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Family History of Substance Problems among African Americans: Associations with Drug Use, Drug Use Disorder, and Prescription Drug Misuse

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A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University.

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"*I have learned that success is to be measured not so much be the position that one has reached in life as by the obstacles which he has overcome while trying to succeed*."

- Booker T. Washington

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Abstract

Background: Understanding individual risk for substance use and substance use disorders is important in the efforts of reducing risk and prevention of these problems. A family history of alcohol and/or drug problems often increases the risk for these problems, however the majority of research in this area is conducted in samples that are predominantly White. African Americans face disparate outcomes from substance use and substance use disorders, and the risks for substance problems may not be the same as for Whites. A systematic review of the literature identified nine studies that examined a family history of either substance problems or substance use as a risk for substance use and substance use disorders in African Americans. Results indicate that family history is a risk factor for drug use and related problems, particularly for adolescents and young adults, but may be less of a risk factor in later adulthood. The primary aim of the current research study was to examine whether a family history of substance problems is associated with drug use, risk for drug use disorder, and prescription drug misuse in African American adults.

Methods: A secondary analysis of a non-probability sample was conducted and data analyzed from participants who identified as non-Hispanic and African American. Family history was categorized by the relationship and density of the family members with substance problems.

Outcome variables measured were drug use, risk for drug use disorder, and prescription drug misuse. Multivariable logistic regressions were conducted to assess the impact of family history density and sociodemographic variables (age, gender, employment status, education) on drug use, risk for drug use disorder, and prescription drug misuse. Multivariable logistic regressions were repeated for women and men separately.

Results: Results indicate that male gender, those age 26 to 44 years, and family history density of substance problems increased the risk for drug use and drug use disorder in the full sample. Only family history density of substance problems was a significant risk for prescription drug misuse. However, when subgroup analyses by gender were conducted, women had more risk factors (age groups 18 to 25 and 26 to 44 years, unemployment), and family history was no longer a risk factor for prescription drug misuse in the men. Employment status was not a significant risk or protective factor for any drug outcome in the full sample, and education was not significant in the entire group or for men and women when examined separately.

Conclusions: For African Americans, those with a family history of substance problems were at a higher risk for drug use, drug use disorder, and prescription drug misuse. These results were different for men and women. For men family history density was not a risk factor for prescription drug misuse. The younger age group and unemployment status were unique risk factors in women. Implications for future research and prevention efforts include considering the role of a family history of substance problems in the risk for drug use, drug use disorder, and prescription drug misuse among African Americans. Recommendations include investigating age appropriate contemporary risk factors in adult African Americans with further exploration of the gender-specific risk factors related to drug and substance use and related disorders in order to better inform intervention and prevention efforts in this population.

Keywords: African American, drug use, drug use disorders, family history, prescription drug misuse, substance use, substance use disorders

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Chapter I

A well-known area of research in the subject of addiction, particularly in the study of risk factors for substance use disorders (SUDs), is the study of familial transmission of these disorders. This has been demonstrated by the decades of research that exists indicating alcohol use disorders run in families (Cotton, 1979; Johnson & Pickens, 2001; Kendler et al., 2018; Turner et al., 1993). Drug problems are also transmitted in families as indicated by the increased risk for drug use and drug use disorders in the offspring of those with a history of substance (alcohol and/or drug) problems (Kendler et al., 2013; Kendler et al., 2015a; McCaul et al., 1990 Merikangas et al., 1998). A family history of substance problems can indicate that multiple factors (e.g., shared genetic, environmental, behavioral, cultural) contribute to the increased risk for substance use and SUDs (Kendler et al., 2015b; Newlin et al., 2000; Verhulst et al., 2015). Environmental factors play an important role in the development of drug use disorders and these factors may be more influential in the familial transmission of these disorders than for alcohol use disorders (Kendler et al., 2013). There is strong evidence that a family history of substance problems is a risk factor for substance use and SUDs in the offspring, however this research has been conducted in studies of predominantly White subjects and may not be generalizable to other racial or ethnic groups (Unger, 2012). Research conducted with racially diverse samples indicate there may be differences in the pathways to the development of SUDs and it is not clear whether environmental factors moderate the genetic risk (Sartor et al., 2018). Understanding individual risk can be a determinant in prevention and a motivator for change in health behavior to reduce individual risk for the disease or disorder of concern (Claassen et al., 2010).

Background

The main characteristic of a SUD is "a cluster of cognitive, behavioral, and physiological symptoms indicating that the individual continues using the substance despite significant substance-related problems" and there is "an underlying change in brain circuits that may persist beyond detoxification, particularly in individuals with severe disorders" (American Psychiatric Association [APA], 2013, "Substance Use Disorders", paras. 1 & 2). A SUD diagnosis is indicative of a pathological pattern of behaviors related to the use the following classes of drugs: alcohol; cannabis; hallucinogens; inhalants; opioids; sedatives, hypnotics, and anxiolytics; stimulants; tobacco and other unknown substances (APA, 2013). SUD diagnosis and classification can be separated as alcohol use disorders or drug use disorders with certain drugs or other substances having their own differential diagnosis for disorders (e.g., opioid use disorders) (APA, 2013). Substance use, and the problems related to substance use (e.g., lack of ability to control substance use, failure with major role obligations) characterize SUDs, however not all of those who use or misuse substances develop these related problems similarly (Hildebrandt et al., 2021). The single diagnostic category of SUD in the current Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-V) replaces the prior DSM-IV edition diagnoses of substance abuse and substance dependence (APA, 2013).

Following recommendations on the appropriate use of non-stigmatizing language, this dissertation will use terms that reduce the stigma and negative bias associated with SUDs and addiction (Broyles et al., 2014; National Institute on Drug Abuse [NIDA], 2021). Phrases or labels such as substance abuse, drug abuse, alcoholic, addict, drug abuser, and substance dependence are stigmatizing and harmful to those affected by addiction (Broyles et al., 2014; NIDA, 2021). Rather than using language such as substance or drug abuse in the discussion on

SUDs, appropriate language includes a person with a SUD, person with an alcohol use disorder, and drug or substance use or misuse (NIDA, 2021). Common phrasing that is also seen includes problematic or problem substance use, substance problems, and substance use problems; the 'problems' are the symptoms of substance use disorders (Brown & Rounds, 1995; Cowan, 2006; NIDA, 2019; Rehm et al., 2005). The use of the term substance in the discussion of topics regarding SUDs is a broad term and can be in reference to any psychoactive substance; however, substance specific language is used when the information is concerning a specific class of substances (e.g., alcohol, opioids). When the topic of SUDs does not include problems with alcohol, language used may be generalized for recreational or illicit drugs such as 'drug use', 'drug use disorder', 'problem drug use', or specific such as 'prescription drug misuse' or 'cannabis use disorder'. While this dissertation will use non-stigmatizing language, when citing the literature, the authors' original language may be used. Further clarification of key terms is provided in the section *Definition of Terms* below.

Statement of the Problem

Substance use, whether it is the use of alcohol, licit or illicit drugs, or prescription drug misuse, is a massive global problem due to the negative consequences related to misuse and the subsequent development of SUDs. Those who are diagnosed with drug use disorders face significant disabilities, have an increased likelihood of other SUDs (i.e., alcohol and nicotine use disorders) and other mental health disorders (Grant et al., 2016). Data from the most recent World Drug Report in 2019 indicates that approximately 271 million people worldwide used drugs at least once in 2017, and of those who used drugs 35 million have a SUD (United Nations Office on Drugs and Crime [UNODC], 2019). In the United States (U.S.) current prevalence rates indicate that for those aged 12 or older 58.7% (or 162.5 million) used a substance (tobacco,

alcohol, or illicit drug) in the past month, 21.4% (or 59.3 million) used illicit drugs in the previous year (including misuse of prescription drugs), and 14.5% (or 40.3 million) reported having a SUD (Substance Abuse and Mental Health Services Administration [SAMHSA], 2021). The annual financial burden in the U.S. from SUDs is estimated to be more than $740 billion from costs related to health care utilization, lost work productivity, and involvement of the criminal justice system (NIDA, 2020a). Additionally, substance problems also arise from the use or misuse of prescription drugs. For example, more than one third (37.8%) of the U.S. population have reported using a prescribed opioid medication; of adults with an opioid prescription, 12.5% reported misuse, and 16.7% of those who misused reported an opioid use disorder (Han et al., 2017a). Prescription opioid misuse, or nonmedical use of prescription opioids, can escalate to heroin use. Nearly 80% of those who reported initiating heroin use reported prior misuse of prescription opioids (Muhuri et al., 2013). The estimated financial costs from misuse of prescription opioids is estimated to be $78.5 billion for costs related to addiction treatment, lost work productivity, and the use of healthcare services (Florence et al., 2016). The ultimate costs from drug use and SUDs stem from the loss of life due to drug overdoses. Drug overdose death rates in the U.S. have increased over the last 20 years. In 2020 there were 91,799 drug overdose deaths, with an increase in deaths from synthetic opioids, cocaine, and psychostimulants (Hedegaard et al., 2021). Overdose death rates increased from the previous year for all sex, age, and race and Hispanic groups, however the largest percentage increases were in non-Hispanic Black and non-Hispanic Native Hawaiian or Other Pacific Islander people (Hedegaard et al., 2021). The most recent data for opioid-involved deaths indicate that over two-thirds of overdoses involved opioids and in some regions of the country disproportionately affected certain

populations with increases in deaths for non-Hispanic Blacks, Hispanics, and those 65 years of age and older (Wilson et al., 2020).

Drug use can not only lead to the development of substance or drug use disorders and contribute to the loss of life, collectively SUDs have become one of the costliest health problems in the U.S. and these costs could be offset through prevention strategies (Miller & Hendrie, 2008). If an intervention can be done early, before substance use progresses to a disorder, it can be the most cost-effective means to addressing these problems by reducing costs to society and improving public health (Office of National Drug Control Policy [ONDCP], 2012). One of the most comprehensive approaches in the prevention of SUDs is identifying risk factors that predispose individuals to substance use and progression to a SUD (Gerstein & Green, 1993). Research examining risk in minority populations indicates that the risk factors that are known to be predictive of substance use or SUDs in Whites are not predictive for other races or ethnicities. For example, several studies have demonstrated that risk models that are predictive for drug use in White subjects are not predictive for African Americans (Brown et al., 2004a; Ellickson & Morton, 1999; Galaif et al., 2007; Vanyukov et al., 2009). With regard to family history research, there is a lack of inclusion of minority populations as demonstrated by a systematic review and meta-analysis (Elliott et al., 2012) examining the effects of a family history of alcohol problems on drinking and substance use in college students. The review included 65 publications from 53 samples, of which only four were non-White – three African American, and one Native American – with a total sample of 77.1% White subjects for the meta-analysis (Elliott et al., 2012). When minority subjects are under-represented in research studies, those findings may not be applicable to all people (Eisenberg, 1995). Legislation was passed decades ago to address this issue. The National Institutes of Health (NIH) Revitalization Act of 1993 mandated the inclusion

of minorities and women in research to ensure that research findings can be generalizable to the entire population (Congress.gov, 1993; NIH, 2022). Unfortunately, under-representation of racial/ethnic minorities continues to occur in research studies despite the new guidelines initiated in 1993 (Chen et al., 2014; Dickerson et al., 2009). Currently, research that does include adequate sampling of minorities indicates there may be differences in the pathways to the development of SUDs, and it is not clear whether environmental factors moderate the genetic risk (Sartor et al., 2018).

Not only are risks for drug use and related problems different for African Americans, but they also experience disparate consequences and outcomes related to substance use. African Americans face greater deleterious health and social consequences from substance use (NIDA, 2003; Zapolski et al., 2014) such as higher rates of lung cancer (Ryan, 2018) and HIV (Des Jarlais et al., 2017). Non-Hispanic Blacks have had higher rates of overdose deaths involving the opioids heroin, synthetic opioids, and methadone (Hoopsick et al., 2021). They also have an increased likelihood of incarceration and longer jail sentences for drug offenses even though Whites have represented more than the majority of drug- and alcohol-related arrests (Camplain et al., 2020; Demuth & Steffensmeier, 2004; Lichenstein, 2009). African Americans also face disparities in the treatment of SUDs. Minority participants (African Americans and Hispanics) in a national survey that reported having a SUD and receiving mental health care reported less access to care, poor quality of care, and a greater unmet need for alcohol use disorder, drug use disorder, and mental health treatment when compared to Whites (Wells et al., 2001).

Prevalence rates of substance use and risk for SUDs are conflicting for African Americans due to the differences in sample populations of research studies particularly for certain age groups. Previous studies examining differences between racial/ethnic groups for

substance use in adolescents have reported that African Americans reported less substance use (Feldstein et al., 2011), but those who did use substances had a greater likelihood for any SUD (Gil et al., 2004). Most studies using data from national surveys evaluating trends and correlates of substance use make racial/ethnic comparisons with Whites as the reference groups. Several of these studies indicate that the rates for substance use may be lower for adult African Americans for cigarette smoking (Higgins et al., 2016) and alcohol use (Blanco et al., 2018). While other studies show Blacks were less likely to initiate cocaine use (Blanco et al., 2018) or there were no significant differences in initiation compared to other groups (Mustaquim et al., 2021). For other substances such as prescription opioid misuse several studies indicate that prevalence rates are similar (Han et al., 2017a; Nicholson & Ford, 2018; Nicholson & Rigg, 2021; Salas et al., 2016). When researchers instead make comparisons with the group that has the lowest rates of substance use as the reference group (i.e., Asians), results indicate that Blacks have higher odds for illicit drug abuse/dependence and lower odds for cigarette smoking than Whites (Kurti et al., 2016; Higgins et al., 2016).

The research study design will take a within-group approach, versus a comparative approach to another race/ethnic group (i.e., Whites). Comparative approaches in research may inhibit the understanding of minority health, and could minimize the importance of these health issues eventually leading to reduced priority for those that influence health research agendas (Bediako & Griffith, 2008). Also, when White subjects (representing the majority) are used as the comparison or control group in research to explain outcomes in an ethnic minority group there is an assumption that Whites represent a standard from which racial/ethnic minorities deviate (Whitefield et al., 2008). There is also the assumption that when research is examining group differences, the underlying processes affecting the outcome of interest are the same;

however, those underlying processes might be different for each racial/ethnic group thereby leading to differences in outcomes (Whitefield et al., 2008).

Substance Use, Risks in African Americans

Previous research has demonstrated that predictors of substance use and SUDs differ between racial/ethnic groups particularly when comparing African Americans to Whites. Several studies that examined risk factors in adolescents have found that those risk factors that are known to be predictive of drug use in Whites are not predictive for African Americans. For example, Brown and colleagues (2004b) examined whether categories of risk factors that have previously been shown to be predictive for marijuana use in Caucasian adolescents (i.e., conventionality, intrapersonal variables, peer relationships, and family relations) were equally predictive for African American adolescents. Their results demonstrated that two of the risk factors – peer relationships and family relations – were predictive of marijuana use in African Americans, however the developmental patterns of marijuana use were different between African Americans and Caucasians (Brown et al., 2004b). The authors suggest the known risk factors in Caucasians for marijuana use may change over time for African Americans and that there are other risk factors that need to be examined in order to predict risk effectively for this population (Brown et al., 2004b).

Ellickson and Morton (1999) examined whether prediction models for drug use that were developed for White adolescents were as effective for predicting drug use in Black, Hispanic, and Asian adolescents. The researchers examined risk factors representing early problem behavior (e.g., prior drug use, deviant behavior), drug-related perceptions (e.g., intentions to use), and environmental variables (e.g., family relationships, school performance). They did find that four factors – early marijuana use, offers of drugs, intentions to use drugs, and low-

resistance self-efficacy –raised the risk of drug use for all groups, however, in the multivariate model the risk factors had no explanatory power for Blacks (Ellickson & Morton, 1999). Galaif and colleagues (2007) had similar results in their study examining risks for drug use in adolescent boys. Specifically, the constructs in the model were inadequate for African Americans, and this was partly explained by the prevalence for substance use at a much later age in African Americans. Other disparities in risk assessment are evident in prior studies and have demonstrated that African Americans have more risk factors than Whites for substance use (Evans et al., 2017; Gil et al., 2002; Vega et al., 1993), while others indicate they have less risk factors (Ellickson & Morton, 1999; Nurco et al., 1997). The previous research indicates that risk models for substance use and SUDs do not translate across all subgroups of the population particularly for racial and ethnic minority groups.

Family History in African Americans. In regard to family history, previous research has indicated that a family history of substance problems is a significant risk factor for substance use and SUDs, however for African Americans that risk may vary. A family history of substance problems has been demonstrated to be a risk factor in African Americans for alcohol-related problems including lifetime alcohol use (Vega et al., 1993), alcohol dependence (Gil et al., 2002), and earlier onset of drinking and heavy drinking (Chartier et al., 2013). Other studies demonstrate that individual factors such as experiencing an interpersonal traumatic event was a greater risk for alcohol use disorders than family history in young adult African Americans (Su et al., 2018). Studies examining outcomes for drug use indicate that family history is a risk factor for drug abuse in Blacks (Luthar et al., 1993) but not for marijuana abuse/dependence (Gil et al., 2002). The effect of family history as indicated by heritability rates for drug dependence, using family relatedness, may be greater for African Americans than for European Americans

(Wetherill et al., 2019). When it comes to the heritability rates for specific substances such as cigarette and cannabis use those rates may be similar. Agrawal and colleagues (2016) found heritability rates for cigarette and cannabis use to be 43% and 66% respectively for both African American and European American women. Their study also revealed that familial influence and individual-specific environmental factors overlap in the risk for substance use (Agrawal et al., 2016) which may indicate other factors need to be considered when determining risk for African Americans. Additional well documented risk factors for substance use and SUDs include the sociodemographic variables of age, gender, education, and employment (Higgins et al., 2016; Kurti et al., 2016; Swendsen et al., 2009).

Age and Gender. Age and sex/gender are common sociodemographic variables examined as predictor variables in risk research. For African Americans, substance use initiation may begin later in adulthood as compared to Whites who initiate much younger in adolescence (Banks & Zapolski, 2018). This has been explained as a 'crossover effect' due to Whites stopping substance use earlier and African Americans initiating later (Banks & Zapolski, 2018; Geronimus et al., 1993). Several studies using data from national surveys indicated that African Americans are much more likely to use substances or have substance use disorders later in life. Results the National Longitudinal Survey of Youth 1979 (NLSY79) examining racial/ethnic differences in alcohol problems (i.e., alcohol dependence symptoms) found no significant differences in alcohol problems among women, but for the men Blacks had higher rates of later onset and were much more likely to engage in heavy drinking by their 30s compared to Whites (Lui & Mulia, 2018). Watt (2008) examined four years of data from the National Survey on Drug Use and Health (NSDUH) and found that during adolescence Blacks were less likely than Whites to be heavy drinkers and use illegal drugs but by age 35 this pattern was reversed. Interestingly

when the researchers controlled for sociodemographic variables (e.g., socioeconomic status [SES], social support, religiosity, drug exposure) in the analysis, the differences at a later age for drug use and heaving drinking was eliminated, suggesting that risk and protective factors vary for Blacks and Whites and over the life course (Watt, 2008).

Evidence of the later development of SUDs may be indicated in the increased trends in admissions to substance abuse treatment centers over a 12-year period for older adults (ages 55 and older), particularly for African Americans, females, and for those who use drugs as their primary substance (Chhatre et al., 2017). Vasilenko and colleagues (2017) used data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) to examine trends in rates of SUDs across the adult lifespan (ages 18 to 90) and found that Blacks had higher rates for several SUDs in late midlife. Whites had higher rates of SUDs at younger ages, however, a 'crossover effect' between Whites and Blacks was seen around age 60: Blacks had higher rates of tobacco use disorder after age 64, cannabis use disorder was higher from ages 20 to 66, alcohol use disorder higher from ages 59 to 68, and opioid use disorder higher between 56 and 78 (Vasilenko et al., 2017). This study also demonstrated that men had higher rates of all SUDs (alcohol, tobacco, cannabis) except opioid use disorder where men and women had similar rates at most ages and occasionally women had higher rates (Vasilenko et al., 2017).

Additional studies utilizing data from national surveys have found males to be at increased risk for substance use (Merline et al., 2004) including illicit drug use (Mack et al., 2017), and the misuse of prescription drugs (Hughes, et al., 2016; Mojtabai et al., 2018). Not all research supports that African American males have higher rates or risk for substance use than females, and these differences may be substance specific. For example, a study of rural African American adolescents found that males were no more likely to use alcohol or illegal drugs than

females, however older age was associated with increased drug and alcohol use (Myers, 2013). A longitudinal study of African Americans following adolescents to young adulthood found that males were at increased risk for marijuana and cigarette use, but there were no differences between males and females for alcohol use (Zapolski et al., 2020). Fothergill and colleagues (2016) examined the pathways of marijuana and cocaine use over the life course (from childhood to mid-adulthood) in African Americans and found no gender differences in the overall models for either drug. Evans and colleagues (2017) used data from the NESARC to examine the persistence of SUDs throughout periods of a person's life and found that Black women had higher rates of drug use disorder persistence than Black men (Evans et al., 2017). The same study found that when it came to those with a poly-substance use disorder, Black men had the highest rates for SUD persistence and that both Black men and Black women had more risk factors for SUD persistence compared to Whites and Hispanics (Evans et al., (2017).

Employment and Education. Socioeconomic indicators such as employment, low income, or education may be factors contributing to risk for substance use and SUDs. SES may not be a risk factor for African Americans for substance use during adolescence but in adulthood it becomes a risk factor for substance use and related problems (Banks & Zapolski, 2018). In examining risk for cocaine use, Nicholson and Ford (2019) found that unemployment was a risk factor, but other indicators such as income or education level were neither risk nor protective for cocaine use. Fothergill and colleagues (2009) found the opposite effect, in that low income experienced in early adulthood increased the likelihood of marijuana use and cocaine use in mid-adulthood. Lower SES was a risk factor for earlier initiation of marijuana use but not alcohol or cocaine use, and was also a significant risk factor for earlier progression of problem use for alcohol, marijuana, and cocaine use in a sample including Caucasians and African Americans

seeking treatment for addiction (Lewis et al., 2018). Education or academic achievement has been shown to be a protective factor for African Americans. For African Americans that live in an urban area, having a high school degree and/or some college in mid-adulthood lowered the risk for prescription opioid misuse (Rigg & Nicholson, 2019). A separate analysis using findings from the NSDUH found that Blacks who graduated from high school and who had some college were less likely to report prescription opioid misuse compared to those who didn't finish high school (Nicholson & Ford, 2018). Not graduating from high school doubled the risk of persistent, or long-term, SUDS in non-Latino Blacks compared to non-Latino Whites without a high school degree (Vilsaint et al., 2019). The same study demonstrated that having a higher level of education decreased the odds of persistent mood disorders and persistent SUDs for non-Latino Blacks but not for other racial/ethnic groups (Vilsaint et al., 2019).

For African American adults the research is sparse whether a family history of substance problems is a significant risk factor for substance use, particularly for drug use, and risk for drug use disorders and prescription drug misuse. Other factors that co-occur (i.e., sociodemographic variables) may pose an additional risk in this population, and considering the health and social consequences of these disorders, further investigation is warranted to better understand what places African Americans at risk. In summary, drug use and prescription drug misuse carry many risks related to the negative health and social consequences that develop, and in vulnerable populations may lead to the development of drug or substance use disorders. Considering the extensive problems and health disparities that African Americans face in regard to substance use and related problems, and the lack of research examining the risk related to family history in African American adults, a research study is warranted to examine whether a family history of substance problems is a risk factor in this population. Specifically, attention needs to be focused

on risks related to drug use, drug use disorder, and prescription drug misuse due to the limited research on these outcomes. The research question that is the foundation of this study is: Is a family history of substance problems a risk factor for drug use, drug use disorder, and/or prescription drug misuse in African American adults?

Purpose of the Study

The primary goal of the research study is to examine whether a family history of substance problems is a risk factor for drug use, drug use disorder, and prescription drug misuse in African American adults. Prior research indicates that for African Americans a family history of substance problems is a risk for alcohol use and related problems (e.g., health consequences, dependence) (Chartier et al., 2013; Gil et al., 2002: Vega et al., 1993), but may not be as strong for drug use or only a risk for specific drugs in adulthood (Arteaga et al., 2010; Doherty et al., 2008). There are a limited number of studies that exist examining risk for drug use in adult African Americans, and some of these studies are in vulnerable populations such as incarcerated males (Rounds-Bryant et al., 2004; Wheeler et al., 2019) or adults in treatment for SUDs (Lister et al., 2017).

Secondary goals are to examine whether individual-related sociodemographic factors (age, gender, education, employment) are associated with drug use, risk for drug use disorder, and prescription drug misuse; to examine the prevalence of family history of substance problems and its association with the demographic variables; and to conduct subgroup analyses by gender. African Americans tend to initiate substance use later in adulthood compared to Whites who initiate in adolescence (Gil et al., 2004; Wilson & Widom, 2010). For African Americans lower SES status may be protective in adolescence (Ellickson & Morton, 1999) but a risk factor in adulthood (Fothergill et al., 2016) indicating it is a more relevant risk factor for adults.

Examining the strength of the relationship between these risk factors and drug use, risk for drug use disorder, and prescription drug misuse in African Americans is an important step for a trajectory of prevention in this population.

Significance

The dissertation study will provide evidence as to whether a family history of substance problems increases the likelihood of drug use, risk for drug use disorder, and prescription drug misuse in African American adults. Conducting the study with a sample of African Americans rather than making comparisons to Whites elucidates particular risk factors that exist within the group versus revealing variations between the two groups (Turner & Wallace, 2003). The risk factors for African Americans may be more relevant when experienced in adulthood, as contemporary risk factors, as opposed to experiences from adolescence (Gil et al., 2004). Determining other individual and environmental risk factors in African Americans would enhance the predictive value of establishing risk and have a greater impact in prevention efforts (Merikangas & Avenevoli, 2000). When examining risk profiles or establishing models to predict risk for substance use or SUDs, there is a need to develop culturally specific models which include relevant variables along with the constructs that may be uniquely expressed across different racial and ethnic groups (Galaif & Newcomb, 1999). Previous researchers investigating correlates or risk factors for substance use and SUDs in racial/ethnic minorities have stressed the need for research to identify the risk factors that are unique to the various groups within the population to more effectively address the public health crisis of SUDs (Nicholson & Ford, 2018). Much of the research on predicting risk for substance use and SUDs have been conducted in studies with predominantly White subjects, it is imperative at this time to examine risk factors in a representative sample of African American adults. There is a gap in the literature with regard

to risk profiles related to drug use and prescription drug misuse specifically, and the factors that are related to the risk for drug use disorders for adult African Americans. Results from the study will contribute to the literature, may help improve screening for risk and prevention practices, and inform the stakeholders that shape future policies.

Specific Aims

The purpose of the research study is to examine whether a family history of substance problems is a risk factor for drug use, drug use disorder, and prescription drug misuse in African American adults. The research study also examines whether there are associations with the sociodemographic variables and drug use, risk for drug use disorder, and prescription drug misuse, and whether there are differences between men and women by conducting separate analyses by gender.

The primary aim of the study is to:

Aim 1. Examine whether a family history of substance problems is associated with drug use, risk for drug use disorder, and prescription drug misuse in African American adults.

The hypotheses of the study are: (H1) Participants who report a family history of substance problems will be more likely to report drug use in the past 30 days; (H2) Participants who report a family history of substance problems will be more likely to score positive for increased risk for drug use disorder; and (H3) Participants who report a family history of substance problems will be more likely to score positive for prescription drug misuse.

The secondary aims of the study are to:

Aim 2. Examine whether there are associations with sociodemographic variables (age, gender, employment status, education level) and drug use, risk for drug use disorder, and prescription drug misuse in African American adults.

Aim 3. Conduct subgroup analyses by gender to examine whether a family history of substance problems and the sociodemographic variables are associated with drug use, risk for drug use disorder, and prescription drug misuse in women and men.

Aim 4. Examine the prevalence of family history of substance problems and associations with sociodemographic variables (age, gender, employment status, education level) in African American adults.

Definition of Terms

The following is a list of terms commonly used in research and in publications on the subject of substance use disorders.

Addiction. "…a primary, chronic, neurobiological disease, with genetic, psychosocial, and environmental factors influencing its development and manifestations. It is characterized by behaviors that include one or more of the following: impaired control over drug use, compulsive use, continued use despite harm, and craving." (Savage et al., 2003, p. 662). May be used as an equivalent to the diagnosis of a severe substance use disorder (NIDA, 2020b).

Drug Use Disorder. A pathological pattern of behavior related to drug use, meeting previous DSM-IV criteria for drug abuse or dependence; drugs included but not limited to: amphetamines, cannabis, club drugs (e.g., ecstasy), cocaine, hallucinogens, heroin, non-heroin opioids, synthetic opioids, and inhalants (APA, 2013; Grant et al., 2016). Excludes alcohol and tobacco.

Family history. Information that is collected from an individual about their biological relative's (usually parents, siblings, and/or grandparents) physical or mental health, including substance use and substance use disorders (Andreasen et al., 1977; Kendler, 2001)

Prescription drug misuse. Inappropriate use of prescription drugs (Hughes et al., 2016). Terminology used in the National Survey on Drug Use and Health, a national survey directed by the Substance Abuse and Mental Health Services Administration (SAMHSA), to indicate the use of prescription drugs "in any way that a doctor did not direct you to use them" (Hughes et al., 2016, p.2). Also defined by the NIDA (2020c) as "… taking a medication in a manner or dose other than prescribed; taking someone else's prescription, even if for a legitimate medical complaint such as pain; or taking a medication to feel euphoria (i.e., to get high)." The most commonly misused prescription medications are opioids (e.g., pain medications), central nervous system depressants (e.g., sedatives, hypnotics), and stimulants (e.g., attention-deficit hyperactivity disorder medications) (NIDA, 2020c).

Substance. A psychoactive compound, which may be legal or illegal, that is grouped into classes based on the pharmacologic effects including but not limited to: alcohol; cannabis; central nervous system depressants (e.g., barbiturates, benzodiazepines); hallucinogens (e.g., ketamine, LSD, phencyclidine); inhalants; opioids, including heroin, fentanyl, and other synthetic opioids; stimulants (e.g., amphetamine-type substances, methamphetamine, cocaine); tobacco/nicotine; and other (or unknown) substances (APA, 2013; McLellan, 2017; NIDA, 2020d).

Substance abuse. Clinical diagnosis from the previous DSM edition (DSM-IV), previously a division of substance use disorders. Diagnosis made when one or more criteria were met for substance use (except nicotine): hazardous use, social/interpersonal problems related to use, neglected major roles to use, legal problems (Hasin et al., 2013). Also,

"intentional self-administration of a [substance] for nonmedical purposes such as altering one's state of consciousness" (Katz et al, 2007, p.650).

Substance dependence. Clinical diagnosis from the previous DSM edition (DSM-IV), previously a division of substance use disorders. Diagnosis made when three or more criteria were met: withdrawal, tolerance, used larger amounts/longer, repeated attempts to quit/control use, much time spent using, physical/psychological problems related to use, activities given up to use (Hasin et al., 2013). Also, "physical dependence is a state of adaptation that is manifested by a drug class specific withdrawal syndrome that can be produced by abrupt cessation, rapid dose reduction, decreasing blood level of the drug, and administration of an antagonist" (Katz et al, 2007, p.650).

Substance misuse. Use of a substance (e.g., alcohol or drugs) for a purpose other than as directed or consistent with legal or medical guidelines, whether willful or unintentional, that may or may not have negative effects on physical, psychological, or social functioning (Katz et al, 2007; National Collaborating Centre for Mental Health, 2008).

Substance use disorder. A diagnosis that "is based on a pathological pattern of behaviors related to use of the substance" (APA, 2013, "Substance Use Disorders", para. 3). Diagnosis is made when two or more symptoms are met from criterion representing *impaired control* (i.e., taking substance in larger amounts or longer than intended; desire or attempts to decrease or stop use but unable to; spends a lot of time obtaining, using, or recovering from effects of substances; daily activities revolve around substance use; craving or strong urge to take the substance), *social impairment* (i.e., fails to fulfill major role obligations at work, school, or home; continued use despite having social or interpersonal problems caused by effects of the substance; gives up important life activities because of

substance use), *risky use* (i.e., using substance in hazardous situations; continued use despite having physical or psychological problems caused by the substance), and *pharmacological criteria* (i.e., tolerance; withdrawal) (APA, 2013).

