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Associations Between Substance Abuse and Mental Illness Among Sexual Minority Adults

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2018

Abstract

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Public Health

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Abstract

Sexual minorities (lesbians, gays, and bisexuals) have a greater risk for substance abuse and mental illness than sexual majorities (heterosexuals). Associations between substance abuse and mental illness among sexual minority adults have not been widely studied. The purpose of this quantitative cross-sectional study was to use the 2015 National Survey on Drug Use and Health data from the Substance Abuse and Mental Health Administration to study the association of substance abuse (alcohol; hard drugs such as heroin, cocaine, methamphetamine; and hallucinogens), prescribed drugs (pain relievers, tranquilizers, sedatives, stimulants, psychotherapeutic, and inhalants, as well as marijuana) and mental illness (no past year, mild, moderate, and severe in the past year) among sexual minority adults ages 18 and older in the United States. Confounding factors that may influence these associations were controlled. The theoretical framework for this study was Meyer's minority stress model. The sample was 43,561 adults. Chi-square and logistic regression analyses were performed to estimate odds for mental illness by drug type. Findings showed that higher odds of mental illness were significantly associated with prescribed drugs and marijuana abuse (*OR*: 3.48, 95% *CI*:1.66, 7.29) among gays/lesbians, and with alcohol abuse among bisexuals (*OR:* 2.31, 95% *CI*: 1.62, 3.29). Positive social change resulting from this study may include increased knowledge of associations between substance abuse and mental illness among sexual minority adults and guidance for public health interventions to improve sexual minorities' access to early substance abuse and mental health prevention and treatment.

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Dedication

Throughout my life, my mother and my spouse have always been there during those difficult and trying times. I would like to dedicate this doctoral study in memory of my mother, Elsie Taylor, and my spouse, Joseph Wright, who sadly died while I was completing my degree. I would not be who I am today without their love, support, and encouragement. My mother was a midwife and a humanitarian who spent her life serving others. My spouse who was an important part of my life was very supportive of my doctoral study, and I drew my strength from him during those times when I felt like giving up. He helped me face the challenges and made good decisions to better the lives of others to promote positive social change.

Acknowledgments

First and foremost, I would like to thank God for giving me the strength and perseverance to achieve this goal. I would also like to express my sincere gratitude to my committee members: Dr. Vasileios Margaritis and Dr. Aimee Ferraro. A special thanks to Dr. Margaritis for being an excellent chair, and for his guidance, motivation, support and encouragement. His commitment and dedication in helping to keep me focused, his invaluable and insightful comments, and generously given his time to share his knowledge and expertise have helped me to finish my journey. I would also like to extend a special thanks to Dr. Ferraro, my committee member, for her detailed and exceptional feedback and guidance and quick turnaround times in reviewing submissions that I submitted. Thank you for challenging my mindset. To my URR member, Dr. Tabung, thank you for your invaluable support. Without each of you, I would not have reached this milestone and finished my journey. Second, I would like to acknowledge my family members, my daughter, Jessica and my grandson, Demajeo, for their relentless efforts, perseverance, patience, and understanding they showed throughout this lengthy process. They sat with me at the kitchen table as this project evolved and provided me with support and encouragement that have helped me in my academic career. Last but not the least, I would like to thank my special friends, particularly Willie Dowdell and Ellsworth Cross for their significant contributions, support, motivation, and encouragement that have contributed to my success.

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Section 1: Foundation of the Study and Literature Review

The purpose of this study was to examine the associations between different types of substance abuse (i.e., alcohol, prescription drugs, marijuana, cocaine, and heroin) and mental illness (i.e., depression and anxiety) among sexual minority adults ages 18 and older in the United States. I also examined the confounding factors that influence these associations. I used increased knowledge of these variables to show if a relationship existed between them. Sexual minorities (i.e., lesbians, gays, and bisexuals) are at greater risk for substance abuse and mental health issues than sexual majorities (i.e., heterosexuals or straights). However, in national studies, scholars have not reported this trend; thus, sexual minority adults associations with substance abuse and mental illness have not been studied or understood. Sexual minority groups are combined, although their health may be different. Scholars are not aware of the stressors and disparities that sexual minority adults experience. In this study, the independent variable was substance abuse (i.e., alcohol, prescription drugs, marijuana, cocaine, and heroin), and the dependent variable was mental illness (binary; yes/no), adjusted for age group, sex, race/ethnicity, education, employment, and sexual identity. The National Survey on Drug Use and Health (NSDUH, 2015) cross-sectional dataset collected by the Substance Abuse and Mental Health Administration (SAMHSA, 2016) was used for secondary data analysis. This study added to the current body of knowledge by (a) providing a more representative and better quality data for increased knowledge and better understanding of lesbian, gay, and bisexual (LGB) adults' associations with substance abuse and mental illness; (b) increasing the low level of awareness about the stressors and health disparities

experienced by sexual minority adults because of their minority status; and (c) helping to guide future public health interventions aimed at improving the health of sexual minorities for improved access to early substance abuse and mental health prevention screening and treatment (Guerrero, 2013; Institute of Medicine [IOM], 2011).

This section is comprised of 12 subsections: (a) background information describing why the study is important; (b) the research problems and issues in this study that need to be addressed; (c) the purpose statement presenting the study's intent; (d) the two research questions and associated hypotheses; (e) the theoretical foundations; (f) the nature of the study providing the rationale for the study's design; (g) the literature strategy and review; (h) definition of unique terms used in the study; (i) the assumptions for the study; (j) the scope and delimitations addressing validity, study boundaries, and generalizability; (k) the limitations; and (l) the study's significance, including the potential contributions of the study and implications for positive social change.

Background

Historically, LGB in the United States has been invisible because their identity was equated with deviancy, sickness, and shame (Fredriksen-Goldsen et al., 2014). Same-sex sexual behavior was against the law, with sodomy being a criminal offense prior to 1961 in all 50 states (Kane, 2003). Homosexuality was treated as a sociopathic personality disorder, also known as antisocial personality disorder, until its removal from the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) in 1973 (Silverstein, 2009). Both prejudice and stigma result in higher rates of substance abuse and mental health problems among sexual minority adults that may start prior to young adulthood,

which is reflective of the historical practice of pathologizing and criminalizing LGB people (Garnets, Herek, & Levy, 2003).

Balsam et al. (2015) alluded that sexual minorities (defined as people who identify as LBG) are at greater risk for substance abuse and mental health problems than sexual majorities (defined as people who identify as heterosexual or straight). Duncan and Hatzenbuehler (2014) found that sexual minority status is related to substance abuse and mental health issues, such as depression and anxiety. Duncan and Hatzenbuehler attributed these behaviors to greater exposure to discrimination, resulting in higher rates of stress-related mental distress; this, in turn, encourages substance use as a coping behavior. The stigma of belonging to the sexual minority group, as well as perceived discrimination, can impact mental health (Bockting, Miner, Romine, Hamilton, & Coleman, 2013; Choi, Paul, Ayala, Boylan, & Gregorich, 2013). Bockting et al. (2013) stated that difficult social situations create a state of chronic stress that leads to poor mental health outcomes for LGB adults. Green and Feinstein (2012) found that lesbian and bisexual women are at greater risk for alcohol abuse and mental problems, while gay and bisexual men are at greater risk for illicit drug abuse and mental problems. Bisexual identity and/or behavior is related to increased risk for substance abuse and mental illness. Cochran, Grella, and Mays (2012) reported that illicit drug and heavy alcohol abuse is more common among gay men. Cochran et al. stated that social environmental context, including perceived drug availability and more tolerant substance abuse norms within the gay community, contribute to sexual orientation–related disparities in substance abuse and mental health issues. In population-based studies, scholars

(Hatzenbuehler, McLaughlin, Keyes, & Hasin, 2010; Meyer, 2003; Talley, Hughes, Aranda, Birkett, & Marshal, 2014) found that individuals with minority sexual orientation, regardless of their gender, tend to have higher rates of illicit drug abuse, heavy alcohol abuse, and mental health problems than their same-gender heterosexual counterparts. Bostwick, Boyd, Hughes, West, and McCabe (2014) found that there are health disparities among sexual minority groups, particularly mental health disparities about which the level of awareness among the general population is low. Mereish and Bradford (2014) examined the relationship between multiple types of discrimination and substance abuse and identified health disparities for LGB adults in the United States, due to stressors that LGB people experience as a result of these discriminations. Balsam et al. (2015) posited that the differences in rates of mental health problem and substance abuse are related to social stressors, such as discrimination.

Although increased rates and risk of substance abuse and mental health issues among LGB individuals have been established in previous studies, scholars have not reported this trend in national, federal studies, and no researcher has determined the associations between substance abuse and mental illness among sexual minority adults (IOM, 2011; SAMHSA, 2016). Ranju, Beamesderfer, Kates, and Salganicoff (2015) stated that the LGB community is a diverse and multidimensional group of individuals with unique identities and experiences, including stigmatization and variations by race/ethnicity, income, education, and other demographic characteristics.

According to IOM (2011), the health and health care of sexual minorities have been identified as priority areas for research. Because of the paucity of research using

large, representative samples, much of what is known about the health of sexual minorities comes from small samples that may not accurately represent national populations. Scholars have tended to combine sexual minority groups that may be different in their health and experiences with health care.

Although a significant body of research in LGB health has developed over the last several decades, much remains to be studied about the health-related experiences, challenges, and outcomes of LGB people (HHS, 2013; IOM, 2011). At a time when sexual minority populations are becoming visible in social and political life, or coming out (i.e., self-identification to others as LBG), federal surveys should begin collecting more representative and better quality data on the characteristics and health disparities among the sexual minority population. Studies on LBG adults have been confined to samples not representative of the U.S. adult population or have been limited in size or geographic scope (HHS, 2013; IOM, 2011). Mereish and Bradford (2014) stated that most of the studies conducted on sexual minorities used predominately White samples, rather than racially diverse samples, limiting their findings.

For the first time in history, SAMHSA/NSDUH (2015) included one question on sexual identity **(**defined as the way someone identifies with a given sexual orientation), and one on sexual attraction (defined as the sex or gender to which someone feels attraction) to its survey. SAMHSA compared estimates on sexual identity and sexual attraction with other national surveys: the National Health Interview Survey (NHIS, 2014), the 2014 General Social Survey (GSS), and the 2011-2013 National Survey of Family Growth (NSFG). Findings of the comparison are shown in the literature review.

Groves et al. (2013) stated that sexual identity and sexual attraction are two dimensions used to measure sexual orientation (i.e., sexual minority and sexual majority). Scholars should focus on accurate measurement of the dimension(s) in which they are interested for the purposes of the study. Operationally defining and measuring sexual orientation poses a challenge to researchers (HHS, 2013; IOM, 2011). Groves et al. found that studies measuring sexual identity have been conducted with respondents of varying populations. Some researchers select a population of interest based on respondents' sexual identity. According to Groves et al., developing a new question in a survey should be validated with techniques like pretesting.

The terms substance use disorder and substance abuse and mental health disorder and mental illness are often used interchangeably, and they were used interchangeably in this study. The case definitions for substance abuse and mental illness in this study was based on *DSM-IV* criteria (SAMHSA, 2016). Substance abuse is defined as overindulgence in an addictive substance (i.e., alcohol, prescription drugs, marijuana, cocaine, and heroin), and mental illness as disorders that affect a person's mood, thinking and behavior, such as depression and anxiety disorders. They are classified as any mental illness (AMI), serious mental illness (SMI), AMI excluding SMI, major depression episode (MDE), and MDE with severe impairment to indicate the level of severity. An adult with AMI is defined as having any mental, behavioral, or emotional disorder in the past year that met *DSM-IV* criteria. Adults with AMI are defined as having SMI if they had any mental, behavioral, or emotional disorder that substantially interfered with or limited one or more major life activities. Adults are defined as having an MDE if they

had a period of 2 weeks or longer in the past 12 months when they experienced a depressed mood or loss of interest or pleasure in daily activities, and they had at least some additional symptoms, such as problems with sleep, eating, energy, concentration, and self-worth. Adults are defined as having an MDE with severe impairment if it caused severe problems with their ability to manage at home, manage well at work, have relationships with others, or have a social life (SAMHSA, 2016). Binge drinking was defined in this study as consuming five or more alcoholic drinks on one occasion. Heavy drinking is defined as drinking (i.e., eight or more drinks a week or in the past year for women, fifteen or more for men; American Psychological Association [APA], 2013; SAMHSA, 2016).

The independent variables in this study were different types of substance abuse (please see more details on the operational definition of these variables in Section 2). The dependent variable was mental illness (i.e., depression and anxiety). The potential confounding variables, which were a third variable that should be controlled as they could threaten the internal validity of my results and introduce bias, were age group, sex, race/ethnicity, education, employment, and sexual identity.

Problem Statement

In this study, I examined if there was a relationship between substance abuse and mental illness among sexual minority adults ages 18 and older in the United States. I also examined the confounding variables of the associations. Knowledge of the relationship between the variables can lead to an understanding of the conceptual framework that was used in this study (i.e., the minority stress model [MSM]). Findings in the research about

sexual minorities at greater risk for substance abuse and mental health problems than sexual majorities are mixed and conflicting, especially when investigating these health disparities among racial and ethnic minorities. There are no consistent and definitive answers on the associations between substance abuse and mental illness among the sexual minority population. Mereish and Bradford (2014) showed that there are substance use disparities vary among sexual minority men and women compared with heterosexual counterparts. Mereish and Bradford showed higher risk for sexual minority women of color when compared with heterosexual women of color. Sexual minority men of color are at comparable or less risk compared to heterosexual men of color. For instance, Latina sexual minority American women are more likely to have alcohol and other drug problems than their heterosexual counterparts (Mereish and Bradford, 2014). Latino sexual minority American men, on the other hand, are less likely to have alcohol and drug abuse problems than their heterosexual counterparts (Hughes, Wilsnack, & Kantor, 2016). The APA (2017) suggested that LGBs have higher rates of some mental disorders compared to heterosexuals, although not to the level of a serious pathology. Discrimination may help fuel these higher rates. Gates (2017) found that lesbians reported equally strong levels of mental health as their heterosexual counterparts and higher self-esteem. According to Gates, there were higher rates of recurrent major depression among gay men. These data contradicted previous findings that the differences in the mental health of heterosexuals and LGB people are not statistically significant.

The variability of findings may be due to factors including (a) insufficient information and lack of knowledge and understanding about the characteristics and health disparities of sexual minorities; (b) combining sexual minority groups rather than considering them as a diverse and multidimensional group of individuals with unique identities and different health and experiences; (c) limitations by methodological shortcomings, including the use of poor quality data collection methods and small sample sizes not representative of the U.S. adult population; and (d) the use of predominately White samples rather than racially diverse samples (Blosnich, Farmer, Lee, Silenzio, & Bowen, 2014; House et al., 2011; Mereish & Bradford, 2014). There is a gap in previous studies in determining whether or not there are associations between substance abuse (i.e., alcohol, prescription drugs, marijuana, cocaine, and heroin) and mental illness (i.e., depression and anxiety) outcomes in the sexual minority adult population. The most important factors or characteristics that are involved in determining the associations supported the need for the current study. Using the NSDUH (2015) dataset collected by SAMHSA for secondary data analysis, I (a) compared estimates of sexual identity and sexual attraction with other national data sources to provide more representative and better quality data; (b) provided increased knowledge and better understanding that showed relationships between substance abuse (i.e., alcohol, prescription drugs, marijuana, cocaine, and heroin abuse – the independent variables) and mental illness (i.e., depression and anxiety- the dependent variable) and confounding variables that can lead to an understanding of the conceptual framework; and (c) increased the low level of awareness about the stressors and health disparities among sexual minorities. The results

of this study may help guide future public health interventions aimed at improving sexual minorities health for improved access to early substance abuse and mental health prevention screening and treatment.

Purpose of the Study

The purpose of this quantitative study using NSDUH 2015 cross-sectional dataset for secondary data analysis was to determine if there were relationships between different types of substance abuse and mental illness among sexual minority adults ages 18 and older in the United States. The independent variable was substance abuse (consisting of alcohol, prescription drugs, marijuana, cocaine, heroin abuse, etc.). The dependent variable was mental illness (i.e., depression and anxiety). The potential confounding variables were age group, sex, race/ethnicity, education, and employment. These confounding variables (i.e., a third variable) were important to my study as they could threaten the internal validity of my results and introduce bias if not controlled. Recognizing them and controlling for their effects were important to my study's credibility.

Research Questions and Hypotheses

RQ1: Which are the descriptive statistics of different types of substance abuse in association with mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015?

RQ2: What are the associations between different types of substance abuse and mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015, adjusted for potential confounding variables

(age group, sex, race/ethnicity, education, and employment), and are these associations different among gay/lesbians than among bisexuals?

$H_0$2: There are no confounding factors which influence the associations between substance abuse and mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015.

H_a2: There is at least one confounding factor which influences the associations between substance abuse and mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015.

Theoretical Foundations for the Study

The theoretical framework for this study was based on Meyer's (2003) Minority Stress Model (MSM). The foundation for a model of minority stress is not found in one theory; rather, it is inferred from several sociological and social psychological theories. Meyer developed the MSM based on the stress model presented by Dohrenwend (1998, 2000) that described the stress process within the context of strengths and vulnerabilities in the larger environment and within the individual. However, Meyer adapted only the elements of the stress process that was unique to minority stress. In the MSM, Meyer proposed that LGBs experience an increased prevalence of poor mental health outcomes attributed to minority stress. Meyer refers to minority stress as the excess stress that individuals with a stigmatized social identity (such as LGB) experience due to their social and often minority position (Meyer, 1995, 2003). The minority stress is a unique type of stress based on social views and structures that leads to psychological distress, including depression and anxiety (APA, 2017; Meyer, 2003).

Meyer (2003) conceptualized the MSM by describing the minority stress processes along a continuum: from distal to proximal stressor. From distal to proximal, the four stress processes proposed in the Meyer MSM are (a) the occurrence of stressful events (chronic and acute prejudice-related events, rejection, and discrimination); (b) the expectation of stressful events, and the vigilance this expectation requires (stigma); (c) the internalization of negative social attitudes (internalized homophobia); and (d) concealment or hiding of a person's minority identity. In the MSM, Meyer suggested that distal stressors are external and objective events or conditions from the social environment (e.g., prejudice and discrimination). Proximal stressors are internal and personal processes related to individuals' subjective appraisal and perceptions (e.g., rejection subjectivity, internalized homophobia and the concealment of a person's minority identity). According to Meyer, many of the concepts in the model overlap, (Figure 1). Figure 1 is only for monitoring and research purposes and the data are for fair use, but not copyrighted.

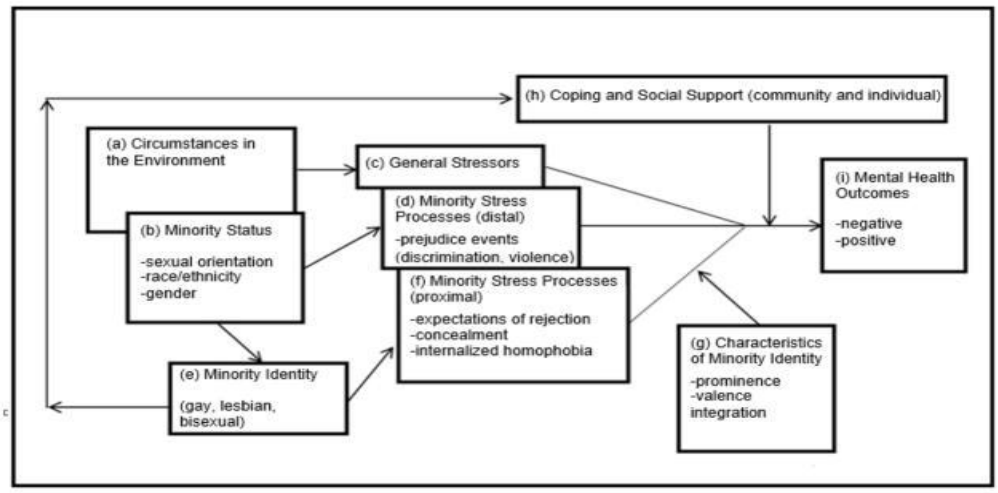

Figure 1. Diagram of the minority stress processes in lesbian, gay, and bisexual populations. Adapted from Meyer, I. H. (2003). Minority stress and the health of sexual minorities. Retrieved July 29, 2017, from http://diversityscience.psych.ucla.edu/speakers/pdf/Meyer_Psych_Diversity_Lecture_2-9-12.pdf.

Although Meyer (2003) applied the MSM framework to show the role stigma, prejudice, rejection, and internalized homophobia play on the health and disparities among LGB populations because of their stigmatized minority status, it can be applied to this study as well. According to Meyer, LGB individuals are at risk for increased rates of substance abuse leading to poor mental health outcome. As such, in applying Meyer's MSM as a framework, I had two aims: (a) to illustrate the associations between substance abuse and mental health outcome as a unique stress related to LGB ages 18 and older in the United States because of their minority status (i.e., age, sex, race/ethnicity, education

level, employment status, and sexual identity) and (b) to show how the variables in this study can fit into the various levels of the distal and proximal minority stress processes/stressors. LGB as a community are exposed to distal and proximal stressors (such as discrimination and rejection) that cause them to indulge in substance abuse that accrue over time, which can be associated with poor mental health outcomes and disparities (Meyer, 2003). Meyer showed LGB as a community and their ability to cope with these stressors. In this study, the independent variable was substance abuse (i.e., alcohol, prescription drugs, marijuana, cocaine, and heroin).

The dependent variable was mental illness/health (depression and anxiety), adjusted for potential confounding variables of age group, sex, race/ethnicity, education, employment, and sexual identity. These variables can be linked to either the distal minority stress processes/stressors at the organizational, societal, or policy level or the proximal minority stress processes/stressors at the individual or interpersonal level or at the community level or to both distal and proximal stressors. The application of these variables to the minority stress processes/stressors include (a) linking the independent variable (substance abuse) to distal minority stress processes/stressors, which include external prejudice events such as discrimination. Meyer (2003) suggested that prejudice events can be considered at the distal (i.e., organizational, societal, or policy) level of the MSM for public health and public policy interventions. Substance abuse can be linked to proximal minority stress processes/stressors as well. These include events or conditions, such as expectations of rejection and internalized homophobia. Meyer suggested that proximal events or conditions can be considered at the (individual or interpersonal level;

(b) linking the independent variable (substance abuse) to the dependent variable (mental illness/health). The independent variable (substance abuse) can have a negative effect on the health of LGB. It can lead to mental illness (the dependent or outcome variable) problems such as depression and anxiety. Meyer suggested that mental illness problems can be considered at the individual or interpersonal level, as well as the organizational, societal, or policy level of the model; (c) the confounding variable, sexual or minority identity (i.e., LGB can be linked to the proximal minority stress processes/stressors. These include events such as expectations of rejection, concealment, and internalized homophobia, which can be considered at the individual or interpersonal level of the model (Meyer, 2003); (d) age group, sex/gender, race/ethnicity, education, employment, and other confounding variables are demographic characteristics of the LGB individual and can be linked to distal minority stress processes/stressors of the MSM. LGB as a community are exposed to prejudicial events such as discrimination because of their sexual minority status. Meyer suggested that they be considered at the organizational, societal, or public policy level, as well as the individual or interpersonal and community level of the model.

Nature of the Study

In this quantitative study, I used the NSDUH (2015) cross-sectional dataset, collected by SAMHSA for secondary data analysis to explore the associations between different types of substance abuse and mental illness among sexual minority population ages 18 and older. This age group was appropriate for this study because it allowed me to compare NSDUH 2015 data estimates of sexual identity and sexual attraction among

sexual minority adults based on age group and sex with estimate of sexual identity and sexual attraction of NHIS 2014, GSS 2014, and NSFG 2011-2014 (Medley et al., 2016; SAMHSA, 2016). Unlike the qualitative and mixed-methods that focus on gathering detailed information, employing the quantitative method will yield numeric data that describes a sample of the population studied (Creswell, 2009). The nature of this investigation is consistent with the MSM framework as adapted from Meyer (2003). LGB adults ages 18 and older in the United States, because of their minority status (i.e., age, sex, race/ethnicity, education level, and employment), are exposed to distal and proximal stressors (such as discrimination and rejection) that cause them to indulge in substance abuse that accrue over time, which can be associated with poor mental health outcomes and disparities (Meyer, 2003. These variables can be linked to either the distal minority stress processes/stressors at the organizational, societal, or policy level or the proximal minority stress processes/stressors at the individual or interpersonal level or to both distal and proximal stress processes/stressors. My focus was to use SAMHSA/NSDUH (2015) cross-sectional dataset for secondary data analysis to determine the associations between substance abuse (the independent variable) and mental illness/health (the dependent variable), among sexual minority adults ages 18 and older in the United States, adjusting for age group, sex, race/ethnicity, education, and employment (the potential confounding variables or factors of the associations) in a given year (2015).

Literature Search Strategy

The literature search strategy included examining a companion document, *Lesbian, Gay, Bisexual, and Transgender Health Issues: An Annotated Bibliography*

(Northern Illinois University, 2016) that provided a reference to the studies and sources on the LGB and transgender population health issues with broad search criteria. Four databases (PubMed, Medline, Cochrane, and Psych), my local library, Walden University library, and Google Scholar were examined to locate scholarly journal articles from primarily the last 5 years. Studies published between 2008 and 2017 were also reviewed that reflected patterns, risk factors, prevalence, and trends in substance abuse and mental health in sexual minority adults. The search also encompassed books, book chapters, articles published in peer-reviewed and other professional journals, and government documents, as well as other literature on substance abuse and mental health among sexual minority adults ages 18 and older. Keywords were used in meta-analyses and previously cited references to assist in the search of relevant literature. Also, I used a dictionary and thesaurus to expand the number of key words, which were combined with standard key words from the PubMed, Medline, Cochrane, and Psych databases. Google Scholar was used as the search engine to find sources included in other databases. I linked sources to the world catalog, local library, and Walden collections using the library access links. The scope of the literature review included an initial search with dates from 2012 onward, followed by a search of all years to further explore the issue of substance abuse and mental health in sexual minority adults. Some of the keywords used in this literature review included *adult sexual minority alcohol use disorder, alcohol abuse, substance use disorder, substance abuse, prescription drug abuse/misuse, marijuana abuse, cocaine abuse, heroin abuse, mental health/illness, sexual minority groups, sexual majority groups, sexual and gender diversity, sexual orientation, sexual attraction, sexual identity,*

LGB, heterosexual, MSM, and mental health screening and treatment. Some of these terms (such as substance abuse, mental health, and sexual identity) were looked up in combination for articles on the connection between substance abuse and mental health among sexual minority adults.

Literature Review

In this subsection, I examine literature on the increased rates of substance abuse and mental illness among sexual minority adults ages 18 and older in the United States to determine the associations and the confounding factors of the associations, United States policies on health services for sexual minority adults, and SAMHSA's guidelines on surveying sexual minority adults for substance abuse and mental illness. I reviewed key covariates, including age group, sex, race/ethnicity, education, employment, and sexual identity. Finally, using the NSDUH (2015) dataset collected by SAMHSA for secondary data analysis, I compared estimates of sexual identity and sexual attraction among sexual minority and sexual majority adults with the 2014 NHIS, 2014 GSS, and 2011-2013 NSFG national data sources.

United States National Policies on Health Services for Sexual Minority Adults

Although federal agencies are ruling that sexual minority populations fall under the prohibition against discrimination based on sex and sex-stereotyping, enforcement is challenging. Reasons for a lack of enforcement include the lack of uniform application in health services (Bradford & Mayer, 2014). The U.S. federal government recognized that people (including sexual minorities) in the United States living with substance abuse and mental health challenges lack insurance coverage can benefit from enrollment support.

