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Marital Status and Human Immunodeficiency Virus Mortality in a Southern County

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Abstract

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by

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MPH, Argosy University, 2016

BS, University of Bamenda, Cameroon, 2004

Dissertation Submitted in Partial Fulfillment

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Abstract

Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) remains a substantial cause of mortality, particularly among U.S. segments of the population. Marriage is protective of HIV/AIDS mortality due to monogamy; however, the increased risk of HIV/AIDS mortality among other marital subgroups is understudied. The purpose of this study was to examine the association between marital status and HIV/AIDS mortality among a cohort of HIV infected individuals in a southern county. Mills' behavior theory guided this research as it posits that all behaviors are acquired through conditioning, which occurs through the interaction with the environment. The study had a quantitative research design and consisted of a cohort of 1,164 cases 20 years and older infected with HIV/AIDS who died during the period between 2012-2018. The exposure variable was marital status (divorced, widowed, single/never married with married as reference category). HIV/AIDS mortality was the outcome variable with age, gender, and race/ethnicity as moderator variables. Logistic regression analysis indicated that compared to those married, widowed were 8.247 times more likely to die from HIV/AIDS (OR=8.247, 95% CI [3.100-21.941], $p < .05$). Gender (male), age, and race (African Americans) moderated the association between exposure and outcome. Although not statistically significant, those who divorced were 0.30 times less likely and single/never married 1.385 times more likely to die from HIV/AIDS than those married. This study's findings may help health educators and public health planners identify strategies to reduce risky behavior resulting in HIV/AIDS mortality/infection for those who are single/never married or widowed.

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Dedication

I dedicate this study to my wonderful mom Nguafac Dorothy, who has devoted her life to her children's welfare and has encouraged me to pursue my dreams relentlessly.

For my four beautiful children, Jaline, Treasure, Bright, and Brilliant, who believed in me and inspired me, and can make me laugh, work hard, and dream big, even on the most challenging days. For my sibling, who call me to encourage me and ask if there is anything for them, I promise to be there for you and forever. To my beloved wife, Mrs. Linda Nkendem, your support is immense and infinite, and I will live to say, "thank you." Thank you for your support and encouragement throughout this long dissertation process; I could not have done it without you.

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Chapter 1: Introduction to the Study

Over half a million (507,351) people died from the onset of the Human Immunodeficiency Virus (HIV)/Acquire Immune Deficiency Syndrome (AIDS) epidemic in the United States through 2015 (Centers for Diseases Control and Prevention [CDC], 2018a). The epidemic increased rapidly from the 1980s, peaked during 1994-1995, and continued to decrease at a slower pace. HIV/AIDS remains a substantial cause of death, particularly among specific segments of the population. Persons dying from HIV infection consist of women (26%), Blacks/African Americans (51%), residents of the South (54%), and those 45 years of age and older (76%). Despite national efforts to decrease HIV mortality, in 2016, the U.S. Southern states represented over a third (38%) of the U.S. population, almost half (45%) of those living with HIV, and 51% of new HIV infections (CDC HIV Surveillance, 2019). The present study explored HIV/AIDS mortality due to lifestyle changes in the South where marital status was the exposure in this epidemic. In this chapter, I discuss the background issues leading to an increased risk of HIV/AIDS among individuals after the dissolution of marriage. Additional topics covered include the problem statement, research gap, purpose and significance, research questions based on Mills' (2010) behavior theory, and assumptions, scope, delimitations, and limitations of the study.

Background of the Study

HIV is an urban disease, with most cases occurring in metropolitan areas with 500,000 or more people. Despite the success of HIV antiretroviral therapy (HAART) in decreasing mortality nationally, segments of the population are at higher risk of dying from HIV/AIDS (Kari et al., 2012). The overall success of HAART was at the national

level but simply missed segments of the population, like the South and African Americans. In addition to specific portions that were not captured by national campaigns, the HIV epidemic changes trajectory; thus, new patterns need to be addressed. The CDC estimated the incidence of HIV infection between 2006 and 2009 at 19.0 to 22.5 per 100,000 population, with a significant majority occurring among men who have sex with men and African Americans (Prejean et al., 2011).

Cultural factors in the South place those who transitioned from a marriage lifestyle to divorce at a higher risk of HIV/AIDS. Being married is inversely associated with the number of sexual partners. Findings by Kposowa (2013) indicated that those divorced were 1.8 times more likely to be infected with HIV compared to married individuals, while the divorced were 0.46 times less likely to get HIV infection. These transitional patterns in marital status and their influence on HIV/AIDS risk are not documented in the South of the United States, where the epidemic is overrepresented.

Even though the HIV/AIDS death rate has declined significantly, diagnoses rates (per 100,000 people) are still significant in the South (16.1) compared to the entire U.S. and six dependent areas (12.3), Northeast (10.6), West (9.4), and Midwest (7.4). As infections surpass deaths each year, the number of people living with HIV continues to increase (Febo-Vazquez, Copen, Daugherty, 2018). As HIV transmission patterns continue to shift, there is a need to further explore HIV mortality as a lifestyle factor, such as transitions in sexual risk from married to divorced through finding new sexual partners. Recently, the confluence of knowledge and technology on the treatment and prevention of HIV infections has shifted the HIV discussions to normalizing or ending the AIDS epidemic in 2030.

HIV stigma and homophobia pose a threat to the prevention and treatment of HIV/AIDS. According to (Frye et al (2019) HIV stigma and homophobia constitute the main barrier to HIV prevention and treatment. Marital status in some cultural subgroups poses stigma and discrimination, where limited information and awareness may lead people to fear accessing HAART. Some people still think HIV is a disease for specific population subgroups (Frye et al., 2019). This has led to negative value judgments about people who are living with HIV. Having facts can help reduce misunderstandings and decrease the stigma associated with HIV/AIDS.

It is crucial to reduce HIV prevention and treatment barriers among subgroups of the population at higher risk of being infected with HIV to curb the United States epidemic. Understanding the association between those transitioning from a married to divorced lifestyle and engaging in new sexual networks and HIV mortality is imperative. HIV stigma and homophobia have considerably reduced access to HIV testing (Golub & Gamarel, 2013; Mannheimer et al., 2014) and antiretroviral treatment (Eaton et al., 2015) among different population subgroups.

Despite the direct effect of HIV on the U.S. population, widowed, African American, and men are at the highest risk of infection and have grown complacent about HIV (Hurley, 2018; Kaiser Family Foundation, 2009; MacKellar et al., 2007). This complacency poses a significant concern since increased risk behaviors and reduced community and national mobilization are attributed to a lack of cognizance about HIV. For example, the rate of death (per 100,000) was highest (16.9) for African Americans. The diagnoses of HIV infection remained relatively stable from 2012 to 2017 for the

Black/African American population: 18,196 (2012), 17,326 (2013) 17,533 (2014) 17,453 (2015)17,269 (2016) and 16,690 (2017) (CDC, 2017b).

The discrepancy in HIV diagnoses and deaths between different population subgroups indicates that national studies cannot capture specific population subgroups or tailored interventions aimed at subgroups. Although data from national samples can be generalized to the nation as a whole, it may not apply to subpopulations. Therefore, national research or survey like that of Kposowa (2013) for marital status and HIV/AIDS mortality does not capture specific population subgroups. Subgroup analysis is further justified by recommendations for further studies made by Kposowa (2013) and Momenyan et al. (2018).

The environment has a significant influence on behavior (Mills, 2010; Watson, 1913). Thus, different population subgroups behave differently because of their different environmental settings. This upholds that a positive behavior reinforcement (Mills, 2010) and the right behavior conditioning (Watson, 1913) is necessary for a proper understanding of HIV/AIDS mortality/infections in Southern cities of the U.S. Therefore, it is imperative to examine specific population subgroups to have a more apparent trend of this epidemic, HIV/AIDS. The study by Kposowa (2013) is a national analysis of survey and mortality data. While Kposowa's research taps the association between marital status and HIV, it does not provide the depth of issues affecting the South and African Americans.

Attention has meaningfully been directed to African Americans and men who have sex with men (MSM) (Hurt, Tera, 2013; Momenyan et al., 2018). The more conservative groups (religious and cultural) do not capture the message because they do

not see themselves at risk. The South historically has had more intact marriages, and this has been a protective factor against HIV. The patterns of dissolution of marriage are reaching this area and placing a burden on public health prevention (CDC, 2017c). Also, the number of deaths from HIV outweighs African Americans' representation in the area (CDC, 2017a).

Problem Statement

While the majority of research on HIV focuses on HIV testing, attitudes, and interventions among adolescents and youth, and men who have sex with men, the impact of HIV infection compared to deaths from HIV/AIDS among those who transitioned from marriage to divorce is understudied (Kerpelman et al., 2016). Those divorced are more likely to (1) acquire HIV infection, and (2) die from HIV infection than those who were never married. HIV remains a substantial cause of death in some populations, and it was the 9th leading cause of death in the United States in 2015, for ages 25 to 44 (CDC, 2018c). In 2015, HIV cases were not evenly distributed across states and regions (CDC, 2018d). Over a third (38%) of the U.S. population lives in Southern states and accounted for more than half of new HIV diagnoses in 2016 (CDC, 2018d). The CDC estimates that the HIV/AIDS epidemic will continue to increase (CDC, 2018e). HIV infection is more likely to be transmitted via sexual activity and shared drug-injected needles (CDC, 2018).

There are gender differences in the association between marital status and risk of death from HIV/AIDS (Kposowa, 2013; Liddon et al., 2010). As the proportion of marriages that end in divorce increases, the number of sexual partners increases (Liddon et al., 2010). Women who are divorced or separated are more likely to report five or more lifetime sex partners and two or more sex partners in the past year than women who were

never married (Liddon et al., 2010). Fagbamigbe et al. (2016) found similar associations between women's marital status and risky sexual behavior. The odds of HIV infection were 1.8 times higher among formerly married women than married women.

In contrast, Kposowa (2013) found that the association between marital status and mortality from HIV/AIDS only applied to men. Kposowa analyzed data from the National Longitudinal Mortality Survey, which indicated that divorced and single/never-married men have a higher risk of death from HIV/AIDS than married persons. In general, those married are less likely to die from HIV/AIDS compared to the divorced and separated, who were 5.8 times more likely to die of HIV/AIDS, and the single/never married, who were 23 times more likely to die from HIV/AIDS (Kposowa, 2013).

These findings suggest that marital status has a dose-response exposure where being married is protective of HIV/AIDS mortality. During a marriage, individuals are likely to have a reduced network of sexual partners compared to the lifetime years of multiple sexual partners while single, divorced, separated, or widowed. These variations in sexual behavior and HIV infection among population subgroups affected by transitions brought about by the dissolution of marriage represent a gap in the literature. Kposowa (2013) and Momenyan et al. (2018) recommend additional studies on HIV/AIDS using population-based cohorts. Most studies on behavior and HIV risk were carried out using younger populations whose sexual behavior was established before marriage. Therefore, additional research is needed to examine the connection between risky marital status and HIV/AIDS mortality among adult populations (Kposowa, 2013; Dembo et al., 2009). Considering the regional disparities in HIV/AIDS mortality rates across the United States, understanding broader contextual factors that increase the risk for HIV and

subsequent death is critical (Momenyan et al., 2018). This research study may contribute to the literature gap by examining the association between marital status and HIV/AIDS mortality, hypothesizing that the dissolution of marriage increases risky sexual behavior that leads to HIV infection.

Purpose of the Study

The purpose of this study was to examine the association between marital status and HIV/AIDS mortality in a cohort of HIV/AIDS infection cases in a southern county of the United States. Marital status is defined as married, divorced, widowed, and single (never married). There are gender differences in the association between marital status and risk of death from HIV/AIDS. The analysis was controlled by demographic factors, such as gender, age, and race/ethnicity.

Research Questions and Hypotheses

RQ1. Is there an association between marital status and HIV/AIDS mortality among residents of a southern county?

H_o1: There is no association between marital status and HIV/AIDS mortality among residents of a southern cCounty.

H_a1: There is an association between marital status and HIV/AIDS mortality among residents of a southern county.

RQ2: Is there an association between marital status and HIV/AIDS mortality, controlling for gender among residents of a southern county?

H_02: There is no association between marital status and HIV/AIDS mortality, controlling for gender among residents of a southern county.

H_a2: There is an association between marital status and HIV/AIDS mortality, controlling for gender among residents of a southern county.

RQ3: Is there an association between marital status and HIV/AIDS mortality, controlling for age, gender, race, and ethnicity among residents of a southern county?

H_o3: There no association between marital status and HIV/AIDS mortality, controlling for age, gender, race, and ethnicity among residents of a southern county?

H_a3: There is an association between marital status and HIV/AIDS mortality, controlling for age, gender, race, and ethnicity among residents of a southern county?

To investigate these hypotheses, I used secondary data to determine whether there was a relationship between marital status and HIV/AIDS mortality, controlling for age, gender, race, and ethnicity. The probable links between exposure (marital status, risky behavior) and outcome (HIV mortality) is displayed in Figure 1.

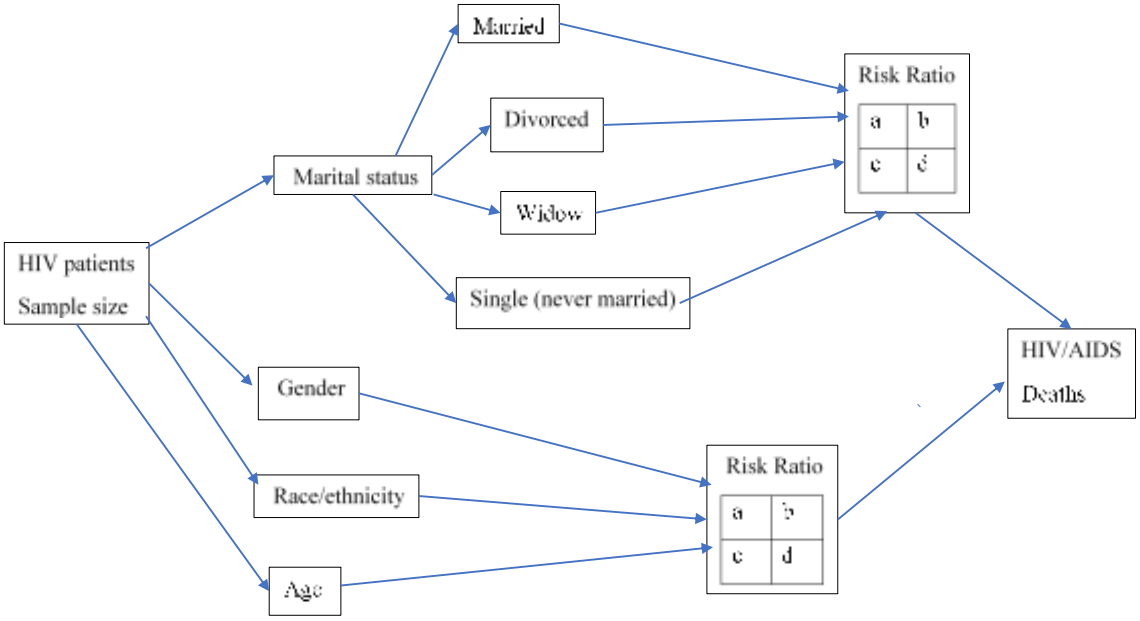

Figure 1: Probable links between the exposure and the outcome.