Philosophical Assumptions

A philosophical approach of pragmatism guides the researcher and research project of this dissertation. Pragmatism places the focus on how factors influence the choices made when deciding how to research a problem (Morgan, 2014). A pragmatist approach drives the focus of inquiry on prevention of SUDs based on the researcher's personal source of beliefs of placing attention to an important social issue. It also places emphasis on shared meanings which influences the researcher's selection of assessing family history as a risk for SUDs (Morgan, 2007). An approach from a pragmatist perspective connects theory and data by means of abductive reasoning moving back and forth between induction and deduction (Morgan, 2007). A philosophical approach of pragmatism also asks how might the results be transferable to other settings (Morgan, 2007)? Steps in a pragmatist research methodology include: 1) recognizing the research problem; 2) using existing beliefs to reflect on the problem and how to define it; 3) considering ways to address the research question and design; 3) evaluating the choice of research methods; and 4) conducting research (Morgan, 2014). For the pragmatist, the knowledge developed through research is a process that can always be revised and improved on, there is no final result or solution to the problem (Kaushik & Walch, 2019). When a pragmatist chooses a theory for the framework it is not chosen as a solution to the problem but based on the value of that theory to the phenomenon and how it shapes nursing practice (Doane & Varcoe, 2005).

Theoretical Foundation

There is not one single factor that predisposes or explains why an individual uses substances and consequently develops a SUD, the factors are numerous and include those from the biological, psychological, and social/environmental domains (Skewes & Gonzalez, 2013; U.S. Department of Health and Human Services, 2016). The underlying theory of the research study is that an individual's vulnerability for substance use and progression to SUD is multifactorial and overlaps with modifiable and nonmodifiable risk factors contained within the biopsychosocial (BPS) model of health and disease. The BPS model incorporates the biological, psychological, and social systems which overlap, and at times are difficult to separate (Wanigaratne, 2006). The BPS model has guided previous research, treatment development, and literature related to SUDs, and allows for a more comprehensive understanding of the process of SUDs (Kaempf, et al., 1999; McNamara & McCabe, 2012). The BPS model as a framework for research empowers the researcher with the tools to see the individual and understand each part of that individual as a whole. The framework for the dissertation study is further guided by a behavioral model for change called the Health Belief Model (HBM). The HBM is useful in explaining how perceptions of risk of a disease or disorder influence individuals to make lifestyle changes to reduce their own personal risk (Janz & Becker, 1984).

Biopsychosocial Model

Dr. George Engel was the first to discuss and present the BPS model at various lectures which he later published as an article on the subject (Engel, 1977). During his discussions, he spoke of the need for a change in medicine concerning the then current reductionist method and biomedical model of disease because it was no longer adequate for tasks of science or the social responsibilities of health care (Engel, 1977). The BPS model was identified as a more complete and inclusive conceptual framework which can guide the care of individuals that accommodates

the “human domain” in science (Engel, 1997). In Engel’s (1977) article, he explained why some individuals experience a disease process or disorder as an “illness” condition and others view it as a “problem of living”, making the argument for why we cannot treat just the disease but we have to consider the individual and their subjective experience. The BPS model can help shape research examining risk for substance use and SUDs as well as guiding treatment, support systems, and recovery programs (Garland et al., 2011; Kaempf et al., 1999). Historically evidence from research has demonstrated multiple risk factors for SUDs that fall within each system of the BPS model.

There are several biological factors that are attributable to the development of SUDs. The evidence of genetic risk is demonstrated in studies of twins that estimate heritability rates – which represents the relative contribution of genetic factors – for SUDs (van den Bree et al., 1998). For drug use disorders heritability estimates can vary from 55% for men and 73% for women (Kendler, et al., 2014). For alcohol use disorders the heritability estimate is approximately 50% for both sexes (Verhulst, et al., 2015). Additional biological factors contributing to risk factors for substance use and SUDs include: biological differences between men and women and their physical responses to drugs (Bobzean et al., 2014), and changes at the receptor level in the brain after repeated exposure to substances (Gorwood et al., 2012; Hooks et al., 2008). The psychological factors attributable to SUDs center around several variables related to developmental factors, individual motivation, personality variables, learning factors, and higher-order cognitive processes (Campbell & Rohrbaugh, 2006; Skewes & Gonzalez, 2013). Multiple social/environmental factors attributed to the increased risk can include the cultural contexts that are ‘out of sight’ within the context of health care (Henningsen, 2015). Many of these risk factors can be seen arising from the family as tolerance of substance use in the family

(Abikoye & Adekoya, 2010), and exposure to substance use and behavior modeling from substance use or substance problems within the family (Newlin et al., 2000). Other social factors include gender and social acceptability of substance use particularly for males (Abikoye & Adekoya, 2010; Skewes & Gonzalez, 2013), and life challenges across different age groups throughout adulthood (Afuseh et al., 2020). Lastly, several variables related to SES (e.g., income, employment, education) have been found to increase the risk of substance use and SUDs (Compton et al., 2014; Fothergill et al., 2009;);

There is a general consensus that addiction is a biopsychosocial phenomenon (Wanigaratne, 2006). For this research, the theoretical framework uses the BPS model as an interrelated set of constructs that specify the relationship of how the multitude of risk factors for SUDs are multifactorial, inter-related, and at times overlap within systems (Creswell & Creswell, 2018; Amodia, et al., 2005). A family history of substance problems falls within the BPS model as an indicator of the shared biological, psychological, and social/environmental factors that contribute to the multitude of variables influencing the risk of substance use and SUDs (Valdez et al., 2010).

Health Belief Model

Perceptions of risk of a disease or disorder may motivate individuals to engage in preventative behavior which may in turn lower their personal risk (Brewer, et al., 2004). Knowledge of a family history of a disease or disorder is associated with perceived risk and perceived severity, and strongly associated with adherence to health promotion behaviors to reduce risk (Hunt, et al., 2000). The HBM will help guide the researcher in understanding why individuals take action to diagnose, detect, and prevent diseases or disorders (Rosenstock, 1966/2005). The HBM was chosen because it was developed as a method to understand the

causal processes of why people modify their behavior, and that understanding and predicting behavior change should come before trying to persuade people to make lifestyle changes (Rosenstock, 1966/2005).

The HBM theorizes that behavioral change is dependent on several key beliefs and variables (Rosenstock, et al., 1988). The key variables in the HBM include: 1) perceived susceptibility: the degree to which an individual will feel vulnerable to a particular health condition; 2) perceived seriousness: the extent of the consequences from contracting the health condition; 3) perceived benefits to taking action: beliefs in the availability and effectiveness of taking action to reduce risks; 4) barriers to taking action: perceived negative aspects of taking action (i.e., inconvenience, expense, pain from treatment); 5) cues to action: an instigating event that sets actions in motion (i.e., body perception, media messages); and 6) self-efficacy: perception of competence to implement change (Rosenstock, 1966, 2005; Rosenstock et al., 1988).

The HBM model has been used to guide research utilizing family history to establish risk as a motivator for screening for genetic diseases (Bylund, et al., 2011), breast cancer (Darvishpour, et al., 2018), and receiving health education for anxiety, depression, and hypertension (Prom-Wormley et al., 2019). In regard to SUDs, the use of the HBM in perceived susceptibility to the harms of drug injection-related health conditions predicted intentions to engage in safe injection practices (Bonar & Rosenberg, 2011). Family history influences all dimensions of the HBM and knowledge of one's family history has motivated lifestyle changes (Prom-Wormley et al., 2019).

Conceptual Framework

A conceptual framework is presented that is congruent with the focus of inquiry and the dissertation study. The conceptual model is represented in Figure 1. The model illustrates how a family history of substance problems along with sociodemographic variables (age, gender, education, employment) are representative of the BPS model and may influence behavior change through the HBM. A family history of substance problems represents the biological vulnerability, as well as the psychological and social/environmental risks for SUDs (Merikangas et al., 1998; Valdez et al., 2010). Because a future goal of the trajectory is developing an intervention, the HBM is useful as a guide to understanding and explaining the dynamics of health behaviors along with influential forces that can affect those behaviors (Rimer & Glanz, 2005). As a model for behavior theory the HBM can act as a guide to help identify the most suitable target audiences for an intervention, methods for fostering change and outcomes for evaluation (Rimer & Glanz, 2005).

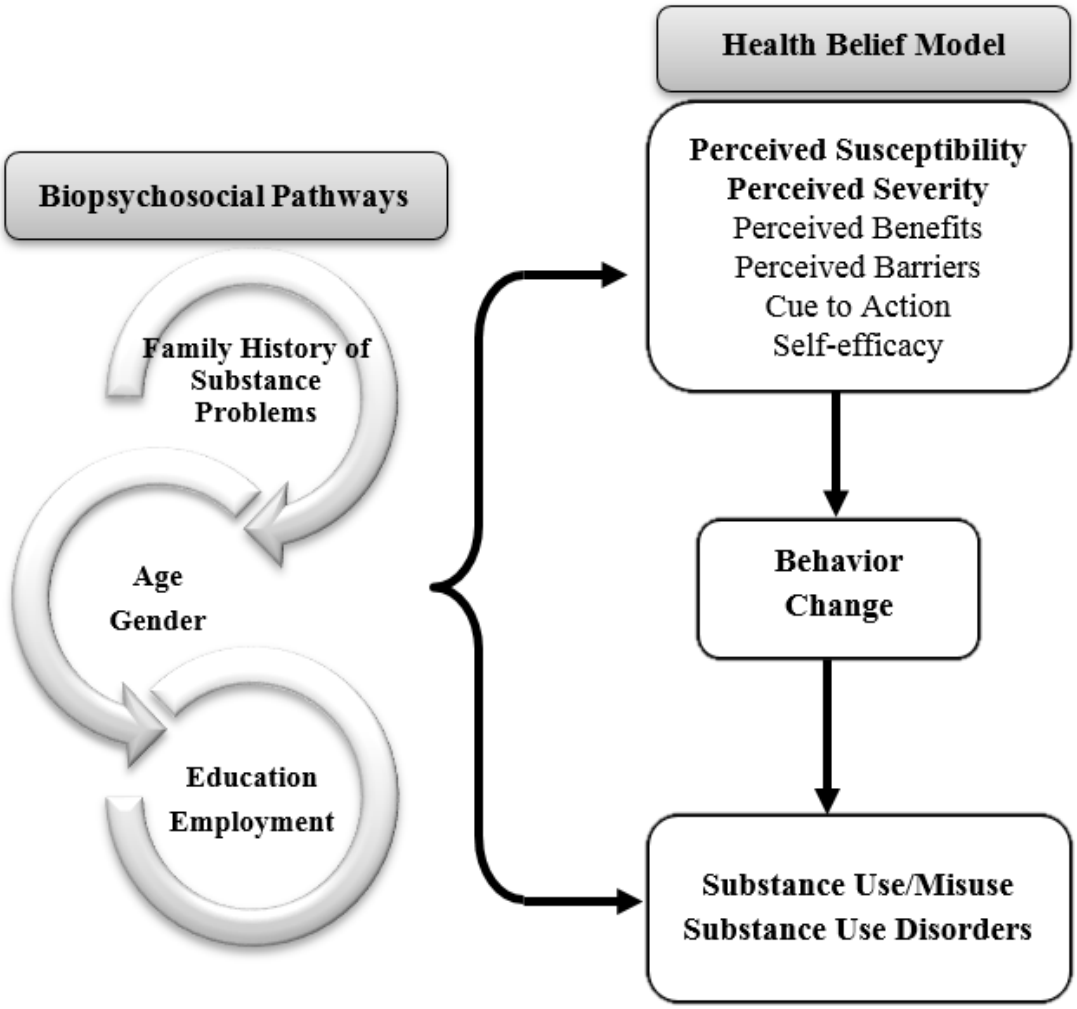


Figure 1. Conceptual Framework

Assumptions and Limitations

Several assumptions were made in this dissertation study. A secondary data analysis will be conducted on a sample that identified as non-Hispanic African American adults over the age of 18. The first assumption that was made was the individuals correctly identified as non-Hispanic and African American and were consenting adults. The second assumption was that the participants were aware of their parents' and grandparents' history of problems with alcohol

and/or drugs. Because the data collected were from self-report surveys, the third assumption was that participants were truthful in their responses to the surveys.

Summary

Society has faced the long-standing negative consequences related to substance use and SUDs for generations, and in the recent decades this has compounded due to the escalating problems related to prescription opioids and overdose deaths involving opioids. For African Americans the impact is greater due to the disparate treatment for mental health care (Wells et al., 2001), and the worse health and social consequences they experience from substance use (NIDA, 2003; Zapolski et al., 2014). While alcohol and tobacco problems may be lower for African Americans (Fix et al., 2014; Han et al., 2017b), the prevalence of drug use and drug use disorders is the same if not greater (Chen & Jacobsen, 2012; Mustaquim et al., 2021; Nicholson & Ford, 2018). Assessing for risk is a key measure in prevention strategies, and identifying risk inclusive of broad categories of substances rather than substance specific problems (e.g., opioid use disorders) is appropriate as they are likely to share common risk factors (Vanyukov et al., 2003). While it is known that the strongest and most well-known risk factor for SUDs is a family history of substance problems (Merikangas et al., 1998), a vast amount of research has been conducted with studies of predominantly White subjects and for risks related to alcohol use and alcohol use disorders. Because of this, and the lack of research conducted in African Americans, the research study for this dissertation will focus on outcomes for drug use, drug use disorder, and prescription drug misuse. While a family history of substance problems is not necessarily a direct measurement of the biological, psychological, and social/environmental factors that contribute to the multitude of variables that affect the risk of substance use and SUDs, it can serve as an indicator of those potential contributing factors thereby serving as a marker of risk.

The following chapter will present a systematic review of the literature, presented in manuscript format, followed by a second manuscript of the study findings; the dissertation will conclude with a final discussion chapter.

References

Abikoye, G. E., & Adekoya, J. A. (2010). Predicting substance abuse in a sample of Nigerian undergraduate students: The role of core self-evaluations and delay of gratification. *Psychological Studies, 55,* 299-307. https://doi.org/10.1007/s12646-010-0047-9

Agrawal, A., Grant, J. D., Lynskey, M. T., Madden, P. A. F., Heath, A. C., Bucholz, K. K., & Sartor, C. E. (2016). The genetic relationship between cannabis and tobacco cigarette use in European- and African-American female twins and siblings. *Drug and Alcohol Dependence, 163,* 165-171. https://doi.org/10.1016/j.drugalcdep.2016.04.011

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Amodia, D., Cano, C., & Eliason, M. J. (2005). An integral approach to substance abuse. *Journal of Psychoactive drugs, 37*(4), 363-371. https://doi.org/10.1080/02791072.2005.10399809

Andreasen, N. C., Endicott, J., Spitzer, R. L., & Winokur, G. (1977). The family history method using diagnostic criteria. *Archives of General Psychiatry, 34,* 1229-1235.

Arteaga, I., Chen, C.-C., & Reynolds, A. J. (2010). Childhood predictors of adult substance abuse. *Children and Youth Services Review, 32*(8), 1108-1120. https://doi.org.10.1016/j.childyouth.2010.04.025

Banks, D., & Zapolski, T. C. B. (2018). The crossover effect: A review of racial/ethnic variations in risk for substance use and substance use disorder across development. *Current Addiction Reports, 5*(3), 386-395. https://doi.org/10.1007/s40429-018-0220-0

Barrera, I., Sharma, V., & Aratani, Y. (2019). The prevalence of mental illness and substance abuse among rural Latino adults with multiple adverse childhood experiences in California. *Journal of Immigrant and Minority Health, 21,* 971-976. https://doi.org/10.1007/s10903-018-0811-9

Basu, D., Ghosh, A., Hazari, N., & Parakh, P. (2016). Use of Family CAGE-AID questionnaire to screen the family members for diagnosis of substance dependence. *Indian Journal of Medical Research, 143*(6), 722-730. https://doi.org/10.4103/0971-5916.191931

Bediako, S. M., & Griffith, D. M. (2008). Eliminating racial/ethnic health disparities: reconsidering comparative approaches. *Journal of Health Disparities Research and Practice, 2*(1), 49-62.

Blanco, C., Flórez-Salamanca, L., Secades-Villa, R., Wang, S., & Hasin, D. S. (2018). Predictors of initiation of nicotine, alcohol, cannabis, and cocaine use: results of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *The American Journal on Addictions, 27*(6), 477-484. https://doi.org/10.1111/ajad.12764

Blanco, C., Wiley, T. R. A., Lloyd, J. J., Lopez, M. F., & Volkow, N. D. (2020). America's opioid crisis: The need for an integrated public health approach. *Translational Psychiatry, 10(1),* 167. https://doi.org/10.1038/s41398-020-0847-1

Bobzean, S. A. M., DeNobrega, A. K., & Perrotti, L. I. (2014). Sex differences in the neurobiology of drug addiction. *Experimental Neurology, 259,* 64-74. https://doi:org/10.1016/j.expneurol.2014.01.022

Bonar, E. E., & Rosenberg, H. (2011). Using the health belief model to predict injecting drug users' intentions to employ harm reduction strategies. *Addictive Behaviors, 36*(11), 1038-1044. https://doi.org/10.1016/j.addbeh.2011.06.010

Breland, A. B., Almond, L., Kienzle, J., Ondersma, S. J., Hart Jr., A., Weaver, M., Dillon, P., & Svikis, D. (2014). Targeting tobacco in a community-based addiction recovery cohort: Results from a computerized, brief, randomized intervention trial. *Contemporary Clinical Trials 38*(1), 113–120. https://doi.org/10.1016/j.cct.2014.03.008

Brewer, N. T., Weinstein, N. D., Cuite, C. L., & Herrington, Jr., J. E. (2004). Risk perceptions and their relation to risk behavior. *Annals of Behavioral Medicine, 27*(2), 125-130. https://doi.org/10.1207/s15324796abm2702_7

Brown, T. L., Flory, K., Lynam, D. R., Leukefeld, C., & Clayton, R. R. (2004a). Comparing the developmental trajectories of marijuana use of African American and Caucasian adolescents: Patterns, antecedents, and consequences. *Experimental and Clinical Psychopharmacology, 12*(1), 47–56. https://doi.org/10.1037/1064-1297.12.1.47

Brown, T. L., Miller, J. D., & Clayton, R. R. (2004b). The generalizability of substance use predictors across racial groups. *The Journal of Early Adolescence, 24*(3), 274–302. https://doi.org/10.1177/0272431604265677

Brown, R. L., & Rounds, L. A. (1994). Conjoint screening questionnaires for alcohol and other drug abuse: criterion validity in a primary care practice. *Wisconsin Medical Journal, 94*(3), 135–140.

Broyles, L. M., Binswanger, I. A., Jenkins, J. A., Finnell, D. S., Faseru, B., Cavaiola, A., Pugatch, M., & Gordon, A.J. (2014). Confronting inadvertent stigma and pejorative language in addiction scholarship: A recognition and response. *Substance Abuse, 35*(3), 217-221. https://doi.org/10.1080/08897077.2014.930372

Bylund, C. L., Galvin, K. M., Dunet, D. O. & Reyes, M. (2011). Using the Extended Health Belief Model to understand siblings' perceptions of risk for hereditary hemochromatosis. *Patient Education and Counseling, 82*(1), 36-41. https://doi.org/10.1016/j.pec.2010.03.009

Campbell, W. H., & Rohrbaugh, R. M. (2006). *The Biopsychosocial Formulation Manual a Guide for Mental Health Professionals.* Taylor & Francis Group: New York, NY.

Camplain, R., Camplain, C., Tronner II, R. T., Pro, G., Sabo, S., Eaves, E., Peoples, M., & Baldwin, J. A. (2020). Racial/ethnic differences in drug- and alcohol-related arrest outcomes in a southwest county from 2009 to 2018. *American Journal of Public Health, 110*(S1), S85-S92. https://doi.org/10.2105/AJPH.2019.305409

Carlson, M. D. A., & Morrison, R. S. (2009). Study design, precision, and validity in observational studies. *Journal of Palliative Medicine, 12*(1), 77-82. https://doi.org/10.1089/jpm.2008.9690

Chartier, K. G., Hesselbrock, M., & Hesselbrock, V. M. (2013). Ethnicity and gender comparisons of health consequences in adults with alcohol dependence. *Substance Use & Misuse, 48*(3), 200-210. https://doi.org/10.3109/10826084.2013.747743

Chen, P., & Jacobson, K. C. (2012). Developmental trajectories of substance use from early adolescence to young adulthood: Gender and racial/ethnic differences. *Journal of Adolescent Health, 50*(2), 154-163. https://doi.org/10.1016/j.jadohealth.2011.05.013

Chen, M. S., Lara, P. N., Dang, J. H. T., Paterniti, D. A., & Kelly, K. (2014). Twenty years post-NIH Revitalization Act: Renewing the case for enhancing minority participation in cancer clinical trials. *Cancer, 120*(07), 1091-1096. https://doi.org/10.1002/cncr.28575

Chhatre, S., Cook, R., Mallik, E., & Jayadevappa, R. (2017). Trends in substance use admissions among older adults. *BMC Health Services Research, 17*(1), 584. https://doi.org/10.1186/s12913-017-2538-z

Claassen, L., Henneman, L., Janssens, A. C. J. W., Wijdenes-Pilj, M., Qureshi, N., Walter, F. M., Yoon, P. W., & Timmermans, D. R. M. (2010). Using family history information to promote healthy lifestyles and prevent diseases; a discussion of the evidence. *BMC Public Health, 10*(1), 248. http://www.biomedcentral.com/1471-2458/10/248

Compton, W., Gfoerer, K., Conway, K., & Finger, M. S. (2014). Unemployment and substance outcomes in the united states 2002 – 2010. *Drug and Alcohol Dependence, 142*, 350-353. https://doi.org/10.1016/j.drugalcdep.2014.06.012

Congress.gov. (1993). *S.1 – National Institutes of Health Revitalization Act of 1993*. https://www.congress.gov/bill/103rd-congress/senate-bill/1

Cotton, N. S. (1979). The familial incidence of alcoholism. *Journal of Studies on Alcohol, 40*(1), 89-116.

Cowan, D. (2006). Problematic terminology for problematic drug use. *Journal of Opioid Management, 2*(1), 23-30.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications, Inc.

Cuijpers, P., & Smit, F. (2001). Assessing parental alcoholism: A comparison of the Family History Research Diagnostic Criteria versus a single-question method. *Addictive Behaviors, 26*(5), 741-748. https://doi.org/10.1016/S0306-4603(00)00155-6

Darvishpour, A., Vajari, S. M., & Noroozi, S. (2018). Can Health Belief Model predict breast cancer screening behaviors? *Macedonian Journal of Medical Sciences, 6*(5), 949-953. https://doi.org/10.3889/oamjms.2018.183

Demuth, S., & Steffensmeier, D. (2004). Ethnicity effects on sentence outcomes in large urban courts: Comparisons among White, Black, and Hispanic defendants. *Social Sciences Quarterly, 85*(4), 994–1011. https://doi.org/10.1111/j.0038-4941.2004.00255.x

Des Jarlais, D. C., Arasteh, K., McKnight, C., Feelemyer, J., Tross, S., Perlman, D., Friedman, S., Campbell, A. (2017). Racial/ethnic disparities at the end of an HIV epidemic: Persons

who inject drugs in New York City, 2011-2015. *American Journal of Public Health, 107*(7), 1157-1163. https://doi.org/10.2105/AJPH.2017.303787

Dickerson, D. L., Leeman, R. F., Mazure, C. M., & O'Malley, S. S. (2009). The inclusion of women and minorities in smoking cessation clinical trials: A systematic review. *The American Journal on Addictions, 18*, 21-28. https://doi.org/10.1080/10550490802408522

Doane, G. H., & Varcoe, C. (2005). Toward compassionate action pragmatism and the inseparability of theory/practice. *Advances in Nursing Science, 28*(1), 81-90. https://doi.org/10.1097/00012272-200501000-00009

Doherty, E. E., Green, K. M., Reisinger, H. S., & Ensminger, M. E. (2008). Long-term patterns of drug use among an urban African-American cohort: The role of gender and family. *Journal of Urban Health, 85*(2), 250-267. https://doi.org/10.1007/s11524-007-9246-7

Eisenberg, J. M. (1995). NIH promulgates new guidelines for the inclusion of women and minorities in medical research. *Berkley Women's Law Journal, 10*, 183-189.

Ellickson, P., & Morton, S. (1999). Identifying adolescents at risk for hard drug use: Racial/ethnic variations. *Journal of Adolescent Health, 25*(6), 382-395. https://doi.org/10.1016/S1054-139X(98)00144-X

Elliott, J. C., Carey, K. B., & Bonafide, K. E. (2012). Does family history of alcohol problems influence college and university drinking or substance use? A meta-analytical review. *Addiction, 107*(10), 1774-1785. https://doi.org/10.1111/j.1360-0443.2012.03903.x

Engel, G. L. (1997). From biomedical to biopsychosocial being scientific in the human domain. *Psychosomatics, 38(6),* 521-528. https://doi.org/10.1016/S0033-3182(97)71396-3

Evans, E. A., Grella, C. E., Washington, D. L., & Upchurch, D. M. (2017). Gender and race/ethnic differences in the persistence of alcohol, drug, and poly-substance use

disorders. *Drug and Alcohol Dependence, 174*, 128-136. https://doi.org/10.1016/j.drugalcdep.2017.01.021

Feldstein Ewing, S. W., Venner, K. L., Mead, H. K., & Bryan, A. D. (2011). Exploring racial/ethnic differences in substance use: A preliminary theory-based investigation with juvenile justice-involved youth. *BMC Pediatrics, 11*(1), 71–81. https://doi.org/10.1186/1471-2431-11-71

Fix, B. V., O'Connor, R. J., Vogl, L., Smith, D., Bansal-Travers, M., Conway, K. P., Ambrose, B., Yang, L., & Hyland, A. (2014). Patterns and correlates of polytobacco use in the United States over a decade: NSDUH 2002–2011. *Addictive Behaviors, 39*(4), 768-781. https://doi.org/10.1016/j.addbeh.2013.12.015

Florence, C. S., Zhou, C., Luo, F., & Xu, L. (2016). The economic burden of prescription opioid overdose, abuse, and dependence in the United States, 2013. *Medical Care, 54*, 901-906. https://doi.org/10.1097/MLR.0000000000000625

Fothergill, K., Ensminger, M. E., Doherty E. E., Juon, H-S., & Green, K. M. (2016). Pathways from early childhood adversity to later adult drug use and psychological distress: A prospective study of a cohort of African Americans. *Journal of Health and Social Behavior, 57*(2), 223-239. https://doi.org/10.1177/0022146516646808

Fothergill, K. E., Ensminger, M. E., Green, K., Robertson, J. A., & Juon, H. S. (2009). Pathways to adult marijuana and cocaine use: A prospective study of African Americans from age 6 to 42. *Journal of Health and Social Behavior, 50*(1), 65-81.

Galaif, E. R., & Newcomb, M. D. (1999). Predictors of polydrug use among four ethnic groups: A 12-year longitudinal study. *Addictive Behaviors, 24*(5), 607-631. https://doi.org/10.1016/S0306-4603(99)00027-1

Galaif, E. R., Newcomb, M. D., Vega, W. A., & Krell, R. D. (2007). Protective and risk influences of drug use among a multiethnic sample of adolescent boys. *Journal of Drug Education, 37*(3), 249-276. https://doi.org/10.2190/DE.37.3.c

Garland, E. L., Boettiger, C. A., & Howard, M. O. (2011). Targeting cognitive-affective risk mechanisms in stress-precipitated alcohol dependence: An integrated, biopsychosocial model of automaticity, allostasis, and addiction. *Medical Hypotheses, 76,* 745-754. https://doi:org/10.1016/j.mehy.2011.02.014

Geronimus, A. T., Neidert, L. J., & Bound, J. (1993). Age patterns of smoking in US black and white women of childbearing age. *American Journal of Public Health, 83*(9), 1258-1264. https://doi.org/10.2105/AJPH.83.9.1258

Gerstein, D. R., & Green, L. W. (Eds.). (1993). *Preventing drug abuse: What do we know?* The National Academies Press.

Gil, A. G., Vega, W. A., & Turner, R. J. (2002). Early and mid-adolescence risk factors for later substance abuse by African Americans and European Americans. *Public Health Reports, 117*(S1), S15-S29.

Gil, A. G., Wagner, E. F., & Tubman, G. (2004). Associations between early-adolescent substance use and subsequent young-adult substance use disorders and psychiatric disorders among a multiethnic male sample in south Florida. *American Journal of Public Health, 94*(9), 1603-1609. https://doi.org/10.2105/AJPH.94.9.1603

Gorwood, P., Le Strat, Y., Ramoz, N., Deubertret, C., Moalic., J., & Simonneau, M. (2012). Genetics of dopamine receptors and drug addiction. *Human Genetics, 131,* 803-822. https://doi:org/10.1007/s00439-012-1145-7

Grant, B. F., Saha, T. D., Ruan, J., Goldstein, R. B., Chou, P., Jung, J., Zhang, H., Smith, S. M., Pickering, R. P., Huang, B., & Hasin, D. S. (2016). Epidemiology of DSM-5 drug use disorder. *JAMA Psychiatry, 73*(1), 39-47. https://doi.org/10.1001/jamapsychiatry.2015.2132

Green, K. M., Zebrak, K. A., Fothergill, K. E., Robertson, J. A., & Ensminger, M. E. (2012). Childhood and adolescent risk factors for comorbid depression and substance use disorders in adulthood. *Addictive Behaviors, 37*(11), 1240-1247. https://doi.org/10.1016/j.addbeh.2012.06.008

Han, B., Compton, W. M., Blanco, C., Crane, E., Lee, J., & Jones, C. M. (2017a). Prescription opioid use, misuse, and use disorders in U.S. adults: 2015 National Survey on Drug Use and Health. *Annals of Internal Medicine, 167*(5), 293-301. https://doi.org/10.7326/M17-0865

Han, B. H., Moore, A. A., Sherman, S., Keyes, K. M., & Palamar, J. J. (2017b). Demographic trends of binge alcohol use and alcohol use disorders among older adults in the United States, 2005-2014. *Drug and Alcohol Dependence, 170*, 198-207. https://doi.org/10.1016/j.drugalcdep.2016.11.003

Hardt, J., & Franke, P. (2007). Validity, reliability and objectivity of the family history method in psychiatry: A meta analysis. *European Psychiatry, 22*(1), 49-58. https://doi.org/10.1016/j.eurpsy.2006.10.003

Hasin, D. S., O'Brien, C. P., Auriacombe, M., Borges, G., Bucholz, K., Budney, A., Compton, W. M., Crowley, T., Ling, W., Petry, N. M., Schuckity, M., & Grant, B. F. (2013). DSM-5 criteria for substance use disorders: Recommendations and rationale. *American Journal of Psychiatry, 170*(8), 834-851. https://doi.org/10.1176/appi.ajp.2013.12060782

Hedegaard H, Miniño AM, Warner M. (2020). *Drug overdose deaths in the United States, 1999-2019.* NCHS Data Brief, no 394. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics; 2020. https://www.cdc.gov/nchs/data/databriefs/db394-H.pdf

Henningsen, P. (2015). Still modern? Developing the biopsychosocial model for the 21st century. *Journal of Psychosomatic Research. 79*, 362-363. https://doi:org/10.1016/j.jpsychores.2015.09.003

Higgins, S. T., Kurti, A. N., Redner, R., White, T. J., Keith, D. R., Gaalema, D. E., Sprague, B. L., Stanton, C. A., Roberts, M. E., Doogan, N. J., & Priest, J. S. (2016). Co-occurring risk factors for current cigarette smoking in a U.S. nationally representative sample. *Preventive Medicine, 92*, 110-117. https://doi.org/10.1016/j.ypmed.2016.02.025

Hildebrandt, M., Dieterich, R., & Endrass, T. (2021). Neural correlates of inhibitory control in relation to the degree of substance use and substance-related problems – A systematic review and perspective. *Neuroscience & Biobehavioral Reviews, 128*, 1-11. https://doi.org/10.1016/j.neubiorev.2021.06.011

Hinkin, C. H., Castellon, S. A., Dickson-Fuhrman, E., Daum, G., Jaffe, J., & Jarvik, L. (2001). Screening for drug and alcohol abuse among older adults using a modified version of the CAGE. *American Journal of Addiction, 10*(4), 319–326 https://doi.org/10.1111/j.1521-0391.2001.tb00521.x

Hooks, S. B., Martemyanov, K., & Zachariou, V. (2008). A role of RGS proteins in drug addiction. *Biochemical Pharmacology*, *75*, 76–84. https://doi:org/10.1016/j.bcp.2007.07.045

Hoopsick, R. A., Homish, G. G., & Leonard, K. E. (2021). Differences in opioid overdose mortality rates among middle-aged adults by race/ethnicity and sex, 1999-2018. *Public Health Reports, 136*(2), 192-200. https://doi.org/10.1177/0033354920968806

Hosmer, D. W., & Hjort, N. L. (2002). Goodness-of-fit processes for logistic regression. *Statistics in Medicine, 21*, 2723-2738. https://doi.org/10.1002/sim.1200

Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). Wiley & Sons, Inc.

