% CI for EXP(B)	
				3.207	4	0.524			
Step 1	Less than 9th to 11th Grade	-1.674	1.299	1.661	1	0.198	0.1875	0.015	2.392
	12th Grade	0.172	0.938	0.034	1	0.855	1.187	0.189	7.471
	Some College	0.374	0.784	0.227	1	0.634	1.453	0.312	6.758
	College Graduate and above	-0.297	0.689	0.186	1	0.666	0.743	0.193	2.867

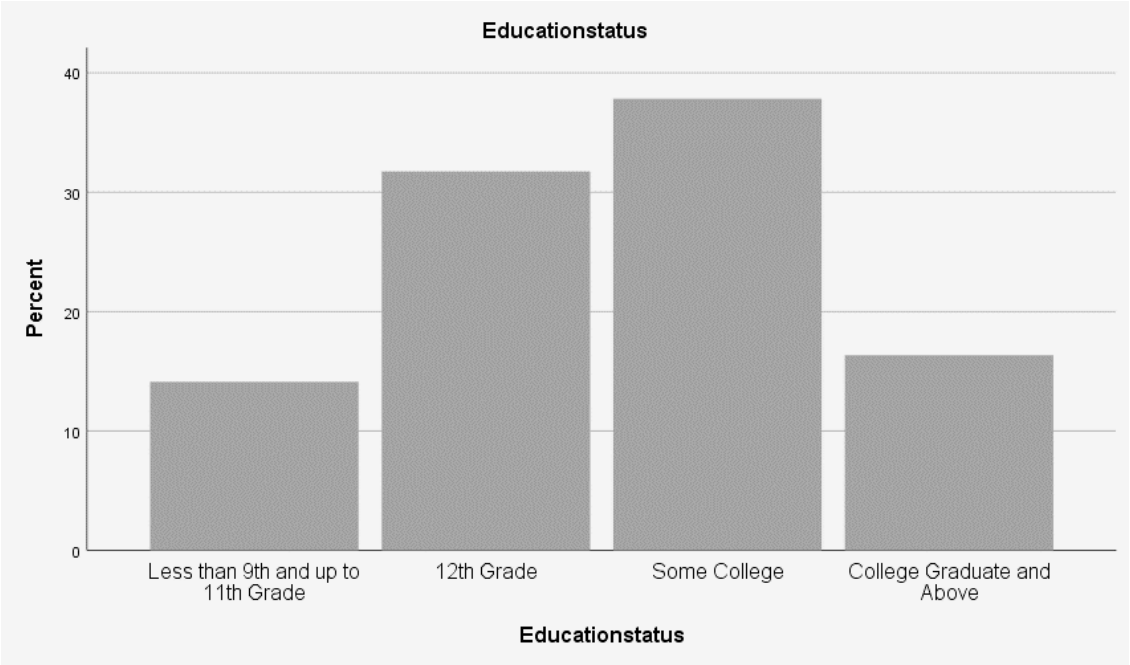

Figure 7 Educational status for African American MSM

Research Question 4

Will depression be predicative of taking an HIV test among AA MSM? The results as to whether depression was predictive of AA MSM in having an HIV test result are summarized in Table 6.

Table 6

Logistic Regression for Mental Health

	Mental Health	B	S.E.	Wald	df	Sig	Exp(B)	95% CI for Exp(B)	
Step 1	Feeling Down/Depressed	0.415	0.545	0.581	1	0.446	1.514	0.521	4.403

Mental health. The independent variable for depression asked the participants if they were feeling down or depressed. AA MSM who felt down or depressed were 1.5

times more likely to have an HIV test result (OR=1.5, *p*=0.4) than those who were not feeling down or depressed. Figure 8 clearly shows that the majority of the African American MSM did not self-report as feeling down or depressed.