Theoretical Base

The theoretical base for this research was Mills' (2010) behavioral theory as it explains the ability to change behavior through positive or negative reinforcement. This theory posits that all behaviors are acquired through conditioning, which occurs through interaction with the environment. The behavioral approach is used to explain human behavior by examining the experiences and consequences present in the individual's environment and the learned associations acquired through previous experience (Mills, 2000). Previously married, single people and couples who divorce and the widowers start new relationships have gone through stress and trauma that may influence their behavior (Liddon et al., 2010). This theory is appropriate as it explains the behavior (risky interaction) involved with marital status, where race, ethnicity, age, and gender of the

population may enhance vulnerability to deaths from HIV/AIDS. People develop a behavior through conditioning, which occurs through interaction with the environment. Society perceives that when couples become single, the eagerness to get another partner is high (Liddon et al., 2010).

Individuals' or groups' actions are shaped by their response to environmental stimuli (Krapfl, 2016). Classical conditioning explains how the potent biological stimulus (natural stimulus) pairs with an environmental stimulus (unrelated or neutral stimulus) to produce a behavior response (conditioned response) (Krapfl, 2016; Mills, 2010). In this context, the natural urge to have sexual relationships is paired with the concurrent sexual connections within the southern states, notably African Americans, to produce a behavior response (conditioned response) of multiple sexual partner practices. Thus, both person, behavior, and environment may contribute to the higher HIV/AIDS infection prevalence and mortality in the Southern states. The prominence of the environmental stimuli has a powerful role to play in how quickly the stimuli-response association is formed or weakened and extinct (Vanelzakker et al., 2014). As more research on the association between marital status and HIV/AIDS is done, the results may serve as a stimulus (awareness), which may encourage protected sex and abstinence, and halt concurrent or multiple sexual partnerships.

Nature of the Study

The study was a quantitative study where the association between marital status and HIV/AIDS mortality was examined using the HIV/AIDS mortality and infection dataset from a southern county of the United States. The quantitative research design was used to evaluate the association between exposure and outcome variables (Creswell,

2014). The HIV/AIDS mortality surveillance dataset of a cohort of infected HIV cases from a southern county in Georgia were analyzed using binary logistic regression. A binary logistic regression estimates the association between the independent variables and the dependent variable (Creswell, 2014). Vital statistics are collected as elements required for disease surveillance so that numerical data can be analyzed using statistical procedures (Draper, & Swift, 2011). This quantitative analysis may help identify the significance of the prevalence and risk between the exposure and the outcome.

Definition of Terms

Marital status: Marital status is defined as married, divorced, widowed, and single (never married). There are several types of marital status: single, married, widowed, divorced, separated, and, in some instances, registered partnership (CDC, 2018g).

Sexual behavior: Sexual behavior can also be termed sexual health, sexual activity, or sexual practice. The World Health Organization (as cited in CDC website) defines sexual health as a state of physical, emotional, mental, and social well-being concerning sexuality; it is not just the absence of disease or illness. It can also the way humans experience and express their sexuality. (CDC, 2016).

HIV infection or contraction: These two terms are used interchangeably and are defined as the invasion and multiplication of HIV viruses within the body (CDC, 2018f)

HIV: HIV is defined as the human immunodeficiency virus. Its effect can lead to acquired immunodeficiency syndrome or AIDS if not treated (CDC, 2018f).

AIDS: AIDS stands for acquired immunodeficiency syndrome. It is the stage of HIV infection where a person's immune system is sufficiently compromised, leaving the

body open to a wide range of potentially deadly diseases known as opportunistic infections (CDC, 2018f).

Multiple sexual relationships: Multiple sexual relationships is defined as having more than two sexual partners. It is used interchangeably with parallel sexual relations (CDC, 2018f).

Assumptions

For this study, I assumed that all the HIV/AIDS deaths are residents of a Southern County and had contracted the disease in a Southern County. People are continually relocating, and death in a Southern County maybe someone who just relocated from a northern County, for example. It is also assumed that the cause of death is HIV/AIDS and not any of the opportunistic diseases like tuberculosis (TB). Some people infected with HIV die not because of HIV but because of different opportunistic infections as HIV destroys the body's defense system (CDC, 2017a).

Since HIV transmission is through sexual activities, I assumed that having multiple sexual partners or having concurrent sexual partners increases the chances of HIV infection. Any category of marital status that engages in various sexual partnerships is more susceptible to HIV infection. While some people may have HIV from a single relationship, others may have multiple sexual partners and not contract HIV. I assumed that those married were HIV negative at the time of marriage. In addition, I assumed that those who transitioned from a marriage status to a divorced one develop new sexual networks. At the same time, I assumed that the single/never married are monogamous.

Scope and Delimitations

The following scope and delimitations restricted this research (1) the data were limited to a Southern County, (2) only HIV/AIDS cases with marital status were analyzed (3) the data were limited to cases in the years 2012-2018. The generalizability of the findings from this research is limited to individuals whose sexual identity is unknown. Thus, generalizability to lesbian, gay, bisexual, transgender, and queer individuals and individuals living outside a Southern County were beyond this research scope.

In this study, I focused on marital status and its connection to HIV/AIDS mortality on a cohort of HIV infected cases in a Southern County. The HIV/AIDS mortality data were extracted from the vital statistics database of the state of Georgia. The analysis did not have complete data on marital status mainly because it was information that was optional at the time of testing and at the time of death.

Theresa, Hans-Peter, and Jere (2015) demonstrated that being aware of HIV status (a) does not impact the odds of divorce among either HIV-positive or negative individuals; (b) reduce the number of HIV-positive transmission from sexual partners; (c) reduces the amount of reported sexual partners among HIV-positive respondents, and (d) increase self-reported condom use with spouses for both HIV-negative and HIV-positive respondents. Similarly, Steven et al. (2015) and Eaton et al. (2012) demonstrated that compared to other gender subgroups and racial/ethnic subgroups, African American men are more likely to report high numbers of sexual partners. In this study, I explored how multiple sexual relationships elevate the rate of sexually transmissible infections (STIs), including HIV (Steven et al., 2015; Adimora et al., 2006), and poses a significant health problem to young men and the general community. Therefore, the inclusion criteria were

all HIV deaths in a Southern County of ages fifteen (15) and above, men and women, and CDC recognized race and ethnic groups. Although age 15 through 17 (for women) is not the legal age for marriages, they constitute single/never married individuals who engage in sexual relationships. In contrast, the exclusion criteria included those out of metro Atlanta cities and age below 15.

Limitations

Frye et al. (2019) stated that HIV stigma and homophobia pose a threat to the prevention and treatment of HIV/AIDS. Due to this stigma and homophobia, limited data were collected on marital status. Georgia officially began collecting the marriage status of HIV/AIDS cases as recently as 2013. Even after 2013, providing marital status was optional; thus, only 6.27% of HIV/AIDS cases from 2012-2018 had marital status documented on the diagnosis and mortality records. Also, even though the data were deidentified, the state could not provide all demographic factors for confidentiality purposes. For example, race and ethnicity were limited to African Americans, whites, and others. Lastly, I could not account for those HIV/AIDS mortality and infection cases not reported to the state yet.

Reporting bias is defined as the selective suppression or revealing of information by the subjects. Subjects and researchers have the tendency to under-report the available information for proper analysis of the significances of the effects. For example, only about 60.78% of marital status reports have HIV mortality cases in this study. It is optional for people to declare their marital status at the time of testing and during treatment. The CDC testing guidelines stipulate that an institution cannot deny someone testing base on his/her marital status. As such, some people do not find it necessary to

disclose their marital status. Thus, in some of the cases, marital status cannot be determined; consequently, limiting the effect of marital status prediction of HIV infections and mortality threatens the validity and reliability of the study in general. Similarly, marital status was not recorded on death certificates until recently in 2013, when the item was added to the questionnaires.

Moreover, opportunistic diseases like TB and malaria are the cause of death in some HIV patients. TB is one of the top infectious disease killers in the world and is one of the leading causes of death in people living with HIV (CDC, 2017d). TB accounts for more than 30% of deaths among people living with HIV in 2017 (CDC, 2017d). In addition, the CDC stated that people living with HIV (PLHIV) are about 21 times more likely to develop TB disease than HIV negative individuals.

Lastly, Georgia's strict HIV/AIDS laws (see OCGA 24-12-20 and 24-12-21) do not allow HIV/AIDS raw data to be released out of the Georgia Department of Human Services. In this study, data on race/ethnicity were limited to white and African American categories; the remaining races/ethnicities were aggregated into an “other” race category. This limitation was to maintain the privacy of HIV/AIDS cases. Thus, the demographic, race/ethnicity, was released as African American, Whites, and others.

Significance of the Study

This study is unique as it addressed the limited research on the association between marital status and HIV/AIDS mortality (Coatsworth et al., 2017; Khan et al., 2011) in a Southern County. HIV was the 9th leading cause of death in the United States in 2015, for ages 25 to 44, and the distribution of cases was concentrated in the Southern states (CDC, 2016). This study examined a Southern County because HIV affects a

disproportionate number of people in the South where over a third (38%) of the U.S. population lives. Still, more than half of new HIV cases are diagnosed and expected to continue to increase (CDC, 2016). The study examined the influence of marital status on the risk of HIV within the context of the protective effect of being married or living with a partner, and where those divorced, separated, widowed, and single are at higher risk of HIV while engaging in new and more extensive networks of sexual partners. The social change implications from this study may include use by health educators and public health planners to identify strategies to bring awareness to those outside of a marriage environment about engaging in risky sexual behavior.

Summary and Transition

In this chapter, I presented the current epidemic of HIV/AIDS and how it is affecting African Americans living in the South at higher rates. Several risk factors contribute to the acquisition and subsequent death from HIV/AIDS. Despite the prevalence of this infectious disease, people still engage in several risk behaviors that make them prone to HIV infection and death. Although not specifically studied, HIV is less prevalent among those that are married, but there is consistent evidence that marital status is inversely related to HIV infection and STDs. I examined the influence of marital status on the risk of HIV/AIDS mortality within the context of the protective effect of being married or living with a partner, and where those divorced, separated, widowed, and single are at higher risk of HIV while engaging with new and more extensive networks of sexual partners. Mills' behavioral theory guided the study in explaining human behavior changes through experiences in the environment and consequent adaptation to the present environmental conditions.

In chapter two, I explained how marital status is associated with HIV/AIDS mortality. Human sexual behavior is dependent on marital status, age, gender, race, and ethnicity. Concisely, HIV infection is dependent on sexual behavior as sex is a prominent means of transmission. So, an understanding of the marital status and sexual behavior is a prerequisite for a greater understanding of the association between marital status and HIV/AIDS mortality.

Chapter 2: Literature Review

The purpose of this study was to examine the association between marital status and HIV/AIDS mortality in a Southern County, controlling for age, gender, race, and ethnicity. In this chapter, I outline what was found in the literature. Prior research on HIV focused on testing, attitudes, and interventions among adolescents and youth, and men who have sex with men (Kerpelman, 2016). This prior research led to a focus on the number of sexual partners and relationship status associated with unprotected sex (Ashenhurst, 2017). Little attention was paid by researchers to the association between HIV and marital status. Fagbamigbe et al. (2016) focused on marital status and HIV prevalence among women (even though in Nigeria), and Kposowa (2013) focused on marital status and HIV/AIDS mortality using the U.S. National Longitudinal Mortality Study. Kposowa found that those divorced and separated had a higher likelihood, 5.8 times of dying from HIV/AIDS than those married.

In contrast, single/never married individuals were 23 times more likely to die from AIDS than married individuals. Thus, additional research is needed to examine the connection between risky sexual behavior, marital status, and HIV/AIDS mortality among adult populations. Considering the regional disparities in the rates of HIV/AIDS mortality across the United States, understanding broader contextual factors that increase the risk for HIV and subsequent death is critical (Momenyan et al., 2018).

In this chapter, I present a comprehensive review of the literature on the components of marital status. Following the literature search strategy, I offered a synopsis of the most significant themes in the literature, marital status, and HIV/AIDS,

approaches to the study of sexual relationships, selection of variables, marital status and HIV/AIDS literature.

Literature Search Strategy

My literature search strategy consisted of using the following databases to identify and retrieve literature: CINAHL & MEDLINE Combined Search, CINAHL Plus with Full Text, MEDLINE with Full Text, ProQuest Health & Medical Collection, ProQuest Nursing & Allied Health Source, Walden University's Thoreau multi-database search engine, Google Scholar, and SAGE Premier. Initially, the search included articles from 2000 up to 2018; nevertheless, only new materials (last 5 years) will be for the final document, except for those articles with excerpts that have not been cited in past years. Search terms included *divorce, marriage separation, marriage breakup, marriage breakdown, marriage split, marriage split up, sexual attitude, age, and marital satisfaction, gender, and marital separation, marital beliefs, relationship status, American marriage, race and marriage, American marital trends, race and marital trend, interpersonal behavior and marriage, matrimonial expectations, marital quality, marital patterns, divorce, divorce rate, race and divorce, racial identity and divorce, HIV, AIDS, HIV/AIDS, Human Immune Virus, Acquired Immune Deficiency Syndrome, sexual partners, multiple sexual partners, concurrent sexual behavior, varied sexual behavior, and concurrent sexual partners.*

Few or no articles were found that harmonize the search terms or variables alike to this study. Even though research regarding divorce and multiple sexual partners spans decades, there is little or no link between these variables and HIV, AIDS, or HIV/AIDS. However, although there is literature on race and ethnicity, especially HIV/AIDS and

divorce among African Americans, there is little research on the association between marital status and HIV/AIDS.

Significant Themes in the Literature

Married and divorced persons have varied sexual behavior, which is associated with HIV infection among populations, and marriage is protective of multiple sexual partners and HIV/AIDS due to the reduced network of sexual partners. This underscores Kposowa's (2013)and Momenyan et al.'s (2018) recommendation to conduct additional studies on sexual behavior, marital status, and HIV/AIDS, using population-based cohorts. There are gender differences in the association between marital status, risky sexual behavior, and risk of death from HIV/AIDS (Kposowa, 2013; Liddon et al., 2010). For example, Kposowa found that men are more likely to die of HIV than their female counterparts. Women who are divorced or separated are more likely to report five or more lifetime sex partners and two or more sex partners in the past year than women who were never married (Liddon et al., 2010).

