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Differences in Preferences for Using Microbicides Among Gay Men Seeking Internet

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Walden University
2016

Abstract

Differences in Preferences for Using Microbicides Among Gay Men Seeking Internet

Partners

by

Nnenna Jean Wilson

MPH, University of Texas School of Public Health, 2007

BS, United States Air Force Academy, 2005

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

July 2016

Abstract

Efforts to reduce the spread of human immunodeficiency virus (HIV) and find innovative

alternatives to condom use are important public health challenges. While the incidence of

HIV is leveling off among some populations, it is escalating in other populations such as

young African American men who have sex with men (MSM). Guided by the health

belief model (HBM) and the AIDS risk reduction model (ARRM), this quantitative,

cross-sectional study sought to use multiple linear regression, binary logistic regression,

and Fisher's exact test to determine how perceived susceptibility, as measured by the

AIDS Health Belief Scale (AHBS), and labeling of unprotected receptive anal intercourse

(URAI) risk predicted the preference for prevention products and the number of self-

reported sexual activities among MSM who seek sexual partners on the Internet. This

study also sought to determine any ethnic differences in the preference for prevention

products among these men. Due to the limited sample size ($N = 19$), there were no

significant relationships between the independent variables (i.e., AHBS Score, URAI

Risk, or ethnicity) and dependent variables (i.e., product preference or sexual activity).

Moreover, covariates of age and alcohol/drug use were not significant in this study. The

implications of positive social change include new insights into designing culturally-

sensitive, Internet-based, HIV interventions for hard-to-reach and hidden populations that

protect their privacy.

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Dedication

      I dedicate this dissertation to my loving husband and my children who sacrificed and allowed me the time to work on my dissertation.   My dedication extends to my supportive parents and grandparents as well as my wonderful siblings and friends who always pushed me forward by asking me to give them status updates on my dissertation. Finally, this research is dedicated to the MSM of this world and their families whose lives have been affected by HIV. I hope that this research will add new information to the existing body of knowledge that all people and future researchers may turn to educate themselves as we battle this global pandemic.

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I am eternally grateful to my committee chair, Dr. John Oswald, and my committee member, Dr. Susanne Richins, who took a chance on me and mentored me through their scholarly guidance, support, and words of encouragement. I also offer my sincere gratitude to Dr. Patrick Dunn and Dr. Zin Htway whose expert guidance in statistics guided me through my data analysis to ensure that my findings were analyzed and interpreted correctly. I also extend my gratitude to my University Research Reviewer, Dr. Diana Naser, and members of the Walden University Writing Center who careful reviewed my manuscript to ensure it conformed to APA style. These men and women from Walden University inspired me to keep taking steps forward in this "thousand mile journey." Because of their countless hours of mentorship, I have completed my journey and have emerged from this process as a better scholar-practitioner. Finally, I would like to acknowledge the participation of the MSM who participated in this study through the social networking site Manjam. They offered me their time and trusted me with private information about their sexual behaviors that helped me better understand their risk and preference for prevention products.

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Chapter 1: Introduction to the Study

The human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS) pandemic spans 3 decades. In those decades, it has claimed the lives of an estimated 35 million and left another 75 million living with the disease (World Health Organization [WHO], 2014). Despite these daunting numbers, there is cause for optimism because the death rate and incidence has slowed down in recent years and has even decreased in some populations due to technological advances in vaccines, increases in early diagnosis, access to antiretroviral treatment (ART), and near eradication of mother-to-child transmission (Havlir, 2012). The hope of reducing the spread of HIV is diminished for populations of men who have sex with men (MSM), especially for young African American MSM (YAA MSM) residing in the United States. For them, the incidence and death rates of this disease have increased and are at alarmingly high levels (Beyrer et al., 2013; United Nations AIDS [UNAIDS], 2013). Reducing stigma and increasing access to culturally sensitive HIV testing, counseling, and treatment for these men are paramount (UNAIDS, 2013).

The literature indicated that interventions that combine behavioral, biomedical, and structural elements are more likely to be effective in preventing HIV among MSM (Sullivan et al., 2012). In other words, prevention interventions targeting MSM should focus less on safe sex practices and substance abuse and more on providing HIV tests and early initiation and maintenance of ART. Such efforts may reduce the viral load within the sexual networks, thereby reducing the HIV incidence in the community (Millett et al., 2012). Further measures should be taken to reduce homophobia, limited access to

healthcare, and financial constraints (Millett et al., 2012; Sullivan et al., 2012). Many of these barriers could be removed early on through structural interventions such as paid parental leave, free and high quality public schools, and community acceptance of gay people (Millett et al., 2012; Sullivan et al., 2012). Otherwise, this disease will continue to cause calamity in minority populations such as YAA MSM.

The study results may offer the necessary insights in designing culturally sensitive HIV prevention programs that will be well received by YAA MSM. Such interventions will lessen the stigma by empowering these men to protect themselves from the spread of HIV while maintaining their right to privacy. Moreover, it may lead to the decrease of HIV incidence in this community, thus bridging the gap in health disparity and contributing to a positive social change for the YAA MSM and society as a whole. This study may also help to reduce societal cost due to HIV morbidity and mortality and the cost of treatment that is used to care for HIV patients who eventually develop AIDS.

This chapter is comprised of the following sections: background, problem statement, purpose of the study, research questions and hypotheses, theoretical framework, nature of the study, definitions, assumptions, limitations, scope and delimitations, significance, and summary. In the background, I provide a summary of the literature as it relates to the scope of the topic of interest. In doing so, I identify the gaps in the literature that the study could fill and frame this gap within the problem statement. In the purpose to the study section, I make a connection between the problem being addressed and the study's intent in exploring that problem. By stating the research questions and associated hypotheses, I identify the variables under study and how they

were measured and tested. These variables are more clearly described in the definition

section. Furthermore, the underlying assumptions that were necessary are presented,

along with the limitations and delimitations of the study, respectively. In the framework

section, I identify the theories that framed my study, their origin, and how they relate to

the research questions and study's approach. In the nature of the study section, I provide

a more concise rationale for selecting my study design, methodology, and method of

analysis. In the significance section, I identify the potential contributions and positive

social change that this study will make in the field of HIV. Finally, the summary section

summarizes the major points of this chapter while providing a transition to the successive

chapters that follow.

Background to the Study

Recently, the Centers for Disease Control and Prevention (CDC) identified HIV as a disease that it is threatening the human potential of the African American community, especially YAA MSM (ages 15-24). These men consist of an only 1% of the U.S. population, yet they make up 55% of all new cases of HIV (CDC, 2013a; CDC 2013b; U.S. Census Bureau, 2011). A modest body of research has explained why YAA MSM exhibits such an elevated HIV risk. Researchers revealed that their elevated risk is due to ethnic differences in HIV disclosure and sexual risk, high incidence of other sexually transmitted diseases (STDs), late diagnosis, unknown HIV status, racism, discrimination, poverty, limited access to care, stigma, homophobia, and social constructions of Black masculinity (Bird, Fingerhut, & McKirnan, 2011; Le et al., 2011, Mantell et al., 2005; Miller, 2005; Millet, Peterson, Wolitsi, & Stahl, 2006).

HIV also spreads through networks of YAA MSM very quickly. The phenomenon is not fully explained by their number of sex partners, use of alcohol/drugs before sex, and lack of condom use. Understanding the structure of sexual contact networks of MSM is key to understanding how the infection spreads (Lewis, Hughes, Rambaut, Pozniak & Brown, 2008). Research has shown that concurrent sexual partnerships may speed up the transmission of HIV in sexual networks and that African Americans are more likely than Caucasians to be engaged in concurrent sexual relationships (Adimora, Schoenbach, & Doherty, 2007). According to Wilson (2012), a highly respected African American sociologist, the issue of poverty among African American populations includes violence, high rates of incarceration, poor education, low

job skills, unemployment, welfare dependency, and young unmarried women having and raising children by themselves.

Not only does poverty influence family structure, but it also influences people's ability to seek medical treatment for an infection. People who have low incomes may not be able to afford to take an absence from work to go to a medical facility. Even when they can afford it, their lack of trust in the medical system due to past experiences of discrimination or poor service may make them even more reluctant to seek care (Thomas & Thomas, 1999). Consequently, the delays in care translate to an increased opportunity for the infection to spread. When the infections spread, they are confined to low-income African Americans, which in turn adds to the disparity in infection rates between African Americans and other ethnicities in the community (Thomas & Thomas, 1999).

Recently, Hurt et al. (2012) confirmed this concept of assortative mixing by race on a population of predominantly YAA MSM in North Carolina through a retrospective network mapping. They sought to investigate the sexual network of YAA MSM and to characterize their risk environment. They found that the risk environment of these men where characterized by high HIV prevalence, comorbid STIs, and assortative mixing. They also found that YAA MSM joined a sexual network at a younger age and often rejoined the same sexual network that led to their HIV acquisition. This study provided the right context for the national incidence data on YAA MSM (Hurt et al., 2012).

While male latex condoms are effective when used correctly and consistently in preventing the sexual spread of HIV, using them correctly and consistently is not an easy undertaking for YAA MSM because physical discomfort, decreased sexual pleasure,

power imbalances, and a culture of stigma prevent them from doing so (Hart & Peterson, 2004; Mantell et al., 2005). To circumvent this barrier, researchers suggested incorporating gels, creams, and foams (often termed lubricants) with microbicidal agents as an alternative to condoms. These products are more desirable because they do not reduce sexual sensation or break the mood (Carballo-Diéguez et al., 2000; Nodin Carballo-Diéguez, Ventuneac, Balan, & Remien, 2008; Rader et al., 2001).

Some researchers have examined the acceptability of rectal microbicides (RM) among other MSM populations (Carballo-Diéguez et al., 2000; Gross, Buchbinder, Celum, Heagerty, &Seage, 1998). Many of these studies focused on product formulation properties of the microbicides such as: color, texture, viscosity, and application (Carballo-Diéguez et al., 2008; Mantell et al., 2005). While these features are important in determining the acceptability of microbicidal products, the need to understand the complex interplay of relationship dynamics and behavioral factors that determine whether or not people would actually use the product persists (Mantell et al., 2005).

To date, I have found no research on how AA MSM are likely to adopt RMs. Although no studies were found involving the use of RM among YAA MSM, a recent cross-sectional Internet study by Calabrese, Rosenberger, Schick, Novak, and Reece (2013) analyzed the ethnic differences in lubricant use between AA MSM and MSM of other ethnicities. They found that AA MSM were just as likely as other MSM to use lubricants. In their study, AA MSM reported a 33 to 43% use in lubricants during the last sexual event. Other MSM who participated in the study had similar reports of lubricant use. While their study did not involve the use of microbicidal lubricants, they suggested

that future research should develop lubricants such as microbicides that do not facilitate the transmission of HIV (Calabrese et al., 2013).

These finding are similar to studies by Gross et al. (1998) on mostly Caucasian MSM populations and that of Carballo-Dieguez et al. (2000) on Hispanic MSM. Though these two studies varied in time frame and ethnic composition, they that revealed that over three quarters of the MSM use lubricants in 80% to 93% their sexual encounters and that most of them were willing to participate in clinical trials involving microbicides. Mantell et al. (2005) suggested that future directions of microbicidal research should seek to understand to social factors and behavioral factors that drive its acceptability. Hence, the purpose of this study was to analyze the ethnic differences in microbicides perceptions among MSM (ages 18-25) to determine if YAA MSM are more likely to use this product than other MSM, and if not, what behavioral factors may influence their perceptions.

Since YAA MSM are unlikely to respond to traditional interventions that target the general MSM population, researchers have recommended the use of the Internet as a vehicle to transcend this risk group categorization and reach these men. The Internet is an effective instrument for engaging this hidden and hard-to-reach population of nongay identifying YAA MSM in prevention efforts relating to HIV testing, awareness, and use of condoms (Berg, 2008; Young et al., 2013). Due to their low cost nature and ability to rapidly deliver HIV intervention to large numbers of people in a short time frame, the Internet is a practical platform to address at-risk populations who seek sexual partners on the Internet (Bowen, William, Daniel, & Clayton, 2008; Hightow-Weideman et al., 2011;

Swendeman & Rotheram-Borus, 2010; Young et al., 2013). A major concern about using the Internet in HIV prevention programs is that lack of access to a personal computer and broadband Internet may worsen the ethnic and socioeconomic disparities in HIV (Baur, 2008). These concerns are not without merit; however, the literature has indicated that mobile phones are effective at reversing this digital divide. According to Horrigan (2009), approximately half of African Americans and Hispanics use their mobile phones to access the Internet and their email compared to only quarter of Caucasians who use their mobile devices for these functions.

Research has indicated that using the Internet to reach YAA MSM is a more viable option than seeking to reach them through traditional means such as bars, bath houses, and clubs (Hospers, Harterink, Van Den Hoek, & Veenstra, 2002). Unlike face-to-face methodologies, Internet-based interventions have the capacity to reach large numbers of hard-to-reach populations while allowing for increased disclosure and uninhibited responses (Chiasson et al., 2007; Rhodes, 2003). Many MSM use the Internet to seek sexual partnerships because it is affordable, accessible, private, and anonymous (Elwood, Green, & Carter, 2003). Furthermore, it makes it easier for them to communicate with each other, express their intentions, and become part of a community (Berg, 2009; Grov, 2006; Elwood et al., 2003).

Those MSM who seek online sexual partners tend to report more risky sexual behaviors (e.g., history of STDs), greater number of sexual partners, and greater use of condoms and anal sex than their offline counterparts (Berg, 2009; Grov, 2006; Bolding Davis, Hart, Sherr, & Elford, 2005; Liau, Millett, & Marks, 2006). As a result of MSM's

propensity to use the Internet to seek sexual partners and the elevated nature of risky behaviors of those who do so, researchers have explored the use of the Internet to disseminate HIV prevention information and identified the positive benefits of doing so (Bull, McFarlane, & King, 2001; Rhodes, 2004; Rietmeijer, Bull, McFarlane, Patnaik, & Douglas, 2003).   Hence, this research is needed because it will help to identify whether Internet dating websites such as Manjam are appropriate platforms to gauge the preferences of MSM toward microbicides.

Problem Statement

Researchers have identified the importance of understanding how HIV is transmitted among MSM populations and the need to use the Internet to design innovative HIV prevention interventions that offer safe alternative to using condoms (Bull, McFarlane, & King, 2001; Hurt et al., 2013; Rhodes, 2004; Rietmeijer et al., 2003). They also noted that RMs may be more acceptable among MSM because they do not reduce sexual sensation or break the mood (Carballo-Diéguez et al., 2000; Nodin, 2008; Rader et al., 2001). The research problem addressed in this study is that there is very little known about the acceptability of RMs among MSM who use the Internet to meet sexual partners.

Preference for using RMs among MSM, particularly among YAA MSM, is a significant component when understanding alternatives to condoms and promoting safer sex behavior among this population. Recent clinical studies demonstrated a desire and willingness use RMs among general populations of MSM (Carballo-Dieguez et al., 2007; Gross et al., 1998; Nodin et al., 2008; Ventuneac et al., 2010). Most of these studies were

done mostly on Caucasian and Hispanic MSM (Carballo-Dieguez et al., 2000; Gross et al., 1998). Very few researchers have examined ethnic differences in MSM's desire to use RMs. While Carballo- Diéguez et al. (2000) pointed to the need to use Internet sites to promote the use of microbicides, no studies (to my knowledge) have addressed these differences among MSM who use the Internet to seek sexual partners. Research findings in this area may assist interventionists in designing online HIV prevention interventions that are tailored to fit the needs of the target population.

Purpose of Study

The purpose of this quantitative, cross-sectional study was to determine the relationships among perceived susceptibility to HIV, labeling of bareback sex, and ethnicity (independent variables), and their desire to use microbicides and report sexual activity within the last 3 months (dependent variables) among MSM in the United States who seek sex on the Internet. Based on the reviewed literature, age and alcohol/drug use are associated with risky sexual behaviors (El-Sadr et al., 2010; Hallfors, Iritani, Miller, & Bauer, 2007; Hurt et al., 2012; Peterson, Bakeman, Blackshear, & Stokes, 2003; Williams, Wyatt, Resell, Peterson, & Asuan-O'Brien, 2004). As a result, these two variables were considered covariates. The relationships between these variables were analyzed using univariate descriptive frequencies and multiple regression analyses. In doing so, in this study, I sought to understand how perceived susceptibility to HIV and labeling of bareback sex correlate to MSM's desire to use microbicides. I also sought to determine if there were any ethnic differences in these preferences.

Research Questions and Hypotheses

In order to investigate the relationships between these variables, I formulated the following research questions and associated hypotheses listed below.

1. What is the relationship between the AIDS Health Belief Scale Score and the number of self-reported sexual activities in the past 3 months among MSM online sex seekers, after controlling for age and drug/alcohol use?

   $H1_0$: There is no significant relationship between the AIDS Health Belief Scale Score and the number of self-reported sexual activities in the past 3 months among MSM online sex seekers, after controlling for age and drug/alcohol use.

   $H1_a$: There is a significant relationship between the AIDS Health Belief Scale Score and the number of self-reported sexual activities in the past 3 months among MSM online sex seekers, after controlling for age and drug/alcohol use. I used multiple regression analysis to test Hypothesis 1. The AIDS Health Belief Scale Score and the covariates (i.e., age and drug/alcohol use) were the predictor variables. The number of self-reported sexual activities in the past 3months was the outcome variable.

2. What is the relationship between the AIDS Health Belief Scale Score and preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use?

   $H2_0$: There is no significant relationship between the AIDS Health Belief Scale Score and preference for prevention products among MSM online sex seekers, after controlling for age and drug/alcohol use.

   $H2_a$: There is a significant relationship between the AIDS Health Belief Scale

Score and preference for prevention products among MSM online sex seekers, after controlling for age and drug/alcohol use.

I used multiple regression analysis to test Hypothesis 2. The AIDS Health Belief Scale Score and the covariates (i.e., age and drug/alcohol use) were the predictor variables. The preference for prevention products among MSM online sex seekers was the outcome variable.

3. Will labeling of URAI risk predict number of self-reported sexual reported activities in past 3 months after controlling for age and drug/alcohol use?

   $H3_0$: Labeling of URAI risk will not significantly predict number of self-reported sexual activities in past 3 months after controlling for age and drug/alcohol use.

   $H3_a$: Labeling of URAI risk will significantly predict number of self-reported sexual activities in past 3 months after controlling for age and drug/alcohol use.

   I used multiple regression analysis to test Hypothesis 3. The labeling of URAI risk and the covariates (i.e., age and drug/alcohol use) were the predictor variables. The number of self-reported sexual activities in past 3 months was the outcome variable.

4. Will labeling of URAI risk predict the preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use?

   $H4_0$: Labeling of URAI risk will not significantly predict preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use.

$H4_a$: Labeling of URAI risk will significantly predict preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use.

I used multiple regression analysis to test Hypothesis 4. The labeling of URAI risk and the covariates (i.e., age and drug/alcohol use) were the predictor variables. The preference for prevention products (i.e., condoms versus microbicides) was the outcome variable.

5. Will ethnicity predict the preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use?

    $H5_0$: Ethnicity will not significantly predict preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use.

    $H5_a$: Ethnicity will significantly predict preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use.

    I used multiple regression analysis to test Hypothesis 5. Ethnicity and the covariates (i.e., age and drug/alcohol use) were the predictor variables. The preference for prevention products (i.e., condoms versus microbicides) was the outcome variable.

6. Will the AIDS Health Belief Scale score, when added to the regression model that includes labeling of URAI, significantly contribute to the variance accounted for

in the predictive effect of self-reported activities in the past 3 months among

MSM online sex seekers, after controlling for age and drug/alcohol use?

*H*6$_0$: The AIDS Health Belief Scale Score, when added to the regression model

that includes labeling of URAI, will not significantly contribute to the variance

accounted for in the predictive effect of self-reported sexual activities in the past

3months among MSM online sex seekers, after controlling for age and

drug/alcohol use.

*H*6$_a$: The AIDS Health Belief Scale Score, when added to the regression model

that includes labeling of URAI, will significantly contribute to the variance

accounted for in the predictive effect of self-reported sexual activities in the past 3

months among MSM online sex seekers, after controlling for age and

drug/alcohol use.

I used multiple regression analysis to test Hypothesis 6. The AIDS Health Belief

Scale Score, when added to the regression model that includes labeling of URAI

and the covariates of drug/alcohol use were the predictor variables. The number

of self-reported sexual activities in the past 3 months was the outcome variable.

Theoretical Framework

The theoretical frameworks used in this research study included the health belief

model (HBM) and the AIDS risk reduction model (AARM). These frameworks provide a

model for predicting many different types of health behaviors and have been tested in a

variety of different population (Catania, Coates, & Kegeles, 1994; Gerrard, Gibbons, &

Bushman, 1996; Longshore & Anglin, 1995; Kowalewski, Longshore, & Anglin, 1994;

Steers, Elliott, Nemiro, Ditman, & Oskamp, 1996). Discovered by U.S. Public Health

psychologists in the 1950s, the HBM was developed in an effort to understand why

people did not engage in preventative health behaviors, even when they are offered free

of charge. The AARM was created by Catania, Kegeles, and Coates (1990) in response to

the need for a theoretical platform that fully addresses the process and continuum of

stages that characterize one's ability to identify and change their risk behaviors as they

relate to HIV and other sexually transmitted infections.

The HBM draws upon theoretical constructs such as perceived susceptibility,

perceived severity, perceived vulnerability, benefits, costs, and self-efficacy, which were

added in 1988 by Rosenstock, Strecher, and Becker. These constructs are further

explained in Chapter 2. The main proposition of this theory is that people will only

engage in preventative health behaviors if they feel susceptible to severe health

conditions and perceive the benefits of participating in the health behavior outweigh the

costs of engaging in the high risk behavior. In this study, I sought to determine how

perceived susceptibility correlate to an MSM's desire to use microbicides and their

reported frequency of self-reported sexual activities.

The AARM includes a three-stage model of labeling, commitment, and enactment

and factors such as self-efficacy, response efficacy, perceived enjoyment, and

informational/social normative factors. For more detailed explanations of these stages,

see Chapter 2. The AARM proposes that as people progress from the labeling stage to the

enactment stage, they are more likely to achieve and sustain the intended behavior

change. In this study, I focused primarily on the first stage (labeling). More specifically,

I sought to explore how MSM who use the Internet to seek sexual partners label their URAI risk and how this correlates to their frequency of sexual activities and preference for using microbicides.

Nature of Study

The research study was a quantitative and cross-sectional study from which I sought to obtain private information from a highly stigmatized and hidden population. Based upon my reviewed literature, the Internet is a beneficial tool for collecting such sensitive information from such a hard-to-reach population such as MSM (Bull et al., 2001; Chiasson et al., 2007; Rhodes, 2004; Rietmeijer et al., 2003; Suarez-Balcazar, Balazar, & Taylor-Ritzler, 2009). I collected data from MSM online sex seekers who use the sexual networking site, Manjam, to meet their sex partners. I also used a 9-item Men who have Sex with Men AIDS Health Belief Scale (MSMAHBS) scale that was developed using Survey Monkey and tailored to reflect the research questions and problem to collect the data. Once collected, the data were analyzed using multiple regression within SPSS in order to determine the validity of the hypotheses posited below.