Hughes, A., Williams, M. R., Lipari, R. N., Bose, J., Copello, E. A. P., & Kroutil, L. A. (2016). *Prescription drug use and misuse in the United States: Results from the 2015 National Survey on Drug Use and Health.* NSDUH Data Review. http://www.samhsa.gov/data/

Hunt, K., Davison, C., Emslie, C., & Ford, G. (2000). Are perceptions of a family history of heart disease related to health-related attitudes and behaviour? *Health Education Research, 15*(2), 131-143. https://doi.org/10.1093/her/15.2.131

Janz, N.K., & Becker, M.H. (1984). The health belief model: a decade later. *Health Education Quarterly, 11*(1), 1–47. https://doi.org/10.1177/109019818401100101

Johnson, E. O., & Pickens, R. W. (2001). Familial transmission of alcoholism among nonalcoholics and mild, severe, and dyssocial subtypes of alcoholism. *Alcoholism: Clinical and Experimental Research, 25*(5), 661-666. https://doi.org/10.1111/j.1530-0277.2001.tb02264.x

Kaempf, G., O'Donnell, C., & Oslin, D. (1999). The BRENDA model: A psychosocial addiction model to identify and treat alcohol disorders in elders. *Geriatric Nursing, 20,* 302-304. https://doi.org/10.1053/gn.1999.v20.103922001

Karriker-Jaffe, K., Chartier, K. G., Bares, C. B., Kendler, K. S., & Greenfield, T. K. (2021). Intersection of familial risk and environmental social control on high-risk drinking and alcohol dependence in a US national sample of adults. *Addictive Behaviors, 113*, 106668. https://doi.org/10.1016/j.addbeh.2020.106668

Katz, N. P., Adams, E. H., Chilcoat, H., Colucci, R. D., Comer, S. D, Goliber, P., Grudzinskas, C., Jasinski, D., Lande, S. D., Passik, S. D., Schnoll, S. H., Sellers, E., Travers, D., & Weiss, R. (2007). Challenges in the development of prescription opioid abuse-deterrent formulations. *The Clinical Journal of Pain, 23*(8), 648–660. https://doi.org/10.1097/AJP.0b013e318125c5e8

Kaushik, V., & Walsh, C. A. (2019). Pragmatism as a research paradigm and its implication for social work research. *Social Sciences, 8*(9), 255. https://doi.org/10.3390/socsci8090255

Kelpin, S., Ondersma, S. J., Weaver, M., & Svikis, D. (2018). Representativeness of patients enrolled in a primary care clinical trial for heavy/problem substance use. *Substance Abuse, 39*(4), 469-475. https://doi.org/10.1080/08897077.2018.1526843

Kendler, K. S. (2001). Family history information in biomedical research. *The Journal of Continuing Education in the Health Professions, 21*(4), 215-223. https://doi.org/10.1002/chp.1340210405

Kendler, K. S., Ohlsson, H., Sundquist, K., & Sundquist, J. (2013). Within-family environmental transmission of drug abuse. *JAMA Psychiatry, 70*(2), 235-242. https://doi.org/10.1001/jamapsychiatry.2013.276

Kendler, K. S., Maes, H., Sundquist, K., Ohlsson, H., & Sundquist, J. (2014). Genetic and family and community environmental effects on drug abuse in adolescence: A Swedish national

twin and sibling study. *American Journal of Psychiatry, 171*(2), 209-2017. https://doi.org/10.1176/appi.ajp.2013.12101300

Kendler, K. S., Edwards, A., Myers, J., Cho, S. B., Adkins, A., & Dick, D. (2015a). The predictive power of family history measures of alcohol and drug problems and internalizing disorders in a college population. *American Journal of Medical Genetics. Part B: Neuropsychiatric Genetics, 168*(5), 337-346. https://doi.org/10.1002/ajmg.b.32320

Kendler, K. S., Ji, J., Edwards, A. C., Ohlsson, H., Sundquist, J., & Sundquist, K. (2015b). An extended Swedish national adoption study of alcohol use disorder**.** *JAMA Psychiatry*, *72*(3), 211-218. https://doi.org/10.1001/jamapsychiatry.2014.2138

Kendler, K. S., Ohlsson, H., Sundquist, J., & Sundquist, K. (2018). Transmission of alcohol use disorder across three generations: A Swedish National Study. *Psychological Medicine, 48*(1), 33-42. https://doi.org/10.1017/S0033291717000794

Kurti, A. N., Keith, D. R., Noble, A., Priest, J. S., Sprague, B., & Higgins, S. T. (2016). Characterizing the intersection of co-occurring risk factors for illicit drug abuse and dependence in a U.S. nationally representative sample. *Preventive Medicine, 92*, 118-125. http://dx.doi.org/10.1016/j.ypmed.2016.09.030

Leonardson, G. R., Kemper, E., Ness, F. K., Koplin, B. A., Daniels, M. C., & Leonardson, G. A. (2005). Validity and reliability of the audit and CAGE-AID in North Plans American Indians. *Psychological Reports, 97*(1), 161-166. https://doi.org/10.2466/pr0.97.1.161-166

Lewis, B., Hoffman, L., Garcia, C., & Nixon, S. J. (2018). Race and socioeconomic status in substance use progression and treatment entry. *Journal of Ethnicity in Substance Abuse, 17*(2), 150-166. https://doi.org/10.1080/15332640.2017.1336959

Lichtenstein, B. (2009). Drugs, incarceration, and HIV/AIDS among African American men: A critical literature review and call to action. *American Journal of Men's Health, 3*(3), 252-264. https://doi.org/10.1177/1557988308320695

Lister, J. J., Greenwald, M. K., & Ledgerwood, D. M. (2017). Baseline risk factors for drug use among African-American patients during first-month induction/stabilization on methadone. *Journal of Substance Abuse Treatment, 78,* 15-21. https://doi.org/10.1016/j.jsat.2017.04.007

Lui, C. K., & Mulia, N. (2018). A life course approach to understanding racial/ethnic differences in transitions into and out of alcohol problems. *Alcohol and Alcoholism, 53*(4), 487-496. https://doi.org/10.1093/alcalc/agy015

Luthar, S. S., Merikangas, K. R., & Rounsaville, B. J. (1993). Parental psychopathology and disorders in offspring. A study of relatives of drug abusers. *The Journal of Nervous and Mental Disease, 181*(6), 351-357.

Mack, K. A., Jones, C. M., & Ballesteros, M. F. (2017). Illicit drug use, illicit drug use disorders, and drug overdose deaths in metropolitan and nonmetropolitan areas – United States. *Morbidity and Mortality Weekly Report, 66*(19), 1-12. https://doi.org/10.1111/ajt.14555

McCaul, M. E., Turkkan, J. S., Svikis, D. S., Bigelow, G. E., & Cromwell, C. C. (1990). Alcohol and drug use by college males as a function of family alcoholism history. *Alcoholism: Clinical and Experimental Research, 14*(3), 467-471. https://doi.org/10.1111/j.1530-0277.1990.tb00505.x

McLellan, A. T. (2017). Substance misuse and substance use disorders: Why do they matter in healthcare? *Transactions of the American Clinical and Climatological Association, 128,* 112-130.

McLellan, A. T., Kushner, H., Metzger, D., Peters, R., Smith, I., Grissom, G., Pettinati, H., & Argeriou, M. (1992). The fifth edition of the Addiction Severity Index. Journal of *Substance Abuse Treatment, 9*(3), 199-213.

McNamara, J., & McCabe, M. P. (2012). Striving for success of addiction? Exercise dependence among elite Australian athelets. *Journal of Sports Sciences, 30*, 755-766. https://doi.org/10.1080/02640414.2012.667879

Merikangas, K. R., & Avenevoli, S. (2000). Implications of genetic epidemiology for the prevention of substance use disorders. *Addictive Behaviors, 25*(6), 807-820. https://doi.org/10.1016/S0306-4603(00)00129-5

Merikangas, K. R., Stolar, M., Stevens, D. E., Goulet, J., Preisig, M. A., Fenton, B., Zhang, H., O'Malley, S. S., & Rounsaville, B. J. (1998). Familial transmission of substance use disorders. *Archives of General Psychiatry*, *55*(11), 973-979. https://doi.org/10.1001/archpsyc.55.11.973

Merline, A. C., O'Malley, P. M., Schulenberg, J. E., Bachman, J. G., & Johnston, L. D. (2004). Substance use among adults 35 years of age: prevalence, adulthood predictors, and impact of adolescent substance use. *American Journal of Public Health. 94*(1), 96-102. https://doi.org/10.2105/AJPH.94.1.96

Miller, T., & Hendrie, D. (2008). *Substance Abuse Prevention Dollars and Cents: A Cost-Benefit Analysis*, DHHS Pub. No. (SMA) 07-4298. Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration. https://www.samhsa.gov/sites/default/files/cost-benefits-prevention.pdf

Mojtabai, R., Amin-Esmaeili, M., Nejat, E., & Olfson, M. (2018). Misuse of prescribed opioids in the United States. *Pharmacoepidemiology and Drug Safety, 28*(3), 345-353. https://doi.org/10.1002/pds.4743

Morgan, D. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research, 1*(1), 48-76. https://doi.org/10.1177/2345678906292462

Morgan, D. L. (2014). Pragmatism as a paradigm for social research. *Qualitative Inquiry, 20*(8), 1045-1053. https://doi.org/10.1177/1077800413513733

Muhuri, P., Gfroerer, J. C., & Davies, C. (2013). Associations of nonmedical pain reliever use and initiation of heroin use in the United States. *Center for Behavioral Health Statistics and Quality Data Review, Substance Abuse and Mental Health Services Administration.* https://www.samhsa.gov/data/sites/default/files/DR006/DR006/nonmedical-pain-reliever-use-2013.htm

Mustaquim, D., Jones, C. M., & Compton, W. M. (2021). Trends and correlates of cocaine use among adults in the United States, 2006-2019. *Addictive Behaviors, 120,* 106950. https://doi.org/10.1016/j.addbeh.2021.106950

Myers, L. L. (2013). Substance use among rural African American adolescents: Identifying risk and protective factors. *Child and Adolescent Social Work Journal, 30*(1), 79-93. https://doi.org/10.1007/s10560-012-0280-2

National Collaborating Centre for Mental Health. (2008). Introduction to drug misuse. In *Drug Misuse: Psychosocial Interventions* (NICE Clinical Guidelines, No. 51.). https://www.ncbi.nlm.nih.gov/books/NBK53217/

National Institute on Drug Abuse. (2003, September 1). *Drug use among racial/ethnic minorities*. https://archives.drugabuse.gov/publications/drug-use-among-racialethnic-minorities

National Institute on Drug Abuse. (2019a). *Step by step guides to finding treatment for drug use disorders*. https://www.drugabuse.gov/publications/step-by-step-guides-to-finding-treatment-drug-use-disorders/table-contents

National Institute on Drug Abuse. (2020a). *Trends & statistics*. https://www.drugabuse.gov/related-topics/trends-statistics

National Institute on Drug Abuse. (2020b). *Drugs, brains, and behavior: The science of addiction*. https://www.drugabuse.gov/publications/drugs-brains-behavior-science-addiction/drug-misuse-addiction

National Institute on Drug Abuse. (2020c). *Misuse of prescription drugs research report overview*. https://www.drugabuse.gov/publications/research-reports/misuse-prescription-drugs/overview

National Institute on Drug Abuse. (2020d). *Commonly used drugs charts.* https://www.drugabuse.gov/drug-topics/commonly-used-drugs-charts

National Institute on Drug Abuse. (2021). *Words matter terms to use and avoid when talking about addiction.* https://www.drugabuse.gov/sites/default/files/nidamed_words_matter.pdf

Newlin, D. B., Miles, D. R., van den Bree, M. B. M., Gupman, A. E., & Pickens, R. W. (2000). Environmental transmission of DSM-IV substance use disorders in adoptive and step families. *Alcoholism: Clinical and Experimental Research, 24*(12), 1785-1794. https://doi.org/10.1111/j.1530-0277.2000.tb01982.x

Nicholson, H. L., & Ford, J. A. (2018). Correlates of prescription opioid misuse among Black adults: Findings from the 2015 National Survey on Drug Use and Health. *Drug and Alcohol Dependence, 186*, 264–267. https://doi.org/10.1016/j.drugalcdep.2017.12.006

Nicholson, H. L., & Ford J. A. (2019). Sociodemographic, neighborhood, psychosocial, and substance use correlates of cocaine use among Black adults: Findings from a pooled analysis of national data. *Addictive Behaviors, 88*, 182-196. https://doi.org/10.1016/j.addbeh.2018.08.042

Nicholson, H. L., & Rigg, K. K. (2021). Prescription opioid misuse among Black and White older adults. *Addiction Research & Theory*, 1-7. https://doi.org/10.1080/16066359.2021.1902508

Nurco, D., Hanlon, T. E., O'Grady, K., & Kinlock, T. W. (1997). The association of early risk factors to opiate addiction and psychological adjustment. *Criminal Behaviour and Mental Health, 7*(3), 213-228. https://doi.org/10.1002/cbm.174

Office of National Drug Control Policy. (2012). *Fact sheet: Cost benefits of investing early in substance abuse treatment*. https://obamawhitehouse.archives.gov/sites/default/files/ondcp/Fact_Sheets/investing_in_treatment_5-23-12.pdf

Ondersma, S. J., Svikis, D. S., & Schuster, C. R. (2007). Computer-based brief intervention: a randomized trial with postpartum women. *American Journal of Preventive Medicine, 32*(3), 231–238. https://doi.org/10.1016/j.amepre.2006.11.003

Polit, D. F., & Beck, C. T. (2017). *Nursing research: Generating and assessing evidence for nursing practice* (10th ed.). Lippincott Williams & Wilkins.

Pollack, C. D. (1999). Methodological considerations with secondary analysis. *Outcomes Management for Nursing Practice, 3*(4), 147-152.

Powers, G., Berger, L., Fuhrmann, D., & Fendrich, M. (2017). Family history density of substance use problems among undergraduate college students: Associations with heavy alcohol use and alcohol use disorder. *Addictive Behaviors, 71*, 1-6. https://doi.org/10.1016/j.addbeh.2017.02.015

Prom-Wormley, E. C., Clifford, J. S., Bourdon, J. L., Barr, P., Blondino, C., Ball, K. M., Montgomery, J., Davis, J. K., Real, J. E., Edwards, A. C., Thiselton, D. L., Creighton, G. C., Wilson, D., & Newbille, C. (2019). Developing community-based health education strategies with family history: Assessing the association between community resident family history and interest in health education. *Social Science & Medicine, 271*, 112160. https://doi.org/10.1016/j.socscimed.2019.02.011

Rehm, J., Room, R., van den Brinkt, W., & Kraus, L. (2005). Problematic drug use and drug use disorders in EU countries and Norway: An overview of the epidemiology. *European Neuropsychopharmacology, 15*(4), 389-387. https://doi.org/10.1016/j.euroneuro.2005.04.004

Rigg, K. K., & Nicholson, H. L. (2019). Prescription opioid misuse among African-American adults: A rural-urban comparison of prevalence and risk. *Drug and Alcohol Dependence, 197*, 191-196. https://doi.org/10.1016/j.drugalcdep.2019.01.023

Rimer, B. K., & Glanz, K. (2005). *Theory at a glance: A guide for health promotion practice* (2nd ed.). https://cancercontrol.cancer.gov/brp/research/theories_project/theory.pdf

Rosenstock, I. M. (1966/2005). Why people use health services. *The Millbank Quarterly, 83*(4), 1-32. https://doi.org/10.1111/j.1468-0009.2005.00425.x (Reprinted from *The Milbank Memorial Fund Quarterly*, 44(3), Pt. 2, 1966, pp. 94–124).

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the Health Belief Model. *Health Education Quarterly, 15*(2), 175–183. https://doi.org/10.1177/109019818801500203

Rounds-Bryant, J. L., Motivans, M. A., & Pelissier, B. M. M. (2004). Correlates of drug treatment outcomes for African American and White male federal prisoners: Results from the TRIAD study. *The American Journal of Drug and Alcohol Abuse, 30*(3), 495-514. https://doi.org/10.1081/ADA-200032265

Ryan, B. M. (2018). Lung cancer health disparities. *Carcinogenesis, 39*(6), 741-751. https://doi.org/10.1093/carcin/bgy047

Salas, J., Scherrer, J. F., Lustman, P. J., & Schneider, F. D. (2016). Racial differences in the association between nonmedical prescription opioid use, abuse/dependence, and major depression. *Substance Abuse*, *37*(1), 25-30. https://doi.org/10.1080/08897077.2015.1129523

Sartor, C. E., Grant, J. D., Few, L. R., Werner, K. B., McCutcheon, V. V., Duncan, A. E., Nelson, E. C., Madden, P. A., Bucholz, K. K., Health, A. C., & Agrawal, A. (2018). Childhood trauma and two stages of alcohol use in African American and European American women: Findings from a female twin sample. *Prevention Science*, *19*(6), 795-804. https://doi.org/10.1007/s11121-017-0838-5

Savage, S. R., Joranson, D. E., Covington, E. C., Schnoll, S. H., Heit, H. A., & Gilson, A. M. (2003). Definitions related to the medical use of opioids: evolution towards universal

agreement. *Journal of Pain and Symptom Management, 26*(1), 655–667. https://doi.org/10.1016/S0885-3924(03)00219-7

Skewes, M. C., & Gonzalez, V. M. (2013). The biopsychosocial model of addiction. In P. M. Miller (Ed.), *Principles of addiction: Comprehensive addictive behaviors and disorders* (Vol. 1, pp. 61-70). Elsevier Science & Technology. http://doi.org/10.1016/B978-0-12-398336-7.00006-1

Smaldone, A. M., & Connor, J. A. (2003). The use of large administrative data sets in nursing research. *Applied Nursing Research, 16*, 205-207. https://doi.org/10.1016/S0897-1897(03)0040-5001

Stoltzfus, J. C. (2011). Logistic regression: A brief primer. *Academic Emergency Medicine, 18*, 1099-1104. https://doi.org/10.1111/j.1553-2712.2011.01185.x

Su, J., Kuo, S. I., Meyers, J. L., Guy, M. C., & Dick, D. M. (2018). Examining interactions between genetic risk for alcohol problems, peer deviance, and interpersonal traumatic events on trajectories of alcohol use disorder symptoms among African American college students. *Development and Psychopathology, 30*(5), 1749-1761. https://doi.org/10.1017/S0954579418000962

Substance Abuse and Mental Health Services Administration. (2021). *Key substance use and mental health indicators in the United States: Results from the 2020 National Survey on Drug Use and Health* (HHS Publication No. PEP21-07-01-003, NSDUH Series H-56). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. https://www.samhsa.gov/data/

Swendsen, J., Conway, K. P., Degenhardt, L., Dierker, L., Glantz, M., Jin, R., Merikangas, K. R., Samplson, N., & Kessler, R. C. (2009). Socio-demographic risk factors for alcohol and

drug dependence: The 10-year follow-up of the national comorbidity survey. *Addiction, 104*(8), 1346-1388. https://doi.org/10.1111/j.1360-0443.2009.02622.x

Tong, S. T., Polak, K. M., Weaver, M. F., Villalobos, G. C., Smith, W. R., & Svikis, D. (2019). Screening for psychotherapeutic medication misuse in primary care patients: comparing two instruments. *Journal of the America Board of Family Medicine, 32*(2), 272-278. https://doi.org/10.3122/jabfm.2019.02.180172

Turner, W. M., Cutter, H. S., Worobec, T. G., O'Farrell, T. J., Bayog, R. D., & Tsuang, M. T. (1993). Family history models of alcoholism: Age of onset, consequences and dependence. *Journal of Studies on Alcohol and Drugs, 54*(2), 164-171. https://doi.org/10.15288/jsa.1993.54.164

Turner & Wallace (2003). African American substance use epidemiology, prevention, and treatment. *Violence Against Women, 9*(5), 576-589. https://doi.org/10.1177/1077801202250452

Unger, J. B. (2012). The most critical unresolved issues associated with race, ethnicity, culture, and substance use. *Substance Use & Misuse, 47*(4), 390-395. https://doi.org/10.3109/10826084.2011.638017

United Nations Office on Drugs and Crime. (2019). Executive summary conclusions and policy implications. *World Drug Report 2019*. https://wdr.unodc.org/wdr2019/

U.S. Department of Health and Human Services. (2016). *Facing addiction in America: The Surgeon General's report on alcohol, drugs, and health.* Washington, DC: Author. Retrieved from https://addiction.surgeongeneral.gov/sites/default/files/surgeon-generals-report.pdf

Valdez, R., Yoon, P. W., Quereshi, N., Green, R. F., & Khoury, M. J. (2010). Family history in public health practice: A genomic tool for disease prevention and health promotion. *Annual Review of Public Health, 31*(1), 69-87. https://doi.org/10.1146/annurev.publhealth.012809.103621

van den Bree, M. B., Johnson, E. O., Neale, M., Svikis, D. S., McGue, M., & Pickens, R. W. (1998). Genetic analysis of diagnostic systems of alcoholism in males. *Biological Psychiatry, 43*(2), 139-145. https://doi.org/10.1016/S0006-3223(97)00225-4

Vanyukov M. M., Tarter R. E., Kirisci L., Kirillova G. P., Maher B. S., & Clark D. B. (2003) Liability to substance use disorders: 1. Common mechanisms and manifestations. *Neuroscience and Biobehavioral Reviews, 27*(6), 507-515. https://doi.org/10.1016/j.neubiorev.2003.08.002

Vanyukov M. M., Kirisci L., Moss L., Tarter R. E., Reynolds M. D., Maher B. S., Kirillova, G. P., Ridenour, T., & Clark, D. B. (2009). Measurement of the risk for substance use disorders: Phenotypic and genetic analysis of an index of common liability. *Behavior Genetics, 39*(3), 233–244. https://doi.org/10.1007/s10519-009-9269-9

Vasilenko, S. A., Evans-Polce, R. J., & Lanza, S. T. (2017). Age trends in rates of substance use disorders across ages 18-90: Differences by gender and race/ethnicity. *Drug and Alcohol Dependence, 180,* 260-264. https://doi.org/10.1016/j.drugalcdep.2017.08.027

Vega, W. A., Zimmerman, R. S., Warheit, G. J., Apospori, E., & Gil, A. G. (1993). Risk factors for early adolescent drug use in four ethnic and racial groups. *American Journal of Public Health, 83*(2), 185–189. https://doi.org/10.2105/AJPH.83.2.185

Verhulst, B., Neale, M. C., & Kendler, K. S. (2015). The heritability of alcohol use disorders: a meta-analysis of twin and adoption studies. *Psychological Medicine, 45*(5), 1061-1072. https://doi.org/10.1017/S0033291714002165

Vilsaint, C. L., NeMoyer, A., Fillbrunn, M., Sadikova, E., Kessler, R. C., Sampson, N. A., Alvarez, K., Green, J. G., McLaughlin, K. A., Chen, R., Williams, D. R., Jackson, J. S., & Alegría, M. (2019). Racial/ethnic differences in 12-month prevalence and persistence of mood, anxiety, and substance use disorders: Variation by nativity and socioeconomic status. *Comprehensive Psychiatry, 89*, 52-60. https://doi.org/10.1016/j.comppsych.2018.12.008

Wanigaratne, S. (2006). Psychology of addiction. *Psychiatry, 5*(12), 455-460. https://doi.org/10.1053/j.mppsy.2006.09.007

Watt, T. T. (2008). The race/ethnic age crossover effect in drug use and heavy drinking. *Journal of Ethnicity in Substance Abuse, 71*(1), 93-114. https://doi.org/10.1080/15332640802083303

Wells, K., Klap, R., Koike, A. & Sherbourne, C. (2001). Ethnic disparities in unmet need for alcoholism, drug abuse, and mental health care. *American Journal of Psychiatry*, *158*(12), 2027–2032. https://doi.org/10.1176/appi.ajp.158.12.2027

Wetherill, L., Lai, D., Johnson, E. C., Anokhin, A., Bauer, L., Bucholz, K. K., Dick, D. M., Hariri, A. R., Hesselbrock, V., Kamarajan, C., Kramer, J., Kuperman, S., Meyers, J. L., Nurnberger Jr., J. I., Schuckit, M., Scott, D. M., Taylor, R. E., Tischfield, J., Porjesz, B., … Agrawal, A. (2019). Genome-wide association study identifies loci associated with liability to alcohol and drug dependence that is associated with variability in reward-

related ventral striatum activity in African- and European-Americans. *Genes, Brain and Behavior, 18*(6), e12580. https://doi.org/10.1111/gbb.12580

Wheeler, P. B., Stevens-Watkins, D., Moody, M., Dogan, J., & Lewis, D. (2019). Culturally relevant risk and protective factors for nonmedical use of prescription opioids among incarcerated African American men. *Addictive Behaviors, 93*, 46-51. https://doi.org/10.1016/j.addbeh.2019.01.014

Whitefield, K. E., Allaire, J. C., Belue, R., & Edwards, C. L. (2008). Are comparisons the answer to understanding behavioral aspects of aging in racial and ethnic groups? *Journal of Gerontology: Psychological Sciences, 63B*(5), P301-P308.

Wilson, N., Kariisa, M., Seth, P., Smith, H., & Davis, N. L. (2020, March). Drug and opioid-involved overdose deaths – United States, 2017-2018. *Morbidity and Mortality Weekly Report [MMWR], 69*(11), 290-297. http://dx.doi.org/10.15585/mmwr.mm6911a4

Wilson, H. W., & Widom, C. S. (2010). Predictors of drug-use patterns in maltreated children and matched controls followed up into middle adulthood. *Journal of Studies on Alcohol and Drugs, 71*(6), 801-809. https://doi.org/10.15288/jsad.2010.71.801

Zapolski, T. C. B., Pedersen, S. L., McCarthy, D. M., & Smith, G. T. (2014). Less drinking, yet more problems: Understanding African American drinking and related problems. *Psychological Bulletin, 140*(1), 188-223. https://doi.org/10.1037/a0032113

Zapolski, T. C. B., Yu, T., Brody, G. H., Banks, D. E., & Barton, A. W. (2020). Why now? Examining antecedents for substance use initiation among African American Adolescents. *Development and Psychopathology, 32*(2), 719-734. https://doi.org/10.1017/S0954579419000713

Chapter II

Does a Family History of Alcohol and/or Drug Problems Predict Substance Use in African Americans? A Systematic Review of the Literature

Abstract

Substance use disorders have deleterious health consequences, huge financial costs, and ultimately can result in the loss of life due to drug overdoses. Methods of prevention can include identifying risk factors for substance use disorders. A well-studied risk factor is a family history of alcohol and/or drug problems; however, much of this research has been conducted in studies that include predominantly White subjects. For African Americans, they often face greater harmful and social consequences from substance use disorders, and the risks for substance problems may not be the same as in Whites. This systematic review searched five databases and identified nine peer-reviewed studies examining family history of substance problems or substance use in African Americans as a risk for substance use and substance use disorders. Results indicate that family history is a risk factor for drug use and related problems, particularly for adolescents and young adults, but may be less of a risk factor in later adulthood. The limited number of published research studies examining risks for drug use in the adult African American population suggests that further research is needed.

Keywords: African American, family history, drug use, substance use, substance use disorders.

Does a Family History of Alcohol and/or Drug Problems Predict Substance Use in African Americans? A Systematic Review of the Literature

Substance use, whether it is the use of alcohol, licit or illicit drugs, or misuse of prescription medication, is a massive global problem due to the negative consequences related to misuse and the subsequent development of substance use disorders. Data from the most recent prevalence rates in the United States (U.S.) indicate that 58.7% of Americans aged 12 or older used a substance in the past month, 21.4% reported using illicit drugs (including misuse of prescription drugs) in the previous year, and 14.5% reported having a substance use disorder (SUD; Substance Abuse and Mental Health Services Administration [SAMHSA], 2021). The annual financial burden in the U.S. from SUDs is estimated to be more than $740 billion from costs related to health care utilization, lost work productivity, and involvement of the criminal justice system (National Institute on Drug Abuse [NIDA], 2020). The ultimate costs from SUDs stem from the loss of life due to drug overdoses. In 2020 there were 91,799 drug overdose deaths in the U.S., with an increase in deaths from synthetic opioids, cocaine, and psychostimulants (Hedegaard et al., 2021). Overdose death rates increased from the previous year for all sex, age, and race and Hispanic groups, however the largest percentage increases were in non-Hispanic Black and non-Hispanic Native Hawaiian or Other Pacific Islander people (Hedegaard et al., 2021). The most recent data for opioid-involved deaths indicate that over two thirds of overdoses involved opioids (Wilson et al., 2020). The death rates from opioid-involved overdoses represents a national health problem and has been identified as an opioid overdose crisis (NIDA, 2019). To help address this problem, efforts are needed in understanding the pathways to substance use and misuse, particularly in different populations, and continue efforts for prevention and treatment (Blanco et al., 2020).

Considering the social and economic impacts of drug use and SUDs, prevention efforts should focus on the factors that affect the probability of onset, progression, severity, and cessation of SUDs (Gerstein & Green, 1993). Prevention is one of the first line efforts of the National Drug Control Strategy to address drug problems and if an intervention can be done early, before substance use progresses to a disorder, it can be the most cost-effective means to address SUDs by reducing costs to society and improving public health (Office of National Drug Control Policy [ONDCP], 2012; ONDCP, 2020). One of the general concepts examined in research for prevention strategies includes the identification of predisposing elements, or risk factors, for substance use or SUDs (Gerstein & Green, 1993). One such risk factor can be a family history of the disease or disorder of interest which can imply that multiple factors (e.g., shared genetic, environmental, behavioral, cultural) contribute to the increased risk (Valdez et al., 2010). Assessing a person's family health history is a common practice in healthcare for determining the risk of developing common diseases because many diseases tend to run in families, (Valdez et al., 2010). A positive family history indicates one or more close biological relatives (i.e., first- or second-degree relatives) are affected with the disease or disorder of concern (Kendler, 2001). In regard to SUDs, particularly alcohol and drug use disorders, the strongest and most well-known risk factor is a positive family history of alcohol and/or drug problems (Merikangas et al., 1998).

Decades of research exist demonstrating that alcohol use disorders (AUDs) run in families (Cotton, 1979; Johnson & Pickens, 2001; Kendler, et al., 2018; Turner et al., 1993). Drug use and related problems are also transmitted in families as indicated by the increased risk for drug use and drug use disorders (DUDs) in those with a positive family history of alcohol and/or drug problems (Kendler et al., 2013; Kendler et al., 2015a; Merikangas et al., 1998;

McCaul et al., 1990). Evidence of genetic risk often uses a twin study design (van den Bree et al., 1998) while evidence of risk from shared environmental factors are found in studies that include adoptive and stepfamilies that have a parent(s) with an alcohol problem and show an increased risk for AUDs (Kendler et al., 2015b) and DUDs in the adult children representing environmental transmission and behavioral modeling (Newlin et al., 2000). A family history of drug problems may be a greater risk factor for the development of DUDs compared to the risk of having a relative with an AUD and developing problems with alcohol (Merikangas et al., 1998). Environmental factors play an important role in the development of DUDs and may be more influential in the familial transmission of these disorders than for AUDs (Kendler et al., 2013). Environmental factors such as exposure and access to substances may come from within the family as well. While most studies examining the impact of family history focus on family members with substance problems (abuse/dependence/SUDs), many consider the impact of substance use alone and its effect on the initiation of substances in the offspring. Several studies examining risk factors for substance use have found that parental or family members' substance use was associated with alcohol and/or drug use in the offspring (Myers, 2013; Needle, 1986).