Indeed, the divorce rate (per 100,000) is relatively high and increasing in some Southern states, for example, Maryland 2.5 (2014), 2.6 (2015) to 2.7 (2016) and North Carolina 3.1 (2015) to 3.2 (2016) (National Center for Health Statistics, 2017a). Whereas marriage rates (per 100,000) are relatively low and decreasing in some Southern states, for example, Maryland 6.5 (2014), 6.2 (2015), and 6.3 (2016), as well as Florida 8.2 (2015) to 8.1 in 2016. According to Mojtaba et al. (2015), the most registered divorce cases are related to women aged 20 to 24 and men aged 25 to 29. Most divorce cases are related to couples who had lived together for less than one year. This results in the

likelihood that more divorced women will engage in more sexual partners, as indicated in Liddon et al. (2010).

On the other hand, nonmarital births in the U.S. are on the rise, particularly amongst disadvantaged groups (Christina et al., 2016). Christina et al. (2016) stated that in addition to being less likely to be born to married parents, some children of disadvantaged parents born to married parents are more likely to be born into a typical assumed type of marriage that is relatively fragile. These marriages will likely result in divorce, further increasing the likelihood women will engage in multiple sexual relationships, which tends to increase their vulnerability to HIV and subsequent mortality.

In fact, in 2016, the widowed population was estimated to be 40% among women over 65 in the United States (FIFARS, 2016). Considering those reintegrating into the community and that women and men over the age of 55 approved of sex being crucial in their lives and their relationship (Fisher, 2010; Gott & Hinchliff, 2003), means they will engage in sexual relations to compensate for that lost in the prior marriage. To confirm this, Ellen et al. (2009) stated that about three-quarters of women participants (72%) in his survey said they would miss sex if their partner died. Also, about 53% indicated that they would tremendously miss sex because of past sexual experiences.

Theoretical Framework

John B. Watson (2013) developed the psychological theory in 1913, consisting of the school of behaviorist methodology. Watson outlined behaviorism as an objective branch of science in which its theories and findings are grounded on experimental research using purely observable data. Constructed on one of his goals of behaviorism,

where he wanted to understand how certain behaviors develop, he concluded through his findings that behavior development was due to conditioning to adapt to external stimuli. Behaviorism is a learning theory that emphasizes that all practices are assimilated through conditioning, which occurs through interaction with the environment (Watson, 2013). According to behaviorists, our responses to environmental stimuli shape our actions; thus, behavior can be acquired through an organized and observable manner that does not depend on the internal mental states. According to Watson, behavior can be learned, unlearn, and relearned.

According to Watson (1913), behaviorism psychology is a predictor and control of behavior, and the environment is a determinant of behavior and has the potential to improve response in the society through empirically derived principles of conduct. Mills (2010) further developed this theory by stating that behavior can change through positive reinforcement (classical conditioning) or negative reinforcement (operant conditioning).

The theoretical base for this research is Mills' (2010) behavioral theory as it explains the ability to change behavior through positive reinforcement or negative reinforcement. This theory posits that all behaviors are acquired through conditioning, which occurs through interaction with the environment. The behavioral theory seeks to explain human behavior by examining the experiences and consequences present in the individual's environment and the learned associations acquired through previous experience (Watson, 2013: Mills, 2000). Whether people are married, single, widowed, or divorced, they have gone through stress and trauma that may influence their behavior (Liddon et al., 2010).

Mills' theory is appropriate to guide this study as it explains the behavior (risky interaction) involved with marital status, where race, ethnicity, age, and gender of the population may enhance vulnerability to deaths from HIV/AIDS. There is a conception that when couples become single, the eagerness to get another partner is higher (Liddon et al., 2010). For instance, Fagbamigbe et al. (2016) stated that the odds of HIV infection were 1.8 times higher among formerly married women compared to married women because they are more likely to engage in multiple sexual relationships. Thus, risky sexual behavior and the higher odds of HIV infection in formerly married women are acquired through environmental conditioning. Consequently, if the neutral stimulus is paired with the naturally occurring stimulus (risky sexual behavior) and reinforced, the right conditioning can be acquired (Watson, 2013).

Background of HIV/AIDS

Epidemiology of HIV

In 2015 and 2016, the mortality rate of persons with diagnosed HIV infection remained stable at 4.8/100000 persons (CDC, 2017). However, the rate of diagnosed HIV increased from 303.5 in 2016 to 306.6 in 2017. In 2017, the rate of HIV disease classified as stage 3 (AIDS) was 5.4, similar to that of 2016 5.6. HIV Surveillance Report indicates that from 2012 through 2016, the annual number of HIV diagnoses remained relatively stable in the U.S. Age, sex, race, and ethnicity provide some risk of HIV infections and death across the U.S. (CDC, 2017).

The impact of marital status on HIV infection has been studied a great deal, but the findings have been contradictory (Boikhutso, 2019). The findings have been inconsistent because the behavior of population subgroups from one region to another

and from one country to another fluctuates, yielding different results. Also, marriage patterns have changed considerably from one state to another (Boikhutso, 2019). Consequently, HIV/AIDS mortality pattern has equally changed from one population subgroup to another. For example, preceding research done in sub-Saharan Africa has demonstrated that marital status is directly associated with HIV positivity (Kposowa, 2013; Shisana et al., 2016). However, there are contradictory findings on the association between marital status and the prevalence of HIV in rural South Africa (Boikhutso, 2019).

HIV and Gender

Regarding gender, from 2011 through 2016, the rate of diagnosed HIV for male adults and adolescents was 24.3 and 5.4 for women (CDC, 2016). Likewise, in 2017 men accounted for 81% of the infected case, and 76% of all infections classified as stage 3 (AIDS) among adults and adolescents with a rate of 10.5 as opposed to females with the rate of 3.1 (CDC, 2017b). Similarly, Kposowa (2013) found that the association between marital status and mortality from HIV/AIDS only applied to men from the analysis of data from the National Longitudinal Mortality Survey. In contrast, Fagbamigbe et al. (2016) found similar associations but with women's marital status and risky sexual behavior where the odds of HIV infection were 1.8 times higher among formerly married women compared to married women. Therefore, it is imperative to investigate the association between marital status and HIV/AIDS, controlling for gender, age, race, and ethnicity in a Southern County.

HIV and Age

From 2012 through 2016, the rates of deaths for persons aged 60 to 64 and 65 years and older increased (CDC, 2017). Even though the rate of death for persons aged 20–24, 30–34, 35–39, 40–44, 45–49, and 50–54 years decreased, rates for persons aged 25– 29 and 55–59 years remained stable. HIV remains a substantial cause of death in some populations in the U.S. as it was the 9th leading cause of death in 2015 for ages 25 to 44 (CDC, 2018).

HIV, Race, and Ethnicity

With regard to race and ethnicity, from 2011 through 2016, the diagnosed rate was 43.6 for Blacks/African Americans, followed by 17.0 for Hispanics/Latinos, 12.9 for persons of multiple races, and 10.2 for American Indians/Alaska. Meanwhile, in 2017, the highest diagnosed rate was 20.5 for Blacks/African Americans, followed by 9.3 for persons of multiple races, 6.6 for Hispanics/Latinos, 4.7 for Native Hawaiians/other Pacific Islanders, 3.0 for American Indians/Alaska Natives, 2.2 for Whites, and 1.8 for Asians (CDC, 2016). In 2016, the highest rate of deaths was for Blacks/African Americans: 16.9 (CDC, 2017a). Thus, African Americans are relatively at the highest risk than other races.

Even though the data presented from 2011 through 2017 report for diagnosis and death rates fluctuate from one demographic to another, they provide essential insight and significance in the scope, trends, and the distribution of HIV infections and deaths. All cases are for those who were tested in HIV reporting clinics as some testing are done at home and not reported, and some cases are not even tested yet.

HIV Transition to Chronic Disease

Despite this high incidence of HIV, there is an increasing consensus that HIV is at a stage of being reclassified from a lethal infection to a long-term and manageable condition (CDC, 2017b). However, HIV continues to be complicated with unique and distinctive characteristics from other long-term states (LTC) (CDC, 2017). These thoughts are due to the leading advances in treatment and care, which have slowdown mortality and morbidity. The major advances in treatment and care which have slowdown mortality and morbidity have not overturned the incidence rate, considering that the breakthroughs in treatment and care have slowdown mortality and morbidity are occurring in the U.S. only and not in developing countries. According to Scott, Moga, Harstall, Magnan (2008), lack of funding for basic research and over-strained public budgets in developing countries are a few significant obstacles in developing countries. Nevertheless, researching on the risk factors is paramount as it may be easy to avert the distribution and trend of HIV infections and deaths through a proper understanding and control of sexual behavior to preventive measure the acquisition and mortality. Thus, the need for this research study to contribute to the literature gap through the examination of the association between marital status and HIV/AIDS mortality

Literature Review Related to Key Concepts

State of Marriage

Marriage was a lifetime status and divorce sporadic, though the church sporadically granted a divorce in England. It became more comfortable in the eighteenth and early nineteenth century to get a divorce because it was given by the Act of Parliament, which was an option only open to the rich (Cambridge Family Law Practice,

2012). The Matrimonial Causes Act (MCA) 1857 became the premier divorce law of general application. The MCA of 1857 introduces divorce through civil courts. The act stipulated that the dissolution of marriage should only be allowed in case of adultery. Today, family lawyers are discussing the “no-fault divorce,” which enables people to divorce without delay and without charging that the partner in a marriage has been at fault. Based on Kposowa (2013) that those divorced and separated were 5.8 times more likely to die of HIV/AIDS than those married, it can be inferred that “no-fault divorce” increases the risk of HIV mortality. Therefore, marriage can be protective of HIV mortality.

In general, there were about 60.25 million married couples in 2016 (Robin, 2018), and about 7.2 million families were cohabitating partners, mostly young people struggling financially and less educated (Zagorsky, 2016). Even though married couples still outnumber those not married, annual marriages performed in the U.S. has receded to a historic low (Robin, 2018).

In the same period, just over 50% of U.S. adults lived with a spouse, which is the lowest in the record. This transformation in family structure embodies not only adults but children as well. Conversely, 40% of U.S. children are born outside of marriage (Robin, 2018). Although this decreasing marriage trend cuts across society, it is commonly prominent in low-income populations (Wilcox & Wang, 2017). Wilcox and Wang found that U.S. adults with a college degree or with income in the top half, 56% were married, compared to 26% with low family income, and those who are poorer Americans are disproportionately cohabiting. Consequently, marriage in the U.S has become an activity of the wealthy and those with college degrees. Because Kposowa's analysis of data from

the National Longitudinal Mortality Survey indicated that the divorced and single/never-married men have a higher risk of death from HIV/AIDS than married persons, it can be hypothesized that marriage is protective of HIV/AIDS mortality. On the contrary, those divorced, single/never married, and low-income populations are susceptible to higher HIV/AIDS mortality.

According to Liu et al. (2015) and Wei et al. (2014), being married affects HIV transmission among men having sex with men (MSM) and the general population. In a case, those married MSM sometimes maintain a sexual relationship with their male partners, even though married to a female, and engaging in high-risk behavior, transmitting HIV from MSM to their wives (Liu et al., 2015). In another case, getting married to a woman enhances the sense of responsibility to protect their families, thus, reducing their high-risk behaviors (Liu et al., 2015; Wei et al., 2014). Therefore, HIV/AIDS mortality among straight individuals are affected by MSM, thus, increasing the likelihood of those married dying from HIV/AIDS.

A critical public health intervention for HIV screening is required to reduce the burden of HIV, especially among all categories of marital status and those living in a Southern County who are most at risk of contracting the infection (Makhema et al., 2019). HIV testing is imperative for both individuals who test positive and those who test negative as HIV testing encourages preventive behaviors (Cawley et al., 2014). As recommended by the World Health Organization (WHO), "Universal test and treat" is the best approach for eliminating new HIV infections (WHO, 2016).

Mills' behavioral theory highlights the role of behavior as a critical factor influencing HIV infection and mortality. With improved awareness of HIV, individuals

can assess their risk of contracting HIV, access HIV testing, and initiate antiretroviral treatment (ART), thus, preventing HIV/AIDS mortality. Better knowledge of HIV and behavior could help mitigate the stigma, which is a primary obstacle to the uptake of ART leading to HIV/AIDS mortality (WHO, 2016). With HIV/AIDS ART uptake, there is an undetectable viral load, implying zero risks of HIV transmission (Eisinger, Dieffenbach, & Fauci, 2019).

Divorced

The NCHS stated that divorce rate (per 100,000) is relatively high and increasing in some Southern states, for example, Maryland 2.5 (2014), 2.6 (2015), 2.7 (2016) to 2.5 (2017); Florida 4.0 (2014), 4.0 (2015), 3.9 (2016) to 3.5 (2017); Georgia 3.5 (2017) compared to Iowa 1.5 (2014), 1.2 (2015), 1.3 (2016), and 2.0 (2017) (National Center for Health Statistics [NCHS], 2017b). As stated by Kposowa (2013), marriage is protective of extensive sexual relationships. However, when people divorce, they increase the number of sexual partners and new sexual networks, and the association with HIV/AIDS infection and deaths are understudied. Mojtaba et al. (2015) demonstrated that women age 20-24 and men 25-29 have the greatest divorce frequently. Most divorce cases are related to couples who had lived together for less than one year. Similarly, the age range at which women and men divorce, 20 to 29, is the same age range at which HIV diagnoses peak. Therefore, HIV infections and death trends will increase at this age range as the divorce rate is rising.

Divorce is among the most stressful critical life events in later life because it implies the dissolution of social and emotional ties (Perrig-Chiello et al., 2015). For example, divorce profoundly affects that attachment system and necessitates reception of

the loss and the formation of a new identity and perspective for a better future. Perrig-Chiello et al. stated that divorce involves adapting to new daily routines, which is more thought-provoking when social, physical, and financial resources decline in later life. Grieving proceeds until the divorced finds comfort, which may take several months to years before they can find a replacement, and some do not even find a replacement at all (Prigerson et al., 2009). Some individuals also develop a persistent complex divorce disorder, which is characterized by separation distress, frequent or disabling cognitive, emotional, and behavioral symptoms, such as avoidance of reminders of the loved one, difficulties moving on with life, and functional impairment (Perrig-Chiello et al., 2015; Prigerson et al., 2009). Therefore, divorce is accompanied by the dissolution of social and emotional ties, grieving, and psychological distress. Moreover, the divorced engage in multiple sexual relations to cope and to re-establish themselves in the community, as demonstrated in Kposowa's study.

Besides, Perrig-Chiello et al. (2015) found that some of the divorced and widowed tend to search for a new partner but sooner or later do not trust other men/women as the trauma persists. Within this time, they face challenges of making another choice as some men and women tend to be exploited (used up for sexual satisfaction and not for the interest of a long relationship) (Perrig-Chiello et al., 2015). The divorced establish new social and emotional connections, thereby engaging a concurrent sexual relationship leading to the contract of HIV/AIDS. Consequences of divorce have been written extensively, but there is limited literature on the association of this divorce and HIV/AIDS mortality in a Southern County.