Therefore, there are four integrated national policies on health, access to care, and coverage for sexual minorities that can be used to address substance abuse and mental health issues for LGB individuals in the United States. First, the Affordable Care Act (2010) expands access to health insurance coverage for LGB individuals and their families and includes protections related to sexual and gender diversity. Second, the Supreme Court's reversal of a major portion of the Defense of Marriage Act (DOMA) (a policy that bans same sex marriage on a federal level), resulted in federal recognition of same sex marriages for the first time. Third, the DOMA paved the way for the subsequent legalization of same-sex marriage in many states, which also serves to provide new health insurance coverage options. Fourth, it provided addition to the requirements for data collection on age groups and substance abuse and mental illness and research (Ranju et al., 2015; SAMHSA, 2014; Solomon & Tiemann, 2012).

SAMHSA's Guidelines on Screening for Substance Abuse and Mental Illness

According to SAMHSA (2015), screening and assessment are the first steps in the process of identifying and treating individuals with substance abuse and mental health disorders. For earlier identification and care, regular screenings should be provided to people of all ages, even the young and the elderly, due to the high prevalence of substance abuse and mental health for drug problems among minority groups. Screening tools that can be used by medical, mental health and social services practitioners for adults include CAGE AID, a commonly used, 5-question tool used to screen for drug and alcohol abuse and help determine if an alcohol assessment is needed, based on responses scored 0 or 1, with a higher score indicating alcohol or drug abuse problems; Alcohol Use

Disorders Identification Test (AUDIT), a 10-item questionnaire developed by the World Health Organization (WHO) used in primary care settings and with a variety of populations and cultural groups to screen for hazardous or harmful alcohol consumption; and the Mood Disorder Questionnaire (MDQ), which includes 13 questions associated with bipolar disorder symptoms.

SAMHSA established guidelines for alcohol use disorder or abuse, illicit drug abuse or misuse, and mental health or illness based on the *DSM-IV* criteria. *DSM* is the standard classification of substance use disorder or abuse and mental disorders or mental illness used by clinicians, researchers, and public health officials in the United States (APA, 2013). The case definitions in this study for substance abuse (i.e., alcohol, prescription drugs, marijuana, cocaine, and heroin) and mental illness were based on the *DSM-IV* criteria. The *DSM-5* establishes nine types of substance use-related disorders or addiction or abuse. These are alcohol, caffeine, cannabis (e.g., marijuana), hallucinogens, inhalants, opiod (e.g., heroin), sedatives, hypnotics, or anxiolytics (e.g., valium, qualudes), stimulants (cocaine, methamphetamine), and tobacco (APA, 2013). The *DSM-IV*'s 11 criteria for substance abuse and mental illness are hazardous use, social/interpersonal problems related to use, neglected major roles to use, craving, withdrawal, tolerance, used larger amounts/longer, repeated attempts to quit/control, much time spent using, physical/psychological problems related to use, and activities given up to use. According to the *DSM-IV* criteria, anyone meeting any two of the 11 criteria (i.e., during the same 12-month period would receive a diagnosis of AUD. The severity of an AUD—mild, moderate, or severe is based on the number of criteria met.

Additionally, the drinking levels of alcoholic drinks are classified as binge drinking, heavy drinking, current (past month use), moderate drinking, and low drinking. Mental health or illness was also classified into levels of severity including: any AMI, SMI, AMI severe, MDE, and MDE with severe impairment (APA, 2013; SAMHSA, 2016).

Substance Abuse and Mental Illness Among Sexual Minority Adults

According to Healthy People 2020, for the first time, sexual minority adults were identified in the United States as a national health priority and a population at risk for substance abuse and poor mental health, particularly with respect to depression and anxiety. LGB individuals face health disparities linked to societal stigma and discrimination associated with high rates of substance abuse and mental health issues. Personal, family, and social acceptance of sexual orientation and gender identity affect the mental health of LGB individuals (HealthyPeople.gov, 2016; Simoni, Smith, Oost, Lehavot, & Fredriksen-Goldsen, 2017; HHS, 2012). The IOM (2011) also determined that sexual minority is a health-disparate population that is underserved. IOM recognized the lack of attention and insufficient information in current health research on health disparities related to gender and sexual diversity as gaps in efforts to reduce overall health disparities (Fredriksen-Goldsen et al., 2014; IOM, 2011). Scholars have focused on investigating physical health disparities in the sexual minority population because a growing number of both community and population-based scholars suggested that LGB people are a health-disparate population. They are experiencing an array of physical health difficulties ranging from poor overall health status to heightened incidence of specific health conditions, including mental health (Lick, Durso, & Johnson, 2013).

Despite growing acceptance of sexually diverse individuals in the United States, higher prevalence of alcohol and drug abuse and mental health among sexual minority individuals compared to sexual majority individuals may be a symptom of stress associated with identity-related stigma, which may vary by gender and/or sexual identity (Hequembourg & Dearing, 2013; Meyer, 2003). In some cases, stigma, prejudice, discrimination, and family rejection create a hostile and stressful social environment that can lead to sexual minority individuals having a higher prevalence of substance abuse and mental health problems including depression and anxiety than their sexual majority counterparts (APA, 2017; Cochran, Sullivan, & Mays, 2003; Lea, de Wit, & Reynolds, 2014; Meyer, 2003). Subhrajit (2014) Hequembourg and Dearing (2013) alluded that disparities in substance abuse and mental health among sexual minority adults are primarily understood as a consequence of minority stress. Meyer (2003) stated that sexual minority individuals experience distal and proximal stressors that are associated with substance abuse and adverse mental health outcomes. Thomeer (2013) reported that the relationship between sexual minority status and self-rated health is subject to variation due to socioeconomic status because findings varied across sociodemographic groups.

According to SAMHSA (2016), sexual minority adults can have both a substance abuse problem and mental health issue, referred as a co-occurring disorder or dual diagnosis. In this case, the substance abuse disorder and the mental health problem affect each other and interact, because when a mental health problem goes untreated, the substance abuse problem usually gets worse, and when the substance abuse increases,

mental health problems usually increases too. Substance abuse and mental health problem is substantially higher in sexual minority adults with medical illness (SAMHSA, 2016).

Sexual minorities are at a higher risk for substance abuse and mental health issues, compared with the sexual majorities. In 2015, SAMHSA/NSDUH 2015 (the dataset I used in this study for secondary data analysis) began asking two questions about respondents' sexual orientation – one about sexual identity (defined as the way someone identifies with a given sexual orientation), and one about sexual attraction (defined as the sex or gender to which someone feels attraction). This makes the 2015 NSDUH the first time the federal government has collected information about substance abuse and mental health issues among LGB adults in a nationally-representative sample. This was designed to (a) determine the associations between substance abuse and mental illness among sexual minority adults and the most important factors of the associations, (b) provide a clear understanding of the conceptual framework – the minority stress model, (c) address the changing needs of policy makers and researchers regarding substance abuse and mental health issues among sexual minority adults, and (d) align with the Healthy People 2020 initiatives on sexual minorities health and disparities (HealthyPeople.gov, 2016; Medley et al., 2016; SAMHSA, 2016).

To help achieve these goals, SAMHSA compared NSDUH 2015 estimates on sexual identity and sexual attraction with other national surveys: the 2014 NHIS, the 2014 GSS, and the 2011-2013 NSFG (CBHSQ, 2016; SAMHSA, 2016).

Comparison of Estimates of Sexual Identity

Data on the size of the sexual minority population in the United States vary (Gates, 2014). As reported by the U.S. Census Bureau (2015), estimates of the total U.S. population as at July 1, 2015 was 321,418, 820, and the sexual minority population was relatively small in comparison to their heterosexual counterparts. According to SAMHSA (2016), comparison of the 2015 NSDUH estimates of sexual identity among sexual orientation aged 18 and older were made with estimates of sexual identity of the 2014 NHIS, and the 2014 GSS as they were comparable. They were designed to (a) provide increased knowledge and better understanding on two dimensions (sexual identity and sexual attraction) used to measure sexual orientation to help determine the associations between substance abuse and mental illness among sexual minority adults and (b) assess the quality of the data. From the total population of 50,625 ages 18 and older surveyed by NSDUH in 2015, 1.8% sexual minority adults ages 18 and older identified as lesbian or gay, and 2.5% as bisexual versus 94.0% sexual majority identified as heterosexual. Among males, 2.2% identified as lesbian or gay, 1.4% as bisexual versus 95.1% who identified as heterosexual (SAMHSA, 2016). Among females, 1.5% identified as lesbian or gay, 3.5% as bisexual versus 92.9% who identified as heterosexual (CBHSQ, 2016; SAMHSA, 2016). Difference between the estimates of sexual identity for sexual minority and the estimates of sexual identity for heterosexual adults was statistically significant at the .05 level (CBHSQ, 2016; SAMHSA, 2016).

From the total population of 34,557 surveyed by NHIS, the 2014 NHIS data showed that 1.6% of sexual minority adults ages 18 and older identified as lesbian or gay,

0.7% as bisexual versus 94.5% who identified as heterosexual. Among males, 1.8% identified as lesbian or gay, 0.4% as bisexual versus 94.6% as heterosexual (SAMHSA, 2016). Among females, 1.3% identified as lesbian or gay, 1.0% as bisexual versus 94.3% who identified as heterosexual (SAMHSA, 2016). Difference between the estimates of sexual identity for sexual minority and the estimates of sexual identity for heterosexual adults was statistically significant at the .05 level (CBHSQ, 2016; SAMHSA, 2016).

From the total population of 33,127 surveyed by GSS, the 2014 GSS data showed that 1.6% sexual minority ages 18 and older identified as lesbian or gay, 2.5% as bisexual versus 87.2% sexual as heterosexual. Among males, 2.1% identified as lesbian or gay, 1.7% as bisexual versus 88.7% as heterosexual (SAMHSA, 2016). Among females, 1.1% identified as lesbian or gay, 3.2% as bisexual versus 86.0% as heterosexual (SAMHSA, 2016). Difference between the estimates of sexual identity for sexual minority and the estimates of sexual identity for heterosexual adults was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016).

Unknown for sexual identity includes total adults from the three surveys (who did not know or refused to report their sexual identity). For NSDUH 2015, estimates of sexual identity for unknown were 0.6% (who did not know) 1.0% (refused to report), and 0.1% (blank or those who had other missing data). Among male respondents, 0.4, 0.8, and 0.1% respectively and female 0.8, 1.2, and 0.1 respectively (SAMHSA, 2016). For NHIS 2014, estimates of sexual identity for unknown were 0.4% (who did not know) 0.6% (refused to report), and 2.1% (blank or those who had other missing data). Among male respondents, 0.3, 0.5, and 2.2% respectively and female 0.4, 0.6 and 2.1%

respectively (SAMHSA, 2016). For GSS 2014, estimates of sexual identity for unknown were 0.0% (no report -for those who did not know), 0.0% (no report for those who refused to report), and 8.7% (for blank or those who had other missing data). Among male respondents, 0.0, 0.0 and 7.5% respectively and female 0.0, 0.0, and 9.6% respectively (CBHSQ, 2016; SAMHSA, 2016).

In the comparison of sexual identity estimates, overall, the percentages of adults aged 18 or older in the GSS who reported being heterosexual were lower than the percentages in NSDUH for all adults and for males and females. In contrast, estimates for sexual minority groups (i.e., LGB) were not statistically significantly different between NSDUH and the GSS for all adults and among males and females. However, the estimates for the blank category were higher in the GSS than in NSDUH. When responses for blank, don't know, and refused were not included in the percentages for the GSS, 94.0% of all adults in the GSS were estimated to be heterosexual, which was similar to the NSDUH estimate. The estimated percentage of adult males in the GSS who were heterosexual when missing data were excluded (95.1%) also was similar to the NSDUH estimate for males. An estimated 95.2% of adult females in the GSS were heterosexual when missing data were excluded. Excluding missing data in the GSS changed the GSS estimate for heterosexual females from being lower than the NSDUH estimate to being greater than the NSDUH estimate.

Both adult males and adult females in the 2015 NSDUH were more likely to report that they were bisexual compared with their counterparts in the 2014 NHIS. For example, 3.5% of adult females in NSDUH and 1.0% of adult females in the NHIS

reported that they were bisexual. Adult females in NSDUH were also somewhat less likely than their counterparts in the NHIS to report that they were heterosexual (92.9 versus 94.3%).

Across all surveys, estimates of adults not knowing or refusing to report their sexual identity were low but were somewhat higher in NSDUH than in other surveys. For example, 0.6% of adults in the 2015 NSDUH did not know their sexual identity compared with 0.4% of those in the 2014 NHIS. An estimated 1.0% of adults in NSDUH refused to report their sexual identity compared with 0.6% of those in the NHIS. A small number of respondents in the 2014 GSS answered the sexual identity question as "don't know" or "refused," such that the corresponding percentages for the GSS rounded to less than 0.1% (CBHSQ, 2016; Medley et al, 2016; SAMHSA, 2016).

In addition since the 2011-2013 NSFG only interviewed sexual orientation adults ages 18-44, a comparison of the estimates of sexual identity between 2015 NSDUH and 2011-2013 NSFG was made for that age group based on age group, and sex. From the total population of 50,625 surveyed, the 2015 NSDUH showed that among sexual orientation adults ages 18-44, 2.1% identified as lesbian or gay, 4.0% as bisexual versus 92.1% who identified as heterosexual. Among males, 2015 NSDUH data indicated 2.3% identified as lesbian or gay, 1.8% as bisexual versus 94.5% as heterosexual. Among females, 1.8% identified as lesbian or gay, 6.3% as bisexual versus 89.6% as heterosexual. From the total population of 10,416 surveyed, the 2011-2013 NSFG data showed that among sexual orientation ages 18-44, 1.6% identified as lesbian or gay, 3.7% as bisexual versus 93.6% as heterosexual. Among males, 1.9% identified as lesbian or

gay, 2.0% as bisexual versus 95.0% as heterosexual. Among females, 1.3% identified as lesbian or gay, 5.5% as bisexual versus 92.2% as heterosexual (SAMHSA, 2016). Difference between the estimates of sexual identity for sexual minority and the estimates of sexual identity for heterosexual adults was statistically significant at the .05 level (CBHSQ, 2016; Medley et al, 2016; SAMHSA, 2016).

Safron et al. (2017) found that in the United States, while most individuals identify as heterosexual, a great number of individuals also report identifying as homosexual (1.9–2% of the US population) or bisexual (2–4% of the US population), with even greater proportions reporting some degree of same-sex behavior or attraction. A study by McCabe, West, Hughes, and Boyd (2013) showed that among adults in the United States aged 18 and over, 96.6% identified as heterosexual or straight, 1.6% as gay or lesbian, and 0.7% as bisexual.

Comparison of Estimates of Sexual Attraction

According to SAMHSA (2016) in the 2015 NSDUH data, the sexual attraction question was asked only to respondents ages 18-44, since a large majority in this age group were only or mostly attracted to the opposite sex. Since the 2015 NSDUH sexual attraction question was virtually identical to questions for males and females from the 2011-2013 NSFG, the 2015 NSDUH estimates for sexual attraction were produced and compared separately with 2011-2013 NSFG estimates for sexual attraction for males and females in the 18-44 age group. Based on sex/gender, the comparison showed that from the total population of 50,625 surveyed in 2015 in NSDUH 2015 sexual attraction estimates for males ages 18-44 showed 93.8% for only or mostly attracted to females,

1.1% for equally attracted to females or males, and 2.8% for only or mostly attracted to males. For females ages 18-44, 90.5% for only or mostly attracted to females, 4.3% for equally attracted to females or males, and 2.5% for only or mostly attracted to males.

From the total population of 10,416 surveyed, NSFG 2011-2013 sexual attraction estimates for males ages 18-44 indicated 95.3% for only or mostly attracted to females, 0.8% for equally attracted to females or males, and 2.3% for only or mostly attracted to males. For females ages 18-44, 93.4% for only or mostly attracted to males, 3.2% for equally attracted to females or males, and 1.6% for only or mostly attracted to males. Difference between the NSFG 2011-2013 estimates for sexual attraction and the NSDUH 2015 estimates for sexual attraction for sexual minority and sexual majority adults was statistically significant at the .05 level (CBHSQ, 2016; Medley et al, 201; SAMHSA, 2016).

Based on findings of the comparison of estimates of sexual attraction, overall, both 2015 NSDUH and the 2011-2013 NSFG indicated that the large majority of adults identified themselves as being only or mostly attracted to the opposite sex and being heterosexual. The 2015 NSDUH data indicated that 93.8% of males aged 18 to 44 were only or mostly attracted to females, and 90.5% of females in this age group were only or mostly attracted to males. Corresponding estimates from the 2011-2013 NSFG were 95.3% of adult males aged 18 to 44 who were only or mostly attracted to females and 93.4% of females in this age group who were only or mostly attracted to males. The NSDUH estimates for males aged 18 to 44 for (a) being equally attracted to males or females; and (b) being only or mostly attracted to males were greater than the NSFG

estimates, but the differences between the estimates of sexual attraction from the two surveys were not statistically significant. Unlike the pattern for males, women in NSDUH were more likely than those in the NSFG to report that they were equally attracted to males or females (4.3 versus 3.2%) or that they were only or mostly attracted to females (2.5 versus 1.6%) (CBHSQ, 2016; Medley et al., 2016; SAMHSA, 2016).

With regard to missing data relating to sexual attraction, several percentages for various types of missing data (i.e., "don't know," "refused," or "blank") did not have sufficient precision to be published. However, females aged 18 to 44 in NSDUH were more likely than females in this age group in the NSFG to refuse to report their sexual attraction (1.0 versus 0.4%). In addition, 0.6% of males aged 18 to 44 in the 2015 NSDUH refused to report their sexual attraction (CBHSQ, 2016; Medley et al. 201; SAMHSA, 2016).

McCabe, West , Hughes, and Boyd (2013) showed that young adults who are same-sex attracted have higher rates of substance use, sexual risk behavior, and mental health problems.

There is lack of understanding in the general population of the associations between substance abuse and mental illness among sexual minority adults. As defined in this study, substance use disorder or abuse was overindulgence in an addictive substance (i.e., alcohol, prescription drugs, marijuana, cocaine and heroin). Mental illness was disorders that affect a person’s mood, thinking and behavior, such as depression and anxiety disorders. They are classified as any mental illness (AMI), serious mental illness (SMI), AMI excluding SMI, major depression episode (MDE) and MDE with severe

impairment to indicate the level of severity (SAMHSA, 2016). To strengthen assessment of health status and inequities, Section 4302 of the Affordable Care Act (2010) contains provisions, including a plan to integrate sexual orientation and gender identity variables into all Health and Human Services national surveys (Wolff, Wells, Ventura-DiPersia, Renson, and Groy**,** 2016). As such, SAMHSA/NSDUH 2015 provided estimates of substance abuse and mental illness among sexual minority adults ages 18 and older in the United States. This was designed to: (a) determine the associations of substance abuse (i.e., alcohol, marijuana, prescription drugs, cocaine, and heroin) and mental illness among sexual minorities, and the most important factors of the associations; (b) provide a more representative and quality data for increased knowledge and better understanding of the associations, and conceptual framework; and (c) show the disparities in substance abuse and mental illness among sexual minority adults to help increase the low level of awareness about the disparities.

According to SAMHSA (2016), research suggests that sexual minority adults (i.e., people who identify as lesbian, gay, or bisexual) are at greater risk for substance abuse and mental illness than sexual majority adults (i.e., people who identify as heterosexual). However, age group, sex, race/ethnicity, education, employment, and sexual identity are important factors to consider when examining the associations between substance abuse and mental illness among sexual minority adults. The types of substance abuse that were examined in this study were: alcohol, prescription drugs, marijuana, cocaine and heroin abuse.

Age Group and Alcohol Abuse

According to SAMHSA (2016), the patterns of substance abuse vary by age, with the rates generally declining as people grow older.

Ages 18-25 and alcohol abuse. SAMHSA (2016) r**e**ported that from the total population of 50,625 surveyed in NSDUH 2015 in 2015, among sexual minority adults ages 18-25, 20.1% identified as lesbian or gay, 38.7% as bisexual versus 13.7% as heterosexual. From the total population of 50,625 surveyed in NSDUH 2015 in 2015, 15.2% lesbian or gay, and 14.5% bisexual ages 18-25 abused alcohol in the past year versus 10.6% of their heterosexual or straight counterparts. Estimates of past year (binge drinking – i.e., five or more alcoholic drinks on one occasion, at least in one day or once in the past year for males and four for females) showed lesbian or gay 53.0%, bisexual 41.4% versus heterosexual 38.7%. For (heavy drinking i.e., eight or more drinks a week or in the past year for women, fifteen or more for men) estimates of alcohol abuse in the past year showed 11.9% lesbian or gay, 9.6% bisexual versus 11.0% heterosexual (SAMHSA, 2016). Difference between the estimates of alcohol abuse in the past year among sexual minority young adults ages 18-25 and estimates of alcohol abuse among sexual majority heterosexual or straight was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). The statistical significance means that (in using SAMHSA/NSDUH 2015 dataset for secondary data analysis) there is a good chance that I am right in finding that a relationship exists between substance abuse (alcohol abuse) (the independent) variable and mental illness (the dependent) variable among sexual minority adults ages 18-25. It refers to whether any differences observed among sexual

minority adults ages 18-25 between substance abuse (alcohol abuse) and mental illness (the groups being studied) are "real" or whether they are simply due to chance, and that the finding has a five percent (.05) chance of not being true (Creswell, 2009).

Ages 26 and older and alcohol abuse. From the total population of 50,625 surveyed in NSDUH 2015, SAMHSA (2016) reported that among sexual minority adults ages 26 and older, 79.9% identified as lesbian or gay, 61.3% as bisexual versus 86.3% as heterosexual. From the total population of 50,625 surveyed in NSDUH 2015, 8.1% lesbian or gay, and 10.0% bisexual abused alcohol in the past year versus 5.3% of their heterosexual or straight counterparts. The estimates of past year alcohol abuse (binge drinking) among ages 26 and older showed lesbian or gay 30.7% bisexual 33.9% versus heterosexual 24.8%. For (heavy drinking) estimates of alcohol abuse in the past year showed 8.0% lesbian or gay, 6.7% bisexual versus 6.5% heterosexual. Difference between the estimates of alcohol abuse in the past year among sexual minority adults ages 26 and older and estimates of alcohol abuse among sexual majority heterosexual or straight was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). The statistical significance means that there is a good chance that I am right in finding that a relationship exists between substance abuse (alcohol abuse) (the independent) variable and mental illness (the dependent) variable among sexual minority adults ages 26 and older. The finding has a five percent (.05) chance of not being true (Creswell, 2009). Findings showed that in 2015, sexual minority (LGB) young adults ages 18-25 and adults ages 26 and older had a higher rate of alcohol abuse than heterosexual (SAMHSA, 2016). However, sexual minority young adults ages 18-25

showed a higher rate of alcohol abuse (binge drinking and heavy drinking) in the past year than sexual minority adults ages 26 and older (SAMHSA, 2016). Hughes et al. (2016) found that alcohol abuse among sexual minority groups decreases with age, but the declines tend to be smaller and to occur at later ages relative to sexual majority heterosexual groups. For example, Hughes et al. conducted a community-based study of 447 women who identified as lesbian or bisexual, and found that, in contrast with the tendency for drinking among women in the general population to decline with age, there was relatively little variation in drinking rates among sexual minority women across 4 age groups (≤30 years, 31–40 years, 41–50 years, >50 years). Emlet, Fredriksen-Goldsen, and Kim (2013) and Fredriksen-Goldsen, Kim, Barkan, Muraco, and Hoy-Ellis (2013) in a population-based study found that lesbian and bisexual women ages 50 and older are more likely to drink excessively than heterosexual women, and gay and bisexual men 50 years and older are more likely to drink excessively compared with their heterosexual counterparts. The rates of alcohol abuse (binge drinking and heavy drinking) vary between men and women (SAMHSA, 2016).

Sex and Alcohol Abuse

Males and alcohol abuse. According to SAMHSA (2016**),** from the total population of 50,625 surveyed in NSDUH 2015, among sexual minority males ages 18 and older, 57.9% identified as gay, 27.2% as bisexual versus 48.8% as heterosexual. From the total population of 50,625 surveyed in NSDUH 2015 among sexual minority males ages 18 and older, 11.5% gay, and 9.8% bisexual abused alcohol in the past year versus 8.3% heterosexual among sexual majority adults. Estimates of past year alcohol

abuse (binge drinking) among males ages 18 and older showed gay 36.2%, bisexual 28.4% versus heterosexual 32.3%. For (heavy drinking) estimates of alcohol abuse in the past year showed 9.2% gay, 7.6% bisexual versus 9.9% heterosexual (SAMHSA, 2016). Difference between the estimates for sexual minority males ages 18 and older and estimates for sexual majority males that abused alcohol in 2015 was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). The statistical significance means that there is a good chance that I am right in finding that a relationship exists between substance abuse (alcohol abuse) (the independent) variable and mental illness (the dependent) variable among sexual minority males ages 18 and older. The finding has a (.05) chance of not being true (Creswell, 2009).

Females and alcohol abuse. From the total population of 50,625 surveyed in NSDUH 2015, among females ages 18 and older, 42.1% identified as lesbian, 72.8% as bisexual versus 51.2% as heterosexual (SAMHSA, 2016). From the total population of 50,625 surveyed in NSDUH 2015, among sexual minority females ages 18 and older, 6.8% lesbian, and 12.5% bisexual abused alcohol in the past year versus 3.9% heterosexual among sexual majority adults. Estimates of past year alcohol abuse (binge drinking) among female sexual minority ages 18 and older showed lesbian, 35.2% bisexual 36.8% versus heterosexual 26.7%. For (heavy drinking) estimates of alcohol abuse in the past year showed 8.8% lesbian, 7.8% bisexual versus 7.1% heterosexual (SAMHSA, 2016). Difference between the estimates for sexual minority females ages 18 and older and estimates for sexual majority females that abused alcohol in the past year was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). The

statistical significance means that there is a good chance that I am right in finding that a relationship exists between substance abuse (alcohol abuse) (the independent) variable and mental illness (the dependent) variable among sexual minority females ages 18 and older. The finding has a (.05) chance of not being true (Creswell, 2009). The findings showed that sexual minority females were much more likely than their sexual majority counterparts to abuse alcohol users, while similar percentages were found among sexual minority and sexual majority males. Also, sexual minority females were much more likely to be binge drinkers, and heavy drinkers than their sexual majority counterparts, and similar drinking levels were found among sexual minority and sexual majority males (SAMHSA, 2016). According to Hughes et al. (2016), researchers have found greater differences in rates of alcohol abuse and alcohol-related problems between sexual minority and sexual majority women than between sexual minority and sexual majority men. Lesbians and gay men are likely to drink larger amounts and to report more alcohol-related problems. Talley et al. (2014) found that alcohol abuse and heavy drinking are more prevalent among lesbian and bisexual women than among their women heterosexual counterparts. Talley et al. in comparing sexual minority and sexual majority adults suggest that differences in alcohol-abuse patterns between lesbian or bisexual women and gay or bisexual men are much smaller than those between heterosexual women and men.