While there is strong evidence indicating a positive family history of alcohol and/or drug problems are risk factors for SUDs, this research has been conducted in studies of predominantly White samples and may not be generalizable to racial/ethnic minorities (Unger, 2012). Under-representation of racial/ethnic minorities continues to occur in research studies despite the new guidelines initiated in 1993 for the inclusion of women and minorities in research (Chen et al., 2014; Dickerson et al., 2009; National Institutes of Health [NIH], 2022). The National Institutes of Health Revitalization Act of 1993 mandated the inclusion of women and minorities in research to ensure that research findings can be generalizable to the entire population

(Congress.gov, 1993; NIH, 2022). This new policy not only required the inclusion of women and minorities as subjects, but also required subgroup analyses regardless of sample size of the relevant variables in the research being conducted (Bennett, 1993; NIH, 2001). A systematic review of the literature by Dickerson and colleagues (2009) of the inclusion of women and minorities in smoking cessation trials found women to be well-represented but fewer outcomes reported by gender. Their review also found that minorities were still under-represented, and there was no improvement in the reporting of either gender or minority analyses in studies that were recruiting following the NIH Revitalization Act of 1993 (Dickerson et al., 2009). A review of cancer studies found similar outcomes in that racial/minority subjects are still underrepresented in cancer clinical trials 20 years after the NIH Revitalization Act (Chen et al., 2014).

Currently, research that does include adequate sampling of minorities indicates there may be differences in the pathways to the development of SUDs, and it is not clear whether environmental factors moderate the genetic risk (Sartor et al., 2018). There is some research that examines whether a family history of substance problems is a risk factor in African Americans for alcohol use or AUDs, but even less research on outcomes related to drug use and DUDs. In studies with racially and ethnically diverse samples, a positive family history is a risk factor in African Americans for lifetime alcohol use (Vega et al., 1993), alcohol dependence (Gil et al., 2002), and earlier onset of drinking and heavy drinking (Chartier et al., 2013). In studies that include only African Americans, a positive family history of AUDs is a risk factor for drinking problems (Rodney, 1995) and AUDs in young adult college students (Su et al., 2018). Risk factors for family history and outcomes for drug use however are conflicting in comparison to the research conducted with mostly White samples. Gil and colleagues (2002) examined risk

factors experienced in adolescence for substance use later in young adulthood in a group of African American and European Americans and found that family drug-use problems experienced in adolescence were risk factors for marijuana abuse and dependence for European Americans but not for African Americans. When parental substance use is measured as an indicator of unresponsive parenting it has been shown to have an indirect effect on substance abuse for African Americans in early adulthood, while a personal history of previous substance abuse was the greatest risk factor (Cho & Kogan, 2016). Some of these conflicting outcomes could be related to differences in age regarding the risk for substance use, for Whites the risk is during adolescence but for Blacks the risk is greater in adulthood (Brown et al., 2004a; Chen & Jacobson, 2012; Chhatre et la., 2017; Patrick et al., 2021). Also, risk models that have been developed and examined in predominantly White subjects may not translate as risk profiles for African Americans (Brown et al., 2004b; Galaif & Newcomb, 1999; Galiaf et al., 2007; Ellickson & Morton, 1999; Zapolski et al., 2020).

The importance of establishing risk factors in African Americans is they may be at a greater risk for chronic dependence than Whites (Warner et al., 1995) and face greater deleterious health and social consequences as a result of drug use (National Institute on Drug Abuse [NIDA], 2003; Zapolski et al., 2014). Additionally, while it has previously been reported that Whites have the highest rates of drug use those differences are narrowing especially for illicit drug use (Johnston et al., 2020) and are similar for prescription opioid misuse (Han et al., 2017a; Salas et al., 2016). Examining risk for DUDs specifically is important because the risk may be greater when there is a family history of drug problems (Merikangas et al., 1998). Additionally, those with DUDs are more likely to have an additional nonalcohol co-occurring SUD than those with an AUD (McCabe et al., 2017).

There is conclusive evidence indicating the strong relationship between a family history of alcohol and/or drug problems and the risk for substance use, misuse, and SUDs. While other systematic reviews exist examining family history (Elliott et al., 2012; Park & Schepp, 2015; Wlodarczyk et al., 2017), these reviews lack studies that included samples representing racial and ethnic minority populations or conducted subgroup analyses by race. A meta-analysis conducted on a family history of alcohol problems and its influence on college student's drinking or substance use (Elliot et al., 2012) included 65 published papers (53 samples), of which only four were fully non-White samples (three African American and one Native American), with a combined total of 77.1% White subjects for the meta-analysis. The results of the meta-analysis found that family history had the largest effect on alcohol and drug use combined, and small to medium effects on drug use alone, alcohol problems, and AUDs (Elliot et al., 2012). Therefore, a systematic review of family history and its effect on substance use and related problems, including drug use, in the African American population is warranted.

This systematic review examines a family history of substance (alcohol and/or drug) use or problems as a risk factor for substance use and SUDs in African Americans. Because the risk for drug use and DUDs may be greater due to family history, and that African Americans face disparate health and social consequences related to drug use, this review will focus on outcomes for other licit and illicit drugs besides alcohol and tobacco. Due to the variance in the literature with the categorization of race with the use of Blacks and African Americans, these descriptive terms will be used interchangeably.

Methods

A systematic search for published peer-reviewed English-language literature was conducted to identify papers addressing a family history of substance use, misuse, and/or SUDs

in African-Americans and outcomes for substance use, misuse, and SUDs – to include licit and illicit drugs. The databases searched were OVID MEDLINE, EMBASE (OVID), Cumulative Index to Nursing and Allied Health Literature (CINAHL; EBSCO), PsycINFO (EBSCO), and Sociological Abstracts (Pro-Quest). These databases were searched from inception through June 3, 2020. The search used a combination of keywords and controlled vocabulary for the concepts addressing "family history", "substance abuse", and "African-Americans", which was adapted to each database. A sample search strategy can be seen in the Appendix. In addition, a hand search of reference lists of articles was used to discover publications not identified in the database searches. A total of 1901 articles were found, plus an additional 46 identified after manually reviewing the references, with 1210 left to review after deduplication.

Study Selection Process

All references were uploaded to reference management software and duplicates were removed. One reviewer (RMG) conducted the title and abstract as well as the full-text review. Collaboration between remaining reviewers (RMG, NJ, DS) guided the final decision for articles included in the review. The screening process began by scanning the titles and abstracts for inclusion criteria, presented in Table 1, yielding 755 articles. Next, the full text and methods were examined in articles that did not indicate whether family history was measured or specified that drug use was an outcome variable in the title or abstract. Only quantitative studies that measured a family history of alcohol and/or drug use and/or problems (i.e., abuse, dependence, or SUDs) in biological relatives and outcomes in the offspring for drug use or drug use problems including alcohol, licit or illicit drug use, prescription drug misuse, or substance use disorders were included yielding a result of 180 articles. A final review of the full text using the previously defined inclusion criteria for eligible studies yielded a final result of nine articles. The search

results and study selection process are illustrated in Figure 1. Any disagreements between reviewers were resolved by consensus between the reviewers.

Data Collection & Analysis

We extracted the following information using a standardized data collection form: study design, location, sample size, dropout rate, study population, measurements and diagnostic criteria, predictor and outcome variables, relative of subject assessed for family history, type of analysis, and results of analyses. Assessment of the methodological quality of the included studies was conducted using a tool designed by the National Institutes of Health (NIH). The tool used for this review was the NIH (n.d.) Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies, results are presented in Table 2. This tool helps in identifying factors related to internal validity and risk of bias in study designs with quality ratings of poor, fair, or good (NIH, n.d.).

Synthesis of the Results

A narrative analysis was conducted to synthesize the data extracted from the included studies. Results were considered to be statistically significant when $p < .05$.

Results

Study Characteristics

The basic characteristics, including family history information and substance use outcomes measured, are provided in Table 3. The sample sizes ranged from 141 to 2,078, ages ranged from 10 to 43, one study was all male while the remainder were 44% to 52% female, and one study did not report gender. A single study had a sample that was <90% African American which conducted subgroup analysis by race, the remainder of the studies were 90% to 100% African American. The studies represented mostly urban populations from Chicago,

Philadelphia, Boston, and Baltimore City. Other geographical regions represented included the states Kentucky, Iowa, and Georgia. Most of the studies (*n*=7) were longitudinal, while the remaining two were cross-sectional. Family history was assessed through survey or interview and three studies collected family history information directly from the parent(s) while the remainder collected from the offspring.

Two studies were from the Woodlawn Study in Chicago (Doherty et al., 2008; Green et al., 2012), both studies were included due to different methods for inclusion of the sample for analysis and different outcome variables related to substance use. The Woodlawn Study is a longitudinal study consisting of a cohort of first grade students from Chicago's South Side with a population that is 99% African American that was followed through adolescence (ages 16-17), young adulthood (ages 32-33), and mid-adulthood (ages 42-43). The Doherty and colleagues' (2008) study included 85% (*n*=1053) of the sample from the final two adult interviews with a final sample of *n*=571 used in regression analyses and outcomes for patterns of initiation of substance use and lifetime substance use. Green and colleagues (2012) maintained the original (*n*=1242) study participants with a final restricted sample of *n*=1181 for regression analyses and outcomes for SUDs alone, SUDs and depression together, depression alone, and neither SUD nor depression.

There were no studies that included a control group. One study examined pre- and young adolescents with a median age of 10 years (Iannotti & Bush, 1992), one study examined risk factors experienced in pre-adolescence and later substance use in mid-adolescence (Gibbons et al., 2007), the remainder of the studies examined risk factors experienced in childhood or adolescence and outcomes for substance use or problems in adulthood (Arteaga et al., 2010; Doherty et al., 2008; Friedman & Glassman, 2000; Green et al., 2012; Schilling et al., 2007;

Stanton et al., 2002; Wheeler et al., 2019). One study included adult subjects that were in prison at the time of the study (Wheeler et al., 2019).

In addition to examining a family history of substance use or problems as risk factors for substance use outcomes, studies also examined other risk factors related to the family environment, parenting styles and relationships, peer influences, academic variables, other mental health or behavioral disorders, deviant behavior, parental history of mental health disorders, adverse childhood experiences, history of incarceration, and neighborhood factors, these additional risk factors are presented in Table 4. Additional outcomes in the studies included other mental health disorders, deviant behavior, and other risky behaviors (e.g., sexual intercourse).

In the narrative analysis, results from the review were categorized into one of four categories: family history, family and parental factors, individual-related factors, and socioenvironmental factors. Additional results of racial differences from studies that conducted analyses by race are included in a separate section. Risk factors were discussed first, then protective factors were highlighted.

Quality of the Studies

All of the studies included in the review were identified as being of ‘good’ quality and none were assessed as being of ‘poor’ quality, see Table 2.

Family History

The studies included in the review collected either a history of substance use and/or a history of substance problems in family members. The studies varied in their definition of family history and in their collection methods. The characteristics of the studies are presented in Table 3. Collection methods for family history included either direct interview of the parent (Doherty

et al., 2008; Gibbons et al., 2007; Green et al., 2012), interview of the offspring (Friedman & Glassman, 2000; Schilling et al., 2007; Wheeler et al., 2019), or survey of the offspring (Artega et al., 2010; Iannotti & Bush, 1992; Stanton et al., 2002). Four studies examined a family history of substance problems (Arteaga et al., 2010; Friedman & Glassman, 2000; Gibbons et al., 2007; Schilling et al., 2007), one a family history of prescription misuse (Wheeler et al., 2019), while the remaining four examined family member substance use (Doherty et al., 2008; Green et al., 2012; Iannotti & Bush, 1992; Stanton et al., 2002). Four of the studies used a validated measure to collect family history (Friedman & Glassman, 2000; Gibbons et al., 2007; Stanton et al., 2002; Wheeler et al., 2019), however, only a single study utilized a measure with diagnostic criteria for problematic substance use which was administered directly to the parent (Gibbons et al., 2007). The remaining studies asked participants if their parents had problems with substance abuse (Artega et al., 2010), whether parental drinking or drug use caused problems for the family (Schilling et al., 2007), and whether the participants perceived family use of drugs (Iannotti & Bush, 1992: Stanton et al., 2002). Two studies that directly interviewed the parent, the mother self-reported any illegal substance use or regular use of alcohol for herself (Doherty et al., 2008) and any family member (Green et al., 2012). Most of the studies included in the review collected history on the parent(s) (Arteaga et al., 2010; Doherty et al., 2008; Gibbons et al., 2007; Green et al., 2012; Schilling et al., 2007). The remaining included any family member in their family history assessment (Green et al., 2012; Iannotti & Bush, 1992; Stanton et al., 2002), immediate family members (Wheeler et al., 2019), and a single study included both parents and siblings (Friedman & Glassman, 2000).

The studies examined in this review indicate that a family history of alcohol and/or drug use and/or problems are risk factors for substance use and related problems (i.e., abuse,

dependency, SUDs), but these outcomes may differ depending on factors such as developmental age, risks for a specific class of drugs, different analyses, or belonging to a high risk group (e.g., incarcerated individuals). Perceived family drug use was a strong predictor in early adolescence for alcohol and drug use (Iannotti & Bush, 1992) and mid-adolescence for drug use (Stanton et al., 2002). In a cross-sectional study of fourth and fifth graders in an urban area, results indicate that perceived family use of substances was the strongest predictor for alcohol use, followed by cigarette and marijuana use (Iannotti & Bush, 1992). As subjects age, the risk related to family substance use or substance problems may decrease or no longer be as significant, or may be a risk factor for specific substances. The study by Stanton and colleagues (2002) that followed subjects for four years beginning in early to mid-adolescence (median age 11 years) found that perceived family drug use was significant for offspring drug use at the first year and year and a half point, but no longer remained significant later. A family history of problematic alcohol and drug use also increased the risk for drug use in adolescents (Gibbons et al., 2007). In a longitudinal study conducted over five years in a group of adolescents, a parent's history of problematic alcohol use or drug use was predictive for later drug use (Gibbons et al., 2007). Another study with a racial/ethnically diverse sample of high school students in their senior year of high school (49% White, 21% Black, 11% Hispanic, 7% Asian, 5% multi, 7% other) followed up two years later found that a parent with a drinking or drug problem was not a significant risk factor for drug use for Blacks, but when examined as a group and controlling for gender, race/ethnicity, and socioeconomic status, it remained a significant risk factor not only for drug use but also for depressive symptoms and antisocial behavior (Schilling et al., 2007). The same study conducted subgroup analyses by gender and found no differences between males and females in the entire group for parent with a drinking or drug problem for any outcome, however

these differences in gender were not examined in separate racial/ethnic groups (Schilling et al., 2007). Longitudinal studies that measured risk factors experienced in childhood or adolescence and outcomes in adulthood found that family history of substance problems was a risk factor for substance abuse and dependency (Arteaga et al., 2010), and alcohol and drug use (Friedman & Glassman, 2000), while a maternal history of substance use was positively associated with heroin and cocaine use (Doherty et al., 2008). When Arteaga and colleagues (2010) followed children beginning in kindergarten up to age 26 examining the risk of substance dependence over time – beginning at age of first use up to age 26 – they found a history of parental substance abuse was not a risk factor for the group that reported substance use, but was significant in the males when examined separately (Arteaga et al., 2010). When the outcome for substance dependence was examined as a dichotomous measure representing a static risk in adulthood (rather than risk as subject ages), family history was a risk factor for dependence for both the group that reported substance use and the full sample, and for males when examined separately (Arteaga et al., 2010). The authors of the study reported they did not examine for risk in females separately due to sample size limitations (Arteaga et al., 2010). When a family history of alcohol and/or drug problems were examined separately by relationship, a paternal history of an alcohol problem was a risk for alcohol use, maternal history of a drug problem was a risk for marijuana use, and sibling history of a drug problem was a risk for all substances collectively (Friedman & Glassman, 2000). Two studies that examined maternal or familial substance use during adolescent and outcomes for drug use in later adulthood (42 years old) did not have the same results as the adolescent or younger adult studies. Doherty and colleagues (2008) analyzed data from the Woodlawn Study in Chicago which followed subjects and their families from first grade until middle adulthood (up to age 42) found that a maternal history of substance use increased

the hazard for initiation of cocaine and heroin for the entire group, but when examined separately by gender no longer remained significant for either females or males. The same study found that maternal substance use was not a risk for marijuana use for the entire group nor for males or females when examined separately (Doherty et al., 2008). A separate study that used the same sample as the one by Doherty and colleagues (2008), but with different inclusion methods for the sample and different outcome variables, found a family history of substance use was not a risk factor for any outcome, including substance use disorders with or without depression in middle adulthood by age 42 (Green et al., 2012). The risk factors may be different when considering the misuse of prescription drugs and/or high-risk populations. The single study that examined risks for prescription drug misuse found that in a high-risk sample of incarcerated men in their early 30s a family history of prescription drug misuse was the greatest risk factor for nonmedical use of prescription opioids (Wheeler et al., 2019).

While a family history of substance use or problems was the primary focus of this review, several of the studies that were included indicated that other factors such as individual, family and parental, and socioeconomic factors are greater risk factors for substance use or substance problems, particularly in adulthood, than a family history of substance problems (Arteaga et al., 2010; Friedman & Glassman, 2000) or substance use (Doherty et al., 2008; Green et al., 2012).

Family and Parental Factors

In addition to examining family history as a risk factor for substance use, several characteristics of the family environment, including parental relationships and parenting styles, have been investigated for their influence on substance use in adolescence and adulthood. Additional risk factors examined as predictors for substance use outcomes are listed in Table 4. Family and parental characteristics include: family adversity, family relations, family bonding

and support, family management, parent-child relationships, parental disciplinary practices, parent communication, parent expectations, and other parental experiences.

Risk Factors. Children and adolescents who experienced family adversity – indicated by greater levels of family conflict – had an increased risk for substance abuse and substance dependency (Arteaga et al., 2010) and alcohol use in early adulthood (Friedman & Glassman, 2000). However, another study examining risk for both SUDs and depression found that frequent family conflict in adolescence was a risk factor for depression later in mid-adulthood but not SUDs (Green et al., 2012). Additional indicators of early childhood adversity included the involvement of child protective services during childhood due to child maltreatment which predicted early substance use, substance abuse, and substance dependency in early adulthood (Arteaga et al., 2010). In addition to greater family conflict, experiencing negative behaviors between family members (e.g., resisting, lying, stealing) increased the risk for all substances combined (including drug use), as well as for alcohol and marijuana use when examined separately (Friedman & Glassman, 2000). When family-related factors pertaining to family structure (single-parent), mother (age, employment), household (number of children) and socioeconomic factors were combined in a family risk index, Arteaga and colleagues (2010) found that children with higher family risk scores were at an increased risk for early substance use, but not substance abuse or dependency in early adulthood.

When family and parental factors were examined as adverse childhood experiences (ACEs) in a racial/ethnically diverse sample (49% White, 21% Black, 11% Hispanic, 7% Asian, 5% multi, 7% other), being sent away from home, having parents who were separated, or a parent who was unemployed were predictive for drug use for the entire group but when outcomes were examined by race none of the experiences remained significant for Blacks

(Schilling et al., 2007). Parental disciplinary practices that increased the risk for substance problems were reported as physical abuse during adolescence which increased the risk for marijuana use in early adulthood (Friedman & Glassman, 2000). Self-report of physical and frequent discipline as a child were predictors of cocaine and heroin use but remained a risk factor only for females when examined separately by gender (Doherty et al., 2008). Additional disciplinarian behaviors that increased risks for lifetime drug use in adulthood included having a mother that was not firm enough, and a mother who shouted at the subject often (Friedman & Glassman, 2000).

Parent relationship factors experienced in adolescence that affected risk for substance use in early adulthood included a distrust in the father being unable to rely on what he says, and having a mother who did not listen or want the subject around (Friedman & Glassman, 2000). When problems within the family included the mother's behavioral problems, having a mother with a mental health problem increased the risk for substance use (Friedman & Glassman, 2000). Unique outcomes were found for when parents were consistent in making family decisions, and having a family that was fun to live with, the subjects reported more substance use which was explained by the authors as the offspring possibly viewed the parents as too strict or more tolerant of drug use (Friedman & Glassman, 2000).

Protective Factors. Certain family relationship factors experienced in childhood and adolescence such as family cohesion was protective in reducing the risk of substance use for females (Doherty et al., 2008). Disciplinary factors such as stricter rule setting reduced the risk for alcohol and tobacco use, and for females reduced the risk of cocaine and heroin use later in adulthood (Doherty et al., 2008). Having greater parental supervision with open communication and parental monitoring decreased the risk of drug use at an earlier age (Stanton et al., 2002).

Characteristics indicating involvement in education and learning indicated that when the parents had higher expectations of their child's progress in school it decreased the risk for substance abuse (Arteaga et al., 2010), and a mother that helped with school work decreased the risk for marijuana use in adulthood (Friedman & Glassman, 2000). In a sample of adult incarcerated men, having a closer relationship with their father decreased the risk for nonmedical use of prescription opioids (Wheeler et al., 2019).

Individual Factors

Other variables that were examined as risk factors for substance use outcomes in the included studies were characterized as individual level factors and included demographic factors (sex/gender, age, race/ethnicity), other mental health or behavioral measures, academic related factors, prior substance use, experiencing racial discrimination, and experiencing traumatic or adverse events.

Risk Factors. The studies that examined differences between males and females found there were differences in substance use and SUDs. During adolescence (ages 16 to 17) males initiate alcohol and marijuana at an earlier age, stop using marijuana at a later age, and have a higher lifetime prevalence for marijuana, cocaine, and heroin than females (Doherty et al., 2008). Adult males (ages 32 to 33 and 42 to 43) were also found to be twice as likely to have a SUD with or without depression than females (Green et al., 2012). One longitudinal study found male gender was not significantly associated with substance use. Stanton and colleagues (2002) collected data 6 to 48 months from baseline at median age of 11 and found that male gender was not a significant risk factor for drug use throughout the study, but was significant at a single point in time – at the two-year measurement in adolescence at ages 11 to 17. Other studies demonstrated that males were at greater risk for alcohol, marijuana, and all drug use in

childhood/early adolescence – median age of 10 (Iannotti & Bush, 1992), reported more frequent drug use in late adolescence – ages 16 to 20 and above (Schilling et al., 2007), and were at an increased risk for substance abuse and dependency in early adulthood – up to age 26 (Arteaga et al., 2010). Age was significant in two studies demonstrating that older age was a predictor for drug use in a group of adolescents followed over five years into late adolescence – ages 13 to 19 (Stanton et al., 2002) and in a cross-sectional study in childhood/early adolescence (median age 10) as a predictor for alcohol and multiple substance use (Iannotti & Bush, 1992). Doherty and colleagues (2008) found that for alcohol, tobacco, and marijuana, substance use was initiated in mid-adolescence (average age 16). For harder drugs initiation was later – cocaine and heroin were first used in the mid-20s with some initiating even later, nearly a third (29%) initiated heroin at age 30 or later and 12% initiated cocaine at 30 or later (Doherty et al., 2008).

Graduating from high school may have an effect on the risk for substance use later in adulthood. The two studies that examined the effects of completing high school found that dropping out of high school was a risk factor for later substance dependence (Arteaga et al., 2010) and SUDs in adulthood (Green et al., 2012). Another school-related risk factor was changing schools frequently during adolescence which increased the risk for early substance use, substance abuse, and substance dependency later in adulthood (Arteaga et al., 2010).

Behavioral factors that increased risk for substance dependence in adulthood included a lack of social maturity in adolescence (Arteaga et al., 2010), and low self-control in childhood predicted the development of SUDs in adulthood (Green et al., 2012). An early diagnosis of conduct disorder predicted later drug use and was nearly as strong a predictor as a parental history of substance use (Gibbons et al., 2007). Other mental health issues such as anxiety increased the risk of prescription drug misuse in incarcerated adult males, it was the second

greatest predictor while family history was the strongest (Wheeler et al., 2019). In a racial/ethnically diverse study examining traumatic events (witnessed an injury/murder, sexual abuse/assault, physical abuse/assault, serious neglect, threatened/held captive/kidnapped) categorized as ACEs found that for the entire group all of the traumatic events were significant risk factors for drug use, however, they did not remain significant for Blacks when groups were examined separately by race (Schilling et al., 2007). One study examined the effects of racial discrimination on drug use and found that experiencing early discrimination was not only a risk factor for later drug use, but also a risk factor for early conduct disorder, and when tested for interaction effects both discrimination and conduct disorder produced main effects and the combination of the two was associated with the greatest risk for later drug use in adolescence (Gibbons et al., 2007). In regard to a history of substance use, previous substance use in adolescence was a risk factor for substance abuse later in early adulthood (Arteaga et al., 2010) and SUDs in mid-adulthood (Green et al., 2012).

Protective Factors. Certain behaviors and relationships reduced the risk for substance use and related problems. No trouble making behavior in adolescence, having greater social maturity, and female gender was protective for substance use problems in early adulthood (Arteaga et al., 2010). Iannotti and Bush (1992) found that being female and having a close friend that was concerned about the subject's substance use decreased the risk for drug use.

Socioenvironmental Factors

The most common social influence to be examined as a risk factor for substance use outcomes was peer-related characteristics. Indicators of low socioeconomic status (SES) were also measured and included in the analyses as predictors of substance use outcomes.

Risk Factors. In a longitudinal study that followed children to early adulthood, Arteaga and colleagues (2010) measured a family risk index that combined family-related factors and low-income related indicators (participation in public assistance, free lunch eligibility, residence in low-income neighborhood) which demonstrated the more variables that were met the greater the risk for earlier substance use, but not substance abuse or dependency. In a cross-sectional study of young adolescents, students who were eligible for a government subsidized lunch program were at increased risk for alcohol and multiple substance use (Iannotti & Bush, 1992). Green and colleagues (2012) measured a mother's education level as an indicator of SES and found that fewer years of education was a risk for depression but not SUDs.

Several studies also examined peer-related variables as risk factors for substance use. Friedman and Glassman (2000) found that social activity and peer relationship risk factors accounted for a greater degree in the variance for later substance use in early adulthood than family relationship variables. Factors such as spending time with friends in deviant behavior and admitting they would lie to protect their friends from the police predicted drug, alcohol, and marijuana use in early adulthood (Friedman & Glassman, 2000). Also, continuing relationships with friends who lead the subjects into trouble increased the risk for marijuana use (Friedman & Glassman, 2000). Having friends in adolescence who engaged in deviant behavior was a risk for substance abuse in early adulthood (Arteaga et al., 2010) and friends who used substances predicted later drug use in mid-adulthood (Gibbons et al., 2007). The perception of drug use by those identified as "best" friends and actual substance use by casual friends such as classmates were strong predictors for substance use in early adolescents (Iannotti & Bush, 1992). Not all of the studies found similar results. Stanton and colleagues (2002) found that while the perception

of friend's drug use was a risk factor for drug use in earlier adolescence, it did not remain significant in later adolescence.

Protective Factors. Spending time with friends who were involved in conventional pursuits (e.g., doing well in school) during adolescence decreased the risk for lifetime drug and alcohol use into early adulthood, and spending more leisure time alone decreased the risk for drug use (Friedman & Glassman, 2000).

Race/ethnicity

There were two studies with diverse samples that conducted analyses for differences by race (Arteaga et al., 2010; Schilling et al., 2007). The Arteaga and colleagues (2010) study which was 93% Black and 7% Hispanic found that by young adulthood (ages 22 to 24) Blacks had a lower risk for early substance use but a slightly higher risk for substance dependency. The study with the most racial/ethnically diverse sample (21% Black, 49% White, 11% Hispanic, 7% Asian, 5% multi, 7% other) examined adverse childhood experiences (ACEs) as risk factors for drug use, depressed mood, and antisocial behavior in late adolescence/early adulthood (Schilling et al., 2007). ACEs examined were: parents separated, child sent away from home, parent unemployed, a parent with a drinking or drug problem, witnessing an injury or murder, sexual abuse or assault, physical assault or abuse, seriously neglected, and threatened/held captive/kidnapped. There were significant differences in the prevalence of these experiences for certain groups. Whites had higher rates for parents with a drinking or drug problem, Blacks and Hispanics had higher rates for witnessing an injury or murder, and Hispanics had the highest rates for sexual abuse or assault and threatened/held captive (Schilling et al., 2007). Results demonstrated that Whites had the highest rates of drug use, followed by Hispanics then Blacks, however in regard to risk Blacks and Hispanics would have to experience 5 times as many ACEs

as Whites did to carry the same risk for drug use (Schilling et al., 2007). Analyses for the entire group, after controlling for race/ethnicity, gender, and SES, found that all of the ACEs, except for parents separated, were significant for drug use, depressive symptoms, and antisocial behavior, and the more ACEs experienced the greater the impact on all outcomes. When the effects of ACEs were examined by subgroup analyses by race, the only factor to remain significant for Blacks was witnessing an injury or murder as a risk for antisocial behavior, and no ACEs were a significant risk factors for any outcome for Hispanics (Schilling et al., 2007).

Discussion

The primary purpose of this review was to examine the effects of a family history of alcohol/and or drug problems on substance use, particularly drug use and other drug-related problems in African Americans. The results of the search yielded a total of nine studies that examined either a family history of substance problems or a family history of substance use. While a family history of substance problems versus a history of substance use represents different influences of risk for substance use and problems in the offspring, it was important to include both types of studies given the limited research within this population. A family history of substance problems (e.g., substance use disorder) can be considered a direct risk factor that can also modulate the effect of other risk factors (Kendler, 2001) representing genetic and environmental influences (Merikangas et al., 1998; Newlin et al., 2000). Substance use by family members, particularly by the parents, represents a more indirect risk factor by modeling through behavior, normalization of substance use and exposure to substances, which can mediate other risk factors and is an important risk factor for substance use (Mayes & Suchman, 2006; Myers, 2013; Needle, 1986; Wills et al., 1996). The nine studies included in this review also examined

additional risk factors for substance use that were categorized into three groups: family and parental factors, individual factors, and socioenvironmental factors.

The present review found that a family history of substance problems (Gibbons et al., 2007) and family substance use (Iannotti & Bush, 1992; Stanton et al., 2002) were positively associated with substance use in African Americans particularly for adolescents, although one study reported no significant relationship with drug use in a sample of Black adolescents (Schilling et al., 2007). Associations between a family history of substance problems and adult substance use were more variable (Arteaga et al., 2010), and/or substance dependent (Friedman & Glassman, 2000; Wheeler et al., 2019). The variable association between a family history of substance problems and substance use in adults as they get older has been demonstrated in a separate longitudinal study examining risk factors for drug use. Wilson and Widom (2010) found in their sample which was 35.4% Black, that for the group who reported drug use in both young (age 29) and middle (age 39) adulthood (36.5% Black), a parental history of substance-use problems was the strongest predictor for illicit drug use. The outcomes were different for the late-use group however, which reported no drug use in young adulthood but past-year drug use in middle adulthood only (n=46) and was more likely to be Black (61%), found that this group was less likely to report parental substance-use problems, however, this study did not conduct separate analyses by race (Wilson & Widom, 2010). Substance use in the family may be more influential on adolescent/young adult than middle adulthood substance use. Myers (2013) examined risk factors for substance use in African American middle and high school students and found that those who reported family members' use of alcohol and illegal drugs were more likely to use alcohol and drugs. This review found that family substance use increased the risk of drug use in adolescence (Iannotti & Bush, 1992; Stanton et al., 2002), but was not a risk factor

for all substances (Doherty et al., 2008) or for SUDs (Green et al., 2012) in adults at age 42. A family history of substance problems may also be a better predictor for drug use in adolescents and younger adults. A previous study with a racial/ethnically diverse sample of high school students found that parental problematic substance use was positively associated with student substance use (Shorey et al., 2013). Studies of young adult college students with racial/ethnically diverse samples found a positive relationship between a family history of alcohol problems and drug use including illicit drug use (Braitman et al., 2009; McCaul et al., 1990).

Surprisingly only two studies conducted separate analyses by gender, which falls short of the policies for research to conduct subgroup analyses of relevant variables to determine whether the variable of interest under investigation affect women differently (Bennett, 1993). Doherty and colleagues (2008) found that while a maternal history of substance use was not associated with marijuana use, it did increase the risk of heroin and cocaine use for the entire group, but was no longer significant when examined separately for males and females. In the study with the most racial/ethnically diverse sample, a parental drinking or drug problem increased the risk for drug use in the entire group and the subgroup analyses indicated there were no differences between males and females for family history for any outcome (Schilling et al., 2007). Schilling and colleagues (2007) did find there were gender differences in the effects of the ACEs in that the cumulative effect of ACEs on drug use was greater for males than females. When differences were examined by race, a parental drinking or drug problem was not significant for drug use for Blacks or Hispanics, however, further subgroup analyses by gender was not conducted in Blacks or Hispanics (Schilling et al., 2007). The review identified additional risk factors and found peer influence (e.g., deviant behavior and substance use) was a strong risk factor for substance use (Gibbons et al., 2007; Iannotti & Bush, 1992; Stanton et al., 2002). As individuals age into

adulthood, family-related factors (Arteaga et al., 2010; Doherty et al., 2008) and peer deviant or risky behavior (Friedman & Glassman, 2000) may have a stronger influence on risk for substance use than family history. The role of peer risky behavior in adolescent African Americans has been supported by previous research that demonstrates peers who engage in deviant behavior and use substances is a significant risk factor for drug use and drug refusal efficacy, while parental monitoring may reduce the influence from peer risk behavior (Clark et al., 2012). A study with a majority African American sample (68%) found that a paternal history of SUD was associated with an increased risk of substance abuse for the adolescent offspring when some or most of the friends used substances but was not a risk when none or just a few of the friends used substances; there was no evidence that maternal history of SUD was associated with offspring substance abuse regardless of whether friends' used substances (Henry et al., 2018). Additional findings from previous research indicate that peer influences increase the risk for specific substance use or problems including increased risk for alcohol and marijuana use (Clark et al., 2008), alcohol dependence and marijuana abuse/dependence (Gil et al., 2002), and nonmedical use of prescription drugs (Nargiso et al., 2015).