Zagumny and Brady (1998) measured the independent variable of perceived susceptibility using the AIDS Health Belief Scale (AHBS; Carmel, 1990; Lin, Simoni, & Zemon, 2005; Yep, 1993). Steers et al. (1996) found a positive association between perceived susceptibility and increased use of preventative products. In this study, I hypothesized that perceived susceptibility will have a positive correlation to an MSM's

desire to use microbicides and their reported number of sexual activities within the last 3 months (dependent variables).

My second independent variable was labeling of bareback sex. This construct was developed by Catania, Kegeles, and Coates (1990), and researchers tested it and concluded that perceived susceptibility to HIV could be used to predict one's labeling behavior (Catania et al., 1994; Longshore & Anglin, 1995). I posited that there was a positive correlation among the variables relating to the labeling of bareback sex, MSM's desire to use microbicides, and their reported number of sexual activities within the last 3 months.

My final independent variable was ethnicity. While ethnicity is part of the descriptive statistics, it may also be treated as an independent variable in order to assess the ethnic differences in preference for microbicides. I hypothesized that AA MSM may show a greater preference toward microbicides than MSM of other ethnicities. Based on my reviewed literature, drug/alcohol use and age are often associated with risky sexual behaviors (El-Sadr, Mayer, & Hodder, 2010; Hallfors et al., 2007, Hurt et al., 2012; Peterson et al., 2003; Williams et al., 2004). Therefore, these two variables were considered covariates in order to control for any confounding effects that they may have on the dependent and independent variables.

Definitions

Definition of Terms

The section below represents a list of terms and their operational definitions as used within the context of this study.

Assortative mixing: A term used to describe how African Americans tend to have sex with other people who have the same ethnicity and belong to the same sexual networks that led to their HIV acquisition. This behavior confines the HIV infection to that ethnicity and adds to the disparity in infection rates between African Americans and other ethnicities in the community (Hurt et al., 2013; Thomas & Thomas, 1999).

Men who have sex with men (MSM): A neutral term that is used in public health surveillance systems and within HIV literature that was coined in order to reduce stigma and refer to sexual risk behaviors between men that would lead to the transmission of HIV infection. It does not necessarily relate to how individuals self-identify themselves in terms of their sexuality. In fact, many of these men may have many female partners in order to mask their identity and escape the stigma associated with homosexuality. This is especially the case with YAA MSM, who due their culture of homophobia and masculinity, do not self-identify as gay (CDC, 2015; Young & Meyer, 2005).

Serosorting: The practice of choosing one's sex partner or deciding whether or not to engage in UAI with them based on them having the same HIV status (i.e., HIV-concordant partners). This practice is also used when making decisions about condom-use with partners that have differing HIV status (i.e., HIV-discordant partners). Studies have shown that this practice may help to prevent high rates of HIV transmission among MSM (Golden, Stekler, Hughes, & Wood, 2008).

Unprotected receptive anal intercourse (URAI): This term is used to describe condomless, anal intercourse where one's partner inserts his penis into his anus (Carballo-Diéguez et al., 2009). The partner that is doing the insertion is called the

insertive partner, and his action is called unprotected insertive AI (UIAI). The other partner is called the receptive partner and considered engaging in URAI. While UIAI is less infectious than URAI, both practices put MSM at risk for HIV because the rectal mucosa are not as protective as vaginal secretion, making them more susceptible to traumatic abrasions that allow the virus to be transmitted (Baggaley, White, & Boily, 2010). Other terms used to describe this risky sexual behavior include barebacking and unprotected anal intercourse (UAI).

Definition of Research Variables

The section below includes a list of variables used in this study and their definitions. For more detailed information regarding how these variables are coded, see Chapter 3.

Age: This refers to continuous variable that is obtained when the participant is asked to self-report their age (in years) on their last birthday. This variable is also used to screen participants because it is used as a dichotomous variable, whereby participants are asked if they are 18 years of age or not. If they answer no, then they are exited out of the survey.

Drug/alcohol use: This self-reported variable is a dichotomous variable that captures the participant's response regarding the use of drugs or alcohol during sexual activities with men they met on the Internet. The responses were minimized to a simple *yes* or *no* response, in order to minimize any fear of disclosure that may lead to skipping of question or dropout of survey by the participant.

Ethnicity: This variable is a categorical variable that categorizes participants based on the following categories: Caucasian, African American, Hispanic, or Other. The purpose of this variable is to analyze difference in preferences of participants based on their ethnicity.

Preference for prevention products: This variable is embedded within the 11-itmes on the MSMAHBS scale where participants are asked if he might enjoy (or think he might enjoy sex when using a lubricant-like product [i.e., microbicide gel]). The participants were asked to select from response options, that is, *strongly disagree (1), disagree (2), slightly disagree (3), slightly agree (4), agree (5),* and *strongly agree (6)*) that best describes themselves. Responses of (3), (4), (5), or (6), were recoded as (1) prefers microbicide and responses of (1) or (2) were coded as (0) no preference for microbicide.

Sexual activity: This is an ordinal variable related to the online sex partner dichotomous variable where participants are asked to respond with a *yes* or *no* whether they participated in sex with someone they met on the Internet. If the respondent answers *yes*, then they are then asked to self-report the number of times in the past 3 months that they had sex with someone they met on the Internet.

URAI risk: This variable reflects the participants' perceptions about the level of risks associated with eight common MSM sexual activities. Participants were asked to rate each activity as either *low risk, high risk,* or *do not know the risk.* Their responses indicate their ability to proper gauge and label URAI as a high-risk activity. This variable was later recoded so that participants who rated URAI as a high-risk activity

were recoded as success (1), regardless of their coding of the other seven activities.
Those who did not rate it as high risk were recoded as failure (0), regardless of their
coding of the other seven activities.

ABHS Scale Score: This mean score from a 9-item, Likert-like scale called the
MSMAHBS scale was revised from the AHBS scale from Zagumny and Brady (1998). It
includes items relating to perceived susceptibility and tailored the items relating to
barriers in order to capture both condom use and microbicides as HIV prevention
products. Participants were asked to select responses options (e.g., *strongly disagree (1),
disagree (2), slightly disagree (3), slightly agree (4), agree (5),* and *strongly agree (6)*)
that best describes themselves.

Assumptions

Participants in the research study provided their responses in a self-administered
questionnaire. Therefore, I assumed that the MSMAHBS instrument that was designed
for this study provided an accurate measure of the variables under study. I assumed that
the variables were logical and consistent with those used in the HIV literature and within
the MSM culture. Due to the anonymous nature of the survey, I assumed that the
participants were truthful about their age, ethnicity, and reports of their sexual activity.

Scope and Delimitations

While research on HIV prevention is abundant, there is a dearth of information
when it comes to understanding the sexual networks of MSM and potential preference for
microbicides, particularly in reference to those who seek sexual partners online.
Therefore, I sought to investigate the relationship between the AHBS and number of

sexual activities and the ability of these men to label URAI as a high-risk activity. As a result, the scope of this research is limited to MSM online sex seekers who have active profiles within the Manjam website and who participated in the online survey during the data collection period.

The theories that were applicable included the HBM and ARRM. While both theoretical frameworks where integrated into the study design, not all aspects of the theories where tested. For example, the study included perceived susceptibility and barriers within the HBM, but excluded perceived severity and barriers. Within the ARRM, I examined the labeling construct (i.e., Stage 1) and omitted the commitment and enactment constructs (Stage 2 and Stage 3, consecutively). The studies' findings may not be discussed within the context of those constructs that are omitted from both theories.

With regard to generalizability, the results are limited to those participants who participated in the study. The participants' Manjam profiles indicated that they were from different states within the United States; therefore, the participants appeared to be representative of MSM who use Manjam to seek sexual partners, but they are not representative of other populations of MSM. Thus, the study results may not be generalizable to all MSM populations or apply to all populations of online, sex-seeking MSM.

Limitations

This cross-sectional quantitative study was using one sexual networking website (Manjam) because the survey that was conducted was limited exclusively to those members who had active profiles on this website. Elford, Bolding, Davis, Sherr, and Hart

(2004a) suggested the use of multiple Internet sites to increase internal validity and triangulate the data. Due to anonymous nature of my study, I opted not to include many websites, as this would increase the complexity of the study. Furthermore, it may have made it more likely for participants to submit duplicate responses. The use of only one website also threatened the external validity of this study and limited the generalizability of the study results.

The external validity of my study was further weakened by my access to the demographics of my online population and use of convenience samples (Pequegnat et al., 2007). To counter this sampling bias, I used time-based sampling to randomly sample and send study invites to participants based on the random nature of when they log onto the website. To further strengthen external validity, I used a large and geographically diverse sample in order to minimize sampling biases that exist in smaller and geographically limited samples of smaller studies. Finally, I controlled for the confounding effects of demographic variables such as age and drug/alcohol use.

According to researchers, it is not uncommon for MSM to misrepresent themselves, especially on the Internet (Pequegnat et al., 2007; Ross, Daneback, Månsson, Tikkanen, & Cooper, 2006). This practice of deception about one's identity threatens the internal validity and content validity of my study because all of my samples of MSM are from the Internet. It is impossible to verify the demographic information content validity of the study. Short of compromising the confidential nature of this study, there is no reasonable way of overcoming this limitation.

Finally, in order to strengthen construct validity, I constructed an instrument (MSMAHBS) that is modified from the AHBS and is based on well-grounded theories such as HBM and ARRM with high construct validity scores as described in Chapter 3. Although I modified the MSMAHBS from its original form, I had a panel of experts review the instrument and validate this instrument in its modified version. This measure helped to counter any weaknesses in construct validity that may occur when the instrument was modified.

Significance

After 3 decades of studying the HIV pandemic and discovering new scientific advances such as ART, the incidence and death rates have leveled off in most populations. For the MSM population, these rates continue to skyrocket above other populations. MSM continue to disproportionately bear the burden of this disease present and opportunity for research studies, such as the one I undertook to make a positive impact to improve their health status.

Previous research has indicated that MSM reject the use of condoms; this highlights the need to find alternatives to condom for this population. While the Food and Drug Administration has not yet allowed the general public access to rectal microbicides, these drugs appear to be a promising alternative to condoms. Very little research exists that examines their preference among various populations of MSM. This research study sought to fill the gap in the literature with an added challenge of exploring their preference among MSM who use the Internet to meet sexual partners. I further sought to contribute to this body of literature by investigating how perceived

susceptibility to HIV and labeling of bareback sex correlated to MSM's desire to use microbicides. I also sought to determine if there are any ethnic differences in these preferences.

As such, the research design of this study served as a model for designing Internet-based HIV prevention programs that aim to understand preferences of MSM for different types of prevention products. Additionally, the research findings from this study could help to promote positive social change by impacting the development of public health initiatives and interventions that encourage healthier sexual practices among MSM that will reduce their risk for HIV. In doing so, this research could not only help to advance the human and social conditions of MSM, but it offers a scientifically-grounded approach that promotes a better understanding of how Internet-based sexual networks place these men at risk for HIV and how Internet-based interventions that partner with these sexual networking sites may use them to improve the health status of these MSM.

Summary

While the global trends in HIV stabilized in many populations, it remains a significant threat to the lives of MSM. Past researchers have suggested the use of microbicides as alternatives to condoms (Carballo-Diéguez et al., 2000; Nodin, 2008; Rader et al., 2001). Very few researchers examined their acceptability among MSM populations, and even fewer sought to understand the complex interplay of relationship dynamics and behavioral factors that determine people's preference for these products (Carballo-Diéguez et al., 2000; Gross et al., 1998; Mantell et al., 2005). In this research study, I comprehensively examined the relationships between perceived susceptibility to

HIV and labeling of bareback sex as they relate to MSM's desire to use microbicides. I also explored ethnic differences in these preferences.

Chapter 1 provided an overview as well as an introduction to the significance and rationale for this study. I also provided a preview of key terms and variables, along with a list of research questions and associated hypotheses that are examined in successive chapters. Chapter 2 provides a discussion and analysis of key literature that is published in the areas of HIV epidemiology, relevant theoretical frameworks, sexual risk behaviors of MSM, attitudes of MSM toward prevention products, and social networking sites as tool for sexual networking. In Chapter 3, I explain the quantitative methodology, instruments, methods, and data analysis plan for examining the relationships between variables that are tested through the formulated hypotheses. Chapter 4 provides an analysis of the data as they relate to each research questions and hypothesis. Finally, Chapter 5 encompasses interpretations of my results and their implications for positive social change. It also includes my recommendations for future studies in this research topic.

Chapter 2: Literature Review

Introduction

Globally, the AIDS disease continues to threaten the lives and health of many

people, especially for MSM. Many of these men engage in anal intercourse. However,

they do not openly identify themselves as gay or use condoms as a practical way of

protecting themselves from HIV. Therefore, it is imperative to research the risk factors

that put these men at a disproportionate risk for HIV as well as alternative methods of

protection and media that may be more practical for them. Such research will enable

public health professionals to develop and tailor interventions to meet their needs.

In this portion of my study, I review the behavioral research literature as it relates

to this topic and its research variables with specific emphasis on microbicides and

Internet-based interventions. I also include the theoretical frameworks that help to

understand the sexual risk behavior of MSM. The strategies for reviewing this body of

literature included searches on EBSCO, ProQuest, PubMed, and Google Scholar

databases using the terms *MSM, HIV, barebacking, condoms, sexual networking*, and

microbicides. Online searches on health related websites such as the CDC) UNAIDS, and

WHO were also conducted. The results of the articles yielded were further organized

based on the variables of interest, the Internet, and the target population under study (i.e.,

African American MSM). The initial database searches where limited to the previous 5

years; however, the searches were extended to as much as the last 20 years in order to

fully understand and appreciate the progression in research from the history of HIV to the

current Internet-based risk practices and social networks. I used the reference sections of

relevant research articles to cross-reference and find foundational articles in order to add more depth and breadth to the study.

The organization landscape of this review is divided into five major sections. The first section includes a discussion of strengths and limitations of the theoretical frameworks of the HBM and the AIDS risk reduction model ARRM and how they guided the design of the study. The second section gives a general overview of the history and current epidemiological trends in HIV among the target population, including prevention successes and challenges. The third section includes a review to the literature related to the sexual risk behavior of AA MSM. I highlight the role of social forces, sexual networks, homophobia, and sexual identity on the risk behavior of these men. In the fourth section, I discuss the attitudes of AA MSM toward prevention products by exploring the culture of bareback sex and the barriers to condom use. I also investigate the frequency and acceptability of lubricants as a precursor and predictor of potential acceptability of microbicidal lubricants. The fifth and final section will conclude with a thorough review of the Internet's role in MSM activity. This will include the use of social networking sites a tool for sexual networking, the risk differences between online and offline dating, as well as an analysis of methodological and ethical consideration of Internet-based HIV behavioral research and how it may be used to target MSM.

Theoretical Framework/Model

Since the beginning of the HIV epidemic, a number of theories and models have tailored to explain and predict behavior change in those at risk for HIV. The HBM and the AARM are the two most prominent models that best frame the research (Fisher &

Fisher, 2000; see Figure 6 and Figure 7 for diagrams of these models). In this section of

the paper, I explain the origins, basic assumptions, and constructs of each model. I also

explain how these models relate to the study approach and research questions.

Health Belief Model (HBM)

The HBM is one of the first behavior change models. It was discovered by social

psychologists of the United States Public Health Service Hochbaum, Rosenstock, and

Stephen in the early 1950s. They developed this model because they wanted to

determine why people did not take advantage of free tuberculosis screening programs. In

1966, Rosenstock published their findings in *The Milbank Memorial Fund Quarterly* in

an article entitled, "Why people use health services." In 1988, Rosenstock et al.

published another article in *Health Education Quarterly* clearly delineating the constructs

and incorporating self-efficacy as a new variable. The fundamental assumptions for this

model is that people will engage in preventative health behaviors if they feel susceptible

to severe health conditions and perceive the benefits of participating in the preventative

health behavior outweigh the costs of engaging in the high risk behavior.

The original constructs of the HBM include perceived susceptibility, perceived

severity, perceived vulnerability, benefits, and costs. Perceived susceptibility refers to

how one perceives his or her risk for contracting the health condition. This perception is

not only a result of knowledge about the health condition, but the social environment may

influence it. For example, some barebacking websites may down play the risk of HIV by

attributing it to a matter of personal choice or an eventual outcome. Thus, MSM online

sexual seekers may have an altered reality of their risk for contracting HIV. Perceived

severity refers to the physical and social consequences of contracting the disease such as pain, death, and social stigma. Perceived vulnerability refer to how the individual views their risk in light of the costs and benefits. Even though an MSM may feel vulnerable to contracting HIV, he may continue to engage in risky sexual behaviors such as UAI because the emotional and sexual connection of it outweighs the benefit of using a condom. MSM will continue to participate in risky health behaviors, unless the benefits (i.e., the beliefs about the effectiveness using a condom) are enough to prevent the disease (i.e., HIV; Fisher & Fisher, 2000).

Over the years, researchers revised the HBM to include other constructs such as a cue stimulus and self-efficacy. A cue stimulus may be internal or external. An example of an internal cue may be experiencing the symptoms of HIV, whereas an external cue stimulus may be being exposed to someone with HIV or receiving a mass media communication message through the Internet. Self-efficacy refers to the possibility that a person can, with confidence, successfully perform the preventative health behavior such as using a microbicidal lubricant and experience the expected outcome of pleasure and protection. Critics of HBM have argued that it is more applicable to preventive behaviors such as receiving vaccinations than for complex tasks such as negotiating safer sex via condoms or microbicides (Fisher & Fisher, 2000).

Since the HBM does not clearly delineate the interrelationships among the constructs, researchers have found inconsistent findings using it to validly predict levels of risky behaviors. For example, Steers et al. (1996) showed an association between high levels of perceived susceptibility and increased use of preventative products. Other

researchers found that perceptions of high levels of vulnerability may result in risky behavior (Gerrard, Gibbons, & Bushman, 1996). More studies need to be done to clarify the relationship between perceived susceptibility and HIV preventative behavior (Fisher & Fisher, 2000). In this study, I sought to measure how perceived susceptibility and costs may relate to an MSM's desire to use microbicides.

AIDS Risk Reduction Model (AARM)

The AARM was modeled after the stages of behavior change model, where a person undergoes a process whereby different factors affect their ability to go from one stage to the next. Catania et al. (1990) created the ARRM's three-stage model of labeling, commitment, and enactment to be used on individuals who are at risk for HIV and who are sexually active or use injection drugs. The first stage of labeling requires that the individual label his or her health behavior as problematic. For example, an MSM must view his behavior of participating in UAI as a behavior that places him at a high risk for contracting HIV. In the commitment stage, the individual decides if the behavior in question may be changed and if the cost-benefit ratio of doing so is favorable. The labeling stage is very similar to the HBM construct of perceived susceptibility (Fisher & Fisher, 2000).

The ARRM's commitment stage is very similar to the cost-benefit analysis of expectations found in the HBM. After weighing the pros and cons of committing to the proposed health behavior, an MSM may decide to adopt the new health practice, stay in limbo, or give up completely. Making the decision to adopt a safer health practice such as using condoms instead of participating in a more pleasurable act of UAI is a difficult

decision. The alternative health practice of using microbicides does not reduce pleasure, so it may be a more readily accepted practice. Additionally, the three stages of ARRM are not merely isolated constructs like the HBM. As an MSM progresses from the continuum of the labeling stage to the commitment stage, he may be more likely to achieve behavior change in the long run. Like the HBM, the AARM does contain elements of self-efficacy as one of the factors that affect commitment. Other factors include response efficacy, perceived enjoyment, and informational/social normative factors (Fisher & Fisher, 2000).

In the enactment stage, an individual seeks out strategies to achieve the behavior change. These strategies may vary from one person to another and may require one to prevail over adversarial situations and barriers such as financial barriers, peer pressure, and internal barriers like denial, fear, and anxiety (Fisher & Fisher, 2000). Catania et al. (1990) suggested that successful completion of the enactment stage is dependent on the level of social support they receive from their partner and the communication skill that one possess that allows him or her to negotiate with them.

It is important to note that the AARM behavior change continuum is not a unidirectional. Sometimes, an individual may experience obstacles that may change the way the view their behavior, thus affecting their ability to progress through the stages. For example, an MSM may view his participation in UAI as high risk, but the financial cost of using microbicides may cause them to view their attempts to have safer sex more problematic than performing the risky sex behavior. As a result, he may relabel his behavior as unproblematic and stunt his progression into the commitment stage. In this

way, the model explains why people fail to move the stages of change (Fisher & Fisher, 2000). Catania et al. (1990) discussed internal and external stimuli that cause one to move from one stage to another. While moderate stress levels encourage progression through the stages, high levels of stress associated with behavior change may lessen one's self-efficacy and stunt one's progression from one state to another (Fisher & Fisher, 2000).

Researchers tested the univariate correlations between the different components of the AARM and the attainment of different stages of change within the ARRM. For example, Catania et al. (1994) discovered that perceived susceptibility to HIV could be used to predict how problematic one viewed their behavior. Longshore and Anglin (1995) confirmed this finding and demonstrated that ARRM variables could be used to predict one's labeling behavior. Catania et al. also found that supportive norms were predictive of an individual's commitment. This finding was consistent with that by Kowalewski et al. (1994), who found that self-efficacy and normative support for change were associated with greater commitment to change. I hoped to see if there is any correlation between labeling of bareback sex and MSM's desire to use microbicides.

Summary of Theoretical Frameworks

In summary, the HBM is useful in predicting behavior, but the relationships between its constructs are unclear and inconsistent. While the HBM constructs are applicable in addressing many health behavior, these constructs appear to be a list of conditions that would compel one to seek health intervention such as a health screening, rather than a model that would require them to engage in complex behavior processes

such changing ones sexual practice from something that is risky such as UAI to something less pleasurable such as using a condom. Studies that used the model did not fully test the model; rather, they correlated its constructs to a specific behavioral outcome. Since the HBM does not fully specify how its constructs may be tailored to fit the different target populations and contexts of HIV interventions, it may be difficult to operationalize its constructs in this study (Fisher & Fisher, 2000). Due to these limitations, I sought to determine if there are any correlations between perceived susceptibility and MSM's desire to use microbicides. Nevertheless, the HBM laid the foundation for other theories and models that came after it, like the ARRM.

In comparison to the HBM, the ARRM was developed with HIV prevention behaviors in mind, and many researchers tested it on a variety of different populations. The HBM was developed with screening behaviors. It clearly frames the HIV behavior change process as a continuum involving many stages with many factors that directly and indirectly affect one's progress. However, the ARRM is not without its limitations. While it focuses on the attainment of a single stage and addresses how one may digress and revert back to an early stage, it does not specify how one moves from one stage to a higher stage. The model is very complex because the factors that affect one stage may affect other stages. This complexity makes it difficult to use the ARRM in designing interventions (Fisher & Fisher, 2000). While many of the aforementioned studies yielded similar results, some tests of the model yielded inconsistent results between ARRM components an actual behavior (Flowers, Sheeran, Beail, & Smith, 1997). In this study, I used the ARRM to test the correlation between labeling of bareback sex and MSM's

desire to use microbicides. By using the HBM to explore the determinant of behavior and using the ARRM's broader conceptual framework, I hoped to better understand how future microbicide interventions may be tailored to encourage MSM to stop risky sexual practices such as UAI and adopt safer and equally satisfying options such as microbicides.