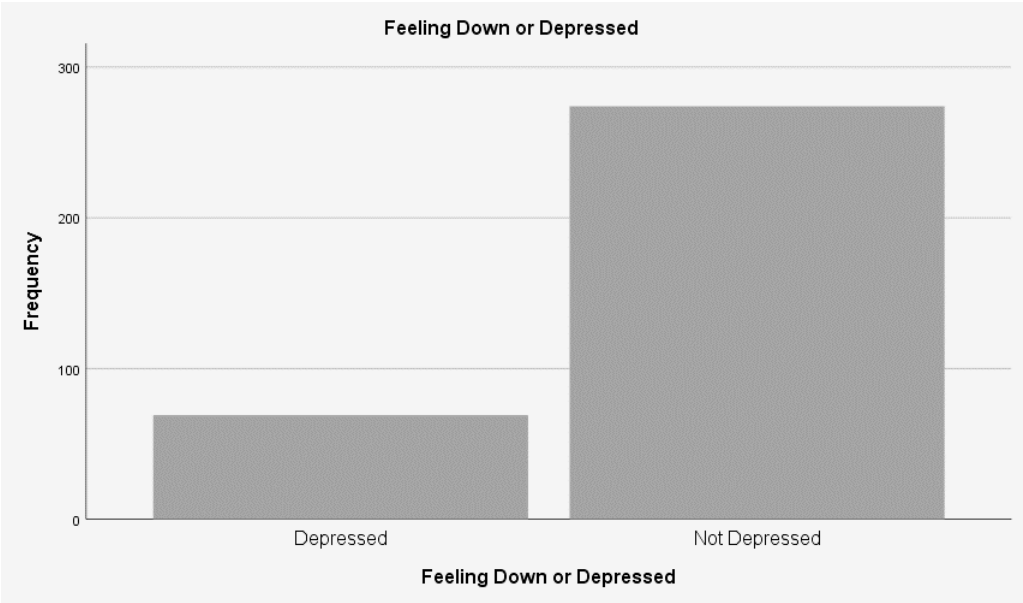

Figure 8 Mental health for African American MSM

Research Question 5

Will access to healthcare be predicative of having an HIV test for AA MSM? The results as to whether access to care was predictive of AA MSM in having an HIV test result are summarized in Table 7.

Access to care. The independent variable for access to care asked the participants if they were feeling down or depressed. AA MSM who had access to routine care were 0.2% more likely to have an HIV test result (OR=0.2, *p*=0.1) than those who did not have a routine place for care. Access to care did not appear to be a predictor of AA MSM

getting an HIV test. The majority of AA MSM reported that they have a routine place to go for care as shown in Figure 9.

Table 7

Logistic Regression for Access to Care

	Access to Care	B	S.E.	Wald	df	Sig	Exp(B)	95% CI for Exp(B)	
Step 1	Routine Place for Care	-1.866	1.189	2.462	1	0.117	0.155	0.015	1.592

