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Impact of Education on HIV Testing Among African American Women in the United States

Florence Matimbah Mbangowah
Walden University

Walden University

College of Health Sciences

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Florence Mbangowah

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2020

Abstract

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by

Florence Mbangowah

MA, Trinity University Washington DC, 2015

BS, Bowie State University, 2012

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Improved and increased human immunodeficiency virus (HIV) testing among African American women in the United States could facilitate early detection of the virus. The purpose of this cross-sectional quantitative study was to determine if there was a significant association between HIV testing participation and education level (i.e., high school, college, post-college level) based on access to healthcare after accounting for insurance, income, employment, marital status, English language proficiency, and vision quality. The integrated theory of health behavior change, the theoretical framework used for this research, proposes that changes in health behavior can be improved by various factors such as fostering knowledge and increasing self-regulation skills. Data from the 2017 National Health Interview Survey dataset were analyzed using logistic regression. The sample for the study was 3203 African American women who were 30 years and older, living in the United States. The results of the analysis indicated that education level was significantly associated with HIV testing (p = .02), such that higher education level is associated with a greater likelihood of undergoing HIV testing (p = .01). Additionally, better English proficiency was associated with a greater likelihood of HIV testing because enabled patients to improve their communication with clinicians within a health care facility. Finally, participants with a vision problem were less likely to undergo HIV testing than participants without a vision problem (p = .03). The findings of this study could provide evidence for promoting tailored education, culturally competent tools, and educational materials about HIV, as well as improve HIV testing among vulnerable populations, especially among African American women.

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Dedication

This study is dedicated to my husband, Eric Mbangowah, who has supported me to work my way to this level. Not forgetting my children, Zei Mbangowah, Abraham Mbangowah, Dr. Mbangowah Yvette, Armand Mbangowah, and Hosea Mbangowah. During my studies, you all experienced a temporal vacuum during the time that I was in school. I want to say thank you for bearing with me during that period. Thanks to my brother Dr. Joseph Mbuh, and my mom, Mahla Veronica. I know we were behind in a lot of things that we used to do together. I pray that after this, we should be able to have more time together. I cannot conclude without mentioning my dad, Pa Mbuh Bernard, who was an inspiration to my life but is now a blessed memory. To all other family members for whom I have not mentioned names, I have you in mind and I say that you all were an inspiration to me.

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I want to express my gratitude by saying to God be the Glory for helping me to make it to this level. God, I say thank you for directing me to the right path. I had some challenges throughout my entire studies, but God Almighty was there to guide and direct my way. I had an incredible chair and committed team working with me. I acknowledge and express my heartfelt gratitude, and thanks to all of them. Special thanks to my Committee Chair, Dr. Diana Naser, Committee Member Dr. Sriya Krishnamoorthy, University Research Reviewer Dr. Chinaro Kennedy, and the rest of Walden staff for all of their support.

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Chapter 1: Introduction to the Study

Introduction

Community and societal factors such as race and ethnicity can influence the trend of HIV diagnoses among African Americans living in the United States (George, Duran, & Norris, 2014) Siddiqi, Hu, and Hall (2015) concur that race and ethnicity are risk factors to HIV transmission. However, the race or ethnicity of a person may not directly present biological factors that increase infection or exposure to human immunodeficiency virus (HIV; George et al., 2014). Untreated HIV infection could develop into acquired immunodeficiency syndrome (AIDS), which could lead to death (Reif et al., 2014). On average, HIV infection develops into AIDS within 10-15 years without effective medical intervention (Lanier & DeMarco, 2015). Increased HIV test participation may help detect the virus at an early stage, allow the individual the opportunity to start treatment, and prevent transmission of the virus to others. Addressing education status within a given population setting could improve the management of HIV screening/testing and treatment and could reduce the rate of HIV transmission (Lanier & DeMarco, 2015). The positive social change implications of this study include an expansion of knowledge on education level and its impact on HIV testing among African American women. In this chapter, I present the problem statement, background for this study, purpose, nature of the study, research questions, and theoretical framework, as well as assumptions, limitations, and significance of this study.

Background

Sociodemographic characteristics are significantly associated with human immunodeficiency virus (HIV) prevalence and incidence (Denning & Dinenno, 2010; Duthely, Carugno, Suthumphong, Feldman, & Potter, 2019). Age is a possible covariate or confounder that could influence educational attainment and health outcomes including HIV, as well as lifestyle behavior or routine care services received. HIV disproportionately impacts high-risk groups such as low- income families and members of racial and ethnic minorities (Wawrzyniak, Ownby, McCoy, & Waldrop, 2018). Income is a possible covariate or confounder that could influence educational attainment and many health outcomes, including HIV. It could also affect the type of health care or health screening behavior or routine care services received, such as the HIV test.

Seth, Walker, Hollis, Figueroa, and Belcher (2015) suggested that health literacy is closely related to socioeconomic status and education. Health literacy is associated with the risk of infection and the level of adherence to HIV screening, testing, and treatment. HIV education barriers deal with the capacity of individuals or communities to obtain, understand, and interpret necessary HIV preventive measures, screening or testing, services, and health competency to prevent, control, managing HIV infection and AIDS, and improving patient quality of life. Although health education plays an essential role in expanding knowledge, research suggests that a variety of skills and competencies are necessary to understand and utilize health education.

Apart from the adverse health impacts associated with HIV, stigma about HIV and AIDS still exists in the United States (Fatoki, 2016). Persons infected with HIV or

individuals that develop AIDS often do not openly ask for help or may avoid routine screening and treatment to remain anonymous and prevent social stigma (Thomas, Kakkar, & Nimbiakkim, 2018). This study is needed because when patients avoid receiving appropriate medical intervention due to perceived social stigma or social irresponsibility, HIV transmission and the increase in AIDS cases become a serious public health issue (Thomas et al., 2018). Increased HIV test participation may help detect the virus at an early stage, allow the individual the opportunity to start treatment, and may prevent transmission of the virus to others. The identified gap in the literature inspired this research inquiry as a further comparative study to explore the association between HIV test participation and the differential impacts of education level and sociodemographic factors among African American women.

Problem Statement

Failure to engage in HIV testing due to a lack of proper education among African American women in the United States of America is a problem. Social factors such as race and ethnicity influence the trend of HIV diagnoses among African Americans living in the United States (George, Duran, & Norris, 2014). According to Siddiqi et al. (2015), race and ethnicity are risk factors for HIV transmission. In 2016, the Centers for Disease Control and Prevention (CDC) suggested that 17,528 African Americans were diagnosed with HIV in the United States (CDC, 2018). African Americans make up only 12% of the United States population (CDC, 2017a). However, about 43% of African Americans were diagnosed with HIV in 2016 (CDC, 2016). Based on a CDC (2015) report, approximately 152,800 African American women were living with HIV in the United States. At the

national level, about 73.54% of African Americans who are newly diagnosed with HIV are men, while women accounted for around 26.46%; these numbers varied based on state and demographics (CDC, 2016).

Education is an essential factor that could improve health promotion measures and preventative approaches to reduce HIV incidence and prevalence (Kerr et al., 2015). As people become informed and aware of the risk factors of HIV or disease, they adopt the lifestyle or behavioral change to improve their quality of life (Seth et al., 2015). Similarly, gaining knowledge through education can improve health-seeking behaviors such as adherence to treatment recommended and prescribed by health providers to improve patients' quality of life (St. Lawrence et al., 2015). Both the ability to comprehend written and verbal health information and to process numerical data are the basics of functional health literacy that could be enhanced through education (Palumbo, 2015). English proficiency and vision quality could play a role in the comprehension and processing of health information. The exact nature of educational level association with disease is varied by country (Harling & Bärnighausen, 2016). Given the demographic data and social barriers experienced by African Americans in the United States, evaluation of the association between educational attainment and HIV testing among this group is warranted (Harling & Bärnighausen, 2016). Although the role of participation in HIV testing in the prevention of HIV spread and infection among women has been examined, there was no demonstration or findings of the extent to which different education levels, sociodemographic factors, or vision quality, specifically among African American women influenced their routine HIV test participation for diagnosis of HIV. To

address a significant gap as identified in the literature, future research should focus on African American women's characteristics in examining how their education level impacts their participation in HIV testing (Harling & Bärnighausen, 2016).

Purpose of the Study

The purpose of this study was to determine if, among African American women age 30 and older, there was a significant association between HIV test participation and educational level (i.e., high school, college, post-college level) based on access to healthcare, after accounting for insurance, income, employment, marital status, English language proficiency, and vision quality. Learning more about HIV testing could enable medical organizations to focus on improving this aspect of education among the target population of African American women.

Research Questions and Hypotheses

RQ1: Among African American women age 30 and older, is there a significant association between HIV test participation and educational level (i.e., high school, college, post-college level) based on access to healthcare after accounting for insurance, income, employment, and marital status?

H_{o1}: There is no significant association among African American women age 30 and older between HIV test participation and educational level (i.e., high school, college, post-college level) based on access to a regular healthcare facility after accounting for insurance, income, employment, and marital status.

H_{a1}: There is a significant association in African American women age 30 and older between HIV test participation and educational level (i.e., high school, college,

post-college level) based on access to healthcare after accounting for insurance, income, employment, and marital status.

RQ2: Among African American women age 30 and older, is there a significant relationship between educational level (i.e., high school, college, post-college level) and HIV test participation based on English proficiency, and vision quality?

H_{o2}: There is no significant relationship among African American women age 30 and older, between educational level (i.e., high school, college, post-college level) and HIV test participation based on English proficiency and vision quality.

H_{a2}: There is a significant relationship among African American women age 30 and older between educational level (i.e., high school, college, post-college level) and HIV test participation based on English proficiency and vision quality.

Theoretical Framework

The integrated theory of health behavior change formed the conceptual framework for this study. The basis of the unified approach of health behavior change is that providers working directly with patients play an essential part in helping them adopt behavior change (Ryan, 2009). This framework is related to the research questions since it can help analyze the relevance of different factors such as fostering knowledge and beliefs through education on health behavior change. Gaining required knowledge about HIV testing can allow African American women to value their health and participate in HIV tests due to the desire of improving their medical conditions. The second research question directly relates to the operationalization of this theory since it focuses on the link between education and changes in human health. Based on the integrated theory of health

behavior change concept, human behaviors can be altered through an increased understanding of positive health behaviors, health literacy, and continuous practice or application of healthy behaviors (Ryan). An integrated theory of health behavior change concept promotes the idea that individual patients should be responsible for practicing healthy behaviors that influence their health and that doctors, nurses, and health educators play a crucial role in promoting healthy lifestyle choices (Ryan). For negative behaviors, the integrated theory of health behavior change concept was designed to discourage unhealthy behaviors as a mechanism to prevent adverse health outcomes associated with the unhealthy lifestyle or behavior (Ryan).

Most importantly, the integrated theory of health behavior change concept was designed to assess the role of patients' responses in predicting health outcomes as well as understanding the importance of health education or literacy (Ryan, 2009). The research questions for this study include an objective assessment of health-seeking behavior, which is HIV test participation. As a result, because integrated theory drives incentive for a health-seeking expression, the approach is the best-fitted model to explain the findings of this study.

Nature of the Study

A cross-sectional quantitative research design was used to explore the research questions and hypotheses. A quantitative design was most appropriate for this research because numerical data were analyzed for associations and relationships between HIV test participation and educational level. A 2017 secondary dataset from the National Health Interview Survey (NHIS) was used for this research study. The target population

for this research included African American women who were 30 years and older and living in the United States. Women ages 30 and older were purposefully selected in this study because, at the age of 30, it is reasonable to assume that many of the women could have obtained a post-college degree. Because education level is the primary focus of the study, it was possible that including women who were below the age of 30 may have not strategically represent African American women with post-college education (Ryan & Bauman, 2016).

For research question 1, participation in HIV testing was the dependent variable, and the educational level (i.e., high school, college, post-college level) was the independent variable. Access to healthcare, defined as having access to a regular healthcare facility after insurance status, income, employment, and marital status, were the confounding factors. For research question 2, HIV test participation was the dependent variable, while education level (i.e., high school, college, post-college level) was the independent variable. English proficiency and vision quality were modifying factors.