Background

History of HIV Epidemic

The first cases of HIV were documented in June 5, 1981 when the CDC showcased a report in their Morbidity and Mortality Weekly Report about five gay men in California who had *Pneumocystis carinii*, but were later known to have had AIDS (De Cock, Jaffe, & Curran, 2011). The disease was first characterized as an immune deficiency disease affecting homosexual men. *The New York Times* referred it as GRID (gay-related immune deficiency) syndrome. As epidemiologists interviewed affected individuals, they discovered that this infectious disease not only affected MSM, but also affected women, babies of affected women, heterosexual men, and intravenous drug users. The term MSM was coined in the late 1980s to describe men who had sex with men who self-identified and those who did not self-identify as being homosexuals (Altman et al., 2012). The disease was later renamed AIDS and HIV (was deemed to be its causative agent (Schneider, 2011). The CDC set up a surveillance system and a national reporting system. With retrospective testing, they discovered that the HIV virus infected hepatitis patients in Los Angeles as early as 1979 and that an epidemic was under way. Little did they know that they were unveiling the beginnings of the worst

pandemics in the history of mankind that claimed a toll of more than 60 million

infections, 30 million deaths, and no end in sight (De Cock et al., 2011).

In the early stages of discovering HIV, resources were slowly mobilized because

the disease was associated with homosexuality, and people (especially those with

political power) did not want to acknowledge that the epidemic was significant (Altman

et al., 2012). Even after several decades, the same reluctance remains persistent in many

segments of society, even in parts of the world where a majority of the infections are not

due to MSM activity (Altman et al., 2012). The intricate relationship between

homosexuality and HIV left an endemic mark on the way the disease spreads and how it

is prevented. Many cultures have a propensity toward heterosexism (i.e., view that

heterosexual relationships are normal) and a disdain toward homosexuality that may lead

people to experience homophobia (Altman et al., 2012). While some states passed

legislation to protect people from being discriminate upon on the grounds of their

sexuality and gender, it does not change the prevalent attitudes of people who

misunderstand, dread, and discriminated against homosexuals. As a result, homosexuals

often feel stigmatized, so they do not talk about it or disclose their sexual identities

(Altman et al., 2012). This stigma and silence have only served to fuel the pandemic

(Altman et al., 2012). Moreover, it hinders the development of HIV prevention programs

that target these hard-to-reach segments of the population who are most affected by the

virus. Heterosexism and homophobia may lead to lack of access to adequate information

and resources because it further marginalizes homosexuals, making them more

vulnerable to infections and less likely to adopt disease prevention material, even when

they are readily available (Altman et al., 2012).

Current Epidemiological Trends in HIV

From the early 1980s until the present day, HIV is spreading globally infecting 75

million people and killing 35 million (WHO, 2014). At the end of 2012, about 35.3

million people and 0.8% of adult aged 15-49 years of age lived with the virus (UNAIDS

2013; WHO, 2014). Appendix A: Figure 1 and Figure 2 provides diagrams depicting

these global trends. While the epidemic varies between countries and regions of the

world, Sub-Saharan African bares the greatest burden with 1 in every 20 adults are living

with the virus. Seventy-one of the people living with HIV are in Sub-Saharan Africa

(WHO, 2014). With more people receiving antiretroviral treatment, the HIV prevalence

is increasing because people are living longer with the virus. Subsequently, the AIDS

death rate is also decreasing with an estimated 1.6 million deaths in 2012, which went

down from the 2.3 million in 2005. The incidence of HIV appears to be decreasing. In

2012, the number of new HIV infections was approximately 2.3 million, which is 33 %

less than the number of new infections in 2001 that was estimated to be 3.4 million

(UNAIDS, 2013).

So, despite the ongoing transmission of HIV and the morbidity and mortality

associated with it, current technological advances in vaccines, increases in HIV testing

and access to antiretroviral treatment and near eradication of mother-to-child

transmission, there is hope that control of pandemic may be achievable (Havlir & Beyrer,

2012). The United Nations General Assembly set a goal to achieve a 50% reduction in

sexual transmission of HIV by 2015 in order to meet the millennium development goal of halting and reversing the spread of HIV/AIDS (UNAIDS, 2013). Achieving a generation of people free of AIDS is a difficult and costly endeavor that would require an end to stigma and discrimination of people living with AIDS and those at risk for HIV (Havlir & Beyrer, 2012).

Among those people who are at the greatest risk for HIV globally are MSM. While epidemiological surveys of MSM are limited and variable among countries around the world, Western and Central Africa experienced the highest median prevalence reported at 19%. The Caribbean reported the lowest prevalence at 7%. Latin America, Asia and pacific countries, and Western and central Europe and North America are in the middle with prevalence averages of 12%, 11%, and 8%, respectively (UNAIDS, 2013). The global trend for MSM slightly increased, but remain at alarmingly high levels (Beyrer et al., 2013; UNAIDS, 2013). MSM tend to be infected at younger ages. The global median prevalence for MSM under the age of 25 is 5.4%. Therefore, increasing their access to culturally sensitive HIV testing, counseling, and treatment is a global health priority that demands immediate redirection of funding and a legal reform that may reduce stigma and increase rights literacy (UNAIDS, 2013).

Thus, the global health priority to reduce the spread of HIV/AIDS is evident in the United States and communicated through the National HIV/AIDS Strategy and Healthy People (HP) 2020 goals (CDC, 2012a). In the first twenty years of the epidemic, scientific advances in preventing mother-to-child transmission, screening of blood products, and behavior change interventions led to drastic decreases in HIV in the

incidence of HIV from about 130,000 in 1984 to 60,000 in 1991 (El-Sadr et al., 2010).

Since the mid-1990s, the incidence rate slightly fluctuated but remained relatively stable,

perhaps even stalled at around 50,000 infections per year (CDC, 2012c; El-Sadr et al.,

2010). The CDC estimates that there are 1.1 million people living with HIV in 2010 and

16% of people who have HIV are unaware of their infection (CDC, 2014). That same

year, 47,500 people were newly infected with the virus (CDC, 2012c). Areas of the

world like Sub-Saharan Africa rightfully received much of the attention regarding the

global HIV epidemic; however, there are populations in the United States who experience

HIV prevalence rates similar to some countries in Sub-Saharan Africa. For instance, the

prevalence of HIV for MSM in South Africa is lower than that of MSM in the United

States whose HIV prevalence is 30 (El-Sadr et al., 2010).

There is also a racial health disparity in the incidence of HIV in the United States.

African Americans disproportionately bear the greatest burden of the disease. While they

make up about 14% of the total U.S. population, they made up nearly half (44%) of all

new infections in the U.S. in 2010. In fact, their HIV incidence is approximately eight

times that of Caucasians. African American men comprised about 70% of the incidence

rate among African Americans, which was higher than any other group by race or sex.

Their rate was six times higher than Caucasian men (e.g., 103.6 vs. 15.8 per 100,000).

African American women accounted for percent of the HIV incidence in 2010, but made

up 64% of all new infections among women. Their rate of new HIV infection was 20

times that of Caucasian women and five time that of Hispanic women (e.g., 38.1 vs. 1.9

and 8.0 per 100,000, respectively). Some studies indicated that the high prevalence of

HIV among African American women might be attributed to their heterosexual contact with African American MSM who have sex with women (Wohl et al., 2002). While their HIV incidence rate remains high, they experienced a 21% decrease in new HIV infections between 2008 and 2010 (CDC, 2012c). A diagram on HIV incidence by race/ethnicity can be found in Appendix A. Figure 3.

While, the number of new HIV infections among African American women is decreasing, the incidence rates continue to increase for young MSM by 22%. While MSM represent a very small segment (4%) of male population in the United States, they account for 78% of the HIV incidence among men and 63% of all new infection in 2010. The number of new HIV cases in 2010 for Caucasians, African Americans, and Hispanics were 11,200, 10,600, and 6,700, respectively. While Caucasians appear to have the greatest number of new HIV, the rate of new HIV infections is highest for AA MSM into relationship to their small population make-up. Among young MSM, YAA MSM, make up 55% of new infections (CDC, 2012c). In fact, between 2006 and 2009, the incidence of HIV among YAA increased by 48% (CDC, 2012b). Based on mathematical models the current incidence rate of 2.39%, Stall et al. (2009) noted that a given cohort of YAA MSM might contract HIV by the time they are 40 years of age. Factors such as high prevalence, unknown HIV status, risk misconceptions, stigma, homophobia, and lack of health insurance or access to testing, care, and antiretroviral treatment may contribute to the high incidence rates (CDC, 2012c). See Appendix A. Figure 4 and Figure 5 for diagram on HIV incidence by transmission category and for MSM, respectively.

Sexual Risk Behavior of African American MSM (AA MSM)

As previously discussed in the sections, AA MSM have an elevated risk of HIV, not simple because of their individual behavior, but mostly due their high prevalence. Additionally, the dynamics of their sexual networks indicates that they tend to participate in assortative networks where they choose partners who have the same ethnicity as themselves, which coupled with their high prevalence puts them at higher risk for contracting HIV. In comparison to their Caucasian counterparts, AA MSM are more likely not to know their HIV status or receive antiretroviral therapy (El-Sadr et al., 2010). Recently, Hurt et al. (2012) confirmed these findings on a population of predominantly YAA MSM in North Carolina. Through the process of retrospective network mapping, they sought to investigate the sexual network of YAA MSM and characterize their risk environment. They found that the risk environment of these men where characterized by high HIV prevalence; co-morbid STIs; and assortative mixing. They also found that YAA MSM joined sexual network at younger age and often rejoined the same sexual network that led to their HIV acquisition. Since other studies revealed that there are no differences between the types and frequencies of YAA MSM and other MSM, this high-risk environment clearly delineates why MSM are such at a disproportionate risk for HIV (Hurt et al., 2013, Millett et al., 2012, Oster et al. 2011). In addition to providing a plausible explanation for this health disparity of HIV among YAA, this study provided the right context for the national incidence data on YAA MSM (Hurt et al., 2013).

In a cross-sectional national survey of a multi-ethnic sample of 503 MSM, Tieu, Murrill, Xu, and Koblin (2010) confirmed previous finding by El-Sadr et al. (2010) that

AA MSM are more likely to be unaware of their HIV status. They also confirmed

finding from other studies by Aral, Adimora, and Fenton (2008), Hallfors et al. (2007),

Laumann and Youm (1999), and Raymond and McFarland (2009) that AA MSM were

more likely to have sex with male partners that shared the same ethnicity as themselves.

Their study showed that AA MSM were also more likely to have protected anal

intercourse (AI) with first time partner and use condoms with a partner of unknown HIV

status. While most of their findings confirmed those of previously published studies,

they had a contradictory finding that AA MSM were not more likely to have UAI with an

older partner (more than 40 years of age) as suggested by other studies such as Bingham

et al. (2003) and Raymond & McFarland (2007). These contradictory results highlighted

the need for further research on sexual partnering characteristics of AA MSM in order to

inform prevention intervention that aim to decrease the prevalence of HIV among this

population.

     As previously discussed, the nature and pattern of HIV transmission among AA

MSM is complex. It is not based on individual risk behavior alone, but it is an outcome

of the interactions between individual and population-level factors (Aral et al., 2008).

For instance, Caucasian Americans may acquire HIV from high-risk behaviors. The

prevalence of HIV is so high in the AA MSM community that they may acquire it

through low risk behaviors (Hallfors et al., 2007). Awareness of their HIV diagnosis

causes them to experience rejection and isolation. While they feel an obligation to

disclose their serostatus to their long-term partners and they did not feel the same level of

responsibility toward casual partners (Harawa et al., 2006). In sum, MSM increase their

risk of spreading HIV among their population because they are less likely to know their HIV status and more likely to participate in assortative mixing and engage in multiple, concurrent relationships between those infected and those who are not they (Aral et al., 2008; Hallfors et al., 2007; Laumann & Youm, 1999).

Role of Social Forces and Sexual Networks on Risk Behaviors of AA MSM

As previously stated, there is much to discover about the relationship between social and sexual networks. For, MSM, these two are related and intricately linked to each other and influence their risk for HIV (Koblin, Tieu, & Fyre, 2012; Tieu, Murrill, Xu , & Koblin, 2012). Research also indicates that HIV spreads through large networks of MSM very quickly. The phenomenon is not fully explained by their number of sex partners, use of alcohol/drugs before sex, and lack of condom use. The propensity of MSM to engage in unprotected anal intercourse (UAI) and their ability to take on versatile sex roles as receptive and insertive partners during anal intercourse puts them at a higher risk for transmitting and acquiring the virus (Beyrer et al., 2012). Baggaley et al. (2010) noted that while unprotected insertive AI (UIAI) is less infectious than unprotected receptive UAI (URAI), both practices put MSM at risk for HIV because the rectal mucosa are not as protective as vaginal secretion, making them more susceptible to traumatic abrasions that allow the virus to be transmitted (Baggaley et al., 2010).

Understanding the structure of sexual contact networks of MSM is key to understanding how the infection spreads (Lewis et al., 2008). Research shows that concurrent sexual partnerships may speed up the transmission of HIV in sexual networks and that African Americans are more likely than Caucasians to be engaged in concurrent

sexual relationships (Adimora, Schoenbach, & Doherty, 2007). Contextual factors such

as sex ratio, poverty and violence explain the disparity in concurrency. Social forces

during the civil rights era caused these contextual factors in the African American

community. In this time, social forces such as housing and hospital segregation, ethnic

disparities in employment opportunities, and mass migration of skilled African American

men north decreased the sex ratios and social capital of many African American

communities. They also caused the formation of rural ghettos that became the breeding

ground for STDs (Thomas & Thomas, 1999). The sex ratio of a given area is also a

major determinant of sexual network patterns because when men are scarce, it makes it

difficult for women to seek and maintain mutually monogamous partnerships. So, men

may take advantage of this and seek multiple concurrent partnerships, knowing that

establishing primary partners is difficult and that the women may not end the relationship

(Thomas & Thomas, 1999). In turn, women may be less likely to use condoms out of

fear of offending their partner. Doing so, places both of them at a higher risk for

acquiring STDs and since men have multiple relationships they even more likely to

spread the infections within the community. In their case study on STDs in a

predominantly African American rural county in the North with low male-to-female sex

ratio, Thomas and Thomas (1999) found that two-thirds of the men had sex with multiple

women in the last three months and that 60% of the people in that county never reported

using condoms during sexual intercourse with their main partner.

In a more recent study by Adimora et al. (2013), men who lived in communities

with low sex ratios and low income for women were more prone to have extra-marital

activities. These finding was confirmed by a Zambian study by Benefo (2008) who

conducted a multi-level logistic regression on data from the 2003 Zambian Sexual

Behavior Study in order to understand the community determinants of extra-marital sex

that fueled the HIV epidemic. He found that extra-marital sex was lower in areas with

high sex ratios or higher surplus of men, suggesting that community factors were just as

important as individual-level determinants in understanding the dynamics of extra-marital

sex (Benefo, 2008). By matching census-level data and data from the National Health

and Nutritional Examination Survey, Pouget, Kershaw, Niccolai, Ickovics, and

Blankenship, (2010) also found that on 95% confidence intervals, African Americans in

counties with high incarceration rates and low sex ratios had greater odds of having

multiple partners (*AOR* 1.6 and 1.9, respectively).

Not only does low sex ratio contribute to concurrent partnerships in African

American communities, but poverty also works with low sex ratio to undermine long-

term monogamous partnerships. In the late 20th century, the number of young African

American men who were financially able to support a family fell dramatically. As a

result, the pool of young African American marriageable adults fell. According to

William Wilson, a high respected African American sociologist, the issue of poverty

among African American populations includes violence, high rates of incarceration, poor

education, low job skills, unemployment, welfare dependency, and young unmarried

women having and raising children by themselves (Wilson, 2012).

In addition to influencing family structure, poverty also influences people's

ability to seek medical treatment for an infection. People who have low income may not

be able to afford to take off of work to go to a medical facility. Even when they can afford it, their lack of trust in the medical system due to past experiences of discrimination or poor service may make them even more reluctant to seek care. Consequently, the delays in care translate to an increased opportunity for the infection to spread. When the infections spread it is confined to low-income African Americans, which in turn adds to the disparity in infection rates between African Americans and other ethnicities in the community (Thomas & Thomas, 1999). In their mixed methods study of 4752 young black adults in South Africa, Nattrass, Maughan-Brown, Seekings, and Whiteside (2012) sought to determine the correlation among socioeconomic status, sexual behavior and HIV status. They found that having concurrent relationships increased the odds of HIV infection for men but not for women. Women who were the transition to tertiary education were less likely to get HIV than those who transitioned to unemployment. Nattrass et al. revealed that poverty and sexual behavior increased HIV risk for men and women in different ways.

Yerba et al. (2013) further clarified the dynamics of HIV at the network and population level through their quantitative phyolgenetic study of MSM networks in Madrid, Spain where they analyzed a multiethnic sample of HIV positive patients an discovered that MSM were more likely than other groups (i.e., IDUs and heterosexuals) to be involved in large and faster transmission networks. Yerba et al. only sampled 5% of the HIV population in Madrid. Despite their shortfalls due to partial sampling, their use of phylogeny revealed information about HIV transmission among MSM, that traditional epidemiological surveillance alone may not have achieved (Yerba et al., 2013).

Ambrosioni et al. (2012) conducted a similar but longitudinal phylogenic study in Switzerland to evaluate trends in how HIV is transmitted and the impact of HART on transmission clusters of 142 HIV patients who were diagnosed between 2000 and 2010. Newly diagnosed infections were a significant source of HIV spread. Individuals diagnosed a decade ago had lower viral load due to HART and were, therefore, less likely to contribute to the onward transmission of HIV. Ambrosione et al. showed that two-thirds of the transmissions in these MSM were due to recent infections. They concurred that not only were MSM more likely to be in transmission clusters, but they were significantly more likely to be in transmission clusters of recent infections. Newly diagnosed MSM carrying drug-resistant strains of HIV were frequently included in network clusters and were a significant source of onward transmission. Even though the retrospective ecological nature the study may not allow it to prove a cause-effect relationship between transmission and viral load, it results adds to the body of evidence that recent infections do contribute to the spread of the virus (Fisher et al., 2010; Ragonnet-Cronin et al., 2010; Yerly et al., 2009) and it highlight the need for prevention programs to focus their efforts on recently infected MSM because these individuals tend to have a higher viral load, thereby contributing to the onward transmission of HIV (Ambrosioni et al., 2012).

Leigh Brown et al. (2011) confirmed these findings in their retrospective phylodynamic study of 14,560 MSM who were newly infected. They showed that 16% of new infections were acquired within six months of index acquisition. This led them to conclude that the high infectious nature of recent infections played a central role in

accelerating the HIV transmission among networks of MSM. Despite the retrospective limitations imposed on the study, their findings suggest that there is a preferential association when it comes to how HIV is transmitted among MSM. They concluded that interventions with random distributions may be ineffective in stopping the spread of HIV.

Aside from these studies that were conducted outside of the United States, Oster et al. (2011) conducted a cross-sectional, National HIV Behavioral Surveillance system among MSM (NHBS-MSM2) survey on 5855 MSM from 21 cities in the U.S. to understand the differences in HIV infection between Caucasians and African Americans. They found that having partners of unknown HIV status and duration of infectiousness might partially explain the differences in HIV infection between Caucasians and African Americans. Despite the self-report nature, the size and geographic diversity of the study allowed them to investigate the relationship between the factors while controlling for confounders. Moreover, their findings will inform interventions that seek to increase awareness of HIV status among AA MSM and remove barriers to ART.

In sum, these studies show that HIV spreads through networks of MSM at an accelerated rate due to social forces, recent infections, drug resistant strains, and high viral load. These factors may partially explain why the incidence of HIV may be increasing in this population in settings where the epidemic is decreasing among other populations. Additionally, social and structural determinants, and network level effects also influence the speed at which HIV is transmitted through large networks of MSM (Beyrer et al., 2012). This is especially the case in AA MSM. In their meta-analysis of 194 racial comparative studies of HIV risk and infection from Canada, UK, and USA,

Millett et al. (2012) found that in every country, AA MSM were not more likely than other MSM to engage in unprotected sex. In fact, they were less likely to have a history of substance abuse, but they were more likely to be HIV positive. They suggested that the disparity in HIV among AA MSM might lie in clinical access and use, structural issues, and sex partner characteristics as opposed to substance use risk behaviors.

These previous research findings may serve to guide HIV interventions that target AA MSM. In my study, I sought to use the Internet is an tool in overcoming some of the structural barriers that may prevent AA MSM from using HIV prevention products such as rectal microbicidal lubricants. In my study, I found that the Internet is an effective tool for obtaining information about preferences for these products by AA MSM. Therefore, I suggest that the Internet has a tremendous potential to be sued in delivering interventions to MSM, thereby mitigating issues of clinical access and care.

Impact of Homophobia on Risk Behavior of AA MSM

Homophobia as defined by the Merriam-Webster Medical Dictionary is an "irrational fear of, aversion to, or discrimination against homosexuality or homosexuals" (Homophobia, 2014). This fear may manifest itself through personal or political acts of violence, discrimination, and persecutions against someone on the basis of their sexual preference. Sometimes MSM may internalize this fear through self-loathing or not wanting to publicly declare one's sexuality (Altman et al., 2012). Research shows that homophobia makes MSM more vulnerable to HIV and that it reduces their access to available HIV services (Altman et al., 2012; Sullivan et al., 2012). People who are homosexual may experience homophobia from external sources (i.e., heterosexual

members of society who oppose homosexuals). Sometimes the feelings of homophobia

may arise internally. For example, some African American MSM may suffer from

internal homophobia because cultural expectations imposed on them may make them

express hatred toward other homosexuals and deny their homosexual tendencies in order

to fit in to the cultural expectations of male masculinity that is required of them (Altman

et al., 2012).

On a societal level, homophobia toward MSM creates a stigma around

homosexuality and HIV. Stigma is defined as a mark of shame that separates a person or

a group from the rest of the group and labels them with negative, undesirable stereotypes

(Link & Phelan, 2001). Stigmatizing a group of people is society's way of punishing

them for acting outside the social norm (Herek, 1999). AA MSM are a unique group in

that they belong to two groups of marginalized people: African Americans and

homosexuals. The social stigma and discrimination that they experience forces them to

avoid disclosure and become part of another marginalized group, non-self-identifying

MSM sometimes termed the "down low" (DL) men. While the concept of DL is not

confined to AA MSM, the media and scientific literature discussed it as an African

American phenomenon and stigmatized AA MSM by labeling them as sexually deviant

predators (Ford, Whetten, Hall, Kaufman, & Thrasher, 2007, p. 209). In a focus group

interview of AA MSM, the participants voiced that the term DL invoked feelings of

frustration and embarrassment due to the incongruity between their attraction for other

men and society's expectations on how they should behave (Lapinski, Braz, & Maloney,

2010). To emotionally distance themselves from the homosexual acts, these men may

choose to be the receptive partners during the anal sexual encounters. As a result of misinformation about disease transmission, they may operate under the false assumption that they cannot transmit the HIV virus because they are the "ones being done" (Lapinski et al., 2010, p. 624).