Race/Ethnicity and alcohol abuse

SAMHSA (2016) stated that racial and ethnic sexual minority groups have different rates of substance abuse and mental illness. As communities of color they tend

to experience greater increase of substance abuse and mental illness often due to their minority status. From the total population of 50,625 surveyed in NSDUH 2015, among sexual minority adults ages 18 and older, Not Hispanic or Latino that identified as lesbian or gay were 80.8%, bisexual 82.5% versus heterosexual 84.8%. Among White, 62.5% identified as lesbian or gay, 58.9% as bisexual versus 65.5% as heterosexual. Among Black or Africa-American, 12.4% identified as lesbian or gay, 13.2% as bisexual versus 11.7% as heterosexual. Among American Indian or Alaska Native, 0.7% identified as lesbian or gay, 0.9% as bisexual versus 0.5% identified as heterosexual. Among Native Hawaiian or Other Pacific Islander, 0.5% identified as lesbian or gay, 0.1% as bisexual versus 0.2% identified as heterosexual. Among Asian, 3.2% identified as lesbian or gay, 4.9% as bisexual versus 5.3% identified as heterosexual. Among Two or More Races, 1.6% identified as lesbian or gay, 4.4% as bisexual versus 1.5% as heterosexual. Among Hispanic or Latino, 19.2% identified as lesbian or gay, 17.5% as bisexual versus 15.2% as heterosexual (SAMHSA, 2016). From the total population of 50,625 surveyed by NSDUH 2015 in 2015, estimates of past year (binge drinking) abuse by Not Hispanic or Latino were lesbian or gay, 18.2%, bisexual 25.6% versus heterosexual 10.2%. Among White, lesbian or gay 19.4%, bisexual 28.3% versus heterosexual 16.4%. Among Black/African American, lesbian or gay 9.4%, bisexual 18.3% versus 9.4% heterosexual. Among American Indian, lesbian or gay, 22.4%, bisexual 32.0% versus heterosexual 18.3%. Among Native Hawaiian, lesbian or gay, 8.8%, bisexual 11.8% versus 7.4% heterosexual. Among Asian, lesbian or gay, 7.8%, bisexual 9.0% versus heterosexual 7.0%. Among Two or More Races, lesbian or gay, 16.4%, bisexual 16.2% versus

heterosexual 10.1%. Among Hispanic or Latino, lesbian or gay, 16.7%, bisexual 24.7% versus heterosexual 12.3%. The estimates of alcohol abuse (heavy drinking) for the past year among Not Hispanic or Latino was lesbian or gay 4.5%, bisexual 6.4% versus heterosexual 3.7%. Among White, lesbian or gay 7.4%, bisexual 8..0% versus heterosexual 5.4%. Among Black/African American, lesbian or gay 2.5%, bisexual 3.8% versus heterosexual 1.5%. Among American Indian, lesbian or gay, 6.3% bisexual 8.1% versus heterosexual 4.3%. Among Native Hawaiian, lesbian or gay 2.8%, bisexual 3.9% versus 1.4% heterosexual. Among Asian, lesbian or gay 1.8%, bisexual 2.9% versus heterosexual 1.3%. Among Two or More Races, lesbian or gay, 6.2%, bisexual 7.4% versus heterosexual 4.1%. Among Hispanic or Latino, lesbian or gay, 6.0%, bisexual 7.8% versus heterosexual 4.1%. Difference between the estimates of alcohol abuse in the past year between racial/ethnic sexual minority group ages 18 and older and estimates of alcohol abuse of sexual majority group was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Findings showed higher rates of binge drinking among ethnic sexual minorities for Native Americans, Whites and Hispanics relative to other ethnic groups. The rates for binge and heavy alcohol drinking was lowest among Asians (SAMHSA, 2016). Gates (2017) found that there are variations across ethnicities in drinking, alcohol abuse, alcohol problems, and treatment use. According to Gates, in 2015, among LGB adults, 3.5% identified as White (non-Hispanic), 4.5% as Black (non-Hispanic), 5.1% as Hispanic, 4.9% as Asian (non-Hispanic), and 5.6% as Other (non-Hispanic).

Education and Alcohol Abuse

From the total population of 50,625 surveyed in NSDUH 2015, among sexual minority adults ages 18 and older with High School or less education, 10.9% identified as lesbian or gay, 16.4% bisexual versus 13.7% heterosexual. Among High School Graduate, 16.3% identified as lesbian or gay, 26.0% bisexual versus 25.5% heterosexual. Among sexual minority adults with Some College or Associate Degree, 31.2% identified as lesbian or gay, 33.8% bisexual versus 30.7% heterosexual. Among College Graduate, 41.6% identified as lesbian or gay, 23.8% as bisexual versus 30.1% as heterosexual (SAMHSA, 2016). From the total population of 50,625 surveyed in NSDUH 2015 in 2015, estimates for alcohol abuse (binge drinking) among sexual minority adults ages 18 and older with High School or less education was lesbian or gay, 22.4%, bisexual 32.9% versus heterosexual 15.0%. Among High School Graduate, lesbian or gay 21.6%, bisexual 31.9% versus heterosexual 12.2%. Among sexual minority adults with Some College or Associate Degree, lesbian or gay, 20.1%, bisexual 26.8% versus heterosexual 10.3%. Among College Graduate, lesbian or gay, 12.6%, bisexual 14.0% versus heterosexual 8.1%. For alcohol abuse (heavy drinking) among sexual minority adults ages 18 and older with High School or less education, estimates for lesbian or gay was 7.9%, bisexual 12.8% versus heterosexual 6.5%. Among High School Graduate, lesbian or gay 7.2%, bisexual 10.3% versus heterosexual 6.1%. Among sexual minority adults with Some College or Associate Degree, lesbian or gay, 6.7%, bisexual 8.4% versus heterosexual 5.2%. Among College Graduate, 5.4% lesbian or gay, 5.0% bisexual versus 4.3% heterosexual (SAMHSA, 2016). Difference between the estimates of alcohol abuse

in the past year among sexual minority adults and estimates of alcohol abuse among sexual majority adults based on education level was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Findings showed that the prevalence of alcohol abuse among college graduates is lower than the other groups. Full-time college students are less likely than their peers who are not enrolled full time in college to abuse alcohol (SAMHSA, 2016). According to Gates (2017), among LGB adults, 4.1% had High School or Less, 3.9% Some College, 3.6% College Graduates, and 3.9% Postgraduates.

Employment and Alcohol Abuse

From the total population of 50,625 surveyed in NSDUH 2015, among sexual minority adults ages 18 and older that were employed full-time, 50.1% identified as lesbian or gay, 41.7% bisexual versus 49.2% heterosexual. Among those employed part-time, 13.9% identified as lesbian or gay, 18.6% bisexual versus 3.3% heterosexual. Among those unemployed, 7.2% identified as lesbian or gay, 10.3% bisexual versus 4.5% heterosexual. Among Other (i.e. students, adults keeping house or camp for children full-time, retired or disabled adults or other person not in the labor force), 28.7% identified as lesbian or gay, 29.5% bisexual versus 33.0% heterosexual (SAMHSA, 2016). From the total population of 50,625 surveyed in NSDUH 2015 in 2015, estimates for alcohol abuse (binge drinking) among sexual minority adults ages 18 and older that were employed full-time showed lesbian or gay 22.5%, bisexual 27.6% versus heterosexual 18.4%. Among those employed part-time, lesbian or gay 20.0%, bisexual 24.5% versus heterosexual 16.1%. Among those unemployed, lesbian or gay, 31.5%, bisexual 44.6%

versus heterosexual 20.8%. Among other (not in the labor force), lesbian or gay, 10.4%, bisexual, 12.0% versus heterosexual 7.2%. For alcohol abuse (heavy drinking), among sexual minority adults employed full-time, 3.2% lesbian or gay, 4.4% bisexual versus 2.8% heterosexual. Among those employed part-time, lesbian or gay, 1.8%, bisexual 2.0% versus heterosexual 1.5%. Among those unemployed, lesbian or gay, 4.3%, bisexual 4.9% versus heterosexual 3.2%. Among Other (i.e. students, adults keeping house or camp for children full-time, retired or disabled adults or other person not in the labor force), lesbian or gay 1.5%, bisexual 1.9% versus heterosexual 1.2% (SAMHSA, 2016). Difference between the estimates of alcohol abuse in the past year among sexual minority adults and estimates of alcohol abuse among sexual majority adults based on employment status was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). The statistical significance means that there is a good chance that I am right in finding that a relationship exists between substance abuse (alcohol abuse) (the independent) variable and mental illness (the dependent) variable among sexual minority adults based on employment status. The finding has a (.05) chance of not being true (Creswell, 2009). Findings showed that alcohol abuse was more prevalent among sexual minority adults ages 18 and older who were unemployed than among sexual minority adults who were working full-time or part-time (SAMHSA, 2016). Gonzales, Przedworski, and Henning-Smith (2016) found that among males, gays employed full-time were 53.1%, bisexuals 43.6% versus heterosexuals 53.9%. Those employed part-time were gays, 14.6%, bisexuals 13.6% versus heterosexuals 12.3%. Unemployed were gays, 5.1%, bisexuals 7.8% versus heterosexuals 5.4%rcent. Among females, those

employed full-time were lesbians, 49.1%, bisexuals 31.4% versus heterosexuals 35.6%. Those employed part-time were lesbians, 17.8%, bisexuals 22.7% versus heterosexuals 18.4%. Unemployed were lesbians, 8.4%, bisexuals 16.6% versus heterosexuals 4.5%.

Sexual Identity and Alcohol Abuse

From the total population of 50,625 surveyed in NSDUH 2015, according to SAMHSA (2016) among sexual minority adults ages 18 and older, 4.3% identified as sexual minority, including 1.8% who identified as being lesbian or gay and 2.5% who identified as being bisexual versus 94.0% who identified as sexual majority (heterosexual or straight). Unknown includes adults who did not know or refused to report their sexual identity (0.6 and 1.0%, respectively) or who had other missing data (0.1% (SAMHSA, 2016). From the total population of 50,625 surveyed in NSDUH 2015, in 2015, 9.5% lesbian or gay, 11.8% bisexual have abused alcohol in the past year versus 6.1% heterosexual among sexual majority adults. The estimates of sexual identity for binge alcohol abuse in the past year were, lesbian or gay 35.2%, bisexual 36.8% versus heterosexual 26.7%**.** For heavy alcohol abuse, lesbian or gay, 8.8%, bisexual 7.8% versus heterosexual 7.1% (SAMHSA, 2016). Difference between the estimates for alcohol abuse among sexual minority adults, and estimates of alcohol abuse among sexual majority adults was statistically significant at the .05 level (SAMHSA, 2016). Findings of alcohol abuse by sexual identity showed that sexual minority adults were more likely to have abused alcohol in the past year than sexual majority adults in the United States (9.5% lesbian or gay, and 11.8% bisexual have abused alcohol in the past year versus 6.1% heterosexual among sexual majority adults (SAMHSA, 2016). Blosnich et al. (2014) and

Talley et al. (2014) stated that mounting evidence suggest that LGB populations are more likely to engage in alcohol abuse (i.e., for binge drinking – five or more alcoholic drinks on one occasion, at least in one day or once in the past year for males and four for females), and for heavy drinking - i.e., eight or more drinks a week or in the past year for women, fifteen or more for men) when compared with their heterosexual counterparts. According to Hughes et al. (2016), researchers have found higher rates of alcohol abuse and alcohol-related problems among sexual minority adults than among sexual majority adults.

Age Group and Prescription Drugs Abuse

Sexual minority young adults ages 18-25 and adults ages 26 and older were more likely than their sexual majority counterparts to have abused prescription drugs in the past year (SAMHSA, 2016).

Ages 18-25 and prescription drugs abuse. From the total population of 50,625 surveyed in NSDUH 2015**,** for ages 18-25, 15.1% lesbian or gay and 13.9% bisexual abused prescription pain relievers in the past year versus 8.0% heterosexual or straight. For tranquilizers, 10.8% lesbian or gay, and 8.3% bisexual abused tranquilizers in the past year versus 5.0% heterosexual. For stimulants, 8.0% lesbian or gay, and 7.9% bisexual abused stimulants in the past year versus 7.2% heterosexual. For sedatives, 1.6% lesbian or gay, and 1.3% bisexual abused sedatives in the past year versus 0.7% heterosexual (SAMHSA, 2016). Difference between the estimates for prescription drugs abuse by sexual minority adults ages 18-25 and estimates for heterosexual or straight was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016).

Ages 26 and older and prescription drugs abuse. From the total population of 50,625 surveyed in NSDUH 2015, for ages 26 and older, 6.2% lesbian or gay and 11.0% bisexual abused prescription pain relievers in the past year versus 4.0% heterosexual or straight. For tranquilizers, 3.4% lesbian or gay, and 5.7% bisexual abused tranquilizers in the past year versus 1.7% heterosexual. For stimulants, 1.6% lesbian or gay, and 3.4% bisexual abused stimulants in the past year versus 1.0% heterosexual. For sedatives, 0.5% lesbian or gay, and 1.6% bisexual abused sedatives in the past year versus 0.5% heterosexual (SAMHSA, 2016). Difference between estimates for prescription drugs abuse among sexual minority adults ages 26 and older and estimates for heterosexual or straight was statistically significant at the .05 level (SAMHSA, 2016). Myers (2014) also found that young adults 18 to 25 years of age report the highest prevalence of prescription drug abuse relative to other age groups.

Sex and Prescription Drugs Abuse

Both sexual minority adult males and females ages 18 and older were more likely than their sexual majority counterparts to have abused or misused prescription drugs in the past year (SAMHSA, 2016).

Males and prescription drugs abuse. From the total population of 50,625 surveyed in NSDUH 2015, **a**mong sexual minority males ages 18 and older, 8.9% gay, and 8.1% bisexual have abused prescription pain relievers in the past year versus 5.4% heterosexual males. For tranquilizers, 5.0% gay, and 5.5% bisexual have abused tranquilizers in the past year versus 2.4% heterosexual males. For stimulants, 3.4% gay, and 3.6% bisexual have abused stimulants in the past year versus 2.3% heterosexual

males. For sedatives, 0.9% gay, and 1.0% bisexual have abused sedatives in the past year versus 0.5% heterosexual males (SAMHSA, 2016). Difference between the estimates of prescription drugs abuse among sexual minority adult males and estimates of prescription drugs abuse among heterosexual males was statistically significant at the .05 level (SAMHSA, 2016).

Race/Ethnicity and Prescription Drugs Abuse

SAMHSA (2016) stated that racial and ethnic sexual minority groups have different rates of substance abuse (prescription drug abuse) and mental illness. Race/ethnicity is an important factor associated with prescription drug abuse.

From the total population of 50,625 surveyed in NSDUH 2015, among Not Hispanic or Latino, estimates of prescription drug (pain relievers) abused by sexual minority adults ages 18 and older in the past year was lesbian or gay, 10.4%, bisexual 12.8% versus heterosexual 8.2%. Among White, lesbian or gay, 16.1%, bisexual or gay 17.4% versus heterosexual 15.5%. Among Black/African American, lesbian or gay 7.8% bisexual 8.1% versus heterosexual 6.4%. Among American Indian, lesbian or gay, 16.1%, bisexual 17.6% versus heterosexual 12.3%. Among Native Hawaiian, lesbian or gay 7.8%, bisexual 9.9% versus heterosexual 6.4%. Among Asian, lesbian or gay, 7.3%, bisexual 9.6% versus heterosexual 5.8%. Among Two or More Races, lesbian or gay 20.4%, bisexual 22.9% versus heterosexual 10.1%. Among Hispanic or Latino, lesbian or gay, 15.7%, bisexual 16.3% versus heterosexual 12.8%. For tranquilizers abuse, among Not Hispanic or Latino, estimates were lesbian or gay, 9.3%, bisexual 12.0% versus heterosexual 8.1%. Among White, lesbian or gay, 15.3%, bisexual 16.7% versus

heterosexual 14.2%. Among Black/African American, lesbian or gay, 6.8%, bisexual 7.9% versus heterosexual 5.2%. Among American Indian, lesbian or gay, 15.7%, bisexual 17.0% versus heterosexual 11.8%. Among Native Hawaiian, lesbian or gay 6.7%, bisexual 8.8% versus heterosexual 6.0%. Among Asian, lesbian or gay, 6.1% bisexual 8.7% versus heterosexual 5.2%. Among Two or More Races, lesbian or gay, 19.2%, bisexual 21.5% versus heterosexual 9.0%. Among Hispanic or Latino, lesbian or gay, 14.3%, bisexual 16.1% versus heterosexual 11.9%. For stimulants abuse, among Not Hispanic or Latino, estimates were lesbian or gay, 9.3%, bisexual 12.5% versus heterosexual 7.8%. Among White, lesbian or gay, 17.3%, bisexual or gay 18.7% versus heterosexual 149%. Among Black/African American, lesbian or gay, 5.9%, bisexual 6.4% versus heterosexual 4.5%. Among American Indian, lesbian or gay, 15.0%, bisexual 17.6% versus heterosexual 12.3%. Among Native Hawaiian, lesbian or gay, 7.4%, bisexual 9.2% versus heterosexual 6.1%. Among Asian, lesbian or gay, 4.8%, bisexual 5.4% versus heterosexual 4.0%. Among Two or More Races, lesbian or gay 19.8%, bisexual 1.7% versus heterosexual 11.2%. Among Hispanic or Latino, lesbian or gay, 11.7%, bisexual 12.4% versus heterosexual 10.7%. For sedatives abuse, among Not Hispanic or Latino, estimates were lesbian or gay, 9.8%, bisexual 11.9% versus heterosexual 7.8%. Among White, lesbian or gay, 15.9%, bisexual or gay 17.2% versus heterosexual14.6%. Among Black/African American, lesbian or gay, 5.8%, bisexual 6.3% versus heterosexual 5.1%. Among American Indian, lesbian or gay, 14.3%, bisexual 15.5% versus heterosexual 11.0%. Among Native Hawaiian, lesbian or gay, 7.1%, bisexual 9.0% versus heterosexual 5.9%. Among Asian, lesbian or gay, 5.6 %,

bisexual 6.0% versus heterosexual 5.1%. Among Two or More Races, lesbian or gay, 20.1%, bisexual 25.1% versus heterosexual 9.9%. Among Hispanic or Latino, lesbian or gay, 9.8%, bisexual 10.1% versus heterosexual 8.8% (SAMHSA, 2016). Difference between the estimates of prescription drugs abuse among sexual minority adults ages 18 and older and estimates of prescription drugs abuse among heterosexual adults was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). According to Kelly (2013), Whites abuse stimulants at highest rate, Blacks lower rate, and Asians low rate relative to other racial/ethnic minority groups.

Education and Prescription Drugs Abuse

From the total population of 50,625 surveyed in NSDUH 2015, among sexual minority adults ages 18 and older with <High School education, 21.2% lesbian or gay, 30.0% bisexual versus 17.4% heterosexual abused prescription drug (pain relievers) in the past year. Among High School Graduate, 17.1% lesbian or gay, 20.3% bisexual versus 15.6% heterosexual abused pain relievers in the past year. Among sexual minority adults with Some College or Associate Degree, 20.5% lesbian or gay, 22.8% bisexual versus 18.9% heterosexual abused pain relivers in the past year. Among College Graduate, 11.7% lesbian or gay, 15.2% bisexual versus 10.6% heterosexual abused pain relievers in the past year. For tranquilizers abuse, among sexual minority adults ages 18 and older with <High School education, 18.3% lesbian or gay, 21.2% bisexual versus 16.1% heterosexual abused tranquilizers in the past year. Among High School Graduate, 13.7% lesbian or gay, 14.6% bisexual versus 11.8% heterosexual abused tranquilizers in the past year. Among sexual minority adults with Some College or Associate Degree,

14.1% lesbian or gay, 15.9% bisexual versus 12.3% heterosexual abused tranquilizers in the past year. Among College Graduate, 9.8% lesbian or gay, 11.9% bisexual versus 8.6% heterosexual abused tranquilizers in the past year. For stimulants, among sexual minority adults ages 18 and older with <High School education, 18.9% lesbian or gay, 21.8% bisexual versus 16.5% heterosexual abused stimulants in the past year. Among High School Graduate, 14.2% lesbian or gay, 15.1% bisexual versus 12.9% heterosexual abused stimulants in the past year. Among sexual minority adults with Some College or Associate Degree, 15.1% lesbian or gay, 16.3% bisexual versus 11.8% heterosexual abused stimulants in the past year. Among College Graduate, 10.4% lesbian or gay, 11.0% bisexual versus 8.9% heterosexual abused stimulants in the past year. For sedatives, estimates for sedatives abuse among sexual minority adults ages 18 and older with <High School education were lesbian or gay, 17.7%, bisexual 20.7% versus heterosexual 15.3%. Among High School Graduate, lesbian or gay, 14.0%, bisexual 14.8% versus heterosexual 12.3%. Among sexual minority adults with Some College or Associate Degree, lesbian or gay, 14.8%, bisexual 18.6% versus heterosexual 12.5%. Among College Graduate, lesbian or gay, 12.2%, bisexual 13.6% versus heterosexual 11.7% (SAMHSA, 2016). Difference between the estimates of prescription drugs abuse in the past year among sexual minority adults ages 18 and older and estimates of prescription drugs abuse among sexual majority adults based on education level was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). According to Kelly (2013), prescription drug abuse is lower among college graduates (6.6%) than

those with some college education (10.2%), high school graduates who did not attend college (9.8%) and those that had not graduated from high school (11.1%).

Employment and Prescription Drugs Abuse

From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates for prescription drugs abuse (pain relievers) among sexual minority adults ages 18 and older that were employed full-time showed lesbian or gay, 18.9%, bisexual 20.4% versus heterosexual 15.2%. Among those employed part-time, lesbian or gay, 16.1%, bisexual 19.2% versus heterosexual 14.8%. Among those unemployed, lesbian or gay, 23.1%, bisexual 26.8% versus heterosexual 18.8%. Among Other (not in the labor force), lesbian or gay, 25.4%, bisexual 28.8% versus heterosexual 19.3%. For tranquilizers, among sexual minority adults employed full-time, estimates for tranquilizers abuse showed 8.6% lesbian or gay, 10.2% bisexual versus 7.3% heterosexual. Among those employed part-time, lesbian or gay, 8.0%, bisexual 9.1% versus heterosexual 6.5%. Among those unemployed, lesbian or gay, 10.3%, bisexual 13.9% versus heterosexual 6.2%. Among Other (i.e. students, adults keeping house or camp for children full-time, retired or disabled adults or other person not in the labor force), lesbian or gay, 18.5%, bisexual 20.9% versus heterosexual 16.2%. For stimulants, among sexual minority adults employed full-time, estimates for stimulants abuse showed 8.9% lesbian or gay, 10.5% bisexual versus 7.8% heterosexual. Among those employed part-time, lesbian or gay, 7.7%, bisexual 8.2% versus heterosexual 6.0%. Among those unemployed, lesbian or gay 11.3%, bisexual 14.8% versus heterosexual 6.5%. Among Other (i.e. students, adults keeping house or camp for children full-time, retired or disabled adults or other person

not in the labor force), lesbian or gay, 18.9%, bisexual 21.5% versus heterosexual 16.7%. For sedatives, among sexual minority adults employed full-time, estimates for sedative abuse showed 7.3% lesbian or gay, 8.4% bisexual versus 5.1% heterosexual. Among those employed part-time, lesbian or gay, 7.0%, bisexual 8.0% versus heterosexual 5.2%. Among those unemployed, lesbian or gay, 10.8%, bisexual 12.9% versus heterosexual 6.0%. Among Other (i.e. students, adults keeping house or camp for children full-time, retired or disabled adults or other person not in the labor force), lesbian or gay, 18.0%, bisexual 19.8% versus heterosexual 15.1% (SAMHSA, 2016). Difference between the estimates of prescription drugs abuse in the past year among sexual minority adults and estimates of prescription drugs abuse among sexual majority adults ages 18 and older based on employment status was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Gonzales et al. (2016) stated that prescription drug abuse was highest among unemployed, higher among Other, and lowest among College Graduates.

Sexual Identity and Prescription Drugs Abuse

According to SAMHSA (2016), sexual minority adults ages 18 and older were more likely to have abused/misused prescription drugs in the past year than sexual majority adults of the same age. From the total population of 50,625 surveyed in NSDUH 2015, estimates of sexual minority adults ages 18 and older that abused pain relievers in the past year were lesbian or gay, 8.0%, bisexual 12.1% versus heterosexual 4.5%. Tranquilizers abuse was lesbian or gay, 4.9% bisexual 6.7% versus heterosexual 2.2%. Stimulants abuse was lesbian or gay, 2.9%, bisexual 5.2% versus heterosexual 1.9%. Sedatives abuse was lesbian or gay, 0.7%, bisexual 1.5% versus heterosexual 0.6%

(SAMHSA, 2016). Difference between the estimates of prescription drugs abuse in the past year among sexual minority adults and estimates of prescription drugs abuse among sexual majority adults ages 18 and older based on sexual identity was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). The finding has a (.05) chance of not being true (Creswell, 2009). McCabe, West, Hughes, and Boyd (2013) found that those who identified themselves as bisexual abused prescription drugs than those that identified as lesbian or gay or heterosexual.

Age Group and Marijuana Abuse

Sexual minority young adults ages 18-25 and adults ages 26 and older were more likely than their sexual majority counterparts to abuse marijuana in the past year (SAMHSA, 2016).

Ages 18-25 and marijuana abuse. From the total population of 50,625 surveyed in NSDUH 2015, among sexual minority young adults ages 18-25, 49.3% lesbian or gay, 45.0% bisexual versus 31.0% heterosexual abused marijuana in the past year (SAMHSA, 2016). Difference between the estimates of marijuana abuse by sexual minority young adults in the past year and estimates of marijuana abuse by heterosexual was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016).

Ages 26 and older and marijuana abuse. From the total population of 50,625 surveyed in NSDUH 2015, in 2015, among adults ages 26 and older, estimates of marijuana abuse in the past year among lesbian or gay was 20.3%, bisexual 27.3% versus heterosexual 10.1% (SAMHSA, 2016). Difference between the estimates of marijuana abuse among sexual minority adults and estimates of marijuana abuse among

heterosexual was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Myers (2014) found that young adults between 18 to 25 years of age, especially lesbian or gay have the highest past year prevalence rates of marijuana abuse, relative to older age groups.

Sex and Marijuana Abuse

Both sexual minority males and females were more likely than their sexual majority counterparts to have abused or misused marijuana in the past year (SAMHSA, 2016).

Males and marijuana abuse. From the total population of 50,625 surveyed in NSDUH 2015, in 2015**, e**stimates of marijuana abuse in the past year among sexual minority males ages 18 and older showed 27.7% among gay, 26.1% among bisexual versus 16.2% among heterosexual sexual majority males (SAMHSA, 2016). Difference between estimates of marijuana abuse in the past year among sexual minority males and among sexual majority males was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016).

Females and marijuana abuse. From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates of marijuana abuse in the past year among sexual minority females showed 24.0% lesbian, 37.1% bisexual versus 9.8% heterosexual sexual majority adult females (SAMHSA, 2016). Difference between estimates of marijuana abuse among sexual minority females and among sexual majority females was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). McCabe, West, Hughes, and Boyd (2013) in a nationally representative sample found that lesbian

women showed greater odds of past year marijuana use versus . heterosexual women. According to West et al., differences among men were less pronounced, and homosexual men had higher odds of past year marijuana use than heterosexual men. According to Goldberg, Strutz, Herring, and Halpern (2013), young adult female sexual minority groups are at a higher risk than their heterosexual peers of marijuana misuse. Newcomb, Birkett, Corliss, and Mustanski (2014) found that male young adults had higher odds of marijuana abuse than female young adults.

Race/Ethnicity and Marijuana Abuse

From the total population of 50,625 surveyed in NSDUH 2015 in 2015, estimates of marijuana abuse in the past year among Not Hispanic or Latino sexual minority ages 18 and older showed lesbian or gay, 11.6%, bisexual 12.9% versus heterosexual 8.7%. Among White, lesbian or gay, 18.5%, bisexual 28.1% versus heterosexual 16.8%. Among Black/African, lesbian or gay, 16.4%, bisexual 19.7% versus heterosexual 12.3%. Among American Indian, lesbian or gay, 18.2%, bisexual 20.1% versus heterosexual 13.5%. Among Native Hawaiian, lesbian or gay, 10.0%, bisexual 12.9% versus heterosexual 7.4%. Among Asian, lesbian or gay, 8.1%, bisexual 9.4% versus heterosexual 4.5%. Among Two or More Races, lesbian or gay, 18.9%, bisexual 29.0% versus heterosexual 17.0%. Among Hispanic or Latino, lesbian or gay, 17.7%, bisexual 21.5% versus heterosexual 16.9% (SAMHSA, 2016). Difference between the estimates of marijuana abuse for the past year among sexual minority adults ages 18 and older and estimates of marijuana abuse among heterosexual adults was statistically significant at the .05 level. (Medley et al., 2016; SAMHSA, 2016). According to Balsam et al., (2015), marijuana

abuse is common among sexual minority adults. Hispanic and Whites have higher rates of marijuana abuse and Asian and Blacks have lower rates relative to other racial/ethnic minority groups.