Definitions

Acquired immunodeficiency syndrome (AIDS): AIDS is a chronic, potentially life-threatening condition caused by HIV. By damaging the immune system, HIV interferes with the body's ability to fight the organisms that cause disease (Mayo Clinic, 2018).

Human immunodeficiency virus (HIV): HIV stands for human immunodeficiency virus. It is the virus that can lead to AIDS if not treated (HIV.gov, 2018).

Assumptions

This study had three key assumptions. The first assumption was that the participants in the CDC dataset provided honest and unbiased answers. Researchers have the responsibility to protect the privacy of the study respondents and to create a sense of trust to attain the responses that were not biased (Creswell, 2008). The second assumption was that the secondary data obtained from the CDC were classified as reliable and valid data. A third assumption was that the sample was representative of the study's target population.

Scope and Delimitations

The focus of the study was on the relationship between education and HIV testing in the United States. The scope of the study was limited to data collected from the publicly available CDC website. This study only involved women in the United States who had been tested for HIV. These included females over the age of 30 years. African American women over 30 years were selected as the target population because barriers to HIV education and healthcare screenings are higher within this cohort than in either African American men, African American women under 30, or persons of other ethnicities (Harling & Bärnighausen, 2016).

Although the theoretical framework addresses the importance of core health behaviors to health outcomes of patients with many chronic illnesses, the results were only applied to individuals with HIV. Other theories, such as social learning theory and the health belief model, were considered for use within this study but were ultimately

rejected for use because both of these theories were too broad in application to address the issue of HIV testing and HIV education at the crux of this project.

The fact that I selected the participants for this study may create issues with the generalizability of the results of data analysis. Because this study only focused on HIV education and HIV testing in African American women over 30 in the United States, the results of this study may not be generalizable to men of any ethnicity, women of other ethnicities, or African American women under 30. Additionally, as this study was entirely in the United States, results may not be generalizable to African American women outside this country.

Limitations

The use of secondary data was a limitation to the study because the NHIS questionnaires were not designed initially to address HIV test participation. The 2017 NHIS is self-reported information. Thus, the responses obtained from the participants could have been biased because there was no available clinical data or measures collected by NHIS to support the self-reported data provided by the respondents. Also, for this study, the use of self-reported information could not be verified using medical records based on the nature of the inherent limitations of the 2017 NHIS questionnaire procedures. Another limiting factor was the possibility of respondents misunderstanding the questions or misrepresenting their actual behaviors. The information presented was anonymously; therefore, limiting the motivation of respondents to distort their real reactions. In this study, incurring misclassification bias, participants' bias, and recall bias were all also possible because the research design was cross-sectional and survey driven.

The responses of participants could have been biased towards responding based on what they felt reflected the socially desirable answer, rather than what reflected their experiences. If substantial misclassification bias existed, then there could be a Type I (false positive) or Type II (false negative) conclusion drawn, due to the preferences. This study was also limited in that it was a quantitative nonexperimental design and, therefore, could determine a causal relationship between HIV testing, race and HIV education.

Significance

Untreated HIV infection can develop into AIDS, which can lead to death (Reif et al., 2014). African Americans account for a higher proportion of new HIV diagnoses, those living with HIV, and those who have received an AIDS diagnosis compared to other races/ethnicities (CDC, 2018). In 2015, African American women represented 61% of the human immunodeficiency virus (HIV) diagnoses among women.

Addressing education status within a given population setting could improve the management of HIV screening/testing and treatment and could reduce the rate of HIV transmission (Lanier & DeMarco, 2015). Increased HIV test participation may help detect the virus at an early stage, allow the individual the opportunity to start treatment, and may prevent transmission of the virus to others. The family is a significant source of education and information. If mothers are adequately educated about HIV testing, they are likely to educate their daughters to test early and minimize the spread of HIV (CDC, 2019).

Several areas are affected by HIV-driven economic impacts (Taraphdar et al., 2011). Individual, organizational, and societal levels are affected by the HIV burden.

As a result, to promote equitable screening and treatment among people exposed to the virus or with HIV or AIDS, intensive behavioral change awareness or effective communication process, provision of care, and support are needed to substantially reduce HIV or AIDS-related stigma, discrimination, and dehumanization of people with HIV to maintain physical, mental, and social wellbeing of people living with HIV and AIDS (Taraphdar et al., 2011).

The findings of this study could provide evidence for the need to promote tailored education, culturally competent tools, and educational materials about HIV and testing among vulnerable target populations, especially among African Americans.

Summary

In this quantitative study, I used a secondary NHIS data from the CDC to determine if a significant association in African American women age 30 and older exists between HIV test participation and education level based on the availability to regular access to healthcare facilities, after accounting for insurance, income, employment, and marital status as well as between educational level and HIV test participation based on English proficiency, and vision quality. The integrated theory of health behavior change formed the theoretical framework for this study. In Chapter 2, I provide information about the literature search strategy, conceptual framework, and a comprehensive literature review, which includes detailed information on topics relevant to this study, including HIV, education, and HIV testing.

Chapter 2: Literature Review

Introduction

Social factors such as race and ethnicity influence the trend of HIV diagnoses among African Americans living in the United States (George et al., 2014). However, the race or ethnicity of a person may not directly present biological factors that increase infection or exposure to HIV (George et al., 2014). According to Siddiqi et al. (2015), race and ethnicity are risk factors for HIV transmission. Further, according to the CDC (2018), African Americans are disproportionately likely to be diagnosed with HIV in the United States. As research is completed about the disproportionately high prevalence of HIV transmission in the African American community, education about risk factors may lead to lifestyle or behavior change to improve quality of life for those at risk for HIV infection (Seth et al., 2015). The purpose of this cross-sectional quantitative study was to determine if a significant association in African American women age 30 and older exists between HIV test participation and educational level.

To more comprehensively examine the issues that lead to the overrepresentation of African Americans regarding HIV diagnoses and what can be done to mitigate this issue, a comprehensive review of the current literature was done. The information contained within this chapter outlines the literature review, literature search strategy, and theoretical framework that guided the research questions and associated hypotheses of this study.

Literature Search Strategy

Literature was collected utilizing the following databases and search engines: ProQuest, EBSCO, ScienceDirect, and Google Scholar were used. Key terms used to find pertinent literature included search terms such as *HIV, HIV test participation*, *education level*, *access to healthcare*, *insurance*, *income*, *employment*, *marital status*, *African American*, and *women*. Terms were used alone and in combination to discover the studies included in this literature review. The search for literature yielded approximately 350 articles; however, only articles that fit the inclusion criteria for this research were utilized within the literature review. The literature review included only peer-reviewed articles from the previous five years. Grey literature or secondary sources were sparingly used to supplement information and only to corroborate evidence-based research. Moreover, any materials present in this literature review that are older than five years are seminal literature and utilized primarily to discuss theory and pivotal ideas in research.

Theoretical Foundation

The theoretical framework for this study is comprised primarily of the integrated theory of health behavior change (Ryan, 2009). Ryan (2009) posits that the health behavior change of an individual can be enhanced by fostering knowledge and beliefs that increase the awareness of the consequences and outcomes of actions that affect health (Ryan). Moreover, health change can be created by growing many skills related to proper health knowledge, such as self-regulation skills and abilities, or by enhancing social awareness and participation in treatment (Ryan, 2009). The basis of the integrated theory of health behavior change is that health providers are more effective in changing

patients' health care habits by working directly with patients, and the more interactive the dynamic the more critical part in helping them adopt behavior change (Ryan, 2009). Health care providers, such as doctors, nurses or physician assistants, are often tasked with the identification of behaviors that are detrimental to patient health and, as such, are instrumental in creating protocols to adjust practices and promote healthy alternatives (Ryan, 2009). Human behaviors, specifically as it relates to health management, can be permanently altered through an increased understanding of positive health behaviors which often require increased education on unhealthy or risky behavior and how to address health problems (Ryan, 2009). Reactions that may positively change health care habits may include acquisition of health literacy and continuous practice or application of healthy behaviors (Ryan, 2009). An integrated theory of health behavior change also promotes the role of the patient in changing their health outcomes, especially with patients, have chronic issues. According to Ryan (2009), individual patients should be responsible for practicing healthy behaviors once they have been educated on healthy behaviors by health care professionals.

Regarding factors that negatively affect patient health, the integrated theory of health behavior change concept was designed to discourage the facilitation, or continuation, of unhealthy behaviors (Ryan, 2009). This theory can be applied as a mechanism to prevent adverse health outcomes associated with an unhealthy lifestyle or behavior (Ryan, 2009). Just as the integrated approach of health behavior change can change behavior by promoting healthy and prosocial behaviors to dissuade individuals' risky behaviors, this theory can be practical by expressing adverse outcomes or

consequences that risky health behaviors may facilitate (Ryan, 2009). Kwasnicka, Dombrowski, White, and Sniehotta (2016) completed a similar study in which the theory of health behavior change was utilized to describe how an individual's behavior changes and in which way theory may explain differences in both short term and long-term behavior. In another study completed by Ryan, Weiss, Traxel, and Brondino (2011), the authors tested the integrated theory of health behavior change concerning weight loss initiatives in women with postpartum depression and how low extended –team behavior changes were facilitated. Ryan et al. (2011) founded this theory was adequate in explaining weight loss in women that adhered to treatment protocols, reinforcing the integrated approach of health behavior change as a viable theory to tell the difference in behavior about health initiatives.

In addition to managing health behaviors to mitigate consequences of extant health issues, the integrated theory of health behavior change concept was designed to assess the role of patients' behavior in predicting health outcomes as well as understanding the importance of health education or literacy (Ryan, 2009). In this way, patients' actions may be predictive, and proactive, to prevent adverse health outcomes from initiating (Ryan, 2009). As the research questions for this study include an objective assessment of health-seeking behavior, including HIV test participation, the integrated theory of health behavior change is an appropriate framework. Moreover, this theory encourages health-seeking conduct; the unified approach of health behavior change is a well-fitted model to explain the findings of this study.

Literature Review Related to Key Variables and Concepts

Historical Context of HIV

Although there is some discrepancy about the exact origin of HIV, it has been established that HIV originated in the area of Africa now known as the Democratic Republic of the Congo, sometime in the 1920s; however, at that time it was relegated to species' of great apes, especially the chimpanzee (Rambaut et al., 2001). It wasn't until the 1930's that the first reported case of HIV was recorded in human populations throughout the region. The transmission of HIV to humans is blamed primarily on the consumption of raw or undercooked, bushmeat which at the time was a popular food source for indigenous people (Rambaut et al.). It is believed that individuals that ate bushmeat regularly routinely contacted a simian or ape virus, referred to as simian immunodeficiency virus (SIV; Rambaut et al.). Although it would be rare to contract HIV from SIV, the sheer number of exposures to SIV would create ample opportunity to cross-species and infect humans (Rambaut et al.). Further, it would be rare for human immune systems to not adequately eradicate SIV from a person's body, however with repeated exposure in several individuals and with various degrees of immunity in each person, SIV would be able to successfully infect immunocompromised persons (Rambaut et al.). As healthy adults routinely fight SIV, mutated versions are more successful in infection rates, meaning that mutated SIV, would more successfully infect other previously healthy adults. It is widely accepted that through the constant ingestion of bushmeat, repeated exposure to SIV resulted in successful infection of immunocompromised persons (Rambaut et al.). After SIV would mutate within the body

and this mutated version would be able to successfully infect other individuals, regardless of the ingestion of bushmeat or immunity (Rambaut et al.). Conventional transition methods, including sexual intercourse and intravenous drug usage, could transmit HIV quickly throughout initially infected populations as prostitution and drug use were more widely utilized at that time (Rambaut et al.). Moreover, there is some evidence to suggest that unsanitary practices regarding war wounds could quickly spread HIV between populations as medics and caretakers would take care of injuries with the same tools, with less knowledge of sterilization and less availability to sterile conditions (Rambaut et al.).