Thus, homophobia influences HIV prevention directly because it drives discussions related to homosexuality underground. It justifies peoples fear and prejudices toward homosexuals, and makes it difficult for prevention programs to publically work with members who engage in MSM activity (Altman et al., 2012). MSM in general are less likely to disclose that they have sex with male partners if they were denied care in the past or suffered from breaches in confidentiality due to such disclosure. As a result, they are also less likely to utilize health-care services, even when engaging in these services may lessen their risk for HIV (Lapinski et al., 2010; Sullivan et al., 2012).

There is a recent shift in society to oppose homophobia through social events, school programs, movies, television series, and capacity building programs. For example, homosexual characters emerged in popular television series such as *Modern Family,* to level homophobic attitudes. Gay Pride parades promote social visibility and sexual diversity of the gay community. In the 1990s, Brazil created the Brazil without Homophobia program to fight homophobia in their country. In 2009, scholars from the UN Educational, Scientific and Cultural Organization (UNESCO) met and endorsed the Rio Statement on Homophobic Bullying and Education for All which called for an end to end all bully in educational institutions around the world (UNESCO, 2011). Despite these efforts, bullying and marginalization toward MSM persists. That same year in the

United States, a number of suicides occurred in adolescent boys who were constantly taunted and bullied about their sexuality (Rivers, 2011). In order for societal attitudes to change in a way that makes a difference in how homosexuals are treated and how they view themselves, their needs to be a continuous vigilance and engagement of social, political, and cultural segments of society in promoting sexual diversity.

Role of Sexual Identity on Sexual Risk Behaviors of MSM

A qualitative study by Williams et al. (2004) revealed that AA MSM knowingly avoided acknowledging risky sexual behaviors because the culture of silence within the African American community that looked down on same-sex behaviors and HIV seropositivity. For these men, the cultural expectations to have a family and children influenced how they defined the relationships. Additionally, the social stigma associated with being gay and subsequent social isolation that comes with self-identification, led some AA MSM to perceive themselves as heterosexuals. Since Caucasian communities have openly gay men, some AA MSM buy into the stereotypes that being gay or having HIV is unique to Caucasian men. In fact, some AA MSM consider the terms gay, down low, homosexual, or MSM offensive. They prefer to view themselves as heterosexual or bisexual. To prevent anyone from challenging their identity, they will have female partners. Even in their risk-taking situations, they maintain their masculine roles by being the insertive partner during anal sex. For them, having sex with a woman is an emotionally satisfying act. Having anal sex with a man, however, is purely physical and anonymous act that they plan to take to their grave. Engaging in anal sex with another man is just a part of meeting a sexual need (Williams et al., 2014). Discussions about

sex in the African American community are uncommon and when they do occur, they stress the importance of having family and children to pass on one's family name. So, their conflict with cultural values, family expectations, and self-identification as being gay may put AA MSM at a higher risk for acquiring HIV from men and passing it on to their female partners (Williams et al., 2004).

The Black church is a very influential body within the African American community (Berkley-Patton et al. 2010). Because of Christian views that homosexuality is immoral and the link between homosexuality and HIV, the Black Church as been slow to respond to the HIV epidemic (Walton, 2006). In a focus group interview by Lapinski, Braz, and Maloney (2010), AA MSM stated that many congregations are filled with MSM. Yet, churches are judgmental and unsupportive when it came to addressing homosexuality. In doing so, the church indirectly kept them from disclosing their sexuality. Those churches that gain a reputation of accepting homosexuals end up indirectly chasing these men away because the men stop attending in fear of being discovered (Lapinski, Braz, & Maloney 2010).

Contrary to popular expectations, Williams et al. (2004) revealed through another qualitative study that some Black churches are hubs where a large segment of AA MSM seek consensual sex and where older AA MSM sought out younger boys to sexually exploit. While some AA MSM looked at the church as an opportunity to meet other MSM, they felt conflicted by religious beliefs that condemned homosexuality and increased pressure to get married and have children. Furthermore, the pressure to live up to religious beliefs brought on feelings of guilt and isolation that further exacerbated their

risk-taking behavior (William et al., 2014). These findings were consistent with another qualitative study by Woodyard, Peterson, and Stokes (2000) that showed that participation of AA MSM in these Black churches only encouraged more silence and secrecy regarding their sexual identities.

These results were further substantiated Lapinski, Braz, and Maloney (2010) who found that AA MSM viewed religion as source for the stigma and source of expectations surrounding sexuality. Additionally, the AA MSM in his study rejected the label DL label and conceptualized the DL as any man who has sex with other men in secret. They were more accepting of labels such as "trade" and "cake" that were used in their inner circles to refer to AA MSM who were closeted and those who were not, respectively. Most of them sought to be overly strong and masculine to negate views of gay men as feminine and weak. These men linked stigma and discrimination to sexual risk behaviors such as misinformation about HIV transmission, inability to disclose sexual identity healthcare providers, and substance use to cope with stress of having sex with other men (Lapinski et al., 2010).

In order to further understand the how AA MSM perceive themselves as part of a community, Kraft, Beeker, Stokes, and Peterson (2000) conducted a qualitative in-depth interviews on 76, 18-26 year old AA MSM in Chicago and Atlanta. They found that AA MSM perceived themselves a double minority. They did not identify with the gay Caucasian community due to discrimination. While some identified with AA communities, others did not due to experiences with homophobia. These men reported being part of an informal network of communities with other men, who shared similar

values, shared experiences of rejection, and who interacted with them in similar settings

such as bars. While bars provided a source of community identification, it also provided

opportunities for substance use and unplanned sexual activity. Kraft et al. provided

insights on strategies that promote the development of AA MSM communities through

the rise of strong AA MSM leaders to mobilize a reduction in homophobia and creation

of places where they could meet and interact in a nonsexual and drug-free zone (Kraft et

al., 2000)

Concluding Thoughts on Sexual Risk Behavior of MSM

All in all, the sexual risk behavior of AA MSM risk behavior is very complex and

may not simple be explained by individual risk behavior, but by the ecological, social,

environmental forces that are unique to their sexual networks. Additionally, their culture

of homophobia and their triple-minority status of being African American, homosexual,

and non-gay identifying further influences their sexual risk behaviors (Harawa et al.,

2006). Effective interventions that will adequately reach this hidden population have to

address these social determinants in order to cause behavior change in them and slow or

reverse the epidemiological trends in the HIV transmission among them.

Attitudes of African American MSM (AA MSM) Toward HIV Prevention Products

Culture and Barriers of Condom Use Among AA MSM

Unfortunately, UAI confers significantly more risk for HIV than other forms

unprotected intercourse. According to a cohort study on 2,189 homosexual and bisexual

men in California, the per-contact risk of acquiring HIV from UAI was 82% when the

partner was HIV positive and 27% when the serostatus of one's partner was (Vitinghoff

et al., 1999). Varghese, Maher, Peterman, Branson, and Steketee, (2002) calculated the relative risk for acquiring HIV based on partner choice, sexual act, and condom us. They found that the risk for HIV was 47 times higher when the partner had an unknown HIV status than when their status was negative. They also found that not using a condom increased one's risk by 20-fold. Additionally, they found that receptive anal intercourse was five times more risky than receptive vaginal intercourse (Vanghese et al., 2002)

Although research shows that condoms are effective in reducing the risk of contracting the HIV virus through AI by 78%, MSM are reluctant to use condoms for many reasons. Barriers to condom use among these men may be divided into structural and social barriers. Structural barriers include lack of; innovative prevention programs; condom availability in social venues; condom promotion in neutral settings, African American organizations that promote condom use; condom promotion within African American churches. Most of the AA MSM reported that they were tired of long-term current prevention programs. They wanted fresh, new approaches that are feasible and culturally appropriate such as the use of lubricants alongside condoms. Due to the spontaneity of their sexual activities, many of the men expressed a desire to obtain condoms at social venues (Peterson et al., 2003).

Research has shown that marketing condoms at these venues have been shown to increase social support within their sexual networks. According to a meta-analysis of structural-level condom distribution intervention by Charania et al. (2011), condom distribution interventions that made condoms more available and included individual, small-group, and community-level components were more effective at increasing condom

use behaviors because these interventions did more than increase availability and accessibility of condoms to populations at high-risk for HIV, but they also addressed norms, knowledge, skills, and motivations for using condoms. Therefore, this may be exactly what these men need to increase their chances of using a condom. Not only do AA MSM prefer to obtain condoms at social venues but they also expressed an interest in receiving prevention services at neutral settings that did not link them to being gay. Such prevention services may help to minimize the stigma that they experience on a daily basis. An example of a current intervention that uses this method is the M'powerment program. Case managers in this program, distribute condoms and HIV prevention information within local community organizations settings, community centers, popular cafes, and bars (Hays, Rebchook, & Kegeles, 2003).

A large segment of MSM also perceived that African American organizations and churches in the community should promote condoms. The popular opinion model by Kelly et al. (1999) uses key members in the community who are well liked and respected to spread the prevention messages and increase condom use. This model has been proven to be successful among AA MSM. In a large-scale randomized community trial involving popular opinion leaders, Jones et al. (2008) reported a 37% decrease in UAI in four intervention cities compared to control cities. Such interventions not increase condom use, but they also help to change the social norms and increase social support for condom use with networks of AA MSM.

Social barriers that hinder MSM from using condoms include: substance abuse, spontaneous sex, lack of knowledge about effective condom use practices, and decreased

sexual sensations. Using alcohol prior to engaging in sexual activity is a widely accepted

social norm in the MSM community because it minimizes the stigma-related discomfort

felt by these men as they take part in homosexual activity such as AI (Peterson et al.,

2003). In semi-structured interviews by Peterson et al. (2003), 80% of the YAA MSM

identified alcohol use a major barrier to condom use. Using alcohol minimized the

ability of these men to make rational choices. It also helped them in dealing with the

guilt of engaging in risky sex behaviors such as UAI (Peterson et. al., 2003). In addition

to using alcohol, drugs such as methamphetamine and cocaine are commonly used during

sex parties or at bathhouses (El-Sadr, Mayer, & Hodder, 2010; Williams et al., 2004). In

focus group interviews AA MSM reported that being intoxicated with drugs or alcohol

affected their ability to exhibit control in a situation or make safer sex choices. It allowed

them to be themselves and fulfill their desires and have an excuse for doing so (Hallfors,

et al., 2007). Another focus group interview study by Williams et al. (2004) confirmed

that AA MSM acknowledge that substance use affected their ability to make safer sex

choices. Not only did they freely engage in substance abuse, but some of them also use it

to cope with depression and post-traumatic stress that they may experience in sexually

abusive situations (Williams et al., 2004). Lapinski, Braz, and Maloney (2010) noted in

their focus group interviews of AA MSM that these men often engage in substance use in

order to have sex because being high allows them to attribute their behavior to their

altered mental state.

Lack of knowledge about appropriate condom use also prevents some AA MSM

from using them. Some AA MSM do not use condoms during anal sex because they are

under the false assumption that as long as their insertive partner does not ejaculate inside their anus then, they are protected against contracting the HIV. Since the incubation period for HIV is long, many MSM may not get diagnosed with HIV/AIDS until their later years. So, it is common for young MSM to view AIDS as a disease of older men. With this, they feel that it is safe for them to have unprotected sex with other younger men. Furthermore, the advance in ART allowed HIV positive men to live longer and appear healthier.   Not seeing the symptoms of HIV in their peers further contributes to their misperception (Hays et al., 2003). Lack of knowledge on how to negotiate condom use during sex may also be a barrier (Peterson et al., 2003). In a study by Sullivan et al. (2012), participants also reported lack of condom negotiation skills and condom slippage or breakage as reasons for not using condoms.

Additionally, many AA MSM expressed that their partners did not support condom use. The use of condoms by AA MSM was mostly dependent on how many people in their sexual network actually used it and the duration of the relationship. If the men were in a committed relationship, then there was an attitude that condoms should not be used. They had a desire to use condoms only in casual relationships. Thus, the spontaneity of sex among casual partners made it difficult to use condoms. Their tendency to use condoms also depended on their personal knowledge and assumptions about the serostatus of their partners that may at time be inaccurate. Using condoms over a long period of time is difficult to sustain, so lack of condom use among this population may occur due to burnout (Peterson et al., 2013). YAA MSM reported that it was difficult for them to consider condom use when they have sex unexpectedly because

many times the condoms are unavailable in these situations. Therefore, suggesting the use of condoms in these situations is embarrassing and often breaks the mood.

In addition to breaking the mood, condoms are thought to reduce the pleasure of sex. Some AA MSM report that the condoms do not let them feel anything and it takes away from the real feeling they experience when they do not use it. As a result, they prefer unprotected sex because it is more enjoyable (Peterson et al., 2003). In an effort to identify and understand the behaviors and perceptions of HIV positive African American MSM who have sex with men and women (AA MSM/W) toward condom use, HIV disclosure, Harawa et al. (2006) conducted a qualitative study where participants revealed that they used condoms to prevent pregnancy and HIV transmission. These participants had concerns about the effectiveness of condoms and the tendency of condoms to decrease sensation. Additionally, they felt that asking a regular partner to use a condom might lead to questions about promiscuity and suspicions about sexual affairs with others (Harawa et al., 2006).

In sum, AA MSM perceived that condoms interfere with intimacy and pleasure and introduces issues of mistrust. In focus group interviews with AA MSM, participants revealed that they inconsistently used condoms because they were unsafe and decreased pleasure (Harawa et al., 2006). Those that used condoms used oil-based lubricants with them that often led to condom breakage (Harawa et al., 2006). Therefore, many MSM, including YAA MSM, opted to explicitly exclude condoms in their practice of UAI not because of poor planning or unintentional incidents, but because it is risky and invigorating (Berg, 2009). These findings were consistent with the study by Williams et

al. (2004) on HIV positive MSM/W that found that some of these men preferred not to use a condom because they experienced more pleasure in unprotected sex than protected sex.   Some of these men viewed their seropositivity as a relief from having to use condoms (Williams et al., 2004). Other MSM found their decision not to use a condom empowering because it allowed them to resist the homophobic culture and defiance from restrictions on sexual freedoms (Carballo-Diéguez et al. 2006; Carballo-Diéguez et al. 2007).

Contrary to mainstream beliefs, research suggests that the decision to have UAI (also termed barebacking) is not unintentional. Rather it is the results of rational decision-making were MSM weigh the benefits of not wearing a condom (i.e., sexual satisfaction and closeness with one's partner) with the costs (risk of acquiring or transmitting STIs) (Pinkerton & Abramson 1992). There is a difference between unintentional UAI and intentional UAI. Through in-depth interviews of HIV positive and HIV negative men, Carballo-Diéguez et al. (2009), helped to clarify this difference. The participants defined barebacking as intentional condomless intercourse that poses some risks regarding HIV. They distinguished this from two other categories of condomless sex. The first being unintentional condomless sex that may occur by accident/heat of the moment, condom breakage or by non-consensual adults; the second being condomless sex that is intentional but risk free between monogamous HIV negative partners or nonmangamous couples that practice negotiated safety. MSM who barebacked or practice intentional unprotected sex may benefit from intervention that involve the use of

microbicides, so that these men may lower their risk of acquiring HIV, while engaging in condomless sex (Carballo-Diéguez et al., 2009).

In their cross-sectional study on an ethnically diverse sample of HIV positive and HIV negative MSM in New York City, Bauermeister, Carballo-Diéguez, Ventuneac, and Dolezal, (2009) sought to develop a psychometric measure that quantified the decisional balance of MSM to engage in bareback sex (DBB) as oppose to use a condom. They found that DBB is linked to need to cope with social vulnerabilities and stressors and plays a role in the need for MSM to connect and experience pleasure with other men. DBB was positively associated with number of URAI occasions, number of partners, and risk of having one or more URAI occasions with a serodiscordant partner. Additionally, they found that HIV positive men were more likely than HIV negative men to associate gains with bareback sex as a way of coping with social vulnerabilities. All in all, they suggested the need for proven harm reduction alternatives such as pre/post prophylactic measures and microbicidal lubricants to minimize the risk of these men to contract and transmit HIV because these means may allow them to protect themselves will maximizing the gains of bareback sex (Bauermeister et al., 2009). These findings were consistent with those by Halkitis, Parsons, and Wilton (2003) and Carballo-Diéguez and Bauermeister (2004) who concluded that bareback sex is an intentional act that provided sexual and emotional reward that condom use does not provide.

Halkitis and colleagues (2003) also conducted a cross-sectional survey of a multi-ethnic sample of HIV positive and HIV positive men in order to further assess how frequently participants engaged in bareback sex and to examine their explanations of the

emergence of barebacking. They found that HIV positive men were more likely to report barebacking and report significantly more sexual partners that they barebacked with. They noted that participant who barebacked reported significantly more benefits associated with barebacking. Unlike the study by Bauermeister et al. (2009), they did not note any differences in serostatus between the benefits of barebacking. They reported that the Internet, advances in HIV treatments, emotional fatigue regarding HIV prevention, and increased popularity of "club" drugs were factors that encouraged barebacking among these men (Halkitis et al., 2003).

Frequency and Acceptability of Lubricants Among AA MSM

Since the incidence of HIV is increasing among YAA MSM and a vast majority of men do not use condoms during sex, researchers recommended applying antiretroviral agents like rectal microbicides (RM) to the rectal mucosa as safe alternative to condoms in order to reduce the spread of HIV (Beyrer et al., 2012). Studies also showed that most MSM use lubricants in 80% their sexual encounters (Carballo-Dieguez et al. 2000; Gross et al. 1998). Using lubricants is a routine part of participating in RAI. Therefore, making the transition to using RM should not be that far fetched. Application of rectal microbicides containing tenofovir has substantially reduced the spread of HIV. Luckily, some MSM displayed interest in using such microbicides (McGowen, 2011).

Researchers recommend the use of qualitative and quantitative studies to assess the acceptability of RMs among MSM (Morrow & Ruiz, 2008). Research on the use of RMs indicates that MSM are receptive to their use and even willing to use them in the future or participate in clinical trials involving RMs (Carballo-Dieguez et al., 2007; Gross

et al., 1998; Nodin et al., 2008). In an acceptability study, MSM preferred using microbicidal gel to rectal suppositories (Carballo-Dieguez et al. 2008). Another study by Ventuneac et al. (2010), the participants expressed interest in using antiretroviral microbicidal gels if they could buy them over-the-counter.

While some studies studied the acceptability of RM among the general MSM population, there is a dearth in research on how acceptable RMs are among young MSM especially in YAA MSM. Although no studies were found involving the use of RM among YAA MSM, a recent cross-sectional Internet study by Calabrese et al. (2013) analyzed the ethnic differences in lubricant use between AA MSM and MSM of other ethnicities. They found that AA MSM were just as likely as other MSM to use lubricants. In their study, AA MSM reported a 33-43% use in lubricants during the last sexual event. Other MSM who participated in the study had similar reports of lubricant use. While their study did not involve the use of microbicidal lubricants, they suggested that future research should develop lubricants such as microbicides that do not facilitate the transmission of HIV (Calabrese et al., 2013).

These finding are similar to studies by Gross et al. (1998) on mostly Caucasian MSM populations and that of Carballo-Dieguez et al. (2000) on Hispanic MSM. Though these two studies varied in time frame and ethnic composition, they revealed that over three quarters of the MSM use lubricants in 80% to 93% their sexual encounters and that most of them were willing to participate in clinical trials involving microbicides. This study was significant because it helped to debunk negative stereotypes of high risk-taking

by AA MSM and highlighted the need to further explore social and structural barriers to prevention as well as the need to increase research in lubricant use.

HIV Prevention Recommendations and Challenges

Sullivan and colleagues (2012) conducted a review of 60 meta-analysis and systematic reviews to identify these relating to success and barriers in HIV prevention. While they did not differentiate between different MSM populations in their study, they created a conceptual framework for packaging HIV interventions for MSM that may be tailored to YAA MSM. They showed that combining behavioral, biomedical, and structural interventions would optimize the reach and effectiveness of intervention in preventing the spread of HIV among MSM (Sullivan et al., 2012). The meta-analysis by Millett et al. (2012) made similar recommendations. They recommended that prevention interventions for YAA MSM should not focus on safe sex practices or substance abuse but should focus on providing HIV tests and initiation and maintenance of ART, especially to older HIV-positive AA MSM who often partners of YAA MSM. Doing so may reduce the viral load in the sexual networks and the HIV incidence community in general (Millett et. al., 2012).

Homophobia, bias, limited healthcare access, and financial constraints challenged the access and delivery of HIV programs for MSM (Millett et al., 2012; Sullivan et al., 2012). Millett et al. (2012) found that HIV positive YAA MSM had significantly greater odds of poverty (less than 20,000 per year), as well as, a significantly lower olds of having access to health insurance or attending clinical visits than their Caucasian counterparts. Low income, unemployment, incarceration, and low educations are

cofactors that correlate with HIV rates in African Americans (Aral et al., 2008). When isolated in communities with high prevalence of HIV and high viral load, MSM have limited sexual partners and their risks of becoming infected with HIV are high (Millett et al., 2012). These structural barriers coupled with greater childhood sexual abuse (Mimiaga et al., 2009; Welles et al., 2009), earlier sexual début (Lyons et al., 2012), greater likelihood having sex with older partners, having undiagnosed HIV, and in greater probability of having sex with an HIV partner, may also explain why YAA MSM have disproportionate rates of HIV (Millett et al., 2012).

If society is to make any impact in the spread of HIV in the YAA MSM community, long-term changes have to be made to address the structural barriers that exist. These long-term changes have to be made at or before birth. Examples of structural interventions include: paid parental leave, free and high quality public schools, community acceptance of gay, bisexual, lesbian, or transgender people, changes in legal and criminal laws that dictate how young African Americans are dealt with in the criminal justice system. Given the recent political climate and adverse economic conditions, mobilizing the community and convincing governmental entities to adapt these changes will be difficult. They may, however, be the strongest ecologic approach that may address the source of the health-related racial disparities in HIV and prevent them from getting worse (Koblin et al., 2012).

Social Networking Sites as a Tool for Sexual Networking

Traditional HIV interventions focus on using social venues where MSM frequent (i.e. bars, bath houses, and club that cater to gay and bisexual men) (Hospers, Harterink,

Van Den Hoek, & Veenstra, 2002). Participants who attend these venues to meet their

sexual partners often incur a negative social consequence because they have to publicly

identify with being gay or bisexual; conversely, the growing nature of social networking

via the Internet allows these men to seek sex with other male partners without the risk of

negative social consequences that occurs when doing so publically. The Internet changed

the way these men seek sex and companionship because it is affordable, accessible,

private, and anonymous (Elwood, Green, & Carter, 2003).

MSM are skilled in using the Internet for seeking sex partners because the

Internet allows them to explicitly communicate with other MSM through chat sessions,

photos and video streaming, rather than depend on subtle gestures or nonverbal

communication that are social norms used in offline venues such as bathhouses that

inhibits expression of goals (Elwood et al., 2003). Through the Internet, they can search

for other MSM by geographical locations (i.e., typing in zip code or search terms such as

NYCm4m), HIV status (i.e., HIVm4m), ethnic group (i.e., Latinom4m), physical

characteristics (i.e., body type and penis size), and sexual modes (i.e., top, bottom,

versatile). Some of these websites even encourage MSM to have multiple partners by

allowing them to create buddy lists where members can identify those who expressed

interest in them and invite them all together to play sex games (Carballo-Diéguez et al.