Education and Marijuana Abuse

From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates of marijuana abuse in the past year among sexual minority adults ages 18 and older with <High School education showed lesbian or gay, 18.1%, bisexual 22.9% versus heterosexual 16.0%. Among High School Graduate, lesbian or gay, 15.9%, bisexual 16.6% versus 15.5% heterosexual abused marijuana in the past year. Among sexual minority adults with Some College or Associate Degree, 17.8 % lesbian or gay, 20.7% bisexual versus 15.9% heterosexual abused marijuana in the past year. Among College Graduate, 13.5% lesbian or gay, 14.2% bisexual versus 12.1% heterosexual abused marijuana in the past year (SAMHSA, 2016). Difference between the estimates of marijuana abuse in the past year among sexual minority adults ages 18 and older and estimates of marijuana abuse among sexual majority adults based on education level was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). According to Newcomb, Birkett, Corliss, and Mustanski (2014), marijuana abuse is lower among college graduates than those with some college education and high school graduates who did not attend college, as well as those that had not graduated from high school.

Employment and Marijuana Abuse

From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates for marijuana abuse among sexual minority adults ages 18 and older that were employed

full-time showed lesbian or gay, 19.7%, bisexual 20.0% versus heterosexual 14.8%. Among those employed part-time, lesbian or gay, 15.8%, bisexual 18.2% versus heterosexual 13.6%. Among those unemployed, lesbian or gay, 22.7%, bisexual 25.8% versus heterosexual 18.8%. Among Other (not in the labor force), lesbian or gay, 24.4% bisexual 27.8% versus heterosexual 19.3% (SAMHSA, 2016). Difference between the estimates of marijuana abuse in the past year among sexual minority adults and estimates of marijuana abuse among sexual majority adults ages 18 and older based on employment status was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Newcomb, Birkett, Corliss, and Mustanski (2014) stated that marijuana abuse was highest among unemployed, higher among Other, and lowest among College Graduates.

Sexual Identity and Marijuana Abuse

Sexual minority adults were more likely to have abused marijuana in the past year than sexual majority adults (SAMHSA, 2016). From the total population of 50,625 surveyed in NSDUH 2015, in 2015, 26.1% lesbian or gay, 34.1% bisexual versus 12.9% heterosexual abused marijuana in the past year (SAMHSA, 2016). Difference between the sexual minority adult estimates of marijuana abuse and heterosexual sexual majority estimates of marijuana abuse was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Myers (2014) found that those who identified themselves as bisexual report the highest prevalence of marijuana abuse relative to those who identified themselves as lesbian or gay or heterosexual.

Age Group and Cocaine Abuse

Sexual minority young adults ages 18-25 and adults ages 26 and older were more likely than their sexual majority counterparts to abuse cocaine in the past year (SAMHSA, 2016).

Ages 18-25 and cocaine abuse. From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates of cocaine abuse in the past year among sexual minority young adults ages 18-25 showed 10.6% lesbian or gay, 8.3% bisexual versus 5.0% heterosexual (SAMHSA, 2016). Difference between the estimates of cocaine abuse among sexual minority young adults and estimates of cocaine abuse among heterosexual sexual majority young adults was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016).

Ages 26 and older and cocaine abuse. From the total population of 50,625 surveyed in NSDUH 2015, in 2015 estimate of cocaine abuse in the past year among 26 and older adults showed lesbian or gay, 2.7%, bisexual 4.2% versus heterosexual 1.3% (SAMHSA, 2016). Difference between the estimates of cocaine abuse among sexual minority adults and estimates of cocaine abuse among heterosexual sexual majority adults was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). According to Gonzales et al. (2016), young adults aged 18 to 25 years have a higher rate of cocaine abuse than any other age group, with 1.4% of young adults reporting past year cocaine abuse.

Sex and Cocaine Abuse

Both sexual minority males and females were more likely than their sexual majority counterparts to have abused or misused cocaine in the past year (SAMHSA, 2016).

Males and cocaine abuse. From the total population of 50,625 surveyed in NSDUH 2015, in 2015, the **e**stimates of cocaine abuse among males in the past year showed 5.6% gay, 3.4% bisexual versus 2.5% heterosexual (SAMHSA, 2016). Difference between estimates of cocaine abuse among sexual minority males and estimates of cocaine abuse among sexual majority males was statistically significant at the .05 level (Medley et al., 2016: SAMHSA, 2016).

Females and cocaine abuse. From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates of cocaine abuse among sexual minority females in the past year showed 2.4% lesbian, 6.7% bisexual versus 1.1% heterosexual females (SAMHSA, 2016). Difference between estimates of cocaine abuse in the past year among sexual minority females and among sexual majority females was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). According to Corliss et al. (2013), sexual minority is a risk indicator for abuse of cocaine. Corliss et al. found that bisexual females have the highest past year prevalence of cocaine abuse, and among sexual minority males, gays have higher prevalence of past year cocaine abuse than females.

Race/Ethnicity and Cocaine Abuse

From the total population of 50,625 surveyed in NSDUH 2015 in 2015, estimates of cocaine abuse in the past year among Not Hispanic or Latino sexual minority ages 18

and older showed lesbian or gay, 10.3%, bisexual 11.2% versus heterosexual 7.4%. Among White, lesbian or gay, 16.2%, bisexual 20.3% versus heterosexual 13.7%. Among Black/African American, lesbian or gay, 9.6% bisexual 10.5% versus heterosexual 6.7%. Among American Indian, lesbian or gay, 17.1%, bisexual 20.8% versus heterosexual 13.3%. Among Native Hawaiian, lesbian or gay, 9.0%, bisexual 10.1% versus heterosexual 6.2%. Among Asian, lesbian or gay, 7.1%, bisexual 8.3% versus heterosexual 3.8%. Among Two or More Races, lesbian or gay, 17.7%, bisexual 27.1% versus heterosexual 15.2%. Among Hispanic or Latino, lesbian or gay, 16.0%, bisexual 18.3% versus heterosexual 13.2% (SAMHSA, 2016). Difference between the estimates of cocaine abuse for the past year among sexual minority adults ages 18 and older and estimates of cocaine abuse among heterosexual adults was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). According to Balsam et al. (2015), cocaine abuse is lowest among Asians and highest among American Indians or Alaska Natives and persons that reported two or more races.

Education and Cocaine Abuse

From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates of cocaine abuse in the past year among sexual minority adults ages 18 and older with <High School education showed lesbian or gay, 12.7%, bisexual 18.9% versus heterosexual 11.1%. Among High School Graduate, lesbian or gay 10.3%, bisexual 14.5% versus 9.6% heterosexual abused cocaine in the past year. Among sexual minority adults with Some College or Associate Degree, 9.7% lesbian or gay, 12.6% bisexual versus 8.3% heterosexual abused cocaine in the past year. Among College Graduate,

7.2% lesbian or gay, 8.3% bisexual versus 5.6% heterosexual abused cocaine in the past year (SAMHSA, 2016). Difference between the estimates of cocaine abuse in the past year among sexual minority adults ages 18 and older and estimates of cocaine abuse among sexual majority adults based on education level was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). According to Newcomb, Birkett, Corliss, and Mustanski (2014), cocaine abuse is lower among college graduates than those with some college education and high school graduates who did not attend college, as well as those that had not graduated from high school. It is also lower than marijuana abuse among sexual minority adults based on educational level.

Employment and Cocaine Abuse

From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates for cocaine abuse in the past year among sexual minority adults ages 18 and older that were employed full-time showed lesbian or gay, 16.4%, bisexual 17.2% versus heterosexual 13.3%. Among those employed part-time, lesbian or gay, 14.3%, bisexual 15.8% versus heterosexual 12.8%. Among those unemployed, lesbian or gay, 19.4%, bisexual 21.6% versus heterosexual 17.5%. Among Other (not in the labor force), lesbian or gay, 20.1% bisexual 22.9% versus heterosexual 18.1% (SAMHSA, 2016). Difference between the estimates of cocaine abuse in the past year among sexual minority adults and estimates of cocaine abuse among sexual majority adults ages 18 and older based on employment status was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Newcomb, Birkett ,Corliss, and Mustanski (2014) stated that cocaine abuse was highest among unemployed and higher among Other.

Sexual Identity and Cocaine Abuse

Sexual minority adults were more likely to have abused cocaine in the past year than sexual majority adults. From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates of cocaine abuse in the past year among adults ages 18 and older who identified themselves as sexual minority showed lesbian or gay, 4.3%, bisexual 5.8% versus heterosexual 1.8% (SAMHSA, 2016). Difference between the estimates of sexual minority adults who identified themselves as lesbian or gay and bisexual and sexual majority adults who identified themselves as heterosexual was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Myers (2014) found that sexual minority adults that identified themselves as bisexual report the highest prevalence of cocaine abuse versus those who identified themselves as lesbian or gay or heterosexual.

Age Group and Heroin Abuse

Sexual minority young adults ages 18-25 and adults ages 26 and older were more likely than their sexual majority counterparts to abuse heroin in the past year (SAMHSA, 2016).

Ages 18-25 and heroin abuse. From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates of heroin abuse in the past year **a**mong sexual minority young adults ages 18-25 showed lesbian or gay, 0.9%, bisexual 1.3% versus heterosexual 0.6% (SAMHSA, 2016). Difference between the estimates of heroin abuse in the past year among sexual minority young adults ages 18-25 and estimates of heroin abuse among heterosexual young adults was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016).

Ages 26 and older and heroin abuse. From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates of heroin abuse in the past year among 26 and older adults showed lesbian or gay, 0.4%, bisexual 1.2% versus heterosexual 0.3% (SAMHSA, 2016). Difference between the estimates of heroin abuse among sexual minority adults and estimates of heroin abuse among heterosexual was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Myers (2014) found that sexual minority adults 26 and older report a lower prevalence of heroin abuse relative to those aged 18-25 but higher rate relative to heterosexual ages 18 and older.

Sex and Heroin Abuse

Both sexual minority males and females were more likely than their sexual majority counterparts to have abused or misused heroin in the past year (SAMHSA, 2016).

Males and heroin abuse. From the total population of 50,625 surveyed in NSDUH 2015, in 2015 estimates of heroin abuse in the past year among sexual minority males ages 18 and older showed gay, 0.8%, bisexual 0.9% versus heterosexual 0.4% (SAMHSA, 2016). Difference between estimates of heroin abuse among sexual minority males and estimates of heroin abuse among sexual majority males was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016).

Females and heroin abuse. From the total population of 50,625 surveyed in NSDUH 2015, in 2015 estimates of heroin abuse in the past year among sexual minority females ages 18 and older showed lesbian or gay, 0.0%, bisexual 1.4 versus heterosexual 0.2% (SAMHSA, 2016). Difference between estimates of heroin abuse among sexual

minority females and estimates of heroin abuse among sexual majority females was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Corliss et al. (2013) found that bisexual females have the highest past year prevalence of drug use for all drug categories except heroin. According to Corliss et al., among heterosexuals, males have higher prevalence of past year use of heroin than females.

Race/Ethnicity and Heroin Abuse

From the total population of 50,625 surveyed in NSDUH 2015 in 2015, estimates of heroin abuse in the past year among Not Hispanic or Latino sexual minority ages 18 and older showed lesbian or gay, 5.4%, bisexual 6.2% versus heterosexual 3.5%. Among White, lesbian or gay, 6.2%, bisexual 6.8% versus heterosexual 5.0%. Among Black/African American, lesbian or gay, 3.2%, bisexual 4.1% versus heterosexual 2.8%. Among American Indian, lesbian or gay, 6.7%, bisexual 7.1% versus heterosexual 5.4%. Among Native Hawaiian, lesbian or gay, 2.3%, bisexual 3.0% versus heterosexual 1.8%. Among Asian, lesbian or gay, 1.6%, bisexual 1.9% versus heterosexual 0.8%. Among Two or More Races, lesbian or gay, 7.8%, bisexual 8.1% versus heterosexual 5.6%. Among Hispanic or Latino, lesbian or gay, 5.3%, bisexual 5.0% versus heterosexual 4.4% (SAMHSA, 2016). Difference between the estimates of heroin abuse among sexual minority adults and estimates of heroin abuse among heterosexual sexual majority adults was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). According to Balsam et al. (2015), heroin abuse is lowest among Asians and highest among American Indians or Alaska Natives and persons that reported two or more races.

Education and Heroin Abuse

From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates of heroin abuse in the past year among sexual minority adults ages 18 and older with <High School education showed lesbian or gay, 7.6%, bisexual 8.9% versus heterosexual 5.2%. Among High School Graduate, lesbian or gay, 6.4%, bisexual 7.3% versus heterosexual 4.8%. Among sexual minority adults with Some College or Associate Degree, estimates of heroin abuse showed lesbian or gay, 3.2%, bisexual 3.8% versus heterosexual 2.1%. Among College Graduate, estimates of heroin abuse showed lesbian or gay, 1.1%, bisexual 1.4% versus heterosexual 0.3% (SAMHSA, 2016). Difference between the estimates of heroin abuse among sexual minority adults and estimates of heroin abuse among sexual majority adults based on educational level was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). According to Newcomb, Birkett, Corliss, and Mustanski (2014), heroin abuse is lower among college graduates than those with some college education and high school graduates who did not attend college, as well as those that had not graduated from high school. It is also the lowest illicit drug abused by both sexual minority and sexual majority adults based on educational level.

Employment and Heroin Abuse

From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates for heroin abuse in the past year among sexual minority adults ages 18 and older that ere employed full-time showed lesbian or gay, 10.1%, bisexual 11.4% versus heterosexual 8.3%. Among those employed part-time, lesbian or gay, 8.5%, bisexual 9.1% versus

heterosexual 7.2%. Among those unemployed, lesbian or gay, 11.0%, bisexual 11.7% versus heterosexual 8.7%. Among Other (not in the labor force), lesbian or gay, 11.4%, bisexual 12.8% versus heterosexual 9.2% (SAMHSA, 2016). Difference between the estimates of heroin abuse among sexual minority adults and estimates of heroine abuse among sexual majority adults based on employment status was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Newcomb, Birkett, Corliss, and Mustanski (2014) stated that heroin abuse was highest among unemployed.

Sexual Identity and Heroin Abuse

Sexual minority adults were more likely to have abused heroin in the past year than sexual majority adults (SAMHSA, 2016). From the total population of 50,625 surveyed in NSDUH 2015, in 2015 estimates of heroin abuse among sexual minority ages 18 and older that identified themselves as lesbian or gay showed 0.5%, bisexual 1.2% versus heterosexual 0.3% (SAMHSA, 2016). Difference between the estimates of heroin abuse among lesbian or gay and bisexual that identified themselves as sexual minority and estimates of heroin abuse among heterosexual that identified as sexual majority was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Myers (2014) found that those who identified themselves as bisexual report the highest prevalence of heroin abuse compared with those who identified themselves as lesbian or gay or heterosexual.

Age Group and Mental Illness

Sexual minority adults ages 18 and older were more than twice as likely than sexual majority adults to have experienced any mental illness (AMI), serious mental

illness (SMI), AMI excluding SMI, major depressive episode (MDE) and major depressive episode with severe impairment in the past year (SAMHSA, 2016).

Ages 18-25 and mental illness. From the total population of 50,625 surveyed in NSDUH 2015, in 2015 the rate or estimates of AMI in the past year among sexual minority adults ages 18-25 showed lesbian or gay 31.4%, bisexual 46.2% versus heterosexual 19.8%. Estimates of SMI showed lesbian or gay, 0.0%, bisexual 25.8% versus heterosexual 9.0%. Estimates of AMI excluding SMI showed lesbian or gay, 21.4%, bisexual 29.3% versus heterosexual 15.7%. Estimates of MDE among lesbian or gay showed 15.8%, bisexual 25.8% versus 9.0% for heterosexual. Estimates of MDE with severe impairment showed lesbian or gay, 11.4%, bisexual 15.8% versus 5.7% for heterosexual (SAMHSA, 2016). Difference of estimates of AMI, SMI, AMI excluding SMI, MDE, and MDE with severe impairment among lesbian or gay and bisexual ages 18-25 and estimates for heterosexual adults was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016).

Ages 26 and older and mental illness. From the total population of 50,625 surveyed in NSDUH 2015, in 2015 estimates of AMI in the past year among sexual minority adults ages 26 and older showed lesbian or gay, 26.1%, bisexual 44.1% versus heterosexual 16.7%. Estimates of SMI showed lesbian or gay, 9.5%, bisexual 14.9% versus heterosexual 3.6%. Estimates of AMI excluding SMI showed lesbian or gay, 16.6%, bisexual 29.2% versus heterosexual 13.1%. Estimates of MDE showed lesbian or gay, 10.3%, bisexual 21.5% versus heterosexual 5.8%. Estimates of MDE with severe impairment showed lesbian or gay, 8.8%, bisexual 16.0% versus heterosexual 3.6%

(SAMHSA, 2016). Difference in estimates of AMI, SMI, AMI excluding SMI, MDE, and MDE with severe impairment among lesbian or gay and bisexual ages 18-25 and the estimates for heterosexual adults was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Myers (2014) found that adults 26 and older report lower prevalence of mental health problems, such as depression or anxiety relative to young adults ages 18-25.

Sex and Mental Illness

Males and mental illness. From the total population of 50,625 surveyed in NSDUH 2015, in 2015 estimates of AMI in the past year among gay showed 27.0%, bisexual 38.0% versus heterosexual 13.7%. Estimates for SMI showed gay, 9.6%, bisexual 11.8% versus heterosexual 2.7%. Estimates for AMI excluding SMI in the past year showed gay, 17.3%, bisexual 26.2% versus heterosexual 11.0%. Estimates of MDE showed gay, 11.1%, bisexual 20.7% versus heterosexual 4.3%. Estimates of MDE with severe impairment in the past year showed gay, 8.7%, bisexual 13.2% versus heterosexual 2.7% (SAMHSA, 2016). Difference between estimates of mental illness among sexual minority adult males and estimates of mental illness among sexual majority heterosexual males was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016).

Females and mental illness. From the total population of 50,625 surveyed in NSDUH 2015, in 2015 estimates of AMI in the past year among lesbian showed 27.3%, bisexual 47.5% versus heterosexual 20.4%. Estimates for SMI showed lesbian, 9.5%, bisexual 17.1% versus heterosexual 4.5%. Estimates for AMI excluding SMI in the past

year showed lesbian, 17.8%, bisexual 30.4% versus heterosexual 15.9%. Estimates of MDE showed lesbian 11.8%, bisexual 24.1% versus heterosexual 8.0%. Estimates of MDE with severe impairment in the past year showed lesbian, 10.0%, bisexual 17.0% versus heterosexual 5.0% (SAMHSA, 2016). Difference between estimates of mental illness among sexual minority adult females and estimates of mental illness among sexual majority heterosexual females was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Balsam et al. (2015) found that sexual minority lesbian and bisexual women experience elevated rates of mental health problems compared to their heterosexual counterparts. According to Bostwick et al. (2014), bisexuals often report some of the worst mental health outcomes when compared with heterosexuals and lesbians or gay men. Shearer et al, (2016), found that gay men experience higher rates of depression, panic attacks, and psychological distress compared to heterosexual men. According to Shearer et al., lesbian and bisexual women showed greater rates of generalized anxiety disorder than heterosexual women.

Race/Ethnicity and Mental Illness

Racial/ethnic sexual minorities experience different rates of mental illness (SAMHSA, 2016). From the total population of 50,625 surveyed in NSDUH 2015 in 2015, rates or estimates of AMI in the past year among sexual minority adults ages 18 and older showed, among Not Hispanic or Latino, lesbian or gay, 14.4%, bisexual 15.1% versus heterosexual 13.7%. Estimates of SMI showed lesbian or gay, 7.2%, bisexual 8.3% versus heterosexual 5.5%. Estimates of AMI excluding SMI showed lesbian or gay, 13.8%, bisexual 14.6% versus heterosexual 10.2%. Estimates of MDE showed lesbian or

gay, 13.2%, bisexual 14.1% versus heterosexual 9.5%. Estimates of MDE with severe impairment showed lesbian or gay, 6.5%, bisexual 7.1% versus heterosexual 4.2%. Among White, estimates of AMI showed lesbian or gay, 15.2%, bisexual 17.8% versus heterosexual 12.3%. Estimates of SMI showed lesbian or gay, 10.3%, bisexual 12.4% versus heterosexual 10.1%. Estimates of AMI excluding SMI showed lesbian or gay, 14.8%, bisexual 15.3% versus heterosexual 11.1%. Estimates of MDE showed lesbian or gay, 14.1%, bisexual 14.9% versus heterosexual 9.8%. Estimates of MDE with severe impairment showed lesbian or gay, 9.2%, bisexual 10.1% versus heterosexual 5.4%. Among Black/African American, estimates of AMI were lesbian or gay, 11.3%, bisexual 15.5% versus heterosexual 6.3%. Estimates of SMI were lesbian or gay, 8.4%, bisexual 8.7% versus heterosexual 5.8%. Estimates of AMI excluding SMI were lesbian or gay, 11.4%, bisexual 12.4% versus heterosexual 8.2%. Estimates of MDE were lesbian or gay, 13.1%, bisexual 13.9% versus heterosexual 9.9%. Estimates of MDE with severe impairment were lesbian or gay, 5.3%, bisexual 6.8% versus heterosexual 3.9%. Among American Indian, estimates of AMI were lesbian or gay, 17.4%, bisexual 21.2% versus heterosexual 15.1%. Estimates of SMI were lesbian or gay, 16.1%, bisexual 18.3% versus heterosexual 12.6%. Estimates of AMI excluding SMI were lesbian or gay, 15.0%, bisexual 16.2% versus heterosexual 11.1%. Estimates of MDE were lesbian or gay, 13.0%, bisexual 13.8% versus heterosexual 8.8%. Estimates of MDE with severe impairment were lesbian or gay, 12.2%, bisexual 12.9% versus heterosexual 10.9%. Among Native Hawaiian, estimates of AMI were lesbian or gay, 10.1%, bisexual 10.9% versus heterosexual 7.2%. Estimates of SMI were lesbian or gay, 9.1%, bisexual 9.7%

versus heterosexual 8.2%. Estimates of AMI excluding SMI were lesbian or gay, 9.0%, bisexual 9.6% versus heterosexual 7.2%. Estimates of MDE were lesbian or gay, 8.1%, bisexual 8.5% versus heterosexual 6.7%. Estimates of MDE with severe impairment were lesbian or gay, 5.4%, bisexual 6.3% versus heterosexual 4.8%. Among Asian, estimates of AMI were lesbian or gay, 6.2%, bisexual 6.8% versus heterosexual 3.4%. Estimates of SMI were lesbian or gay, 4.9%, bisexual 5.1% versus heterosexual 3.2%. Estimates of AMI excluding SMI were lesbian or gay, 5.8%, bisexual 6.2% versus heterosexual 3.0%. Estimates of MDE were lesbian or gay, 5.2%, bisexual 6.0% versus heterosexual 2.8%. Estimates of MDE with severe impairment were lesbian or gay, 4.6%, bisexual 4.9% versus heterosexual 2.5%. Among Two or More Races, estimates of AMI were lesbian or gay, 18.1%, bisexual 19.3% versus heterosexual 16.3%. Estimates of SMI were lesbian or gay, 16.8%, bisexual 17.4% versus heterosexual 13.2%. Estimates of AMI excluding SMI were lesbian or gay, 17.1%, bisexual 17.8% versus heterosexual 13.5%. Estimates of MDE were lesbian or gay, 16.3%, bisexual 17.2% versus heterosexual 12.7%. Estimates of MDE with severe impairment were lesbian or gay, 14.7%, bisexual 15.3% versus heterosexual 12.0%. Among Hispanic or Latino, estimates of AMI were lesbian or gay, 13.5%, bisexual 15.6% versus heterosexual 9.1%. Estimates of SMI were lesbian or gay, 12.8%, bisexual 13.8% versus heterosexual 12.8%. Estimates of AMI excluding SMI were lesbian or gay, 12.6%, bisexual 13.1% versus heterosexual 9.4%. Estimates of MDE were lesbian or gay, 12.9%, bisexual 13.4% versus heterosexual 8.3%. Estimates of MDE with severe impairment were lesbian or gay, 10.4%, bisexual 10.9% versus heterosexual 7.5% (SAMHSA, 2016). Difference between the estimates of AMI, SMI, AMI excluding

SMI, MDE, and MDE with severe impairment among sexual minority adults and estimates of heterosexual adults based on race/ethnicity was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). Bostwick (2014) found Asians to have the lowest rate and American Indians the highest rate of mental illness.

Education and Mental Illness

From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates of AMI in the past year among sexual minority adults ages 18 and older with <High School education were lesbian or gay, 10.7%, bisexual 12.3% versus heterosexual 8.5%. Estimates of SMI were lesbian or gay, 5.8%, bisexual 6.1% versus heterosexual 3.2%. Estimates for AMI excluding SMI were lesbian or gay, 8.2%, bisexual 10.1% versus heterosexual 7.3%. Estimates of MDE were lesbian or gay, 6.8%, bisexual 7.9% versus heterosexual 4.6%. Estimates of MDE with severe impairment were lesbian or gay, 6.0%, bisexual 6.4% versus heterosexual 3.8%. Among High School Graduate, estimates of AMI were lesbian or gay, 5.8%, bisexual 6.7% versus heterosexual 4.2%. Estimates of SMI were lesbian or gay, 4.6%, bisexual 5.5% versus heterosexual 3.0%. Estimates of AMI excluding SMI were lesbian or gay, 6.6%, bisexual 7.1% versus heterosexual 6.3%. Estimates of MDE were lesbian or gay, 6.3%, bisexual 7.2% versus heterosexual 4.1%. Estimates of MDE with severe impairment were lesbian or gay, 5.0%, bisexual 6.1% versus heterosexual 5.1%. Among sexual minority adults with Some College or Associate Degree, estimates of AMI were lesbian or gay, 3.0%, bisexual 3.8% versus heterosexual 2.1%. Estimates of SMI were lesbian or gay, 2.6%, bisexual 3.3% versus heterosexual 2.2%. Estimates of AMI excluding SMI were lesbian or gay, 2.9%, bisexual 3.6% versus

heterosexual 2.5%. Estimates of MDE were lesbian or gay, 2.8%, bisexual 3.1% versus heterosexual 2.4%. Estimates of MDE with severe impairment were lesbian or gay, 2.3%, bisexual 3.0% versus heterosexual 2.3%. Among College Graduate, estimates of AMI were lesbian or gay, 2.9%, bisexual 3.6% versus heterosexual 2.0%. Estimates of SMI were lesbian or gay, 2.5%, bisexual 2.8% versus heterosexual 1.7%. Estimates of AMI excluding SMI were lesbian or gay, 2.8%, bisexual 3.1% versus heterosexual 1.9%. Estimates of MDE were lesbian or gay, 2.6%, bisexual 3.0% versus heterosexual 1.6%. Estimates of MDE with severe impairment were lesbian or gay, 2.0%, bisexual 2.3% versus heterosexual 1.4% (SAMHSA, 2016). Difference between the estimates of AMI, SMI, AMI excluding SMI, MDE, and MDE with severe impairment among sexual minority adults and estimates of sexual majority adults based on education level was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). According to Bostwick (2014) the rate of mental illness or health is lowest among College Graduate and highest among sexual minority adults with <High School education than with sexual majority adults.