In the 1940s, a disease presenting almost identical in other simian or ape species was described in Guinea-Bissau (Lemey et al., 2003), and again was attributed to the consumption of improperly cooked bushmeat, a delicacy in Guinea-Bissau as well (Lemey et al., 2003). Researchers have since realized that there are distinct morphological and functional differences between the HIV found in the Congo and the strain found in Guinea-Bissau, and as such, they are labeled HIV-I and HIV-2, respectively (Lemey et al., 2003; Rambaut et al., 2001). Although recognized as different strains today, at the time, both strains were primarily treated as the same disease and addressed as one virus. HIV-I is the more prevalent type of HIV and is more likely to infect humans, more research has been completed concerning the origin and spread of HIV-1 (Magiorkinis et al., 2016) as such for this research, HIV-I will be the strain of HIV under examination.

Little is known about the transmission or spread of HIV during much of the rest of the 20th century until the 1970s when HIV was transmitted from Central Africa to the United States via introduction through Haiti (Magiorkinis et al., 2016). The most accepted hypothesis concerning the reason for the introduction concerns the emigration of infected African sailors and their families through trade routes (Magiorkinis et al.). Once established as a pandemic by medical professionals in the late 1970s, much more attention was given to HIV (Wertheim et al., 2016). In the 1980s, HIV transmission was still widely understood, as it was challenging to test infection in early stages, as early stages of HIV infection are primarily asymptomatic (Wertheim et al.). In the 1980s, HIV has garnered more considerable global and national attention throughout the United States as HIV had spread to most of the world, all continents except Antarctica (Wertheim et al.). Although testing was sporadic and not very precise, the best estimates of global cases in the early 1980s reached approximately 250,000 people (Wertheim et al.).

With the spread of HIV now a well-recognized global pandemic, with the attention of the general public, the vigorous study of HIV was initiated. In the early 1980s, the majority of reported cases of HIV were associated with intravenous drug users and homosexual males (Bramson et al., 2015). Within the United States, many reported cases were substantiated in the Los Angeles (L.A.) area, and thus, L.A. became an unofficial epicenter for HIV study in the United States (Bramson et al.). Researchers in L.A. at the time noticed that many HIV patients were suffering from a rare lung infection classified as Pneumocystis carinii pneumonia (PCP). Other members of intravenous drug-

using and homosexual male cohorts were increasingly reported to suffer from a form of aggressive cancer named Kaposi's sarcoma, which was unusually fast-affecting and became fatal more quickly than other types of cancer (Bramson et al.). Although both PCP and Kaposi's sarcoma were devastating comorbidities, what was most surprising to health care providers was that these illnesses were catastrophic to the health of previously healthy and active adults. At the end of 1982, there were approximately 300 reported cases of HIV related death in the United States alone (Bramson et al.).

In the same year, 1982, it was established that unlike the cases of HIV in Africa, the transmission of HIV was not associated with the consumption of undercooked bushmeat but instead was transferred from person to person both through anal sex and intravenously through needle sharing (Bramson et al., 2015). It wasn't until 1983 that medical professionals observed HIV in females resulting in the amendment in diagnostic tools to include heterosexual sexual activity among transmission pathways (Irwin, Jones, & Mundo,1996). Later in 1983, it was established that mothers could pass HIV to children through childbirth or breastfeeding (Irwin et al.,1996). This spurred the examination of spread through casual contact with infected persons or with surfaces, air, or water that may have been contaminated by HIV infected individuals (Irwin et al.). The hysteria associated with HIV transmission within the early 1980s was mitigated slightly when the CDC published the first comprehensive list of guidelines and HIV protocols based on evidence-based research (Irwin et al.). Researchers at the CDC were able to establish that someone could not contract HIV through sharing food, touching surfaces, sharing toilet seats with infected individuals or casual touch, nor could it be contracted

from airborne pathways (Irwin et al.,1996). At the end of 1983, the approximate number of HIV cases within the United States had multiplied approximately 10-fold, reaching an estimated 3,000 cases of verified HIV infection (Irwin et al.,1996).

By 1985, the number of known HIV cases had doubled throughout the United States, with just over 6,000 cases in this country alone (Irwin et al., 1996). In an attempt to better understand contraction methods, symptomology, and find more effective treatments, the FDA established the Enzyme-Linked Immuno-sorbant Assay (ELISA) (Beyrer & Karim, 2013). ELISA is a blood test that can detect even trace amounts of enzymes that are created to combat various illnesses (Beyrer & Karim). In this way, detection and subsequent diagnoses can be made about disease more precisely than utilizing traditional symptomology to ascertain diagnoses (Beyrer & Karim). In April of the same year, the United States Department of Health and Human Services (HHS) and the World Health Organization (WHO) facilitated and executed the first international HIV/AIDS conference. Besides, in 1985, the American Foundation for research was also founded to complete research for more comprehensive treatment protocols.

By the mid-1980's the United States had reported over 30,000 cases of HIV, which was when the term HIV was created to better describe the virus responsible for the compromising of the human immune system (Chin & Lwanga, 1991). In 1985 the CDC reported approximately 39,000 cases of HIV, globally in over 85 countries, cementing HIV as a global pandemic (Chin & Lwanga). As such, the medical community was tasked with developing more comprehensive treatment protocols and diagnostic tools.

By 1987, the Food and Drug Administration (FDA) released the initial antiretroviral drug to fight HIV infection and mitigate symptoms (Beyrer & Karim, 2013). This drug called zidovudine (AZT) was marketed to slow the progression of HIV, and while it cannot cure HIV, it does effectively prolong the life of the patient (Beyrer & Karim, 2013). Additionally, the FDA created a comprehensive blood test to screen for HIV antibodies, called the western blot. The specificity of this test is more magnificent than ELISA and, as such, is better at diagnosing HIV (Beyrer & Karim). Western blot has a lower incidence of false positives or false negatives and can also detect HIV antibodies in lower concentrations than ELISA can (Beyrer & Karim). By the end of the 1980s, there were500,000 reported cases of HIV worldwide, with approximately 100,000 cases within the United States alone (Chin & Lwanga, 1991).

By the middle of the 1990s, the incidence of HIV had exploded, with approximately five million confirmed cases of HIV worldwide (Irwin et al., 1996). As such, a special task force was created by the United Nations (UN) in 1996, called The Joint United Nations Programme on HIV/AIDS (UNAIDS). Further, in 1996, the FDA also approved a home testing procedure that used urine to detected enzymes associated with HIV infection (Beyrer & Karim, 2013). This allowed individuals who believed they might be infected to proactively test for HIV without the stigma of publicly seeking medical treatment since, at that time, public knowledge of possible HIV infection could be detrimental to employment and public image (Beyrer & Karim). By the end of 1996, cases of corroborated HIV infection reached approximately 30 million people with

estimated new cases occurring at a prevalence of almost 19,000 per day making HIV the third leading cause of death in adults worldwide (Irwin et al.,1996).

In the early 21st century, the CDC, WHO, the UN and the FDA collaborated on establishing generic HIV drugs for broader distribution, although no cure was found better mitigation of symptoms was possible as well as prolonged lifespan after infection (Beyrer & Karim, 2013). HIV tests also became more efficient, with increased accuracy of almost 100% and results in less than an hour, allowing for more accurate and timely diagnoses (CDC, 2018). This was especially useful in treating HIV within Africa in which HIV was the leading cause of death by a significant number (CDC). By 2012, the FDA approved medications to prevent transmission of HIV through sexual intercourse, which dramatically reduced the number of new cases in areas where these prevention drugs were available (CDC). Moreover, at this time, HIV treatment drugs led to longer lives for HIV infected individuals in all parts of the world, making 2012 the first year that effective treatments reached the majority of individuals in need of treatment (CDC). The year 2013 marked the first time in which AIDS-related death and incidence of new HIV infection both decreased (CDC). The most significant change in the prevalence of AIDS-related death was experienced within sub-Saharan Africa and Southern Asia, in which the highest numbers of HIV-affected people resided. At the end of 2013, it was estimated that almost 40 million people were living with HIV globally, but with the availability of proper medications and therapy treatments, the mortality rate associated with HIV decreased (CDC). Additionally, it was estimated by the CDC (2018) that over 35 million new cases of HIV were avoided by education and proper preventative treatments.

In 2017, the last year's global comprehensive data regarding HIV infection were available, half the individuals with HIV were receiving regular and holistic HIV treatments. The most substantial disparity persisted in sub-Saharan Africa and Southern Asia, where many residents are unable to gain access to proper HIV treatment (Justman, Mugurungi, & El-Sadr, 2018). As numbers of HIV affected individuals are estimated, around 45 million individuals were living with HIV, new cases have decreased by approximately 40%, with an estimated incidence of just 1.3 million people, which, although high is vastly reduced from years prior (Justman et al., 2018). Moreover, the most significant decrease in new HIV infection was observed mostly in female cohorts, especially those of young adults through sub-Saharan Africa and Asia (Justman et al.). The decreases in these cohorts are contributed primarily to effective HIV preventative medications and more comprehensive educational initiatives (Justman et al.). As education on HIV becomes more accessible, individuals are more likely to learn about how HIV operates, symptomology, transmission pathways, and preventions.

Human Immunodeficiency Virus (HIV)

Human Immunodeficiency Virus (HIV), is the first part of dual diagnosis with Acquired Immunodeficiency Syndrome (AIDS). HIV is transmitted in a variety of ways, in which infected bodily fluids are combined with those of a noninfected person (Simonetti et al., 2016). An individual’s immune system fights infections by using blood cells called lymphocytes, which include specialized cells referred to as B cells. B cells are responsible for the creation of antibodies that flag invading infectious agents such as viruses, bacteria or fungi (Simonetti et al.). T-cells another critical cell type in acquired

immunity is responsible for the destruction of foreign agents within the human body, as it is T cells which directly fight infection by lysing, or breaking down, infected cells and subsequently consuming and recycling useful components for future use (Simon, Ho, & Karim, 2006).

HIV attacks the immune system of an individual, especially the acquired immune system, specialized cells within the immune system such as T-Cells and CD4 cells (Simonetti et al., 2016). T-cells, named as they are created in the human thymus, are a composite of two unique cell types; the first is CD8 cells also known as Killer T-cells and the other cell type is referred to as CD4 cells which are more commonly known as helper T-cells (Sodora & Silvestri, 2008).

Both T-Cells and CD4 cells are responsible for the sequestering and destruction of foreign infection within the cells of the body (Simonetti et al., 2016). Although not responsible for cell destruction proper, T-Cells, and CD4 cells guide other leukocytes, or white blood cells, to destroy infected cells (Simonetti et al.). In this way T-cells and CD4 cells guide and organize the operation of the acquired immune system. Once the individual becomes infected with HIV, the acquired immune system starts to degrade; as T-cells and CD4 cells are destroyed, the immune system is unable to function appropriately (Simonetti et al.). This is how HIV compromises the human immune system by utilizing the host's immune own immune system to attack and eliminate CD4 cells (Sodora & Silvestri, 2008).

Moreover, HIV can transform some T-cells and CD4 cells to create further versions of HIV within the cells of the human host (Pace et al., 2017). Meaning that once

HIV infects the human host, it no longer must spend energy on reproduction as the host's cells will create duplicate copies of the HIV (Simonetti et al., 2016). This allows HIV to reproduce exponentially if left untreated. Often when this phenomenon begins, cells of the human host begin to create new HIV, the progression of the disease increases significantly, and treatment options, like medications and bone-marrow therapies, become less active (Pace et al., 2017). Moreover, it is at this stage when HIV progression may become a terminal prognosis for patients, especially those with little, or no, enacted treatment protocols (Pace et al.)

As HIV progresses and begins manipulating and destroying the acquired immunity of the infected individual, the human body is increasingly less likely to adequately combat infection (Pace et al., 2017). When this occurs, typically benign sicknesses like colds, flu, or pneumonia can be catastrophic to the patient (Simonetti et al., 2016). Often it is not HIV proper that is fatal to the patient but rather opportunistic infection (Simonetti et al., 2016). With such quick incubation times without medication and with bleak prognoses, if left untreated understanding the symptoms of HIV is a paramount early diagnosis (Pace et al.).