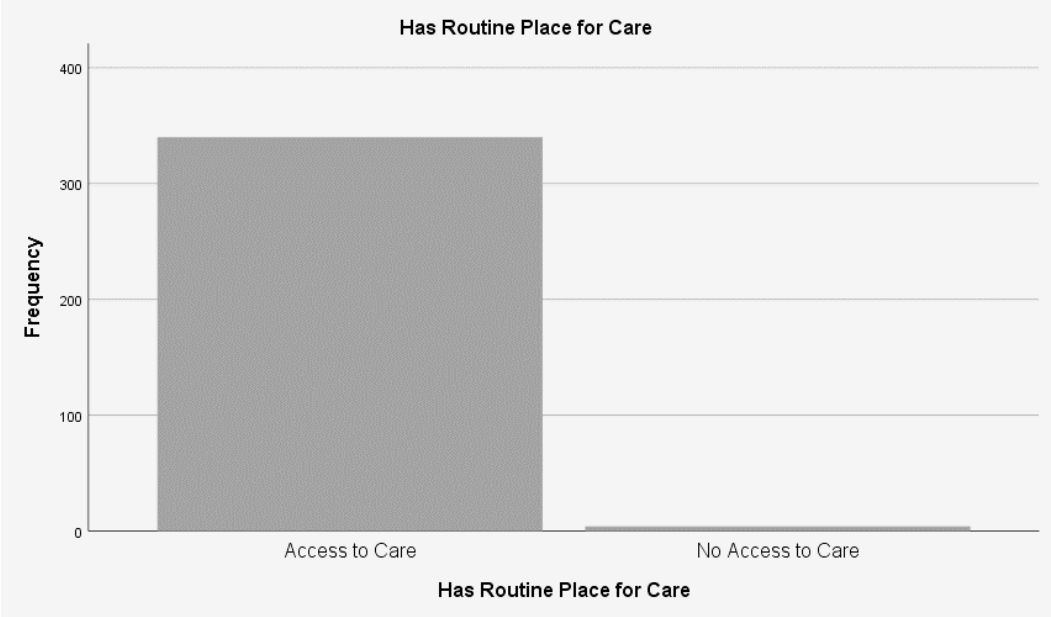

Figure 9 Access to care for African American MSM

The summary results for multiple logistic regression results for the A MSM are shown in Table 8.

Table 8

Summary of Logistic Regression

	Age	B	S.E.	Wald	df	Sig.	Exp(B)	95% CI for Exp(B)	
Step 1	Age								
	Age (20 to 29)	0.178	0.575	0.096	1	0.757	1.195	0.387	3.687
	Age (30 to 64)	-0.382	0.449	0.725	1	0.395	0.682	0.283	1.645
	Income								
	$0 to $9,999	0.000	0.000	3.207	4	0.524	0.000	0	0.000
	$10,000 to $19,999	-1.674	1.299	1.661	1	0.196	0.188	0.015	2.392
	$20,000 to $29,999	0.172	0.938	0.034	1	0.855	1.187	0.189	7.471
	$30,000 to $49,999	0.374	0.784	0.227	1	0.634	1.453	0.312	6.758
	$50,000 to $74,999	-0.297	0.689	0.186	1	0.666	0.743	0.193	2.867
	$75,000 and above	-0.969	1.168	0.688	1	0.407	0.379	0.038	3.746
	Education Status								
	Less than 9th Grade to 11th Grade	-1.674	1.299	1.661	1	0.198	0.1875	0.015	2.392
	12th Grade	0.172	0.938	0.034	1	0.855	1.187	0.189	7.471
	Some College	0.374	0.784	0.227	1	0.634	1.453	0.312	6.758
	College and Above	-0.297	0.689	0.186	1	0.666	0.743	0.193	2.867

Only 5.5% of the AA MSM surveyed had an HIV test result reported in the NHANES survey. The only independent variable statistically significant for AA MSM in having an HIV test result was income (X^2=8.079, *p*=0.152). The likelihood ratio test for income has a p=0.002 which shows that income in the full model statistically significantly predicts the dependent variable. The likelihood ratio test for age, the potential covariate, had an X^2 =0.04, *p*=0.8 which is not statistically significant meaning

age did not appear to influence the model. None of the other the other independent variables showed any statistical significance in the AA MSM in having an HIV test result.

Summary

Chapter 4 summarized the data analysis process of this study. Chapter 4 re-stated the research purpose statement, gave a summary of the demographics, the statistical analysis results along with the testing of the hypotheses and research questions posed earlier in the study and the results of the final study. This study presented research from the 2000 to 2016 NHANES survey in an attempt to show any statistical association between the dichotomous outcome variable (having an HIV test) and the independent variables (age, income, educational status, mental health, and routine access to care).

This study was comprised of 344 AA MSM sampled throughout the United States. The study participants were between the ages of 20 to 69 years of age. The age group with the highest frequency of reporting was the 30 to 64 year olds (68.9%). The income group reporting with the highest frequency was the group earning $50,000 to $74,999 (35.6%). The educational status reporting at the highest frequency was those completing at least some college (34.3%). The highest frequency of reporting for mental health were those not depressed (79.9%). As for access of care, those reporting the highest frequency were those who had a routine place to go for care (98.8%).