Employment and Mental Illness

From the total population of 50,625 surveyed in NSDUH 2015, in 2015, estimates of AMI in the past year among sexual minority adults ages 18 and older that were employed full-time were lesbian or gay, 8.2%, bisexual 8.9% versus heterosexual 6.7%. Estimates of SMI were lesbian or gay, 7.0%, bisexual 7.5% versus heterosexual 5.1%. Estimates of AMI excluding SMI were lesbian or gay, 7.6%, bisexual 7.9% versus heterosexual 5.9%. Estimates of MDE were lesbian or gay, 7.4%, bisexual 7.7% versus

heterosexual 5.5%. Estimates of MDE with severe impairment were lesbian or gay, 7.1%, bisexual 7.6% versus heterosexual 5.7%. Among those employed part-time, estimates of AMI were lesbian or gay, 7.9%, bisexual 8.2% versus heterosexual 6.5%. Estimates of SMI were lesbian or gay, 6.2%, bisexual 6.9% versus heterosexual 5.0%. Estimates of AMI excluding SMI were lesbian or gay, 6.5%, bisexual 7.6% versus heterosexual 5.3%. Estimates of MDE were lesbian or gay, 6.3%, bisexual 7.4% versus heterosexual 5.5%. Estimates of MDE with severe impairment were lesbian or gay, 5.8%, bisexual 6.2% versus heterosexual 5.1%. Among those unemployed, AMI estimates were lesbian or gay, 9.3%, bisexual 9.7% versus heterosexual 7.0%. Estimates of SMI were lesbian or gay, 7.9%, bisexual 8.2% versus heterosexual 6.2%. Estimates of AMI excluding SMI were lesbian or gay, 8.9%, bisexual 9.4% versus heterosexual 6.7%. Estimates of MDE were lesbian or gay, 8.5%, bisexual 9.1% versus heterosexual 6.5%. Estimates of MDE with severe impairment were lesbian or gay, 8.7%, bisexual 9.2% versus heterosexual 6.3%. Among Other (not in the labor force), AMI estimates were lesbian or gay, 9.8%, bisexual, 10.2% versus heterosexual 6.9%. Estimates of SMI were lesbian or gay 7.9%, bisexual 8.2% versus heterosexual 6.7%. Estimates of AMI excluding SMI were lesbian or gay, 8.3%, bisexual 8.7% versus heterosexual 6.8%. Estimates of MDE were lesbian or gay, 8.0%, bisexual 8.9% versus heterosexual 7.1%. Estimates of MDE with severe impairment were lesbian or gay, 7.7%, bisexual 8.5% versus heterosexual 6.0% (SAMHSA, 2016). Difference between the estimates of AMI, SMI, AMI excluding SMI, MDE and MDE with severe impairment based on employment status was statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). The statistical

significance means that there is a good chance that I am right in finding that a relationship exists between substance abuse (the independent) variable and mental illness (AMI, SMI, AMI excluding SMI, MDE and MDE with severe impairment - the dependent) variable among sexual minority adults based on employment status. The finding has a (.05) chance of not being true (Creswell, 2009). Balsam et al. (2015) stated that on the whole, mental illness was highest among unemployed.

Sexual Identity and Mental Illness

SAMHSA (2016) stated that from the total population of 50,625 surveyed in SAMHSA, in 2015, sexual minority adults ages 18 and older were more than twice as likely compared to sexual majority adults to have experienced (AMI) in the past year — 37.4% for sexual minority adults versus 17.1% for sexual majority counterparts. Sexual minority adults were also more than three times as likely to have experienced SMI in the past year than sexual majority adults —13.1% versus 3.6% for sexual majority counterparts. Sexual minority adults were also more likely to have had AMI excluding SMI in the past year than sexual majority adults. Sexual minority adults were also more likely to have MDE or to have had an MDE with severe impairment in the past year than their sexual majority counterparts. Also, sexual minority adults with AMI severe were more likely to or have had an MDE with severe impairment, as well as have received mental health services during the past year, compared to sexual majority adult (SAMHSA, 2016). Difference between these estimates and the sexual majority adults' estimates were statistically significant at the .05 level (Medley et al., 2016; SAMHSA, 2016). According to SAMHSA (2016), sexual minority adults are more likely to seek

help and treatment for both substance abuse and mental illness compared to sexual majority adults of the same age. NAMI (2017) alluded that substance abuse and mental health problems are correlated in many ways. Meyer (2013) indicated that LGB sexual minority adults are almost three times more likely to experience mental health conditions such as major depression, anxiety, as well as substance abuse compared to their heterosexual sexual majority counterparts. According to McCabe, West, Hughes, and Boyd, 2013), reasons for this include the fear of coming out and being discriminated against for sexual orientation and gender identities, which can lead to depression, posttraumatic stress disorder, thoughts of suicide and substance abuse.

Definition of Terms

Age Groups: Years of life at time of survey, as defined by 18–25, 26–34,35–49, 50–64, 65 or older (SAMHSA, 2016).

Alcohol Abuse: Binge drinking on 5 or more days in the past month and heavy drinking (SAMHSA, 2016).

Any Mental Illness (AMI): Individuals having any diagnosable mental, behavioral, or emotional disorder in the past year regardless of the level of impairment in carrying out major life activities (SAMHSA, 2016).

Any without Serious mental illness: Low (mild) mental illness or moderate mental illness represented as a single category of any mental illness (AMI) without serious mental illness (SMI) (SAMHSA, 2016).

Binge drinking: Five or more alcoholic drinks for males or four or more alcoholic drinks for females on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past 30 days (SAMHSA, 2016).

Bisexual: A person who is sexually attracted to both men and women (SAMHSA, 2016).

Cocaine Abuse: Overuse of a strong stimulant that is more addictive than heroin (SAMHSA, 2016).

Current (Past month*) use:* At least one drink in the past 30 days (SAMHSA, 2016).

Drink: A can or bottle of beer, a glass of wine, or a wine cooler, a shot of liquor, or a mixed drink with liquor in it (SAMHSA, 2016).

Ethnicity: The cultural patterns and collective identities shared by groups from specific geographic regions, such as Hispanic or non-Hispanic (Meyer, & Zane, 2013).

Gay: A homosexual, especially a man, exhibiting sexual desire or behavior directed toward a person or persons of the same sex (SAMHSA, 2016).

Heavy drinking: Five or more drinks on the same occasion on each of 5 or more days in the past 30 days (SAMHSA, 2016).

Heroine Abuse: Overuse of a strong narcotic pain killer (SAMHSA, 2016).

Heterosexual: Person sexually attracted to people of the opposite sex. This subpopulation is coded in SAMHSA in the sexual orientation question as straight (SAMHSA, 2016).

Lesbian: Sexual attraction or sexual activity between women (SAMHSA, 2016).

Low (mild) mental illness: Persons who at any time in the past year have had a diagnosable mental, behavioral, or emotional disorder resulting in mild impairment in carrying out major life activities (SAMHSA, 2016).

Major Depressive Episode (MDE): A period characterized by the symptoms of major depressive disorder: primarily depressed mood for two weeks or more, and a loss of interest or pleasure in everyday activities, accompanied by other symptoms such as feelings of emptiness, hopelessness, anxiety, worthlessness, guilt and/or sadness (SAMHSA, 2016).

Marijuana Abuse: Uncontrollable or overly frequent marijuana consumption without a doctor's prescription (SAMHSA, 2016).

Mental health: A person's condition with regard to their psychological and emotional well-being (SAMHSA, 2016).

Mental illness: Disorders that affect a person's mood, thinking and behavior, such as depression and anxiety disorders (SAMHSA, 2016).

Moderate drinking: Up to 1 drink per day for women and up to 2 drinks per day for men (SAMHSA, 2016).

Moderate mental illness: Persons who at any time in the past year have had a diagnosable mental, behavioral, or emotional disorder resulting in moderate impairment in carrying out major life activities (SAMHSA, 2016).

Prescription Drug Abuse/Misuse/Use: The intentional use of a medication in any way not directed by a doctor, including use without a prescription of one's own, and use in greater amounts, more often or longer than told to take a medication (SAMHSA,2016).

Race: Biologically distinct populations within the same species, such as white, black, Asian, Pacific Islander, or multiracial (Meyer, and Zane, 2013).

Severe mental illness (SMI): Persons at any time in the past year who have had a diagnosable mental, behavioral, or emotional disorder and resulting in substantial impairment in carrying out major life activities (SAMHSA, 2016).

Sex: A person's biological and anatomical assigned sex at birth based on an original birth certificate, such as male or female (Cahill and Makadon, 2014).

Sexual Attraction: The desire to have sexual relations with one or both sex (SAMHSA, 2016).

Sexual Behavior: Any mutually voluntary activity with another person that involves genital contact and sexual arousal, even if intercourse or orgasm did not occur (SAMHSA, 2016).

Sexual Diversity: In this study, defined as sexual orientation and/or gender identity (SAMHSA, 2016).

Sexual Identity: Personal selected labels attached to the perceptions and meanings individuals have about their sexuality (SAMHSA, 2016).

Sexual majority adults: In this study, adults aged 18-44 or older who self-identified in a question on sexual identity as being heterosexual or straight (SAMHSA, 2016).

Sexual minority adults: In this study, adults aged 18-44 or older who self-identified in a question on sexual identity as being lesbian, gay or bisexual (SAMHSA, 2016).

Sexual orientation: Culturally defined gender identities based on personal preferences, such as straight, gay or lesbian, and bisexual (Cahill and Makadon, 2014).

Substance Abuse/Substance Use Disorder/Dependence: Overindulgence in or dependent on an addictive substance, especially alcohol or drugs. Defined as mild, moderate or severe to indicate the level of severity, determined by the number of diagnostic criteria met by an individual (SAMHSA, 2016).

Transgender: A person who identifies with or expresses a gender identity that differs from the one which corresponds to the person's sex at birth (Meyer, and Zane, 2013).

Assumptions

One key assumption for this study was that the instrument used in SAMHSA/NSDUH 2015 to collect data provided an accurate measure of the variables under study and the participants willingness to respond honestly to this survey about sensitive issues, such as illegal drug abuse and mental health problems (SAMHSA, 2016). Also, underlying the perspective in the minority stress model was that sexual minority adults because of their minority status experience distal (depression), and proximal (rejection) minority stress processes/stressors that cause the higher prevalence of substance abuse, which leads to mental health problems (Meyer, 2003). Also, it was assumed that minority stressors are: (a) unique (not experienced by non-stigmatized populations); (b) chronic (related to social and cultural structures); and (c) socially based (stemming from social processes, institutions, and structures) (Meyer, 2003). This model assumed that sexual identity, age group, sex, race/ethnicity, education, and employment

were interrelated to each other, the differences shaped the context in which individuals' functioned, and therefore directly and indirectly influenced their substance abuse and mental health risks and resources (Meyer, 1995, 2003).

Scope and Delimitations

The scope of this study was limited in nature using both descriptive and inferential statistics, with conclusions that were only generalizable to sexual minority population ages 18 and older in the United States (the sample population of the NSDUH). This specific focus was chosen because there are mixed results regarding the associations between substance abuse and mental illness outcome in this population. The scope was also limited to 2015. Prevalence of substance abuse and mental illness may have changed since then.

Delimitations for this study was related to the screening tools used for the NSDUH, such as the CAGE AID and Alcohol Use Disorders Identification Test (AUDIT) for assessment of alcohol, prescription drugs, marijuana, cocaine, and heroin abuse on mental illness (SAMHSA, 2015). Other drugs such as phencyclidine (PCP) were not selected because of low precision as no estimates were reported by NSDUH 2015 for lesbian or gay and bisexual based on demographic characteristics (i.e., age group, sex, race/ethnicity, education, employment, and sexual identity) (SAMHSA, 2016).

Study Boundaries

Boundaries of the study included sexual minority adults (i.e., lesbian, gay, and bisexual) and sexual majority adults (i.e. heterosexual or straight) populations in the

United States ages 18 and older. Other sexual minority populations such as the transgender population was excluded. The rationale was based on respondents answers to the two questions on sexual orientation included for the first time in NSDUH 2015 data (one on sexual identity and one on sexual attraction). Respondents only self-identified themselves as lesbian, gay or bisexual. They consider themselves to be either heterosexual (i.e., straight) or if they are female, lesbian or gay if they are male, or bisexual if they are sexually attracted to both men and women (SAMHSA, 2016). Also, transgender is an umbrella term that includes people who do not fit societal expectations for sex (male/female) or gender (masculine/feminine) role. Transgendered individuals may identify as lesbian, gay, or bisexual, or heterosexual because gender identity and sexual orientation are separate, distinct constructs (APA, 2017).

The theoretical framework of the minority stress model was chosen because this model helps explain about the health disparities that exist among the sexual minority population as a result of their minority status that can lead to stressors, which may contribute to mental health outcome (Meyer, 2003). Other theories, such as Health Belief Model (HBM) and Transtheoretical Model/Stages of Change were not used because they focus solely on the individual-level factors like knowledge and beliefs rather than the complex and multiple levels range of factors or stressors (such as individual, interpersonal, organizational, community, and public policy) that influence sexual minority adults to indulge in substance abuse that leads to poor mental health outcome (McLeroy, Bibeau, Steckler, and Glanz, 1988; Meyer, 1995, 2003).

Generalizability and Scope

The generalizability of this investigation was limited to the United States. The scope of the variables included substance abuse (i.e., alcohol, prescription drugs, marijuana, cocaine, and heroin abuse) and mental illness. Mental illness is classified as any mental illness (AMI), serious mental illness (SMI), AMI excluding SMI, major depression episode (MDE), and MDE with severe impairment to indicate the level of severity. The potential confounding variables were: age group, sex, race/ethnicity, education, employment and sexual identity (SAMHSA, 2016).

Limitations

The limitations of this study were related to the research design, methodology, sample size, and data collection. Since this was a quantitative study it did not allow for the gathering of in-depth information, but rather for the gathering of numerical data for statistical analysis and hypothesis testing. Findings were descriptive because variables will not be directly manipulated and results will be observed from existing groups. Threats to external, internal, and construct validity will determine the quality of the study. Additionally, because SAMHSA/NSDUH 2015 survey is based on participants self-report, it is uncertain the extent to which sexual minority adults are honest in their answers. Furthermore, data collected by SAMHSA/NSDUH 2015 is subject to recall, and nonresponse biases, and there are missing and incomplete data or values that affect the external validity of the results (SAMHSA, 2016). As explained in Section 2, missing or incomplete data were excluded from the analysis. Recall bias may influence reporting for various reasons. The first is that with stressors such as depression and anxiety that the

sexual minority adults are experiencing due to their minority status, these may negatively impact their ability to accurately recall an event. Moreover, individuals may have difficulty retrieving a memory or remember it inaccurately. SAMHSA (2016) indicated that while the honesty of sexual minority adults responses cannot be determined, the data provided are considered acceptable in quality. To address consistency, SAMHSA/NSDUH 2015 has built in consistency validity check in its audio computer assisted self-interviewing (ACASI) instrument, and also conducted field tests and pre-tests as validity check to assess the consistency of sexual minority adults responses (SAMHSA, 2016). Surveys with fewer than 20 valid responses are deleted, and questions that are inconsistent are deemed invalid and counted as missing. Participants are offered $30 as incentive payment to maximize nonresponse rate (SAMHSA, 2016). Since the study is using secondary data with cross-sectional design, Fredriksen-Goldsen et al. (2013) reported study limitations that included the use of a cross-sectional study with existing data, which did not allow for an examination of temporal relationships between variables.

Significance of the Study

This study may contribute to filling a gap in the literature and the findings that are mixed with regard to sexual minority adults being at increased risk for substance abuse and mental illness than sexual majority adults. These mixed findings, and thus sexual minority adults associations with substance abuse and mental illness not extensively studied and well understood, make SAMHSA/NSDUH 2015 (the dataset I used in this study for secondary data analysis) to be the first federal study to collect information about

substance abuse and mental illness among sexual minority adults in a nationally-representative sample. Findings in this study may advance knowledge in this discipline, support professional practice and allow practical application, because it will provide information about the need to focus on the relationship between substance abuse and mental illness among sexual minority adults, and the health disparities affecting this population. This will help guide future public health interventions aimed at improving the health of sexual minorities for improved access to early substance abuse and mental health prevention screening and treatment.

This information was relevant to society and had potential implications that may lead to positive social changes by: (a) providing a more representative and better quality data for increased knowledge and clear understanding of the associations between substance abuse and mental illness among sexual minority adults; (b) showing the most important factors of the associations that can lead to a clear understanding of the conceptual framework (the minority stress model); and (c) increasing the low level of awareness about the stressors and health disparities among sexual minority adults because of their minority status.

Summary

In this section, I presented the foundation of the study on clearly articulated gaps in knowledge, followed by a discussion of the problem and problem statement, study purpose, research questions and hypotheses, the theoretical foundations for the study, nature of the study, literature search strategy, and literature review. Review of the literature described ways researchers in the discipline have approached the problem

related to the topic of my study, and the strengths and weaknesses inherent in their approaches. The review helped me to identify the mixed findings by researchers related to my study, and the fact that sexual minority adults associations with substance abuse and mental illness have not been extensively studied and well understood. This helped me to decipher what remains to be studied, which in turn helped provide support for my study. In addition in this section, I presented definitions of terms, assumptions, scope and delimitations, study boundary, and limitations. I also justified the application of the minority stress model as the theoretical framework, highlighting the different minority stress processes/stressors that influence substance abuse, leading to poor mental health outcome and disparities among sexual minority adults in the United States. I also discussed the secondary data sources. The next section described the design and methodological approaches, which was used in this investigation.

Section 2: Research Design and Data Collection

The purpose of this study was to explore the associations between different types of substance abuse and mental illness among sexual minority adults ages 18 and older in the United States. In this section, I identify the research design and procedures for this study and present the methodology, methods, and the rationale. Additionally, I describe the study's sample and data and statistical analyses techniques that address the literature gap. I also describe the variables (i.e., independent, dependent, and covariate), and identify the connection of the research design to the research questions.

Research Design and Rationale

This study was a secondary analysis of quantitative data collected through a cross-sectional survey design. According to Hall (2009), cross-sectional research designs have three distinctive features: (a) no time dimension, (b) a reliance on existing differences rather than change following intervention, and (c) groups are selected based on existing differences rather than random allocation. Because the NSDUH 2015 dataset has already been collected by SAMHSA for national and state-specific purposes, there were no time constraints consistent with the design choice and process of the collection of data for this investigation. Also, because the aim of the research questions was to determine if the independent variable (substance abuse) predicted the dependent variable (mental illness), the appropriate design to answer this question is the quantitative research design. Strengths in employing the survey design include cost-effectiveness, generalizability, reliability, and versatility (Aschengrau & Seage, 2014). The survey method employed by SAMHSA/NSDUH 2015 to collect data, which I used in this study for secondary data

analysis, was relatively cost effective as it is an excellent way for SAMHSA to gather information from the population rather than interviewing them individually in person. Another benefit is a survey's potential for generalizability as it will lend itself to probability sampling techniques. Compared to other methods of data collection, such as interview, survey research is the best method to use when a scholars hopes to gain a representative picture of the attitudes and characteristics of a large group. With a well-constructed question and questionnaire design, survey research also tends to produce reliable results and is a reliable method of inquiry, because surveys offer consistency and are standardized in that the same questions, phrased in exactly the same way, are posed to participants. The versatility of survey research is also a strength, because surveys are used by all kinds of people in all kinds of professions (Aschengrau & Seage, 2014; Creswell, 2009).

Research Methodology

Population

The target population for this study was sexual minority adults (i.e., self-identified LGBs), United States, household residents, ages 18 and older who were surveyed by SAMHSA/NSDUH in 2015. As reported by the U.S. Census Bureau (2015), estimates of the total U.S. population as at July 1, 2015 was 321,418,820, and the sexual minority population was relatively small in comparison to their heterosexual counterparts (Gates, 2014). The total population ages 12 and older surveyed in NSDUH 2015 in 2015 was 67,500. Because the target age group for the population in this study was ages 18 and

older, the total national annual target sample size was 50,625 in 2015, based on NSDUH 2015 survey (CBHSQ, 2016; Medley et al., 2016; SAMHSA, 2016).

Sampling and Sampling Procedures

In this study, because I used the NSDUH 2015 dataset collected by SAMHSA for secondary data analysis, I used the total sample size of 50,625, which served as the representative sample of the total U.S. population ages 18 and older surveyed in NSDUH 2015 in 2015 at their place of residence (CBHSQ, 2016; Medley et al., 2016; SAMHSA, 2016). A representative sample is one that has strong external validity in relationship to the target population the sample is meant to represent. As such, the findings from the survey can be generalized with confidence to the population of interest (Aschengrau & Seage, 2014; Creswell, 2009).

The survey sample design SAMHSA/NSDUH 2015 employed was a 50-state design with an independent, multistage area probability sample that provide representative estimates for each of the 50 states and the District of Columbia. SAMHSA combined the stratified sampling method and the cluster sampling method in stages. Although this type of probability sampling was selected in such a way as to be representative of the population and provides the most valid or credible results because it reflects the characteristics of the population from which it is selected; yet, it can be a complex form of sampling. It is a type of sampling that involves partitioning the population into groups (strata), obtaining a simple random sample from each group (stratum), and collecting data on each sampling unit that was randomly sampled from each group (stratum). It also involves dividing the population into groups (clusters),

obtaining a simple random sample of so many clusters from all possible clusters, and obtaining data on every sampling unit in each of the randomly selected clusters (Medley et al., 2016; SAMHSA, 2016).

Sampling frame. The sampling frame included (a) self-identified sexual minority (i.e., LGB) adults surveyed in NSDUH 2015, (b) ages 18 and older, (c) U.S. primary or secondary household residence, (d) survey year 2015, and (e) all reported races or ethnicities. The sample excluded those who were younger than 18 years, because the SAMHSA/2015 NSDUH survey did not ask the sexual orientation questions to these age groups as noted in the questionnaires (SAMHSA, 2016). The population that was sampled included sexual minority adults ever having mental illness versus those not having mental illness to determine the associations between substance abuse and mental illness. NSDUH 2015 dataset is cross-sectional (i.e., in the survey, individuals will be interviewed only once and will not be followed for additional interviews in subsequent years) and was used for secondary data analysis. As a cross-sectional dataset, the study only looked at 2015 at a point in time (SAMHSA, 2016). The NSDUH 2015 dataset is also observational, wherein without assigning treatments to the subjects, investigators observed their subjects and measure variables of interest (Creswell, 2009; SAMHSA, 2016).

In this study, the simple random sampling (SRS) was used. The simple random sample is a probability sampling technique that involves random selection and is representative of the population. Because the aim of the simple random sample is to reduce the potential for human bias in the selection of cases to be included in the sample,

as a result, it was appropriate to use in this study. It can provide a sample that is highly representative of the population being studied. Also, because the units selected for inclusion in the sample were as chosen using probabilistic methods, simple random sampling allows us to make generalizations (i.e., statistical inferences) from the sample to the population. This is an advantage because such generalizations are more likely to be considered to have external validity (Aschengrau & Seage, 2014; Creswell, 2009). This approach was feasible given the size of the target population and the time and financial constraints of this study.

Power analysis. G*Power (Demindenko, 2007; Erdfelder, Faul, & Buchner, 1996) was used to estimate a priori and post hoc statistical power. As I had a predetermined large sample size to use for statistical analyses (50,625), I must be able to respond how much power this sample size can provide to detect significant differences. Because the dependent variable was recoded into a binary one (mental illness, yes/no) for these calculations, the minimum effect size (odds ratio) that can provide adequate power (>0.80) was calculated 1.03. Also, post hoc power analysis was conducted to confirm that there was adequate statistical power.

Table 1

*Logistic Regression A Priori Statistical Power Calculation using G*Power*

z tests - Logistic regression			
Options:	Large sample z-Test, Demidenko (2007) with var corr		
Analysis:	Compromise: Compute implied α & power		
Input:	Tail(s)	=	Two
	Odds ratio	=	1.03
	Pr(Y=1|X=1) H0	=	0.2
	β/α ratio	=	1
	Total sample size	=	50625
	R^2 other X	=	0
	X distribution	=	Normal
	X parm μ	=	0
	X parm σ	=	1
Output:	Critical z	=	1.5230913
	α err prob	=	0.1277359
	β err prob	=	0.1277359
	Power (1-β err prob)	=	0.8722641

Data accessibility and permissions. SAMHSA/NSDUH 2015 consists of open and public-use data files available in the public domain and may be reproduced or copied without permission from SAMHSA. Also, this study was merely a monitoring and evaluation investigation, and therefore, no permission was needed to access the data (SAMHSA 2016).

Data Collection and Management

This study used NSDUH 2015 Population Data collected by SAMHSA for secondary data analysis. The NSDUH is considered the primary source of statistical information on the prevalence, patterns, use or abuse of alcohol and illicit drugs, and mental health among United States households ages 18 and older (SAMHSA, 2016). SAMHSA/NSDUH 2015 consists of open and public-use data files available free of charge.

Instrumentation

In this study, I conducted a quantitative analysis using secondary data collected by SAMHSA for the NSDUH 2015 survey to determine the associations between substance abuse and mental illness. The outcome of interest was mental illness among sexual minority adults who were surveyed. The NSDUH 2015 uses an audio computer assisted self-interviewing (ACASI) as the instrument, wherein respondents enter their answers into a laptop computer after reading the questions on the computer screen or listening to the questions on headphones. The computer-based questionnaire has the capacity to be interactive and bilingual with languages in both English and Spanish (SAMHSA, 2016; CBHSQ, 2016).

Operationalization of Variables

Table 2 shows the nominal, ordinal, and binary variables used in this analysis. The variables that were analyzed were: age, sex, race,/ethnicity, education, employment, and sexual identity. In this analysis, the dependent variable, mental illness had four levels (no past year, past year mild, past year moderate, and past year serious), and the independent variables substance abuse (alcohol, prescription drugs, marijuana, cocaine, heroin, etc.) were nominal, whereas the confounding variables, age group, sex, race/ethnicity, education, employment, and sexual identity were either nominal or ordinal.

Table 2

Measurement Level and Operational Definition of Variables

Variable	Level of Measurement	Definition	Levels
Age (confounder)	Ordinal	Years of life at time of survey	1=18-25 2=26-34 3=35-49 4=50-64 5=65 or older
Sex (confounder)	Nominal	Sex at birth	1=Male 2=Female
Race/ethnicity (confounder)	Nominal	Reported race/ethnicity	1=Not Hispanic or Latino 2=White 3=Black or African-American 4=American Indian or Alaska Native 5=Native Hawaiian or Other Pacific Islander 6=Asian 7=Two or More Races 8=Hispanic or Latino
Education (confounder)	Nominal		1=< High School 2=High School Graduate 3=Some College or Associate Degree 4=College Graduate
Employment status (confounder)	Nominal		1=Full-Time 2=Part-Time 3=Unemployed 4=Other (students, retired or disabled and other persons not in the labor force)
Sexual identity (confounder)	Nominal	Self-perceived identification	1=Heterosexual 2=Straight 3=Lesbian or Gay 4=Bisexual 5=Other (adults who did not know or refused to report their sexual identity)
Substance Abuse (Independent variable)	Nominal	Type of abuse past year	RQ1 and RQ2: 1= No abuse 2= Abuse for any of the following, separately: [alcohol, hard drugs (heroin, cocaine, methamphetamine, and hallucinogens), prescribed drugs (pain relievers, tranquilizers, sedatives, stimulants, psychotherapeutic, and inhalants, as well as marijuana)]

Mental Illness (Dependent variable)	Nominal	Presence of mental illness past year	1= No 2= Mild 3= Moderate 4= Severe/Serious

Research Questions and Hypotheses

RQ1-Quantitative: Which are the descriptive statistics of different types of substance abuse in association with mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015,

RQ2 – Quantitative: What are the associations between different types of substance abuse and mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015, adjusted for potential confounding variables (age group, sex, race/ethnicity, and employment), and are these associations different among gay/lesbians than among bisexuals?

H_a^2: There are no confounding factors which influence the associations between different types of substance abuse and mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015.

H_a^2: There is at least one confounding factor which influences the associations between different types of substance abuse and mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015.

The data analysis technique that I used for RQ1 was Pearson's chi-square tests. For RQ2, I used adjusted ordinal logistic regression analyses. I performed these analyses to compare the distributions of the levels of mental illness according to each covariate that I assessed.