According to Theresa, Hans-Peter, and Jere (2015), awareness of HIV/AIDS status does not affect the probability of divorce for either HIV-negative or HIV-positive respondents. Although the experience of HIV status does not influence divorce decisions, it is imperative to assess the burden of HIV in the divorce population and examine trends in disease prevalence or severity overtime for health services. The impact of many divorces is related to more engagement with a concurrent sexual relationship and place individuals at risk for HIV (Laura et al., 2014). Divorce provides leeway for multiple sexual partnerships (Millett et al., 2012). Accordingly, divorce is the cause of the concurrent sexual relationship, and the observed HIV disparities amongst African Americans compared to other ethnic groups (Fernandes et al., 2017; Morris et al., 2009) because they have a higher divorce rate.

In addition, Theresa et al. stated that knowledge of HIV status (a) does not affect people's chances of divorce among either HIV-positive or negative (b) reduce the number of HIV-positive transmission from sexual partners (c) reduces the amount of reported sexual partners among HIV-positive respondents (d) increase self-reported condom use with spouses for both HIV-negative and HIV-positive respondents. Epidemiological surveillance demonstrates that equated with other gender subgroups and racial/ethnic, African American men are more likely to report higher numbers of sexual partners (Tianyi et al., 2015; Eaton et al., 2012; Steven). Their multiple sexual relationships possess a significant health problem to African American communities and young men as they engage in elevated rates of sexual infection transmission, including HIV (Steven et al., 2015; Adimora et al., 2006).

Accordingly, Kposowa's indication that divorced and single/never-married men have a higher risk of death from HIV/AIDS than married persons can be confirmed. Because Kposowas further stated that the divorced and separated were 5.8 times more likely to die of HIV/AIDS than those married, whereas single/never married individuals were 23 times more likely to die from AIDS than married individuals.

Widowed

The aging of the population affects life expectancy and widowhood at the same time, and the exposure among this group should not be ignored. Current reports indicate that 40% of U.S. women over 65 were widowed in 2016 (Federal Interagency Forum on Aging-Related Statistics [FIFARS], 2016). Many seniors experience the death of their partners and the loss of sexual and affectional activities they have enjoyed (Lindau et al., 2010). Landau et al. stated that about 54% of men and 31% of women report that they are still sexually active at 70 years of age and above. Furthermore, women and men over the age of 55 years acknowledged sex was an essential part of their lives, and of course, a critical part of their relationship (Fisher, 2010; Gott & Hinchliff, 2003). DeLamater (2012) suggested that adults in their eighth and ninth decades also considered sexual expression as a substantial part of their lives.

Widows over 65 years still take part in sexual relationships and, therefore, vulnerable to HIV infection and mortality. It can be concluded that the loss of a sexual partner, as in widowhood, maybe the cause of increased HIV mortality for persons aged 60–64 and 65 years and older from 2012 through 2016 (CDC, 2017a). This emphasizes the need to explore the association between those widowed (marital status) and HIV mortality while controlling for age, gender, race, and ethnicity. Thornton (2015)

investigated HIV infections and deaths among widows age 50 and below; he hypothesized that young unmarried widows would have high odds of transmitting HIV as they are highly sexually active.

Data were collected from eight national surveys in Sub-Sahara Africa to compare low and high HIV prevalence. Four studies were from countries with HIV prevalence rates higher than 10% and four from countries with an HIV prevalence rate of less than 2%. The results demonstrated that the proportion of widows was higher in countries with higher HIV prevalence, as opposed to low HIV prevalence in countries with low HIV prevalence. Thornton suggested that HIV/AIDS deaths are led by men in Sub -Sahara Africa. Even though these studies were carried out in Sub-Sahara Africa, the findings have the same pattern as the 2016 research conducted by FIFARS. In comparison, the epidemiological surveillance report produced by Tianyi et al. (2015) demonstrated that similar African American men are more likely to report higher numbers of sexual partners.

Approaches to Research on Sex and Relationships

Many researchers have conducted research on sexual relationships and have covered a range of associated factors. For instants, gender (Jackson, Miller, Oka, & Henry, 2014), race (Cole, 2015), health and life-satisfaction (Botha & Booysen, 2013), age at marriage and level of education (Aughinbaugh et al., 2013), and subsequent marriages (Mirecki et al., 2013). Relationship status is positively associated with external factors such as socioeconomic success (St. Vil, 2014) and increased well-being (Yap et al., 2014). Therefore, the quality and success of those relationships are linked to social knowledge or cognition. Anthony and McCabe (2015) found that social interaction with

friends plays a role in the development of positive social norms. Dorahy et al. (2015) found that abusive relationships can impact the self-identity of individuals and can result in difficult choices like divorce in black Americans. Consequently, divorced and separated men and women are 5.8 times more likely to die of HIV/AIDS than those married (Kposowa, 2013). Nonetheless, none of these studies demonstrated how the sexual relationship was associated with marital status and divorce. Besides, none of these studies were done in a Southern County where 45% of people living with HIV reside in the U.S., thus, upholding the need to study the epidemic, HIV/AIDS, at multiple fronts and subgroups (cohorts) of the U.S. Nonmarital births in the United States are on the rise, particularly amongst disadvantaged groups (Gibson-Davis et al., 2016). The rate of births out of wedlock have attracted much attention amongst both policymakers and researchers in the last decade. The proportion of nonmarital births is 75% amongst African-Americans compared to 29% among whites and 11% amongst the college-educated, and 68% amongst those without a high school diploma (Manning et al. 2015).

However, disparities in the type of marriage in which married births occur have received less attention. According to Christina et al., in addition to being less likely to be born to married parents, some children of disadvantaged parents born to married parents are more likely to be born into a typical assumed type of marriage that is relatively fragile. In addition, according to Gibson-Davis et al. and Rackin and Gibson-Davis (2012), births in which the parents married during the gestation period have declined over time in the United States, with estimates suggesting that only 4% to 8% of births occur to couples who are at mid-pregnancy marriage. Such representation of mid-pregnancy-married births among married births may have implications for child and family well-

being because marriages formed from mid-pregnancy are less stable with higher odds of divorce than marriages formed before conception (Gibson-Davis et al., 2016). This mid-pregnancy marriage is fragile and contributes to the divorce rate in the U.S. Christina et al. address the shaky nature of mid-pregnancies that lead to divorce but did not link it to HIV acquisition or deaths. Therefore, childbirth out of marriage is a social issue that needs attention to address the divorce phenomenon, which in turn encourages parallel sexual relationships and HIV infections and deaths.

Nevertheless, a crucial phase of the family life cycle is marriage. From the onset, most couples feel a potent and everlasting commitment to each other; nonetheless, they experience some conflicts in due course (Chang, 2008; Mojtaba et al., 2015). Even though conflict is a common issue and a part of marital life, it is not reasonable if misbehavior dominates the marital joy, that is, physical and verbal misbehavior, the feelings of anger, hostility, disgust, and jealousy dominate the relationship amongst the couple (Callian & Siewgeok, 2009). These potent conflicts can affect matrimonial associations and cause divorce (Worthington, 2005). Separation is a consequence of marital skirmish and is one of the unusual events that might occur during the life cycle. These robust matrimonial skirmishes and divorce make it usual for the sequence of marriage, divorce, and remarriage that we observed today. This was not a common phenomenon in the family life cycle before the no-fault divorce (Carter et al., 2011). Divorce is associated with severe disruptive consequences, ranging from anxiety disorders and depression (Karami et al., 2012) to children’s aggression and disagreement (Okrodudu, 2010).

According to Gonzalez and Viitanen (2009), the divorce rate has been augmented globally in the last decades because of cultural, economic, legal, value, and population changes. Most divorce cases were related to women aged 20 to 24 and men aged 25 to 29 (Gonzalez & Viitanen, 2009) with the length of marriage for less than one year. Thus, there is an increase in the divorce rate, and its consequences emphasize the need for more attention (Mojtaba et al., 2016; Lyke, 2009). Carter et al. and Karami et al. demonstrated this marital issue that leads to divorce but did not discuss the outcome of the divorce, nor its link to HIV/AIDS

On the other hand, St Vil (2014) found that African Americans compared to any other race and ethnic group, are more likely to report lower levels of marital satisfaction. Even though numerous benefits of marriage, such as better physical and mental health, impact African American marital satisfaction. St Vil studied the effects of work-family conflict and work-family balance on African American marital satisfaction. His results demonstrated a negative relationship between work-family conflict and marital satisfaction and differences in work-family factors that envisage husbands versus wives' marital satisfaction. The article offers implications for social work. Despite the benefits to the marriage like better economic, physical, and mental health, and overall better quality of life compared to those who are divorced, divorce and marriage rates have been on the decline amongst African Americans since the 1970s (St Vil, 2014; Teachman et al., 2000; Wilcox et al., 2009). On average, couples who marry have a 40% to 50% chance of experiencing divorce or separation (Wilcox et al., 2009). African American women observe lesser marital satisfaction compared to African American males (Bulanda & Brown, 2008; Lincoln & Chae, 2010). St. Vil concluded that to promote lasting and

healthy marriages amongst African Americans, recognition of the factors that impact African American martial satisfaction is imperative. In this society, where both partners are an earner in a family, more spouses are challenged with the task of alternating both work and family. This study is essential as it states the issues that destabilize marriages, even, it does not address what happens the men and women after divorce. Thus, marital satisfaction and work-family imbalance are some of the causes of divorce, and marriage is protective of multiple sexual relationships. These different researchers have dealt with marriage and divorce, yet research on the link between this marital satisfaction and work-family imbalance to HIV/AIDS mortality is scant.

The Rationale for Selection of Variables

One of the most significant segments of the family life cycle is marriage. The mainstream of couples have a permanent and robust commitment to each other at the beginning of their relationship and experience some conflicts as time passes (Chang, 2008; Mojtaba et al., 2016). Conflict is a typical issue and part of a matrimonial home; however, it becomes unpleasant when feelings of anger, hostility, disgust, jealousy, and physical and verbal misbehavior becomes prominent or dominates the relationship between the couple (Callian & Siewgeok, 2009). Consequently, these intense conflicts diminish the feeling of love in some marital relations, thus, causing divorce, separation, and sometimes death of a partner through suicide (Worthington, 2005; Mojtaba et al., 2015). These intense marital conflicts and their consequences (ex., divorce, separation, widow) have created a familiar cycle of marriage, divorce, and remarriage that is observed today (Carter et al., 2011). Dissolution of marriage is accompanied by some mean values and depression (Karami et al., 2012), thus, elucidating the need to examine

the link between marital status and HIV/AIDS as the divorced, separated, and widows scramble for new sexual relationships.

Furthermore, the global divorce trend is observed even at the local level in the U.S. Divorce rate (per 100,000) is relatively high and increasing in some Southern states, for example, Maryland 2.5 (2014), 2.6 (2015) to 2.7 (2016) and North Carolina 3.1 (2015) to 3.2 (2016) (National Center for Health Statistics, 2017a). Whereas marriage rates are relatively low and decreasing in some Southern states, for example, Maryland 6.5 (2014), 6.2 (2015), and 6.3 (2016), as well as Florida 8.2 (2015) to 8.1 in 2016. According to Mojtaba et al. (2015), the most registered divorce cases are related to women aged 20 to 24 and men aged 25 to 29; most divorce cases are related to couples who had lived together less than one year. Indeed, the age range at which women and men divorce, 20 to 29, is the same age range at which HIV diagnoses high. Therefore, HIV infections and death trends will continue to increase at this age range as the divorce rate is rising.

Moreover, there are gender differences in the association between marital status, risky sexual behavior, and risk of death from HIV/AIDS (Kposowa, 2013). As the proportion of marriages that end in divorce increases, the number of sexual partners is increasing (Liddon et al., 2010). Women who are divorced or separated are more likely to report five or more lifetime sex partners and two or more sex partners in the past year than women who were never married (Liddon et al., 2010). Fagbamigbe et al. found similar associations with women's marital status and risky sexual behavior where the odds of HIV infection were 1.8 times higher among formerly married women compared to married women. In contrast, Kposowa (2013) found that the association between

marital status and mortality from HIV/AIDS only applied to men. Kposowa (2013). Kposowa analyzed data from the National Longitudinal Mortality Survey and indicated that divorced and single/never-married men have a higher risk of death from HIV/AIDS than married persons. Thus, to control HIV infections and deaths, women should be placed as a priority as they are the most vulnerable to engage in many sexual relationships.

Summary of Literature on Marital Status and HIV/AIDS

Variation exists between marital status, risky sexual behavior, and HIV/AIDS mortalities (Kposowa, 2013; Liddon et al., 2010). Sexual risk behavior is measured by the number of unprotected sexual encounters, multiple sexual partners in the past year, and the lifetime prevalence of numerous partners (Santelli et al., 2000). As the proportion of marriages that end in divorce increases, the number of sexual partners increases (Liddon et al., 2010). Women who are divorced or separated are more likely to report five or more lifetime sex partners and two or more sex partners in the past year than women who were never married (Liddon et al., 2010). Fagbamigbe et al. found similar associations with women's marital status and risky sexual behavior where the odds of HIV infection were 1.8 times higher among formerly married women compared to married women. So, marital status is directly linked to sexual behavior. Considering that multiple sexual relationships increase the vulnerability to HIV infections; therefore, marital status may be associated with HIV/AIDS mortality.

On the other hand, Kposowa (2013) found that the association between marital status and mortality from HIV/AIDS only applied to men. According to Kposowa, analyzes using the data from the National Longitudinal Mortality Survey, findings

indicated that divorced and single/never-married men have a higher risk of death from HIV/AIDS than married persons. In general, those divorced and separated were 5.8 times more likely to die of HIV/AIDS than those married. In contrast, single/never married individuals were 23 times more likely to die from AIDS than married individuals (Kposowa, 2013). Consequently, Kposowa and Fagbamigbe et al.'s studies suggested that gender is a risk factor concerning HIV mortality.

Therefore, it can also be suggested that marriage (being married) is protective of HIV/AIDS due to the reduced network of sexual partners compared to the multiple sexual partners while single, divorced, separated, or widowed. These variations in sexual behavior and HIV infection among population subgroups affected by transitions brought about by the dissolution of marriage represent a gap in the literature. Kposowa and Momenyan et al., (2018) recommend additional studies on HIV/AIDS using population-based cohorts.

Contrary to gender, most of these studies on age and HIV risk were carried out using younger populations whose sexual behavior was established before marriage. FIFARS current reports indicated that 40% of women over 65 in the U.S. were widowed in 2016. Lindau et al. stated that many seniors experience the death of their partners and the loss of sexual and affectional activities they have enjoyed. Also, Landau et al. noted that about 54% of men and 31% of women still report that they are sexually active at 70 and above. Therefore, age is a risk factor for HIV infections and HIV/AIDS mortalities, and research is needed to examine the connection between age, marital status, and HIV/AIDS mortality among adult populations (Dembo et al., 2009; Kposowa, 2013).

Considering the regional disparities in the rates of HIV/AIDS mortality across the United States, some regions are at risk. For instance, the Southern states have the highest HIV diagnosis. Understanding broader contextual factors that increase the risk of HIV and subsequent mortality is critical (Momenyan et al., 2018). This research study may contribute to the literature gap through the examination of the association between marital status and HIV/AIDS mortality, hypothesizing that the dissolution of marriage increases the risk of HIV infection and subsequent death.