Statistical testing was performed using SPSS 25. The statistical testing shows that only income of $20,000 to $29,000 was significantly associated with AA MSM having an HIV test. Those aged 20 to 29 years were 1.2 times more likely to have an HIV test than

those aged 30 to 69 years old. AA MSM participants earning $30,000 to $49,999 were 1.5 times more likely to have an HIV test. The AA MSM graduating with some college were 1.5 times more likely to have an HIV test than the others. Those not depressed were 1.5 times to have an HIV test result. Access to care showed that those with routine access to care were 0.16 times more likely to have an HIV test than those without any routine access to care.

Chapter 5 presents a detailed interpretation of the findings from Chapter 4. The interpretation and possibilities for social change is the focus for Chapter 5.

Chapter 5: Discussion, Conclusions, and Recommendations

The main purpose of this research was to find barriers to HIV testing within the AA MSM population. This research examined the socioeconomic predictors for AA MSM to obtain an HIV test result as part of the NHANES survey. This study looked at the influence of the socioeconomic factors of age, income, educational status, mental health, and access to care towards the AA MSM having a reported HIV test result to NHANES.

AA MSM have been disproportionately affect by HIV (CDC, 2020). In 2018, 9,756 of the new HIV diagnoses were among adult and adolescent AA MSM (CDC, 2020). This resulted in 37% of the new HIV diagnoses being amongst AA MSM (CDC, 2020). The new HIV diagnoses by ethnicity are shown in Figure 10 (CDC, 2020).

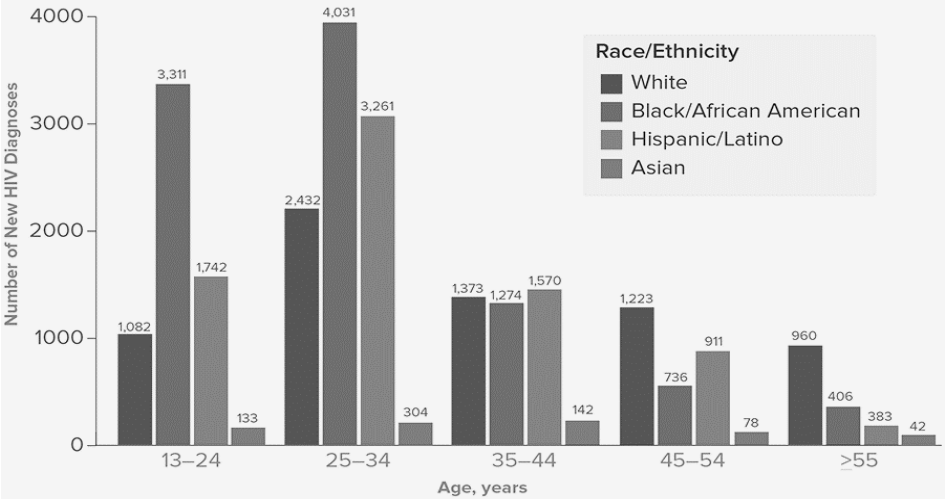

Figure 10. CDC new HIV diagnoses by ethnicity. Adapted from "HIV Among African American Gay and Bisexual Men," by the Centers for Disease Control. Retrieved from www.cdc.gov/hiv/group/msm

The largest increase amongst the AA MSM was observed in the 13 to 24- and 25- to 34-year old age ranges. This study was not able to look at participants younger than 20 years of age due to privacy issues. Future studies may be better designed by dividing the age in to more than two categories to look at 20 to 25 years, 26 to 30 years, 31 to 34 years, 35 to 45 years, and 45 years and above since those aged 13 to 24 and 25 to 34 years old seem to be the most impacted for AA MSM. A study examining income by age may be of benefit because this study revealed statistical significance for having an HIV test for those making $20,000 to $29,000.

The main purpose of this research was to find barriers to HIV testing within the AA MSM population. This research examined any possible influence of age, income, educational status, depression, and access to care variables towards HIV test results reported to NHANES among AA MSM in the United States.

AA MSM are disproportionately affected by HIV (CDC, 2017). The CDC (2020) reports that 9,756 of the 37,832 new HIV diagnoses were adult and adolescent black AA MSM, and A MSM comprise 37% of HIV diagnoses among gay and bisexual men.