Symptomology of HIV

The first stage of HIV progression is the primary stage of HIV infection, commonly known as the acute stage (Fuentes, 2017). This stage occurs 1-4 weeks after initial HIV transmission occurs (Fuentes). At this time, HIV begins to continuously reproduce, increasing the proportion of HIV within a persons' bodily fluids. In the acute phase of infection, individuals are highly contagious as high levels of HIV remain within

the bloodstream (Fuentes). The initial infection stage of HIV, between two and four weeks, presents as flu-like symptoms; including high fever, swollen glands, lymph nodes around the armpits and legs, sore throat, bright red rash throughout the body, muscle aches, severe joint pains, and migraine-like headache (Fuentes). These flu-like symptoms appear to the host like the rapid-onset flu, and as severe symptoms persist for only a few days to a week, many times, these symptoms are dismissed by the infected person (Fuentes). During this time, a process called seroconversion occurs (Guaraldi et al., 2015). Seroconversion refers to the change in blood composition as the development of HIV antibodies floods the bloodstream to try and fight the plethora of newly developed HIV (Guaraldi et al.). It is at this time that HIV can first be detected within the bloodstream with the use of diagnostic tools, including blood or blood serum tests (Guaraldi et al.). After seroconversion occurs within the acute stage of HIV infection, HIV infection progresses to the second asymptomatic stage (Guaraldi et al.).

Flu-like symptoms are only present for a brief time before the second phase of infection occurs. The second stage, the asymptomatic stage, initiates when large amounts of HIV are present within the bloodstream (Guaraldi et al., 2015). As ratios of HIV material in blood supply increase, HIV begins an incubation stage within the human host (Nuvor et al., 2016). This stage typically occurs approximately three months after initial infection, however as this stage may not begin until the adequate proliferation of HIV has occurred, may take some time longer to initiate During this stage, the virus is continuing to replicate but there are no visible symptoms (Nuvor et al.).

Within the incubation stage, HIV is asymptomatic (Fuentes, 2017). Infected persons often do not realize anything is amiss, and they do not feel sick. This does not mean HIV is not infectious; however, as transmission may still occur during this phase (Fuentes). During this time, HIV is affecting and transforming T-Cells and CD4 cells to create duplicates of HIV. as the disease spreads throughout the body (Fuentes). It is towards the end of the incubation period that the infected individual may notice slight deficits regarding their immune system (De Cock et al., 2012). Although rarely serious at this stage, infected persons may see a higher prevalence of illness or longer duration of common diseases such as cold or flu (De Cock et al.). According to infected patients, this increase in sickness is often dismissed as odd but rarely dangerous, often it is viewed as a bit of poor luck or dismissed as nothing serious (De Cock et al.).

As HIV progresses after several years, increased interference with the host immune system occurs (De Cock et al., 2012). This more significant interference within the patient's immune system creates an increase in the patients' susceptibility to an array of otherwise benign diseases. Also, the formation of tumors becomes increasingly common as the persons' immune system is unable to regulate unusually, or problematic cell replication as healthy immune systems do routinely (De Cock et al.). As HIV infection continues to progress to terminal stages before transformation into AIDS, the infected individual will experience a great deal of weight loss as the body utilizes a great deal of energy and resources to try unsuccessfully to combat disease and restore properly acquired immunity (De Cock et al.). When the HIV stage of this dual disorder terminates, AIDS will initiate within the patient until the patient becomes terminal (De Cock et al.).

HIV Transmission

HIV transmission occurs from person to person, typically, in a one-way transmission pathway (Wertheim et al., 2017). This means that affected persons must come in intimate contact with another individual for HIV to infect a subsequent individual (Wertheim et al.). HIV must be transmitted through close communication, as the virus cannot survive outside the human body for any measurable length of time. As such, HIV must be spread through blood or the breaching and subsequent infection of mucosal membranes (Wertheim et al.). HIV is primarily spread by the exchange of infected bodily fluids such as blood, semen, fluids found in the vagina or anus, or breast milk from an HIV infected mother which enters the physical tissues of another non-infected individual and proliferates (Wertheim et al.).

The most common transmission method is sexual activity. According to the CDC (2017a), approximately 95% of new HIV diagnoses within the United States occur primarily through unprotected sex. Regarding vaginal sex, HIV can be transmitted from man to woman, woman to man, or in some cases woman to woman (De Oliveira et al., 2017). If the genitals of a woman contain any open cuts, sores or abrasions a woman is more likely to be susceptible to infection, as does sexual behavior that is overly aggressive and may lead to vaginal injury during intercourse proliferates (Wertheim et al., 2017). The transmission of HIV is higher with sexual behaviors including anal sex. A higher prevalence of HIV infection through anal sex is contributed to two main factors (De Oliveira et al.). First, the anus has a thinner and less durable lining, increasing the likelihood of tears, cuts, and abrasions either through sexual activity or through

complicated bowel movements (De Oliveira et al.). Second, the anus contains its body fluid unique to that anatomical region; this anal fluid also has a higher proportion of HIV than does fluid found elsewhere, increasing the prevalence of facilitating infection or conversely being infected (De Oliveira et al.). Although possible, the incidence of disease about participation in oral sex remains lower than either vaginal or anal sexual activity (De Oliveira et al.). Transmission of HIV is only possible if there are sores, cuts, or abrasions in or around the mouth or upon the genital region of a previously infected partner (Wertheim et al., 2017). Moreover, the transmission of HIV can only be transmitted through participation in kissing if the kissing behaviors included open mouth kissing and one or more partners have open mouth sores or bleeding gums (Wertheim et al.).

Another transmission pathway includes the exchange of blood or blood-related materials from an HIV infected individual (Mujugira et al., 2016). According to the CDC (2017b), 5% of annual HIV diagnoses occur because of needle sharing or other related equipment with an individual who is infected with HIV. This includes the use of intravenous drugs such as cocaine, heroin, and methamphetamine (CDC, 2017b). Individuals that utilize intravenous drugs are approximately 45% percent more likely to be infected with HIV than are non-drug users (CDC). This is based primarily on the fact that HIV can live in the blood contained within a needle for approximately two months after use; this means that even if individuals are sharing needles long between applications, the transmission of HIV is still possible (CDC, 2017a). Although primarily reduced since the 1980s, this transmission pathway becomes more prevalent as

intravenous drug use has become more common in recent years (CDC). As the prevalence of this type of drug use continues to increase, the number of newly infected individuals continues to rise (CDC).

Concentration methods may include receiving a blood transfusion from an HIV infected donor, or the donation of platelets (Mujugira et al., 2016). Further, bone marrow transplants from infected donors may lead to HIV infection, as the bone marrow is responsible for the formation of erythrocytes, or red blood cells, and platelets (Mujugira et al.). Another possible risk of HIV infection includes becoming the recipient of organs from an individual. When this occurs, HIV that is sequestered in organ tissue will proliferate and infect the bloodstream of the donor (Mujugira et al.). Although possible for transmission of HIV to be accomplished by blood, platelet, or bone marrow transfusion and through the receipt of infected organs through transplant, the odds of communication are much lower in these pathways than in sexual activity of any kind (Mujugira et al.). This is due primarily to proactive measures on behalf of healthcare professionals to extensively examine blood, organs, and tissues (Mujugira et al.). Health care professionals routinely review individuals before donation, after material collection, and before transfusion protocols to ensure the incidence of HIV transmission is reduced (Mujugira et al.).

HIV is not always transferred between two adults. It can also be spread from mother to child (Peters et al., 2017). Mother-to-child transmission can occur during pregnancy or any subsequent action, including labor and delivery. This transmission occurs for a few reasons (Peters et al.). First, transmission from mother to fetus occurs as

mother and fetus share the same blood supply, and also, HIV can cross the membrane barriers (Peters et al.). Second and less commonly, sometimes the act of labor and birth spread HIV to the baby as tears and abrasions in the uterine and vaginal walls can infect the baby as it passes through the birth canal (Peters et al.). To mitigate this issue, HIV+ mothers will often opt to undergo a cesarean section delivery to bypass this possible HIV transmission pathway (Peters et al.). In addition to HIV transmission from mother to child through pregnancy or birth, HIV can also be spread through the donation of breastmilk to an uninfected child (Peters et al.). As such HIV+ mothers are advised not to breastfeed their babies and instead nourish their young children with baby formula to reduce HIV transmission (Peters et al.).

In addition to the HIV mentioned above transmission pathways, there are other rarer ways to acquire HIV. Although not commonly discussed, these pathways are more common when considering transmission from children to adults (Peters et al., 2017). The first pathway in this category includes eating food that has been pre-chewed by an HIV-infected person (Peters et al.). This occurs primarily when HIV affected children have bleeding gums, sores, or abrasions and share food with parents, siblings, or other caretakers (Peters et al.). Another transmission pathway for HIV includes being forcibly being bitten by an HIV infected person, in which the bite breaks the skin and draws blood. Although this transmission can consist of adults biting other adults, it is more commonly associated with children biting adults (Peters et al.). However, HIV transmission will not occur if the skin is not broken, as saliva does not successfully transmit HIV (Peters et al.).

Although no cure has been developed to eradicate HIV, with proper use of HIV suppressive medications and other therapy treatments, HIV has become manageable for affected individuals and their loved ones (Gori et al., 2018). Many individuals with HIV can now live longer and often live free from symptoms or fear of transmission to loved ones (Gori et al.). HIV is manageable, especially in developed countries in which prevention and treatment options are widely available to the public. However, HIV management requires the patient to proactive within their treatment options (Gori et al.).

HIV Treatment Options

If an HIV infection is left untreated, HIV will attack and transform the immune system of the host individuals to facilitate the proliferation of more HIV (Cattin et al., 2019). HIV will continue to replicate until the immune system of the infected individual is depleted, and opportunistic disease becomes deadly (Cattin et al.). As HIV has varied stages and symptomology, HIV treatments are often state-specific and treat particular stages of HIV infection (Cattin et al.). Effective HIV treatments are utilized to reduce symptoms and slow the progression of stages of HIV to AIDS. HIV is classified in a unique group of viruses known as retroviruses, as they utilize reverse transcriptase to create other forms of genetic templates like deoxyribose nucleic acid (DNA) or ribose nucleic acid (RNA), which they use to proliferate (Cattin et al.). As HIV is a type of retrovirus, the array of medications used to treat HIV is known as antiretroviral therapy (ART)(Cattin et al.). Currently, ART is widely available, especially in developed countries, health care professionals recommend ART for all HIV-affected people. The

recommendation of ART is routinely made for all people living with HIV regardless of date or length of exposure, ethnicity, age, or gender (Cattin et al.).

Within the United States, most guidelines about effective HIV treatments are created by the U.S. Department of Health and Human Services (HHS), (Judd et al., 2018). HHS strongly recommends that any person that tests positive for HIV begin treatment as soon as possible (Judd et al.). Often medicines are offered the same day diagnosis occurs, as medications are reasonably common in the United States (Judd et al.). The sooner the treatment begins, the slower the progression of HIV. ART should be started while HIV is in the acute stage of infection, especially if the proliferation of HIV has not much progressed (Judd et al.). ART may slow HIV proliferation in such a way that the asymptomatic second stage is not entered for many years (Boyd & Cooper, 2018). Historically, ART was designed and implemented to only prevent the virus from replicating by preventing HIV genetic code from integration into the host cells' replication code (Boyd & Cooper). Since then, combination ART therapies have been developed to completely suppress HIV replication, and proliferation, as proteins necessary for replication are also contained and are largely unassembled (Boyd & Cooper, 2018).

When HIV+ women give birth, especially vaginally, HIV can be transmitted from mother to child. As such, all babies born to HIV+ mothers are given ART treatments that are designed to be appropriate for infants (Palma et al., 2019). HIV suppressing medications are administered for approximately two months after birth, regardless of the presentation of symptoms, as young children already possess inadequate acquired

immunity (Palma et al.). HIV+ women who adhere to ART treatment protocols during gestation and subsequently give their children proper ART medications after birth have significantly lower rates of HIV transmission to their children when compared to women who did not (Palma et al.).

Another similar treatment option is referred to as highly active antiretroviral therapy (HAART). HAART is a type of ART that is more specific to the needs of an HIV patient (Ako et al., 2018). As such, many HAART treatments are a combination of medications and other therapies which are prescribed by health care specialists, that base treatment protocols on a combination of factors unique to each patient including viral load, CD4 cell count within the bloodstream, the type of HIV strain, and current expression of symptoms (Lu et al., 2018). Although more effective than necessary ART, HAART medications must be taken every day, at the same time to ensure efficiency in HIV suppression and reduction (Ako et al.). HAART has been established as an effective treatment therapy in largely halting the progression of HIV and keeping HIV infection from progressing into AIDS infection (Lu et al.). Moreover, HAART attempts to prevent the degradation of the hosts' immune system and extend functionality for a more extended period (Lu et al.).