2006, and Chiasson et al., 2007). Using these search capabilities and buddy lists, MSM

can instantly and anonymously identify and have sex with large numbers of partners who

they might not otherwise meet through other social venues such as clubs and bathhouses

(Chiasson et al., 2007).

As discussed earlier, AA MSM often feel like sexual deviants, or outcast of society. As a result, they often refrain from participating in community organizations and activities. With the advent of online dating services, chat rooms, and pornography, the Internet is a social gateway for MSM to find sexual partners, fulfill their sexual desires and become part of growing community of like-minded others (Berg, 2009 and Grov, 2006). While the Internet did not develop the concept of barebacking, it is a medium for websites to cater to barebackers and assist them in finding their sex partners (Berg, 2009). For these men, the Internet helps them develop a sense of community that helps to lessen the feeling of isolation and shame by normalizing their non-normative behaviors (e.g. UAI) (Chiasson et al., 2007). While some Internet sites promote the use of condoms, these health messages are not received by barebackers because they echo a sentiment that citizens who use condoms are mindful of their health and the health and of others, while those who do not are irresponsible and inconsiderate of the health and safety of others.

Risk Differences Between Meeting a Partner Online Versus Offline

With the over-abundance of barebacking websites, there have been increasing concerns that these sites promote the spread of HIV and other STDs. A number of researchers sought to determine risk differences between online sex seekers and those MSM who seek sex offline. Researchers showed that MSM who seek sexual partners on the Internet are more likely than their counterparts to have sexually transmitted infections, thereby, increasing their risk for HIV transmission. McFarlane, Bull, and Rietmeijer (2000) showed that the Internet has a role in soliciting risky sex partners and therefore presents a risk for HIV and underscored the importance of developing online

prevention programs for online sex seekers. Through their quantitative analysis of a heterogeneous group of online sex seekers in the U.S., they found that online sex seekers were more likely than offline sex seekers to be homosexual, a previous STD, greater number of partner, more exposure to MSM and persons of unknown HIV status, greater use of condoms during last sexual encounter, and report oral and anal sex (McFarlane, Bull, & Rietmeijer, 2000).

In London, HIV positive MSM reported having UAI with concordant partners. While they are not transmitting the HIV to uninfected MSM, they are increasing their risk for co-infections and/or drug-resistant strains of HIV (Bolding, Davis, Hart, Sherr, & Elford, 2005). In a cross-sectional study of using online and offline samples of MSM, Bolding et al. (2005) sought to examine if meeting partners online explains the excess risk of HIV among MSM. They found that high sexual risk behavior was associated with seeking sex on the Internet. HIV-positive MSM who sought sex on the Internet were more likely to report UAI with concordant casual partners and meet them online. They noted that these men might use the Internet to establish concordance because it was less stigmatizing than offline social venues. Regardless of HIV status, MSM who sought sex on the Internet were more likely to report UAI with discordant causal partners but they were no more likely to meet these partners online than offline. Unlike previous studies, this study was able to establish that the excess risk for HIV among MSM who seek sex online actually occurred with partners they met online. Thus, this study helped to identify the Internet as a target for Interventions among HIV-positive MSM (Bolding et al., 2005).

All of these results were consistent with the findings from a meta-analysis by Liau

et al. (2006) involving 22 studies that recruited gay men who sex partners online. This

meta-analysis was done to obtain an integrative understanding of the percentage of MSM

who seek sex online and the prevalence of risky sex among them in comparison to those

MSM who seek sex offline. They found that 40% of MSM sought sex partners online

and the prevalence of online sex seeking was higher in men who were positive for HIV

than those who were HIV-negative. Approximately 30 % of MSM actually had sex with

partners they met online. Regardless of the status of HIV partners, UAI was more

prevalent in MSM who sought online sex partners. Despite the methodological

limitations of the primary studies considered in this meta-analysis, this study provided

evidence that the Internet may be creating a network of high-risk men that aide the spread

of HIV in MSM who seek sex online (Liau et al., 2006).

HIV Behavioral Research Online

The Internet is an effective tool to improving efficiency of existing interventions

(Sullivan et al., 2012). According to Noar and Willoughby (2012), interventions

delivered through computerized devices might be as effective as those administered

through face-to-face human interactions. Technology assisted interventions reach

populations who have little or no access to traditional prevention services. Even if people

do not have computers at home, most people own mobile phones that may also help them

get access to prevention services on the Internet (Sullivan et al., 2012). A major concern

about using the Internet in HIV prevention programs is that lack of access to personal

computer and broadband Internet may worsen the ethnic and socioeconomic disparities in

HIV (Baur, 2008). These concerns are not without merit; nevertheless, the literature indicates that mobile phones are effective at reversing this digital divide. According to Horrigan (2009), approximately half of African Americans and Hispanics use their mobile phones to access the Internet and their email compared to only quarter of Caucasians who use their mobile devices for these functions.

Not only is the Internet a new medium to better understand the sexual networks of MSM, but it is now a new venue to deliver HIV prevention interventions because it has the potential of reaching large numbers of hard-to-reach MSM and disseminating creative harm reduction prevention messages through their social, online networks (Chiasson et al., 2007). Harm reduction messages may encourage serosorting and the use of microbicides during unprotected sex as a way of protecting against the transmission of HIV. Such messages not only meet the needs of the individual, but they also emphasize safety (Grov, 2006). Grov et al. (2006) conducted a cross-sectional review of two of the 12 U.S. based barebacking websites to further understand how the content of these websites and how they address health risk of bareback sex and influence the sexual behaviors of MSM. He discovered that one website promoted harm reduction strategies (i.e. serosorting, frequent HIV-testing, and limiting number of partners and use of drugs) while, the other website negated the risks of HIV and facilitated its transmission. Grov demonstrated that barebacking Internet sites may be used to provide health information that are appropriate for MSM regardless of condom use behavior (Grov, 2006). Online surveys reduce the social desirability and sensitive nature of soliciting bareback sex and participants tend to show increased disclosure and uninhibited responses because

they feel that their responses are more secure and anonymous (Rhodes, 2003). In an

Internet-based cross-section study on how MSM use chat rooms to find sex partners

Hospers et al. (2002) noted that some of these men reported using chat rooms to set up

meetings for sex with other MSM. Thirty percent of these participants reported UAI at

higher levels than other populations in other studies who sought sex through other venues

(Davidovich, de Wit, & Stroebe, 2000). The study was significant because Davidovich et

al. identified chat rooms as a new venue for conducting HIV interventions for high-risk

populations (Hospers et al., 2002).

Not only have Internet sites been identified as new venues for conducting HIV

interventions, but a cybercartographic analysis of popular Internet sites by Carballo-

Diéguez et al. (2006) points to the need of HIV prevention to evolve and shift from

promoting condom use to HIV serosorting and the use of microbicides which are pre-

existing practices associated with UAI (Carballo-Diéguez et al. 2006). Carballo-Diéguez

et al. revealed that Internet sites promoting UAI are easily accessible and free of charge

and allow MSM to find information about how to link up with others like themselves.

Many of these sites encourage UAI as a way of promoting intimacy in a reckless manner

and associate it with images of masculinity and courage. Additionally, some of these

sites undermine the risks of HIV and do not address how to manage its transmission.

They also create virtual networks that support UAI and defend it politically as a matter of

choice and individual responsibility. Thus, sending prevention messages that promote

condom use will achieve little or no success (Carballo-Diéguez et al., 2006). Rather

Internet-based behavioral research needs to be more innovative in their approach and the prevention messages that they send.

As a result of the study by Hospers et al. (2002) and many others interventionists in the U.S. and Europe began exploring the use of MSM-oriented chat rooms to disseminate HIV prevention information and programs (Rhodes, 2004). While the effectiveness of these Internet-based interventions remains unknown, some researchers identified some positive benefits of doing so (Bull et al., 2001; Rhodes, 2004; Rietmeijer et al., 2003). Rhodes (2004) conducted an ethnographic study to deliver an intervention that helped chatters identify their risks and strategies for reducing it. In his sample of 619 MSM with varied ethnicities, Rhodes sought to determine who effective their Internet intervention would be in causing a behavior change in their target population. He found that the perceived anonymity and rapport established by health educator allowed him to engage chatters in discussions regarding sexual risk reductions, HIV testing, non-sexual social support, referrals for youth, resource for disclosing sexual identity, and access to risk reduction resource. Rhodes showed that online HIV prevention interventions are valuable tool in reaching hard-to-reach MSM populations.

In a more recent, cross-sectional study of 2577 Internet using, HIV negative MSM, Wilkerson, Smolenski, Horvath, Danilenko, and Rosser, (2010), sought to identify how HIV negative MSM access health information from diverse sources and the predictors for such behaviors. They found that men who do not disclose their sexuality are less likely to seek sexual health information from health professionals or diverse resource and more likely to use the internet to seek the information due to the anonymity

of it. This study provided insight on how MSM seek health information both online an

offline that can better inform interventions targeting non-gay-identifying MSM.

Methodological Considerations in Internet-Based Research

   While the previous section demonstrates that the Internet is a useful medium HIV

behavioral research, this type of research has methodological challenges and ethical

considerations that are unique to it. Researchers conducting online research continue to

face issues such as verifying informed consent, assuring anonymity, and avoiding the

surveillance of minors (Chiasson et al., 2007). In terms of recruiting and retaining

participants, researchers who use the Internet to recruit participant are able to recruit

larger samples as well as geographically dispersed and behaviorally isolated men

(Bowen, Williams, & Horvath, 2004). Some researchers sought to determine the SES of

respondents and HIV status of surveys posted to gay-oriented websites. Hirshfield,

Remien, Humberstone, Walavalkar, and Chiasson (2004) conducted an anonymous,

cross-sectional Internet survey on 2,916 MSM. They found that these respondents were

younger than 50, had less than a college degree, earned less than 40,000, and were more

likely to be HIV positive (Hirshfield et al., 2004). While African Americans have large

presence on Internet websites that cater to other African Americans (e.g., Black Planet

with over 3.5 million visitors who self-identity as African Americans), there is little

research that demonstrates that they participate in surveys presented on gay-related

websites (Chiasson et al., 2007). Since the U.S. Census does not enumerate MSM, it is

difficult to know whether MSM who seek partners online are representative of the

general MSM population. Therefore, result from online surveys may not be generalizable to all populations of MSM.

Researchers often employ active solicitation via email blasts, chat rooms, and instant messaging. They may accomplish passive solicitation via survey banner advertisements on popular websites and hypertext links to surveys on search engines (Hirshfield et al., 2004; Riggle, Rostosky, & Reedy, 2005). As a caution, researchers should be careful not to spam emails because it sends a message to the recipients that surveys are annoying and unimportant. Building trust with a highly stigmatized group such as AA MSM is important; therefore; they should seek to build trust by including information about themselves and the purpose of their research. Researchers using chat room discussions for recruitment should consult a moderator so that they do not inadvertently say inappropriate comments or become invasive in the online environment. When use correctly these venues may prove MSM with more opportunities to be more open and truthful about the information that they disclose online (Riggle et al., 2005).

The drawback of using these online recruitment techniques is that some of the data may be missing and the data that exists may include some duplicate enrollment. To reduce having multiple surveys from the same participant researcher may remove financial incentives, advise participants to fill out survey only once, block participants from bookmarking the survey, filter data during data cleaning phase, or use Internet protocol (IP) addresses or email addresses, cookies, or passwords that can detect a multiple surveys from a single participant. Hirshfield et al. (2004) conducted an anonymous study where the recruited MSM online. They minimized duplicity of the

survey by rotating the study banner at the end of other advertisements on online chat rooms and disabling the participants ability to bookmark the website (Hirshfield et al., 2004).

The anonymous nature of online surveys eliminates interviewer bias and social desirability bias by the respondent. Since these biases are minimized, online survey respondents tend to over report high-risk behaviors when compared to men who are surveyed offline. According to a study by Elford, Bolding, Davis, Sherr, and Hart (2004b), HIV-negative MSM and MSM with unknown HIV status were more likely to report high-risk sexual behavior online than offline; consequently, the study's inability to identify the respondent threatens the validity internal validity of the study.

Internet-based research also incurs higher attrition rates. In order to reduce these attrition rates, researchers should use user-friendly and widely available software. They should also avoid sophisticated technology such as JavaScript, Flash, and multimedia component because users may be unwilling to download such software and be excluded from the start. It is also important to validate the survey and check for brevity. Keeping the survey brief reduces dropouts because people are more likely to fill out a short survey than a long one. If a survey takes longer than a few minutes to fill out, then participants may become frustrated about completing it and may randomly fill in answers or drop out. Since drop out are expected, it is important to use a one item, one screen design. Linking the survey to multiple Internet sites also help to understand the effects of self-selection and estimate generalizability (Reips, 2002).

Ethical Considerations in Internet-Based Research

According to Kraut et al. (2004), online research does not pose less risk to human

subjects than traditional research. Rather, it changes the nature of the risk and the

researcher's capability in assessing it. Therefore, it is important to identify those risks,

assess them, and put in safeguards to minimize them. Assessing these risks involves

analyzing whether the participants are anonymous or identifiable. The researcher must

also seek to understand whether the behavior is public or private and the overall risk that

the research poses to the participants. Internet-based research methodologies include

online focus groups, online surveys, and content analysis of emails or website pages. If

these methodologies obtain information from the participant, then there will be fewer

risks involved versus when the information contains identifiable data. Ensuring

anonymity of the participants means that the research has to modify the information so

that it does not allow others to directly or indirectly trace the identity of the participant.

While offering monetary rewards reduces dropout rates, it may compromise the

anonymity of the participants. To safeguard against this risk, researchers will often

purchase the online gift certificates prior to the start of the study and assign them unique

certification numbers so that participants may use their certification numbers to obtain the

gift certificates (Chiasson et al., 2007; Kraut et al., 2004).

Once the risks have been determined, the researcher must seek to obtain inform

consent from the participants. Researchers do not have to obtain informed consent from

individuals participating in public behavior such as using online chat rooms, participating

in forums that have unrestricted distribution lists, and who use computers with fixed IP

addresses. Individuals participating in theses online arenas generally have no expectation of privacy; contrastingly, those participating in online forums that have restricted memberships or who use computers with dynamic IP addresses have a higher expectation of privacy. Consequently, obtaining informed consent from them is paramount (Chiasson et al., 2007).

Obtaining a written informed consent from online participants is challenging, especially when the participants are anonymous. As a result, researchers of online studies often create buttons that the participants can click on to show that they have read, understood, and agree to the terms and conditions of participating in the study. Even when the informed consent is provided, it is difficult to verify that the person pressing the button is an adult and not a minor. Researchers may safeguard against this pitfall by requiring information that only adults have access to such as credit cards. Another safeguard would be to require that the adults register with verification organizations such as VeriSign (Chiasson et al., 2007).

The risks of Internet research include those associated with the research and those linked to breaches in confidentiality. Since online participants may by anonymous and may quickly drop out of the study, the risks associated with the research itself may be minimal. When participants are anonymous, it is difficult to monitor their status or condition to determine the impact the online study is having on them. While these risks are minimal and undetermined, it is important for researchers to post links to other websites at the end of the survey or research period so that participants may access information an materials to cope with any risks that they may be experiencing. While the

risk associated with the actual online research may be minimal, the potential of breaching confidentiality is much higher. Inadvertent breaches in confidentiality may occur during data collection. Computer hackers may obtain the confidential information and deliberately disclose it for malicious reasons. These breaches in confidentiality may be prevented by using password protected directory, encryption, and routine security patches. Still, caution should be taken when using these security protocols because they may intimidate participants and make them unwilling to participate in the study. Hence, it is more practical to collect anonymous and innocuous data (Chiasson et al., 2007).

Concluding Thoughts on the Role of the Internet in MSM Activity

All things considered, MSM seek sexual partners online to circumvent the social stigma of public self-identification as gay or bisexual. The idea that some people use barebacking websites to promote the spread of HIV should deter behavioral interventionists from using these websites; instead, they should use this knowledge to design effective Internet-based interventions that may reach this hidden population. Since online surveys appear to offer increased anonymity and increase the likelihood that participants will respond uninhibited, I used the chatroom to deliver a brief online survey to solicit responses from the participants regarding their potential preference for microbicidal lubricants over condoms and vice versa. While Internet-based surveys have methodological and ethical consideration that are unique to it, the benefits of possibly having a large sample size and receiving uninhibited responses, make it worthwhile.

Conclusion

The HIV pandemic continues to claim the lives of millions of people around the world (WHO, 2014). While the prevalence appears to stabilize among certain populations, it is increasing in MSM (especially young, AA MSM residing in the U.S.), who continue to bear the greatest burden of the disease (UNAIDS, 2013). Epidemiological evidence suggests that the transmission of HIV among AA MSM is not solely explained by individual behavior such as explained by number of sex partners, use of alcohol/drugs before sex, and lack of condom use (Beyrer et al., 2012); rather, it is a conglomeration of high prevalence, recent infections, drug resistant strains, high viral loads, assortative mixing, concurrent sexual partnerships, unknown HIV status, and their ability to assume versatile sex roles as receptive and insertive partners during UAI (Aral et al., 2008; Baggaley et al., 2010; Beyrer et al., 2012; El-Sadr et al., 2010; Hallfors et al., 2007; Hurt et al., 2013; Laumann & Youm, 1999). Social forces such as sex ratios, poverty, and violence created the nature and structure of the sexual networks (Thomas & Thomas, 1999). The culture of silence, family/religious expectation, social stigma, and homophobia also contribute to the high-risk sexual practices of these men (Williams et al., 2004).

While research shows that condoms are effective in reducing the transmission of HIV, MSM are reluctant to use them due to structural (i.e., lack of innovative prevention programs and condom availability in neutral settings) and social barrier (i.e., substance abuse, spontaneous sex, lack of knowledge about effective condom use practices, and decreased sexual sensations (Peterson et al., 2003). Some MSM intentionally avoid

condom use as part of their identity as barebackers. Therefore, it appears that MSM who practice bareback sex may benefit from using microbicides because most of them use lubricants when they participate in UAI (Carballo-Diéguez et al., 2009).

Not only will they benefit from interventions using microbicides, but they may benefit from those promoted through online sources because MSM are a hard-to-reach population and the Internet is the setting where a vast number of them they seek and meet their sexual partners (Elwood et al., 2003). Many researchers noted that some MSM use the Internet to avoid the social stigma of seeking sexual partners in public places (Elwood et al., 2003). With the advent of the Internet, they may instantly and anonymously connect with and arrange sexual encounters with large numbers of like-minded partners (Berg, 2009; Chiasson et al., 2007; Grov, 2006). Thus, the nature of the online environment increases the risk of HIV in MSM because those MSM who seek sex on the Internet are more likely than their counterparts to have sexually transmitted infections (Bolding et al., 2005; Liau et al., 2006; McFarlane, Bull, & Rietmeijer, 2000). All things considered, Internet-based interventions have the potential of reaching large samples of MSM, but they are not without risks. Careful attention must be made to verify informed consent, assure anonymity, and avoid the surveillance of minors (Chiasson et al., 2007).

The purpose of my study was to expand upon the body of literature and examine the differences in preferences of using condoms versus microbicidal lubricants among gay men seeking Internet sex partners. Using theoretical such as the HBM and ARRM, I tested the correlation between normative support and MSM's desire to use microbicides versus condoms. Through this study, I increased the understanding of how future

microbicide interventions may be tailored to encourage MSM to stop risky sexual

practices such as UAI and adopt safer and equally satisfying options such as

microbicides. The following chapter will discuss the instruments and methods I used to

examine and test the relationships between variables that were formulated in the

hypotheses discussed in Chapter 1.

Chapter 3: Research Method

Introduction

The purpose of this study was to use an online cross-sectional survey to assess how perceived susceptibility to HIV and labeling of bareback sex correlate to the desire to use microbicides as opposed to condoms among MSM who seek sexual partners on the social networking site Manjam. This chapter includes a description of the methodology used in this research study. I discuss the research design and rationale for the study as well as the population and sampling procedures used to collect the data. I also outline the variables and the how the constructs are operationalized and analyzed. Additionally, I explore various threats to validity that may exist in the data. Finally, I end with ethical considerations used to protect the rights of the participants during the research process.

Research Design and Rationale

This research study was quantitative and cross-sectional in nature. It was designed to assess how the independent variables of perceived susceptibility to HIV and labeling of bareback sex as the highest risk activity correlate to the dependent variable of the desire to use microbicides among MSM who seek sex on the Internet. The Internet is an effective mechanism for collecting data from hidden or hard-to-reach populations (Bull et al., 2001; Chiasson et al., 2007; Rhodes, 2004; Rietmeijer et al., 2003; Suarez-Balcazar et al., 2009). Given the sensitive nature of the research topic and the fact that MSM do not respond to traditional HIV interventions, I decided that the Internet might be the most practical means of reach MSM who seek sexual partners online. I chose a well-liked sexual networking site called Manjam. I chose this website because other

researchers successfully used them to deploy online survey to MSM populations

(Matarelli, 2011). This Internet site also allows for search filtering capabilities that

allowed me to streamline, maximize, and rapidly recruit the potential participants for the

study sample.

When deciding on this research design, I considered the risks and benefits of

using the Internet to deploy my questionnaire versus collecting in using face-to-face

contact. I found that while the Internet allows for rapid recruitment, it exhibits

methodological challenges. For instance, Internet-based studies similar to this study use

convenience sampling that may make it difficult to generalize findings to other

populations. While Internet research makes it more economical for the researcher to

select samples, it is more prone to sampling bias. Researcher may overcome this bias by

using sampling frames to allow for better representation of data (Klein, Lambing,

Moskowitz, Washington, & Gilbert, 2010). All in all, the benefits of using Internet-based

research to reach this unique population outweigh the risks of doing so.

Methodology

Population

The target population for this research was MSM who reside in the United States

and who use sexual networking websites Manjam to seek sexual partners. The Manjam

website was filtered on December 30, 2014 to include MSM residing in North America.

Additional filters were added to filter out those of African, Latin, or White males who

within the age range of 18 to 25 years of age. A final filter was applied to target those

who self-identified as gay or bisexual. After applying theses filters, the website yielded a

total of 477 membership profiles.   It is important to note that these membership profiles may remain current for up to a year, but may be deleted at any point based on the request of the member.

Sampling and Sampling Procedures

In order to minimize the recency effect where researchers over-recruit frequent users, researchers suggested space sampling where recruitment times are staggered across time and the researcher can randomly select times of day for the sampling frame (Elford et al., 2004a; Pequegnat et al., 2007). I used purposeful and space sampling techniques to obtain the sample for this study. As described above, a number of filtering techniques were used narrow down the sample into MSM who self-identified their ethnicity as African, Latin, or White and who identified themselves being gay or bisexual, and within the age range of 18 to 25 years of age. I left the filtering boxes for other categories (i.e., role, circumcised, body type, minimum height, body hair, hair color, eye color, online now, and photo) unchecked in order to maximize the yield in membership profiles obtained.