Influence of Independent Variables on HIV Test Results

Research Question 1

Research question 1 examined the relationship between age and having an HIV test for the AA MSM. Age was categorized as 20 to 29 years and 30 to 69 years of age. AA MSM aged 20 to 29 years were 1.2 times more likely to have an HIV test than those aged 30 to 69 years old. The statistical significance for those aged 20 to 29 years old was p=0.757 which is not statistically significant. The group aged 30 to 69 years old was not statistically significant (p=0.395).

Research Question 2

Research question 2 examined the relationship between income and having an HIV test. None of the income levels were found to be statistically significant. Income levels of $20,000 to $29,000 showed the strongest statistical correlation (p=0.9) followed by incomes of $50,000 to $74,999 ($p$=0.7). Income levels of $10,000 to $19,999 showed the weakest statistical correlation (p=0.2).

Research Question 3

Research question 3 looked at the relationship between educational status and having an HIV test. High school graduates were 1.7 times more likely to have an HIV test than the others. Those completing college and above were 0.80 times more likely to have

an HIV test. The individuals completing some college were 0.67 times more likely to have an HIV test. Those completing ninth grade were not likely to have an HIV test.

Research Question 4

Research question 4 examined the relationship between depression and having an HIV test. Those not feeling down or depressed were 1.5 times more likely to have an HIV test. The majority of participants reported not feeling down or depressed (p=0.446).

Research Question 5

Research question 5 asked about the relationship between access to care and having an HIV test. The question asked of participants was if they had a routine place for access of care. Study participants with access to care were 0.115 times more likely to have an HIV test. The majority of the study participants had access to care.

The framework of this study to address the gap in research included the following research questions:

1. Is there a statistically significant association between age and having a reported HIV test result among AA MSM?
2. Is there a statistically significant association between income and having a reported HIV test result among AA MSM?
3. Is there a statistically significant association between educational status and having a reported HIV test result among AA MSM?
4. Is there a statistically significant association between depression and having a reported HIV test result among AA MSM?

5. Is there a statistically significant association between access to care and having a reported HIV test result among AA MSM?

All of the research questions were addressed using the data from the 2000 to 2016 NHANES survey data that examined 71,053 individuals in the United States. Of those 71,053 individuals, 344 were AA MSM included in this study.

Interpretation of Findings

As noted in Chapter 4, there were not any statistically significant findings for this study of AA MSM. This section revisits those results in addition to providing a more in depth interpretation of the results.

The Influence of Individual Socioeconomic Factors on HIV Testing

Research Question 1

Research question 1 examined the possible influence of age on AA MSM having a reported HIV test result in the NHANES survey. Age was divided into two categories: 20 years to 29 years and 30 to 69 years. AA MSM aged 20 to 29 Years were 1.6 times more likely (p=0.8) to have a reported HIV test than those aged 30 to 69 years (p=0.4).

The results of this study showed that younger AA MSM were more likely to have a reported HIV test result than those 30 years of age and older. The literature review revealed a possible lack of HIV education leading to fear of HIV testing and of HIV disclosure. It may be possible that younger AA MSM are receiving more education in HIV prevention.

Research Question 2

Research question 2 examined the possible influence of income on AA MSM having a reported HIV test result in the NHANES survey. Income was divided into six groups: $0 to $9,999, $10,000 to $19,999, $20,000 to $29,000, $30,000 to $49,999, $50,000 to $74,999, and $75,000 and above. None of the income levels were found to be statistically significant. The income range of $20,000 to $29,999 and $50,000 to $74,999 were not statistically significant (p=0.9 and 0.7). The income levels of $75,000 and above or $10,000 to $19,999 or $0 to $9,999 were not statistically significant (p=0.4, p=0.2, and p=0.5 respectively).

Gant et al. (2014) reported that poverty has been associated with increased prevalence of HIV. This study supports that finding. The lower income of $10,000 to $19,999 showed the weakest statistical correlation as reported above. Higher incomes showed stronger statistical correlations with the exception of $75,000 and above was not as strong of a correlation as those making less. Those earning $75,000 and above comprised 30.9% of the population studied.