Summary and Transition

Several risk factors contribute to the HIV acquisition and the subsequent death; gender differences (Kposowa, 2013; Liddon et al., 2010), marital status differences (Fagbamigbe, Adebayo, and Idemudia, 2016), age, race, and ethnicity differences (CDC, 2017), marital conflict (Mojtaba et al., 2009; Worthington, 2005), variation in sexual behavior during the marriage and after divorce or separation (Momenyan et al., 2018), and older adults' loss of sexual and affectional activities they have enjoyed (Lindau et al., 2007) is what is known concerning the marital status and HIV/AIDS. However, no literature has elucidated the relationship between marital status and HIV/AIDS in a Southern County where the rate of HIV infection is highest compared to other regions of the United States.

This study will examine a Southern County where HIV affects a disproportionate number of the population where over a third (38%) of the U.S. population lives. Still, more than half of the new HIV cases are diagnosed and expected to continue to increase. The study will examine the influence of marital status on the risk of HIV within the context of the protective effect of being married or living with a partner, and where those

divorced, separated, widowed, and single are at higher risk of HIV while engaging in new and more extensive networks of sexual partners.

In chapter 3, I describe the methodology of this quantitative study and the approach to use a state-wide HIV/AIDS mortality surveillance cohort.

Chapter 3: Research Methodology

The purpose of this study was to examine the association between marital status and death from HIV/AIDS. In this chapter, I outlined the method used to test for the hypothesis. Marital status is defined as married, divorced, widow, and single (never married). There are gender differences in the association between marital status, risky sexual behavior, and risk of death from HIV/AIDS. The analysis was controlled by demographic factors, gender, age, race, and ethnicity. In this chapter, I present a description of the methodology, including research design and approach, rationale, target population, sample and sample size power calculations, data collection of surveillance data, and research questions along with hypotheses and statistical analyses plan. The protection of human subjects and threats to validity are also included in this chapter.

Research Design and Rationale

This study used a quantitative cohort research design. In epidemiology, a cohort study is nonexperimental and involves comparing a disease or condition in two or more groups of people that differ on a certain characteristic, risk factor, or exposure (Salkind, 2010). The disease or condition under study is referred to like the outcome, and the character is referred to as the exposure. The cohort studied was delimited by individuals infected with HIV surveilled by the Georgia Department of Health. The cohort was further delimited by the need to include marital status as the exposure variable. Finally, the cohort was delimited by cases of HIV/AIDS that died between 2012 and 2018.

A quantitative research design with a cohort study approach was used to examine the association between HIV/AIDS mortality among marital status subgroups, controlling for age, gender, race, and ethnicity. It allows for the analysis of secondary data collected

during HIV/AIDS infection surveillance. The hypothesis was that those who transitioned from a lifestyle of being married to being divorced and widowed are more likely to (a) acquire HIV infection and (b) die from HIV infection compared to those who were never married in a Southern County. Those no longer married increase their risk for HIV infection by seeking new sexual partners and forming new sexual networks. Thus, those married are protective (not exposed) of multiple sexual relationships, HIV acquisition, and HIV/AIDS mortality.

A quantitative method was used in this analysis. The quantitative method provides some objective measurements and the statistical, mathematical, or numerical analysis of secondary data or the manipulation of pre-existing statistical data using computational techniques (Croswell, 2013). In quantitative research, the focus was to gather numerical data and generalize it across groups of people to explain a phenomenon (Yilmaz, 2013). Creswell and Yilmaz stated that the quantitative method allows the researcher to present information through inferential and descriptive statistics. The inferential and descriptive statistical presentation is compelling (has strength), as the researcher can determine probabilities, generalizations, patterns, and relationships.

Methodology

Target Population

The data are categorical and numerical data retrieved from the vital statistic database and HIV/AIDS surveillance database of Georgia Human Health Services. The data variables are marital status (married, divorced, widow, and single/never married). For confidentiality purposes, the data will be de-identified by the public health agency that manages it. The Georgia HIV/AIDS Mortality/Infection Surveillance statistics are

collected from hospitals and HIV/AIDS facility centers by designated personnel and stakeholders as directed by Georgia Public Health officials. Any mortality with HIV/AIDS as a cause of death is communicated to the registry office, where personnel responsible adds it to The Georgia HIV/AIDS Mortality/Infection Surveillance statistics. The state of Georgia collects and stores in the registry for internal use and study purposes. The Georgia HIV/AIDS Mortality/Surveillance Statistics dataset is from 1992 to 2017. However, for this study, the data from 2012-2017 (five years) was used, with an estimated 2,160 HIV/AIDS mortality cases. Even though the HIV/AIDS mortality data spans about three decades, the marital status is populated only when provided by the individual at the time of testing.

Moreover, to properly examine various factors deemed to be associated with HIV/AIDS mortalities, the study cases will be restricted to (a) those whose cause of death is HIV/AIDS (b) five years (2012-2017) (c) those whose death records specify their marital status (married, divorced, widow, separated, and single/never married) (d) both men and women (e) all ages, and (f) all races and ethnicity. The vital statistic data was used obtained from the Georgia HIV surveillance system database, and the sample was randomly selected.

The inclusion criteria for this study consisted of (a) men and women, (b) all ages, (c) all races and ethnicity, d) marital status (e) all HIV mortalities. Exclusion criteria included HIV/AIDS deaths without (a) marital status, (b) age, (c) race and ethnicity, (d) gender. To protect patient confidentiality, personal identification was not included, such as patient name and Social Security number. Consent was not needed as the data were secondary data and available on restricted access.

Sampling and Power Calculations

G*Power was used to run the power analysis with a small effect size of 0.10 (Cohen, 1988). The calculated sample size was 1,289 following the conventional significance level alpha = .05, the actual power of 95%, effect size 0.10, and five independent variables. A small effect size of 0.10 was utilized to ensure that enough individuals were included in the sample. However, the final sample size was 1164 because only these cases had the marital status populated (included in the surveillance dataset).

Setting and Sample Size

The size of the surveillance cohort used for the analysis met the minimum sample size calculations (N=1164 actual vs. 1289 calculated). If the initial data received from the health department in Georgia did not meet the calculated sample size at 80% power, the researcher would have expanded the denominator of the surveillance area and include additional populations within the state, like Atlanta, Dekalb, and Cobb, which are close to each other. Also, the number of years to examine would have been increased beyond 2012-2018.

Instrumentation and Operationalization of Constructs

Vital statistics are collected as elements required for disease surveillance so that numerical data can be analyzed using statistical procedures (Draper, & Swift, 2011). To quantify the prevalence and risk between the marital status (exposure) and HIV/AIDS mortality (outcome), data elements from the Georgia Health Department surveillance office were analyzed. The variables needed to test the hypotheses are shown in Table 1

and include marital status with four categories, gender, race/ethnicity, age, and those with HIV/AIDS classification at the time of death.

Table 1
Operationalization of Measures

Variable	**Description**	**Response Category**	**Type of Variable**
Marital status	Marital status at the time of death	0 = Married [Reference] 1 = Divorced 2 = Widow(er) 3 = Single/never married	Nominal
HIV/AIDS mortality cases	HIV/AIDS mortality cases combined	0 = No 1 = Yes	Binomial
Gender		0 = Male 1 = Female	Binomial
Age in years	Age range	0 = 20-29 1 = 30-39 2 = 40-49 3 = 50 and older	Ordinal
Race and Ethnicity		0 = White 1 = Black/African American 2 = Other race/ethnicity	Nominal

Data Sources and Data Collection

The HIV/AIDS Epidemiology Section (HAES) at the Georgia Department of Public Health is responsible for the management of the state HIV/AIDS surveillance system, the conduct of HIV/AIDS surveillance, and other HIV-related epidemiologic activities. These activities provide profound information on populations at risk for HIV and samples of persons. These data collected are used in the following ways (a) to describe and monitor the epidemic in Georgia, (b) to guide data-driven planning and resource allocation (c) to evaluate the effectiveness and impact of prevention programs and care treatment services. The state health department utilizes the expertise and legal authority to conducts these activities while protecting the confidentiality of existing

public health disease surveillance and reporting systems. As a practice, vital records are collected as HIV patients die in hospitals and other institutions. Often, vital records are reported within six months of a collection to the HIV surveillance system following the necessary protocol, and the state also stores it in the state's vital record office.

Statistical Analysis

All data analysis was achieved using IBM SPSS Statistics Version 24. Since this study was restricted to HIV/AIDS mortality and diagnoses, only data with HIV/AIDS mortality and diagnoses were analyzed. Binary logistic regression was used for the analysis of HIV/AIDS mortality and HIV infection as the dependent variable (DV) and marital status (married, divorced, single, and widow) as independent variables (IV), controlling for age, gender, race, and ethnicity. In the first step, since the variables are in multiple categories, they were dummy coded. In step two, a descriptive analysis was performed to have the chi-square and the frequency, which was reported for categorical variables. A line graph was used to depict some variables. Finally, a binary logistic regression was used in the analysis of the dummy coded data in SPSS

Furthermore, evidence of the relationship between marital status and HIV/AIDS mortality was examined, then the associations and relationships were studied using inferential statistics. These associations and relationships between each marital status category and HIV/AIDS mortality were examined using bivariate analysis. Per the connections illustrated in the theoretical framework (Figure 1), the analysis plan steps are described for each research question.

Research Questions and Hypotheses

RQ1. Is there an association between marital status and HIV/AIDS mortality among residents of a Southern County?

$H_0$1: There is no association between marital status and HIV/AIDS mortality among residents of a Southern County.

H_a1: There is an association between marital status and HIV/AIDS mortality among residents of a Southern County.

Statistical Plan. This research question was answered using binary logistic regression analysis to examine the exposure variable marital status (married, divorced, single, and widowed) and the association with the outcome (HIV/AIDS mortality). The reference category was married. The null hypothesis was rejected if $p < .05$.

RQ2. Is there an association between marital status and HIV/AIDS mortality, controlling for gender among residents of a Southern County?

$H_0$2: There is no association between marital status and HIV/AIDS mortality, controlling for gender among residents of a Southern County.

H_a2: There is an association between marital status and HIV/AIDS mortality, controlling for gender among residents of a Southern County.

Statistical Plan. A logistic regression analysis was used to test the hypotheses, and an interaction term was used to test whether gender moderated the association between exposure and outcome. The null hypothesis was rejected if $p < .05$.

RQ3. Is there an association between marital status and HIV/AIDS mortality, controlling for age, gender, race, and ethnicity among residents of a Southern County?

$H_0$3: There is no association between marital status and HIV/AIDS mortality, controlling for age, gender, race, and ethnicity among residents of a Southern County?

H_a3: There is an association between marital status and HIV/AIDS mortality, controlling for age, gender, race, and ethnicity among residents of a Southern County?

Statistical Plan. A logistic regression analysis was used to examine the association between the exposure variable marital status (married, divorced, single, and widowed) and the outcome variable (HIV/AIDS mortality). The full model included interaction effects for age, gender, race, and ethnicity to determine if they moderated the association between exposure and outcome. Marital status was nominal, and HIV/AIDS mortality had a binomial distribution. The null hypothesis was rejected if $p < .05$.

Protection of Human Participants

This study used secondary analysis of existing data. Consequently, there was no concern about influencing or manipulating the data collection process. The authority that provided the dataset was the state of Georgia, and to avoid any ethical conflict, identifiable information such as name and social security number was de-identified to protect patient confidentiality. In addition, data were provided separately for African American and White races, but all other racial/ethnic groups were collapsed into a general "Other" category because the percent distribution was low, and there was a chance to target specific groups at a level that identity could be at risk. The information used in this research was coded, and only the aggregated results are provided. The state of Georgia incorporated the following guidelines as part of the agreement for using these

limited data sets: (a) The state of Georgia holds all ownership rights to the data (b) I must only use the data for this research (c) I have no legal protection to contact or identify any of the participants included in this data set (d) The state of Georgia has a retention date, in that the researcher is to notify the state of Georgia within 30 days of completion of the research using the limited data and to destroy any such data. I will not have access to these data except for this analysis. The information was stored in the vital statistics database of the state. The file in which the dataset is stored was password-protected. The individual observations were de-identified of any personal information and only linked by a chronological file identification, demographics, HIV/AIDS diagnosis and dates, and date of death. As such, the individual cannot be identified based on the information that was provided to the vital statistics bureau.

Threats to Validity

The HIV/AIDS data from the vital statistics records were not collected to retrospectively examine the relationship between marital status and HIV/AIDS. Nevertheless, the presence of specific items in the vital statistics profoundly justified the importance of it for this study. The inclusion of marital status as a field in the database was information provided by individuals on a voluntary basis. HIV testing must be reported to vital statistics, but it is also a data field that depends on whether individuals were tested and were not randomly selected nor represent a cross-section of the population studied. Death certificates, on the other hand, are a mandatory vital statistic data records whether individuals were previously tested for HIV and reveal cases that died of AIDS, whether previously tested or infected with HIV/AIDS.

Cohort study approach is observational research to analyze data from a population or a representative subset, using archived or self-report data to examine whether the risk of disease was different between the exposure and the outcome. Thus, a cohort study approach does not explore cause and effect (Croswell, 2013); hence, constituting critical limitations. When using secondary data, there is no possibility of controlling for potential confounding variables to provide more confidence that the effects are due to the independent variable.

A cohort study approach is predisposed to antecedent-consequent bias as the researcher cannot determine if the exposure precedes the outcome (Croswell, 2013). Besides, a cohort study is susceptible to sampling bias. Cohort study approach is a snapshot of the population and liable to sampling bias. The researcher cannot determine how many people had died before the study was done. Many cases of a subgroup might have been killed before the start of the research and cannot be account for. For example, a participant may not recall when he/she got infected with HIV and to determine whether he/she was affected before or during the marriage. Furthermore, studies are inclined to information or misclassification bias. For example, the researcher cannot determine the accuracy of the archived data concerning the exposure and the outcome.

The emotional well-being and mental health of people living with HIV are affected due to stigma and discrimination. HIV infected individuals often adopt a stigma and experience and begin to develop a negative self-image. As such, they dread being discriminated against or judged negatively if their HIV status is revealed. Thus, the sample pool may not be an accurate representation of the HIV death cases, mainly

because the stigma prevents some individuals from testing or disclosing their HIV status when they do home testing.

Summary and Transition

Chapter 3 describes the methodology of this study, the study design, the hypothesis, and the research questions, instrumentation, and analysis plan. Also, the ethical considerations were addressed. The vital statistic data collection process was delineated. Inclusive, this research attempted to explore the explanatory variable, marital status, and the response variable, HIV/AIDS deaths, to determine the association or relationship. The results of the analysis were discussed in Chapter 4.

Chapter 4: Results

The purpose of this study was to examine the association between marital status and death from HIV/AIDS in Southern County. In this chapter, I display and explain the results of my study. Marital status was defined as married, divorced, widow and single/never married, with those married as the reference category. In this study, I sought to answer three research questions by examining: (a) the association between marital status and mortality from HIV/AIDS; (b) the association between marital status and mortality from HIV/AIDS controlling for gender; and (c) the association between marital status and mortality from HIV/AIDS, controlling for age, gender, and ethnicity for possible moderating effects. In this chapter, I present the descriptive statistics to characterize the population, the data source data and collection procedures, statistical analyses plan, and multivariate analyses.