A study conducted by Lu et al. (2018) established that HAART treatments led to an approximate 90% reduction in HIV to AIDS incidence and subsequent mortality. Moreover, it was determined that if HAART protocols were adhered to properly, patients experienced a decline in heterosexual sex transmission pathways of HIV (Ako et al., 2018). Currently, antiretroviral drugs have been adapted to fulfill a variety of other HIV-

driven needs. HAART therapy can eliminate the loss of CD4 cells, decrease blood plasma concentrations of the HIV in organs and tissues, and fight various other comorbidities that accompany all three stages of HIV infection (Ako et al., 2018).

Although compelling, ART and HAART are not without consequence. As ART and HAART are potent medications, they have been associated with a variety of side effects that can differ within the individual (Renju et al., 2017). Moreover, the severity of side effects can offer to vary based on viral load, overall health, age, sex, and CD4 count. Side effects can last from just a few hours to weeks, depending on the criteria mentioned above and may change with the progression of HIV (Renju et al.). Some of the most common side effects of ART or HAART treatments include rashes, migraine-like headaches, insomnia, nausea, vomiting, diarrhea, severe sweating, body, joint, and muscle pain, and severe fatigue with associated lightheadedness (Renju et al.). Often as side effects can be detrimental to the health and feelings of wellbeing in a patient, side effects are commonly cited by HIV+ patients as the primary reason they discontinued treatment when it was readily accessible (Renju et al.). Discontinued use of treatment therapies can be devastating to HIV+ individuals, even if medication disruption is minimal (Renju et al.).

Although treatments such as ART and HAART treatments have been shown to significantly reduce and suppress HIV, these therapies are only useful if they are strictly adhered to, creating some challenges or barriers to the utilization of both treatments (Amsterdam, 2015). For example, HAART therapy protocols require the consumption of various medications daily. Often these pills must be taken at specific times during the

day, and often, HAART protocols include upward of five different drugs at a time to effectively mitigate HIV infection through various interventions (Amsterdam, 2015). To ensure the efficacy of HAART treatment in decreasing viral load or CD4 destruction, proper adherence to pill administration is paramount (Martrus & Altfeld, 2016).

Proper adherence to HAART treatment protocol is tantamount as even minimal disparities, such as missing one dose at any given time, can result in the resumed replication of HIV (Fogel et al., 2016). Further, when HIV is no longer suppressed, patients can rapidly enter subsequent infection stages of HIV, including the progression of HIV to AIDS (Fogel et al.). When this occurs, the initial treatment is no longer effective in suppressing HIV or mitigate associated symptoms (Fogel et al.).

In addition to the renewed proliferation of HIV within patients that do not adhere to treatment protocols properly, mismanaging ART or HAART medications can facilitate the acquisition of drug resistance (Fogel et al., 2016). As HIV replicates and reproduces inside the bloodstream of the host, HIV can spontaneously mutate from one strain to another. Although new strains function as the original infectious strain of HIV, they are often structurally distinct from prior forms (Fogel et al.). As such original medication associated with treatments is no longer effective against mutated strains (Fogel et al.). As mutated HIV proliferates in the body, then treatment ceases to be effective against HIV progression in any capacity, making them resistant to treatment drugs Just as spontaneously mutated HIV can create drug resistance within an individual, drug-resistant strains of HIV can be transmitted through any of the established pathways (Fogel et al.) This phenomenon can be catastrophic for communities as drug-resistant

HIV is spread between adults and children that are either previously unaffected or taking now ineffective medications (Fogel et al.). This is especially true within communities where only limited access to HIV treatments exist, as supplemental drugs are primarily unavailable, including those of low socioeconomic status, rural, and urban areas (Fogel et al.).

African Americans and HIV

HIV affects all types of communities throughout the world, regardless of socioeconomic status or prevalent ethnicity. There are trends; however, that indicates there are differences within the rates of incidence of HIV within different communities based on a variety of factors, including socioeconomic status, ethnic composition, and resource availability. Research indicates that minorities are highly overrepresented regarding the prevalence of HIV, especially African American individuals (CDC, 2018). Further, HIV/AIDS persists as a leading cause of mortality for African Americans aged 30-45 (CDC, 2018). In 2016, the Centers for Disease Control and Prevention (CDC) suggested that 17,528 African Americans were diagnosed with HIV in the United States (CDC, 2016). African Americans make up only 12% of the United States population (CDC, 2017a). However, about 43% of African Americans were diagnosed with HIV in 2016 (CDC, 2016). Based on a CDC (2015) report, approximately 152,800 African American women were living with HIV in the United States. At the national level, about 73.54% of African Americans who are newly diagnosed with HIV are men, while women accounted for around 26.46%; these numbers varied based on state and demographics (CDC, 2015).

HIV is often categorized partly on transmission modes, including homosexual and heterosexual intercourse, intravenous drug use, and from mother to child. According to the CDC (2017b), regarding all four transmissions as mentioned earlier pathways, African Americans accounted for the most significant percentages of new HIV transmission and subsequent infection. In this way, African American men and woman have the highest incident rate of new infection when examination of communications via traditional pathways are examined (CDC, 2017b).

Socioeconomic Status and HIV

The relationship between socioeconomic status and HIV is complex and often interrelated. Often communities have a higher incidence rate of both extant and new HIV infections (Probst et al., 2017). This phenomenon exists for various reasons. First, lack of resources in areas of the lower socioeconomic station often leads to increased participation in risky behaviors that lead to HIV infections, including intravenous drug use, prostitution, unprotected sex, and sex with multiple partners (Probst et al., 2017). These risky behaviors increase the likelihood of HIV infection but also persist, partly because the other risky behaviors are present, creating comorbidities to each risk behavior (Probst et al.). Further, communities of lower socioeconomic status are typically urban or rural areas that also exhibit, not only higher minority residents but also increased incidence of poverty, often accompanied by a prevalence of drug use and homelessness that is higher than the national average (Greenwood & Agarwal, 2015). Although the trends in HIV are challenging to extrapolate from many confounding variables, often,

poverty is the primary correlational variable for directions concerning the prevalence of HIV globally (Greenwood & Agarwal).

In impoverished areas, access to education is primarily limited by both financial constraints and adequate opportunity. Educational access is vital to mitigate the effects of poverty within a community (Probst et al., 2017). With sufficient educational opportunities, community residents are often able to break the cyclical poverty present within areas of low socioeconomic status. Education leads to the acquisition of knowledge and skill that facilitates proactive goal settings for future career opportunities (Probst et al.). Moreover, with proper education and subsequent employment opportunity often residents of impoverished areas can make more money than uneducated workers, even when referring to the same role in the workplace (Greenwood & Agarwal, 2015). In addition to academic knowledge, health education is often lacking in many places of lower socioeconomic status (Probst et al.). Health education is crucial as it could enhance health literacy, as well as improve health promotion measures and preventative approaches to reduce HIV incidence and prevalence (Kerr et al., 2015). As health education becomes accessible, residents of impoverished communities become increasingly informed regarding risk factors of HIV or disease, and they adopt the lifestyle or behavioral change to improve their quality of life (Seth, et al., 2015). Similarly, gaining knowledge through education can improve health-seeking behaviors such as adherence to treatment recommended and prescribed by health providers to improve patients' quality of life (St. Lawrence et al., 2015).

The acquisition of academic knowledge, such as the ability to comprehend written and verbal instruction can significantly advance the ability of an individual to be proactive about their health and create autonomy in decision making regarding positive health behaviors and the abstaining of risky health behaviors (Probst et al., 2017). Further understanding of health information and the ability to process numerical data is the basics of functional health literacy that could be enhanced through education (Palumbo, 2015).

In addition to a higher incidence of poverty, increased rates of poverty, and restriction to proper scholastic and health education, areas of lower socioeconomic status exhibit differences in how the male and female residents experience their communities (Greenwood & Agarwal, 2015). Often income inequality and poverty lead to higher HIV risk for females than their male counterparts. Globally, impoverished women are more likely to engage in risky sexual behaviors such as prostitution, unprotected sex and sex with multiple partners when women feel they need to participate in these behaviors to acquire resources such as shelter, food or access to money (Probst et al.). As women are more at risk for infection of HIV in impoverished neighborhoods than male counterparts, women must gain the opportunity to education, employment and resources to reduce participation in risky behavior and subsequent HIV infection (Greenwood & Agarwal, 2015).

As socioeconomic status affects the likelihood of HIV infection and the spread of HIV throughout a community, the HIV status of an individual may change their socioeconomic station, which creates cyclical situations of HIV infection and poverty (Probst et al., 2017). After an individual becomes HIV+, it often affects their ability to

work or gain an education, especially in childhood, adolescence, or older-aged cohorts (Greenwood & Agarwal, 2015). Without the ability to achieve educational goals often finding adequate employment is difficult, especially as HIV+ persons must find employment sympathetic to HIV+ treatments and the time off needed to adequately address and HIV-related issues including time off for doctors' visits, time off for HIV testing, or other related medical procedures, or time off needed to recover from the side effects of medication (Greenwood & Agarwal).

It is estimated that within the United States, approximately 40%-60% of all persons infected with HIV experienced unemployment at least once (Greenwood & Agarwal, 2015). Moreover, HIV+ people need to find work that affords them proper health insurance to ensure access to appropriate treatments and medications and help reduce the cost of associated treatment protocols (Probst et al., 2017). Finding employment with those benefits can be severe with reduced, or absent, educational achievement (Greenwood & Agarwal). When examined, the severity of HIV and self-reported feeling of workplace discrimination based on respective HIV+ diagnoses often lead to even higher incidences of unemployment as many HIV+ individuals believe that they are still overlooked for employment or promotion, although illegal within the United States, due to HIV-related status (Dray-Spira et al., 2008).

When examined, the most affected cohort by perceived discriminatory workplace practices were HIV+ women, especially if they had lower levels of education, became pregnant, or already had children (Dray-Spira et al., 2008). Further, when workplace discrimination was studied regarding HIV+ status by Dray-Spira et al., researchers found

that some employers routinely believed employees with HIV were less competent in job roles than HIV- persons. Employers were less likely to interview hypothetical applicants if they knew previously about the hypothetical applicant's HIV+ status, especially if they were women. The employers examined also believed HIV+ persons were more likely to take advantage of their HIV+ status to garner more time off, take more sick days and create unwarranted absences from work, creating detrimental situations within the workplace (Dray-Spira et al.). Finally, employers believed hiring individuals with known HIV+ status, as employers believed HIV+ employees would speak about their respective HIV+ diagnoses within the workplace, would be detrimental for the team dynamic of the workplace. Employers surveyed thought that other HIV- employees would be mistrusting or less accepting of HIV+ workers, feel more uncomfortable around HIV+ individuals and work less efficiently together (Dray-Spira et al.). Moreover, they perceived the possibility of spreading HIV throughout the workplace as a possible risk of hiring HIV+ employees (Dray-Spira et al.). The perception of biased employers and perceived discrimination of HIV+ employees can create issues for finding gainful employment for HIV+ individuals, creating problems for the acquisition of comprehensive and effective HIV treatment.

As many HIV+ people struggle to find adequate employment, primarily within lower socioeconomic status', often it becomes difficult to gain access to appropriate HIV treatments (Walcott et al., 2016). In this way, the socioeconomic status becomes influential to HIV mitigation and treatment. Proper employment is needed to ensure adequate health coverage because, often, governmental-based health benefits do not offer

the same comprehensive healthcare that does other insurance companies. As such, HIV/AIDS mortality is higher in places of lower socioeconomic statuses, especially regarding women (Walcott et al., 2016).

African American Healthcare Disparities

One explanation for the ethnic differences seen in HIV may be due to the way HIV is treated and managed in communities of high minority residence. Research indicates that homosexual African American men are almost 50% less likely to be aware of their HIV statuses comparative to other cohorts and therefore less likely to be on antiretroviral therapy (ART)(Dale et al., 2016) when compared to homosexual white males when all other sociodemographic factors are equal (Dale et al.). Additionally, African American men and women are less knowledgeable about health outcomes, treatment options and proper treatment adherence than Caucasian counterparts (Dale et al.)