Research Question 3

Research question 3 examined the possible influence of educational status on AA MSM having a reported HIV test result in the NHANES survey. Educational status was divided into four groups: less than ninth grade and up to eleventh grade, twelfth grade, some college, and college graduate and above. Educational status did not show any statistical significance in this study. Less than ninth grade and up to eleventh grade had a

p value of 0.2, twelfth grade had a value of 0.9, and some college had a *p* value of 0.6, and college and above had a *p* value of 0.7.

Seeking HIV testing has been linked to educational levels in AA MSM (Buttram & Kurtz, 2014; Diaz et al., 2014; Gant, Gant, Song, Willis, & Johnson, 2014; Hampton et al., 2012; O'Leary, Jemmott III, Stevens, Rutledge, & Icard, 2014). Buttram and Kurtz (2014) reported that AA MSM had high school completion rates of 82.4% and college completion rates for AA MSM of 14.8% (Buttram & Kurtz, 2014). This study found high school completion rates of 28.8% and college completion rates of some college of 34.3% for the AA MSM in the NHANES surveys. AA MSM completing college and above was 14.8%.

Research Question 4

Research question 4 examined the potential influence of depression on AA MSM having a reported HIV test result in the NHANES survey. Depression status was divided into two categories: one not depressed and two feeling depressed. Feeling down or depressed was not found to be statistically significant (p=0.446) for AA MSM in having a reported HIV test.

A study by Robinson et al. (2013) reported in their cross sectional study of HIV positive AA MSM were reporting the use of more mental health services (AOR=1.2, 95% CI=1.0, 1.5, p=.054). This study did show that only 20% of the AA MSM reported feeling down or depressed. Only 1.2% reported no access to care. It may be possible that the majority of the AA MSM have services available to them for depression.

Research Question 5

Research question 5 examined the possible influence of access to care on AA MSM having a reported HIV test result in the NHANES survey. Routine access to care was not found to be statistically significant (p=0.1).

The findings of this study support the fact that AA MSM, especially younger AA MSM, may feel stigmatized to have an HIV test (Quinn et al., 2017). Even though the majority reported access to routine care the majority did not have an HIV test. Symptoms of depression and anxiety were reported by Quinn et al. (2017) as barriers to HIV testing especially among younger AA MSM. AA MSM face obstacles from the white community as well as cultural norms within the AA community (Quinn et al., 2017). Quinn et al. (2017) found that antiretroviral medication adherence was positively correlated to public attitudes toward HIV (OR 2.18, 95 % CI 1.20–3.94). Interestingly those who had higher levels of personalized and reported total stigma were less likely to be virally suppressed.

The results of this study show that none of the factors correlated with HIV testing among AA MSM. None of the other variables showed any statistical significance. None of the variables showed any statistical significance. Some variables showed a stronger correlation than others with respect to income and educational status. African American MSM making $30,000 to $49,999 were 1.5 times as likely to have an HIV test result (OR=1.5, p=0.6, 95% CI 0.312-6.758). AA MSM completing some college were 1.5 times as likely to have an HIV test result (OR=1.5, p=0.6, 95% CI 0.312-6.758).

It is important to try to identify important factors that might influence HIV testing behaviors of AA MSM. This information can prove to be useful to HIV researchers and practitioners. Any insight into HIV testing behaviors can prove to be valuable in the community to encourage AA MSM to be tested for HIV. This study shows that African American MSM making incomes of less than $20,000 to and more than $75,000 need to be targeted for HIV intervention programs among AA MSM. AA MSM over the age of 30 need to be the target of more HIV testing intervention programs.

Limitations of the Study

In Chapter 1, limitations were addressed and were confirmed by this study. There were few limitations. One limitation of the NHANES is that certain individuals are excluded from participating: institutionalized individuals, incarcerated individuals, active duty military members, and any citizens living outside of the continental 50 states (Mirel et al., 2013). Additionally, homeless and mentally ill individuals will be potential sub-populations of AA MSM who may be affected by HIV which will not be surveyed as part of the NHANES survey. Very few AA MSM had a reported HIV test result reported to NHANES. The smaller sample size was a limitation of this study. A final limitation is due to the cross-sectional nature of this study causation cannot be determined.