Family and parental factors found in the review that were risk factors for substance use included family conflict (Arteaga et al., 2010; Friedman & Glassman, 2000), distrust in the father or maternal relationship factors (Friedman & Glassman, 2000), and physical discipline or physical abuse (Arteaga et al., 2010; Doherty et al., 2008; Friedman & Glassman, 2000). A unique finding was that consistent parenting and having a family that was fun to live with were predictors of drug use, these results may be related to parents being too strict or tolerant of drug use (Friedman & Glassman, 2000). Previous research has demonstrated how the effect of parenting styles in childhood is related to substance use later in adulthood. Cho and Kogan

(2016) examined how harsh, unresponsive parenting affected substance abuse in African American men and found that it had an indirect effect through adolescent early transition into adult roles, future economic instability, and reduced future orientation which increased the risk for substance abuse. African Americans may be more vulnerable to certain family experiences. Nurco and colleagues (1997) examined differences between Black and White participants with an opioid use disorder and found that Blacks had the lowest scores for family dysfunction (i.e., lack of emotional support, caring, and comfort within the family), but they scored highest for family instability (i.e., breakdown of family composition, lack of joint parental involvement). There are some family and parental factors that may be protective for substance use. Parental relationships such as a close relationship with one's father (Wheeler et al., 2019), and disciplinary factors during childhood such as stricter rule setting (Doherty et al., 2008) and parental supervision and parental monitoring (Stanton et al., 2002) reduced the risk for later substance use. Better family relationships as demonstrated by greater family cohesion during childhood and adolescence reduced substance use in adulthood (Doherty et al., 2008). Parental influence in academic achievement during childhood and adolescence may also be protective for substance use or problems in young adulthood such as higher expectations for school progress (Arteaga et al., 2010) and assisting with school-related work (Friedman & Glassman, 2000). These results indicate that the effect of familial and parental factors may function as risk or protective factors for substance use in African Americans.

Male gender continues to carry the same risk for substance use outcomes as demonstrated in previous research (Chartier, et al., 2013; Hughes, et al., 2016; Morgan et al., 2010). In the studies included in the review that examined gender as an independent variable in the analysis, males were more likely to use substances or have substance use problems (Arteaga et al., 2010;

Doherty et al., 2008; Green et al., 2012; Iannotti & Bush, 1992; Schilling et al., 2007; Stanton et al., 2002). Older age was also found to be a predictor for drug use in adolescents (Iannotti & Bush, 1992; Stanton et al., 2002) and drug use initiation later in adulthood (Doherty et al., 2008). This is consistent with previous research indicating African Americans demonstrate higher rates of substance use later in mid-adulthood (Chen & Jacobsen, 2012). Substance use later in life has also been supported by Watt (2008) which found that Black male adolescents were 11% less likely to use illegal drugs than White male adolescents, however that changed over time and by age 35 or older Black males were 57% more likely to use illegal drugs than White males.

Other risk factors found to be significant for the development of SUDs in adulthood included previous substance use in adolescence and dropping out of high school (Arteaga et al., 2010; Green et al., 2012), low self-control in childhood (Green et al., 2012), and conduct disorder as a risk for substance use in adolescence (Gibbons et al., 2007). These results have been supported by previous research. In a longitudinal study of African Americans, substance use in adolescence had direct and total effects for marijuana and cocaine use in mid-adulthood, and low school achievement had indirect effects through low income in early adulthood which increased the likelihood of marijuana and cocaine use later (Fothergill et al., 2009). Lower academic achievement has also been identified as a risk factor for marijuana and alcohol use in African American adolescents (Clark et al., 2008). Lee and colleagues (2020) demonstrated in a sample of adolescents (53% African American, 47% Puerto Rican) that low self-control, as well as peer drug use, were risk factors for heavy substance use in adulthood (20s and 30s). When examining the progression of the development of dependence, conduct disorder and childhood physical abuse predicted rapid development of dependence in a sample of cocaine dependent (51.9% Black) and opioid dependent (29.5% Black) subjects (Sartor et al., 2014).

One study in the review that examined racial discrimination as a risk factor for substance use found that adolescents who perceived earlier discrimination were at an increased risk for later substance use (Gibbons et al., 2007). Discrimination as a risk factor for substance use has been supported by previous research (Clark et al., 2015; Zapolski et al., 2020). Zapolski and colleagues (2020) examined risk factors across adolescence as predictors for substance use by age 21 and found discrimination to be predictive for all substances (alcohol, cigarettes, marijuana). Clark and colleagues (2015) in their study of African American and Caribbean Black adults ages 18 to 65 found that the two groups that reported higher rates of recurrent experiences of discrimination (i.e., multiple times each year, and monthly or weekly) were at higher risk for alcohol use disorders and illegal drug use disorders. The cumulative effects of discrimination may be a risk factor for substance use in adulthood for African Americans (Clark, 2014).

The studies included in the review that examined socioeconomic (SES) status found lower SES was a risk factor for substance use (Arteaga et al., 2010; Iannotti & Bush, 1999), but not for abuse or dependency or substance use disorders (Arteaga et al., 2010; Green et al., 2012). Gibbons and colleagues (2007), however, did not find SES to be a risk factor for substance use. The conflicting outcomes regarding whether lower SES is a risk factor have been shown in previous research. Zapolski and colleagues (2020) examined whether a family SES risk index was a predictor for substance use across adolescence up to age 21 and found that lower SES was not a risk factor for any substance, and was protective for alcohol use. Lower SES may have a greater effect in adulthood, Fothergill and colleagues (2009) found that low income in early adulthood had a direct and total effect for marijuana and cocaine use in mid-adulthood while low income in childhood had an indirect effect. Like family history and peer relationships, SES may

have different effects for substance use for African Americans depending on the developmental period.

The results of this review found that for African Americans a family history of alcohol and/or drug use or problems are risk factors for substance use in adolescence and young adulthood, but may not be as much of a risk factor for substance use or SUDs by mid- or late-adulthood. Other risk factors for substance use included individual (male, high school dropout, previous substance use, low self-control, conduct disorder, discrimination, anxiety), peer (deviant behavior, substance use), and parent and family (involvement of child protective services, family conflict, school mobility, parental relationship or disciplinarian behaviors) domains. These risk factors have been supported by other reviews of the literature. Stone and colleagues (2012) conducted an extensive review of the literature for risk and protective factors of substance use and problem use in emerging adulthood (age 18 to 26). The authors found that parental substance use history, male gender, previous substance use in adolescence, childhood maltreatment, family relationships, family management, and peer substance use were all risk factors, with mixed results for SES and conduct disorder. A review on risk factors for nonmedical use of prescription drugs among adolescents found that family history, dropping out of high school, poor parental monitoring, lack of parental involvement, peer deviant behavior, and previous substance use were all risk factors (Nargiso, et al., 2015). Implications from this review indicate that due to the few studies examining a family history of substance problems as a risk for outcomes related to drug use in the African American population, further research is needed for risk factors related to substance use and use disorders, particularly in later adulthood into the 30s and 40s and later.

Limitations

The limitations of this systematic review are primarily related to the differences between the studies not only for the predictor variables, but also for the differences in substance use outcomes during various stages of development – from adolescence, to young adulthood (20s and early 30s), and through to middle adulthood (up to the mid-40s). Family history also varied between the studies with information collected either about the parent(s), any family member, or all first-degree relative's substance (alcohol and/or drug) use, substance abuse, substance problems, or perceived substance use. While most of the studies examined for differences between males and females for drug use or SUDs, only two studies conducted subgroup analyses by gender examining risk for substance use outcomes (Doherty et al., 2008; Schilling et al., 2007).

Conclusion

This systematic review examined the evidence for a family history of alcohol and/or drug use or problems as risk factors for substance use or SUDs in African Americans. The review also provided evidence of other risk and protective factors. The results of the literature search revealed that not all studies collected data for a family history of substance problems, but given the risks related to family substance use those studies were included. Also, there was a lack of studies of middle aged and older adults when the risk for substance use may be greater. Two of the included studies followed subjects up to age 42 measured family substance use rather than substance problems therein pointing to another lack of investigation into whether the risk factor of a family history of substance problems is really a risk for this population at that age. These findings should inform future research for risk factors for substance use, misuse, and SUDs in the African American population. Future research may further explore whether a family history of substance problems is a risk factor for drug use and related problems in African Americans,

particularly in later adulthood, past the 20s and early 30s and into the 40s where risk factors may be different. One of the studies included in this review (Schilling et al., 2007) supported previous research (Brown et al., 2004; Ellickson & Morton, 1999; Galaif et al., 2007) that found risk models that are predictive for drug use in White subjects are not predictive for African Americans. This outcome, and the small number of publications included in this review, points to a lack of research for relevant risk factors in the African American population, this should alert the field of research in reconsidering the common methodology of comparative approaches. It should also alert those researchers and clinicians interested in prevention and intervention strategies for SUDs that a subpopulation here in the U.S. has been disregarded when it comes to establishing risk factors.

References

Arteaga, I., Chen, C.-C., & Reynolds, A. J. (2010). Childhood predictors of adult substance abuse. *Children and Youth Services Review, 32*(8), 1108-1120. https://doi.org.10.1016/j.childyouth.2010.04.025

Bennett, J. C. (1993). Inclusion of women in clinical research trials – policies for population subgroups. *The New England Journal of Medicine, 329*(4), 288-292. https://doi.org/10.1056/NEJM199307223290428

Blanco, C., Wiley, T. R. A., Lloyd, J. J., Lopez, M. F., & Volkow, N. D. (2020). America's opioid crisis: The need for an integrated public health approach. *Translational Psychiatry, 10(1),* 167. https://doi.org/10.1038/s41398-020-0847-1

Braitman, A. L., Kelley, M. L., Ladage, J., Schroeder, V., Gumienny, L. A., Morrow, J. A., & Klostermann, K., (2009). Alcohol and drug use among college student adult children of alcoholics. *Journal of Alcohol and Drug Education,* 53(1), 69–88.

Brown, T. L., Flory, K., Lynam, D. R., Leukefeld, C., & Clayton, R. R. (2004a). Comparing the developmental trajectories of marijuana use of African American and Caucasian adolescents: Patterns, antecedents, and consequences. *Experimental and Clinical Psychopharmacology, 12*(1), 47–56. https://doi.org/10.1037/1064-1297.12.1.47

Brown, T. L., Miller, J. D., & Clayton, R. R. (2004b). The generalizability of substance use predictors across racial groups. *The Journal of Early Adolescence, 24*(3), 274–302. https://doi.org/10.1177/0272431604265677

Chartier, K., Hesselbrock, M. N., & Hesselbrock, V. M. (2013). Ethnicity and gender comparisons of health consequences in adults with alcohol dependence. *Substance Use & Misuse, 48*(3), 200-210. https://doi.org/10.3109/10826084.2013.747743

Chen, P., & Jacobson, K. C. (2012). Developmental trajectories of substance use from early adolescence to young adulthood: Gender and racial/ethnic differences. *Journal of Adolescent Health, 50*(2), 154-163. https://doi.org/10.1016/j.jadohealth.2011.05.013

Chen, M. S., Lara, P. N., Dang, J. H. T., Paterniti, D. A., & Kelly, K. (2014). Twenty years post-NIH Revitalization Act: Renewing the case for enhancing minority participation in cancer clinical trials. *Cancer, 120*(07), 1091-1096. https://doi.org/10.1002/cncr.28575

Chhatre, S., Cook, R., Mallik, E., & Rayadevappa, R. (2017). Trends in substance use admissions among older adults. *BMC Health Services Research, 17*(1), 584. https://doi.org/10.1186/s12913-017-2538-z

Cho, J., & Kogan, S. M. (2016). Risk and protective processes predicting rural African American young men's substance abuse. *American Journal of Community Psychology, 58*(3), 422-433. https://doi.org/10.1002/ajcp.12104

Clark, T. T. (2014). Perceived discrimination, depressive symptoms, and substance use in young adulthood. *Addictive Behaviors, 39*(6), 1021-1025. https://doi.org/10.1016/j.addbeh.2014.01.013

Clark, T. T., Belgrave, F. Z., & Abell, M. (2012). The mediating and moderating effects of parent and peer influences upon drug use among African American adolescents. *Journal of Black Psychology, 38*(1), 52-80. https://doi.org/10.1177/0095798411403617

Clark, T. T., Belgrave, F. Z., & Nasim, A. (2008). Risk and protective factors for substance use among urban African American adolescents considered high-risk. *Journal of Ethnicity in Substance Abuse, 7*(3), 292–303. https://doi.org/10.1080/15332640802313296

Clark, T. T., Salas-Wright, C. P., Vaughn, M. G., & Whitfield, K. E. (2015). Everyday discrimination and mood and substance use disorders: A latent profile analysis with

African Americans and Caribbean Blacks. *Addictive Behaviors, 40*, 119-225. https://doi.org/10.1016/j.addbeh.2014.08.006

Congress.gov. (1993). S.1 – *National Institutes of Health Revitalization Act of 1993*. https://www.congress.gov/bill/103rd-congress/senate-bill/1

Cotton, N. S. (1979). The familial incidence of alcoholism. *Journal of Studies on Alcohol, 40*(1), 89-116.

Dickerson, D. L., Leeman, R. F., Mazure, C. M., & O'Malley, S. S. (2009). The inclusion of women and minorities in smoking cessation clinical trials: A systematic review. *The American Journal on Addictions, 18*, 21-28. https://doi.org/10.1080/10550490802408522

Doherty, E. E., Green, K. M., Reisinger, H. S., & Ensminger, M. E. (2008). Long-term patterns of drug use among an urban African-American cohort: The role of gender and family. *Journal of Urban Health, 85*(2), 250-267. https://doi.org/10.1007/s11524-007-9246-7

Ellickson, P., & Morton, S. (1999). Identifying adolescents at risk for hard drug use: Racial/ethnic variations. *Journal of Adolescent Health, 25*(6), 382-395. https://doi.org/10.1016/S1054-139X(98)00144-X

Elliott, J. C., Carey, K. B., & Bonafide, K. E. (2012). Does family history of alcohol problems influence college and university drinking or substance use? A meta-analytical review. *Addiction, 107*(10), 1774-1785. https://doi.org/10.1111/j.1360-0443.2012.03903.x

Fothergill, K. E., Ensminger, M. E., Green, K. M., Robertson, J. A., & Juon, H. S. (2009). Pathways to adult marijuana and cocaine use: A prospective study of African Americans from age 6 to 42. *Journal of Health and Social Behavior, 50*(1), 65-81. https://doi.org/10.1177/002214650905000105

Friedman, A. S., & Glassman, K. (2000). Family risk factors versus peer risk factors for drug abuse: A longitudinal study of an African American urban community sample. *Journal of Substance Abuse Treatment, 18*(3), 267-75. https://doi.org/10.1016/S0740-5472(99)00072-0

Galaif, E. R., & Newcomb, M. D. (1999). Predictors of polydrug use among four ethnic groups: A 12-year longitudinal study. *Addictive Behaviors, 24*(5), 607-631. https://doi.org/10.1016/S0306-4603(99)00027-1

Galaif, E. R., Newcomb, M. D., Vega, W. A., & Krell, R. D. (2007). Protective and risk influences of drug use among a multiethnic sample of adolescent boys. *Journal of Drug Education, 37*(3), 249-276. https://doi.org/10.2190/DE.37.3.c

Gerstein, D. R., & Green, L. W. (Eds.). (1993). *Preventing drug abuse: What do we know?* Washington, DC: The National Academies Press.

Gibbons, F. X., Yeh, H., Gerrard, M., Cleveland, M. J., Cutrona, C., Simons, R. L., & Brody, G. H. (2007). Early experience with racial discrimination and conduct disorder as predictors of subsequent drug use: A critical period hypothesis. *Drug and Alcohol Dependence, 88S,* S27-S37. https://doi.org/10.1016/j.drugalcdep.2006.12.015

Gil, A. G., Vega, W. A., & Turner, R. J. (2002). Early and mid-adolescence risk factors for later substance abuse by African Americans and European Americans. *Public Health Reports, 117*(S1), S15-S29.

Green, K. M., Zebrak, K. A., Fothergill, K. E., Robertson, J. A., & Ensminger, M. E. (2012). Childhood and adolescent risk factors for comorbid depression and substance use disorders in adulthood. *Addictive Behaviors, 37*(11), 1240-1247. https://doi.org/10.1016/j.addbeh.2012.06.008

Han, B., Compton, W. M., Blanco, C., Crane, E., Lee, J., & Jones, C. M. (2017a). Prescription opioid use, misuse, and use disorders in U.S. adults: 2015 National Survey on Drug Use and Health. *Annals of Internal Medicine, 167*(5), 293-301. https://doi.org/10.7326/M17-0865

Hedegaard, H., Miniño, A. M., Spencer, M. R., & Warner, M. (2021). *Drug overdose deaths in the United States, 1999–2020.* NCHS Data Brief, no 428. Hyattsville, MD: National Center for Health Statistics. https://dx.doi.org/10.15620/cdc:112340

Henry, K., Fulco, C. J., Agbeke, D. V., & Ratcliff, A. M. (2018). Intergenerational continuity in substance abuse: Does offspring's friendship network make a difference? *Journal of Adolescent Health, 639*(2), 205-212. https://doi.org/10.1016/j.jadohealth.2018.02.014

Hughes, A., Williams, M. R., Lipari, R. N., Bose, J., Copello, E. A. P., & Kroutil, L. A. (2016). *Prescription drug use and misuse in the United States: Results from the 2015 National Survey on Drug Use and Health.* NSDUH Data Review. http://www.samhsa.gov/data/

Iannotti, R. J., & Bush, P. J. (1992). Perceived vs. actual friends' use of alcohol, cigarettes, marijuana, and cocaine: Which has the most influence? *Journal of Youth and Adolescence*, *21*(3), 375-389. https://doi.org/10.1007/BF01537024

Johnston, L. D., Miech, R. A., O'Malley, P. M., Bachman, J. G., Schulenberg, J. E., & Patrick, M. E. (2020). *Monitoring the Future national survey results on drug use 1975-2019: Overview, key findings on adolescent drug use.* Ann Arbor: Institute for Social Research, University of Michigan. http://www.monitoringthefuture.org/pubs/monographs/mtf-overview2019.pdf

Johnson, E. O., & Pickens, R. W. (2001). Familial transmission of alcoholism among nonalcoholics and mild, severe, and dyssocial subtypes of alcoholism. *Alcoholism:*

Clinical and Experimental Research, 25(5), 661-666. https://doi.org/10.1111/j.1530-0277.2001.tb02264.x

Kendler, K. S. (2001). Family history information in biomedical research. *The Journal of Continuing Education in the Health Professions, 21*(4), 215-223. https://doi.org/10.1002/chp.1340210405

Kendler, K. S., Edwards, A., Myers, J., Cho, S. B., Adkins, A., & Dick, D. (2015a). The predictive power of family history measures of alcohol and drug problems and internalizing disorders in a college population. *American Journal of Medical Genetics. Part B: Neuropsychiatric Genetics, 168*(5), 337-346. https://doi.org/10.1002/ajmg.b.32320

Kendler, K. S., Ji, J., Edwards, A. C., Ohlsson, H., Sundquist, J., & Sundquist, K. (2015b). An extended Swedish national adoption study of alcohol use disorder**.** *JAMA Psychiatry, 72*(3), 211-218. https://doi.org/10.1001/jamapsychiatry.2014.2138

Kendler, K. S., Ohlsson, H., Sundquist, J., & Sundquist, K. (2018). Transmission of alcohol use disorder across three generations: A Swedish National Study. *Psychological Medicine, 48*(1), 33-42. https://doi.org/10.1017/S0033291717000794

Kendler, K. S., Ohlsson, H., Sundquist, K., & Sundquist, J. (2013). Within-family environmental transmission of drug abuse. *JAMA Psychiatry, 70*(2), 235-242. https://doi.org/10.1001/jamapsychiatry.2013.276

Lee, J. Y., Kim, W., Brook, J. S., Finch, S. J., & Brook, D. W. (2020). Adolescent risk and protective factors predicting triple trajectories of substance use from adolescence into adulthood. *Journal of Child and Family Studies, 29*(2), 403-412. https://doi.org/10.1007/s10826-019-01629-9

Mayes, L. C. & Suchman, N. E. (2006). Developmental pathways to substance abuse. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Volume 3. Risk, disorder, and adaptation* (2nd ed., pp. 599-619). Wiley. https://doi.org/10.1002/9780470939406

Myers, L. L. (2013). Substance use among rural African American adolescents: Identifying risk and protective factors. *Child and Adolescent Social Work Journal, 30,* 79-93. https://doi.org/10.1007/s10560-012-0280-2

McCabe, S. E., West, B. T., Jutkiewicz, E. M., & Boyd, C. J. (2017). Multiple DSM-5 substance use disorders: A national study of US adults. *Human Psychopharmacology, 32*(5), e2625. https://doi.org/10.1002/hup.2625

McCaul, M. E., Turkkan, J. S., Svikis, D. S., Bigelow, G. E., & Cromwell, C. C. (1990). Alcohol and drug use by college males as a function of family alcoholism history. *Alcoholism: Clinical and Experimental Research, 14*(3), 467-471. https://doi.org/10.1111/j.1530-0277.1990.tb00505.x

Merikangas, K. R., Stolar, M., Stevens, D. E., Goulet, J., Preisig, M. A., Fenton, B., Zhang, H., O'Malley, S. S., & Rounsaville, B. J. (1998). Familial transmission of substance use disorders. *Archives of General Psychiatry, 55*(11), 973-979. https://doi.org/10.1001/archpsyc.55.11.973

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med* 6(7): e1000097. https://doi.org/10.1371/journal.pmed1000097

Morgan, P. T., Desai, R. A., & Potenza, M. N. (2010). Gender-related influences of parental alcoholism on the prevalence of psychiatric illnesses: Analysis of the National

Epidemiologic Survey on Alcohol and Related Conditions. *Alcoholism: Clinical and Experimental Research, 34*(10), 1759-1767. https://doi.org/10.1111/j.1530-0277.2010.01263.x

Nargiso, J. E., Ballard, E. L., & Skeer, M. R. (2015). A systematic review of risk and protective factors associated with nonmedical use of prescription drugs among youth in the United States: A social ecological perspective. *Journal of Studies on Alcohol and Drugs, 76*(1), 5-20. https://doi.org/10.15288/jsad.76.1.5

National Institutes of Health. (n.d.). *Study quality assessment tools*. https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools

National Institutes of Health. (2001). *NIH policy and guidelines on the inclusion of women and minorities as subjects in clinical research*. https://grants.nih.gov/policy/inclusion/women-and-minorities/guidelines.htm

National Institutes of Health. (2022). *Inclusion of women and minorities as participants in research involving human subjects.* https://grants.nih.gov/policy/inclusion/women-and-minorities.htm

National Institute on Drug Abuse. (2003, September 1). *Drug use among racial/ethnic minorities*. https://archives.drugabuse.gov/publications/drug-use-among-racialethnic-minorities

National Institute on Drug Abuse. (2019). *Opioid overdose crisis.* https://www.drugabuse.gov/drugs-abuse/opioids/opioid-overdose-crisis#one

National Institute on Drug Abuse. (2020). *Trends & statistics costs of substance abuse*. https://www.drugabuse.gov/drug-topics/trends-statistics/costs-substance-abuse

Needle, R. (1986). Interpersonal influences in adolescent drug use – the role of older siblings, parents, and peers. *The International Journal of the Addictions, 21*(7), 739-766.

Newlin, D. B., Miles, D. R., van den Bree, M. B. M., Gupman, A. E., & Pickens, R. W. (2000). Environmental transmission of DSM-IV substance use disorders in adoptive and step families. *Alcoholism: Clinical and Experimental Research, 24*(12), 1785-1794. https://doi.org/10.1111/j.1530-0277.2000.tb01982.x

Nurco, D., Hanlon, T. E., O'Grady, K., & Kinlock, T. W. (1997). The association of early risk factors to opiate addiction and psychological adjustment. *Criminal Behaviour and Mental Health, 7*(3), 213-228. https://doi.org/10.1002/cbm.174

Office of National Drug Control Policy. (2020). *National drug control strategy*. https://www.whitehouse.gov/wp-content/uploads/2020/02/2020-NDCS.pdf

Park, S., & Schepp, K. G. (2015). A systematic review of research on children of alcoholics: Their inherent resilience and vulnerability. *Journal of Child and Family Studies, 24*(5), 1222–1231. https://doi.org/10.1007/s10826-014-9930-7

Patrick, M. E., Kloska, D. D., Mehus, C. J., Terry-McElrath, Y., O'Malley, P. M., & Schulenberg, J. E. (2021). Key subgroup differences in age-related change from 18 to 55 in alcohol and marijuana use: U.S. national data. *Journal of Studies on Alcohol and Drugs, 82*(1), 93–102. https://doi.org/10.15288/jsad.2021.82.93

Rodney H. E. (1995). A profile of collegiate black adult children of alcoholics. *Journal of College Student Development, 36*(3), 228–235.

Salas, J., Scherrer, J. F., Lustman, P. J., & Schneider, F. D. (2016). Racial differences in the association between nonmedical prescription opioid use, abuse/dependence, and major

depression. *Substance Abuse, 37*(1), 25-30. https://doi.org/10.1080/08897077.2015.1129523

Sartor, C. E., Kranzler, H. R., & Gelernter, J. (2014). Rate of progression from first use to dependence on cocaine or opioids: A cross-substance examination of associated demographic, psychiatric, and childhood risk factors. *Addictive Behaviors, 39*(2), 473-479. https://doi.org/10.1016/j.addbeh.2013.10.021

Sartor, C. E., Grant, J. D., Few, L. R., Werner, K. B., McCutcheon, V. V., Duncan, A. E., Nelson, E. C., Madden, P. A., Bucholz, K. K., Health, A. C., & Agrawal, A. (2018). Childhood trauma and two stages of alcohol use in African American and European American women: Findings from a female twin sample. *Prevention Science, 19*(6), 795-804. https://doi.org/10.1007/s11121-017-0838-5

Schilling, E. A., Aseltine, R. H., Jr., & Gore, S. (2007). Adverse childhood experiences and mental health in young adults: A longitudinal survey. *BMC Public Health, 7*(1), 30. https://doi.org/10.1186/1471-2458-7-30

Shorey, R. C., Fite, P. J., Elkins, S. R., Frissell, K. C., Tortolero, S. R., Stuarty, G. L., & Temple, J. R. (2013). The association between problematic paternal substance use and adolescent substance use in an ethnically diverse sample of 9th and 10th graders. *Journal of Primary Prevention, 34*(6), 381-393. https://doi.org/10.1007/s10935-013-0326-z

Stanton, B., Li, X., Pack, R., Cottrell, L., Harris, C., & Burns, J. M. (2002). Longitudinal influence of perceptions of peer and parental factors on African American adolescent risk involvement. *Journal of Urban Health, 79*(4), 536-48. https://doi.org/10.1093/jurban/79.4.536

Stone, A. L., Becker, L. G., Huber, A. M., & Catalano, R. F. (2012) Review of risk and protective factors of substance use and problem use in emerging adulthood. *Addictive Behaviors, 37*(7), 747-75. https://doi.org/10.1016/j.addbeh.2012.02.014

Su, J., Kuo, S. I., Meyers, J. L., Guy, M. C., & Dick, D. M. (2018). Examining interactions between genetic risk for alcohol problems, peer deviance, and interpersonal traumatic events on trajectories of alcohol use disorder symptoms among African American college students. *Development and Psychopathology, 30*(5), 1749-1761. https://doi.org/10.1017/S0954579418000962

Substance Abuse and Mental Health Services Administration. (2021). *Key substance use and mental health indicators in the United States: Results from the 2020 National Survey on Drug Use and Health* (HHS Publication No. PEP21-07-01-003, NSDUH Series H-56). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. https://www.samhsa.gov/data/

Turner, W. M., Cutter, H. S., Worobec, T. G., O'Farrell, T. J., Bayog, R. D., & Tsuang, M. T. (1993). Family history models of alcoholism: Age of onset, consequences and dependence. *Journal of Studies on Alcohol and Drugs, 54*(2), 164-171. https://doi.org/10.15288/jsa.1993.54.164

Unger, J. B. (2012). The most critical unresolved issues associated with race, ethnicity, culture, and substance use. *Substance Use & Misuse*, *47*(4), 390-395. https://doi.org/10.3109/10826084.2011.638017

United Nations Office on Drugs and Crime. (2018). Executive summary conclusions and policy implications. *World Drug Report 2019*. https://wdr.unodc.org/wdr2019/

Valdez, R., Yoon, P. W., Quereshi, N., Green, R. F., & Khoury, M. J. (2010). Family history in public health practice: A genomic tool for disease prevention and health promotion. *Annual Review of Public Health, 31*(1), 69-87. https://doi.org/10.1146/annurev.publhealth.012809.103621

van den Bree, M. B., Johnson, E. O., Neale, M., Svikis, D. S., McGue, M., & Pickens, R. W. (1998). Genetic analysis of diagnostic systems of alcoholism in males. *Biological Psychiatry, 43*(2), 139-145. https://doi.org/10.1016/S0006-3223(97)00225-4

Vega, W. A., Zimmerman, R. S., Warheit, G. J., Apospori, E., & Gil, A. G. (1993). Risk factors for early adolescent drug use in four ethnic and racial groups. *American Journal of Public Health, 83*(2), 185–189. https://doi.org/10.2105/AJPH.83.2.185

Warner, L. A., Kessler, R. C., Hughes, M., Anthony, J. C., & Nelson, C. B. (1995). Prevalence and correlates of drug use and dependence in the United States: Results from the National Comorbidity Survey. *Archives of General Psychiatry, 52*(3), 219–229. https://doi.org/10.1001/archpsyc.1995.03950150051010

Watt, T. T. (2008). The race/ethnic age crossover effect in drug use and heavy drinking. *Journal of Ethnicity in Substance Abuse, 71*(1), 93-114. https://doi.org/10.1080/15332640802083303

Wheeler, P. B., Stevens-Watkins, D., Moody, M., Dogan, J., & Lewis, D. (2019). Culturally relevant risk and protective factors for nonmedical use of prescription opioids among incarcerated African American men. *Addictive Behaviors, 93*, 46-51. https://doi.org/10.1016/j.addbeh.2019.01.014

Wills, T. A., Pierce, J. P., & Evans, R. I. (1996). Large-scale environmental risk factors for substance use. *American Behavioral Scientist, 39*(7), 808-822. https://doi.org/10.1177/0002764296039007004

Wilson, N., Kariisa, M., Seth, P., Smith, H., & Davis, N. L. (2020, March). Drug and opioid-involved overdose deaths – United States, 2017-2018. *Morbidity and Mortality Weekly Report [MMWR],* 69(11), 290-297. http://dx.doi.org/10.15585/mmwr.mm6911a4

Wilson, H. W., & Widom, C. S. (2010). Predictors of drug-use patterns in maltreated children and matched controls followed up into middle adulthood. *Journal of Studies on Alcohol and Drugs, 71*(6), 801-809. https://doi.org/10.15288/jsad.2010.71.801

Wlodarczyk, O., Schwarze, M., Rumpf, H-J., Metzner, F., & Pawils, S. (2017). Protective mental health factors in children of parents with alcohol and drug use disorders: A systematic review. *PLoS ONE, 12*(6), e0179140. https://doi.org/10.1371/journal.pone.0179140

Zapolski, T. C., Pedersen, S. L., McCarthy, D. M., & Smith, G. T. (2014). Less drinking, yet more problems: Understanding African American drinking and related problems. *Psychological Bulletin, 140*(1), 188–223. https://doi.org/10. 1037/a0032113

Zapolski, T. C. B., Yu, T., Brody, G. H., Banks, D. E., & Barton, A. W. (2020). Why now? Examining antecedents for substance use initiation among African American Adolescents. *Development and Psychopathology, 32*(2), 719-734. https://doi.org/10.1017/S0954579419000713

Table 1

Inclusion Criteria

Criteria	Inclusion	Exclusion
Preselection	Studies of the offspring of biological relatives (parents) with a history of substance use/misuse/disorders. Studies that examine family history of substance use/misuse/disorders as a risk factor for substance use, misuse, use disorder (including licit and illicit drugs) in the offspring.	Prenatal exposure.
Outcome	Substance use, misuse, use disorders, and related problems. To include licit and illicit drug use.	No drug use outcomes.
Population	Study populations of ≥90% African Americans (or studies that included a subgroup analysis of African Americans or interracial comparisons for family history outcomes). Offspring of families in which at least one parent has an alcohol or drug use/misuse/disorder (family history). Adolescents (10 and older), young adults, adults.	Study sample <90% and no subgroup analysis by race. Included nonbiological relatives. Infants or children.
Study	Conducted in the U.S. English language. Published in a peer-reviewed journal. Cohort, case control, or cross-sectional studies.	Descriptive studies. Experimental or intervention studies. Qualitative studies. Mixed Methods studies. Reviews or meta-analyses.
Family history	Family history is measured and examined as a separate variable, and examined as an independent variable in the analysis.	Combined with other variables (e.g., total problem family score, family stress score).
Race	Race measured as non-Hispanic Black/Black/African American.	Reported as non-White, minority, or other. Included Hispanic Blacks.
Analysis	Predicted the probability of drug use given the predictor variable of family history and not just magnitude (or strength/intensity) of association (relationship).	Excluded family history in the analysis or entered only as an interaction term. Examined correlations or degree of association only.