Data Collection and Data Management

The data to test the hypotheses were obtained from the Georgia Department of Health HIV/AIDS Mortality Surveillance System. The data elements were requested as a doctoral dissertation study and included deidentified case number, initial HIV diagnosis, AIDS mortality status, age, gender, marital status, and race/ethnicity. Because marital status was the analytical exposure and the Georgia Department of Health did not begin to populate marital status until 2012, only the data for years 2012-2018 were provided as the raw data file for this research study. HIV/AIDS laws (see OCGA § 24-12-20 and 24-12-21, *Disclosure of AIDS Confidential Information*) prohibit HIV/AIDS raw data from being released outside of the Georgia Department of Human Services. As a safeguard to further protect the identification of cases, the categories of race/ethnicity were collapsed

into African American, White, and others. The “other” race/ethnicity categories had small numbers and may be possible to identify; therefore, the surveillance office first collapsed into one category labeled “other.” The HIV/AIDS surveillance office released data after the Walden IRB approved the application for this study (IRB No. 10-01-19-0675696).

The goal was to isolate a cohort of HIV/AIDS mortality cases that included marital status from the years 2012 to 2018. Beginning in the year 2012, individuals were asked to volunteer their demographic information at the time of HIV status reporting, and a substantial number of HIV/AIDS surveillance cases did not have marital status populated. As shown in Table 2, there were 18,552 cases in the dataset I received, 1580 HIV mortality cases, and 16,972 HIV infected cases. Out of the 1,580 HIV mortality cases, only 961 (60.78%) had marital status populated on their death certificates. Also, out of the 16,972 HIV infected cases, only 203 (1.19%) had marital status populated in the dataset. Therefore, I used the cases with valid marital status values, 1,164 (961 +203), as marital status was the explanatory variable. HIV mortality is the cause of death as specified in the death certificates, even though some HIV mortality cases may have other causes of death.

Table 2

Description of HIV Total Surveillance Cases and Formation of Cohort

	HIV Infected Cases	HIV Mortality Cases	Total Surveillance Cases
Surveillance Cases 2012-2018	16,972	1,580	18,552
Marital Status Populated	203	961	1,164
Total	1.19%	60.82%	60.18%

Note. 2012-2018 HIV surveillance data provided by the Georgia Department of Health

Following the distribution of cases in Table 2, Figure 2 illustrates how the HIV cohort was arrived at from the HIV population in the Georgia Department of Health surveillance system. Although the number of HIV cases was over 18 thousand, the cohort was limited to those cases with data on marital status as marital status was the exposure variable in the study. The cohort included 1,164 cases with marital status and HIV diagnosis. The figure also illustrates those that died from HIV (60.82%) and the representation of the outcome variable.

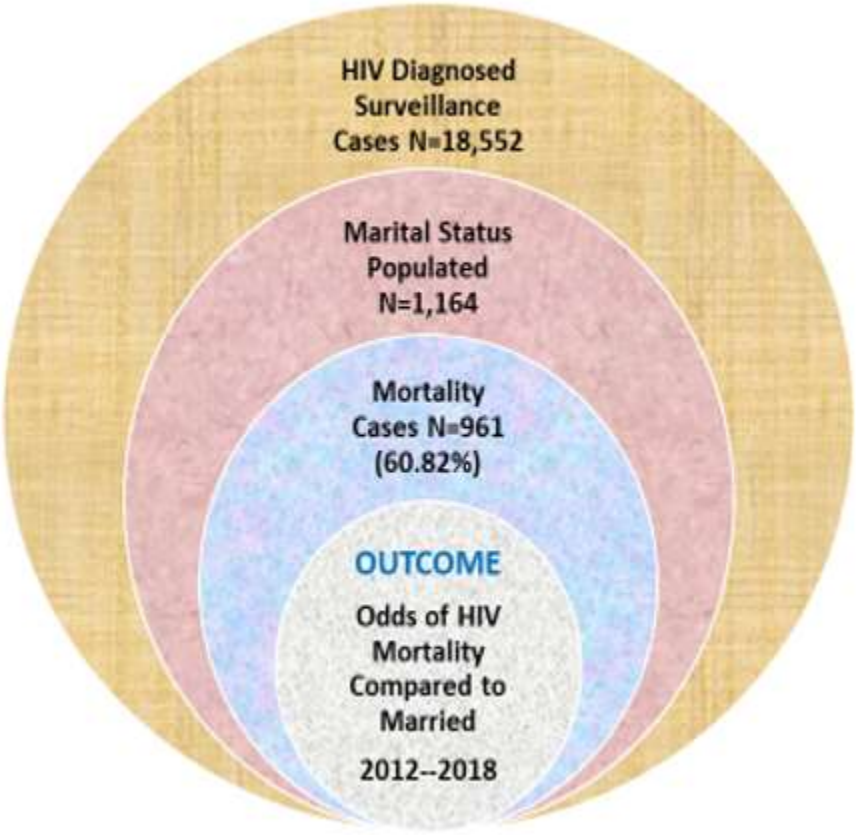

Figure 2. Visual representation of cohort formation based on HIV diagnosed cases

Figure 3 is a graphic representation of marital status among the HIV/AIDS cases in the Georgia Department of Health surveillance cohort (N=1,164). Those single or never married had the highest frequency distribution at almost 700 cases.

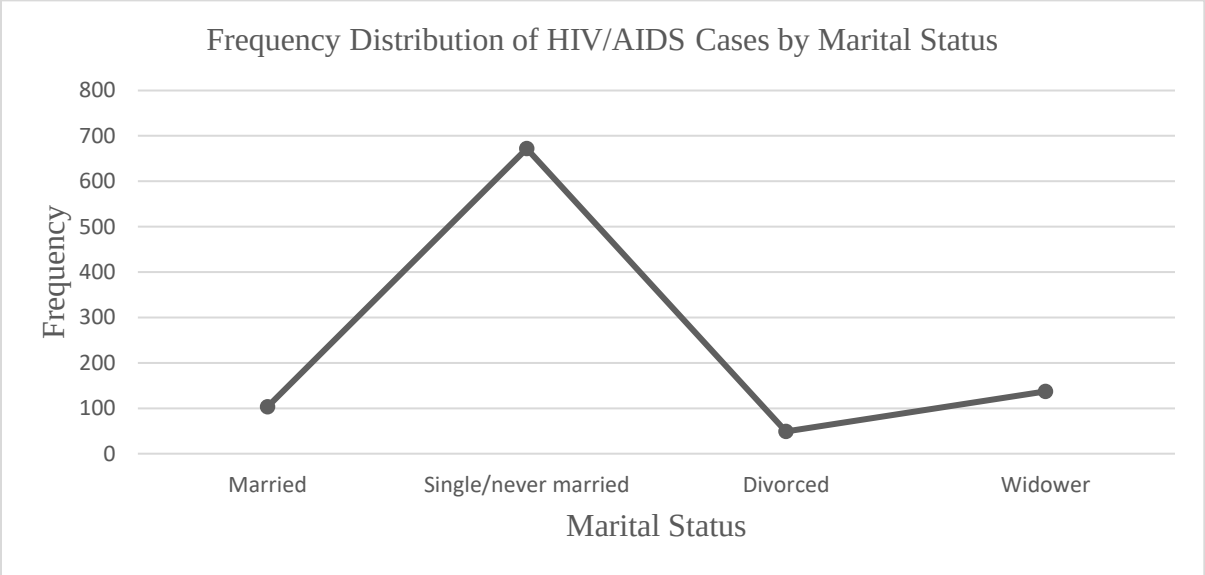

Figure 3. HIV Mortality Cases with marital status populated, N=1,164. Georgia Department of Health, 2012-2018.

Descriptive and Multivariate Results

Descriptive Statistics

The demographic comparison of the cohort, including HIV infected cases and HIV mortality cases is shown below (Table 3). There were significant differences between the two groups for widowed (p = .000), ages 30-39 (p = .002), 40-49 (p = .000), 50 years and older (p = .031), and race Black/African American (p = .015).

Table 3

Demographic Characteristics of HIV Infected and Mortality Cases

	HIV Infected Cases		HIV Mortality Cases		
	N	%	N	%	*p*-value
Marital Status					
Married	31	15.27	103	10.71	.146
Single	146	71.92	672	69.92	.287
Divorced	21	10.34	49	5.09	.000
Widow	5	2.46	137	14.25	
Total cases	203	100	961	100	
Age Group					
20-29	22	10.9	41	5.7	
30-39	23	11.4	123	17.1	.002
40-49	40	19.9	210	29.2	.000
50 and older	116	57.7	344	47.9	.031
Total cases	201	100.0	718	100.0	
Gender					
Female	38	18.7	225	23.4	
Male	165	81.2	736	76.5	.091
Total cases	203	100.0	961	100.0	
Race/Ethnicity					
White	47	23.1	155	16.1	
Black/African American	138	67.9	731	76.0	.015
Others	18	8.8	75	7.8	.695
Total Cases	203	100.00	961	100.0	

Note. Significance Test Pearson Chi-Square. HIV infected cases are those who tested positive for HIV. HIV mortality cases are those in which the cause of death is HIV/AIDS as indicated in the death certificate

Logistic Regression Statistical Assumptions

The first assumption when using logistic regression is that there is little or no multicollinearity among the independent variables. Thus, the independent variables marital status (married, divorced, widowed, and single/never married) and moderating variables (age, gender, race) should not be significantly correlated with each other, as this undermines the statistical significance of an independent variable (Creswell, 2014). However, multicollinearity does not reduce the ability of the statistic model to be predictive.

The second assumption is that logistic regression assumes linearity of independent variables and log odds (probability). Even though logistic regression analysis does not require the dependent and independent variables to be related linearly, it requires that the independent variables be linearly related to the log odds. Thus, the equation should be linear in the data (parameter) or an additive regression equation.

Furthermore, logistic regression requires a large sample size. As a general guideline, a minimum of 10 cases with the least frequent outcome for each independent variable is needed in the model. For example, for five independent variables, and the expected probability of the least frequent outcome of .10, a minimum sample size of 500 is required. Besides, homoscedasticity (constant error variance) is not required. That is, the data points are not required to be evenly distributed along with the graph. The variation of the data points may not be the same as X increases. There is an independent error term as each successive error is independent of the last one. Finally, binary logistic regression requires the dependent variable to be binary (dichotomous), and the dependent variable in logistic regression is not measured on an interval or ratio scale.

Multivariate Logistic Regression

RQ 1. Is there an association between marital status and HIV/AIDS mortality among residents of a Southern County?

$H_0$1: There is no association between marital status and HIV/AIDS mortality among residents of a Southern County.

H_a1: There is an association between marital status and HIV/AIDS mortality among residents of a Southern County.

A binary logistic regression analysis was used to examine the association between the exposure variable (marital status) as a predictor of the outcome (HIV/AIDS mortality). The reference category was married. The results for the first hypothesis indicated that compared to those married, those widowed were 8.247 times more likely to die from HIV/AIDS (OR=8.247, 95% CI [3.100, 21.947], $p < 0.05$). Therefore, I rejected the null hypothesis; there is an association between exposure in the form of being widowed and mortality from HIV/AIDS among residents of a Southern County (see Table 4 and Figure 4).

The logistic regression model was statistically significant (χ^2 {3, N = 1164} = 36.189, $p < 0.05$) and the model had a good fit as indicated by a non-significant Hosmer-Lemeshow test ($\chi^2 = .000$, $p > .05$). The exposure variable in the model (marital status) explained between 3.1% to 5.1% of the variance. The percentage of accuracy (POA) in the classification was 82.6% (Nagelkerke $R^2 = .051$), implying that 82.6% of the time, the model will produce an accurate result, therefore, having a higher predictive capability.

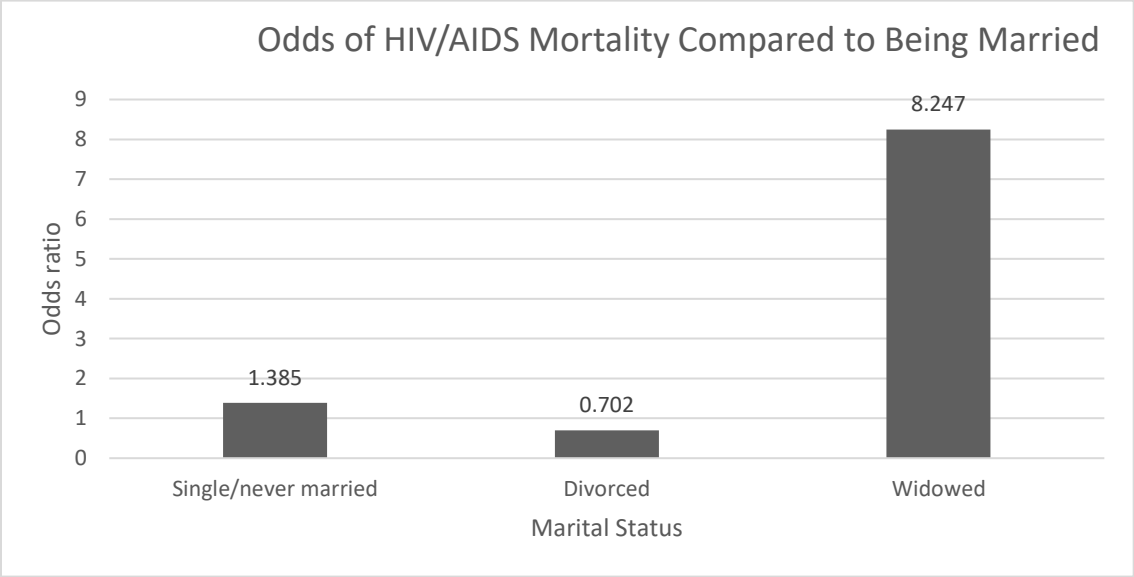

Figure 4. Odds ratio of HIV mortality compared to being married

Table 4

Multivariate Logistic Regression: Marital Status as Predictor of HIV Mortality

Marital Status	β	S.E.	Wald	df	Sig.	Exp(β)	95% C.I. for EXP(β)	
							Lower	Upper
Single/never married	.326	.224	2.111	1	.146	1.385	.893	2.150
Divorced	-.353	.332	1.136	1	.287	.702	.367	1.345
Widowed	2.110	.499	17.857	1	.000	8.247	3.100	21.941
Constant	1.721	.143	145.583	1	.000	5.592		

Note. Variable(s) entered: Marital Status.

RQ2. Is there an association between marital status and HIV/AIDS mortality, controlling for gender among residents of a Southern County?

$H_0$2: There is no association between marital status and HIV/AIDS mortality, controlling for gender among residents of a Southern County.

H_a2: There is an association between marital status and HIV/AIDS mortality, controlling for gender among residents of a Southern County.