Health disparities in African American communities regarding the progression and increased levels of new HIB transmissions may be further exacerbated by access to comprehensive and useful healthcare (Fletcher et al., 2016). As disparities persist in HIV health outcomes in the United States within African American populations, access to proper ART treatments has been examined. Research indicates that much of the disparities between access to HIV treatment and African American communities are contributed mainly to socioeconomic status and adequate access to resources (Fletcher et al.). Moreover, African Americans from lower socioeconomic conditions are less likely to seek treatment for HIV at any stage of disease progression (Fletcher et al.).

Summary and Conclusions

HIV is the first part of dual diagnoses with AIDS and HIV treatments are utilized to reduce symptoms and slow the progression of stages of HIV to AIDS. Currently, ART is widely available and is recommended by health care professionals for all HIV-affected people. Another similar treatment option is referred to as HAART). HIV affects all types of communities throughout the world, regardless of socioeconomic status or prevalent ethnicity. There are trends; however, that indicates there are differences within the rates of incidence of HIV within different communities based on a variety of factors, including socioeconomic status, ethnic composition, and resource availability. Research indicates that minorities are highly overrepresented regarding the prevalence of HIV, especially African American individuals (CDC, 2018).

The purpose of this study was to determine if a significant association exists in African Women age 30 and older regarding their respective education levels and their involvement in HIV test participation. Evaluation of correlation between educational level and HIV testing involvement was based on access to healthcare after accounting for insurance, income, employment, and marital status as well as between educational level and HIV test participation based on English proficiency, and vision quality. In Chapter 3, I provide a framework to more comprehensively understand the methodological approaches to sample selection, data collection and analysis, and any limitations or ethical considerations that occurred during this research study.

Chapter 3: Research Method

Introduction

The purpose of this cross-sectional quantitative study was to determine if a significant association exists between HIV test participation and educational level among African American women ages 30 years and older. In this section, I describe the research design, rationale, methodology, and study variables, the target population and sampling technique, data collection, and data analysis. Finally, I review threats to the validity of this study.

Research Design and Rationale

A cross-sectional research design was used to explore the research questions and hypotheses. A cross-sectional research design is commonly used for assessing the incidence, risk, and prevalence of health outcome or disease determinants at any point in time (Creswell, 2013). The 2017 NHIS secondary dataset used in this study was collected via a cross-sectional design (National Center for Health Statistics [NCHS], 2018). As a result, it was best to report the study design for this study as cross-sectional. With a cross-sectional design, researchers can estimate the snapshot of the prevalence and risk of a factor (Creswell). However, it is vulnerable to biases, such as selection, rumination, participation, researcher, recall, and misclassification induced influences (Creswell). Also, this design cannot be used in the absence of a quasi-experiment or an experimental design to infer a causal relationship; preferably, it can only be used to establish correlational inference (Creswell). Therefore, a cross-sectional design was used to assess

the association between the specified predictor variables and HIV testing participation. There were no time or resource constraints associated with this study.

Methodology

Population

The population of interest for this study was African American women ages 30 years and older and living in the United States. The 2017 public-use data files released contained data for 32,617 households (NHIS, 2018). The 32,617 homes provided data about 78,132 persons within 33,157 families (NHIS). There were 8,845 sample children and 26,742 sample adults (NHIS).

Sampling and Sampling Procedures

African American women ages 30 years and older and living in the United States were included in this study. To select the appropriate women from the 2017 NHIS data that met the inclusion criteria, I stratified the data by race and recoded all the data in the SPSS to exclude women of the other races and those younger than 30 years old. The statistical power for the sample size estimation was 80% and 20% for the beta value (Type II error). Predetermined test statistics values of 95% (0.95) confidence level and 5% (0.05) alpha level (Type I error) were used to assess the statistical significance of the relationship between education level (i.e., high school, college, and post-college) and HIV test participation (yes/participated in HIV test or no/did not participate in HIV test) considering the patients English proficiency, vision quality, access to health care, insurance status, income, employment, and marital status.

Based on Table 1, a minimum of 721 women were needed to conduct the study to achieve a statistical power of 80% and observe at least an effect size of 1.3. The 2017 NHIS data contained 78,132 participants, thus substantially exceeding the minimum sample size required to generate a statistical power of 80%.

Table 1

Minimum Sample Size Estimation

z tests - Logistic regression			
Options:	Large sample z-Test, Demidenko (2007)		
Analysis:	A priori: Compute required sample size		
Input:	Tail(s)	=	Two
	Odds ratio	=	1.3
	Pr(Y=1|X=1) H0	=	0.2
	α err prob	=	0.05
	Power (1-β err prob)	=	0.80
	R^2 other X	=	0
	X distribution	=	Normal
	X parm μ	=	0
	X parm σ	=	1
Output:	Critical z	=	1.9599640
	Total sample size	**=**	**721**
	Actual power	=	0.8001115

Procedures for Recruitment, Participation, and Data Collection

The 2017 NHIS is a survey that involved thousands of households and women was designed to provide information about many health determinants and outcomes

(NCHS, 2018). The sampling selection was made through a multistage approach (NCHS, 2018). Geographic area sampling, commonly called primary sampling units (PSU), was performed (NCHS, 2018). The 2017 NHIS data files are accessible to the public via the NHIS or NCHS website (NCHS, 2018). For the 2017 NHIS dataset version available to the public domain, non-identifiable information is included in the dataset (NCHS, 2018).

The NHIS is an annual survey conducted by the NCHS (NCHS, 2018). The 2017 NHIS was administered by trained staff from the U.S. Census Bureau (NCHS, 2018). Eligible persons qualified for an interview are non-institutionalized adults living in the US (NCHS, 2018). The data collection approach included face-to-face meetings that were administered to a nationally representative sample of households (NCHS, 2018). Individuals or families were randomly recruited and selected via a probability sampling (NCHS, 2018). Within the recruitment and sampling process, each month, a probability sample of the non-institutionalized civilian population was interviewed by personnel of the U.S. Bureau of the Census (NCHS, 2018). Information about the health and characteristic profiles of each member of the households that participated in the interview was obtained and recorded (NCHS, 2018).

The 2017 NHIS data structure contains similar questions every year (NCHS, 2018). Questions or components repeated each year are considered the '*core questions*' (NCHS, 2018). As of 1997 NHIS, the core questions were divided into three segments: (a) the Family, (b) Sample Adult, and (c) Sample Child based-questions (NCHS, 2018). In addition to the core questions, the NHIS have supplemental questions/modules which have been included most years the surveys were administered (NCHS, 2018). Specific to

the 2017 NHIS, the administered survey contained the core questions, enhanced questions on health care access and utilization, and additional supplemental questions in the Family questionnaire about food security (NCHS, 2018). It also included the Sample Child questionnaire that addresses complementary health, mental health, vision, and immunization (NCHS, 2018). Similarly, the Sample Adult questionnaire which covers diabetes, additional health, chronic pain, cultural competence of health care providers, e-cigarettes and use of tobacco products, epilepsy, heart disease, and stroke prevention, hepatitis B and C screening, immunization, internet access, and email usage, and vision were included in the survey (NCHS, 2018). Also, under the Family core questions, the 2017 NHIS core data files contain the Family Disability Questions and person-level data which were collected via the disability questions (NCHS, 2018). A disability supplement was also included in the 2017 NHIS questions as part of the Sample Adult Core referred to as 'Functioning and Disability' (NCHS, 2018). Overall, the 2017 NHIS data released in the public domain consists of seven questionnaires, six-core data, a paradata, a Family Disability Questions, and a Functioning and Disability files (NCHS, 2018).

The 2017 NHIS seven questionnaires released in the public domain are the Household, Family, Family Disability Questions, Adult, Child, Cover, and Functioning & Disability data files (NCHS, 2018). The 2017 questionnaire format released is not identical to the versions administered in the field (NCHS, 2018). The questionnaires uploaded on the NCHS website had minor changes in data presentation due to the editing process (NCHS, 2018). The surveys were released in both English and Spanish versions

(NCHS, 2018). However, the Spanish versions contain interviewer instructions in English (NCHS, 2018).

The arrangement of the NHIS data changed over time and continues to evolve (NCHS, 2018). Before 2004, one household data is considered a ‘case’ (NCHS, 2018). From 2004 and onward, each family is regarded as a separate case (NCHS, 2018). However, for multiple-family households, there is a ‘parent’ case designated for the first family, and each subsequent family is a ‘spawned’ or auxiliary case from the parent, with its unique case identification number (NCHS, 2018).

During the interview process, the respondents were provided flashcards to facilitate their ability to answer specific questions (NCHS, 2018). Before the survey, NCHS developed a Field Representative Manual which contained relevant guidelines and instructions on the survey process and topic areas covered by the NHIS. The Field Representative Manual was provided to the Field Representatives or interviewers (NCHS, 2018). Besides, the interviewers also have in their possession flowchart that described how a respondent navigates through the various questionnaires (NCHS, 2018). The survey questionnaires, flashcards, and Field Representative Manual are all in the Adobe Portable Document Form (PDF) format and viewable via Adobe software (NCHS, 2018).

The 2017 NHIS contains 9 data files, and each is available in two file formats: a column delimited text (ASCII) and a comma-separated values (CSV) structure (NCHS, 2018). Each arrangement was released as a compressed ZIP file with a unique file name (NCHS, 2018). The data are loaded into SAS, SPSS, R, and STATA programs. With the

CSV or ASCII data files inputs, SAS, SPSS, or STATA datasets can be created (NCHS, 2018). The CSV files can also be converted into Microsoft Excel, etcetera. (NCHS, 2018).

The archival data used to address the research questions was the publicly available 2017 NHIS secondary data (NCHS, 2018). However, before uploading this data from the NCHS website, I received IRB approval from Walden University. Once I received the data, I filtered the data by gender, age, and race to exclude all males from the data analysis. I transformed the data to only select women ages 30 years and older. Finally, I also eliminated women of other race groups by either modifying other race groups as missing variables via coding or deleting them from the dataset.

Instrumentation and Operationalization of Constructs

In this study, the education level was grouped into three ordinal levels, high school, college, and post-college. HIV test participation was a nominal variable grouped into ‘yes’ for test participation and ‘no’ for no test participation status. Access to healthcare was grouped into two categories to represent women who reported ‘yes’ to access to healthcare and those who reported ‘no’ to access to healthcare. Similarly, insurance employment and English proficiency were grouped into nominal categories, ‘yes’ and ‘no.’ Also, vision quality was grouped into a nominal category, good vision, or bad vision. Income status was grouped into three interval categories; $0-$30,999, $31,000-$61,999, and ≥$62,000. Marital status was grouped into the following categories married, single, divorced, separated, widow, and widower. HIV test participation was the dependent variable and educational level (high school, college, and post-college) were

the independent variable for research question 1. Access to healthcare was the modifier and insurance status, income, employment, and marital status were the confounders.

Similarly, HIV test participation was the dependent variable for research question 2. The dependent variable was education level (high school, college, post-college level) while English proficiency and vision quality are the modifiers. Table 2 provides specific information about study variables.

Table 2

Study Variables

Variables Name	Level of Measurement	Survey questions	Response options
Education	Ordinal	What is the highest education attained?	High school, College, and Post-College
HIV Test participation	Nominal	In the past 12 months, have you been tested for HIV?	Yes or No
Access to healthcare	Nominal	Do you have access to health care?	Yes or No
Insurance status	Nominal	Do you have health insurance?	Yes or No
Income status	Interval	What is your income range?	$0-$30,999; $31,000-$61,999; and ≥$62,000
Employment status	Nominal	Are you employed?	Yes or No
Marital status	Nominal	What is your marital status?	Married, Single, Divorced, Separated, Widow, and Widower
English proficiency	Nominal	Are you fluent in English?	Yes or No
Vision quality	Nominal	Do you have good vision quality?	Yes or No

Data Analysis Plan

For the descriptive and inferential analyses, version 23 SPSS software was used. Descriptive analysis was used to demonstrate the frequency, count, and percent distribution of education level, HIV test participation, insurance status, income, employment, marital status, access to healthcare, English proficiency, and vision quality among 3203 African American women ages 30 years and older. Logistic regression was used for inferential analyses. The following research questions were used to guide this study:

RQ1: Among African American women age 30 and older, is there any changes in human behavior in terms of participating in HIV test after undergoing processes which foster knowledge and skills such as participation in educational programs?