Table 2

NIH Quality Assessment

Criteria	Arteaga et al. (2010)	Doherty et al. (2008)	Friedman & Glassman (2000)	Gibbons et al. (2007)	Green et al. (2012)	Iannotti & Bush (1992)	Schilling et al. (2007)	Stanton et al. (2002)	Wheeler et al. (2019)
1. Was the research question or objective in this paper clearly stated?	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. Was the study population clearly specified and defined?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3. Was the participation rate of eligible persons at least 50%?	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NR
4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5. Was a sample size justification, power description, or variance and effect estimates provided?	No	No	No	No	No	No	No	No	No
6. For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?	Yes	NA	NA	NA	NA	NA	Yes	Yes	NA
9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10. Was the exposure(s) assessed more than once over time?	Yes	Yes	No	No	Yes	No	No	Yes	No
11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12. Were the outcome assessors blinded to the exposure status of participants?	NR	NR	NR	NR	NR	No	NR	NR	NR
13. Was loss to follow-up after baseline 20% or less?	No	No	CD	No	Yes	NA	Yes	No	NA
14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

CD: cannot determine; NA: not applicable; NR: not reported

Table 3

Study Characteristics

Author (Year)	Location	*n*	Study design	% AA	% F	Mean age	NIH Quality Assessment	Family history Assessment	Biological relative	Substance use outcome in offspring	Substances
Arteaga et al. (2010)	Chicago	1,208	Cohort Prospective: kindergarten to young adult	93%	51.6%	22-24	Good	SA Survey	Parent	Age of first substance use DSM-IV, DSM-IV-TR SA by age 26, SD Self-report, arrest records	Illicit drugs
Doherty et al. (2008)	Chicago	1,053	Cohort Prospective: first grade to mid-adulthood	99%	52.5%	42-43	Good	SU Interview	Parent	Age of first SU Age of last SU Patterns of initiation Lifetime use UM-CIDI	Alcohol, tobacco, marijuana, cocaine, and heroin
Friedman & Glassman (2000)	Philadelphia	380	Cohort Prospective: adolescence to young adult	100%	48.2%	26.33	Good	Alcohol or drug problem ADAD	First-degree relative	Frequency, duration of drug use at age 26	Alcohol, marijuana, amphetamines, barbiturates, tranquilizers, cocaine, heroin, opiates, PCP, nonprescription meds
Gibbons et al. (2007)	Iowa and Georgia	606	Cohort Prospective: pre- to mid-adolescence	99%	NR	Baseline: 10.5	Good	Alcohol use Drug use UM-CIDI	Parent	Ever use to get high Age of first use DISC-IV	Marijuana, ecstasy, cocaine, methamphetamines
Green et al. (2012)	Chicago	1,181	Cohort Prospective: first grade to mid-adulthood	99%	51.9%	42-43	Good	SU Interview	Family member	DSM-III-R, ICD-10 SUD UM-CIDI	Alcohol, marijuana, heroin, analgesics, inhalants, hallucinogens, barbiturates, tranquilizers, simulants, sedatives
Iannotti & Bush (1992)	Urban	2,078	Cross-sectional	90%	51%	10	Good	Perceived SU Survey	Family member	Age of first use Abusable SU score Self-report	Cigarettes, alcohol, marijuana, cocaine/crack
Schilling et al. (2007)	Boston	1,093	Cohort Prospective: senior high school to two years later	21%	52%	16 – 20 and older	Good	Problematic alcohol or drug use Interview	Parent	Frequency past 12 months Self-report	Illegal drugs, legal drugs without Rx, in larger amounts Rx, or longer period than Rx
Stanton et al. (2002)	Baltimore City, MD	141	Cohort Prospective: baseline to 48 months	100%	44%	13 - 19	Good	Perceived drug use YHRBI	Family member	Past 6 month DU YHRBI	Marijuana, cocaine, heroin, or other illicit drugs

Author (Year)	Location	*n*	Study design	% AA	% F	Mean age	NIH Quality Assessment	Family history Assessment	Biological relative	Substance use outcome in offspring	Substances
Wheeler et al. (2019)	Kentucky	187	Cross-sectional	90%	0%	35.92	Good	Prescription drug misuse ASI-V	Family member	Lifetime nonmedical use ASI-V	Prescription opioids

NR=not reported; DU: drug use; Rx: prescription; SA: substance abuse; SU: substance use; ADAD: Adolescent Drug Abuse Diagnosis; ASI: Addiction Severity Index; ASI-V: Modified Addiction Severity Index, fifth edition; DIS: Diagnostic Interview Schedule; FH-RDC: Family History Research Diagnostic Criteria; UM-CIDI: University of Michigan Composite International Diagnostic Instrument; YHRBI: Youth Health Risk Behavior Inventory; UA: urinalysis.

Table 4

Additional Factors

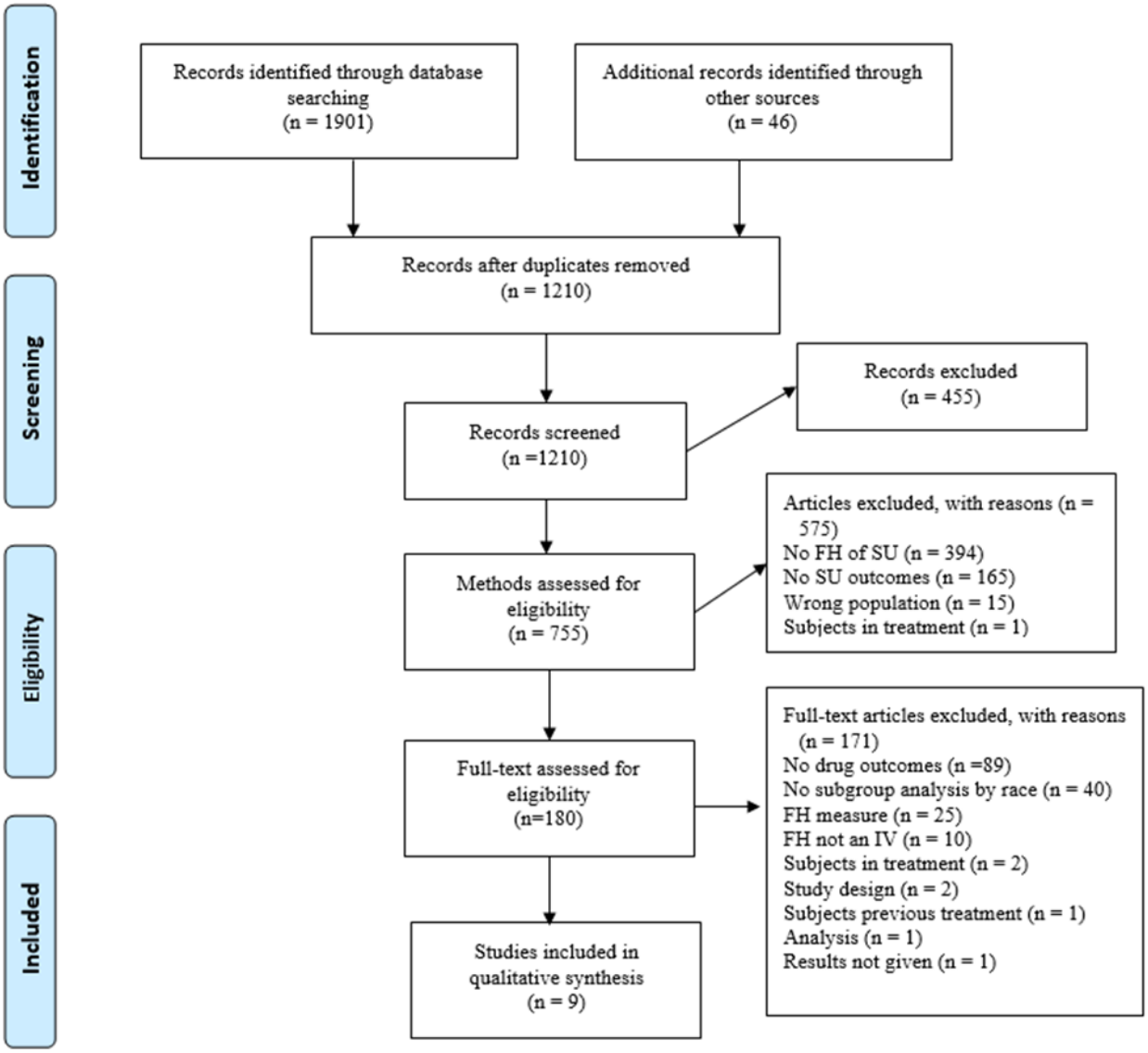
Author (Year)	Family/parent factors	Individual factors	Socioeconomic factors
Arteaga et al. (2010)	Child protective services involvement Family conflict Family risk index (single-parent, mother's age under 18 at child's birth, teenage mother, mother unemployed, 4 or more children in household) Parent's expectations of child's progress	Gender, race/ethnicity Social maturity School quality School mobility Personal substance use High school dropout Trouble making behavior Intrinsic motivation Reading achievement at age 10	Family risk index (mother completed HS, participation in public assistance, free lunch eligibility, residence in low-income neighborhood) Deviant peer affiliation
Doherty et al. (2008)	Family structure Family discipline Family cohesion Parental rule setting	Gender Age	Mother's education years completed in school
Friedman & Glassman (2000)	Parental control Consistent parenting Family conflict Parental care and support Father present	Suspended/expelled from school Leisure time spent alone	Time spent with peers who use/do not use drugs Number of friends in trouble with police Peer deviant behavior Number of friends who know and like subjects' parents, who in turn know and like his/her friends Number of friends involved in conventional activities Participation with friends who lead them into trouble Lie to protect friends that got in trouble with police
Gibbons et al. (2007)	Parent(s) perceived discrimination Parental distress (depression and anxiety)	Perceived discrimination Conduct disorder	Combined measure of family's income and parents' level of education Friends' drug use Neighborhood risk: crime, gang presence, drug availability
Green et al. (2012)	Mother's psychological feelings (sad and blue) Mother's education Family conflict Parental supervision	Low self-control and restless behavior in first grade Marijuana use Graduation from high school Adolescent feelings of anger/aggression and depression	SES

Author (Year)	Family/parent factors	Individual factors	Socioeconomic factors
Iannotti & Bush (1992)		Age	SES (eligibility for federal school lunch program) Perceived friends' substance use Concern about a "best" friend's substance use Friend's substance use Classmates' substance use Classmates' concern about subject's substance use
Schilling et al. (2007)	ACE: parents separated, child sent away from home, parent unemployed	Gender Race/ethnicity ACE: witnessing an injury or murder, sexual abuse/assault, physically abused, physically assaulted, seriously neglected, threatened/held captive/kidnapped	
Stanton et al. (2002)	Parental monitoring Parent-adolescent communication	Gender Age Sexual activity Baseline drug use	Perceptions of peer drug involvement, sexual intercourse, and condom use
Wheeler et al. (2019)	Close relationship with mother Close relationship with father Family social support	Age Incarceration prior to age 18 Number of months of previous incarceration History of homelessness year prior to incarceration Education (years) Marital status Number of children Significant period of serious depression or anxiety	

ACE: adverse childhood experience; SES: socioeconomic status

Figure 1

PRISMA Flow Diagram



From: Moher et al. (2009)

Appendix

Sample Search Strategy

#	Searches	Results	Type	Actions	Annotations
1	exp Substance-Related Disorders/	276676	Advanced	Display Results More	
2	exp Alcohol Drinking/	68538	Advanced	Display Results More	
3	("Substance Addiction" or "Substance Abuses " or "Substance Dependence " or "Substance Abuse " or "Substance Use Disorder " or "Drug Use Disorders " or "Substance Use Disorders " or "Drug Addiction " or "Drug Dependence" or "Drug Abuse" or "Substance Related Disorder " or "Substance Related Disorders " or "Alcohol Related Disorders " or "Alcohol Related Disorder " or "Alcoholism " or "Alcohol Abuse " or "Alcoholic " or "Alcoholics " or "Binge Drinking " or "Binge Drinker " or "Binge Drinkers " or "Amphetamine Addiction " or "Cocaine Addiction " or "Amphetamine Abuse " or "Amphetamine Related Disorders " or "Amphetamine Related Disorder" or "Cocaine Abuse OR Inhalant Abuse " or "Glue Abuse " or "Glue Sniffing " or "Marijuana Abuse " or "Cannabis Abuse " or "Cannabis Dependence " or "Marijuana Dependence" or "Narcotic Abuse " or "Narcotic Addiction " or "Narcotic Dependence " or "Opioid Dependence" or "Opioid Abuse " or "Opioid Addiction " or "Heroin Abuse " or "Heroin Addiction " or "Heroin Dependence " or "Alcohol Drinking " or "Alcohol Consumption " or "Alcohol Use " or "Drug Addict" or "Drug Addicts").ab,ti.	219744	Advanced	Display Results More	
4	1 or 2 or 3	409408	Advanced	Display Results More	
5	Medical History Taking/	19346	Advanced	Display Results More	
6	exp Family Relations/	91871	Advanced	Display Results More	
7	"Child of Impaired Parents"/	5282	Advanced	Display Results More	
8	("Family Medical History" or "Family Medical Histories" or "Family History" or "Family Histories" or "Medical History" or "Familial History " or "Familial Histories " or "Medical Histories" or "Familial History" or "Familial Histories" or "Parental History" or "Parental Histories" or "Family Conflict" or "Family Conflicts" or "Impaired Parent" or "Impaired Parents" or "Family Relations" or "Family Relationships" or "Paternal Behavior" or "Paternal Behaviors" or "Maternal Behavior" or "Maternal Behaviors" or "Paternal Behavior" or "Paternal Behaviors" or "Parental Relationship" or "Parental Relationships" or "Maternal Relationship" or "Fraternal Relationship" or "Fraternal Behavior" or "Fraternal Behaviors").ab,ti.	104694	Advanced	Display Results More	
9	"Parental History".ab,ti.	1617	Advanced	Display Results More	
10	"Parental Histories".ab,ti.	55	Advanced	Display Results More	
11	8 or 9 or 10	104694	Advanced	Display Results More	
12	5 or 6 or 7 or 11	211410	Advanced	Display Results More	
13	4 and 12	13443	Advanced	Display Results More	
14	African Americans/	53470	Advanced	Display Results More	
15	("African American" or "African Americans" or "Black" or "Blacks").ab,ti.	178850	Advanced	Display Results More	
16	14 or 15	192687	Advanced	Display Results More	
17	13 and 16	575	Advanced	Display Results More	
18	limit 17 to english language	571	Advanced	Display Results More	

Chapter III

Family History of Substance Problems among African Americans: Associations with Drug Use, Drug Use Disorder, and Prescription Drug Misuse

Abstract

A family history of substance problems is a well-known risk factor for substance use and use disorders; however, much of this research has been conducted in studies with predominantly White subjects. The aim of this study was to examine the associations between family history density of substance problems and drug use, risk for drug use disorder, and prescription drug misuse in a sample of African American adults. Results indicate that family history density of substance problems increased the risk for all drug outcomes in the full sample. However, when subgroup analyses by gender were conducted, family history was not a risk factor among men for prescription drug misuse.

Keywords: African American, family history, drug use, drug use disorder, prescription drug misuse, substance use, substance use disorders.

Family History of Substance Problems among African Americans: Associations with Drug Use, Drug Use Disorder, and Prescription Drug Misuse

Substance use is a massive global problem due to the negative consequences related to misuse and the subsequent development of substance use disorders (SUDs). SUDs collectively have become one of the costliest health problems in the United States and this could be reduced through prevention strategies (Miller & Hendrie, 2008). One of the most comprehensive approaches in the prevention of SUDs is identifying risk factors that predispose individuals to substance use and progression to SUD (Gerstein & Green, 1993). A well-known area of research in the study of risk factors for SUDs is the study of familial transmission of these disorders. This has been demonstrated by the decades of research that exists indicating alcohol use disorders run in families (Cotton, 1979; Johnson & Pickens, 2001; Kendler et al., 2018; Turner et al., 1993). Drug problems are also transmitted in families as indicated by the increased risk for drug use and drug use disorders in the offspring of those with a history of substance (alcohol and/or drug) problems (Kendler et al., 2013; Kendler et al., 2015a; McCaul et al., 1990 Merikangas et al., 1998). A family history of substance problems can indicate that multiple factors (e.g., shared genetic, environmental, behavioral, cultural) contribute to the increased risk for substance use and SUDs (Kendler et al., 2015b; Newlin et al., 2000; Verhulst et al., 2015). Consequently, the more biological relatives with an alcohol and/or drug problem, higher family density, the greater the risk for substance use, SUDs, and other consequences from use (Acheson, et al., 2018; Johnson & Pickens, 2001; Kendler et al., 2018; Schepis et al., 2022).

While there is strong evidence that a family history of substance problems is a risk factor for substance use and SUDs in the offspring, much of this research has been conducted in studies of predominantly White subjects and may not be generalizable to other racial or ethnic groups

(Eisenberg, 1995; Unger, 2012). The lack of inclusion of minority subjects in research of familial risks was found in a systematic review and meta-analysis (Elliot et al., 2012) examining the effects of a family history of alcohol problems on drinking and substance use in college students. The review included 65 publications from 53 samples, of which only four were non-White – three African American, and one Native American – with a total sample of 77.1% White subjects for the meta-analysis (Elliot et al., 2012). Murphy (2016) also conducted a systematic review and found that African Americans are underrepresented in family or twin studies for risks of other mental health disorders. Currently, research studies examining genetic and environmental factors contributing to substance use that conduct separate analyses by race indicate there may be differences in the pathways to the development of SUDs, and it is not clear whether environmental factors moderate the genetic risk (Sartor et al., 2018). Research studies that examine risk factors in minority populations indicate that the factors that are known to be predictive of substance use or SUDs in Whites are not predictive for other races or ethnicities. For example, several studies have demonstrated that risk models that are predictive for drug use in White subjects are not predictive for African Americans (Brown et al., 2004; Ellickson & Morton, 1999; Galaif et al., 2007; Vanyukov et al., 2009).

In regard to family history, prior research indicates that for African Americans a family history of substance problems is a risk for alcohol use and related problems (e.g., health consequences, dependence) (Chartier et al., 2013; Gil et al., 2002: Vega et al., 1993), but may not be as strong for drug use or only a risk for specific drugs particularly in adulthood (Arteaga et al., 2010; Doherty et al., 2008). Not only are risks for substance use and related problems different for African Americans, but they also experience disparate consequences and outcomes related to substance use. African Americans face greater deleterious health and social

consequences from substance use (NIDA, 2003; Zapolski et al., 2014) such as higher rates of lung cancer (Ryan, 2018) and HIV (Des Jarlais et al., 2017). Non-Hispanic Blacks have had higher rates of overdose deaths involving opioids (heroin, synthetic, and methadone) (Hoopsick et al., 2021). They also have an increased likelihood of incarceration and longer jail sentences for drug offenses, even though Whites have represented more than the majority of drug- and alcohol-related arrests (Camplain et al., 2020; Demuth & Steffensmeier, 2004; Lichenstein, 2009). African Americans also face disparities in the treatment of SUDs. Minority participants (African Americans and Hispanics) in a national survey that reported having a SUD and receiving mental health care reported having less access to care, poor quality of care, and a greater unmet need for alcohol use disorder, drug use disorder, and mental health treatment when compared to Whites (Wells et al., 2001). There are also differences between African American men and women that warrant further examination. African American men demonstrate higher rates of drug use and SUDs (Arteaga et al., 2010; Doherty et al., 2008; Green et al., 2012; Schilling et al., 2007) and higher mortality rates for opioids (Hoopsick et al., 2021). Non-Hispanic Black women had the greatest increases in opioid overdose mortality than non-Hispanic White and Hispanic women (Hoopsick et al., 2021). Black women have shown to have higher rates of drug use disorder persistence than Black men, and higher rates of SUD persistence than White and Hispanic women (Evans et al., 2017). However, some studies indicate there are no differences between Black men and women for prescription drug misuse (Rigg & Nicholson, 2019).

There are an inadequate number of studies examining risk factors for substance use or SUDs, particularly risks for licit or illicit drug use, in African American adults, and some of these studies are in vulnerable populations such as incarcerated males (Rounds-Bryant et al.,

2004; Wheeler et al., 2019) or adults in treatment for SUDs (Boyd & Holmes, 2002; Lister et al., 2017). Previous researchers investigating correlates or risk factors for substance use and SUDs in racial/ethnic minorities have stressed the need for research to identify the risk factors that are unique to the various groups within the population to more effectively address the public health crisis of SUDs (Nicholson & Ford, 2018). Considering the extensive problems and health disparities that African Americans face in regard to substance use and related problems, and the lack of research examining the risk related to family history in African American adults, there is a need for further investigation of risk factors in this population. There is also the need for further examination of differences by gender. There are differences between men and women in response to drugs and in the probability of substance use and developing SUDs (Bobzean et al., 2014; Sanchis-Segura & Becker, 2016). It is important to establish evidence of results that apply to women and/or minorities because results from one demographic group may not be applicable to another demographic group (Bennett, 1993; Eisenberg, 1995). The inclusion of minorities and women in research studies fall within the guidelines established by the National Institutes of Health (NIH) Revitalization Act of 1993 to ensure that research findings can be generalizable to the entire population (Congress.gov, 1993; NIH, 2022). This new policy not only required the inclusion of women and minorities as subjects, but also required subgroup analyses regardless of sample size of the relevant variables in the research being conducted (Bennett, 1993; NIH, 2001). The National Institute on Drug Abuse also promotes research studies designed to address the special needs of women and ethnic minorities and to study gender differences in outcomes of research studies (Greenfield et al., 2011; Tai et al., 2010). Unfortunately, minorities are still underrepresented and studies lack separate gender analyses in the research of SUDs leaving the issues affecting these groups overlooked (Dickerson et al., 2009; Meyer et al., 2019).

Due to the vast research previously conducted on risk factors related to alcohol use and alcohol use disorders, the current study focused on drug outcomes. The primary goal of this study was to examine the associations between family history density of substance problems with drug use, risk for drug use disorder, and prescription drug misuse in a sample of African American adults. Secondary goals were to examine whether individual-related sociodemographic factors (age, gender, education, employment) are associated with drug use, risk for drug use disorder, and prescription drug misuse; to examine the prevalence of family history of substance problems and its association with the demographic variables; and to conduct subgroup analyses by gender.

Methods

The parent research study was approved by the Institutional Review Board at Virginia Commonwealth University (Crouch et al., 2022; Kelpin et al., 2018). A convenience sampling method was used to recruit patients from the waiting room of an urban primary care and gynecological clinic within an academic health system in Virginia (Crouch et al., 2022; Kelpin et al., 2018). Those who were adults, between the ages of 18 and 70 years, and could understand English were eligible to participate in the study. The sample size of the parent study is N = 4,458. After informed consent was obtained, the participants were taken to a private location nearby to complete an anonymous computer-administered health screen called the Health Cheq. Using a tablet computer, the Health Cheq survey guided participants using a three-dimensional avatar known as Peedy the Parrot who read each survey question aloud which keeps participants engaged and has been successfully used in prior research (Breland et al., 2014; Ondersma et al., 2007). Participants listened to Peedy read each item using headphones for privacy and were able to answer by selecting options from a list or visual analog scale, reading literacy was not

required to complete the survey. All participants who completed the survey received a $10 gift card. Data for the parent study was collected from November 2010 to December 2013, those participants who met criteria for problematic substance use were invited to participate in a subsequent clinical trial (Kelpin et al., 2018). The current study included all participants who completed the initial survey and identified as non-Hispanic and Black or African American. The current study was not subject to the regulations of human subject research and therefore no IRB review or approval was required to proceed.

Measures

Predictor Variables

Sociodemographics. The Health Cheq survey collected information on age, gender, employment status, and education. Categories for age were grouped by years: 18 to 25, 26 to 44, and 45 and older. Gender was assessed by the question "What is your gender?" and participants were given the option of "male" or "female". Employment status was categorized as employed (full or part time), unemployed, on disability, and retired. Education level was categorized as less than high school (HS), grade 12 or GED, and some college and beyond.

Family History. The Health Cheq survey contained two questions that asked the participants about their family history of substance problems. The questions were adapted from the fifth edition of the Addiction Severity Index (ASI; McLellan et al., 1992) and included: "Has anyone in your immediate family (blood relatives) ever had a problem with alcohol?", "Has anyone in your immediate family (blood relatives) ever had a problem with drugs?" Next to the questions was a checklist of all first-degree relatives and grandparents which the participants were to check all relatives that apply. There was also the option "I don't know" if the participant did not know of any substance problems in any of their family members. If a participant

indicates a relative has either an alcohol or drug problem or both, that will indicate the family member has a history of substance problems. For this study, family history will be categorized by the relationship and density of the family members with substance problems: no family history, second-degree relative(s) only, first-degree relative(s) only, and both first- and second-degree relatives. This family history density method is similar to other studies examining family history of SUDs (Karriker-Jaffe et al., 2021; McCaul et al., 1990; Powers et al., 2017). The family history density method has been shown to have greater predictive power than the dichotomous method of family history positive versus family history negative (Kendler et al., 2015a). First-degree relatives are the mother and father, and second-degree relatives are the grandmother and grandfather.

Collecting information from subjects regarding their family member's history of substance use disorders has been demonstrated as having high reliability, objectivity, and validity (Hardt & Franke, 2007). Assessing family history with a single question of whether a relative has a problem with alcohol or drugs has been demonstrated to be as reliable as formal measures using diagnostic criteria that ask additional information such as the presence of substance-related problems (i.e., legal, health, marital, family, work or social problems, or previous treatment) (Cuijpers & Smit, 2001).

Outcome Variables

Drug Use. The Health Cheq survey asked the participants "During the past 30 days, on how many days each week did you use recreational drugs?", and were provided a list of classes of drugs that was modified from the Composite International Diagnostic Interview (CIDI) drug module (Üstün, et al., 1997). The list of drugs included marijuana, cocaine, stimulants, inhalants,

heroin, and hallucinogens. If a respondent indicated any drug use, the response to the question was categorized as a dichotomous variable for recent drug use yes/no.

Drug Use Disorder. To assess for risk of drug use disorder, a screening tool called the Cut down, Annoyed, Guilty, and Eye-opener – Adapted to Include Drugs (CAGE-AID) was adapted for drug use only (CAGE-DRUG) and was included in the Health Cheq. The original instrument was designed as a screening tool for risk of substance use disorder in the healthcare setting (Brown & Rounds, 1995). The questions in the CAGE-DRUG are designed to elicit a participant's perceived need to Cut down on drug use, Annoyance with complaints about drug use, Guilt about drug use, and use of a drug as an Eye-opener in the morning (Basu et al., 2016). The questions include: 1) "Have you ever felt you ought to cut down on your drug use?"; 2) "Have people annoyed you by criticizing your drug use?"; 3) "Have you ever felt bad or guilty about your drug use?"; and 4) "Have you ever used drugs first thing in the morning to steady your nerves or to get rid of a hangover?" For both women and men, answering yes to one or more questions indicates a positive risk for drug use disorder (Brown & Rounds, 1995). The CAGE-AID has a reported sensitivity of .79 and specificity of .77 (Brown & Rounds, 1995), with a high internal consistency ($\alpha = 0.92$; Leonardson et al., 2005). When administered in a racial/ethnically diverse sample, the CAGE-AID had a sensitivity of .92 and specificity of .48 in detecting drug use disorder in a group with known drug abuse/dependence (Hinkin et al., 2001). The CAGE-AID has also been used in previous research of SUDs in minority populations (Barrera et al., 2019; Leonardson et al., 2005).

Prescription drug misuse. The Health Cheq survey included four questions that ask about behaviors indicating whether the participants had recently (past 30 days) taken prescription drugs in a manner that was not directed by a physician. These questions were based on the

questions used in the National Survey on Drug Use and Health (NSDUH) questionnaire to assess for prescription drug misuse, which is defined as use of prescription drugs "in any way that a doctor did not direct you to use them." (Hughes et al., 2016, p. A-6). The items asked whether the participants were: (1) taking more pills than prescribed, (2) taking pills more often than prescribed, (3) using medication prescribed for someone else, or (4) getting the same medication from more than one doctor (Kelpin et al., 2018). A positive response to one or more items indicates prescription drug misuse. These prescription drug misuse items have been used as comparison to test the validity of prescription drug misuse screening instruments (Tong et al., 2017).

Data Analysis

An exploratory analysis of the dataset was conducted with recoding of variables that were included in the present study. Those participants that identified as non-Hispanic and Black or African American were included in the analyses. The primary aim of the study was to examine whether a family history of substance problems is associated with drug use, risk for drug use disorder, and prescription drug misuse in African American adults. The secondary aims were to examine whether there are associations between the sociodemographic variables (age, gender, employment, education) and the drug outcome variables; to examine the prevalence of family history density of substance problems and its association with the sociodemographic variables; and to conduct subgroup analyses by gender.

Descriptive statistics were run for the sociodemographic variables, drug use, risk of drug use disorder and prescription drug misuse by gender. In addition, descriptive statistics were run for the sociodemographic and drug outcome variables by family history density. Chi-square

analyses were conducted to examine for differences in family history density of substance problems.

The process for building the models for the analyses of the three drug outcome variables (drug use, risk for drug use disorder, and prescription drug misuse) was conducted using the method proposed by Hosmer and Lemeshow (2000). The First Step for building each of the models was conducting univariate logistic models. For each outcome variable, a univariate logistic model was fit for each predictor variable (age, gender, education, employment, family history density of substance problems). In the Second Step, an initial multivariable model was fit that included any predictors from the univariate models with a *p*-value less than 0.25. Subsequently, the Third Step used a backward stepwise elimination procedure to remove (one at a time) all predictor variables with *p*-values > 0.05. This process resulted in a final prediction model. The Hosmer and Lemeshow (2000) approach again was used to find the best multivariable models separately for men and women. Whole model goodness-of-fit of the logistic regression was tested, and the R-squared value is presented for each model. A Bonferroni correction was applied for the multivariable analyses to account for the three different drug outcomes resulting in a corrected significance level of $p < 0.017$ being considered statistically significant. The rates of missing data were low, however, any case with missing values was excluded from the analyses. Statistical analyses were performed with JMP® Pro version 15.2.0 (SAS Institute Inc., 2019).

Results

Demographic characteristics and prevalence of family history density of substance problems and drug outcomes of the study sample are summarized in Table 1 with findings for the total sample and by gender. The final sample included $n = 3{,}052$ participants that identified as

non-Hispanic and Black or African American. Among the participants, 53.1% reported no family history of substance problems, 4.8% reported a second-degree relative (grandmother and/or grandfather) history only, 31.8% a first-degree relative (mother and/or father) history only, and 10.2% reported both first- and second-degree relatives' history. The participants were mostly female (71.5%), with a mean age of 46.1 (SD = 12.1) years and 62.3% over the age of 45 years. Most of the participants had a HS/GED (41.5%) or college (43.2%) education, and were either employed (31.6%) or unemployed (43.4%).