Implications for Social Change, Theory and Practice

This study has implications for social change and for contributing to both theory and practice of public health practice for the AA MSM community. This research demonstrated that more needs to be done to increase HIV testing within the AA MSM community.

The research shows that the theory of stress, appraisal, and coping may be an ideal theory to address HIV stigma and to increase HIV testing among AA MSM. The majority of AA MSM have reported not being depressed and to having access to care. It is fear of appraisal that the self-reporting may not be accurate? These findings make a positive push for the use of patient navigators to work with the AA MSM community to help reduce stress, fear of appraisal, and to help them develop positive coping mechanisms to deal with their possible fear of appraisal which may prevent the AA MSM from being tested for HIV. Active positive coping skills such as being positive and hoping for the best can be used to encourage HIV testing rather than non-positive coping skills such as denial to avoid HIV testing.

Recommendations for Further Study

There are a few recommendations for future research in this field of HIV research for AA MSM. Analyzing the age groups in more than two groups may help to identify any age specific differences in order to better target specific age groups within the AA MSM population. A study including the populations who were not included as part of the NHAHES study: incarcerated individuals, homeless, and military may prove beneficial to collecting data for the community as a whole. A study to look more at depression and access to care that would use instruments other than self –reporting to have a more accurate account of the real barriers to HIV testing among AA MSM. This is where having patient navigators could prove to beneficial in gaining the trust of the AA MSM and in increasing HIV testing rates within this population.

Recommendations for Practice

In the earlier section in this chapter, it was mentioned that more needs to be done to increase HIV testing for the AA MSM population. This is a current public health issue to reduce the incidence and prevalence of HIV infection within the AA MSM community. There are many roadblocks to overcome to make changes in practice. There are problems with securing enough funding for HIV prevention programs and all programs may not be effective for all populations. Patient navigators could be used to target new interventions for AA MSM that would reduce stigma and to help with coping mechanism to encourage more AA MSM to be tested for HIV in the future.

Epidemiologists and public health workers may be able to use the results of this study to target specific sub-populations within the AA MSM community to address and to increase more specific HIV testing behaviors. The NHANES survey provides a tremendous data set of raw data that can be very time consuming to organize in a fashion to provide invaluable information for epidemiologists. Public health workers and epidemiologists may be able to use these findings in present and future practice to increase HIV testing within the AA MSM community using the theory of stress, appraisal, and coping along with patient navigators to gain the trust of AA MSM to be HIV tested.

Conclusion

This study showed that socioeconomic factors among AA MSM were not largely predictive of AA MSM in having an HIV test result reported to NHANES. The study used data from the 2000 to 2016 NHANES survey. This is a cross sectional survey of

secondary data analysis. All of the data was filtered for AA MSM (*N*=433). The AA MSM were selected based on if they had a reported HIV test result in the NHANES survey. SPSS 25 was used in the data cleaning and analysis of the data. Data analysis was comprised of descriptive statistics, chi-square, Homer and Lemeshow chi-square, and multiple logistic regression analysis.

This study did not show any statistically significant association for any of the factors and having an HIV test for the AA MSM. Age was not found to be a covariate for this study. The study did support the literature review in how few of the AA MSM had reported HIV test results. The results of lower income and lower education levels being associated with less HIV testing was supportive of the literature review. This research can be used to improve public health programs within the community for AA MSM to (a) to provide for more HIV research, (b) to improve HIV education intervention programs to decrease incidence and prevalence of HIV in the AA MSM community, (c) to provide guidance for public health HIV intervention programs, and (d) to reduce HIV stigma and promote HIV testing.

This research can reduce the number of AA MSM dying from HIV/AIDS (more than 290,000). Many AA MSM do not know their HIV status. It is important for them to know their status. Forty percent of people in the United States with HIV are AA and more than 40% of new HIV infections occur among AA (CDC, 2016).

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