Data Analysis Plan

The statistical data analyses I performed include: chi-square, and multivariate adjusted logistic regression, associations between different types of substance abuse, the independent (exposure or predictor) variables and mental illness, the dependent (outcome or response) variable. Since the independent variable (substance abuse) is nominal, Chi-square analyses was performed to estimate the association of substance abuse and mental illness among sexual minority adults ages 18 and older. Chi-square test was also used to determine descriptive statistics about the sample population, and to calculate the probability that a relationship found in a sample between substance abuse and mental illness was due to chance (random sampling error). This was calculated by measuring the difference between the actual frequencies in each cell of a table and the frequencies I expected to find if there were no relationship between substance abuse and mental illness among sexual minority adults from which the (random) sample was drawn. Ordinal multivariable logistic regression analyses were employed to estimate how the odds of ever having mental illness for the associations between substance abuse and mental illness vary with each predictor accessed in SAMHSA/NSDUH 2015. The potential confounding factors included in the multivariable-adjusted models were age group, sex, race/ethnicity, and employment.

SAMHSA/NSDUH 2015 used a complex survey design and sampling approach necessitating a weighted analysis approach, which was already used and described in detail in the codebook. By using a weighted analysis approach, I was able to better estimate parameters and standard errors. In addition, I assessed how the associations

between substance abuse and mental illness was adjusted for different covariates: age group, sex, race/ethnicity, education, employment, and sexual identity. The latest version of Statistical Package for the Social Sciences (IBM SPSS) 23.0 software was used to analyze the data.

Data Cleaning Procedures

The NSDUH is the primary source of information used by SAMHSA for survey, and to provide national, state and sub-state levels data. It includes specific questions relating to the prevalence, patterns, and consequences of alcohol, illicit drug use and mental disorders in sexual minority adults ages 18 and older in the United States. For this analysis, I used NSDUH 2015 dataset, which appears in a public domain for secondary data analysis. NSDUH 2015 dataset may be reproduced or copied, and does not require any permission to access the data. I used SPSS version 23.0 to recode variables that need recoding, for example, for different types of substance abuse, the variables were recoded to consist of alcohol abuse, hard drugs abuse (heroin, cocaine, methamphetamine, and hallucinogens), and prescribed drugs (pain relievers, tranquilizers, sedatives, stimulants, psychotherapeutic, and inhalants, as well as, marijuana).

Data Collection of Secondary Data Set

SAMHSA is a public agency within the U.S. Department of Health and Human Services (HHS), established by Congress in 1992 to make substance use and mental disorder information, services, and research more accessible. The NSDUH 2015 dataset collected by SAMHSA was used in this study for secondary data analysis. The NSDUH 2015 dataset is SAMHSA's primary source of statistical information. In 2015, two

questions on sexual orientation – one on sexual identity and one on sexual attraction were added to the NSDUH 2015 dataset, making the NSDUH 2015 the first time the federal government started collecting information on the prevalence of substance abuse and mental health issues among sexual minority adults in a nationally-representative sample. The sampling frame consisted of self-identified sexual minority (i.e., lesbian, gay, and bisexual) adults ages 18 and older in the United States surveyed in NSDUH in 2015. NSDUH is a face-to-face annual survey conducted in two phases: the screening phase and the interview phase, and generates estimates at the national, state, and sub-state levels. SAMHSA collects data using audio computer-assisted self-interviewing (ACASI), where in respondents read or listen to the questions on headphones, and then enter their answers directly into a NSDUH laptop computer. SAMHSA also uses computer-assisted personal interviewing (CAPI), wherein interviewers read less sensitive questions to respondents, and enter the respondents' answers into a laptop computer (CBHSQ, 2016; SAMHSA, 2016).

Time Frame and Response Rates

SAMHSA/NSDUH 2015 data collection period lasted for one year. The data collection occurred from January 1 to December 31, 2015. The data are an open and public-use accessible at any time via public methods. Since accuracy of the survey estimates can be affected by nonresponse, strategies employed by NSDUH 2015 to maximize response rates include giving respondents $30 as an incentive payment. This resulted in a weighted household screening response rate of 79.7% and a weighted interview response rate of 68.4% for adults aged 18 or older (CBHSQ, 2016; SAMHSA, 2016).

Discrepancies in the Secondary Data Set

The NSDUH 2015 dataset collected by SAMHSA, and used in this study for secondary data analysis showed some discrepancies from the plan presented in Section 2.

Inadequate number of cases for variables of interest for RQS.

Some of the variables in the revised dataset, for instance the independent variable, substance abuse consisting of various abuses were recoded to have the best meaningful analysis. For example, cocaine abuse had 64 cases, while heroin abuse had only 7 cases. As such, the various substances that were abused were recoded, and four types of substances were included as follows: a) alcohol; b) hard drugs (heroin, cocaine, methamphetamine, and hallucinogens); and c) prescribed drugs (pain relievers, tranquilizers, sedatives, stimulant, psychotherapeutic, and inhalants), as well as marijuana.

2015 Questionnaire partial redesign. NSDUH 2015 data are self-reports on substance abuse and mental illness, which are sensitive issues, and their value depends on respondents' truthfulness and memory. To aid respondent recall, the 2015 questionnaire on prescription drug (for example, tranquilizer) was partially redesigned to allow respondents to report about any past year use, rather than just misuse. Although NSDUH 2015 procedures were designed to encourage honesty and recall, there were some underreporting and overreporting. These self-reports were not necessarily accurate for identifying the exact drugs that respondents took, for example for prescription tranquilizer, when a respondent actually took the generic drug alprazolam but reported

abuse or misuse of the brand name tranquilizer Xanax® because of name recognition (SAMHSA, 2016; CBHSQ, 2016).

Missing data. The NSDUH 2015 dataset collected by SAMHSA for secondary data analysis showed that a few items have a slightly higher rate of missing and incomplete data or values that can affect the external validity of the results, for example, items on source of prescription drugs obtained for most recent use. Among sexual minority adults ages 18 and older in the United States, those who did not know or refused to report their sexual identify were classified as unknown.

The exclusion of respondents with missing data induces a negative bias for estimates of population totals and may induce a bias in either direction for estimates of population means and proportions.

Analysis Techniques

For this study, I performed chi-square analyses in RQ1 to estimate the associations of substance abuse and mental illness among sexual minority adults ages 18 and older. Also, I separately investigated potential bivariate association between each confounder variable (age, sex, race, ethnicity, education, employment, and sexual identity) using chi-square tests. I also performed the multivariable logistic regression analyses to estimate how the odds of the levels of having mental illness for the associations between substance abuse and mental illness vary with each of the above confounders in RQ2.

Bivariate analyses. My use of bivariate 2*X table methodology defined the proportion of sexual minority adults with or without mental illness for the associations

between different types of substance abuse and not ever having mental illness using SPSS 23.0 software. Additionally, since the outcome of interest was a nominal variable, it required the Pearson's chi-square tests as the primary bivariate analysis performed for RQ1.

Adjusted analyses. An adjusted ordinal logistic regression analysis was used to estimate likelihood of associations between substance abuse and mental illness among sexual minority adults ever having mental illness, versus not ever having mental illness, using SPSS 23.0 software. The analysis used an ordinal logistic regression model adjusting for: age group, sex, race/ethnicity, education, and employment, which was needed to answer RQ2. According to IBM guidelines, it is currently not possible to change the reference category in the ordinal regression module and SPSS takes automatically the last category as the reference category (IBM Support, n.d.)

Rationale for Covariate Inclusion

As described in the literature review section, the inclusion of age group, sex, race/ethnicity, education, employment, and sexual identity related to differences in the associations of different types of substance abuse that could confound the relationship with mental illness. Based on these substances, substance abuse was defined as the overindulgence of these substances by sexual minority adults.

Interpretation of Results

The results were interpreted using odds ratios with 95% confidence intervals, for adjusted logistic models. Probability values (*p* values) was used for chi square results. The result were determined to be statistically significant if the *p*-value was 5% or lower,

and observed differences between the groups being studied were real, and not simply due to chance.

Threats to Validity

Validity determines whether a measure is evaluating the concept the researcher considers are calculated in the study or examines what the researcher claims to examine (Creswell, 2009). The goals of this section on validity were to reduce or address the potential limitations of using SAMHSA/NSDUH 2015 dataset for secondary data analysis. SAMHSA contains NSDUH, a primary and comprehensive dataset that allows measuring of a wide variety of different research topics. However, the SAMHSA/NSDUH 2015 dataset has the following limitations: (a) the data collected by SAMHSA/NSDUH 2015 is subject to self-reporting, recall, and nonresponse biases; and (b) there are missing and incomplete data or values that affect the external validity of the results. Strategies employed by SAMHSA/NSDUH 2015 to reduce the occurrence of missing/incomplete or ambiguous data/values or to resolve inconsistencies between related variables include: (a) the use of logical editing that uses data from elsewhere within the same respondent's record; and (b) statistical imputation, the process of replacing missing values with valid, non-missing values. Statistical imputation usually involves some randomness to preserve the natural variability in the data. For example, substance abuse, demographic, and other key variables that still had missing or ambiguous values after editing, statistical imputation was used to replace these missing or ambiguous values with appropriate response codes. Similarly, if a response is completely missing, the imputation procedures replace missing values with non-missing ones

(SAMHSA, 2016). This makes the elimination of incomplete information as unusable, unreliable, and unethical. Nonresponse bias occurs when some respondents included in the sample do not respond. To maximize response rates, strategies employed by NSDUH 2015 include giving respondents $30 as an incentive payment. Also, changes were made to the wordings of some instruments of measurement, such as the prescription drug questionnaire to include items on source of prescription drugs obtained for most recent use. These resulted in a weighted household screening response rate of 79.7% and a weighted interview response rate of 68.4% for adults ages 18 or older in the United States (SAMHSA, 2016). Also, among sexual minority adults ages 18 and older in the United States, there were some who did not know answers to the questions asked and some refused to identify their sexual identity. Those who did not know or refused to identify their sexual identify were classified as unknown or missing data. These respondents with missing data in the NSDUH 2015 dataset were excluded from the analysis, and a note included to alert a user of this fact. The exclusion of respondents with missing data induces a negative bias for estimates of population totals and may induce a bias in either direction for estimates of population means and proportions (SAMHSA, 2016).

External Validity

In a quantitative study, the results obtained are based solely on a sample that can be generalized to the population it was drawn from. As such, external validity refers to the generalizability of the research. In other words, it is the extent to which the results of a study can be generalized to other situations and to other people (Bhattacherjee, 2012; Creswell, 2009). The original SAMHSA/NSDUH 2015 study population was sampled

using a 50-state design with an independent, stratified multistage area probability sample for each of the 50 states and the District of Columbia. This sampling method is designed to be representative of both the nation as a whole and for each of the 50 states and the District of Columbia. It also allows estimation of sampling error from the survey data. In addition, some measures are not defined in SAMHSA/NSDUH 2015 data as there are missing or incomplete data. To deal with missing data, each respondent in NSDUH 2015 was given an incentive payment of $30. These strategies employed resulted in an improvement of the response rate - weighted household screening response rate of 79.7 percent and a weighted interview response rate of 68.4 percent for adults aged 18 or older (SAMHSA, 2016).

Internal Validity

In this study, internal validity was about being able to justify that there were associations between substance abuse (i.e., alcohol, prescription drugs, marijuana, cocaine, and heroin, the independent variable) and mental illness (the dependent variable). Since the study was using secondary or existing data from SAMHSA/NSDUH 2015 surveys on sexual minority adults, a key challenge was choosing the wrong dataset, not having a predetermined goal for the investigation (Schlomer & Copp, 2014). Another challenge was the accurate assessment of the variables. The accuracy of self-report data may be impacted by a number of factors, including: (a) the cognitive demands of recalling past behaviors; and (b) motivational biases that can lead people to misreport their behavior (Bhattacherjee, 2012). As a quantitative study, the extraneous variables or the main threats that can impact internal validity include: history, lack of statistical

validity, selection bias, and experimental mortality (experimental attrition) (Aschengrau, & Seage, 2014). Since this investigation took place in one year (2015), and did not use a repeated measure framework, as such it was not affected by history. No instrumental bias took place, since no changes were made over time to the survey measuring instrument that was used in this study. Also, it was not affected by experimental mortality (experimental attrition) since no participant dropped out of the survey whilst taking place or before it finished due to factors including no longer willing to take part, or no longer available (SAMHSA, 2016).

Construct Validity

Construct validity is the degree to which a measure reflects the construct, such as the questionnaire, the measurement procedure used in this study to measure the construct of depression in mental illness. SAMHSA made several changes to the NSDUH questionnaire and data collection procedures in 2015 to increase the efficiency of the data collection and improve the quality of the data collected and validity of the study. These included changes to the prescription drug survey questions for pain relievers, tranquilizers, stimulants and sedatives, which were redesigned to shift the focus from lifetime misuse to past year misuse or abuse. These survey questionnaires were evaluated in field tests during 2012 and 2013 and appropriate adjustments made as a result of these pretests prior to implementation of NSDUH 2015 (SAMHSA, 2016).

Ethical Procedures

This study was conducted based upon permission granted and the ethical standards indicated by the Walden University Institutional Review Board (IRB) (#12-07-

17-0286371). Walden University's IRB confirmed that this study meets ethical standards for research. The study was also conducted based on SAMHSA's publicly acceptable ethical principles. This study did not include adolescents ages 12 to 17 years that require parental informed consent. SAMHSA/NSDUH dataset or programs on substance abuse and mental illness focus on sensitive issues, and deal with a sensitive and vulnerable population – sexual minority. Therefore, there is an understanding of mutual trust between SAMHSA and its participants. Information related to an informed consent has been presented by SAMHSA to respondents to ensure that they are aware that they are involved in a research study, and have given their consent or permission to participate. There was no deception or coercion involved in the research. There were no personally identifiable information collected in the survey to insure anonymity, and no risk involved. The respondents' decision to begin the study were deemed as providing their agreement to the terms of the informed consent communicated in SAMHSA/NSDUH 2015 website prior to beginning the survey (SAMHSA, 2016). The Walden University IRB approval was obtained for this study. Since I used SAMHSA/NSDUH 2015 dataset, which appears in a public domain for secondary data analysis, permission was not required for accessing the data. The NSDUH 2015 dataset may be reproduced or copied (SAMHSA, 2016).

One ethical concern relating to sexual minority adults diagnosed with substance abuse and mental illness was stigmatization. However, using SAMHSA/NSDUH 2015 secondary data, the sexual minority adults diagnosed with mental illness were protected under the Code of Federal Regulations Title 45 Part 46 known as the Common Rule, a federal policy that protects human subjects. To address confidentiality,

SAMHSA/NSDUH 2015 ensured that respondents' names were not collected with the data, and employed computer-assisted interviewing (CAI) methods to provide a private and confidential setting to complete the interview (CBHSQ, 2016).

Treatment of Data

All secondary SAMHSA/NSDUH 2015 data used in this investigation were examined without full personal identifiers, to avoid any ethical breach. The Data Encryption software was used and all data used for this analysis were saved on two Kingston DataTraveler Vault Privacy 3.0 encrypted flash drives and kept for five years, a requirement of Walden's IRB. This standard was put into place because in the past data was simply emailed or mailed without being encrypted, leading to security breaches. Data collected by SAMHSA are publicly available and do not contain any personal identifying information. However, SAMHSA protects respondents' personal information, as required by the Confidential Information Protection and Statistical Efficiency Act (CIPSEA) of 2002 that provides a legal basis for offering this protection to all individually identifiable data collected for statistical purposes under a pledge of confidentiality. Methods used by SAMHSA to prevent the disclosure of information about specific sensitive individuals, such as substance abuse and mental illness include: removing specific identifying variables, such as date of birth, names, addresses, and geographic location (e.g., State and county) from the public-use file (PUF), and ensuring that no personal identifying information about the respondent is captured in the computer-assisted interviewing (CAI) record. To protect the privacy of respondents, all variables that could be used to identify individuals have been encrypted or collapsed in the public use file (SAMHSA, 2016).

Summary

Section 2 presented the methodology for NSDUH 2015 secondary data collected by SAMHSA. This included a discussion of the research design and rationale, and a description of the research population, sampling procedures, and data collection. The instruments used in the study and the data analysis procedures, threats to validity, and ethical concerns were also presented. The following section, Section 3 will present the results and findings of the study relative to the two RQs.

Section 3: Presentation of the Results and Findings

The purpose of this quantitative study was to use NSDUH 2015 cross-sectional dataset collected by SAMHSA for secondary data analysis to determine if associations existed between different types of substance abuse (alcohol, hard drugs [heroin, cocaine, methamphetamine, and hallucinogens]), prescribed drugs (pain relievers, tranquilizers, sedatives, stimulants, psychotherapeutic, and inhalants), as well as marijuana, and mental illness (no past year, mild, moderate, and severe in the past year) among sexual minority adults ages 18 and older in the United States. I also controlled for the confounding factors that may influence these associations.

To facilitate the best meaningful analysis, the SAMHSA/NSDUH (2015) dataset and the corresponding codebook used in this study for statistical data analysis was adjusted to adequately reflect the variables of interest for my two RQs. For example, the independent variable, substance abuse, was recoded to consist of (a) alcohol, (b) hard drugs (heroin, cocaine, methamphetamine, and hallucinogens), and (c) prescribed drugs (pain relievers, tranquilizers, sedatives, stimulants, psychotherapeutic, and inhalants), as well as marijuana. The dependent variable, mental illness, consisted of no past year mental illness and past year mild, moderate, and past year severe mental illness. According to the inclusion criteria of this study (sexual minority adults–LGBs, ages 18 and older), the final sample size was 43,561 individuals. With the adjustment, the following research questions and hypotheses guided this study:

RQ1: Which are the descriptive statistics of different types of substance abuse in association with mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015.?

RQ2: What are the associations between different types of substance abuse and mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015, adjusted for potential confounding variables (age, sex, race, education, and employment), and are these associations different among gay/lesbians than among bisexuals?

$H_0$2: There are no confounding factors which influence the associations between different types of substance abuse and mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015.

H_a2: There is at least one confounding factor that influences the associations between different types of substance abuse and mental among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015.

Section 3 contains reports of the data collection process using NSDUH 2015 dataset collected by SAMHSA for secondary data analysis, along with the results of the statistical analyses (chi square and ordinal logistic regression), on data collected. Also included is a brief description of the time frame and response rates, and discrepancies in the SAMHSA/NSDUH 2015 dataset, followed by descriptive demographics of the sample, and representativeness of the sample. Next, is the study results subsection, which includes an assessment and results of the research questions, using the chi-square tests for

RQ1, and the bivariate (chi-square) analysis, and ordinal logistic regression analysis for RQ2, concluding with a summary of the results for the two RQs.

Sexual Orientation Questions

According to SAMHSA/NSDUH 2015 dataset/codebook, two questions on sexual orientation were added to the SAMHSA/NSDUH 2015 dataset for the first time in 2015: one on sexual attraction and one on sexual identity. To assess the quality of the data, NSDUH 2015 estimates of sexual attraction and sexual identity were compared with estimates from three other national surveys: the NSFG 2011-2013, the NHISy 2014, and the GSS 2014. However, although the sexual identity question was asked to respondents ages 18 and older, the sexual attraction question was only asked to respondents ages 18-44. As such, I dropped sexual attraction from my final analysis and analyzed only the sexual identity question in this study (i.e., "Which one of the following do you consider yourself to be? – heterosexual, that is straight, (if female respondent) lesbian or gay, (if male respondent) gay, and bisexual"), because it covers age group of the study population (i.e., 18 and older).

Representativeness of the Sample

The NSDUH 2015 dataset collected by SAMHSA was used in this study for secondary data analysis. The original SAMHSA/NSDUH 2015 study population was sampled using a 50-state design with an independent stratified multistage area probability sample for each of the 50 states and the District of Columbia. Although this sampling method was complex, it was designed to be representative of both the nation as a whole and for each of the 50 states and the District of Columbia. This allowed estimates at the

national, regional, state, and substate levels. SAMHSA/NSDUH 2015 used a total sample size of 67,500, which served as the representative sample of the total U.S. population ages 12 and older surveyed by NSDUH in 2015 (CBHSQ, 2016; Medley et al., 2016; SAMHSA, 2016).

In this study, the total sample size used was 43,561, which served as representative sample of the total population ages 18 and older surveyed by NSDUH in 2015.

Descriptive Demographics of the Sample

From the total population of 43,561 surveyed by NSDUH in 2015 for mental illness in the past year, 34,580 (79.4%) of sexual minority adults ages 18 and older were identified as not ever having mental illness (i.e., mild, moderate, and severe), 4,434 (10.2%) as ever having mild mental illness, 2,371 (5.4%) as ever having moderate mental illness, and 2,176 (5%) as ever having severe mental illness as shown in Figure 2.

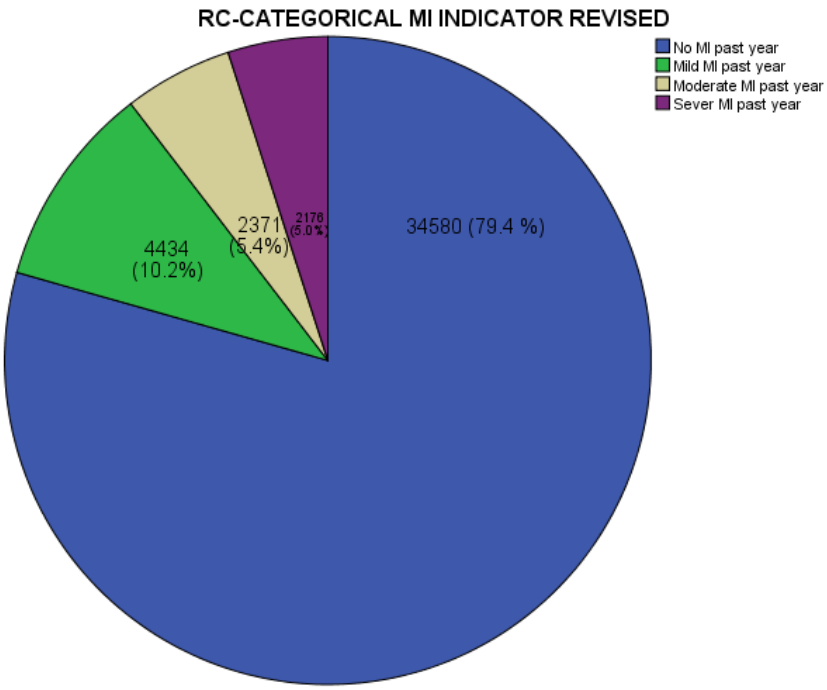

Figure 2. Distribution of sexual minority adults surveyed for mental illness (mild, moderate, and severe) in the past year in NSDUH 2015

Descriptive Statistics of the Sample

Table 3 shows the results of the descriptive statistics analysis, which provides summaries about the sample and the measures. A total population of 43,561 surveyed by NSDUH in 2015 responded to the question "Ever having mental illness in the past year?" (i.e., mild, moderate, and severe), yielding a subset of 34,580 (79.4%) of sexual minority adults ages 18 and older identified as not ever having mental illness (i.e., mild, moderate, and serious) in the past year, 4,434 (10.2%) as ever having mild mental illness, 2,371 (5.4%) as ever having moderate mental illness and 2,176 (5%) as ever having severe mental illness. The number of respondents in NSDUH 2015 for the expected answer yes to the question was low, 8,981 (20.6%) compared to 34,580 (79.4%) of sexual minority

adults ages 18 and older that answered as not ever having past year mental illness (i.e., mild, moderate, and severe), suggesting a data limitation. In addition to the dependent variable, mental illness (mild, moderate, and severe), the other variables included were the independent variable, substance abuse (alcohol, hard drugs [heroin, cocaine, methamphetamine, and hallucinogens], and prescribed drugs (pain relievers, tranquilizers, sedatives, stimulants, psychotherapeutic, and inhalants), as well as marijuana, and the confounding variables (age, sex, race, education, and employment). Regarding the independent variable (substance abuse), the answer, yes, was low. For instance, a total population of 43,561 surveyed by NSDUH in 2015 responded to the question "Ever abused alcohol, hard drugs, or prescribed drugs, as well as marijuana in the past year?", yielding a subset of 41,808 (96%), 43,426 (99.7%), and 43,101 (98.9%) who answered no compared to 1,753 (4%), 135 (.3%), and 460 (1.1%) who answered yes to the alcohol, hard drugs, and prescribed drugs, as well as marijuana abuse question, respectively. A discussion of the significance of the low number of adults who answered yes to these questions will be presented in Section 4. .

Table 3

Univariate Characteristics (Descriptive statistics) of the sample (N = 43, 561)

Variable	**N**	**Percentage (%)**
Sex		
Male	19828	45.5
Female	23733	54.5
Age		
18-25	14553	33.4
26-34	9084	20.9

35-49	11169	25.6
50-64	5157	11.8
>64	3598	8.3
Race		
White/Not Hispanic	26025	59.7
Black/African-.American	5502	12.6
Am.I/AK Native	666	1.5
Native HI/Other Pac. Islands	225	.5
Asian	2050	4.7
More than one race/ Not Hisp..	1445	3.3
Hispanic	7648	17.6
Employment status		
Full Time	22179	50.9
Part Time	7004	16.1
Unemployed	2857	6.6
Other	11521	26.4
Educational Level		
Less High School	6299	14.5
High School Grad	11782	27.0
Some College/Assoc Dg	14504	33.3
College/University Grad	10976	25.2
Alcohol Abuse		
No abuse in the past year	41808	96.0
Abuse in the past year	1753	4.0
Hard Drugs Abuse		
No abuse in the past year	43426	99.7
Abuse in the past year	135	.3
Prescribed Drugs or Marijuana Abuse		
No abuse in the past year	43101	98.9
Abuse in the past year	460	1.1
Mental Illness		
No MI past year	34580	79.4
Mild MI past year	4434	10.2

Moderate MI past year	2371	5.4
Severe MI past year	2176	5.0
Total	43561	100.0

Study Results

Research Question 1

The first RQ asked the following: Which are the descriptive statistics of different types of substance abuse in association with mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015?

Statistical assumptions. I analyzed data for RQ1 using descriptive statistics and Chi-square analysis. The five assumptions of a chi-square test include: (a) individual level data; (b) mutually exclusive categories or levels of the variables; (c) independence of study groups; (d) nominal or ordinal categories of both variables; and (e) values of the cells should be five or more in 80% of the cells (McHugh, 2013). All of the chi square assumptions were met, except the assumption that all the cells should have expected counts greater than or equal to five. The chi square assumptions that relate to the study design were met because the variables or groups are nominal or ordinal, levels or categories of the variables are mutually exclusive, and study groups are independent. The assumption that all the cells should have expected count greater than or equal to five, which relates to how the data fits the model was not met as not all of them were greater than five.

RQ1: As cross-tabulation tables are many, I have included them as Appendix A. According to chi-square results, there was a statistically significant association (p =0.05)

between the independent variable, prescribed drugs (pain relievers, tranquilizers, sedatives, stimulants, psychotherapeutic, and inhalants), as well as marijuana abuse and the dependent variable, mental illness (mild, moderate, and severe), among lesbian/gay adults. The observed magnitude of effect size based on the Cramer's *V* or φ coefficients was .159. Based on this analysis, the significant chi-square value results for prescribed drugs and marijuana abuse (effect size = .159), had a small influence on mental illness as described by Cohen (1988). However, there was no statistically significant association between alcohol abuse and hard drugs (heroin, cocaine, methamphetamine, and hallucinogens) and mental illness with ($p > 0.05$). More specifically, the x^2 and p values per chi-square analysis showed that prescribed drugs (pain relievers, tranquilizers, sedatives, stimulants, psychotherapeutic, and inhalants), as well as marijuana abuse ($\chi^2 = 22.812$, $p = 0.0001$) was the only independent variable that had a statistically significant association with mental illness among lesbian/gay adults. The x^2 and p values per chi-square analysis showed hard drugs (heroin, cocaine, methamphetamine, and hallucinogens) abuse ($\chi^2 = 3.828$, $p > 0.05$), and alcohol abuse ($\chi^2 = 1.523$, $p > 0.05$) demonstrated no statistically significant association with mental illness among lesbian/gay adults as also shown in Appendix A.