A total of 477 membership profiles were displayed on the webpage for the filters applied under the "all" tab. Two other tabs further narrowed the "new" tab to 86 membership profiles. The "online" tab yielded a result of two but may yield varying results depending on the time of day that one logged onto the website. According to Klein et al. (2010), different types of people are likely to use the Internet during different periods of time. For instance, full-time daytime employees are more likely to get on the Internet during the during evening or weekend hours; on the contrary, unemployed or

night shift workers are more likely to get on the Internet during the daytime hours (Klein et al., 2010).

Therefore, I systematically sampled participants during different times of the day and on different days of the week so that I could derive a representative sample of participants who used this website and who met the study criteria. My sampling procedure was to enter the website during four different times and manually sort profiles and identify new member profiles to send the study invitation to members who were online. The reason for sending the study invitation to those who had an online status was to avoid users with inactive memberships. The four different sampling times were midmorning (9:30 a.m. to 10:30 a.m.), lunchtime (12:30 p.m. to 1:30 p.m.), evening (6:30 p.m. to 7:30 p.m.), and late night (10:30 p.m. to 11:30 p.m.). The study invitations were sent out using this sampling procedure for 11 days, distributing a total of 238 samples. I sent the study invitations using the chat message within the member's profile. This message contained a cut-and-paste browser link to the study website where the member would fill out the survey instruments.

Sample Size

A major benefit of using online surveys is that they have the ability to reach large samples and collect data rapidly from them. This is partly because many people use the Internet and frequent online dating sites. As a result, the type of Internet-based samples are geographically diverse and their sizes may range anywhere from one to 5,000 (Pequegnat et al., 2007). A review of the Internet–based studies presented in Chapter 2 revealed a sample size ranging from 190 to 2,577 (Hospers et al., 2002; Wilkerson et al.,

2010). Hospers et al. (2002) used chat rooms and Wilkerson et al. (2010) used survey

banners to recruit participants.

The problem with online samples is response rate. It is difficult to estimate an

exact response rate because of the different ways of recruiting participants for online

surveys (i.e., chat rooms, banners, emails, pop-up advertising, and listserv) vary in the

way that participants respond to them. Depending on the method of recruitment, the

response rate may be as little as 1% or as much as 67% (Elford et al., 2004a; Riggle et al.,

2005; Ross, Daneback, Månsson, Tikkanen, & Cooper 2003; Ross, Rosser, Stanton, &

Konstan, 2004). Assuming a 25% response rate and the convention for determining

adequate sample size provided by Cohen (1992), I estimated that for a population of 440

(assuming an alpha of .05 for a 95% confidence interval, a 5% margin of error, and a

power of .80), minimum sample size of 86 completed survey responses was required.

Eligibility/Exclusion Criteria

In order to be eligible for this study, participants needed to be at least 18 years of

age and no more than 25 years of age. Participants also must have had an active profile

within the Manjam website. The participant must also have self-identified as being gay

or bisexual. They must also have indicated an ethnicity of African, Latin, or White. Any

profiles not meeting these criteria were excluded from the study.

Instruments and Methods

AIDS Health Belief Scale

The AHBS was developed by and published by Zagumny and Brady (1998). This

tool was used to assess the four components of the HBM (i.e., perceived susceptibility,

perceived severity, benefits, and barriers) as they relate to HIV prevention beliefs and practices. It involved 16-items that were scored on a Likert-type scale with responses of *strongly disagree* with a weight of 1 and *strongly agree* with a weight of 6. The scale was divided into four subscales representing each of the four components of the HBM. The higher the score was on the subscale, the more the person represented that component within their belief of HIV. For example, a high score for the perceived susceptibility indicates that the person is highly concerned about contracting HIV (Zagumny & Brady, 1998).

When developing the AHBS, Zagumny and Brady (1998) tested the instrument to a varied sample of 230 undergraduate psychology students, most (93.5%) of whom where Caucasian. They found AHBS to be highly reliable. They used Cronbach's alpha to verify an overall internal consistency ($\alpha =. 82$). Each of the subscales also had a high internal consistency score (i.e., susceptibility $\alpha = .83$, severity $\alpha = .83$, benefits $\alpha = .93$, barriers $\alpha =. 92$). They also demonstrated that AHBS had a high degree of construct validity because perceived benefits, perceived severity, perceived susceptibility, and perceived barriers accounted for 43.7%, 9.6%, 6.6%, and 4.1% of the variance, respectively. Altogether, these four constructs accounted for 64% of the variance. Through an independent sample *t* test, they also found a significant correlation between age and AHBS score ($r =. 26, p <. 001$). Using Mann-Whitney corrected *Z*-tests, they found that females had significantly higher AHBS scores than males ($Z (391) = -7.93, p < .001$) ($M = 4.27, SD = .47$ versus $M = 3.06, SD = .89$), respectively (Zagumny & Brady, 1998).

Researchers tested the AHBS but found conflicting results. Carmel (1990) and

Yep (1993) found that the HBM constructs were reliable predictors of HIV risk

behaviors. Lin et al. (2005) used an anonymous online survey to test the AHBS with a

convenience sample of 144 Taiwanese students. The Cronbach's alpha subscores for

their study was lower (i.e., susceptibility = .53, severity α = .58, benefits α = .26, barriers

α =. 10) than those of Zagumny and Brady (1998). Thus, they posited that their study

had low degrees of internal consistency and construct validity because the scale may not

be psychometrically appropriate for the Taiwanese immigrant population. While they

found that the scale was limited in its ability to be culturally sensitive to non-Euro

American, efforts need to be made to make the instrument more culturally sensitive (Lin

et al., 2005).

Data Collection Procedures

The AHBS instrument developed for this study is called the MSMAHBS. It

includes demographic variables because researchers demonstrated that demographic

variables are linked to HIV preventative behaviors (Zagumny & Brady, 1998). Some of

the demographic variables include age, gender, ethnicity, and country of residence. In

order to create a profile on the website Manjam, a member has to be at least 18 years of

age. Therefore, age was included in the demographic part of the questionnaire in order to

exclude any minors or individuals under the age of 18 years of age and those over the age

of 25. The participant was required to answer the first item indicating that he was 18

years of age or older. All other items within the survey were optional. The demographic

portion also included ethnicity and sexual role in order to target MSM who were African,

Latin, or White. Additionally, questions regarding the preferences for using microbicides were added in order to predict their preference as a safe alternative to condoms. The instrument was designed through Survey Monkey to be a self-report instrument containing 9 items that could be easily completed online. In order to provide informed consent to participate in the study and enter the survey, the participants are required to select the *Next Page*. If the participants did not consent to the study, or if they did not meet the study criteria, they were exited out of the study. Any survey submissions that are incomplete or had missing data was removed from the data analysis; moreover, the demographic information of participants with missing data was analyzed to determine if there were any differences between those who completed the survey and those who did not complete it.

The original version of the AHBS is provided in Table 1. Table 2 shows the modified version of the AHBS that was used in this study. Because perceived susceptibility and barriers are independent variables within my study, the items relating to them were included in the design of the instrument used in this study. Pequegnat et al. (2007) recommended that researchers use short forms of surveys of existing surveys when administering online surveys. Therefore, to keep with the tenets of making Internet surveys brief, items relating to the other constructs were not included.

Table 1

AIDS Health Belief Scale Zagumny and Brady (1998)

Item	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly disagree
1. I feel that the chances are good that I can get AIDS	◯	◯	◯	◯	◯	◯
2. I am afraid that I might contract AIDS.	◯	◯	◯	◯	◯	◯
3. I believe that I can be exposed to HIV infection if my sex partner is heterosexual.	◯	◯	◯	◯	◯	◯
4. I believe that I can get AIDS even if I am only having sex with one partner.	◯	◯	◯	◯	◯	◯
5. AIDS causes death.	◯	◯	◯	◯	◯	◯
6. I would rather have any other terminal illness than AIDS.	◯	◯	◯	◯	◯	◯
7. I would rather die from a violent death (e.g., gunshot, car accident, etc) than from AIDS.	◯	◯	◯	◯	◯	◯
8. AIDS is probably the worst disease a person can get.	◯	◯	◯	◯	◯	◯
9. I believe that the chances of contracting AIDS can be significantly reduced by using a condom.	◯	◯	◯	◯	◯	◯
10. I think it is worth the effort to have condoms readily available.	◯	◯	◯	◯	◯	◯
11. I feel that the chances of contracting AIDS can be significantly reduced by having sex with only one partner.	◯	◯	◯	◯	◯	◯
12. If a condom is not available, it would be worth the effort to discontinue sexual activity to obtain a condom.	◯	◯	◯	◯	◯	◯
13. Using a condom seems like an insult to my partner.	◯	◯	◯	◯	◯	◯
14. It is embarrassing (to me) to buy condoms.	◯	◯	◯	◯	◯	◯
15. I do not enjoy (or think I might not enjoy) sex when using a condom.	◯	◯	◯	◯	◯	◯
16. I would offer first aid to an AIDS patient because I would feel guilty not offering help.	◯	◯	◯	◯	◯	◯

Note. From *AIDS Education and Prevention.* By M. J. Zagumny, and D. B. Brady, 1998, NY: Guilford Press, p. 176. Copyright 1993 by The Guilford Press, 1998. Reprinted with permission (see Appendix B).

Table 2

Revised AIDS Health Belief Scale Zagumny and Brady (1998)

Item	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly disagree
1. I am afraid that I might contract AIDS.	○	○	○	○	○	○
2. I believe that I can be exposed to HIV infection if my sex partner is heterosexual.	○	○	○	○	○	○
3. I believe that I can get AIDS even if I am only having sex with one partner.	○	○	○	○	○	○
4. Using a condom seems like an insult to my partner.	○	○	○	○	○	○
5. Using a lubricant-like product (i.e., microbicide gel) seems like an insult to my partner	○	○	○	○	○	○
6. It is embarrassing (to me) to buy condoms.	○	○	○	○	○	○
7. It is embarrassing (to me) to buy lubricant-like product (i.e., microbicide gel).	○	○	○	○	○	○
8. I do not enjoy (or think I might not enjoy) sex when using a condom.	○	○	○	○	○	○
9. I do not enjoy (or think I might not enjoy) sex when using a lubricant-like product (i.e., microbicide gel).	○	○	○	○	○	○

Note. Adapted from *AIDS Education and Prevention.* By M. J. Zagumny, and D. B. Brady, 1998, NY: Guilford Press, p. 176. Copyright 1993 by The Guilford Press, 1998. Reprinted with permission (see Appendix B).

MSMAHBS Instrument Validation

I consulted research experts at the local San Antonio AIDS Foundation and International Rectal Microbicide Advocates (IRMA) in order to determine the validity of the measures and variables for this study. I provided them brief overview of my research and methodology, as well as, a link of the survey instrument. Each expert was asked to review the instrument and provide me feedback on the readability, content validity, and overall functionality of the research instrument. Their input was then used to conduct the study.

Data Analysis Plan

I analyzed the data collected by Survey Monkey in relation to the research questions and hypothesis listed in the below section. I used multiple regression analysis within SPSS to determine the validity of each hypothesis. The following sections will detail research variables questions and corresponding hypothesis, as well as the rationale for using multiple regression analysis to analyze them.

Operationalization of Variables

A list and description of the study variables and their categories are found below in Table 3. Age was considered a dichotomous as well as continuous variable. Participants were asked about their age (i.e., whether or not they are 18 years old) as a dichotomous variable with a yes/no response. If a respondent answered no, they were considered disqualified for the survey and were therefore exited out of the survey. Age was also considered a continuous variable as participants were asked to self-report their

age on their last birthday. In this form, age was considered a covariate in the regression model. Another covariate was the use of alcohol/drugs during sexual activities. As described in the review of the literature in Chapter 2, MSM often use drugs or alcohol while engaging in high-risk sexual activities. Therefore, this question was included at a low level with dichotomous responses of *yes* or *no*, so that participants may participate without fear of disclosure that may lead to skipping of question or dropout of survey.

The variables listed under descriptive statistics included ethnicity, role of Manjam, and sexual behavior descriptor. Participants were asked about their ethnicity as a categorical variable with responses of *Caucasian, African American, Hispanic, or Other*. The participants were also asked about how they use the Manjam website. They could select from three categories: *social networking, sexual networking (find a partner), or social and sexual networking.* Finally, the participants were asked to select the description that best describes their sexual relationships. Responses included: *I have sex with only men; I have sex with men and women; or I have sex with women only.*

The independent variables included the AHBS scale and the labeling of URAI risk. While ethnicity was part of the descriptive statistics, it was also treated as an independent variable in order to assess the ethnic differences in preference for microbicides. Using the AHBS scale from Zagumny and Brady (1998)*,* I incorporated its items relating to perceived susceptibility and tailored the items relating to barriers in order to capture both condom use and microbicides as HIV prevention products. In keeping with the tenets of having brief Internet survey, I felt that it was not necessary to include the instrument in its entirety. Since the items under perceived susceptibility and

barriers are reliable and valid on their own, I concluded that it was safe to use these items. The revised scale included a total of 9 items. The revised survey is shown below in Table 3. The response options were: *strongly disagree (1), disagree (2), slightly disagree (3), slightly agree (4), agree (5), and strongly agree (6)*. Since the responses are placed on a Likert scale with the higher number indicating a greater degree of belief, the AHBS scale was considered an ordinal variable. This variable was also considered interval data because the participants' scores and summed used to construct a mean score by dividing the total number of responses. For example, if the participants provided responses for all 9 items then the sum of their responses are divided by 9. If participants skipped questions and only answered 8, then the sum of their scores are divided by 9. The other independent variable, labeling of URAI risk activities was a categorical variable. Participants were asked to rate eight common MSM sexual activities as either *low risk, high risk, or do not know the risk*. Their responses indicated their ability to proper gauge and label URAI as a high-risk activity. This variable was later recoded so that participants who rated URAI as a high-risk activity would be recoded as success (1), regardless of their coding of the other seven activities. Those who did not rate it as high risk would be recoded as failure (0), regardless of their coding of the other seven activities.

The dependent variables were sexual activities in the last three months and preferences for prevention products. As part of the demographics participants were asked whether they participated in sex with someone they met on the Internet. This item was called the online sex partner and it was a dichotomous variable with a simple *yes or no*

response. If the respondent answers yes, then they were then asked to self-report the number of times in the past three months that they had sex with someone they met on the Internet. Their response was then considered ordinal data. The preference for prevention products was a categorical variable where participants were asked select from a list of responses that best characterized their preference for condoms or for lubricant-like products like microbicides. This variable was embedded within the 9- items on the MSMAHBS scale where participants were asked if they might enjoy (or think they might enjoy sex when using a lubricant-like product (i.e., microbicide gel). The participants were asked to select from response options e.g., *strongly disagree (1), disagree (2), slightly disagree (3), slightly agree (4), agree (5), and strongly agree (6)*) that best describes themselves. Responses of (3), (4), (5), or (6), were recoded as (1) prefers microbicide and Responses of (1) or (2) were coded as (0) no preference for microbicide.

Table 3

Types of Research Variables

Descriptive	Independent variable	Dependent variable	Covariates
Ethnicity (categorical)	AIDS Health Belief Scale Score (ordinal/interval)	Sexual activities in the past 3 months (ratio/summed number of activities)	Age (dichotomous/ratio)
Manjam purpose (categorical)	Labeling of URAI risk (categorical)	Preference for prevention products (dichotomous)	Use of alcohol/drugs during sexual activities (dichotomous)
Sexual behavior descriptor (categorical) Online sex partner (dichotomous)	Ethnicity (categorical)		

Research Questions, Hypotheses, and Analysis

This study sought to answers the questions enumerated below. Not only have I listed the questions below, but I have also detailed the null and alternate hypotheses for each one and the method of analysis used to assess each question.

1. What is the relationship between the AIDS Health Belief Scale Score and the number of self-reported sexual activities in the past 3 months among MSM online sex seekers, after controlling for age and drug/alcohol use?

   $H1_0$: There is no significant relationship between the AIDS Health Belief Scale Score and the number of self-reported sexual activities in the past 3 months among MSM online sex seekers, after controlling for age and drug/alcohol use.

   $H1_a$: There is a significant relationship between the AIDS Health Belief Scale Score and the number of self-reported sexual activities in the past 3 months among MSM online sex seekers, after controlling for age and drug/alcohol use.

   I used multiple regression analysis to test Hypothesis 1. The AIDS Health Belief Scale Score and the covariates (i.e., age and drug/alcohol use) were the predictor variables. The number of self-reported sexual activities in the past 3months was the outcome variable.

2. What is the relationship between the AIDS Health Belief Scale Score and preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use?

   $H2_0$: There is no significant relationship between the AIDS Health Belief Scale Score and preference for prevention products among MSM online sex seekers,

after controlling for age and drug/alcohol use.

H2$_a$: There is a significant relationship between the AIDS Health Belief Scale Score and preference for prevention products among MSM online sex seekers, after controlling for age and drug/alcohol use.

I used multiple regression analysis to test Hypothesis 2. The AIDS Health Belief Scale Score and the covariates (i.e., age and drug/alcohol use) were the predictor variables. The preference for prevention products among MSM online sex seekers was the outcome variable.

3. Will labeling of URAI risk predict number of self-reported sexual reported activities in past 3 months after controlling for age and drug/alcohol use?

   H3$_0$: Labeling of URAI risk will not significantly predict number of self-reported sexual activities in past 3 months after controlling for age and drug/alcohol use.

   H3$_a$: Labeling of URAI risk will significantly predict number of self-reported sexual activities in past 3 months after controlling for age and drug/alcohol use.

   I used multiple regression analysis to test Hypothesis 3. The labeling of URAI risk and the covariates (i.e., age and drug/alcohol use) were the predictor variables. The number of self-reported sexual activities in past 3 months was the outcome variable.

4. Will labeling of URAI risk predict the preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use?

   H4$_0$: Labeling of URAI risk will not significantly predict preference for

prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use.

$H4_a$: Labeling of URAI risk will significantly predict preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use.

I used multiple regression analysis to test Hypothesis 4. The labeling of URAI risk and the covariates (i.e., age and drug/alcohol use) were the predictor variables. The preference for prevention products (i.e., condoms versus microbicides) was the outcome variable.

5. Will ethnicity predict the preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use?

$H5_0$: Ethnicity will not significantly predict preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use.

$H5_a$: Ethnicity will significantly predict preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use.

I used multiple regression analysis to test Hypothesis 5. Ethnicity and the covariates (i.e., age and drug/alcohol use) were the predictor variables. The preference for prevention products (i.e., condoms versus microbicides) was the outcome variable.

6. Will the AIDS Health Belief Scale score, when added to the regression model that

includes labeling of URAI, significantly contribute to the variance accounted for

in the predictive effect of self-reported activities in the past 3 months among

MSM online sex seekers, after controlling for age and drug/alcohol use?

$H6_0$: The AIDS Health Belief Scale Score, when added to the regression model

that includes labeling of URAI, will not significantly contribute to the variance

accounted for in the predictive effect of self-reported sexual activities in the past

3months among MSM online sex seekers, after controlling for age and

drug/alcohol use.

$H6_a$: The AIDS Health Belief Scale Score, when added to the regression model

that includes labeling of URAI, will significantly contribute to the variance

accounted for in the predictive effect of self-reported sexual activities in the past 3

months among MSM online sex seekers, after controlling for age and

drug/alcohol use.

I used multiple regression analysis to test Hypothesis 6. The AIDS Health Belief

Scale Score, when added to the regression model that includes labeling of URAI

and the covariates of drug/alcohol use were the predictor variables. The number

of self-reported sexual activities in the past 3 months was the outcome variable.

Rationale for Multiple Regression Analysis

According to Cohen, Cohen, West, and Aiken (2013), multiple regression is a

powerful tool and flexible analytical tool that allows one to establish the relationship

between a dependent variable and multiple independent variables. Since I was seeking to

test the relationship between several independent variables and dependent variables in this study, it made sense that I use multiple regression analysis to do so. One of the advantages of using this form of analysis is that the type of relationship between the variables does not limit it. This type of analysis may be used if the relationships between the variables are linear, curvilinear, or, conditional, or a combination of these (Cohen et al., 2013, p. 1). Another advantage of multiple regression analysis is that allows one to test for the relationship between a set of independent and dependent variables, while controlling for the effects of the others. Even when levels are condensed to do so, the information maintains it integrity (Singleton & Straits, 2005, p. 496)

Not only is it not constrained by the nature of the relationships between the variables, but it is also not limited by the nature of the independent variables or the nature of the dependent variables. The independent variables may be naturally occurring (i.e., age, sex, or years of education) or they may be planned experimental conditions. The dependent variables may be scaled, categorical, or ordered categories. Since the nature of my independent and dependent variables exhibit widely vary, multiple regression seems to be a good fit for my method of analysis. (Cohen et al., 2013, p. 1).

Multiple regression analysis, like all forms of statistical analysis, makes assumptions about the nature of the data. It assumes that the data is normally distributed and that there is homogeneity of variance within the data (Cohen et al., 2013, p. 12). It also assumes that there is homscedasticity in the data, meaning that the range of dependent variables exhibit the same levels of relationship. Additionally, the measurement levels must be close to interval level as possible. The data range cannot be

truncated or have outliers. Finally, the model being tested must be specified, especially

with regard to the causal variables. The exclusion of such variables may drastically

affect the coefficients and the weight, thus leading to inaccurate interpretations of the

data (Garson, 2014).

Multiple regression analysis calculates a correlation coefficient r, to measure the

relationship between one independent variable and one dependent variable. When

measuring the relationship between multiple independent variables and one dependent

variable, this measure is termed the multiple correlation coefficient (R). Both correlation

coefficients have values ranging from .00 to 1.00. If correlation coefficient with a value

of zero indicates that there is no relationship between the variables of interests. A value

of 1.00 indicates that one variable is a perfect estimate of the other. The values of r may

be negative or positive to indicate the direction of relationship. If the value is positive,

then high values of one variable correspond with high values of the other variable. If the

value is negative, then a high value for one variable is associated with a low value of the

other variable. The absolute value of the coefficients indicates the strength of the

relationships.   The closer the value is to 1.00 the stronger it is. Contrastingly, the R

coefficient does not exhibit positive or negative values so it cannot predict the direction

of correlation. It can only predict the strength of the correlation (Cohen et al., 2013, p.

28).

Another advantage of using multiple regression analysis is that it has the ability to

determine whether a set of independent variables explains a proportion of variance in the

dependent variable. This is due, in part, because percentage of variance can be explained

by the R^2 (also known as multiple correlation), which is by definition, "the percent of variance in the dependent variable explained collectively by all of the independent variables in the model" (Garson, 2014, Chapter 1, Section 1, para. 2). By comparing the standardized regression coefficients, often termed beta weights, one can assess the relative predictive importance of the independent variables.

Multiple regression is often done in series of stages. In the first step, the independent variable that is best correlated with the dependent variable is inputted into the equation. In the second and successive stages, the remaining independent variables are correlated one at a time with the dependent variable, while controlling for the first independent variable. The process is repeated until the remaining independent variable does not increase R^2 by a significant amount. This process can also be done backwards by starting with all the variables and getting rid of them one at a time until one of them makes a significant difference in the R^2. While the forward selection method is computationally more efficient it becomes redundant as variables are introduced. So, many researchers prefer the backward method. Stepwise regression, through a process of forward selection and backward elimination, combines the efficiency of the forward method while eliminating the redundancy by dropping redundant variables.