H_{o1}: There is no significant changes in the behavior of the African American women age 30 in terms of testing for HIV status after going through educational programs.

H_{a1}: There is a significant association in African American women age 30 and older between HIV test participation and educational level (ie high school, college, post-college level) based on access to healthcare after accounting for insurance, income, employment, and marital status.

RQ2: Does the application of the integrated theory framework improve the willingness of the African American women aged 30 and above to participate in HIV testing and understanding of strategies that can promote their health?

H_o2: Participating in activities that foster knowledge and skills do not result in significant changes in terms of participating in HIV testing.

The significance of the findings in this study were evaluated using the *p*-value estimated through the inferential analysis for each of the research questions. The reference point of the *p*-value was the predetermined alpha value of 0.05 (5%). For instance, if the *p*-value generated for analysis was less than the alpha value of 0.05 (5%) [$p < 0.05$], the finding was statistically significant, and thus, the null hypothesis was rejected.

In contrast, if the *p*-value was higher than the alpha value of 0.05 (5%) [$p > 0.05$], the analysis was not significant, and therefore, I failed to reject the null hypothesis. Since the predetermined alpha value was set at 5%, the corresponding level of confidence for all the estimated *p*-values was 95%. This meant that all *p*-values or test statistic values generated were interpreted with a 95% level of confidence that the findings or result was not by chance or random.

Odds ratio (*OR*) was another statistical measure that was used in the inferential analysis parameter to assess the effect size or magnitude of the effect or public health significance of the study findings. The *OR* value is an optional output that can be estimated using a statistical tool such as binary logistic regression. The fundamental basis of an *OR* calculation is that it is based on the ratio estimation of the odds of the exposed group and the odds of the non-exposed groups. Therefore, an *OR* value of 1.00 means that there is no difference in the risk of an event or outcome for individuals exposed compared to those who are not exposed to the same risk. However, if the *OR* value is

more significant than 1.00, then the exposed group risk is greater, and it is positively linked to the outcome associated with that risk. On the other hand, if the *OR* value is less than 1.00, it means that the exposed group has a lower risk of the outcome linked to that exposure and thus, protective or negatively correlated.

Threats to Validity

Threats to validity are part of research quality control that focuses on components of the study process, variables, designs, rationale, and methodology that may pose substantial internal and external validity issues (Creswell, 2013; Forthofer et al., 2007). Standard parameters used in assessing consistency and accuracy of study procedures are not limited to sampling and subject selection processes (Creswell, 2013; Forthofer et al., 2007). Subject selection can influence internal and external validity (Creswell, 2013; Forthofer et al., 2007). Relevant determinants of internal and external validity as it relates to this current study will be discussed. Also, informed suggestions would be advanced to further address the internal and external validity specific to this present study.

Internal Validity

Fundamentally, external validity cannot be established in the absence of internal validity (Creswell, 2013; Forthofer et al., 2007). Internal validity is an approach used to assess how other factors besides the primary predictor variable influence the outcomes (Creswell, 2013; Forthofer et al., 2007). For instance, the study quality is controlled by the consistency of operational instruments, sample methods, and procedural design applied to that study condition (Creswell, 2013; Forthofer et al., 2007). Another type of accuracy test is constructed validity assessment, which focuses on the evaluation of

construct contents (Creswell, 2013). Faulty instruments that lack consistency and accurately will produce unintended spurious errors (Creswell, 2013; Forthofer et al., 2007). As an example, the 2017 NHIS responses are self-reported. A self-reported reaction in the absence of clinical data is vulnerable to many biases such as recall, researchers, participants, and rumination distortion (Creswell, 2013; Forthofer et al., 2007).

The 2017 NHIS was also not designed initially and specifically for this current research study. There is also a lack of random assignment of patients to exposure variable, which is a fundamental barrier to cross-sectional design (Creswell, 2013; Forthofer et al., 2007). Insufficient statistical power or sample size, effect size estimation, confidence level calculation may distort the study findings and may produce a Type I or Type II error (Creswell, 2013; Forthofer et al., 2007).

External Validity

External validity is operationalized based on the extent of generalization of the event or outcome to different settings beyond the study population (Creswell, 2013; Forthofer et al., 2007). Standard data collection validations used to address the internal and external validity in the 2017 NHIS data are as follows; the 2017 NHIS sampling was randomly selected and included several states in the United States, including Maryland (NCHS, 2018). However, the exposure in this case educational level was not assigned to the population being evaluated, hence, limiting this study design to a cross-sectional approach (NHIS, 2018). A cross-sectional design cannot detect predictor-outcomes' Spatio-temporal sequence (Creswell, 2013; Forthofer et al., 2007). Therefore, I did not

generalize or infer causality with the findings; somewhat, I limited my inferential conclusion to correlational conclusions within the selected population (Creswell, 2013; Forthofer et al., 2007).

Variability among interviewers and participants' demographic factors, internal and external factors are common threats to consistency and accuracy of interview processes and contents (Creswell, 2013; Forthofer et al., 2007). Some of the elements are interview approaches, inter-personality characteristics, and procedural or guidance training provided that may influence both the study response and biases (Creswell, 2013; Forthofer et al., 2007). For instance, an unreliable interviewer or interview approach will adversely influence participants' responses (Creswell, 2013; Forthofer et al., 2007This could induce distortion of the findings towards either a Type I or II error (Creswell, 2013; Forthofer et al., 2007). To limit these types of validity issues, NCHS provided extensively and enhanced training to interviewers (NHIS, 2018). Observed content or procedural errors were corrected and addressed during the training sessions (NCHS, 2018). Finally, training enhancements were provided as needed to facilitate adherence to established interview guidelines (NHIS, 2018).

Ethical Procedures

The NCHS is the agency that controls and administers the NHIS questionnaires (NCHS, 2018). They ensure non-disclosure of identifiable participants' information to the public because any intentional disclosures of identifiable information of persons or establishments violate the assurances of confidentiality assured to the providers of the information in question (NCHS, 2018). As a result, NCHS only provides de-identifiable

data for statistical reporting and statistical analysis (NCHS, 2018). In cases where inadvertently a person's identity is disclosed, NCHS strongly requires users not to publish the information but instead report the error to NCHS Director or Director's office (NCHS, 2018). The publicly available data files are not linked to individually identifiable data from other NCHS non-NCHS data files (NCHS, 2018). NHIS data users are expected to comply and adhere to these agreements or statutory conditions or requirements. NCHS staff provided an informed consent agreement to participants before the conduct of the interview (NCHS, 2018). Only participants that agreed to the terms of the informed consent were interviewed (NCHS, 2018). The 2017 NHIS informed consent was approved by NCHS's IRB (NCHS, 2018). To maintain study transparency and ethical standards in research involving human subjects, I received Walden University IRB approval (#11-20-19-0621779) before analysis of this secondary dataset. Data will be stored in a password protected laptop for five years. I will be the only person who has access to the data on this laptop.

Summary

The cross-sectional quantitative study design was used to assess the association between education level among African American women ages 30 years and older and HIV test participation. The study population was selected from the 2017 NHIS conducted in the US. In the assessment of the risk of the association between education level and HIV participation based on access to healthcare, I accounted for income, insurance, employment, and marital status. Similarly, the association between education level and HIV participation based on English proficiency and vision quality were also evaluated.

Logistic regression was used to analyze data. In Chapter 4, I provide the results of the statistical analysis.

Chapter 4: Results

The purpose of this cross-sectional quantitative study was to determine if a significant association in African American women age 30 and older exists between HIV test participation and educational level. The study was based on two research questions. First, "Among African American women age 30 and older, is there a significant association between HIV test participation and educational level (i.e., high school, college, post-college level) based on access to healthcare after accounting for insurance, income, employment, and marital status?" Second, "Among African American women age 30 and older, are there a significant relationship between educational level (i.e., high school, college, post-college level) and HIV test participation based on English proficiency, and vision quality?" In this chapter, I present the results of the study.

Data Collection

The data for the study was collected for three months after the actual recruitment of the participants. There was no discrepancy in the data collection. All the data collection and analysis was conducted according to the initial plan developed. The sample for this study was 3203 African American women ages 30 years and older, living in the United States. The mean age of the respondents was 50.9741, with a standard deviation of 18.606. The maximum age of the respondents was 85 years while the minimum age of the respondents was 18 years old.

Results

Descriptive Statistics and Frequencies

Table 1 provides information on the frequencies of the categorical variables that were included in the study. Concerning HIV testing, 60.8% of the participants have tested for HIV, while 33.3% have never tested for HIV; 95.9% of the participants have access to insurance coverage, while 3.8% lack access to health insurance coverage; 41.1% are employed while 5.6 are not employed. About marriage, 66.3% are married, while 33.5% are unmarried. The majority of the respondents have no vision problems, as shown by 97.8% of the respondents who have no vision problems compared to 2.2% who reported having problems with their vision.

Table 3

Frequencies for Categorical Variables

Variable	*N*	%
Ever tested for HIV		
No	1065	33.3
Yes	1946	60.8
(Missing)	192	6.0
Any family member has health insurance coverage		
Yes	3073	95.9
No	122	3.8
(Missing)	8	0.2
Ever been employed		
Yes	1315	41.1
No	179	5.6
(Missing)	1709	53.4
Marital status		
Married or living with a partner	1072	66.3
Unmarried	2124	33.5
(Missing)	7	0.2
Vision problem		
No	3132	97.8
Yes	71	2.2

As shown in Table 2, the total combined family income has a mean of 1.82, with *SD*=1.02. With regards to English language proficiency, a mean of 3.88 with *SD*=0.44 was recorded.

Table 4

Descriptive Statistics for Continuous Variables

Variable	*M*	*SD*	Observed Range
The education level of an adult with the highest education in family	5.57	2.22	1-9
Total combined family income	1.82	1.02	1-4
Worry about the cost of healthcare	2.19	1.12	1-4
English language proficiency	3.88	.44	1-4

Inferential Analysis

The research questions developed for the study were tested using logistic regression analysis. However, before a data set can be appropriate for logistic regression analysis, a set of assumptions aligned to this statistical test were tested. In this analysis, the assumptions of logistic regression analysis were first tested before conducting data analysis.

Testing of Assumptions

Assumption 1: Linearity – there must be a linear relationship between any continuous predictor and the logit of the outcome variable (Garson, 2012). Linearity is tested by taking the natural log of each continuous predictor variable and then conducting

a logistic regression, in which all continuous variables, their natural logs, and their interactions are the predictors. For the assumption to be met, the interaction terms should *not* be significant ($p > .05$). The interaction term for education level is significant (B = -1.19, Wald = 7.85, $p = .01$), so the assumption is partially violated. Assumption 2: No, multicollinearity among variables (Garson, 2012). This is examined by looking at the correlations between the independent variables. Correlations above .7 indicate a problem with multicollinearity. None of the correlations are above .7, so this assumption is met.

Regression Analysis

RQ1: Among African American women age 30 and older, is there a significant association between HIV test participation and educational level (i.e., high school, college, post-college level) based on access to healthcare after accounting for insurance, income, employment, and marital status?

H_{o1}: There is no significant association among African American women age 30 and older between HIV test participation and educational level (i.e., high school, college, post-college level) based on access to a regular healthcare facility after accounting for insurance, income, employment, and marital status.

H_{a1}: There is a significant association in African American women age 30 and older between HIV test participation and educational level (i.e., high school, college, post-college level) based on access to healthcare after accounting for insurance, income, employment, and marital status.

Binomial logistic regression was performed to determine whether education level is associated with HIV testing after controlling for access to health insurance coverage,

income, employment status, and marital status. The results of the logistic regression indicated that education level is not significantly associated with HIV testing, B = -.01, p = .70, Odds Ratio = .99. The only significant predictor of HIV testing was worry about the medical cost of healthcare such that greater worry about the cost of healthcare was associated with a greater likelihood of undergoing HIV testing, B = .12, p = .02, OR = 1.13 (see Table 3). Therefore, the null hypothesis was rejected for this variable but was not rejected overall.