Associations Between Family History Density of Substance Problems, Sociodemographics, and Drug Outcome Variables

Table 2 provides the associations between family history density of substance problems and the sociodemographic variables and drug outcome variables. The sociodemographic variables significantly associated with family history were age (χ^2 (6, N = 3052) = 71.93, $p <$ 0.0001), education (χ^2 (6, N = 2399) = 16.61, $p = 0.0108$), and employment (χ^2 (9, N = 2451) = 28.88, $p = 0.0007$). There were no significant differences between family history density of substance problems and gender, χ^2 (3, N = 3052) = 0.73, $p = 0.8659$. A higher percentage of those in the 18 to 25 (49.0%) and 26 to 44 (51.4%) years age group reported a family member with a substance problem compared to the 45 and older (44.4%) years age group. The majority of those that had a HS/GED (54.8%) or college education (53.3%) reported no family history, compared to those with less than HS/GED (49.8%). A larger percentage of those who were unemployed (51.2%) reported a relative with a substance problem compared to those that were employed (44.4%), on disability (47.2%), or retired (36.2%).

Family history was also significantly associated with drug use (χ^2 (3, N = 3052) = 59.12, $p < 0.0001$), risk for drug use disorder (χ^2 (3, N=3052) = 75.28, $p < 0.0001$), and prescription

drug misuse (χ^2 (3, N= 3052) = 34.18, $p < 0.0001$). All family history density groups had a larger percentage of those that reported drug use and scored positive for risk for drug use disorder compared to those reporting no family history. For those that reported prescription drug misuse the proportion that indicated only a second-degree relative(s) with a history of substance problems was close to the no family history group, but a higher percentage reported either a first-degree relative(s) only or both first- and second-degree relatives with a history of substance problems.

Adjusted Models of Family History Density of Substance Problems on the Drug Outcome Variables

Results from the univariate logistic models from Step One of the multivariable model building are presented in Table 3. It is interesting to note that the variable education was eliminated for inclusion in any multivariable model since it was not significant for any drug outcome. The variables included in the final multivariable models from Step Three with results are reported in Table 4.

Those participants who identified as male were at more than twice the increased risk for recent drug use (OR=2.40, 95% CI [1.83, 3.14], $p < 0.0001$) and drug use disorder (OR=2.78, 95% CI [2.07, 3.74], $p < 0.0001$) compared to those identifying as female. Those in the 18 to 25 years age group had a marginally significant risk (after Bonferroni correction) and those 26 to 44 years old a significant increased risk for drug use (OR=1.76, 95% CI [1.11, 2.70], $p = 0.0171$; OR=1.61, 95% CI [1.21, 2.14], $p = 0.0011$) and drug use disorder (OR=1.86, 95% CI [1.12, 3.09], $p = 0.0173$; OR=1.89, 95% CI [1.39, 2.58], $p < 0.0001$) compared to those 45 years and older. None of the employment variables were a significant risk or protective factor in the final models for drug use or risk for drug use disorder. Neither gender, age, nor the employment

variables were significant risk or protective factors for prescription drug misuse in the final model.

Family history density of substance problems was a risk factor for each drug outcome. Those participants that reported a first-degree relative(s) only with a substance problem were at an increased risk for drug use (OR=1.72, 95% CI [1.27, 2.32], $p = 0.0004$), drug use disorder (OR=1.86, 95% CI [1.35, 2.64], $p = 0.0002$), and prescription drug misuse (OR=1.85, 95% CI [1.36, 2.51], $p < .0001$). Those that reported both first- and second-degree relative(s) had an even greater risk for drug use (OR=3.37, 95% CI [2.34, 4.86], $p < 0.0001$), drug use disorder (OR=4.37, 95% CI [2.96, 6.45], $p < 0.0001$), and prescription drug misuse (OR=2.82, 95% CI [1.91, 4.18], $p < 0.0001$). Having a second-degree relative(s) only with a history of substance problems, however, was not a risk factor for drug use, drug use disorder, or prescription drug misuse.

Subgroup Analyses by Gender

For those that identified as male, only family history remained in the final model for all drug outcome variables. In the final models, family history density was a significant risk factor for drug use, and drug use disorder, but was not significant for prescription drug misuse in the men. Men who reported having a first-degree relative(s) only (OR=1.78, 95% CI [1.18, 2.68], $p < 0.01$) and both first- and second-degree relatives (OR=2.72, 95% CI [1.56, 4.75], $p < 0.001$) with a history of substance problems were at an increased the risk for drug use.

All levels of family history density increased the risk in men for drug use disorder: second-degree relative(s) only (OR=2.67, 95% CI [1.30, 5.45], $p < 0.01$), first-degree relative(s) only (OR= 1.66, 95% CI [1.10, 2.51], $p = 0.016$) and both first-and second-degrees relatives

(OR=2.72, 95% CI [1.56, 4.75], $p < 0.001$). The results of the final models with the included predictor variables are shown in Table 5.

For women, age, employment and family history were significant risk factors. Those women ages 18 to 25 years and 26 to 44 years were at an increased risk for drug use (OR=2.15, 95% CI [1.27, 3.64], $p < 0.01$; OR=1.88, 95% CI [1.27, 2.79], $p < 0.01$) and drug use disorder (OR=2.30, 95% CI [1.28, 4.12], $p < 0.01$; OR=2.11, 95% CI [1.35, 3.30], $p < 0.01$) compared to those 45 years and older. Women who indicated they were unemployed had a marginally significant increased risk for drug use (OR=1.56, 95% CI [1.05, 2.31], $p < 0.05$) compared to those that were employed. Family history density of substance problems increased the risk for all of the drug outcome variables in women. Having a first-degree relative(s) only increased the risk for drug use (OR=1.77, 95% CI [1.17, 2.67], $p < 0.01$), drug use disorder (OR=2.19, 95% CI [1.35, 3.57], $p < 0.01$), and prescription drug misuse (OR=2.01, 95% CI [1.34, 3.01], $p < 0.001$). The risk more than doubled for drug use (OR=3.72, 95% CI [2.32, 5.96], $p < 0.001$) and drug use disorder (OR=5.72, 95% CI [3.39, 9.65], $p < 0.001$) when female participants reported having both first- and second-degree relatives with a substance problem. For prescription drug misuse those with both first- and second-degree relatives with a substance problem the risk increased from two times to slightly more than three times (OR=3.19, 95% CI [1.93, 5.26], $p < 0.001$). Having a second-degree relative(s) only with a substance problem was not a significant risk factor for any of the drug outcomes for women. The results of the final models with the included predictor variables are shown in Table 5.

Discussion

This study examined whether a family history of substance problems increased the risk for drug use, drug use disorder, and prescription drug misuse in a sample of African American adults.

Nearly one-half of the sample (46.9%) reported at least one relative (parent and/or grandparent) of ever having an alcohol and/or drug problem. Almost one-third of the sample (31.8%) reported having only a first-degree relative (mother and/or father) with an alcohol and/or drug problem. Far less (4.8%) reported having only a second-degree relative with a substance problem while slightly more than ten percent (10.2%) reported having both first- and second-degree relatives with a substance problem. Previous studies had similar results of 18% to 31% reporting a parent with an alcohol use disorder (George et al., 1999; Erblich & Earleywine, 1999) and 24.8% to 39.5% reporting one or more parents with an alcohol and/or drug problem (Cavazos-Rehg et al., 2010). While this study categorized family history density by degree of relatedness, different variants of this family history classification system are described in the literature (McCaul et al., 1991; Pickens et al., 2001; Svikis et al., 1991).

Gender, age, employment status, and family history density of substance problems were initially significantly associated with drug use and risk for drug use disorder; however, only family history was associated with prescription drug misuse. Education level was not significantly associated with any drug outcome in the initial Steps of building the models for the analyses. The final models for the full sample indicated that male gender, those in the 26 to 44-year age group, and family history density of substance problems increased the risk for drug use and drug use disorder. Family history density of substance problems was significant in the final model for prescription drug misuse.

Previous research has demonstrated that males are at an increased risk for substance use and substance problems in both national surveys (Harrington et al., 2011; Leeman et al., 2016; Morgan et al., 2010) and studies including all African American participants (Arteaga et al., 2010; Green et al., 2012). For prescription drug misuse, previous studies from national surveys

with predominantly White subjects (Merline et al., 2004) and 100% African American subjects (Rigg & Nicholson, 2019) have shown that there are no differences between adult men and women in rates of misuse. Those 26 to 44 years old were at increased risk for drug use and drug use disorder compared to those 45 years and older. For prescription drug misuse age was not a significant risk or protective factor. The results for drug use are consistent with previous research indicating African Americans demonstrate higher rates of substance use in their 20s and 30s (Chen & Jacobson, 2012). Substance use later in life has also been supported by Watt (2008) which found that Black male adolescents were 11% less likely to use illegal drugs than White male adolescents, however that changed over time and by age 35 years or older Black males were 57% more likely to use illegal drugs than White males. A longitudinal study by Doherty and colleagues (2008) that followed African American participants up to age 42 years found older age to be a predictor for drug use later in life. For prescription drug misuse previous study findings demonstrate conflicting results as to whether a certain age group is at risk. Previous studies have demonstrated that younger age predicted misuse in young Black adults ages 18 to 28 years (Harrell & Broman, 2009) while a separate study found age was not significantly related in a sample of African American adults ages 18 to 93 years (Nicholson & Wheeler, 2021). These findings related to age and risks for prescription drug misuse may be related to a lack of age-based differences in risk factors for prescription drug misuse (Schepis et al., 2020) and variations by age in motivation for misuse (Schuler et al., 2019).

The two indicators of socioeconomic status (SES) were not significantly associated with the drug outcomes in the full sample. Education was eliminated in the initial steps of the analyses, and employment status did not remain significant in the final models for the full sample for any drug outcome. Previous research is conflicting on the risk or protective role of education.

Longitudinal studies of African American adults indicate that dropping out of high school increases the risk for SUDs (Arteaga et al., 2010; Green et al., 2012). Graduating from high school or having some college education decreased the likelihood of prescription opioid misuse for Black adults living in an urban location (Rigg & Nicholson, 2019). National surveys indicate that having a college degree decreased the risk for all substance use (tobacco, alcohol, marijuana, cocaine) and prescription drug misuse (Merline et al., 2004), and those with less than a high school degree were at an increased risk for drug dependence (Swendsen et al., 2009). Other national surveys of adults have found that education was not significantly associated with drug use in the full sample (Harrington et al., 2011) or prescription drug misuse in Blacks (Harrell & Broman, 2009). Previous research is conflicting on the role that employment affects risk for substance use. National surveys (majority White subjects) have found that unemployment increased the risk for all substance use (alcohol, tobacco, illicit drugs), alcohol use disorders, drug use disorders (Compton et al., 2014), and prescription drug misuse (Merline et al., 2004; Perlmutter et al., 2017). National surveys of Black adults have indicated that employment status was not associated with SUDs (Hunte & Barry, 2012) or prescription opioid misuse (Rigg & Nicholson, 2019). Other indicators of SES that are representative of the surrounding community such as income inequality have been associated with greater odds of drug use disorders among Blacks, whereas individual indicators of education or income level were not significant (Chen et al., 2019). The findings from this study that education and employment status were not associated with the drug outcomes in the full sample could be related to a subjective interpretation of social status wherein SES indicators that would be associated with lower SES (i.e., low education levels, unemployment) are found to have the opposite effect. Objective measures of SES (income, education, employment) are found to be associated with a higher level

of subjective social status in Whites, but for African Americans those who were unemployed and had lower levels of education perceived themselves higher on a subjective social status scale (Shaked et al., 2016). This could be interpreted as common indicators of SES do not have the same effects on health behavior or health outcomes in African Americans as they do in Whites and African Americans may use different criteria to define social status (Ostrover et al., 2000).

Family history density of substance problems was a significant risk factor for all of the drug outcomes for the entire sample. Having a first- degree relative only or both first- and second-degree relatives with a substance problem increased the risk for drug use, drug use disorder, and prescription drug misuse. The risk was greater when participants reported both first- and second-degree relatives with a substance problem. Those that reported a second-degree relative only with substance problems were not at an increased risk for any drug outcome. These results are similar to a previous study which found students that reported no family history or a second-degree relative only were less likely to report drug use and drug-related problems (McCaul et al., 1990). Previous studies of African American adults have found that a family history of substance problems was a risk factor for substance abuse and dependency (Arteaga et al., 2010), and alcohol and drug use (Friedman & Glassman, 2000). Studies of young adult college students with racial/ethnically diverse samples found a positive relationship between a family history of alcohol problems and drug use (Braitman et al., 2009; McCaul et al., 1990). National surveys of adults indicate that a family history of SUDs increases the risk for illicit drug use (Harrington et al., 2011), SUDs (Lopez-Quintero et al., 2011), prescription drug misuse and SUDs from prescription drug misuse (Liebschutz et al., 2010; Schepis et al., 2022).

This study also conducted separate analyses by gender to examine the differences in risks for drug use, drug use disorder, and prescription drug misuse. Similar to results from the

full sample, education level was not significantly associated with any drug outcome during initial Steps of building the models for the analyses for men or women. For the women, age groups 18 to 25 and 26 to 44 years were at an increased risk for drug use and drug use disorder but not for prescription drug misuse. Unemployment was only marginally significant for drug use in women, but not significant in the final models for risk of drug use disorder or prescription drug misuse. Family history density of substance problems was a significant risk factor for all drug outcomes for the women. Having a first-degree relative only and having both first- and second-degree relatives increased the risk in women for drug use, drug use disorder, and prescription drug misuse. The men had different results. In the initial Step of building the models age and employment were not significant for any drug outcome, however family history density was significant. In the final models for men, family history density of substance problems was significant for drug use and risk for drug use disorder. Having a first-degree relative only and both first- and second-degree relatives with substance problems increased the risk for drug use. Interestingly, only for men were all levels of family density significant for drug use disorder. A unique finding that among men, those that reported second-degree relative(s) only with a history of substance problems were at increased risk for drug use disorder and this risk was nearly similar as the group reporting both first- and second-degree relatives. A possible mechanism associated with this result could be related to how family/parenting factors affect males and females differently (Doherty et al., 2008) or related to the subject's relationship with their second-degree relatives (grandparents) as in some African American family's grandparents may function in the role of surrogate parent (Bertera & Crewe, 2013), however this perspective has not been explored in relation to drug use. No level of family history density of substance problems was significant among men for prescription drug misuse. These results indicate that

there are other factors among men not measured in this study that raise their risk for prescription drug misuse and warrant further exploration. These results highlight the differences between women and men in their risks for substance use and SUDs.

The results from the separate analyses by gender indicate that family history density of substance problems increased the risk for drug use and drug use disorders for both women and men, but remained significant only among women for prescription drug misuse. Additional unique gender differences were found. Age was no longer significant among the men for any drug outcome but remained significant among women for drug use and risk for drug use disorder. Employment status did not remain significant for any drug outcome in the final model for the full sample, but in separate analyses unemployment status was marginally significant among the women for drug use. Previous studies indicate that there are differences between men and women in prevalence rates of substance use and risk factors in the development of SUDs (McHugh et al., 2018; Morgan et al., 2010; Polak et al., 2015; Vasilenko et al., 2017). Longitudinal studies following African American participants beginning in childhood through adulthood have found that adverse experiences have both a direct and indirect effect on adult drug use with different risk and protective effects for males and females (Fothergill et al., 2016). While previous studies have indicated that men are at greater risk for substance use and SUDs (Arteaga et al., 2010; Harrington et al., 2011; Leeman et al., 2016), the risk for prescription drug misuse is the same or greater for women (Merline et al., 2004; Nicholson & Wheeler, 2021; Vaughn et al., 2016). Research is limited to expand on why gender differences exists for prescription drug misuse. Nicholson and Vincent (2019) examined gender differences in prescription opioid misuse among Black adults found that among women who indicated all levels of educational attainment (high school, some college, college graduate) and were 35 to 49

years old were at lower risk, while employment status was neither risk nor protective for men or women. The same study found other risk factors not measured in the current study that varied for men and women which included indicators of health status, mental health disorders, and other substance use (Nicholson & Vincent, 2019). Other studies that do exist lack subgroup analyses by gender and those that are predominantly African American are in high risk/vulnerable populations such as substance users (Peters et al., 2007), incarcerated males (Wheeler et al., 2019), or men who have sex with men (Kecojevic et al., 2015).

A search of the literature revealed there is a lack of studies conducting separate analyses for women and men with regard to associations between a family history of substance problems and outcomes related to drug use, drug use disorder, and prescription drug misuse, particularly in racial/ethnic minority populations. The findings from this study support the evidence for the gender differences in risk and protective factors related to drug use, risk for drug use disorder, and prescription drug misuse.

Limitations

The findings from this research study should be interpreted with caution due to several limitations. First, family history data for substance problems was based on participants reports on family members, the family members were not interviewed directly; however, reporting on a family member's substance problems has high reliability and validity (Hardt & Frank, 2007). Second, many published studies using family density measure of family history focus on parents and siblings for first-degree relatives and aunts/uncles and grandparents for second-degree relatives. The present study limited assessment to parents (first-degree) and grandparents (second-degree). Had these other categories of relatives been included (siblings, aunts/uncles) the findings may have varied. Third, participants may not know whether their family members

have a problem with drugs or alcohol, or they may underreport or misreport their family history status. While the rates of missing data were very low, any case with missing values was excluded from the analyses which may reduce statistical power and result in bias (Graham, 2009).

When conducting secondary data analyses there are threats to reliability from the accuracy of the data collection and coding of variables in the original study. Fourth, the cross-sectional design of the study limits interpretation of the results to association and should not infer causation between family history of substance problems and the drug outcomes. Fifth, since only self-report measures were used the results may be affected by underreporting and social desirability bias. Threats of underreporting and social desirability bias were minimized by administering the survey with a tablet computer, providing privacy and assuring the participants the survey was anonymous. Lastly, because the sample population was limited to non-Hispanic African American adults, the results may not be generalizable to other age groups or racial/ethnic groups.

Conclusions

The findings from this research study indicate that family history density of substance problems among African American adults is associated with drug use, risk for drug use disorder, and prescription drug misuse. These results were different for women and men when examined separately. For women, family history density of substance problems remained significantly associated with all drug outcomes. For the men however, family history density of substance problems was associated with drug use and risk for drug use disorder, but not with prescription drug misuse. Education level and employment status were not associated with any drug outcome, and unemployment was only marginally significant among women for drug use. Future research should be designed to better understand how objective indicators of SES and their effects on

drug use vary by race and gender, and whether there are different mechanisms affecting the subjective perception of social status. Future research and prevention efforts should also consider the role of a family history of substance problems in the risk for drug use, drug use disorder, and prescription drug misuse among African Americans. The results of this study point to how gender may modify the risks associated with substance use and related outcomes which in and of itself warrants further investigation to improve and tailor prevention efforts within different demographic groups.

References

Acheson, A., Vincent, A. S., Cohoon, A. J., & Lovallo, W. R. (2018). Defining the phenotype of young adults with family histories of alcohol and other substance use disorders: Studies from the family health patterns project. *Addictive Behaviors, 77*, 247-254. http://dx.doi.org/10.1016/j.addbeh.2017.10.014

Arteaga, I., Chen, C.-C., & Reynolds, A. J. (2010). Childhood predictors of adult substance abuse. *Children and Youth Services Review, 32*(8), 1108-1120. https://doi.org.10.1016/j.childyouth.2010.04.025

Barrera, I., Sharma, V., & Aratani, Y. (2019). The prevalence of mental illness and substance abuse among rural Latino adults with multiple adverse childhood experiences in California. *Journal of Immigrant and Minority Health, 21*, 971-976. https://doi.org/10.1007/s10903-018-0811-9

Basu, D., Ghosh, A., Hazari, N., & Parakh, P. (2016). Use of Family CAGE-AID questionnaire to screen the family members for diagnosis of substance dependence. *Indian Journal of Medical Research, 143*(6), 722-730. https://doi.org/10.4103/0971-5916.191931

Bennett, J. C. (1993). Inclusion of women in clinical research trials – policies for population subgroups. *The New England Journal of Medicine, 329*(4), 288-292. https://doi.org/10.1056/NEJM199307223290428

Bertera, E. M., & Crewe, S. E. (2013). Parenthood in the twenty-first century: African American grandparents as surrogate parents. *Journal of Human Behavior in the Social Environment, 23*(2), 178-192. https://doi.org/10.1080/10911359.2013.747348

Braitman, A. L., Kelley, M. L., Ladage, J., Schroeder, V., Gumienny, L. A., Morrow, J. A., & Klostermann, K., (2009). Alcohol and drug use among college student adult children of alcoholics. *Journal of Alcohol and Drug Education,* 53(1), 69–88.

Brown, T. L., Flory, K., Lynam, D. R., Leukefeld, C., & Clayton, R. R. (2004). Comparing the developmental trajectories of marijuana use of African American and Caucasian adolescents: Patterns, antecedents, and consequences. *Experimental and Clinical Psychopharmacology, 12*(1), 47–56. https://doi.org/10.1037/1064-1297.12.1.47

Breland, A. B., Almond, L., Kienzle, J., Ondersma, S. J., Hart Jr., A., Weaver, M., Dillon, P., & Svikis, D. (2014). Targeting tobacco in a community-based addiction recovery cohort: Results from a computerized, brief, randomized intervention trial. *Contemporary Clinical Trials 38*(1), 113–120. https://doi.org/10.1016/j.cct.2014.03.008

Brown, R. L., & Rounds, L. A. (1994). Conjoint screening questionnaires for alcohol and other drug abuse: criterion validity in a primary care practice. *Wisconsin Medical Journal, 94*(3), 135–140.

Bobzean, S. A. M., DeNobrega, A. K., & Perrotti, L. I. (2014). Sex Differences in the neurobiology of drug addiction. *Experimental Neurology, 259,* 64-74. http://dx.doi.org/10.1016/j.expneurol.2014.01.022

Boyd, C. J., & Holmes, C. (2002). Women who smoke crack and their family substance abuse problems. *Health Care for Women International, 23,* 576-586. https://doi.org/10.1080/07399330290107340

Camplain, R., Camplain, C., Tronner II, R. T., Pro, G., Sabo, S., Eaves, E., Peoples, M., & Baldwin, J. A. (2020). Racial/ethnic differences in drug- and alcohol-related arrest

outcomes in a southwest county from 2009 to 2018. *American Journal of Public Health, 110*(S1), S85-S92. https://doi.org/10.2105/AJPH.2019.305409

Carlson, M. D. A., & Morrison, R. S. (2009). Study design, precision, and validity in observational studies. *Journal of Palliative Medicine, 12*(1), 77-82. https://doi.org/10.1089/jpm.2008.9690

Cavazos-Rehg, P. A., Spitznagel, E. L., Krauss, M. J., Schootman, M., Bucholz, K. K., Cottler, L. B., & Bierut, L. J. (2010). Understanding adolescent parenthood from a multisystemic perspective. *Journal of Adolescent Health, 46*(6), 525-531. https://doi.org/10.1016/j.jadohealth.2009.11.209

Chartier, K., Hesselbrock, M. N., & Hesselbrock, V. M. (2013). Ethnicity and gender comparisons of health consequences in adults with alcohol dependence. *Substance Use & Misuse, 48*(3), 200-210. https://doi.org/10.3109/10826084.2013.747743

Chen, P., & Jacobson, K. C. (2012). Developmental trajectories of substance use from early adolescence to young adulthood: Gender and racial/ethnic differences. *Journal of Adolescent Health, 50*(2), 154-163. https://doi.org/10.1016/j.jadohealth.2011.05.013

Chen, R., Kessler, R. C., Sadikova, E., NeMoyer, A., Sampson, N. A., Alvarez, K., Vilsaint, C. L., Green, J. G., McLaughlin, K. A., Jackson, J. S., Alegría, M., & Williams, D. R. (2019). Racial and ethnic differences in individual-level and area-based socioeconomic status and 12-month DSM-IV mental disorders. *Journal of Psychiatric Research, 119*, 48-59. https://doi.org/10.1016/j.jpsychires.2019.09.006

Compton, W., Gfoerer, K., Conway, K., & Finger, M. S. (2014). Unemployment and substance outcomes in the united states 2002 – 2010. *Drug and Alcohol Dependence, 142*, 350-353. https://doi.org/10.1016/j.drugalcdep.2014.06.012

Congress.gov. (1993). S.1 – National Institutes of Health Revitalization Act of 1993. https://www.congress.gov/bill/103rd-congress/senate-bill/1

Cotton, N. S. (1979). The familial incidence of alcoholism. *Journal of Studies on Alcohol, 40*(1), 89-116.

Crouch, T. B., Martin, C. E., Polak, K., Smith, W., Dillon, P., Ondersma, S., & Svikis, D. (2022). Gender-specific correlates of nonmedical use of prescription medications in a diverse primary care sample. *Drug and Alcohol Dependence, 234*, 109399. https://doi.org/10.1016/j.drugalcdep.2022.109399

Cuijpers, P., & Smit, F. (2001). Assessing parental alcoholism: A comparison of the Family History Research Diagnostic Criteria versus a single-question method. *Addictive Behaviors, 26*(5), 741-748. https://doi.org/10.1016/S0306-4603(00)00155-6

Demuth, S., & Steffensmeier, D. (2004). Ethnicity effects on sentence outcomes in large urban courts: Comparisons among White, Black, and Hispanic defendants. *Social Sciences Quarterly, 85*(4), 994–1011. https://doi.org/10.1111/j.0038-4941.2004.00255.x

Des Jarlais, D. C., Arasteh, K., McKnight, C., Feelemyer, J., Tross, S., Perlman, D., Friedman, S., Campbell, A. (2017). Racial/ethnic disparities at the end of an HIV epidemic: Persons who inject drugs in New York City, 2011-2015. *American Journal of Public Health, 107*(7), 1157-1163. https://doi.org/10.2105/AJPH.2017.303787

Dickerson, D. L., Leeman, R. F., Mazure, C. M., & O'Malley, S. S. (2009). The inclusion of women and minorities in smoking cessation clinical trials: A systematic review. *The American Journal on Addictions, 18*, 21-28. https://doi.org/10.1080/10550490802408522

Doherty, E. E., Green, K. M., Reisinger, H. S., & Ensminger, M. E. (2008). Long-term patterns of drug use among an urban African-American cohort: The role of gender and family. *Journal of Urban Health, 85*(2), 250-267. https://doi.org/10.1007/s11524-007-9246-7

Eisenberg, J. M. (1995). NIH promulgates new guidelines for the inclusion of women and minorities in medical research. *Berkley Women's Law Journal, 10*, 183-189.

Ellickson, P., & Morton, S. (1999). Identifying adolescents at risk for hard drug use: Racial/ethnic variations. *Journal of Adolescent Health, 25*(6), 382-395. https://doi.org/10.1016/S1054-139X(98)00144-X

Elliott, J. C., Carey, K. B., & Bonafide, K. E. (2012). Does family history of alcohol problems influence college and university drinking or substance use? A meta-analytical review. *Addiction, 107*(10), 1774-1785. https://doi.org/10.1111/j.1360-0443.2012.03903.x

Erblich, J., & Earleywine, M. (1999). Children of alcoholics exhibit attenuated cognitive impairment during ethanol challenge. *Alcoholism, Clinical and experimental research, 23*(3), 476-482. https://doi.org10.1097/00000374-199903000-00014

Evans, E. A., Grella, C. E., Washington, D. L., & Upchurch, D. M. (2017). Gender and race/ethnic differences in the persistence of alcohol, drug, and poly-substance use disorders. *Drug and Alcohol Dependence, 174*, 128-136. https://doi.org/10.1016/j.drugalcdep.2017.01.021

Fothergill, K., Ensminger, M. E., Doherty, E. E., Juon, H-S., & Green, K. M. (2016). Pathways from early childhood adversity to later adult drug use and psychological distress: A prospective study of a cohort of African Americans. *Journal of Health and Social Behavior, 57*(2), 223-239. https://doi.org/10.1177/0022146516646808

Friedman, A. S., & Glassman, K. (2000). Family risk factors versus peer risk factors for drug abuse: A longitudinal study of an African American urban community sample. *Journal of Substance Abuse Treatment, 18*(3), 267-75. https://doi.org/10.1016/S0740-5472(99)00072-0

Galaif, E. R., Newcomb, M. D., Vega, W. A., & Krell, R. D. (2007). Protective and risk influences of drug use among a multiethnic sample of adolescent boys. *Journal of Drug Education, 37*(3), 249-276. https://doi.org/10.2190/DE.37.3.c

George, W. J., La Marr, J., Barrett, K., & McKinnon, T. (1999). Alcohol parentage, self-labeling, and endorsement of ACOA-codependent traits. *Psychology of Addictive Behaviors, 13*(1), 39-48.

Gibbons, F. X., Yeh, H., Gerrard, M., Cleveland, M. J., Cutrona, C., Simons, R. L., & Brody, G. H. (2007). Early experience with racial discrimination and conduct disorder as predictors of subsequent drug use: A critical period hypothesis. *Drug and Alcohol Dependence, 88S*, S27-S37. https://doi.org/10.1016/j.drugalcdep.2006.12.015

Gil, A. G., Vega, W. A., & Turner, R. J. (2002). Early and mid-adolescence risk factors for later substance abuse by African Americans and European Americans. *Public Health Reports, 117*(S1), S15-S29.

Graham, J. W. (2009). Missing data analysis: making it work in the real world. *Annual Review of Psychology, 60*(1), 549–576. https://doi.org10.1146/annurev.psych.58.110405.085530

Green, K. M., Zebrak, K. A., Fothergill, K. E., Robertson, J. A., & Ensminger, M. E. (2012). Childhood and adolescent risk factors for comorbid depression and substance use disorders in adulthood. *Addictive Behaviors, 37*(11), 1240-1247. https://doi.org/10.1016/j.addbeh.2012.06.008

Greenfield, S. F., Rosa, C., Putnins, S. I., Green, C. A., Brooks, A. J., Calsyn, D. A., Cohen, L. R., Erickson, S., Gordon, Sl. M., Haynes, L., Killeen, T., Miele, G., Tross, S., & Winhusen, T. (2011). Gender research in the National Institute on Drug Abuse Clinical Trials Network: A summary of findings. *American Journal of Drug and Alcohol Abuse, 37*(5), 301-312. https://doi.org/10.3109/00952990.2011.596875

Hardt, J., & Franke, P. (2007). Validity, reliability and objectivity of the family history method in psychiatry: A meta analysis. *European Psychiatry, 22*(1), 49-58. https://doi.org/10.1016/j.eurpsy.2006.10.003

Harrell, Z. A. T., & Broman, C. L. (2009). Racial/ethnic differences in correlates of prescription drug misuse among young adults. *Drug and Alcohol Dependence, 104*(3), 268-271. https://doi.org/10.1016/j.drugalcdep.2009.05.017

Harrington, M., Robinson, J., Bolton, S-L., Sareen, J., & Bolton, J. M. (2011). A longitudinal study of risk factors for incident drug use in adults: Findings from a representative sample of the US population. *Canadian Journal of Psychiatry, 56*(11), 686-695. https://doi.org/10.1177/070674371105601107

Hinkin, C. H., Castellon, S. A., Dickson-Fuhrman, E., Daum, G., Jaffe, J., & Jarvik, L. (2001). Screening for drug and alcohol abuse among older adults using a modified version of the CAGE. *American Journal of Addiction, 10*(4), 319–326 https://doi.org/10.1111/j.1521-0391.2001.tb00521.x

Hoopsick, R. A., Homish, G. G., & Leonard, K. E. (2021). Differences in opioid overdose mortality rates among middle-aged adults by race/ethnicity and sex, 1999-2018. *Public Health Reports, 136*(2), 192-200. https://doi.org/10.1177/0033354920968806

Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). Wiley & Sons, Inc.