A binary logistic regression analysis was used to examine the association between the exposure variable (marital status) and the outcome (HIV/AIDS mortality) and whether gender moderated this association. The reference categories were married and male. Compared to those married, only widowed significantly predicted HIV/AIDS mortality (OR=8.229, 95% CI [3.091-21.907], p <.05). Those single or never married (OR=1.428, 95% CI [.918-2.22], p > .05) and divorced (OR=.656, 95% CI (.340-1.266, p > .05) did not significantly predict the odds of dying from HIV/AIDS. In addition, gender did not moderate the association between marital status and HIV/AIDS mortality (OR=.709, 95% CI [.476-1.056], p >.05). Therefore, the null hypothesis was partially rejected for those widowed (See Table 4).

The logistic regression model was statistically significant χ^2 (4, N = 1164) = 39.178, p < .001). The logistic regression model had a good fit, as indicated by a non-significant Hosmer-Lemeshow test (χ^2 = .211, p > .05). The exposure variable in the model (marital status) explained between 3.3% to 3.5% of the variance. The percentage of accuracy (POA) in the classification was 82.6 (Nagelkerke R^2 = .055), implying that 82.6% of the time, the model will produce an accurate result; therefore, having a higher predictive capability. Looking at Table 4, compared to those married, only the widowed

are statistically significant (OR=8.229, 95% CI [3.091-21.907], p <.05, and the single/never married (OR=1.428, 95% CI [.918-2.22], p > .05, and the divorced are not statistically significant (OR=.656, 95% CI (.340-1.266, p > .05, in the prediction of HIV/AIDS mortality, meanwhile, the moderation of gender was not statistically significant (OR=.709, 95% CI [.476-1.056], p >.05). The association between the exposure and outcome of HIV/AIDS mortality is not statistically significant, and the null hypothesis was accepted.

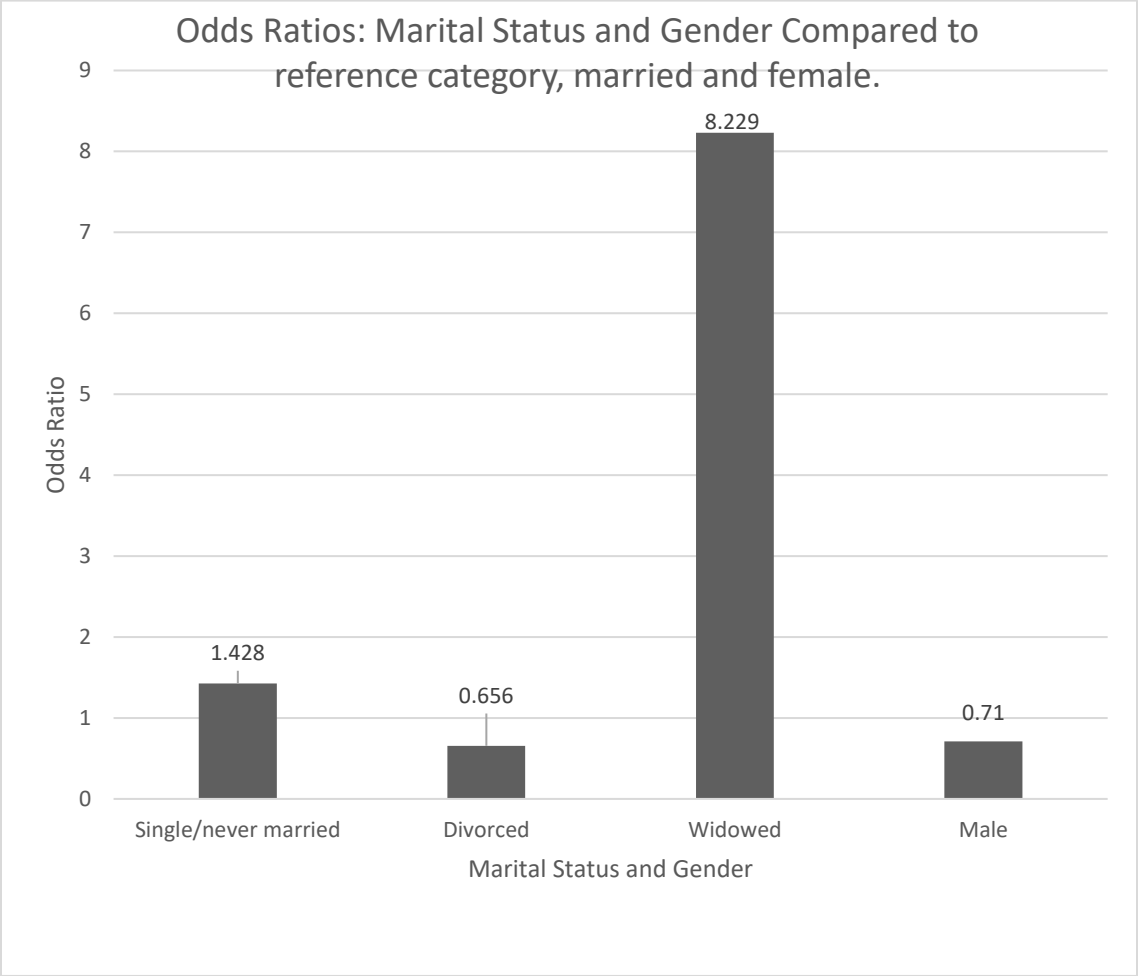

Figure 5: Odds ratio of HIV/AIDS mortality predicted by single/never married, divorced, and widowed compared to being married and male compared to female

Table 5

Multivariate Logistic Regression: Gender and Marital Status as Predictors of HIV Mortality

Marital Status	β	S.E.	Wald	df	Sig.	Exp(β)	95% C.I. for EXP(β)	
							Lower	Upper
Single/never married	.357	.225	2.503	1	.114	1.428	.918	2.222
Divorced	-.421	.335	1.580	1	.209	.656	.340	1.266
Widowed	2.108	.500	17.798	1	.000	8.229	3.091	21.907
Gender (Male)	-.343	.203	2.858	1	.091	.709	.476	1.056
Constant	1.967	.207	90.618	1	.000	7.146		

Note. Variable(s) entered: Marital Status, Gender.

RQ3. Is there an association between marital status and HIV/AIDS mortality, controlling for age, gender, race, and ethnicity among residents of a Southern County?

*Ho*3: There no association between marital status and HIV/AIDS mortality, controlling for age, gender, race/ethnicity among residents of a Southern County?

H_a3: There is an association between marital status and HIV/AIDS mortality, controlling for age, gender, race, and ethnicity among residents of a Southern County?

A binary logistic regression was used to determine whether there was an association between marital status and HIV/AIDS mortality and whether age, gender, and race moderated the association between exposure and outcome. In Table 6, I display the probable links between exposure (marital status risky behavior) and outcome (HIV mortality).

The final logistic regression model was statistically significant (χ^2 (7, N = 1164) = 60.123, $p < 0.001$.The Hosmer-Lemeshow test was not statistically significant (χ^2= 8.703 p > .05), indicating that the model was a good fit. From the model, between 6.3% to 9.7% of the variance in the dependent variable is explained by the independent variable (model). The percentage of accuracy (POA) in the classification was 78.5% (Nagelkerke R^2 = .097), implying that, using this model, an accurate result will be produced 78.5% of the time, therefore, having a higher predictive capability.

As shown in Table 6, only those who were widowed predicted HIV/AIDS mortality ($p < .05$), and ages 30 and older and African Americans moderated the association between exposure and outcome. In the presence of moderator variables, the odds of mortality decreased slightly. Compared to those married, widowed were 8.036

times more likely to die from HIV/AIDS (OR=8.036, 95% CI [2.968, 21.762], $p < 0.05$). Therefore, I rejected the null hypothesis that there is no association between widowed (marital status) and HIV/AIDS mortality and accepted the alternative hypothesis that there is an association between marital status exposure (single/never married and divorced) and HIV mortality while after moderating the effect of age, gender, and race/ethnicity among residents of a Southern County.

Those identifying as Black/African Americans had odds of 1.659 times greater (OR=1.659.877, 95% CI [1.106, 1.691], $p < 0.05$), compared to Whites. Age moderated the association between exposure and outcome. The odds of mortality among ages 30-39 were 3.054 times greater and 3.235 times greater among ages 40-49 and decreased among those ages 50 and older (1.903 times). Groups of ages 30-39 (OR=3.054, 95% CI [1.516, 2.489], $p < 0.05$) and ages 40-49 (OR=3.235, 95% CI [1.708, 6.125], $p <.05$) significantly moderated the odds between exposure and HIV mortality. Finally, people of age 50 and older (OR=1.903, 95% CI [1.061, 3.414], $p < 0.05$) significantly moderated HIV mortality was statistically significant in the moderation of HIV mortality (Figure 4).

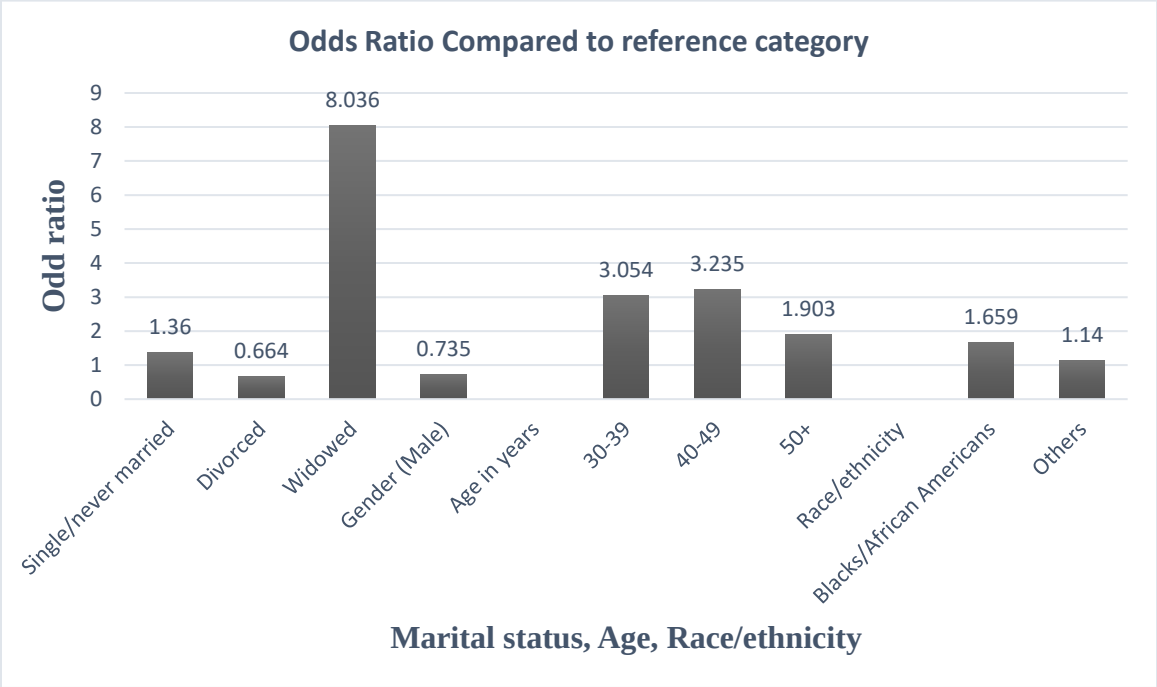

Figure 6: Odds ratio of single/never married, divorced, and widowed compared to being married, male compared to female, age 30-39, 40-49, and 50+ compared to age 20-29, and African Americans and others compared to whites

Table 6

Multivariate Logistic Regression: Demographic Predictors of HIV Mortality

	β	S.E.	Wald	df	Sig.	Exp(β)	95% C.I. for EXP(β) Lower	Upper
Marital Status	.307	.239	1.656	1	.198	1.360	.851	2.171
Single/never married								
Divorced	-.410	.355	1.332	1	.248	.664	.331	1.331
Widowed	2.084	.508	16.810	1	.000	8.036	2.968	21.762
Gender (Male)	-.307	.211	2.115	1	.146	.735	.486	1.113
Age in years								
30-39	1.116	.357	9.758	1	.002	3.054	1.516	6.153
40-49	1.174	.326	12.989	1	.000	3.235	1.708	6.125
50 and older	.644	.298	4.664	1	.031	1.903	1.061	3.414
Race/ethnicity								
Blacks/African Americans	.506	.207	5.975	1	.015	1.659	1.106	2.489
Others	.131	.335	.154	1	.695	1.140	.591	2.199
Constant	1.304	.194	45.049	1	.000	3.684		

Note. Variable(s) entered: Marital Status, Gender, Age in years, Race/ethnicity.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to examine the association between marital status and HIV/AIDS mortality in a Southern County, controlling for age, gender, race, and ethnicity. In this chapter, I provided the discussion, conclusion, and recommendations for further studies. Prior research on HIV focused on testing, attitudes, and interventions among adolescents and youth and men who have sex with men (Kerpelman et al., 2016). This prior research led to a focus on several sexual partners and relationship status associated with unprotected sex (Ashenhurst et al., 2017). Little attention was paid by researchers to the association between HIV mortality and marital status. Fagbamigbe et al. (2016) focused on marital status and HIV prevalence among women (sample in Nigeria), and Kposowa (2013) focused on marital status and HIV/AIDS mortality using the U.S. National Longitudinal Mortality Survey. Thus, additional research was needed to examine the connection between risky sexual behavior, marital status, and HIV/AIDS mortality among adult populations. Considering the regional disparities in the rates of HIV/AIDS mortality across the United States, understanding broader contextual factors that increase the risk for HIV and subsequent death was critical (Momenyan et al., 2018).

The analysis of the study was designed to examine marital status as the exposure leading to an HIV/AIDS mortality outcome among a cohort of 1,164 HIV/AIDS infected cases who died between 2012-2018. The Georgia department of health provided these data from their HIV/AIDS surveillance system. HIV was designated an urban epidemic, and national outreach efforts, although successful, did not reach certain segments of the population; the prevalence of HIV infection continued to overrepresent the epidemic beyond the representation of the population in those areas. One such area is the South

where the majority of African Americans live and where the culture is more traditional than major metropolitan cities.

Summary of Findings

Three research questions were proposed to test marital status as the exposure variable and build up to a saturated logistic regression model predicting HIV/AIDS mortality. In the first question, marital status was entered as exposure. In the second research question marital status was also tested as a predictor of HIV/AIDS mortality and whether the association was modified by gender. That is, whether marital status had an interaction effect with gender. The third question included marital status as the exposure and HIV/AIDS mortality as the outcome; age, gender, race/ethnicity were entered into the logistic regression model to determine whether these demographic variables moderated the association between exposure and outcome. A moderator variable could determine whether it affects the strength of the association between exposure and outcome.

The basic premise of the exposure is that marriage is protective of contracting HIV as it is assumed that monogamy reduces high-risk sexual behavior. The results of the first research question indicated that those widowed were at the highest risk of dying from HIV/AIDS. Compared to those married, widowed were over eight (8) times more likely to die. In the second research question, the association between marital status and the outcome was tested for an interaction between marital status and gender. The results indicated that the association between marital status (widowed) and HIV/AIDS mortality was not moderated by gender (male).