Multiple regression analysis uses the F test as its significance test because it may be used to test the significance or R, R^2, and the model in general. In the words of Garson (2014), "If sig (F) < .05, then the model is considered significantly better than would be expected by chance and the researcher rejects the null hypothesis of no linear relationship of y with the independent variables" (Garson, 2014, Chapter 15, para.6).

Threats to Validity

While, it is optimal to use multiple Internet sites to triangulate the data (Elford et al., 2004a), it may increase the complexity of the study and make it difficult to identify duplicate respondents who may have use multiple websites to seek their sexual partners. Using one website does not eliminate the possibility of one participant may have multiple user names on a single website, but it does minimize the risk of having duplicate responses (Klein et al., 2010). A limitation of using only one website is that it threatens the external validity of this study. Thus, the results of this study may not be generalized to all MSM populations. It may only be generalized to young MSM who use the Manjam website to meet sexual partners. Having access to the demographics of my online population increased the external validity of my study (Pequegnat et al., 2007). The use of convenience samples in this study also threatened its external validity due to lack of randomization. To counter this sampling bias, I used time-based sampling to randomly sample and send study invites to participants based on the random nature of when they log onto the website. To further strengthen external validity, I used a large and geographically diverse sample in order to minimize sampling biases that exist in smaller and geographically limited samples of smaller studies.

According to researchers, it is not uncommon for MSM to misrepresent themselves, especially on the Internet (Pequegnat et al., 2007; Ross et al., 2006). This practice of deception about ones identity threatens the internal validity of my study because all of my samples of MSM are from the Internet. For example, an MSM may lie about their age in order to attract a certain type of sex partner. The accuracy of the

information is more threatened when an MSM who is 35 reports that his age is 25 than if

he is 40 and reported his age to be 39 (Ross et al., 2006). Since the demographic

information of the MSM are all self-report data and anonymous, there is no way of

verifying that these MSM are who they say they are. In sum, the self-report bias

associated with this online questionnaire could affect the content validity of the study.

Lastly, this study took several measures to strengthen construct validity.

Construct validity is a measure of how sound the theoretical framework is in relation to

the concepts being measured (Frankfort-Nachmias & Nachmias, 2007). To ensure

construct validity within my study, I chose an instrument (AHBS) that is based on the

HBM, which is a sound theory proven by the literature and grounded with theoretical

construct with high construct validity scores as described in the previous sections. When

an instrument is modified from its original form, its original validity and reliability may

not be applicable to the new instrument. Review of the modified instrument by experts in

the field counted this weakness in construct validity.

Protection of Participants

Based on the literature I reviewed in Chapter 2 regarding ethical issues, I

identified and assessed the risks relevant to this study and placed safeguards to minimize

them (Kraut et al., 2004). I protected the participants by providing informed consent,

making their responses anonymous and having full study reviewed and approved by the

Walden University IRB (07-14-15-0296791). While individuals participating in public

behavior such as using online chat rooms generally have no expectation of privacy, I

created an online informed consent form to gain their trust and protect their rights and

privacy (Chiasson et al., 2007). I used the survey to electronically provide informed consent to the participants. As described above, the risks and benefits of the study were described on the first screen on the online survey. This screen also informed the participants of the anonymous nature of the online study and how their information will be kept confidential. After reading this screen, the participant selected the *Next Page* button to show that they agreed to participate in the study. To verify that the person pressing the button was an adult and not a minor, I embedded questions asking the participant to verify their age. I also safeguarded against this using a website that requires adult registration (Chiasson et al., 2007). Participants were allowed to skip questions that they did not understand or feel comfortable answering. They could also leave the survey at any time by closing their browser or selecting "Exit this survey." If they exited the survey without submitting their responses, their answers were not saved. However, if they selected "Done and Submit Survey," then their answers were saved.

Once the participants completed and submitted their survey responses, their information was stored in a password-protected account on Survey Monkey. As an additional measure, this data will also be retained on password protected files on my personal computer hard drive and a portable flash drive that only I have access to. These measures were put in place to avoid inadvertent breaches in confidentiality that may occur during data collection by hackers. Their responses were completely anonymous in that the Manjam website did not disclose real names of participants or other personal identifying information. Although Manjam members create and use screen names to interact with other participants, I did not include any of these screen names in my study.

Additionally, I increased the anonymity of the survey by not filtering out the IP addresses of the participants. By excluding personal identifying information, I ensured that no one, including me (the researcher), would directly or indirectly trace the identity of the participant. Once my research is complete, I will delete my survey instrument by canceling my Survey Monkey account. I will transfer and save all the data from my computer hard drive and flash drive onto a password protected compact disk (CD) for five years. After that time frame, I will destroy the CD by shredding it.

Summary

In this quantitative, cross-sectional research study, I sought to determine how perceived susceptibility to HIV and labeling of bareback sex as the highest risk activity correlate to desire to use microbicides as opposed to condoms among MSM who seek sexual partners on the social networking site Manjam. I created the MSMAHBS instrument, an online survey using Survey Monkey to assist in collecting the data from the participants. Once the Walden University IRB approved the instrument, I deployed it in the study. I made efforts to ensure that the responses submitted by the participants were anonymous and confidential by saving the data in password protected files and not capturing the names or IP addresses of the participants. Upon collection of the data, I used multiple regression analysis to test my research questions and hypothesis because it allowed me to explain the degree of variance in change between my independent and dependent variables when the covariates have been controlled. In the next chapter, I will include a test of the research hypothesis presented in this chapter and present the findings of the multiple regression analyses used to test them.

Chapter 4: Results

Introduction

The purpose of this quantitative, cross-sectional study was to assess how the independent variables of perceived susceptibility to HIV, labeling of bareback sex, and ethnicity correlate to the dependent variables of the desire to use microbicides and sexual activity within the last 3 months among MSM who seek sexual partners on the social networking site Manjam. Additionally, age and alcohol/drug use were used as covariates because they are associated with risky sexual behaviors (El-Sadr et al., 2013; Hallfors et al., 2007; Peterson et al., 2003; Williams et al., 2004). Therefore, I examined whether the labeling of URAI risk would predict the number of self-reported sexual reported activities in past 3 months after controlling for age and drug/alcohol use. I also sought to determine whether labeling of URAI risk would predict the preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for the two covariates. Furthermore, I sought to ascertain whether ethnicity would predict the preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for these covariates. Lastly, I wanted to access whether the AIDS Health Belief Scale score, when added to the regression model that includes labeling of URAI, would significantly contribute to the variance accounted for in the predictive effect of self-reported activities in the past 3 months among MSM online sex seekers, after controlling for the two covariates. In this chapter, I discuss the data collection process, its results, and summary.

Research Instrument and Procedure Modifications

After making changes aesthetic changes to the survey instrument based on the recommendations of my instrument review panel, I submitted for and received IRB approval to begin collecting data. The initial IRB (07-14-15-0296791) approved survey was met with resistance for two reasons. First, many of the participants wanted to communicate with me through other platforms of social media such as Facebook and Facetime. When I declined their offer and explained to them that the limitations of my IRB applications prevented me from doing so, they did not want to proceed completing the survey. Secondly, many participants requested an incentive for completing the survey. They did not see how completing the survey would benefit them. When I tried to explain to them the social change impact of it, they could not relate it to their own immediate need for gratification.

From October 2, 2015 through October 23, 2015, I sent out 150 invitations via the chat room. Of those, I only received nine completed survey responses. In order to increase the number of completed surveys, I filed an IRB change on Nov 7, 2015 to imbed instructions at the end of the survey for participants to receive an incentive. The survey incentive is called txtMovies and is valued at ($2.98). While this incentive is of minimal value, coupon based gift coupons are proven to improve response rates for online survey by as much as 36% (Birnholtz, Horn, Finholt, & Bae, 2004; Ryu, 2006). While online gift certificates do not increase response rate as much as cash money, it does not compromise the anonymity of the survey respondent in the same way as sending cash to the participants mailing address. The modifications for the new approach to data

collection were approved on January 4, 2016. After 10 more completed survey

responses, I concluded my invitation routine on February 4, 2016. After manually

sending out 238 survey invitations, I managed to obtain a total of 19 survey respondents.

Descriptive Statistics

From September 6, 2015 through February 4, 2016, I manually sent out 238

survey participation invitations using the systematic selection process outlined in Chapter

3. I concluded my data collection February 8, 2016, 4 days after sending out my final

survey invitation. A total of 19 survey respondents (8.0%) provided responses to the

survey questions; however, four respondents submitted incomplete or erroneous answers

in some or all of the variables. The remaining 15 (6.7%) contained survey responses with

valid data in each of the study variables and demographic questions. The sample size of

15 did not meet or exceed the required minimum sample size of 86 required to achieve

power of at least 0.80 using multiple regression with an alpha of 0.05 (Cohen, 1992).

Since my sample size was too small to achieve the required power to achieve

statistical significance, I was compelled to consider the using Fisher's exact test in

addition to the multiple regression form my methodology for data analysis. According to

Field (2009), Fisher's exact test is appropriate when the sample size is less than 20 with a

2 X 2 matrix involving independent and dependent variable. This test maintains the same

assumptions as Chi-square and involves a direct calculation of the probability p for a two-

tailed test. Therefore, there is no need to calculate degrees of freedom or find critical

Chi-square value. Assuming that I have an independent random sample and an α of 0.05,

I can analyze the p-value. If the p-value is greater than 0.05, then there is no association

between the two groups of interest. If it is less than 0.05, then I conclude that there is an association between the variables of interest.

Descriptive statistics analyses were conducted on age, ethnicity, Manjam use, sex behavior, and the use of drugs and alcohol during sexual activities as it applied to all participants, including those with missing data.   The mean age of the participants was 25.41 (*SD* 5.59). Given the small sample size of my study, it is not meaningful to discuss the differences in descriptive characteristics pertaining to age, ethnicity, Manjam use, sexual behavior, and drugs and alcohol use between the participants who completed the entire survey and those with missing data.

Table 4 provides a summary of the descriptive characteristics for the sample. Overall, participants varied in terms of their ethnicity. The greatest percentage of participants was Black or African American (31.6%). Asian or Pacific Islander comprised 26.3% of the sample, and 21.1% were Caucasian. Nearly half of the participants (47.4%) used the Manjam site for social networking. Only 21.1% of the participants stated that they used the Manjam site solely for sexual networking. In reference to sexual behaviors, 47.4% reported that they only have sex with men, and 31.6% claimed to have sex with men and women. In sum, analyses of this research is limited to this sample of MSM ages 18 to 35 years who use the social networking site Manjam to seek sexual partners. The MSM that were sampled were from many states in the United States and were of diverse ethnicity. Their small sample size, however, makes them not representative of all MSM of this group.

Table 4

Descriptive Characteristics of Participants

	Number	Percentage
Ethnicity		
American Indian or Alaskan Native	2	10.5 %
Asian or Pacific Islander	5	26.3 %
Black or African American	6	31.6 %
Hispanic or Latino	1	5.3 %
White or Caucasian	4	21.1 %
Prefer not to answer	1	5.3 %
Manjam use		
Social networking	9	47.4 %
Sexual networking (finding a sex partner)	4	21.1 %
Social and sexual networking	5	26.3 %
Sexual behaviors		
I have sex with only men	9	47.4 %
I have sex with men and women	6	31.6 %
I have sex only with women	3	15.8 %

Table 5 illustrates data as they relate to the study variables that were reported by the participants. About 79.9% of the participants obtained an AHBS with a mean of 18.73 (*SD* 8.95). Approximately 63.2% of the participants selected URAI as the highest risk versus 10.5% who were unable to appropriately rate URAI as having the highest risk. Most (57.9%) of the participants reported participating in sexual activities in the last 3 months. The summed total of sexual activities reported by all the men was 30 with a mean of 2.45 (*SD* 2.52). When asked about their preference for prevention products, 57.8% of the men chose condoms and 27.3% chose lubricants containing microbicides. The majority (89.5 %) of the participants reported their age. The mean age of the

participants was 25.41 (*SD* 5.59). More participants reported using alcohol/drugs during

sexual activities than not (47.4 % vs. 36.8 %), respectively.

Table 5

Independent/Dependent/Covariate Variables

	Number	Percentage	Mean	*SD*
Independent variables				
AIDS Health Belief Scale Score	15	79.9%	18.73	8.95
Labeling of URAI risk				
Failure[a]	2	10.5 %		
Success[b]	12	63.2 %		
Dependent variables				
Sexual activities in the past 3 months				
Sexual activities reported	11	57.9%		
Summed activities, total	30%		2.45	2.52
Preference for prevention products				
Condom[c]	11	57.8%		
Lubricant[d]	3	27.3%		
Covariates				
Age	17	89.5%	25.41	5.59
Use of alcohol/drugs during sexual activities				
Yes	9	47.4 %		
No	7	36.8 %		

Note.
[a] Participants who did not select URAI as the highest risk were recoded as failure (=0);
[b] Participants who selected URAI as the highest risk were recoded as success (=1);
[c] Participants who chose a statement preference containing the word "condom" were recoded as failure (=0);
[d] Participants who chose a statement preference containing the word "lubricant containing a microbicide" where recoded as success (=1).

Univariate Analysis

A univariate analysis was conducted using an ANCOVA to determine if age and alcohol/drug might have some influence on the dependent variables sexual activity and product preference. In order to perform this test, two assumptions had to be met. First, the values of the covariate cannot vary across the different values of independent variable. This assumption was met because in the Tests for Between Subject Effects, $p >$ .05 for AHBS_Score, URAI_Risk, and ethnicity and both covariates. Second, the assumption for homogeneity of regression was met for the dependent variables sexual activity, product_preference, and the independent variables URAI_Risk and ethnicity using age as a covariate; moreover, the assumption was not met for the independent variable AHBS_Score and the covariate alcohol/drug use, indicating that alcohol/drug use may not be a covariate for this analysis.

After conducting an ANOVA, the effect size of URAI_Risk in predicting sexual activity is small (10.1%) but it is not significant $p >$ .05. With the ANCOVA, the effect size is bigger (27.5 %), although still not significant. This means that although insignificant, when holding age constant, URAI_Risk explains 27.5% percent of the variance in number of sexual activity reported. When conducting an ANOVA the effect size of URAI_Risk in predicting product_preference is small (4.0%) but it is not significant $p >$ .05. With the ANCOVA, the effect size is bigger (7.5 %), although still not significant. This means result that although insignificant, when holding age constant, URAI_Risk explains 7.5% percent of the variance product_preference. Lastly, when conducting an ANOVA, the effect size of ethnicity in predicting sexual activity is small

(37.8%) but it is not significant $p > .05$. With the ANCOVA, the effect size is bigger

(49.7 %), although still not significant. This result means that although insignificant,

when holding age constant, URAI_Risk explains 49.6% percent of the variance in

number of sexual activity reported. All things considered, age and alcohol/drug use may

not be considered as covariates for all of the research questions because age was not a

significant predictor of the dependent variables and alcohol/drug use did not meet the

assumption of homogeneity of regression in order to be considered a covariate.

Research Question 1

What is the relationship between AHBS score and self-reported sexual activities

in the past 3 months among MSM who use the Internet to seek sexual partners,

after controlling for age and alcohol/drug use?

$H1_0$: There is no significant relationship between the AIDS Health Belief Scale

Score and the number of self-reported sexual activities in the past 3 months

among MSM online sex seekers, after controlling for age and drug/alcohol use.

$H1_a$: There is a significant relationship between the AIDS Health Belief Scale

Score and the number of self-reported sexual activities in the past 3 months

among MSM online sex seekers, after controlling for age and drug/alcohol use.

Multiple linear regression and Fisher's exact test were used to test Hypothesis 1. In the

multiple linear regression model, sexual activity was regressed on AHBS_Score, age, and

alcohol/drug use, $R^2 = .011$. Taken as a set, the predictors AHBS_Score, age, an

alcohol/drug use accounted for 1% of the variance in sexual activities. The overall

regression model was not significant because in the ANOVA table, $F (3,6) = .022, p >$

.05, $R^2 = .011$. Therefore, I accept the null hypothesis that there is no significant relationship between the AIDS Health Belief Scale Score and the number of self-reported sexual activities in the past 3 months among MSM online sex seekers, after controlling for age and drug/alcohol use. The Fisher's exact test also validated the conclusion of nonsignificance ($p > .05$). Thus, there is no association between AIDS Health Belief Scale Score and the number of self-reported sexual activities in the past 3 months among MSM online sex seekers, after controlling for age and drug/alcohol use.

Research Question 2

What is the relationship between the AIDS Health Belief Scale Score and preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use?

$H2_0$: There is no significant relationship between the AHBS score and preference for prevention products among MSM online sex seekers, after controlling for age and drug/alcohol use.

$H2_a$: There is a significant relationship between the AIDS Health Belief Scale Score and preference for prevention products among MSM online sex seekers, after controlling for age and drug/alcohol use.

Binary logistic regression and Fisher's exact test were used to test Hypothesis 2. The binary logistic regression analysis was conducted to investigate if AHBS score, age, and alcohol/drug use were factors that predict if a person would choose microbicides instead of condoms. The outcome of interest was product _preference. The possible predictor variables were age, alcohol/drug use, and AHBS_Score. The Hosmer-Lemeshow

goodness-of-fit was not significant ($p > .05$), indicating the model is correctly specified.

Additionally, the *-2 log Likelihood* $= 8.912$ and the *Nagerlkerke R^2* $= .247$, indicating

that the model is not a good fit. All in all, none of the variables could significantly

explain any of the variance in the dependent variable. The Fisher's exact test also

confirmed this finding that there is no significant relationship ($p > .05$) between the

AHBS score and preference for prevention products among MSM online sex seekers,

after controlling for age and drug/alcohol use.

Research Question 3

Will labeling of URAI risk predict number of self-reported sexual reported

activities in past 3 months after controlling for age and drug/alcohol use?

H3_0: Labeling of URAI risk will not significantly predict number of self-reported

sexual activities in past 3 months after controlling for age and drug/alcohol use.

H3_a: Labeling of URAI risk will significantly predict number of self-reported

sexual activities in past 3 months after controlling for age and drug/alcohol use.

Multiple linear regression and Fisher's exact test were used to test Hypothesis 3. In the

multiple linear regression model, sexual activity was regressed on URAI_Risk, age, and

alcohol/drug use, $R^2 = .043$. Taken as a set, the predictors URAI_Risk, age, and

alcohol/drug use accounted for 4% of the variance in sexual activity. The overall

regression model was not significant because in the ANOVA table, $F(3,5) = 1.12$, $p >$

$.05$, $R^2 = .043$. Therefore, I accept the null hypothesis that there is no significant

relationship between the URAI risk and the number of self-reported sexual activities in

the past 3 months among MSM online sex seekers, after controlling for age and

drug/alcohol use. The Fisher's exact test also validated the conclusion of nonsignificance ($p > .05$). Thus, there is no association between URAI risk and the number of self-reported sexual activities in the past 3 months among MSM online sex seekers, after controlling for age and drug/alcohol use.

Research Question 4

Will labeling of URAI risk predict the preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use?

$H4_0$: Labeling of URAI risk will not significantly predict preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use.

$H4_1$: Labeling of URAI risk will significantly predict preference for prevention products (i.e., condoms versus microbicides) among MSM online sex seekers, after controlling for age and drug/alcohol use.

Binary logistic regression and Fisher's exact test were used to test Hypothesis 4. The binary logistic regression analysis was conducted to investigate if URAI risk, age, and alcohol/drug use were factors that predict if a person would choose microbicides instead of condoms. The outcome of interest was product _preference. The possible predictor variables were age, alcohol/drug use, and URAI_Risk. The Hosmer-Lemeshow goodness-of-fit was not significant ($p > .05$) indicating the model is correctly specified. Additionally, the *-2 log Likelihood* $= 4.024$ and the *Nagerlkerke R^2* $= .474$ indicating that the model is not a good fit. All in all, none of the variables could significantly

explain any of the variance in the dependent variable. The Fisher's exact test also

confirmed this finding that there is no significant relationship ($p > .05$) between the

URAI risk and preference for prevention products among MSM online sex seekers, after

controlling for age and drug/alcohol use.

Research Question 5

Will ethnicity predict the preference for prevention products (i.e., condoms versus

microbicides) among MSM online sex seekers, after controlling for age and

drug/alcohol use?

$H5_0$: Ethnicity will not significantly predict preference for prevention products

(i.e., condoms versus microbicides) among MSM online sex seekers, after

controlling for age and drug/alcohol use.

$H5_1$: Ethnicity will significantly predict preference for prevention products (i.e.,

condoms versus microbicides) among MSM online sex seekers, after controlling

for age and drug/alcohol use.

Binary logistic regression and Fisher's exact test were used to test Hypothesis 5. The

binary logistic regression analysis was conducted to investigate if ethnicity, age, and

alcohol/drug use were factors that predict if a person would choose microbicides instead

of condoms. The outcome of interest was product _preference. The possible predictor

variables were age, alcohol/drug use, and ethnicity. The Hosmer-Lemeshow goodness-

of-fit was not significant ($p > .05$) indicating the model is correctly specified.

Additionally, the *-2 log Likelihood* $= 8.919$ and the *Nagerlkerke R^2* $= .246$ indicating

that the model is not a good fit. All in all none of the variables could significantly

explain any of the variance in the dependent variable. The Fisher's exact test also confirmed this finding that there is no significant relationship ($p > .05$) between the ethnicity and preference for prevention products among MSM online sex seekers, after controlling for age and drug/alcohol use.

Research Question 6

Will the AIDS Health Belief Scale score, when added to the regression model that includes labeling of URAI, significantly contribute to the variance accounted for in the predictive effect of self-reported activities in the past three months among MSM online sex seekers, after controlling for age and drug/alcohol use?

$H6_0$: The AIDS Health Belief Scale Score, when added to the regression model that includes labeling of URAI, will not significantly contribute to the variance accounted for in the predictive effect of self-reported sexual activities in the past three months among MSM online sex seekers, after controlling for age and drug/alcohol use.

$H6_1$: The AIDS Health Belief Scale Score, when added to the regression model that includes labeling of URAI, will significantly contribute to the variance accounted for in the predictive effect of self-reported sexual activities in the past three months among MSM online sex seekers, after controlling for age and drug/alcohol use.

Multiple linear regression and Fisher's exact test were used to test Hypothesis 6. In the multiple linear regression model sexual activity was regressed on URAI_Risk, age, AHBS_Score, and alcohol/drug use. The AHBS_Score when added to the regression

model that included URAI_Risk, age, and alcohol/drug use accounted for 33% of the variance in sexual activities. The overall regression model was not significant because in the ANOVA table, $F(4,4) = 1.185$, $p > .05$, $R^2 = .330$. Therefore, I accept the null hypothesis the AHBS_Score, when added to the regression model that includes labeling of URAI, will not significantly contribute to the variance accounted for in the predictive effect of self-reported sexual activities in the past three months among MSM online sex seekers, after controlling for age and drug/alcohol use. The Fisher's exact test also validated the conclusion of non-significance ($p > .05$).