Table 5

Logistic Regression Results for RQ1

Variable	B	SE	Wald	df	*p*-value	Odds ratio
Education of adult with highest education in family	-.01	.03	.15	1	.70	.99
Any family member has health insurance coverage (No v. Yes)	-.07	.32	.05	1	.83	.93
Total combined family income	-.06	.08	.50	1	.48	.94
Ever been employed (No v. Yes)	-.13	.19	.46	1	.50	.88
Marital status (Married v. unmarried)	.06	.13	.20	1	.65	1.06
Worry about medical costs of healthcare	.12	.05	5.29	1	.02	1.13

RQ2: Among African American women age 30 and older, is there a significant relationship between educational level (high school, college, post-college level) and HIV test participation based on English proficiency, and vision quality?

H_{o2}: There is no significant relationship among African American women age 30 and older, between educational level (high school, college, post-college level) and HIV test participation based on English proficiency, and vision quality.

H_{a2}: There is a significant relationship among African American women age 30 and older between educational level (high school, college, post-college level) and HIV test participation based on English proficiency, and vision quality.

Binomial logistic regression was performed to determine whether education level is associated with HIV testing after controlling for English proficiency and vision quality. The results of the logistic regression indicate that education level is significantly associated with HIV testing, $B = .04$, $p = .02$, Odds Ratio = 1.04 such that higher education level is associated with a greater likelihood of undergoing HIV testing. Additionally, better English proficiency is associated with greater likelihood of HIV testing, $B = .25$, $p = .01$, $OR = 1.28$. Finally, participants with a vision problem are less likely to undergo HIV testing than participants without a vision problem, $B = -.56$, $p = .03$, OR = .57 (Table 4). Therefore, the null hypothesis was rejected.

Table 6

Results from the Logistic Regression Analysis for RQ2

Variable	B	SE	Wald	df	*p*-value	Odds ratio
Education of adult with highest education in family	.04	.02	5.10	1	.02	1.04
English proficiency	.25	.09	7.57	1	.01	1.28
Vision problem (Yes v. No)	-.56	.25	4.92	1	.03	.57

Summary

The research was a cross-sectional, quantitative study aimed at examining the relationship between HIV participation and education level among a sample of African American women. The 2017 NHIS data accessible to the public via the NHIS or National Center for Health Statistics (NCHS) website were used for this study. Results showed there was no significant relationship between HIV testing and education level after controlling for access to health insurance coverage, income, employment status, and marital status. The only significant predictor of HIV testing when the selected variables are controlled was concerned with worrying about the medical cost of healthcare. The greater worry about the cost of healthcare was associated with a greater likelihood of undergoing HIV testing. When the same regression model was conducted controlling for English proficiency and vision quality, there was a significant relationship. Education level was significantly associated with HIV testing, such that higher education level is associated with a greater likelihood of undergoing HIV testing. This was when the two

factors were controlled. Additionally, better English proficiency is associated with a greater likelihood of HIV testing. Participants with a vision problem are less likely to undergo HIV testing than participants without a vision problem. The findings from this study, interpretation of these findings, implications, limitations, and recommendations for future research are discussed in Chapter 5.

Chapter 5: Discussions, Conclusions, and Recommendations

The purpose of this cross-sectional quantitative study was to determine if a significant association in African American women age 30 and older existed between HIV test participation and educational level. A significant predictor of HIV testing was worry about the medical cost of healthcare, such that greater worry about the cost of healthcare was associated with a greater likelihood of undergoing HIV testing. The results of the analysis indicate that education level is significantly associated with HIV testing, such that higher education level is associated with a greater likelihood of undergoing HIV testing. Additionally, better English proficiency is associated with a greater likelihood of HIV testing. Finally, participants with a vision problem are less likely to undergo HIV testing than participants without a vision problem.

Interpretation of Findings

The findings of this study address the value of education, awareness, and enlightenment in supporting the decisions by the respondents to participate in HIV testing. With more training, it is assumed that people become more aware of the value of HIV testing. Proficiency in English means that these respondents may be more educated. Also, it suggests that these participants can easily communicate with other people, including healthcare professionals. Thus, it can be assumed that more educated people will be more proficient in English and will have more knowledge of the value of HIV testing and knowing their status. This relationship may explain why a large number of participants who are educated and proficient in English are also likely to take HIV tests more often. These findings support the need for increased education and awareness

among African American women in the United States. The results also support the need to ensure that many of these African American women understand the need for HIV testing and voluntarily choose to take these tests.

HIV testing is a crucial step in the management of HIV in infected patients. Through experimentation, victims of the condition can know their status and prepare for appropriate management interventions. The information can also be used by healthcare professionals in the disease planning and management team to ensure that appropriate options are available for managing the condition and its associated illnesses. Therefore, understanding the factors that determine HIV testing behaviors among people is crucial in ensuring that appropriate management plans are developed for these patients. Similar to this study, other scholars have also examined the different variables that could predict HIV testing behaviors among people. Most of the studies have focused on understanding the role of socioeconomic variables in determining the extent to which people will go for the testing. A study by Rou et al. (2009) is among the studies that examined the demographic and behavioral factors predicting HIV testing in a Chinese population. According to the findings of Rou et al. (2009), the male gender, having many sexual partners, and alcohol abuse were among the significant factors that determined the update of voluntary counseling and testing (VCT). Based on logistic regression, a study by Conserve et al. (2017) noted that HIV testing increased with education and wealth. As shown in this study, as well as in the study by Conserve et al. (2018), both education and marital status will affect HIV testing. Social and demographic factors affecting HIV testing can have profound effects on the prevention and management of HIV infection.

Thus, with such an understanding, healthcare professionals are better placed to manage HIV and its associated diversities. Both community and society-based factors such as racial makeup and a person's ethnic background have also been shown to influence HIV testing and diagnosis among the African American community living in the United States (George et al., 2014).

It should be noted that HIV testing is a crucial step in detecting, preventing, and managing HIV infection. My study found that the relationship between HIV testing and education was dependent on marital status and employment (measured as having ever worked). The findings highlight the vital role played by education and awareness in promoting HIV awareness through testing and implementation of other associated preventive measures. The purpose of education in promoting HIV awareness and testing behavior among people is based on the fact that increased education increases an individual's knowledge and information regarding HIV testing and places one in a better position to deal with the condition. According to Muyunda, Musonda, Mee, Todd, and Michelo (2018), educational attainment is a significant predictor of HIV testing behaviors and decisions among women of childbearing age. The findings from these researchers also support the conclusions made in this study that education and HIV testing behaviors are related. However, this study went further to examine the relationship between education and HIV testing when other factors such as income, employment, and marital status are involved. According to the study by Muyunda et al., HIV testing behavior among the participants also varied according to the income or wealth index. Specifically, women with higher levels of wealth index were more likely to prefer HIV testing

compared to women with low wealth index. These findings conform to the results of this study, whereby the relationship between HIV testing and education was significantly predicted by the income or employment status of the participants. With more training, it is assumed that the participants have more knowledge and information about HIV testing and its value in preventing the impacts of the disease. Thus, explaining why the number of educated persons who prefer HIV testing is higher than the number of people who are less educated. Employment also affects HIV testing because, in some areas, one would need some financial resources to access these services. Besides, the relationship may be based on the fact that wealth or employment and education status may be related. With this information, healthcare professionals and policymakers in the healthcare sector may be better placed to support initiatives to prevent and manage HIV infections among people.

The theoretical framework chosen for this study was based on the integrated theory of health behavior change (Ryan, 2009). The theory posits that the health behavior changes of an individual can be enhanced by fostering knowledge and beliefs that increase the awareness of the consequences and outcomes of actions that affect health. Moreover, health change can be created by growing many skills related to proper health knowledge, such as self-regulation skills and abilities, or by enhancing social awareness and participation in treatment (Ryan, 2009). The basis of the integrated theory of health behavior change is that health providers are more effective in changing patients' health care habits by working directly with patients, and the more interactive the dynamic, the more critical part in helping them adopt behavior change. The findings of this study are

aligned to this theoretical framework because they have shown the link between educational level and HIV testing. Educational level has been demonstrated as a tool for facilitating behavioral change thus allowing African American women to prefer HIV testing

Limitations of the Study

HIV infection is also associated with the stigma that is still present in the United States (Fatoki, 2016). Such stigma and discrimination have a devastating effect on a person's willingness to go for HIV testing. Persons infected with HIV often shy away from openly seeking help from healthcare professionals. Most of these people also fail to test for HIV as they fear the stigma and discrimination associated with the disease. However, a limitation of this study was that it did not examine stigma as one of the confounding factors that may modulate the relationship between HIV testing and education. Some of the questions one may ask include whether stigma affects HIV testing rates differently for women with high levels of education and those with low levels of education. The value of early HIV testing is that through early detection of the virus, it becomes easier for the individual to deal with the disease or change in treatment interventions that may prove helpful in the future. The other limitation of the study was that the focus of the research was on a few variables. The weakness of using secondary data that was collected for other reasons is another problem with this research. Further studies can examine the confounding role of age and gender on the relationship between education and HIV testing, thus providing more data and information that can be

embedded in prevention programs for dealing with HIV within the African American population.

Recommendations

Because a possible limitation of this study was that it focused on a few variables, future research can expand and examine many social variables and their relation to HIV testing. Factors such as age, gender, and ethnicity are core areas that can be considered in future studies. Future studies can also use other research designs, such as longitudinal studies to explore the effects of time on these variables. In another area, more research can be done by using primary data.

Based on the integrated theory of health, behavior change the role of individual healthcare providers and professionals in promoting behavioral change can be examined further. Rather than focusing the study on individuals, a spatio-temporal longitudinal study can be conducted to explore the roles of healthcare personnel in facilitating behavioral change among African American women with regards to HIV testing. Qualitative research can be performed based on the integrated theory of behavioral change.

Implications

The findings from this study are of value to society in terms of illuminating the need for people to go for HIV testing. An understanding of the factors that determine whether people go for HIV testing or not is crucial in supporting an initiative that encourages early screening of HIV. The need for education is also highlighted in the study findings in the sense that with more education, people are more likely to care about

their lives and prefer HIV testing. This information is an encouragement for members of the African American community to support and encourage increased education in the community. The findings from this study also provide a basis for developing appropriate policy changes and recommendations that can improve the health of people at the community level. By highlighting the factors that determine whether people test for HIV or not, this study is at the forefront of the fight against HIV. These findings have significant implications for the population under investigation as well as the healthcare sector. The fact that education and HIV testing are related paves the way for research and development of health literacy interventions that can be used to increase HIV aids knowledge and awareness among African Americans. Health literacy is closely linked to education and socioeconomic status. Most people who are educated also tend to have higher levels of health literacy. Given the prediction of the model, it is also expected that these people will readily engage in health-related interventions such as HIV testing.

According to Seth, Walker, Hollis, Figueroa, and Belcher (2015), there is a close association between health literacy and engagement in interventions that seek to reduce the prevalence and impacts of HIV infections among people. With more health literacy, people become more aware of the value of HIV testing and will thus take active roles in ensuring that they go for early HIV screening, engage in preventive activities, and implement appropriate treatment approaches. In as much as health education and literacy can be of value in increasing the extent to which people prefer early HIV testing, a set of skills accompanying health literacy is required before one can be in an excellent position to engage in preventive behaviors against such infections. This is a possible area for

further research to determine the specific skills and competencies related to health literacy that can improve people's ability to deal with HIV infections. Another potential area for the new study is the particular health literacy or educational interventions that can lead to HIV awareness. This information can be used for developing educational interventions that specifically address the needs of HIV patients. These efforts require interdisciplinary action and participation from all the stakeholders both in the healthcare sector and community.

Conclusion

Several factors affect the role of education in promoting attitudes towards HIV testing. Education improves the ability to understand significant health concepts that relate to the prevention of HIV infection. The issue of medical care and vision also affects the extent to which people will support HIV testing initiatives. However, it is not clear what the role of healthcare providers, governments, and healthcare professionals is in improving adherence to HIV testing. The findings from this study have shown that HIV testing behavior among African American women is affected by education level. Thus, education and awareness among this community will improve HIV testing behaviors. Healthcare providers, professionals, government, and other organizations should support interventions to increase literacy among the African American population to help improve HIV testing rates.

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