Interpretation of the Findings

The findings from this study indicate that marital status was statistically significant in predicting HIV/AIDS mortality in a Southern County. However, gender (male) and race/ethnicity (others) were not statistically significant in the moderation of HIV/mortality; meanwhile, people of all age groups and African Americans were statistically significant in moderating HIV/AIDS mortality. Persons who are single/never married, widowed, male, Black/African Americans and those ages 30 and older are more likely to die from HIV/AIDS; meanwhile, those divorced are less likely to die from HIV/AIDS. Marriage is protective of multiple sexual partners (reducing exposure) and HIV/AIDS mortality due to the reduced network of sexual partners or their commitment to monogamy

The results of the present study slightly align with the findings from Kposowa's study, who stated that the single/never married were 13 times more likely to die of HIV/AIDS than their married counterparts. Fagbamigbe et al. (2016) stated that in their study in Nigeria, HIV is more prevalent among individuals who are formerly married (divorced and separated) as opposed to currently married or never married. Liddon et al. (2010) also stated that women who are divorced or separated are more likely to report five or more lifetime sex partners and two or more sex partners in the past year than women who were never married. However, my study has instead demonstrated that the divorced are less likely to die from HIV/AIDS compared to their counterparts who are married, single/never married, and widowed. Even though Kposowa (2013) stated that those not currently married (divorced, separated, single, or never married) are more likely to die of HIV/AIDS than married persons, my study has proven that the divorced are less

likely to die from HIV/AIDS compared to the married. Also, my results from a Southern County align with that of Fagbamigbe et al.'s findings as they report that HIV mortality and diagnoses are more prevalent in single/never married individuals than the divorced. Whereas the results from a Southern County HIV/AIDS mortality and infection surveillance data indicate that those who are single/never married are more likely to die of HIV/AIDS than those who are married.

There is a gender difference in HIV/AIDS diagnoses and HIV/AIDS mortality. My study disconfirms Kposowa's study, which stated that men are more susceptible to HIV/AIDS mortality than women. Men are 0.709 times less likely to die of HIV/AIDS than women.

Furthermore, there is a race/ethnicity gap in HIV/AIDS diagnoses and HIV/AIDS mortality. Black/African Americans are 1.659 more likely to die of HIV/AIDS compared to white individuals, and individuals of other races/ethnicities are also more likely to die from HIV/AIDS compared to the whites. Therefore, African Americans are more susceptible to HIV diagnoses and HIV mortality compared to different races/ethnicities. Thus, confirming that blacks/African Americans have the highest rate of diagnoses and deaths (CDC, 2017a). In 2016, Blacks/African Americans had an HIV infection rate of 43.6 and a death rate of 16.9 compared to other races (17.0 for Hispanics/Latinos, 12.9 for persons of multiple races, 10.2 for American Indians/Alaska) (CDC, 2017a).

Theoretical Applications of Findings

The disparity in the subgroup's characteristics depends on their behavior, environment, and biological makeup. Thus, these subgroups have different features depending on their environment, and behavior can be acquired through an organized and

observable manner, and it can be learned, unlearn, and relearned in a different environment (Watson, 1913). Examining the association between marital status and HIV/AIDS, using population-based cohorts or subgroups is necessary. Behaviorism is a learning theory that emphasizes that all practices are assimilated through conditioning, which occurs through interaction with the environment (Watson, 1913). According to behaviorists, responses to environmental stimuli shape actions. Therefore, widows have a different sexual behavior pattern compared to those married, single/never married, and divorced as depicted by odds of HIV mortality.

Limitations of the Study

Frye et al. (2019) stated that HIV stigma and homophobia pose a threat to the prevention and treatment of HIV/AIDS. Due to this stigma and homophobia, limited data were collected on marital status. The state of Georgia officially began collecting the marital status of HIV/AIDS cases as recent as 2013. Even after 2013, providing marital status was optional; thus, only 6.27% of HIV/AIDS cases from 2012-2018 had marital status documented on the diagnosis and mortality records. Also, even though the data were deidentified, the state could not provide all demographic factors for confidentiality purposes. For example, race and ethnicity were limited to African Americans, whites, and others. Lastly, I could not account for those HIV/AIDS mortality and infections cases not reported to the state yet.

This study is associated with an antecedent-consequent bias in a cohort study when the researcher cannot determine that exposure precedes the disease (Creswell, 2013). It cannot be ascertained whether marital status (divorced, being single, or widowed) preceded HIV acquisition or death. For example, it cannot be determined

whether the HIV/AIDS case contracted due to high-risk sexual behavior because of a divorce or after divorce, when married, or when they were single.

Reporting bias is defined as the selective suppression or revealing of information by the subjects. Subjects and researchers have the tendency to under-report the available information for proper analysis of the significances of the effects. For example, only about 60.78% of marital status reports have HIV mortality cases in this study. It is optional for people to declare their marital status at the time of testing and during treatment. The CDC testing guidelines stipulate that an institution cannot deny someone testing base on his/her marital status. As such, some people do not find it necessary to disclose their marital status. Thus, in some of the cases, marital status cannot be determined; consequently, limiting the effect of marital status prediction of HIV infections and mortality, thus, threatens the validity and the reliability of the study in general. Similarly, marital status was not recorded on death certificates until recently in 2013, when the item was added to the questionnaires.

Moreover, opportunistic diseases like tuberculosis (TB) and malaria are the cause of death in some HIV patients. Tuberculosis is one of the top infectious disease killers in the world and is one of the leading causes of death in people living with HIV (CDC, 2017d). The CDC stated that Tuberculosis accounts for more than 30% of deaths among people living with HIV in 2017 (CDC, 2017d). In addition, the CDC stated that PLHIV is about 21 times more likely to develop Tuberculosis disease than HIV negative individuals.

Lastly, due to Georgia's strict HIV/AIDS laws (see OCGA 24-12-20 and 24-12-21) that no HIV/AIDS raw data can be released out of the Georgia Department of Human

Services, not all race/ethnicity could be used in this study. This limitation was to maintain the privacy of HIV/AIDS cases. Thus, the demographic, race/ethnicity, was released as African American, whites, and others.

Recommendations for Further Study

Prior research on HIV focused on testing, attitudes, and interventions among adolescents and youth and men who have sex with men (Kerpelman et al., 2016). This prior research led to a focus on the number of sexual partners and relationship status associated with unprotected sex (Ashenhurst et al., 2017). Little attention was paid by researchers to the association between HIV mortality and marital status. Fagbamigbe et al. (2016) focused on marital status and HIV prevalence among women (even though in Nigeria), and Kposowa (2013) focused on marital status and HIV/AIDS mortality using the U.S. National Longitudinal Mortality Study.

Based on my study, researchers must focus on the characteristics of men (straight men) and widows that make them more susceptible to HIV/AIDS diagnoses and HIV/AIDS mortality than their counterparts, women, so proper interventions can be structured to mitigate the characteristics. Kposowa (2013) stated that divorced and separated men had chances (about 6.3 times) of dying of AIDS than their married counterparts. There is a disparity in these characteristics, depending on their behavior, environment, and biological makeup, phenotype. Consequently, cultural relativism is optimal in the understanding of humans, human behavior, and society to mitigate the rate at which HIV/AIDS is ravaging our population in the United States as a whole.

Finally, it is paramount to examine both the effects of social integration and HIV/AIDS mortality/infection and the impact of social integration among the widow

subgroup and HIV/AIDS mortality/infection. The widow needs social inclusion, which is the strength of a person's ties to society and the stability of social relations within that society (Durkheim, 1897). The married individuals are usually considered the most socially integrated among marital status groups; meanwhile, the divorced/separated are considered the least socially integrated (Kposowa, 2000). From Mills' behavior theory, I can conclude that the windows are instead the ones with less social integration. Therefore, I recommend that widows be should be provided with some social integration accommodation.

Implications for Positive Social Change

This study seeks to inform the population that marriage confers buffering in the HIV mortality/infection and many other advantages not observed in different statuses. The utmost advantage of marriage is that it enhances a stable sexual relationship where there is fidelity. It is plausible that individuals with more than one sexual relationship (single/never married persons and the divorced/separated) may be more susceptible to HIV/AIDS mortality/infection than those with reliable partners.

It also informs the population that the spread and acquisition of STDs (including HIV/AIDS) are associated with a social network (Fagbamigbe et al., 2016; Kposowa, 2013; Klovdahl et al., 1994). A sexual network refers to a group of individuals allied through sexual contact (Adimora & Schoenbach, 2005). A more extensive sexual network turns to elevate the risk of HIV/AIDS acquisition and subsequent mortality.

Furthermore, it supports other studies on the effects of loss of a partner in the community. A better understanding of these effects will moderate or lessen the rate of divorce, which is relatively higher in the Southern states. Thus, reducing the social

network and sexual partners of the divorced. Perhaps, also influence the judgment of the personnel in the legal system in issuing divorce without proper analysis of these effects on the divorced. Perrig-Chiello et al. (2015) stated that divorce is among the most stressful critical life events in later life because it implies the dissolution of social and emotional ties. From my study, I can also conclude that those widowed may be the highest at risk for HIV infection and death as their odds of dying from HIV/AIDS compared to any other category of marital status. Some individuals also develop a persistent complex divorce disorder, which is characterized by separation distress, frequent or disabling cognitive, emotional, and behavioral symptoms, such as avoidance of reminders of the loved one, difficulties moving on with life, and functional impairment (Perrig-Chiello et al., 2015; Prigerson et al., 2009). Therefore, divorce is accompanied by the dissolution of social and emotional ties, grieving, and psychological distress. Moreover, the divorced engage in multiple sexual relations to cope and to re-establish themselves in the community (Kposowa, 2013; Fagbamigbe et al., 2016).

Finally, our environment is the source of what we practice, and a better environment enhances better behavior. The behavior of engaging in a more extensive social network or social partners is derivative from the environment. Behaviorism is a learning theory that emphasizes that all practices are assimilated through conditioning, which occurs through the interaction with the environment (Watson, 2013). According to behaviorists, our responses to environmental stimuli shape our actions; thus, behavior can be acquired through an organized and observable manner that does not depend on the internal mental states. Therefore, this study exposes the actions of the population that occur in our environment and creates awareness to those engaging in social networks and

multiple sexual partners of the risk of contracting HIV and subsequent mortality. According to Watson, behavior can be learned, unlearn, and relearned; therefore, the conceptual framework urges or emphasizes that risky behavior can be unlearned, and the population will unlearn their risk behavior and lessen the spread of HIV and HIV/AIDS mortalities.

Conclusion

HIV/AIDS remains a substantial cause of death, particularly among specific segments of the population. Widows, ages 20 to 50 and older, male, and African-Americans are statistically significant in predicting HIV/AIDS mortality. Also, in 2017, 16,350 deaths were registered among adults and adolescents with diagnosed HIV in the United States and six dependent areas, although these deaths may be due to any cause (CDC, 2019).

HIV is an urban disease, with most cases occurring in metropolitan areas with 500,000 or more people; however, rural areas cannot be neglected. Despite the success of HIV antiretroviral therapy (HAART) in decreasing mortality nationally, segments of the population are at higher risk of dying from HIV/AIDS (Althoff et al., 2012). HIV stigma and homophobia pose a threat to the prevention and treatment of HIV/AIDS (Frye et al., 2019). Frye et al. stated that HIV stigma and homophobia constitute the main barrier to HIV prevention and treatment. Marital status in some cultural subgroups poses stigma and discrimination, where limited information and awareness may lead people to fear accessing HAART.

Theresa, Hans-Peter, and Jere (2015) demonstrated that knowledge of HIV status (a) does not affect people’s chances of divorce among either HIV-positive or negative;

(b) reduce the number of HIV-positive transmission from sexual partners; (c) reduces the amount of reported sexual partners among HIV-positive respondents; (d) increase self-reported condom use with spouses for both HIV-negative and HIV-positive respondents. Similarly, Steven et al. (2015) and Eaton et al. (2012) demonstrated that compared to other gender subgroups and racial/ethnic, African American men are more likely to report high numbers of sexual partners.

The results of my study demonstrate that those widowed are more likely (8.247 times) to die of HIV compared to those married. The discrepancy in HIV deaths between different population subgroups indicates that national studies cannot capture specific population subgroups, nor a subgroup intervention can be generalized to the national population. The environment has a significant influence on behavior (Mills, 2010; Watson, 1913). Thus, different population subgroups behave differently because of their different environmental settings. Mills (2010) upholds that a positive behavior reinforcement and the right behavior conditioning (Watson, 1913) is necessary for a proper understanding of HIV mortality/infections in Southern cities of the U.S. Therefore, it is imperative to examine specific population subgroups to have a more definite trend of this epidemic, HIV/AIDS. This theory posits that all behaviors are acquired through conditioning, which occurs through interaction with the environment. Actions by individuals or groups of people are shaped by their response to environmental stimuli (Krapfl, 2016).

The divorce rate (per 100,000) is relatively higher and increasing in some Southern states, for example, Maryland 2.5 (2014), 2.6 (2015) to 2.7 (2016) and North Carolina 3.1 (2015) to 3.2 (2016) (National Center for Health Statistics, 2017a). Whereas

marriage rates (per 100,000) are relatively low and decreasing in some Southern states, for example, Maryland 6.5 (2014), 6.2 (2015), and 6.3 (2016), as well as Florida 8.2 (2015) to 8.1 in 2016. According to Mojtaba et al. (2015), the most registered divorce cases are related to women aged 20 to 24 and men aged 25 to 29; most divorce cases are related to couples who had lived together less than one year. Consequently, the likelihood that more divorced women are going to engage in more sexual partners, as indicated in Liddon et al. (2010).

In my study, men are less likely (0.735 times) to die from HIV/AIDS compared to women. According to Kposowa, men without a live-in partner (divorced, single/never-married) have a higher risk of death from HIV/AIDS than married persons as the divorced and separated were 5.8 times more likely to die of HIV/AIDS than those married. Fagbamigbe et al. (2016) stated that HIV is more prevalent among divorced and widowed women as opposed to married and never married. They attributed this disparity to the affordability and accessibility of contraceptives. That is a lack of economic independence, formal education, and in-depth knowledge of transmission and prevention.

An early diagnosis of the treatment outcomes is paramount for PLHIV (Cawley et al., 2014), and it is necessary to develop a policy framework aimed at intensifying access and uptake of ART and HIV testing among all marital statuses ages, gender, and race/ethnicity. According to previous studies (Boikhutso, 2019; Kpasowa, 2013), this study demonstrates that demographic factors, like age, sex, marital status, are significantly associated with HIV/AIDS mortality.

Finally, place and region of residence are significantly associated with HIV/AIDS mortality. The distribution of HIV/AIDS mortality has mirrored the focus placed on some

states and areas of considerable interventions. Nevertheless, while it is imperative to give priority to areas needing urgent intervention, regions of low HIV mortality cannot be neglected as sparks can quickly spread all over.

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