According to the results above, we can reject the null hypothesis, and conclude that there was an association between prescribed drugs (pain relievers, tranquilizers, sedatives, stimulant, psychotherapeutic, and inhalants), as well as marijuana abuse and mental illness (mild, moderate, and severe) among lesbian/gay adults. For hard drugs (heroin, cocaine, methamphetamine, and hallucinogens abuse, and alcohol abuse, since

the *p* -value was above the significance level (0.05), we can accept the null hypothesis, and conclude that there was no association with mental illness among lesbian/gay adults. Among bisexual adults, the chi-square results showed there was a statistically significant association ($p < 0.05$) between the independent variable, alcohol abuse and the dependent variable, mental illness (mild, moderate, and severe). However, there was no statistically significant association between hard drugs (heroin, cocaine, methamphetamine, and hallucinogens), and prescribed drugs (pain relievers, tranquilizers, sedatives, stimulants, psychotherapeutic, and inhalants), as well as marijuana abuse and mental illness with ($p > 0.05$), since it was higher than the significance level (0.05) as shown in Appendix A. More specifically, the x^2 and *p* values per chi-square analysis showed that alcohol abuse was the only independent variable that had a statistically significant association with mental illness ($\chi^2 = 26.848$, $p = 0.0001$) among bisexual adults. The observed magnitude of effect size based on the Cramer's *V* or φ coefficients was small .124. On the other hand, the x^2 and *p* values per chi-square analysis showed, hard drugs (heroin, cocaine, methamphetamine, and hallucinogens abuse ($\chi^2 = 7.467$, $p = 0.05$), and prescribed drugs (pain relievers, tranquilizers, sedatives, stimulant, psychotherapeutic, and inhalants), as well as marijuana abuse ($\chi^2 = 6.976$, $p > 0.05$) demonstrated no statistically significant association with mental illness among bisexual adults as also shown in Appendix A.

According to the results above, we can reject the null hypothesis, and conclude that there was an association between alcohol abuse and mental illness among bisexual adults. For hard drugs (heroin, cocaine, methamphetamine, and hallucinogens abuse, and prescribed drugs (pain relievers, tranquilizers, sedatives, stimulant, psychotherapeutic,

and inhalants), as well as marijuana abuse, since the *p* – value was above the significance level (0.05), we cannot reject the null hypothesis, and conclude that there was no association with mental illness among bisexual adults.

Research Question 2

The second RQ asked the following: What are the associations between different types of substance abuse and mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015, adjusted for potential confounding variables (age, sex, race, education, and employment), and are these associations different among gay/lesbians than among bisexuals?

Statistical assumptions. I analyzed RQ2 using ordinal logistic regression by sexual minority, or identity. Six assumptions based on the logistic regression methodology by Hosmer and Lemeshow (2000) include: a) binary or ordinal dependent variable; b) factor of one is the desired outcome; c) model should be fitted correctly; d) error terms need to be independent; e) linearity of independent variables and log odds; f) dataset has a large sample size; and g) the proportional odds assumption . Based on the logistic regression assumptions, all of the rules were met for this analysis. For this ordinal regression, the dependent variable is ordinal, the factor of one is the desired outcome, and the model is fitted correctly. Based on sexual identity by gay/lesbian adults, the statistically significant chi-square statistic ($p < .0005$) indicates that the final model provides a significant improvement over the baseline intercept-only model. The Pearson goodness -of-fit test ($X^2(1117) = 1144.648$, $p < .276$) and the deviance goodness-of-fit test ($X^2(1117) = 843.922$, $p = 1.000$) also indicate that the model fits the data, since the observed and

expected cell counts are similar. The pseudo R^2 value for the Nagelkerke's R^2 =0.059 (5.9%) indicate a good fit, since Pseudo R squared is over .5. Finally, the assumption of proportional odds was met by using the "test of parallel lines" (χ^2= 36.708, p =0.619).

By bisexual adults, the statistically significant chi-square statistic ($p < .0005$) indicates that the final model provides a significant improvement over the baseline intercept-only model. The Pearson goodness -of-fit test ($X^2(1378) = 1437.186$, $p < .130$) and the deviance goodness-of-fit test ($X^2(1378) = 1310.413$, $p = .903$) also indicate that the model fits the data, since the observed and expected cell counts are similar. The pseudo R^2 value for the Nagelkerke's R^2 =0.086 (8.6%) indicate a good fit, since Pseudo R squared is over .5. The results also showed that the assumption of logistic regression modeling was met, because the variable and log odds based on the model fit statistics were linear.

Ordinal logistic regression results (Tables 4 and 5):

Multivariable-adjusted results among gay/lesbian show that being a prescribed drugs/marijuana abuser compared to not being a prescribed drugs/marijuana abuser is significantly associated with mental illness. Additionally, it was revealed that being Black/African-American, compared to Hispanic race, working fulltime compared to other than full/part time or being unemployed, is significantly associated with mental illness. On the other hand, 18-49 years old gay/lesbians are significantly less prone to have mental illness, compared to their >64 years old counterparts (Table 4).

According to the bisexual results, being an alcohol abuser compared to not being an alcohol abuser is significantly associated with mental illness. Also, being male,

Black/African-American, and working full time results in significantly higher odds to have mental illness, compared to being female, Hispanic, and working other than full/part time or being unemployed. On the contrary, being 18-49 years old, Non-Hispanic White, having more than one race (not Hispanic), and having some College/Associate degree, has significantly lower odds to have mental illness, compared to the >64 years old age group, being Hispanic, and being College/University graduate (Table 5).

Table 4

Ordinal regression model for association between the independent variables and mental illness among gay/lesbian

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	Df	P
Intercept Only	1152.779			
Final	1106.380	46.399	20	.001

Goodness-of-Fit[a]

	Chi-Square	Df	P
Pearson	1144.648	1117	.276
Deviance	843.922	1117	1.000

Pseudo R-Square[a]

Cox and Snell	.050
Nagelkerke	.059

McFadden	.027

Predictor		Estimate	Odds Ratio	Std. Error	Wald	Df	P	95% CI for Estimate Lower Bound	95% CI for Estimate Upper Bound
Alcohol Abuse	Yes	.238	1.268	.328	.524	1	.469	-.406	.881
	No		-	.	.	0	.	.	.
Hard Drugs Abuse	Yes		0.490	.783	.829	1	.363	-2.249	.822
	No		-	.	.	0	.	.	.
Prescribed Drugs/Marijuana Abuse	Yes	1.246	3.48[1]	.377	10.908	1	.001	.507	1.986
	No								
Gender	Male	-.024	0.976	.146	.028	1	.867	-.311	.262
	Female	0[b]	-	.	.	0	.	.	.
Age	18-25	1.269	3.557[2]	.485	6.845	1	.009	.318	2.219
	26-34	1.209	3.350[3]	.494	5.995	1	.014	.241	2.177
	35-49	1.413	4.108[4]	.491	8.298	1	.004	.452	2.375
	50-64	.448	1.565	.526	.725	1	.394	-.583	1.480
	>64	0[b]	-	.	.	0	.	.	.
Race	White/Not	.200		.192	1.084	1	.298	-.177	.577
	Hispanic		1.221						
	Black/Afric. American	-.553	0.575[5]	.265	4.360	1	.037	-1.071	-.034
	Am. I/AK Native	.092	1.096	.498	.034	1	.853	-.885	1.069
	Native HI/Other Pac. Islands	-.775	0.460	.823	.886	1	.346	-2.388	.838
	Asian	-.222	0.800	.447	.247	1	.619	-1.098	.654
Education	More than one race/ Not Hisp.	.110	1.116	.374	.087	1	.767	-.622	.843
	Hispanic	0[b]	-	.	.	0	.	.	.
	Less High School	.146	1.157	.266	.302	1	.583	-.375	.667
	High School Grad	.168	1.182	.220	.579	1	.447	-.264	.599
Employment	Some College/Assoc Dg	.145	1.156	.198	.540	1	.462	-.242	.532
	College/University Grad	0[b]	-	.	.	0	.	.	.
	Full Time	-.542	0.581[6]	.196	7.649	1	.006	-.927	-.158
	Part Time	-.087	0.916	.234	.139	1	.710	-.546	.372
	Unemployed	-.429	0.651	.278	2.385	1	.122	-.973	.115
	Other	0[b]	-	.	.	0	.	.	.

b. This parameter is set to zero because it is redundant.

[1]95%CI:1.66-7.29; [2]95%C: 1.37-9.2; [3]95%CI: 1.27-8.82; [4]95%CI: 1.57-10.75; [5]95%CI: 0.34-0.97; [6]95%CI: 0.4-0.85

Table 5

Ordinal regression model for association between the independent variables and mental illness among bisexuals.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	Df	P
Intercept Only	2106.574			
Final	1963.809	142.764	20	.000

Goodness-of-Fit[a]

	Chi-Square	Df	P
Pearson	1437.186	1378	.130
Deviance	1310.413	1378	.903

Pseudo R-Square[a]

Cox and Snell	.078
Nagelkerke	.086
McFadden	.034

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Predictor	Estimate	Odds Ratio	Std. Error	Wald	df	P	95% CI for Estimate Lower Bound	95% CI for Estimate Upper Bound

Alcohol Abuse	Yes	.835	2.31[1]	.181	21.388	1	.000	.481	1.189
	No	0[b]	-	.	.	0	.	.	.
Hard Drugs Abuse	Yes	.873	2.4	.472	3.422	1	.064	.502	1.798
	No	0[b]	-	.	.	0	.	.	.
Prescribed Drugs/Marijuana Abuse	Yes	-.432	0.649	.318	1.840	1	.175	-1.056	.192
	No	0[b]	-	.	.	0	.	.	.
Gender	Male	-.364	0.694[2]	.118	9.552	1	.002	-.594	-.133
	Female	0[b]	-	.	.	0	.	.	.
Age	18-25	.996	2.707[3]	.448	4.941	1	.026	.118	1.875
	26-34	1.118	3.058[4]	.453	6.086	1	.014	.230	2.007
	35-49	1.267	3.550[5]	.457	7.681	1	.006	.371	2.162
	50-64	.593	1.809	.510	1.355	1	.244	-.406	1.592
	>64	0[b]	-	.	.	0	.	.	.
Race	White/Not Hispanic	.544	1.722[6]	.133	16.825	1	.000	.284	.804
	Black/Afric. American	-.355	0.701[7]	.179	3.945	1	.047	-.705	-.005
	Am/AK Native	.186	1.204	.325	.327	1	.567	-.452	.824
	Native HI/Other Pac. Islands	-.278	0.757	.847	.108	1	.743	-1.937	1.382
	Asian	-.376	0.686	.299	1.580	1	.209	-.962	.210
	More than one race/ Not Hisp.	.550	1.733[8]	.199	7.612	1	.006	.159	.941
	Hispanic	0[b]	-	.	.	0	.	.	.
Education	Less High School	.129	1.137	.176	.534	1	.465	-.216	.473
	High School Grad	.249	1.282	.152	2.670	1	.102	-.050	.547
	Some College/Assoc Dg	.445	1.560[9]	.145	9.435	1	.002	.161	.729
	College/University Grad	0[b]	-	.	.	0	.	.	.
Employment	Full Time	-.452	0.636[10]	.120	14.254	1	.000	-.687	-.217
	Part Time	-.198	0.820	.136	2.117	1	.146	-.466	.069
	Unemployed	-.094	0.910	.168	.316	1	.574	-.423	.234
	Other	0[b]	-	.	.	0	.	.	.

b. This parameter is set to zero because it is redundant.

[1]95%CI:1.62-3.29; [2]95%C: 0.55-0.88; [3]95%CI: 1.13-6.52; [4]95%CI: 1.26-7.44; [5]95%CI: 1.44-8.69; [6]95%CI: 1.32-2.23; [7]95%CI: 0.49-0.99; [8]95%CI: 1.17-2.56; [9]95%CI: 1.17-2.07; [10]95%CI: 0.51-0.8

RQ2 Hypotheses test results. According to the gay/lesbian results, being a prescribed drugs/marijuana abuser is significantly more likely to have mental illness compared to not being a prescribed drugs/marijuana abuser (*OR*: 3.48, 95% CI:1.66,7.29 , *p*=.001); thus, we can reject the null hypothesis, as there was a significant association between prescribed drugs/marijuana abuse and mental illness among gay/lesbian adults. On the other hand, there was not significant association between alcohol as well as hard drugs abuse and mental illness among gay/lesbian adults, thus for these types of abuse the null hypothesis is not rejected.

According to the bisexual results, being an alcohol abuser results in significantly higher odds to have mental illness compared to not being an alcohol abuser (*OR:* 2.31, 95%CI: 1.62,3.29 *p*=0.0001). Therefore, there was a significant relationship between alcohol abuse and mental illness in bisexuals, and thus, the null hypothesis is rejected regarding this abuse. On the contrary, the null hypothesis for hard drugs and prescribed drugs/marijuana abuse should be accepted, as there was no significant association between these types of abuse and mental illness among bisexuals.

The results of the study per RQ are summarized in table 6 below.

Table 6

Summary of results by Research Question and Main Predictor (Type of Substance Abuse)

Research Question	Results
1. Which are the descriptive statistics of different types of substance abuse in association with mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015?	*By gay/lesbian:* Prescribed drugs and marijuana abusers appeared to have more frequently mental illness.
	By bisexual: Alcohol abusers appeared to have more frequently mental illness.
2.What are the associations between different types of substance abuse and mental illness among sexual minority adults ages 18 and older in the United States surveyed in SAMHSA/NSDUH in 2015, adjusted for potential confounding variables (age, sex, race, education, and employment) and are these associations different among gay/lesbians than among bisexuals?	*By gay/lesbian:* Being a prescribed drugs/marijuana abuser results in significantly higher odds to have mental illness adjusted for age group, sex, race/ethnicity, education, and employment.
	By bisexual: Being an alcohol abuser results in significantly higher odds to have mental illness, adjusted for age group, sex, race/ethnicity, education, and employment.

Summary

Section 3 presented the results and findings of my doctoral study. In this section, I included the study purpose, data collection schema, results of the descriptive and influential statistics of the hypotheses and RQs, and the key findings. This doctoral study used the NSDUH 2015 data collected by SAMHSA for secondary data analysis to examine the associations between the independent variable, substance abuse (alcohol, hard drugs (heroin, cocaine, methamphetamine, and hallucinogens), and prescribed drugs (pain relievers, tranquilizers, sedatives, stimulants, psychotherapeutic, and inhalants), as well as marijuana,) and the dependent variable, mental illness (mild, moderate, and severe) in the past year, and the confounding variables that influence the associations. A detailed analysis and interpretation of the findings presented in the current doctoral study

is discussed in the next section, Section 4. Section 4 serves as an overview of the research study, and conclusions that are relevant to the study, along with an interpretation of the findings in the context of previous literature and the theoretical framework, the Minority Stress Model (MSM) used in this study. In addition, recommendations are made for further study, and proposed future research is suggested, and implications for professional practice and positive social change.

Section 4: Application to Professional Practice and Implications for Social Change

The purpose of my quantitative research study, using the NSDUH 2015 cross-sectional dataset collected by SAMHSA, for secondary data analysis was to determine if associations exist between different types of substance abuse and mental illness (mild, moderate, and severe) among sexual minority adults ages 18 and older in the United States, controlling for the confounding factors that may influence the associations. Section 4 includes a summary of key findings, interpretation of findings in the context of previous literature and the theoretical framework, the MSM, limitations of the study, recommendations for further study, and implications for professional practice and positive social change.

Summary of Key Findings

In the findings of the bivariate analysis by gay/lesbian, I found a statistically significant association between prescribed drugs and marijuana abuse and mental illness, and by bisexual, statistically significant association between alcohol abuse and mental illness. The observed magnitude of effect size based on the Cramer's V or φ coefficient was small .159 by gay/lesbian, and .124 by bisexual, respectively. In the findings of the ordinal regression analysis by gay/lesbian, I found that being Black/African American, working full time, and being a prescribed drugs/marijuana abuser is significantly more possible to have mental illness, compared to being Hispanic, working other than full/part time or being unemployed and not being a prescribed drugs/marijuana abuser. On the other hand, 18-49-years-old gay/lesbians are significantly less prone to have mental illness, compared to their >64-years-old counterparts.

By bisexual, I found that being male, Black/African American, working full time, and being an alcohol abuser resulted in significantly higher odds to have mental illness, compared to being female, Hispanic, working other than full/part time or being unemployed, and not being an alcohol abuser. On the contrary, being 18-49-years-old, White/ Not Hispanic, having more than one races (not Hispanic), and having some college/associate degree, has significantly lower odds to have mental illness, compared to the >64 years old age group, being Hispanic, and being college/university graduate.

Interpretation of the Findings

In the following subsection, I compare the findings to previous literature to either confirm, disconfirm, or extend knowledge in the discipline. I also analyze and interpret the findings in the context of the MSM, the theoretical framework used in this study.

Importance of Findings to Literature

Substance abuse and mental illness. In the findings of my analyses of the NSDUH 2015 secondary dataset collected by SAMHSA, I found that among gay/lesbian adults, being prescribed drugs/marijuana abuser is significantly more possible to have mental illness compared to not being a prescribed drugs/marijuana abuser (*OR*: 3.48, 95% *CI*:1.66, 7.29, *p*=.001). Among bisexual adults, being an alcohol abuser results in significantly higher odds to have mental illness compared to not being an alcohol abuser (*OR:* 2.31, 95% *CI*: 1.62, 3.29, *p*=0.0001). The finding is partly in agreement with Gonzales et al. (2016) who found that lesbian/gay adults experienced elevated odds of moderate (*OR:* 1.45, 95% *CI*, 1.08,1.96) to severe (*OR:* 2.82, 95% *CI*, 1.55,5.14) mental illness, as well as heavy alcohol consumption (*OR*: 1.97, 95% *CI*, 1.08,3.58), and illicit

drugs use (*OR:* 1.98, 95% *CI*, 1.39,2.81). On the other hand, bisexual adults exhibited greater odds of moderate (*OR:*2.60, 95% *CI*, 1.62,4.18) and severe (*OR:* 4.70; 95% *CI*, 1.77,12.52) mental illness, as well as likely to be heavy alcohol abuser (*OR:*3.15; 95% *CI*, 1.22,8.16) and heavy illicit drug abuser (*OR:* 2.10, 95% *CI*, 1.08, 4.10). The findings in this study are also partly consistent with Blosnich et al. (2014) who found that both LGB populations are more likely to engage in alcohol abuse that can lead to mental health problems. A possible explanation for the partial agreement in findings in these studies may have been because Gonzales et al. (2016), and Blosnich et al. (2014) used a 4-year and 3-year pooled data respectively compared to SAMHSA/NSDUH secondary data, which examined only 1 year, 2015. Further research is needed to clarify the effect of substance abuse on mental illness among LGB adults.

The following subsections also present findings in this study broken down by the confounding variables that influence the associations between substance abuse and mental illness among LGB adults. These include age group, sex/gender, race, education, and employment.

Age group. I found that 18-49-years-old gay/lesbians and bisexuals were significantly less prone to have mental illness, compared to their >64-years-old counterparts. This finding is consistent with Fredriksen-Goldsen et al.(2013) who found that LGB older adults had higher risk of poor mental health. According to Fredriksen-Goldsen et al., stigma, discrimination, and sexual identity concealment, because of their minority status, plays a role in the lives of older LGB persons in particular, which can lead to loneliness and poor mental health outcomes, such as depression. Consistent with

the findings in this study is Choi and Meyer (2016), who also found older LGB adults have higher risk of mental health problems. Choi and Meyer stated that age is the greatest risk factor for mental illness for older LGB adults, complicated by delay or not seeking medical care for fear of discrimination due to their minority status. However, the findings in this study contrasted with Myers (2014) who found that LGB adults 26 and older experience lower odds of mental health problems, such as depression or anxiety, relative to young adults ages 18-25. A possible explanation for the contradictory finding may have been because Myers relied on non-probability-based sampling approach, such as convenience sampling. Further research is needed to clarify the impact of age on mental illness among lesbian/gay and bisexual adults.

Sex/gender. I found that among bisexual adults, being male resulted in significantly higher odds to have mental illness compared to being female. Consistent with this finding, Bostwick et al. (2014) found that bisexual men often reported some of the worst mental health outcomes when compared with lesbian/gay females. On the contrary, Gonzales et al. (2016) found that bisexual women are at higher risk for worse mental health than lesbians or gay men is inconsistent with these findings. One possible explanation for the contradictory finding may have been because Gonzales et al. used a small sample size (n= 230), which may not have been sufficient to detect differences in mental health problems for the subgroups.

Race. Among racial groups, I found that being Black/African American LGB was significantly more likely to have mental illness compared to being Hispanic. Also, White/ Not Hispanic, and having more than one race (not Hispanic) bisexuals had lower odds to

have mental illness compared to being Hispanic. The findings in this study contrasted with Bostwick et al. (2014) who found Asians to have the lowest rate of mental illness among bisexuals and American Indians to have the highest rate of mental illness among lesbian/gay. A possible explanation for the contradictory finding may have been because the sample used by Bostwick et al. was mostly White. In addition to LGB subgroups, future research can include more diverse sexual minority populations, such as transgender to have more comparable results.

Education. I found that being a bisexual, having some college/associate degree has significantly lower odds to have mental illness compared to being a college/university graduate. This finding contrasted with Bostwick et al. (2014) who found that the rate of mental illness or health is lowest among college graduates and highest among LGB adults with high school education. A possible explanation for the contradictory finding may have been because Bostwick et al. used college/associate degree as the reference group in the study. Also, I had small sample sizes of LGB who were college graduate, which may account for its lowest mental illness odds in the analysis. This highlights the importance for research to recruit larger samples of LGBs with college graduate educational level to examine critical differences within these levels according to their relationship with mental illness odds.

Employment. I found that gay/lesbians and bisexuals who are working full time are more prone to have mental illness compared to those who are working other than full/part time or being unemployed. The finding contrasted with Balsam et al. (2015) who found that mental illness was highest among unemployed. Balsam et al. also showed that

mental illness among gay/lesbian adults was highest among those with part time status. The reason for the difference may have been due to the small sample size (less than 100 population) in the Balsam study.

Findings to MSM Theoretical Framework

I applied Meyer's (2003) MSM in this study because it provided a useful framework to analyze and interpret the findings relating to (a) the associations between the independent variable, substance abuse (alcohol, hard drugs, and prescribed drugs, as well as marijuana), mental illness outcome (depression and anxiety), and the most important factors influencing the associations; and (b) how the independent, dependent, and confounding variables in this study can fit into the various levels (individual, interpersonal, organizational, community, and policy) of the distal and proximal minority stress processes/stressors.

Individual. Meyer's (2003) MSM showed that at the core of the individual level of the model is lesbian/gay, and bisexual as an individual, surrounded by distal stressors (prejudice events such as discrimination) and proximal stressors (events such as rejection), which they are exposed to as a result of their minority status. The independent variable, substance abuse, the dependent variable, mental illness, and the confounding variables (age group, sex/gender, race, education, and employment), which are intrapersonal or demographic characteristics that defined lesbian/gay, and bisexual individuals can all be linked to the individual level of the MSM. The findings in this study showed that among gay/lesbians and bisexuals, being male, Black/African American, working full time, and being a prescribed drugs and marijuana abuser, as well

as an alcohol abuser results in significantly higher odds to have mental illness compared to being female, Hispanic, working other than full/part time or being unemployed, and not being a prescribed drugs and marijuana abuser, as well as an alcohol abuser. On the other hand, being 18-49 years old gay/lesbians and bisexuals, White/ Not Hispanic, having more than one races (not Hispanic), and having some College/Associate degree, is significantly less prone to have mental illness compared to the >64 years old age group, being Hispanic, and being College/University graduate. These findings in this study correspond with Meyer (2003) minority stress model, wherein Meyer (2003) alluded that lesbian/gay and bisexual adults are exposed to alcohol and drug abuse, which has an adverse effect on their mental health. According to Meyer (2003), the reasons for the substance abuse may be due to the fact that lesbian/gay, and bisexual individuals experience distinct, chronic distal and proximal stressors by virtue of their marginalized sexual minority status, including stigma, prejudice, and discrimination. Consistent to the findings in this study is Bränström (2016) who found that distinct experiences or stressors, such as alcohol, prescribed drugs, and marijuana abuse, in addition to every day or universal stressors, disproportionately compromise the mental health of lesbian/gay, and bisexual individuals. Meyer's (2013) findings also align with findings in this study. More specifically, Meyer (2013) stated that lesbian/gay and bisexual adults are more likely to indulge in substance abuse and experience mental health conditions, such as depression and anxiety, because of coming out and identifying themselves. As a result, they are discriminated against due to their minority status. They are faced with a symptom of stress associated with identity related stigma, which may vary by gender

and/or sexual identity. This suggests the need for further studies to investigate whether substance abuse and mental illness affect certain individuals of sexual minority adults disproportionately.

Interpersonal. The independent variable, substance abuse, and the dependent variable, mental illness can also be linked or correspond to this level of the proximal processes/stressors (rejection) of the MSM. The findings in this study showed that gay/lesbians tend to be prescribed drugs and marijuana abusers, while bisexuals tend to be alcohol abusers, which results in significantly higher odds to have mental illness. The findings correspond to Meyer's (2003) MSM, wherein at the interpersonal level of the proximal processes of the model, gay/lesbian, and bisexual adults lack social support and are faced with events or stressors such as expectations of rejection (by their family members, peers, and significant others), and fear and concealment. These stressors can cause gay/lesbian and bisexual adults to abuse prescribed drugs and marijuana as well as alcohol, which are associated with mental illness in this study.

Slater, Godette, Huang, Ruan, & Kerridge (2017) found a link between rejecting responses from family members, and stressors such as substance abuse, particularly prescribed drugs and marijuana abuse among gay/lesbian adults, and alcohol abuse among bisexual adults, which are strongly associated with myriad negative health issues, such as mental health problems in this study. These stressors may require structural, familial, individual, and interpersonal-level initiatives to advance their well-being.

Organizational. The independent variable, substance abuse, the dependent variable, mental illness, and the confounding variables can also be linked to the

organizational level of the MSM. At this level, lesbian/gay and bisexual adults experience structural or institutionalized discrimination and prejudice, considered as distal and external stressors. The findings of this study can correspond to Meyer's (2003) MSM, wherein Meyer (2003) alluded that the prescribed drugs and marijuana abuse as well as alcohol abuse stressors create a hostile and stressful social environment within which gay/lesbians, and bisexuals are embedded and can impact them differently in terms of mental odds. The findings in this study also align with Lea, de Wit, and Reynolds (2014) who found that stressors, such as alcohol, prescription drugs, and marijuana abuse, as well as prejudice and discrimination are related to the environment and social structures or organization which lesbian/gay and bisexual are exposed to that can be detrimental to their mental health. Also, consistent with findings in this study is Choi et al. (2013) who found that lesbian, gay, and bisexual adults who are Black/African-Americans are more prone to indulge in substance abuse that can result in higher odds of poor mental health. They described substance abuse as a noxious environment for lesbian/gay and bisexual adults, and suggested that it leads to adverse effects, such as mental health problems as in this study.