Summary of Findings

This study examined relationships among AHBS scores, the labeling of URAI as the highest risk for HIV transmission, number of recent sexual activities, ethnicity, and preference for prevention products (i.e., condoms versus microbicides) in MSM online sex seekers, after controlling for age and drug/alcohol use. None of these variables provided significant contributions to R^2 in the regression models. None of the variables significantly predicted the variance in the dependent variables. Using these tests, I failed to reject the null hypothesis in all of the research questions. In Chapter 5, I will present a discussion of these findings and study limitations in light of my reviewed literature. I will also discuss recommendations for future research and implications for positive social change.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to examine the relationships among the independent variable (IV) of AHBS _Score and product preference (i.e., condoms vs. microbicides) and sexual activity as dependent variables in MSM who use the Internet to seek sexual partners. Additionally, I explored the relationship between URAI_Risk (IV) and sexual activity and product preference (DVs) among this population. Furthermore, I assessed the relationship between ethnicity (IV) and product preference (DV). Initially, age and alcohol/drug use were considered covariates in examining the relationships among these variables. After careful analysis of these covariates, I determined that they could not predict the variance in the dependent variables or meet the assumption of homogeneity of regression. In the end, they were not considered covariates.

I collected data over a 5-month period. Due to the hidden nature of this population, I was only able to acquire 19 survey respondents from the 238 survey invites that I distributed. Of the 19 survey invites, four were incomplete, resulting in a total of 15 survey participants. Using multiple linear regression, binary logistic regression, and Fisher's exact test, I found no significant relationships between the independent and dependent variables, indicating that none of the independent variables could predict the variance in the dependent variables. Moreover, the univariate analysis indicated that the covariates did not significantly influence the variance in the dependent variables. In this

chapter, I discuss interpretations of findings, limitations of the study, recommendations, implications for positive social change, and a conclusion.

Interpretations of Findings

This study is novel in that I investigated the AHBS scale and labeling of HIV risk for transmission in relation to sexual activity and preference for condoms versus lubricant-based microbicide in MSM who seek sex on the Internet. Differences in the structures of the surveys, sample size, and populations sampled made it difficult to compare the results of this study with other studies. There are a number of studies that examine condom use, and few that examine microbicide use, but there is an overall lack of research that examines MSM preference for condoms versus microbicides. Research Questions 2 and 4 attempted to elucidate the relationship among measures of perceived susceptibility (AHBS_Score, URAI_Risk) and product preference. Though not significant, I found that, when given the choice of using a condom versus microbicide, most of the men in the study chose to use condoms. These study findings were consistent with the finds by Smith, Herbst, Zhang, and Rose (2015) who surveyed MSM from 57 cities of various HIV statuses from two prospective cohort studies to determine how consistently they used condoms during anal sex. They found that for a 6-month interval, 16.4% reported using condoms, 14.3 % reported using condoms sometimes, and 4.9% reported never using condoms (Smith et al., 2015). While I investigated condom use, I did not address lubricant use. Pines et al. (2014) evaluated the preference for both condom use and the use of commercial microbicides in 422 HIV-negative MSM in Los

Angeles, CA. They found that more MSM (69%) preferred lubricants during their last

sexual event than those MSM who used condoms (57%).

However, these findings were inconsistent with those reported by the CDC in the

National HIV Behavioral, where MSM from 20 major cities were surveyed;

approximately two-thirds reported having sex without a condom during the past year.

This evidence indicated that condom use was declining among MSM populations.

Additionally, 3.5% of the HIV-negative MSM who were surveyed reported using anti-

HIV medicines such as pre-exposure prophylaxis (CDC, 2016). While microbicides are

not daily medications to prevent HIV, they are alternative methods for preventing HIV

transmission. Perhaps, HIV alternatives to condoms are so new and foreign to MSM that

they prefer to select it as a choice on survey, but then choose to exclude it as an option,

when faced with having pleasure-reduced sex with condom versus more pleasurable

condomless sex.

In Research Questions 1, 3, and 6, I sought to shed light on the relationship

among the perceived susceptibility measures (AHBS_Score, URAI_Risk) and sexual

activity. Although not significant, my study indicated that MSM were in most cases were

successful in rating URAI as a high-risk activity, yet many of them reported sexual

activity in the last 3 months. Other studies documented a relationship between other

measures of perceived susceptibility and sexual risk behaviors. Schwitters et al. (2015)

examined HIV negative MSM in Namibia and found that despite high levels of perceived

susceptibility, these MSM participated in high risk sexual activities (e.g., high frequency

of sexual activity and having unprotected sex while being drunk). In a more recent study,

Kesler et al. (2016) investigated the relationship between risk perception and different levels of high-risk sexual activities in MSM from Toronto, Canada. They found participants who reported low condom use with an HIV positive partner were more likely to have high-perceived risk of HIV; nevertheless, they found no significant association between high-perceived risk of HIV and other high-risk behaviors (e.g., having low condom use with a person of unknown HIV status, or using methamphetamine; Kesler et al., 2016). These findings highlight the need to create interventions that increase self-efficacy and safe-sex negotiation skills.

From a theoretical standpoint, AHBS_Score and URAI Risk represented measures of perceived susceptibility in the HBM and ARRM frameworks, respectively. Since perceived susceptibility is a reliable predictor of HIV risk behavior, these measures were hypothesized to predict product preference and sexual activity (Carmel, 1990; Catania et al., 1994; Longshore & Anglin, 1995; Yep, 1993; Zagumny & Brady, 1998). I, however, did not find AHBS_Score or URAI_Risk to be a significant predictor of HIV risk behavior such as sexual activity. Lin et al. (2005) validated this finding because they failed to find a significant relation. In their handbook, Fisher and Fisher (2000) discussed challenges in operationalizing HBM constructs. Flowers et al. (1997) discussed an inconsistent result between AARM components and actual behavior. Taken together, these research findings may help to explain the nonsignificant finding I experienced in this finding between these measures of perceived susceptibility and sexual behavior.

Finally, in Research Question 5, I sought to clarify the relationship between ethnicity and product preference. I found that ethnicity could not significantly predict the

variance in product preference. Calabrese et al. (2013) supported this finding because they found that YAA MSM were just as likely as MSM of other ethnicity to use lubricants. However, other studies discovered ethnic differences in condom use and or lubricant use. In their nationally representative sample of MSM, Dodge et al. (2015) examined data from the National Survey of Sexual Health and Behavior and found that men who used lubricants were more likely to be older, non-White Hispanic MSM. While the study did not include the use of lubricant-based microbicide, it showed that the inclination of MSM toward the use of lubricants makes it a sensible choice for delivering microbicides.

Covariates

While age and alcohol drug uses were not significant contributors in the dependent variables for this study, similar studies indicated age as a covariate in determining sexual activity. In their online-recruited sample of U.S. MSM, (Yu, Wall, Chiason, and Hirshfield (2014) found that 73% of their sample used drugs prior to engaging in sexual risk behaviors when factors such as age was controlled (Yu et al., 2014). Stein et al. (2015) also included age as one of the covariates in their models as they investigated sexual risk behaviors among young MSM ($n = 337$). They found that younger MSM (ages 13-17) reported a significantly higher number of sexual events without a condom than MSM (ages 18-24). Pines et al. (2014) also concluded that younger age was associated with preference for lubricant use. These conclusions support findings about age in my study. The mean age of my participants was 25.42 (*SD* 5.59).

Although not significant, my findings revealed that as the ages of these men increased so did their preference for condom use.

Limitations of the Study

Although anonymity of the survey response encouraged truthful responses from the participants, it limited my ability to document demographic data. While I was able to identify the geographic location of the respondents from their profile, this information was not captured by the data. Therefore, while I knew that my samples were nationally diverse, I could not substantiate that claim with actual survey data. This limitation combined with my low response rate limited the generalization of my findings to all MSM populations who use the Internet to seek sex.

The low response rate in relation to the total number of surveys distributed presented another major limitation. It prevented me from having enough power to reach statistical significance and obtain an effect size. It limited the types of statistical analyses that I could perform on the data.

Lastly, the recall nature of the survey and the extremely sensitive and private nature of my survey questions may cause the participants to over- or under- report the number of sexual activities to numbers that they thought might be more socially acceptable. Issues of recall bias and social desirability may have affected the result of the study. Additionally, the survey assumed a certain level of literacy. A few of the participants had a difficult time filling it out as is evident by the incomplete survey responses I received. A couple of survey participants had questions as they were filling out the survey. Since I remained in standby mode to receive their surveys, I answered

their questions via the chat room, which allowed them to finalize and submit their

surveys.

Recommendations

The nonsignificant findings and low sample size of this study may be beneficial to

researchers who are conducting similar studies with this hard-to-reach and hidden

population. I recommend that future researchers collect data from multiple MSM sexual

networking sites in order to reach a high sample size and have a better chance at reaching

statistical significance in the data. I also recommend that future researchers use a mixed

method approach to conducting such a study because it will allow them to capture some

of the chat room comments I received from the participants expressing their concerns

about sexual risk reduction strategies that I was unable to include in this study due to the

study design. The mixed-methods approach would also allow the researchers to obtain

rich and meaningful data that may help to explain some of the nonsignificant findings.

Despite my poor sample size, I would not have reached as many of these

culturally isolated MSM as I did without the use of the Internet. The accessibility,

practicality, and anonymous nature of the Internet made the data collection feasible for

the participants and the researcher. It allowed me to establish a rapport of trust and

communicate with them in a nonthreatening environment that protected their privacy.

Therefore, I recommend that future researchers continue to use the Internet as a conduit

for interacting with this special population.

For developers of public health programs and policy makers, I recommend that

they go beyond mere HIV prevention education of using condoms and find more

innovative approaches to helping MSM protect themselves by advocating for microbicides and skills that increase self-efficacy. Lastly, I recommend that all members of society work together to create dialogue about sexuality to reduce the silence and stigma that continues to fuel this pandemic.

Implications for Positive Social Change

This study design of using Internet-based sexual networking site to communicate with MSM and deliver an HIV intervention is novel and has positive implications for social change for several reasons. First, it provides the researcher access to a hidden population that may not otherwise been reached. The Internet provided a platform for me to communicate and build trust with this population while protecting their right to privacy. Next, it allows this population access to HIV prevention intervention that they may not ordinarily seek out through HIV community outreach programs. Lastly, it offered this population HIV education that increased self-efficacy and encouraged them to evaluate their sexual high-risk activities and assess their risk for HIV. Lubricant-based microbicides are new and safe alternatives to condom use. This study introduced them to this new product and allowed them to compare it to commercial lubricants and consider the possibility of using lubricant-based microbicides. While not yet available to be purchased over-the-counter, this early exposure to microbicides may condition them to consider using them when they become available to the public.

After completing the survey, I had participants ask me via the chat room "what could they do to prevent themselves from acquiring HIV." These acts of self-reflection may lower their engagement in high-risk sexual activities that may, in the long-term,

reduce their likelihood of transmitting HIV. Such reduction may translate to lower incidences and prevalence of HIV that may lower the disease burden among this population. Lower incidence of HIV in this population may result in lower healthcare expenses for society and an overall increase in the quality of life for MSM.

Conclusion

The global disease burden of HIV/AIDS continues to be a public health concern. pandemic that spans 3 decades. Advances in technology and medicine slowed the morbidity and incidence rates of some populations (Havlir & Beyrer, 2012). However, other populations such as young MSM continue to experience shockingly higher rates of HIV transmission, comparable to underdeveloped third world countries high levels (Beyrer et al., 2013; UNAIDS, 2013). In order to effectively reduce the incidence of HIV in this population, efforts must be made to reduce stigma/homophobia and increase access to innovative, culturally sensitive HIV interventions that combine behavioral, biomedical, and structural elements (Sullivan et al., 2012; UNAIDS, 2013).

This study is a culturally sensitive and innovative intervention that offers a unique approach to determining preferences of MSM for prevention products such as microbicides that other interventionist could build upon. By using the Internet to allow MSM to assess their sexual risk practices and select a prevention product, this study empowers them to protect themselves against the HIV while protecting their privacy. This study contributed to a positive social change because it has the potential to decrease MSM risk for HIV transmission and reduce the societal cost due to the morbidity and mortality associated with HIV/AIDS.

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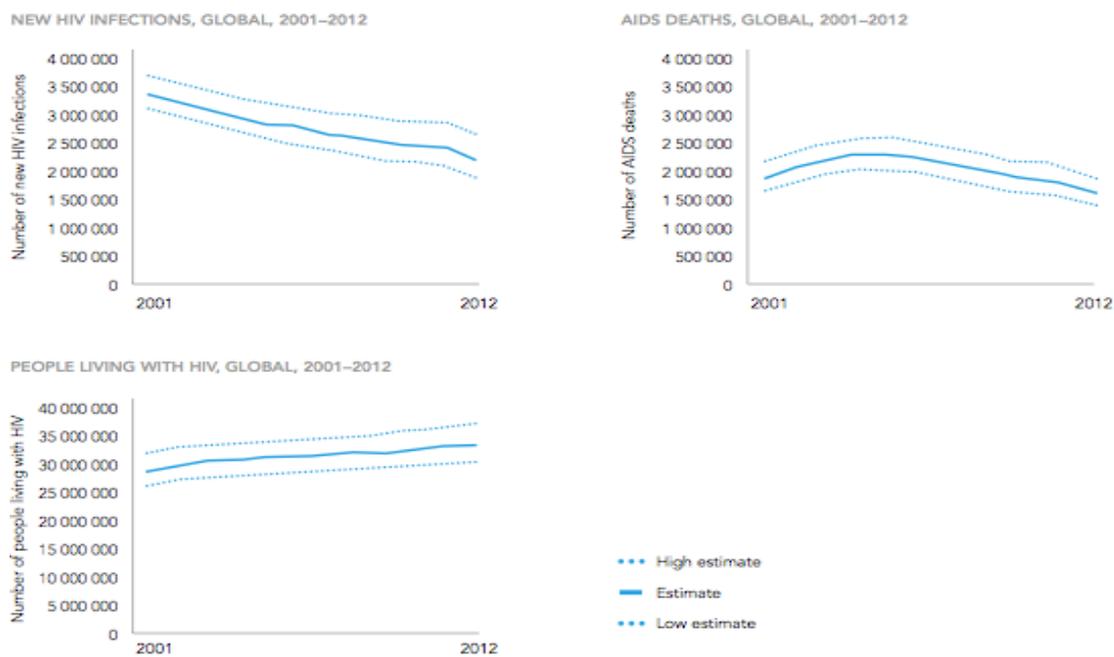
Appendix A: HIV Trends

Figure 1. HIV prevelance worldwide. Adapted from *HIV/AIDS: Global situation and trends*, by WHO, 2016. Retrieved from http://www.who.int/gho/hiv/en/. Copyright 2016 by the WHO.
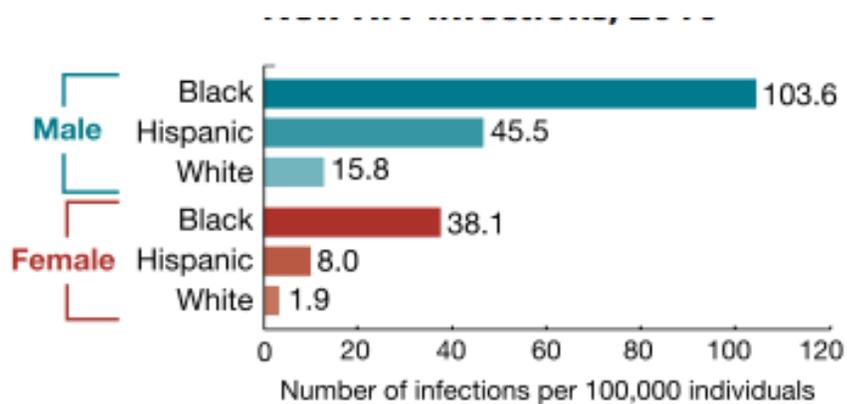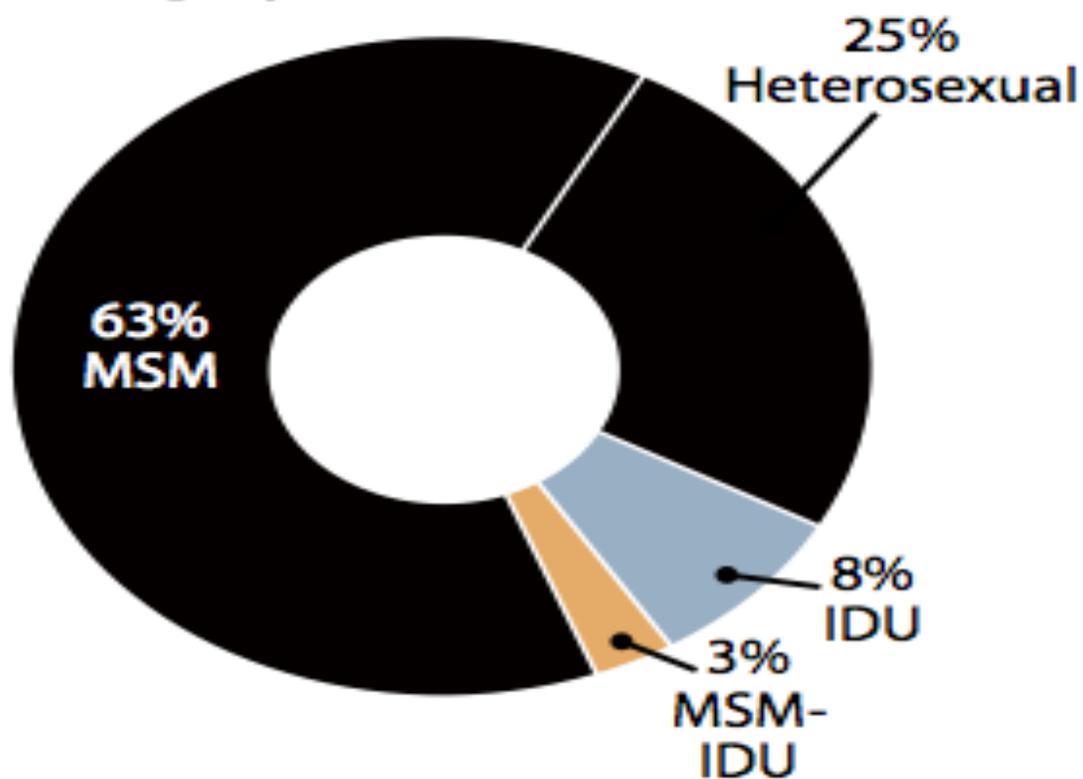
Figure 2. Number of people living with HIV, new infections, and AIDS deaths, 2001-

2012, globally. Adapted from *HIV/AIDS: Global situation and trends*, by WHO, 2016.

Retrieved from http://www.who.int/gho/hiv/en/. Copyright 2016 by the WHO.

Figure 3. Estimated new HIV infections by gender/ethnicity, 2010. Adapted from *New HIV infections in the United States*, by CDC, 2012. Retrieved from http://www.cdc.gov/nchhstp/newsroom/docs/2012/HIV-Infections-2007-2010.pdf. Copyright 2012 by the CDC.
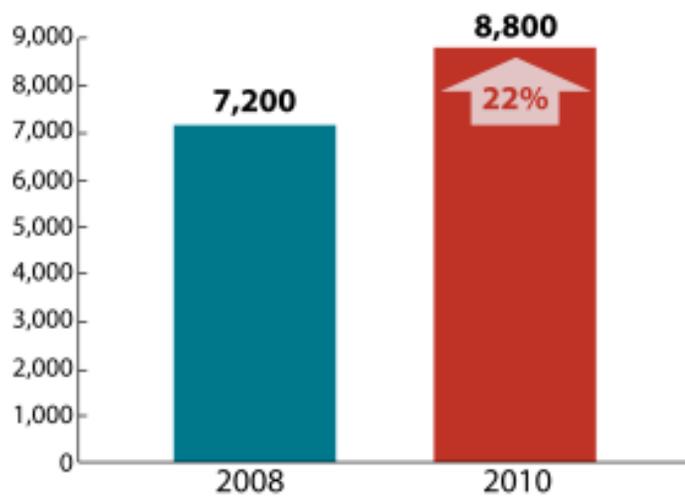
Figure 4. Estimated new HIV infections, 2010, by transmission category. Adapted from

New HIV infections in the United States, by CDC, 2012. Retrieved from

http://www.cdc.gov/nchhstp/newsroom/docs/2012/HIV-Infections-2007-2010.pdf.
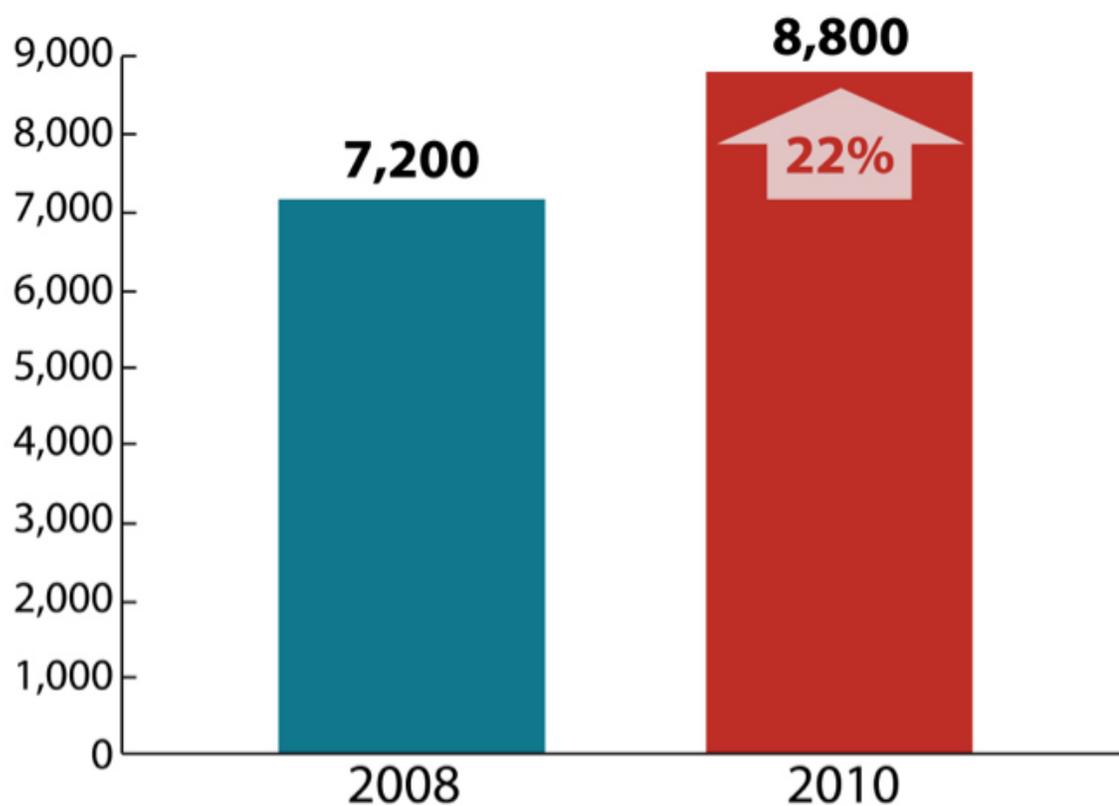
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Figure 5. Estimated new HIV infections among MSM aged 13-24, 2008-2010. Adapted

from *New HIV infections in the United States*, by CDC, 2012. Retrieved from

http://www.cdc.gov/nchhstp/newsroom/docs/2012/HIV-Infections-2007-2010.pdf.

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Appendix B: AHBS Permission

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