Public policy. The independent and dependent variables can be linked to the public policy level of both the distal and proximal processes/stressors where they can be addressed by policymakers. The findings in this study showed that among gay/lesbians, being a prescribed drugs and marijuana abuser, and among bisexuals, being an alcohol abuser, results in significantly higher odds to have mental illness compared to not being a prescribed drugs and marijuana abuser or an alcohol abuser. These findings correspond

to Meyer's (2003) MSM, wherein Meyer (2003) posited that gay/lesbians and bisexuals are faced with increased exposure to excess stress or distal stressors (such as stigma, prejudice, discrimination, and substance abuse), that are associated with mental health problems. Hatzenbuehler, Phelan, & Link (2013) found that US laws and policies unfairly treat gays/lesbians and bisexual adults as a result of societal stigma they are exposed to because of their minority status. For example, Hatzenbuehler, Phelan, and Link (2013) pointed out that population-based data indicate that most Americans have access to health care, yet evidence suggests that lesbian, gay, and bisexual adults may have less access to health care when needed. Fredriksen-Goldsen et al. (2014) also found that lesbian, gay and bisexual adults may be at risk for elevated use of substances and poor mental health outcomes as a result of lack of access or less access to preventive health care because of discrimination or inability to afford care. They further suggested that policymakers need to understand the ways in which policies shape access to resources within society and their role in promoting health equity. Findings in this study can help policymakers address lesbian/gay and bisexual adults substance abuse and mental health problems by promoting interventions specifically tailored to the prevention and treatment of substance abuse that can lead to adverse mental health effects among gay/lesbian and bisexual adults. Russell and Fish (2016) also stated that policymakers should use the minority stress model to promote equitable access to preventive care services that can result in early detection of substance abuse, leading to mental health problems among lesbian/gay and bisexual adults.

Limitations of the Study

There are three main limitations to this study, which future research may want to address. The first of which was related to the research design. I conducted this research using NSDUH 2015 dataset collected by SAMHSA for secondary data analysis. SAMHSA/NSDUH 2015, which employed a quantitative survey method that allowed gathering of numerical data for statistical data analysis and hypothesis testing and provided findings on the relationships between the independent variable to the dependent variable that may be used to guide future quantitative approaches, rather than used mixed methods approach. Mixed methods provides strengths that offset the weaknesses of both quantitative and qualitative research. Employing the qualitative method in addition, would have allowed for the gathering of in-depth information to explore the research problem with the depth or breadth that a qualitative approach, with open-ended survey questions or observations, could provide. In addition, using SAMHSA's secondary data with cross-sectional design in this study did not allow for an examination of cause-effect relationships between variables.

The second limitation was related to the methodology used in the study for data collection. SAMHSA/NSDUH 2015 survey was based on participants self-report. As such, it was subject to recall and non-response biases and missing data, which may influence reporting and affect the external validity of the results. For example, with recall bias stressors such as depression and anxiety that lesbian, gay, and bisexual adults were experiencing due to their minority status may negatively impact their ability to accurately recall an event. Moreover, they may have difficulty retrieving a memory or remember it

accurately. Therefore, it was uncertain the extent to which they were honest in their answers. One can rarely independently verify self-reported data and may reflect biased answers (Brutus, 2013). Regarding non-response bias, since the research involved sensitive issues (substance abuse and mental illness), and sensitive individuals (sexual minority) adults, as victims of discrimination and stigmatization because of their minority status, they are often humiliated or feel uncomfortable answering questions relating to these issues, resulting in non-response. There were also missing data that affect the external validity of the results. As explained in Section 2, missing data were excluded from the analysis. Also, for my RQ1, the assumption for a chi-square test that all the cells should have expected counts greater than or equal to five, which relates to how the data fits the model was not met as not all of them were greater than five, suggesting a data limitation.

The study's third limitation, in terms of a threat to external validity was related to the generalizability of the results and findings. Demographic characteristics of the sample showed that participants were mostly White (59.7%) and identified as heterosexual or straight (92.2%), thus limiting the generalizability of the findings to a more diverse group (SAMHSA, 2016). Also, findings could not be generalized to all lesbian, gay, and bisexual populations in different countries.

Recommendations

Findings in the present research points to several potential avenues for future study. First, this study needs to be replicated to include additional years of data, rather than only using data collected by SAMHSA/NSDUH in 2015 for secondary data analysis.

This will allow changes to be tracked over time for substance abuse and illness among sexual minority adults ages 18 and older in the United States. It will also enable researchers to examine issues in greater depth for specific sexual minority subgroups. Second, future research should involve NSDUH and other data sources, which will be useful for understanding factors associated with substance abuse and mental health issues among sexual minority adults. Third, modifications could be made to future quantitative research to include more diverse sexual minority populations, such as transgender, and investigate whether substance abuse and mental illness affect certain individuals of sexual minority adults disproportionately. Fourth, researchers may also consider both a qualitative and quantitative approach (mixed methods), rather than a single approach (quantitative) on this topic. Mixed methods uses the strengths of both methodologies to provide a broader perspective on the overall issue. Qualitative approach may result in important insights into the demographic factors that influenced the associations between substance abuse and mental illness among sexual minority adults. It may also help to address any questions of bias that may have affected or suppressed results regarding sexual minority adults associations with substance abuse and mental illness. Quantitative approach like a survey, helps to validate or invalidate observations made during the qualitative phase.

Implications for Professional Practice and Social Change

This section provides recommendations to professional practice and positive social change implications relevant to guide practitioners and society as a whole in their

efforts to help sexual minority adults with potential substance abuse and mental health outcomes as a result of their minority status.

Professional Practice

The implications of ignoring the lesbian, gay and bisexual community, in particular, can gravely impact society because they are members of the greater whole. Results of this research of sexual minority adults that indicate associations with substance abuse leading to mental health outcomes such as depression and anxiety can provide practitioners: a) with the opportunity, not only to bring about awareness within the field of public health, but also to a wider population and the community or society as a whole; and b) to collaborate with counselors, health care and social workers that have direct contact with sexual minority adults to be non-judgmental and become knowledgeable about how sexual identities influence their social and interpersonal functioning to provide LGB-competent substance abuse and mental illness programs tailored to their specific needs.

Positive Social Change

The results of this research also support Walden's mission as they can lead to positive social changes by: 1) increased knowledge and better understanding of sexual minority adults associations with substance abuse and mental illness, and the most important factors that influence the associations; 2) increased level of awareness about the stressors and health disparities experienced by sexual minority adults because of their minority status that can lead to substance abuse, which in turn can lead to mental illness 3) increased knowledge and clear understanding of the MSM, and how sexual minority

adults can respond and be protected from the adverse mental health effects of the minority stress through coping and resilience; and 4) may guide future public health interventions in improving sexual minorities access to early substance abuse and mental health prevention screening and treatment.

Conclusion

In utilizing NSDUH 2015 dataset, collected by SAMHSA for secondary data analysis in this investigation, I identified the associations between substance abuse (alcohol, prescribed drugs and marijuana, and hard drugs) and the odds of having mental illness among sexual minority adults, adjusted for: age, sex, race, education, and employment that may influence the associations. This gap identified in previous studies supported the need for this current large-scale national study. Meyer's (2003) minority stress model was incorporated into this study to provide a clear understanding of how social stressors, such as discrimination can result in substance abuse, leading to mental health problems among sexual minority adults, due to their minority status. On the other hand, it also illustrates how sexual minority status is associated not only with stress but with coping and resilience that protect them from the adverse mental effects of the minority stress. The key findings in this study that among gay/lesbian adults, being a prescribed drugs/marijuana abuser, is significantly more possible to have mental illness, and among bisexual adults, being an alcohol abuser, results in significantly higher odds to have mental illness, can contribute as a means of generating directions for future research. Rather than using only one year data for data analysis, future research should include additional years of data that will allow changes to be tracked over time and

examine the relationship between substance abuse and mental health issues among sexual minority adults in greater depth.

Other findings are that among gay/lesbians and bisexuals, being male, Black/African-American, and working full time, results in significantly higher odds to have mental illness, compared to being female, Hispanic, working other than full/part time or being unemployed. On the other hand, being 18-49 years old gay/lesbians and bisexuals, White/ Not Hispanic, having more than one race (not Hispanic), and having some College/Associate degree, is significantly less prone to have mental illness, compared to the >64 years old age group, being Hispanic, and being College/University graduate. These findings can provide me with the opportunity to bring about positive social change by not only heightened the awareness about the stressors (alcohol, and prescribed drugs and marijuana abuse) and mental health disparities that lesbians/gays and bisexuals are exposed to because of their minority status within the field of public health, but also to a wider population and the community or society as a whole. They may also guide future public health interventions in improving sexual minorities access to early substance abuse and mental health prevention screening and treatment.

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Appendix: Bivariate Analysis

A. By Sexual Identity = Lesbian/Gay

ALCOHOL ABUSE - PAST YEAR vs. Mental Illness

x^2= 1.523, p>0.05

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED				
			No MI past year				
RC-ALCOHOL ABUSE - PAST YEAR	No abuse in the past year	Count	584				
		% within RC-ALCOHOL ABUSE - PAST YEAR	68.9%				
		% within RC-CATEGORICAL MI INDICATOR REVISED	93.9%				
		% of Total	64.9%				
	abuse in the past year	Count	38				
		% within RC-ALCOHOL ABUSE - PAST YEAR	73.1%				

		% within RC-CATEGORICAL MI INDICATOR REVISED	6.1%				
		% of Total	4.2%				
Total		Count	622				
		% within RC-ALCOHOL ABUSE - PAST YEAR	69.1%				
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%				
		% of Total	69.1%				

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED			
			Mild MI past year			
RC-ALCOHOL ABUSE - PAST YEAR	No abuse in the past year	Count	110			
		% within RC-ALCOHOL ABUSE - PAST YEAR	13.0%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	96.5%			
		% of Total	12.2%			
	abuse in the past	Count	4			

	year	% within RC-ALCOHOL ABUSE - PAST YEAR	7.7%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	3.5%			
		% of Total	0.4%			
Total		Count	114			
		% within RC-ALCOHOL ABUSE - PAST YEAR	12.7%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%			
		% of Total	12.7%			

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED		
			Moderate MI past year		
RC-ALCOHOL ABUSE - PAST YEAR	No abuse in the past year	Count	64		
		% within RC-ALCOHOL ABUSE - PAST YEAR	7.5%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	92.8%		
		% of Total	7.1%		
	abuse in the past year	Count	5		
		% within RC-ALCOHOL ABUSE - PAST YEAR	9.6%		

		% within RC-CATEGORICAL MI INDICATOR REVISED	7.2%		
		% of Total	0.6%		
Total		Count	69		
		% within RC-ALCOHOL ABUSE - PAST YEAR	7.7%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%		
		% of Total	7.7%		

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED	
			Sever MI past year	
RC-ALCOHOL ABUSE - PAST YEAR	No abuse in the past year	Count	90	
		% within RC-ALCOHOL ABUSE - PAST YEAR	10.6%	
		% within RC-CATEGORICAL MI INDICATOR REVISED	94.7%	
		% of Total	10.0%	
	abuse in the past year	Count	5	
		% within RC-ALCOHOL ABUSE - PAST YEAR	9.6%	
		% within RC-CATEGORICAL MI INDICATOR REVISED	5.3%	
		% of Total	0.6%	
Total		Count	95	
		% within RC-ALCOHOL ABUSE - PAST YEAR	10.6%	

		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%
		% of Total	10.6%

Crosstab[a]

			Total
RC-ALCOHOL ABUSE - PAST YEAR	No abuse in the past year	Count	848
		% within RC-ALCOHOL ABUSE - PAST YEAR	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	94.2%
		% of Total	94.2%
	abuse in the past year	Count	52
		% within RC-ALCOHOL ABUSE - PAST YEAR	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	5.8%
		% of Total	5.8%
Total		Count	900
		% within RC-ALCOHOL ABUSE - PAST YEAR	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%
		% of Total	100.0%

Chi-Square Tests[a]

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.523[b]	3	.677
Likelihood Ratio	1.670	3	.644
Linear-by-Linear Association	.082	1	.775

N of Valid Cases	900	

a. SEXUAL IDENTITY = 2.0

b. 1 cells (12.5%) have expected count less than 5. The minimum expected count is 3.99.

Symmetric Measures[a]

		Value	Approximate Significance
Nominal by Nominal	Phi	.041	.677
	Cramer's V	.041	.677
N of Valid Cases		900	

a. SEXUAL IDENTITY = 2.0

Hard drugs abuse vs. Mental Illness

$x^2 = 3.828$, $p > 0.05$

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED				
			No MI past year				
Hard_drugs_abuse	No abuse in the past year	Count	619				
		% within Hard_drugs_abuse	69.2%				

		% within RC-CATEGORICAL MI INDICATOR REVISED	99.5%				
		% of Total	68.8%				
	abuse in the past year	Count	3				
		% within Hard_drugs_abuse	50.0%				
		% within RC-CATEGORICAL MI INDICATOR REVISED	0.5%				
		% of Total	0.3%				
Total		Count	622				
		% within Hard_drugs_abuse	69.1%				
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%				
		% of Total	69.1%				

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED			
			Mild MI past year			
Hard_drugs_abu	No abuse in the past	Count	113			

se	year	% within Hard_drugs_abuse	12.6%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	99.1%			
		% of Total	12.6%			
	abuse in the past year	Count	1			
		% within Hard_drugs_abuse	16.7%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	0.9%			
		% of Total	0.1%			
Total		Count	114			
		% within Hard_drugs_abuse	12.7%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%			
		% of Total	12.7%			

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED		
			Moderate MI past year		
Hard_drugs_abuse	No abuse in the past year	Count	69		
		% within Hard_drugs_abuse	7.7%		

		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%		
		% of Total	7.7%		
	abuse in the past year	Count	0		
		% within Hard_drugs_abuse	0.0%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	0.0%		
		% of Total	0.0%		
Total		Count	69		
		% within Hard_drugs_abuse	7.7%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%		
		% of Total	7.7%		

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED	
			Sever MI past year	Total
Hard_drugs_abuse	No abuse in the past year	Count	93	894
		% within Hard_drugs_abuse	10.4%	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	97.9%	99.3%
		% of Total	10.3%	99.3%
	abuse in the past year	Count	2	6
		% within Hard_drugs_abuse	33.3%	100.0%

	% within RC-CATEGORICAL MI INDICATOR REVISED	2.1%	0.7%
	% of Total	0.2%	0.7%
Total	Count	95	900
	% within Hard_drugs_abuse	10.6%	100.0%
	% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%	100.0%
	% of Total	10.6%	100.0%

Chi-Square Tests[a]

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.828[b]	3	.281
Likelihood Ratio	3.232	3	.357
Linear-by-Linear Association	1.908	1	.167
N of Valid Cases	900		

a. SEXUAL IDENTITY = 2.0

b. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .46.

Symmetric Measures[a]

		Value	Approximate Significance
Nominal by Nominal	Phi	.065	.281
	Cramer's V	.065	.281
N of Valid Cases		900	

a. SEXUAL IDENTITY = 2.0

Prescribed drugs and marijuana abuse vs. Mental Illness

x^2= 22.812, p<0.0001

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED
			No MI past year
Prescribed_drugs_marijuana_abuse	No abuse in the past year	Count	609
		% within Prescribed_drugs_marijuana_abuse	69.7%
		% within RC-CATEGORICAL MI INDICATOR REVISED	97.9%
		% of Total	67.7%
	abuse in the past year	Count	13
		% within Prescribed_drugs_marijuana_abuse	50.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	2.1%
		% of Total	1.4%
Total		Count	622

		% within Prescribed_drugs_marijuana_abuse	69.1%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%			
		% of Total	69.1%			

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED			
			Mild MI past year			
Prescribed_drugs_marijuana_abuse	No abuse in the past year	Count	113			
		% within Prescribed_drugs_marijuana_abuse	12.9%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	99.1%			
		% of Total	12.6%			
	abuse in the past year	Count	1			
		% within Prescribed_drugs_marijuana_abuse	3.8%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	0.9%			

	% of Total	0.1%			
Total	Count	114			
	% within Prescribed_drugs_marijuana_abuse	12.7%			
	% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%			
	% of Total	12.7%			

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED		
			Moderate MI past year		
Prescribed_drugs_marijuana_abuse	No abuse in the past year	Count	67		
		% within Prescribed_drugs_marijuana_abuse	7.7%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	97.1%		
		% of Total	7.4%		
	abuse in the past year	Count	2		
		% within Prescribed_drugs_marijuana_abuse	7.7%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	2.9%		
		% of Total	0.2%		
Total		Count	69		

		% within Prescribed_drugs_marijuana_abuse	7.7%	
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%	
		% of Total	7.7%	

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED
			Sever MI past year
Prescribed_drugs_marijuana_abuse	No abuse in the past year	Count	85
		% within Prescribed_drugs_marijuana_abuse	9.7%
		% within RC-CATEGORICAL MI INDICATOR REVISED	89.5%
		% of Total	9.4%
	abuse in the past year	Count	10
		% within Prescribed_drugs_marijuana_abuse	38.5%
		% within RC-CATEGORICAL MI INDICATOR REVISED	10.5%
		% of Total	1.1%
Total		Count	95
		% within Prescribed_drugs_marijuana_abuse	10.6%

		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%
		% of Total	10.6%

Crosstab[a]

			Total
Prescribed_drugs_marijuana_abuse	No abuse in the past year	Count	874
		% within Prescribed_drugs_marijuana_abuse	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	97.1%
		% of Total	97.1%
	abuse in the past year	Count	26
		% within Prescribed_drugs_marijuana_abuse	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	2.9%
		% of Total	2.9%
Total		Count	900
		% within Prescribed_drugs_marijuana_abuse	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%
		% of Total	100.0%

a. SEXUAL IDENTITY = 2.0

Chi-Square Tests[a]

	Value	Df	Asymptotic Significance (2-sided)

Pearson Chi-Square	22.812[b]	3	.000
Likelihood Ratio	15.748	3	.001
Linear-by-Linear Association	14.623	1	.000
N of Valid Cases	900		

a. SEXUAL IDENTITY = 2.0

b. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 1.99.

Symmetric Measures[a]

		Value	Approximate Significance
Nominal by Nominal	Phi	.159	.000
	Cramer's V	.159	.000
N of Valid Cases		900	

a. SEXUAL IDENTITY = 2.0

B. By SEXUAL IDENTITY = Bisexual

Alcohol abuse vs. Mental Illness

$x^2 = 26.848$, $p < 0.0001$

Crosstab[a]

RC-CATEGORICAL MI INDICATOR REVISED					
No MI past year					

RC-ALCOHOL ABUSE - PAST YEAR	No abuse in the past year	Count	870				
		% within RC-ALCOHOL ABUSE - PAST YEAR	53.3%				
		% within RC-CATEGORICAL MI INDICATOR REVISED	95.8%				
		% of Total	49.8%				
	abuse in the past year	Count	38				
		% within RC-ALCOHOL ABUSE - PAST YEAR	32.5%				
		% within RC-CATEGORICAL MI INDICATOR REVISED	4.2%				
		% of Total	2.2%				
Total		Count	908				
		% within RC-ALCOHOL ABUSE - PAST YEAR	51.9%				
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%				
		% of Total	51.9%				

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED			
			Mild MI past year			
RC-ALCOHOL ABUSE - PAST YEAR	No abuse in the past year	Count	278			
		% within RC-ALCOHOL ABUSE - PAST YEAR	17.0%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	93.0%			
		% of Total	15.9%			
	abuse in the past year	Count	21			
		% within RC-ALCOHOL ABUSE - PAST YEAR	17.9%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	7.0%			
		% of Total	1.2%			
Total		Count	299			
		% within RC-ALCOHOL ABUSE - PAST YEAR	17.1%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%			
		% of Total	17.1%			

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED		
			Moderate MI past year		
RC-ALCOHOL ABUSE - PAST YEAR	No abuse in the past year	Count	209		
		% within RC-ALCOHOL ABUSE - PAST YEAR	12.8%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	91.7%		
		% of Total	12.0%		
	abuse in the past year	Count	19		
		% within RC-ALCOHOL ABUSE - PAST YEAR	16.2%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	8.3%		
		% of Total	1.1%		
Total		Count	228		
		% within RC-ALCOHOL ABUSE - PAST YEAR	13.0%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%		
		% of Total	13.0%		

Crosstab[a]

		RC-CATEGORICAL MI INDICATOR REVISED	
		Sever MI past year	

RC-ALCOHOL ABUSE - PAST YEAR	No abuse in the past year	Count	274	
		% within RC-ALCOHOL ABUSE - PAST YEAR	16.8%	
		% within RC-CATEGORICAL MI INDICATOR REVISED	87.5%	
		% of Total	15.7%	
	abuse in the past year	Count	39	
		% within RC-ALCOHOL ABUSE - PAST YEAR	33.3%	
		% within RC-CATEGORICAL MI INDICATOR REVISED	12.5%	
		% of Total	2.2%	
Total		Count	313	
		% within RC-ALCOHOL ABUSE - PAST YEAR	17.9%	
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%	
		% of Total	17.9%	

Crosstab[a]

			Total
RC-ALCOHOL ABUSE - PAST YEAR	No abuse in the past year	Count	1631
		% within RC-ALCOHOL ABUSE - PAST YEAR	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	93.3%
		% of Total	93.3%
	abuse in the past year	Count	117
		% within RC-ALCOHOL ABUSE - PAST YEAR	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	6.7%

	% of Total	6.7%
Total	Count	1748
	% within RC-ALCOHOL ABUSE - PAST YEAR	100.0%
	% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%
	% of Total	100.0%

a. SEXUAL IDENTITY = 3.0

Chi-Square Tests[a]

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	26.848[b]	3	.000
Likelihood Ratio	24.945	3	.000
Linear-by-Linear Association	26.291	1	.000
N of Valid Cases	1748		

a. SEXUAL IDENTITY = 3.0

b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.26.

Symmetric Measures[a]

		Value	Approximate Significance
Nominal by Nominal	Phi	.124	.000
	Cramer's V	.124	.000
N of Valid Cases		1748	

a. SEXUAL IDENTITY = 3.0

Hard drugs abuse vs. Mental Illness

$x^2 = 7.467$ $p > 0.05$

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED				
			No MI past year				
Hard_drugs_abuse	No abuse in the past year	Count	904				
		% within Hard_drugs_abuse	52.2%				
		% within RC-CATEGORICAL MI INDICATOR REVISED	99.6%				
		% of Total	51.7%				
	abuse in the past year	Count	4				
		% within Hard_drugs_abuse	23.5%				

	% within RC-CATEGORICAL MI INDICATOR REVISED	0.4%	
	% of Total	0.2%	
Total	Count	908	
	% within Hard_drugs_abuse	51.9%	
	% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%	
	% of Total	51.9%	

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED			
			Mild MI past year			
Hard_drugs_abuse	No abuse in the past year	Count	296			
		% within Hard_drugs_abuse	17.1%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	99.0%			
		% of Total	16.9%			
	abuse in the past year	Count	3			
		% within Hard_drugs_abuse	17.6%			

		% within RC-CATEGORICAL MI INDICATOR REVISED	1.0%			
		% of Total	0.2%			
Total		Count	299			
		% within Hard_drugs_abuse	17.1%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%			
		% of Total	17.1%			

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED		
			Moderate MI past year		
Hard_drugs_abuse	No abuse in the past year	Count	223		
		% within Hard_drugs_abuse	12.9%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	97.8%		
		% of Total	12.8%		
	abuse in the past year	Count	5		
		% within Hard_drugs_abuse	29.4%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	2.2%		
		% of Total	0.3%		
Total		Count	228		

	% within Hard_drugs_abuse	13.0%		
	% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%		
	% of Total	13.0%		

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED	
			Sever MI past year	Total
Hard_drugs_abuse	No abuse in the past year	Count	308	1731
		% within Hard_drugs_abuse	17.8%	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	98.4%	99.0%
		% of Total	17.6%	99.0%
	abuse in the past year	Count	5	17
		% within Hard_drugs_abuse	29.4%	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	1.6%	1.0%
		% of Total	0.3%	1.0%
Total		Count	313	1748
		% within Hard_drugs_abuse	17.9%	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%	100.0%
		% of Total	17.9%	100.0%

a. SEXUAL IDENTITY = 3.0

Chi-Square Tests[a]

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.467[b]	3	.058
Likelihood Ratio	7.018	3	.071
Linear-by-Linear Association	5.776	1	.016
N of Valid Cases	1748		

a. SEXUAL IDENTITY = 3.0

b. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 2.22.

Symmetric Measures[a]

		Value	Approximate Significance
Nominal by Nominal	Phi	.065	.058
	Cramer's V	.065	.058
N of Valid Cases		1748	

a. SEXUAL IDENTITY = 3.0

Prescribed drugs marijuana abuse vs. Mental Illness

$x^2 = 6.976$, $p > 0.05$

Crosstab[a]

RC-CATEGORICAL MI INDICATOR REVISED				

			No MI past year				
Prescribed_drugs_marijuana_abuse	No abuse in the past year	Count	894				
		% within Prescribed_drugs_marijuana_abuse	52.3%				
		% within RC-CATEGORICAL MI INDICATOR REVISED	98.5%				
		% of Total	51.1%				
	abuse in the past year	Count	14				
		% within Prescribed_drugs_marijuana_abuse	36.8%				
		% within RC-CATEGORICAL MI INDICATOR REVISED	1.5%				
		% of Total	0.8%				
Total		Count	908				
		% within Prescribed_drugs_marijuana_abuse	51.9%				
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%				
		% of Total	51.9%				

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED			
			Mild MI past year			
Prescribed_drugs_marijuana_abuse	No abuse in the past year	Count	294			
		% within Prescribed_drugs_marijuana_abuse	17.2%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	98.3%			
		% of Total	16.8%			
	abuse in the past year	Count	5			
		% within Prescribed_drugs_marijuana_abuse	13.2%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	1.7%			
		% of Total	0.3%			
Total		Count	299			
		% within Prescribed_drugs_marijuana_abuse	17.1%			
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%			
		% of Total	17.1%			

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED		
			Moderate MI past year		
Prescribed_drugs_marijuana_abuse	No abuse in the past year	Count	221		
		% within Prescribed_drugs_marijuana_abuse	12.9%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	96.9%		
		% of Total	12.6%		
	abuse in the past year	Count	7		
		% within Prescribed_drugs_marijuana_abuse	18.4%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	3.1%		
		% of Total	0.4%		
Total		Count	228		
		% within Prescribed_drugs_marijuana_abuse	13.0%		
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%		
		% of Total	13.0%		

Crosstab[a]

			RC-CATEGORICAL MI INDICATOR REVISED	
			Sever MI past year	
Prescribed_drugs_marijuana_abuse	No abuse in the past year	Count	301	
		% within Prescribed_drugs_marijuana_abuse	17.6%	
		% within RC-CATEGORICAL MI INDICATOR REVISED	96.2%	
		% of Total	17.2%	
	abuse in the past year	Count	12	
		% within Prescribed_drugs_marijuana_abuse	31.6%	
		% within RC-CATEGORICAL MI INDICATOR REVISED	3.8%	
		% of Total	0.7%	
Total		Count	313	
		% within Prescribed_drugs_marijuana_abuse	17.9%	
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%	
		% of Total	17.9%	

Crosstab[a]

			Total
Prescribed_drugs_marijuana_ab	No abuse in the past year	Count	1710

use		% within Prescribed_drugs_marijuana_abuse	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	97.8%
		% of Total	97.8%
	abuse in the past year	Count	38
		% within Prescribed_drugs_marijuana_abuse	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	2.2%
		% of Total	2.2%
Total		Count	1748
		% within Prescribed_drugs_marijuana_abuse	100.0%
		% within RC-CATEGORICAL MI INDICATOR REVISED	100.0%
		% of Total	100.0%

a. SEXUAL IDENTITY = 3.0

Chi-Square Tests[a]

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.976[b]	3	.073
Likelihood Ratio	6.358	3	.095
Linear-by-Linear Association	6.505	1	.011
N of Valid Cases	1748		

a. SEXUAL IDENTITY = 3.0

b. 1 cells (12.5%) have expected count less than 5. The minimum expected count is 4.96.

Symmetric Measures[a]

		Value	Approximate Significance
Nominal by Nominal	Phi	.063	.073
	Cramer's V	.063	.073
N of Valid Cases		1748	

a. SEXUAL IDENTITY = 3.0