Hughes, A., Williams, M. R., Lipari, R. N., Bose, J., Copello, E. A. P., & Kroutil, L. A. (2016). *Prescription drug use and misuse in the United States: Results from the 2015 National Survey on Drug Use and Health.* NSDUH Data Review. http://www.samhsa.gov/data/

Hunte, H. E. R., & Barry, A. E. (2012). Perceived discrimination and DSM-IV – based alcohol and illicit drug use disorders. *American Journal of Public Health, 102*(12), e111-e117. https://doi.org/10.2105/AJPH.2012.300780

Johnson, E., & Pickens, R. W. (2001). Familial transmission of alcoholism among nonalcoholics and mild, severe, and dissocial subtypes of alcoholism. *Alcoholism: Clinical and Experimental Research, 25*(5), 661-666. https://doi.org/10.1111/j.1530-0277.2001.tb02264.x

Karriker-Jaffe, K., Chartier, K. G., Bares, C. B., Kendler, K. S., & Greenfield, T. K. (2021). Intersection of familial risk and environmental social control on high-risk drinking and alcohol dependence in a US national sample of adults. *Addictive Behaviors, 113*, 106668. https://doi.org/10.1016/j.addbeh.2020.106668

Kecojevic, A., Wong, C., Corliss, H., & Lankenau, S. (2015). Risk factors for high levels of prescription drug misuse and illicit drug use among substance-using young men who have sex with men (YMSM). *Drug and Alcohol Dependence, 150*, 156–163. https://doi.org/10.1016/j.drugalcdep.2015.02.031

Kelpin, S., Ondersma, S. J., Weaver, M., & Svikis, D. (2018). Representativeness of patients enrolled in a primary care clinical trial for heavy/problem substance use. *Substance Abuse, 39*(4), 469-475. https://doi.org/10.1080/08897077.2018.1526843

Kendler, K. S., Edwards, A., Myers, J., Cho, S. B., Adkins, A., & Dick, D. (2015a). The predictive power of family history measures of alcohol and drug problems and internalizing disorders in a college population. *American Journal of Medical Genetics. Part B: Neuropsychiatric Genetics, 168*(5), 337-346. https://doi.org/10.1002/ajmg.b.32320

Kendler, K. S., Ji, J., Edwards, A. C., Ohlsson, H., Sundquist, J., & Sundquist, K. (2015b). An extended Swedish national adoption study of alcohol use disorder**.** *JAMA Psychiatry, 72*(3), 211-218. https://doi.org/10.1001/jamapsychiatry.2014.2138

Kendler, K. S., Ohlsson, H., Bacanu, S., Sundquist, J., & Sundquist, K. (2018). The risk for drug abuse, alcohol use disorder, and psychosocial dysfunction in offspring from high-density pedigrees: its moderation by personal, family, and community factors. *Molecular Psychiatry*. https://doi.org/10.1038/s41380-018-0111-8

Kendler, K. S., Ohlsson, H., Sundquist, K., & Sundquist, J. (2013). Within-family environmental transmission of drug abuse. *JAMA Psychiatry, 70*(2), 235-242. https://doi.org/10.1001/jamapsychiatry.2013.276

Leeman, R. F., Sun, Q., Bogart, D., Beseler, C. L., & Sofuoglu, M. (2016). Comparisons of cocaine-only, opioid-only and users of both substances in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *Substance Use & Misuse, 51*(5), 553-564. https://doi.org/10.3109/10826084.2015.1122063

Leonardson, G. R., Kemper, E., Ness, F. K., Koplin, B. A., Daniels, M. C., & Leonardson, G. A. (2005). Validity and reliability of the audit and CAGE-AID in North Plans American Indians. *Psychological Reports, 97*(1), 161-166. https://doi.org/10.2466/pr0.97.1.161-166

Lichtenstein, B. (2009). Drugs, incarceration, and HIV/AIDS among African American men: A critical literature review and call to action. *American Journal of Men's Health, 3*(3), 252-264. https://doi.org/10.1177/1557988308320695

Liebschutz, J. M., Saitz, R., Weiss, R. D., Averbuch, T., Schwartz, S., Meltzer, E. C., & Samet, J. H. (2010). Clinical factors associated with prescription drug use disorder in urban primary care patients with chronic pain. *The Journal of Pain, 11*(11), 1047–1055. https://doi.org/10.1016/j.jpain.2009.10.012

Lister, J. J., Greenwald, M. K., & Ledgerwood, D. M. (2017). Baseline risk factors for drug use among African-American patients during first-month induction/stabilization on methadone. *Journal of Substance Abuse Treatment, 78,* 15-21. https://doi.org/10.1016/j.jsat.2017.04.007

Lopez-Quintero, C., de los Cobos, J. P., Hasin, D. S., Okuda, M., Wang, S., Grant, B. F., & Blanco, C. (2011). Probability and predictors of transition from first use to dependence on nicotine, alcohol, cannabis, and cocaine: Results of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *Drug and Alcohol Dependence, 115*(1), 120-130. https://doi.org/10.1016/j.drugalcdep.2010.11.004

McCaul, M. E., Turkkan, J. S., Svikis, D. S., & Bigelow, G. E. (1991). Familial density of alcoholism: Effects on psychophysiological responses to ethanol. *Alcohol, 8*(3), 219-222. https://doi.org/10.1016/0741-8329(91)90870-3

McCaul, M. E., Turkkan, J. S., Svikis, D. S., Bigelow, G. E., & Cromwell, C. C. (1990). Alcohol and drug use by college males as a function of family alcoholism history. *Alcoholism: Clinical and Experimental Research, 14*(3), 467-471. https://doi.org/10.1111/j.1530-0277.1990.tb00505.x

McHugh, R. K., Votaw, V. R., Sugarman, D. E., & Greenfield, S. F. (2018). Sex and gender differences in substance use disorders. *Clinical Psychology Review, 66,* 12-23. https://doi.org/10.1016/j.cpr.2017.10.012

McLellan, A. T., Kushner, H., Metzger, D., Peters, R., Smith, I., Grissom, G., Pettinati, H., & Argeriou, M. (1992). The fifth edition of the Addiction Severity Index. Journal of *Substance Abuse Treatment, 9*(3), 199-213.

Merikangas, K. R., Stolar, M., Stevens, D. E., Goulet, J., Preisig, M. A., Fenton, B., Zhang, H., O'Malley, S. S., & Rounsaville, B. J. (1998). Familial transmission of substance use disorders. *Archives of General Psychiatry*, *55*(11), 973-979. https://doi.org/10.1001/archpsyc.55.11.973

Merline, A. C., O'Malley, P. M., Schulenberg, J. E., Bachman, J. G., & Johnston, L. D. (2004). Substance use among adults 35 years of age: Prevalence, adulthood predictors, and impact of adolescent substance use. *American Journal of Public Health, 94*(1), 96-102. https://doi.org/10.2105/AJPH.94.1.96

Meyer, J.P., Isaacs, K., El-Shahawy, O., Burlew, A.K., Wechsberg, W., (2019). Research on women with substance use disorders: reviewing progress and developing a research and implementation roadmap. *Drug and Alcohol Dependence, 197,* 158–163. https://doi-org/10.1016/j.drugalcdep.2019.01.017

Miller, T., & Hendrie, D. (2008). *Substance Abuse Prevention Dollars and Cents: A Cost-Benefit Analysis,* DHHS Pub. No. (SMA) 07-4298. Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration. https://www.samhsa.gov/sites/default/files/cost-benefits-prevention.pdf

Morgan, P. T., Desai, R. A., Potenza, M. N. (2010). Gender-related influences of parental alcoholism on the prevalence of psychiatric illnesses: Analysis of the National Epidemiologic Survey on Alcohol and Related Conditions. *Alcoholism: Clinical and Experimental Research*, *34*(10), 1759-1767. https://doi.org/10.1111/j.1530-0277.2010.01263.x

Murphy, E. (2016). African-American representation in family and twin studies of mood and anxiety disorders: A systematic review. *Journal of Affective Disorders, 205*, 311-318. https://doi.org/10.1016/j.jad.2016.08.016

National Institutes of Health. (2001). *NIH policy and guidelines on the inclusion of women and minorities as subjects in clinical research*. https://grants.nih.gov/policy/inclusion/women-and-minorities/guidelines.htm

National Institutes of Health. (2022). *Inclusion of women and minorities as participants in research involving human subjects*. https://grants.nih.gov/policy/inclusion/women-and-minorities.htm

National Institute on Drug Abuse. (2003, September 1). *Drug use among racial/ethnic minorities*. https://archives.drugabuse.gov/publications/drug-use-among-racialethnic-minorities

Newlin, D. B., Miles, D. R., van den Bree, M. B. M., Gupman, A. E., & Pickens, R. W. (2000). Environmental transmission of DSM-IV substance use disorders in adoptive and step families. *Alcoholism: Clinical and Experimental Research*, *24*(12), 1785-1794. https://doi.org/10.1111/j.1530-0277.2000.tb01982.x

Nicholson, H. L., & Ford, J. A. (2018). Correlates of prescription opioid misuse among Black adults: Findings from the 2015 National Survey on Drug Use and Health. *Drug and Alcohol Dependence, 186*, 264–267. https://doi.org/10.1016/j.drugalcdep.2017.12.006

Nicholson, H. L., & Vincent, J. (2019). Gender differences in prescription opioid misuse among U.S. Black adults. *Substance Use & Misuse, 54*(4), 639-650. https://doi.org/10.1080/10826084.2018.1531427

Nicholson Jr., H. L., & Wheeler, P. B. (2021). Prescription drug misuse among African Americans and Afro Caribbeans: Results from the National Survey of American Life. *Substance Use & Misuse, 56*(7), 962-970. https://doi.org/10.1080/10826084.2021.1901928

Ondersma, S. J., Svikis, D. S., & Schuster, C. R. (2007). Computer-based brief intervention: a randomized trial with postpartum women. *American Journal of Preventive Medicine, 32*(3), 231–238. https://doi.org/10.1016/j.amepre.2006.11.003

Ostrove, J. M., Adler N. E., Kuppermann, M., & Washington, A. E. (2000). Objective and subjective assessments of socioeconomic status and their relationship to self-rated health in an ethnically diverse sample of pregnant women. *Health Psychology, 19*(6), 613–618. http://doi.org/10.1037/0278-6133.19.6.613

Perlmutter, A. S., Conner, S. C., Savone, M., Kim, J. H., Segura, L. E., & Martins, S. S. (2017). Is employment stat us in adults over 25 years old associated with nonmedical prescription opioid and stimulant use? *Social Psychiatry and Psychiatric Epidemiology, 52*(3), 291-298. https://doi.org/10.1007/s00127-016-1312-6

Peteet, B., Mosley, C., Miller-Roenigk, B., McCuistian, C., & Dixon, S. (2019). Transnational trends in prescription drug misuse among women: A systematic review. *International Journal of Drug Policy, 63*, 56-73. https://doi.org/10.1016/j.drugpo.2018.10.005

Peters, R. J., Williams, M., Ross, M. W., Atkinson, J., & Yacoubian, G. S., Jr. (2007). Codeine cough syrup use among African-American crack cocaine users. *Journal of Psychoactive Drugs, 39*(1), 97–102. https://doi.org/10.1080/02791072.2007.10399868

Pickens, R. W., Preston, K. L., Miles, D. R., Gupman, A. E., Johnson, E. O., Newlin, D. B., Soriano, J., van den Bree M. B., & Umbricht, A. (2001). Family history influence on drug abuse severity and treatment outcome. *Drug and Alcohol Dependence, 61*(3), 261-270. https://doi.org/10.1016/S0376-8716(00)00146-0

Polak, K., Haug, N. A., Drachenberg, H. E. & Svikis, D. S. (2015). Gender considerations in addiction: Implications for treatment. *Current Treatment Options Psychiatry, 2*(3), 326-338. https://doi.org/10.1007/s40501-015-0054-5

Powers, G., Berger, L., Fuhrmann, D., & Fendrich, M. (2017). Family history density of substance use problems among undergraduate college students: Associations with heavy alcohol use and alcohol use disorder. *Addictive Behaviors, 71*, 1-6. https://doi.org/10.1016/j.addbeh.2017.02.015

Rigg, K. K., & Nicholson, H. L. (2019). Prescription opioid misuse among African-American adults: A rural-urban comparison of prevalence and risk. *Drug and Alcohol Dependence, 197*, 191-196. https://doi.org/10.1016/j.drugalcdep.2019.01.023

Rounds-Bryant, J. L., Motivans, M. A., & Pelissier, B. M. M. (2004). Correlates of drug treatment outcomes for African American and White male federal prisoners: Results from

the TRIAD study. *The American Journal of Drug and Alcohol Abuse, 30*(3), 495-514. https://doi.org/10.1081/ADA-200032265

Ryan, B. M. (2018). Lung cancer health disparities. *Carcinogenesis, 39*(6), 741-751. https://doi.org/10.1093/carcin/bgy047

Sanchis-Segura, C., & Becker, J. B. (2016). Why we should consider sex (and study sex differences) in addiction research. *Addiction Biology, 21*, 995-1006. https://doi.org/10.1111/adb.12382

Sartor, C. E., Grant, J. D., Few, L. R., Werner, K. B., McCutcheon, V. V., Duncan, A. E., Nelson, E. C., Madden, P. A., Bucholz, K. K., Health, A. C., & Agrawal, A. (2018). Childhood trauma and two stages of alcohol use in African American and European American women: Findings from a female twin sample. *Prevention Science, 19*(6), 795-804. https://doi.org/10.1007/s11121-017-0838-5

Schepis, T. S., Klare, D. L., Ford, J. A., & McCabe, S. E. (2020). Prescription drug misuse: Taking a lifespan perspective. *Substance Abuse: Research and Treatment, 14*, 1-28. https://doi.org/10.1177/1178221820909352

Schepis, T. S., Wastila, L., & McCabe, S. E. (2022). Family history of substance use disorder and likelihood of prescription drug misuse in adults 50 and older. *Aging & Mental Health*. Advance online publication. https://doi.org/10.1080/13607863.2022.2084711

Schilling, E. A., Aseltine, R. H., Jr., & Gore, S. (2007). Adverse childhood experiences and mental health in young adults: A longitudinal survey. *BMC Public Health, 7*(1), 30. https://doi.org/10.1186/1471-2458-7-30

Schuler, M. S., Dick, A. W., & Stein, B. D. (2019). Heterogeneity in prescription opioid pain reliever misuse across age groups: 2015-2017 National Survey on Drug Use and Health.

Journal of General Internal Medicine, 35(3), 792-799. https://doi.org/10.1007/s11606-019-05559-6

Svikis, D. S., McCaul, M. E., Turkkan, J. S., & Bigelow, G. E. (1991). Effects of item correction on Michigan Alcoholism Screening Test scores in college men with and without a family history of alcoholism. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 3*(4), 654-659. https://doi.org/10.1037/1040-3590.3.4.654

Swendsen, J., Conway, K. P., Degenhardt, L., Dierger, L., Glantz, M., Jin, R., Merikangas, K. R., Sampson, N., & Kessler, R. C. (2009). Socio-demographic risk factors for alcohol and drug dependence: The 10-year follow-up of the national comorbidity survey. *Addiction, 104*(8), 1246-1355. https://doi.org/10.1111/j.1360-0443.2009.02622.x

Tai B, Straus MM, Liu D, Sparenborg S, Jackson R, McCarty D. (2010). The first decade of the national drug abuse treatment clinical trials network: bridging the gap between research and practice to improve drug abuse treatment. *Journal of Substance Abuse Treatment, 38*(4), S4–S13. https://doi.org/10.1016/j.jsat.2010.01.011

Tong, S. T., Polak, K. M., Weaver, M. F., Villalobos, G. C., Smith, W. R., & Svikis, D. (2019). Screening for psychotherapeutic medication misuse in primary care patients: comparing two instruments. *Journal of the America Board of Family Medicine, 32*(2), 272-278. https://doi.org/10.3122/jabfm.2019.02.180172

Turner, W. M., Cutter, H. S., Worobec, T. G., O'Farrell, T. J., Bayog, R. D., & Tsuang, M. T. (1993). Family history models of alcoholism: Age of onset, consequences and dependence. *Journal of Studies on Alcohol and Drugs, 54*(2), 164-171. https://doi.org/10.15288/jsa.1993.54.164

Unger, J. B. (2012). The most critical unresolved issues associated with race, ethnicity, culture, and substance use. *Substance Use & Misuse*, *47*(4), 390-395. https://doi.org/10.3109/10826084.2011.638017

Üstün, B., Compton, W., Mager, D., Babor, T., Baiyewu, O., Chatterji, S., Cottler, L., Göğüş, A., Mavreas, V., Peters, L., Pull, C., Saunders, J., Smeets, R., Stipec, M.-R., Vrasti, R., Hasin, D., Room, R., Van den Brink, W., Regier, D. … Sartorius, N. (1997). WHO study on the reliability and validity of the alcohol and drug use disorder instruments: Overview of methods and results. *Drug and Alcohol Dependence*, *47*(3), 161-169. https://doi.org/10.1016/S0376-8716(97)00087-2

Vanyukov M. M., Kirisci L., Moss L., Tarter R. E., Reynolds M. D., Maher B. S., Kirillova, G. P., Ridenour, T., & Clark, D. B. (2009). Measurement of the risk for substance use disorders: Phenotypic and genetic analysis of an index of common liability. *Behavior Genetics*, *39*(3), 233–244. https://doi.org/10.1007/s10519-009-9269-9

Vasilenko, S. A., Evans-Polce, R. J., & Lanza, S. T. (2017). Age trends in rates of substance use disorders across ages 18-90: Differences by gender and race/ethnicity. *Drug and Alcohol Dependence*, *180*, 260-264. https://doi.org/10.1016/j.drugalcdep.2017.08.027

Vaughn, M. G., Nelson, E. J., Salas-Wright, C. P., Qian, Z., & Schootman, M. (2016). Racial and ethnic trends and correlates of non-medical use of prescription opioids among adolescents in the United States 2004-2013. *Journal of Psychiatric Research*, *73*, 17-24. http://dx.doi.org/10.1016/j.jpsychires.2015.11.003

Vega, W. A., Zimmerman, R. S., Warheit, G. J., Apospori, E., & Gil, A. G. (1993). Risk factors for early adolescent drug use in four ethnic and racial groups. *American Journal of Public Health*, *83*(2), 185–189. https://doi.org/10.2105/AJPH.83.2.185

Verhulst, B., Neale, M. C., & Kendler, K. S. (2015). The heritability of alcohol use disorders: a meta-analysis of twin and adoption studies. *Psychological Medicine, 45*(5), 1061-1072. https://doi.org/10.1017/S0033291714002165

Watt, T. T. (2008). The race/ethnic age crossover effect in drug use and heavy drinking. *Journal of Ethnicity in Substance Abuse, 71*(1), 93-114. https://doi.org/10.1080/15332640802083303

Wells, K., Klap, R., Koike, A. & Sherbourne, C. (2001). Ethnic disparities in unmet need for alcoholism, drug abuse, and mental health care. *American Journal of Psychiatry*, *158*(12), 2027–2032. https://doi.org/10.1176/appi.ajp.158.12.2027

Wheeler, P. B., Stevens-Watkins, D., Moody, M., Dogan, J., & Lewis, D. (2019). Culturally relevant risk and protective factors for nonmedical use of prescription opioids among incarcerated African American men. *Addictive Behaviors*, *93*, 46-51. https://doi.org/10.1016/j.addbeh.2019.01.014

Zapolski, T. C., Pedersen, S. L., McCarthy, D. M., & Smith, G. T. (2014). Less drinking, yet more problems: Understanding African American drinking and related problems. *Psychological Bulletin, 140*(1), 188–223. https://doi.org/10. 1037/a0032113

Table 1

Demographic Characteristics and Prevalence of Family History Density of Substance Problems and Drug Outcomes (n=3052)

Variable	Men *n*=871 (28.5%)	Women *n*=2181 (71.5%)	Total *n*=3052 (100%)
Age			
18 to 25	30 (3.4)	219 (10.0)	249 (8.2)
26 to 44	239 (27.4)	664 (30.4)	903 (29.6)
45 and older	602 (69.1)	1298 (59.5)	1900 (62.3)
Education			
Less than HS/GED	237 (32.1)	345 (20.8)	582 (24.3)
HS/GED	336 (45.5)	659 (39.7)	995 (41.5)
College	165 (22.4)	657 (39.6)	822 (43.2)
Employment			
Unemployed	375 (50.2)	689 (40.4)	1064 (43.4)
Employed full or part-time	169 (22.6)	606 (35.6)	775 (31.6)
On disability	159 (21.3)	301 (17.7)	460 (18.8)
Retired	44 (5.9)	108 (6.3)	152 (6.2)
Family History			
No family history	459 (52.7)	1163 (53.3)	1622 (53.1)
2nd degree relative only	45 (5.2)	102 (4.7)	147 (4.8)
1st degree relative only	282 (32.4)	689 (31.6)	971 (31.8)
Both 1st and 2nd degree relatives	85 (9.8)	227 (10.4)	312 (10.2)
Drug Use			
Yes	143 (16.4)	183 (8.4)	326 (10.7)
No	728 (93.6)	1998 (91.6)	2726 (89.3)
Risk for Drug Use Disorder			
Yes	142 (16.3)	190 (8.7)	332 (10.9)
No	729 (86.7)	1991 (92.3)	2720 (89.1)
Prescription Misuse			
Yes	61 (7.0)	166 (7.6)	277 (7.4)
No	810 (93.0)	2015 (92.4)	2825 (92.6)

Table 2

Characteristics and Associations Between Family History Density of Substance Problems and Sociodemographic and Drug Outcome Variables

	No FH *n* = 1622 *n* (%)	2nd degree only *n* = 147 *n* (%)	1st degree only *n* = 971 *n* (%)	Both 1st and 2nd degree *n* = 312 *n* (%)	*p*
Gender					0.8659
Male	459 (52.7)	45 (5.2)	282 (32.4)	85 (9.8)	
Female	1163 (53.3)	102 (4.7)	689 (31.6)	227 (10.4)	
Age					<0.0001
18 to 25	127 (51.0)	17 (6.8)	63 (25.3)	42 (16.9)	
26 to 44	439 (48.6)	50 (5.5)	273 (30.2)	141 (15.6)	
45 and older	1056 (55.6)	80 (4.2)	635 (33.4)	129 (6.8)	
Education					0.0108
Less than HS/GED	290 (49.8)	26 (4.5)	203 (34.9)	63 (10.8)	
HS/GED	545 (54.8)	32 (3.2)	327 (32.9)	91 (9.2)	
College	438 (53.3)	49 (6.0)	238 (29.0)	97 (11.8)	
Employment					0.0007
Unemployed	519 (48.8)	53 (5.0)	367 (32.5)	125 (11.8)	
Employed full or part-time	431 (55.6)	34 (4.4)	233 (30.1)	77 (9.9)	
On disability	243 (52.8)	21 (4.6)	147 (32.0)	49 (10.7)	
Retired	97 (63.8)	1 (0.7)	48 (31.6)	6 (4.0)	
Drug use					<0.0001
Yes	117 (7.2)	19 (12.9)	122 (12.6)	68 (21.8)	
No	1505 (92.8)	128 (87.1)	849 (87.4)	244 (78.2)	
Drug use Disorder					<0.0001
Yes	113 (7.0)	21 (14.3)	124 (12.8)	74 (23.7)	
No	1509 (93.0)	126 (85.7)	847 (87.2)	238 (76.3)	
Prescription Drug misuse					<0.0001
Yes	85 (5.2)	8 (5.4)	90 (9.3)	44 (14.1)	
No	1537 (94.8)	139 (94.6)	881 (90.7)	268 (85.9)	

Table 3

Associations Between the Drug Outcome Variables, Sociodemographics, and Family History Density of Substance Problems

	DU *n* = 326			Risk for DUD *n* = 332			Prescription drug misuse *n* = 227		
	n (%)	χ^2	*p*	*n* (%)	χ^2	*p*	*n* (%)	χ^2	*p*
Gender		39.14	< 0.0001		34.59	< 0.0001		0.34	0.5612
Male	143 (16.4)			142 (16.3)			61 (7.0)		
Female	183 (8.4)			190 (8.7)			166 (7.6)		
Age		24.36	< 0.0001		17.93	0.0001		5.19	0.0745
18 to 25	39 (12.0)			36 (10.8)			19 (8.4)		
26 to 44	125 (38.3)			125 (37.7)			82 (36.1)		
45 and older	162 (49.7)			171 (51.5)			126 (55.5)		
Education		1.97	0.3729		2.30	0.3171		0.14	0.9338
Less than HS/GED	65 (24.9)			57 (26.0)			46 (25.0)		
HS/GED	117 (44.7)			97 (44.3)			74 (40.2)		
College	80 (30.5)			65 (29.7)			64 (34.8)		
Employment		22.30	< 0.0001		25.34	< 0.0001		3.31	0.3466
Unemployed	149 (55.4)			129 (57.3)			93 (49.5)		
Employed full or part time	75 (27.9)			63 (28.0)			53 (28.2)		
On disability	38 (14.1)			28 (12.4)			33 (17.6)		
Retired	7 (2.6)			5 (2.2)			9 (4.8)		
Family History		59.12	< 0.0001		75.28	< 0.0001		34.18	< 0.0001
No family history	117 (35.9)			113 (34.0)			85 (37.4)		
2nd degree relative only	19 (5.8)			21 (6.3)			8 (3.5)		
1st degree relative only	122 (37.4)			124 (37.3)			90 (39.6)		
Both 1st and 2nd degree relatives	68 (20.9)			74 (22.3)			44 (19.4)		

DU=drug use, DUD=drug use disorder

Table 4

Logistic Regression Models of Sociodemographic Variables and Family History Density of Substance Problems on the Drug Outcome Variables

	DU $n = 326$ $R^2 = 6.9\%$			Risk for DUD $n = 332$ $R^2 = 9.6\%$			Prescription drug misuse $n = 227$ $R^2 = 2.3\%$		
	OR	*p*	95% CI	OR	*p*	95% CI	OR	*p*	95% CI
Gender									
Male	**2.40**	**< 0.0001**	**1.83, 3.14**	**2.78**	**< 0.0001**	**2.07, 3.74**			
Female	Ref			Ref					
Age									
18 to 25	1.76	0.0171	1.11, 2.79	1.86	0.0173	1.12, 3.09	1.08	0.7652	0.65, 1.80
26 to 44	**1.61**	**0.0011**	**1.21, 2.14**	**1.89**	**< 0.0001**	**1.39, 2.58**	1.29	0.0892	0.96, 1.74
45 and older	Ref			Ref			Ref		
Employment									
Unemployed	1.29	0.1002	0.95, 1.75	1.29	0.1310	0.93, 1.80			
Employed full or part time	Ref			Ref					
On disability	0.78	0.2597	0.51, 1.20	0.97	0.0984	0.41, 1.09			
Retired	0.56	0.2003	0.26, 1.32	0.55	0.2237	0.21, 1.43			
Family History									
No family history	Ref			Ref			Ref		
2nd degree relative only	1.51	0.1945	0.81, 2.82	1.87	0.0608	0.97, 3.61	1.02	0.9608	0.48, 2.15
1st degree relative only	**1.72**	**0.0004**	**1.27, 2.32**	**1.86**	**0.0002**	**1.35, 2.64**	**1.85**	**< 0.0001**	**1.36, 2.51**
Both 1st and 2nd degree relatives	**3.37**	**< 0.0001**	**2.34, 4.86**	**4.37**	**< 0.0001**	**2.96, 6.45**	**2.82**	**< 0.0001**	**1.91, 4.18**

DU=drug use, DUD=drug use disorder

Table 5

Subgroup Analyses by Gender

	Men ***n* = 871**						**Women** ***n* = 2181**					
	DU *n* = 142 R^2 = 2.1%		DUD *n* = 142 R^2 = 2.2%		Rx drug misuse *n* = 61		DU *n* = 183 R^2 = 6.8%		DUD *n* = 190 R^2 = 10.2%		Rx drug misuse *n* = 166 R^2 = 4.0%	
	ORs	95% CI	ORs	95% CI	ORs	95% CI	ORs	95% CI	ORs	95% CI	ORs	95% CI
Age												
18 to 25							**2.15****	**1.27, 3.64**	**2.30****	**1.28, 4.12**		
26 to 44							**1.88****	**1.27, 2.79**	**2.11****	**1.35, 3.30**		
45 and older							Ref		Ref			
Employment												
Unemployed							**1.56***	**1.05, 2.31**	1.49	0.96, 2.29	1.34	0.90, 2.00
Employed full or part time							Ref		Ref		Ref	
On disability							1.02	0.57, 1.80	0.69	0.34, 1.41	0.71	0.39, 1.27
Retired							0.37	0.09, 1.57	0.24	0.03, 1.85	0.37	0.11, 1.23
Family History												
No family history	Ref		Ref		Ref		Ref		Ref		Ref	
2nd degree relative only	2.10	0.98, 4.47	**2.67****	**1.30, 5.48**	1.40	0.47, 4.16	1.08	0.41, 2.82	1.71	0.64, 4.60	0.76	0.26, 2.46
1st degree relative only	**1.78****	**1.18, 2.68**	**1.66***	**1.10, 2.51**	0.98	0.53, 1.78	**1.77****	**1.17, 2.67**	**2.19****	**1.35, 3.57**	**2.01*****	**1.34, 3.01**
Both 1st and 2nd degree Relatives	**2.72*****	**1.56, 4.75**	**2.72*****	**1.56, 4.75**	1.69	0.77, 3.71	**3.72*****	**2.32, 5.96**	**5.72*****	**3.39, 9.65**	**3.19*****	**1.93, 5.26**

*p<0.05, **p < 0.01, ***p < 0.001 DU=drug use, DUD=drug use disorder, Rx=prescription

Chapter IV

Family History of Substance Problems among African Americans: Associations with Drug Use, Drug Use Disorder, and Prescription Drug Misuse

Discussion

The primary purpose of this study was to examine the relationship between a family history of substance (alcohol and/or drug) problems and outcomes for drug use, risk for drug use disorder, and prescription drug misuse among a sample of African American adults. Substance use, whether it is the use of licit or illicit drugs, or misuse of prescription drugs, is a national problem due to the negative consequences related to drug use and the subsequent development of substance or drug use disorders. Drug use can not only lead to the development of substance or drug use disorders and contribute to the loss of life, collectively substance use disorders (SUDs) have become one of the costliest health problems in the United States and these costs could be offset through prevention strategies (Miller & Hendrie, 2008). For African Americans the costs are even greater because they experience greater deleterious health and social consequences from drug use (National Institute on Drug Abuse [NIDA], 2003; Zapolski et al., 2014) and a higher risk for chronic dependence (Warner et al., 1995). Historically it has been reported that Whites have the highest rates of drug use, however those differences are narrowing and African Americans have had similar and at times greater prevalence rates for drug use, drug use disorders, and prescription drug misuse (Chen & Jacobsen, 2012; Mustaquim et al., 2021; Nicholson & Rigg, 2021). African Americans face greater consequences related to substance use as seen in higher rates of lung cancer (Ryan, 2018), HIV (Des Jarlais et al., 2017), and an increased likelihood of incarceration and longer jail sentences for drug offenses even though Whites have represented more than the majority of drug- and alcohol-related arrests (Camplain et

al., 2020; Demuth & Steffensmeier, 2004; Lichenstein, 2009). African Americans also face disparities in the treatment of SUDs. Minority participants (African Americans and Hispanics) in a national survey that reported having a SUD and receiving mental health care reported less access to care, poor quality of care, and a greater unmet need for alcohol use disorder, drug use disorder, and mental health treatment when compared to Whites (Wells et al., 2001). To help address these problems related to drug use, efforts are needed in understanding the pathways to substance use and identifying those most vulnerable to developing a SUD. A family history of alcohol and/or drug problems is one of the strongest and most well-known risk factors for SUDs, particularly for alcohol and drug use disorders (Merikangas et al., 1998). While there is strong evidence that a family history of substance problems is a risk factor for drug use and SUDs in the offspring, most of this research has been conducted in studies of predominantly White subjects and may not be generalizable to other racial or ethnic groups (Unger, 2012). Due to the vast research conducted on risk factors related to alcohol use and alcohol use disorders, the current study focused on outcomes for drug use, risk for drug use disorders, and prescription drug misuse.

A systematic review of the literature was undertaken prior to conducting the study to examine the association between a family history of substance problems and outcomes related to drug use and SUDs in African Americans. The literature search revealed few studies examining a family history of substance problems as a risk factor in African Americans; because of this, the systematic review also included studies that measured a family history of substance use or misuse (but not problems). While a family history of substance problems represents different influences of risk in the offspring compared to a family history of substance use, it was important to include both types of studies given the limited research within this population. The review

found that a family history of substance problems and substance use were risk factors for substance use particularly for African American adolescents and younger adults, but in later adulthood became more variable and/or substance dependent. Additional risk factors identified from the review included individual (male, high school dropout, previous substance use, low self-control, conduct disorder, discrimination, anxiety), peer (deviant behavior, substance use), and parent and family (involvement of child protective services, family conflict, school mobility, parental relationship or disciplinarian behaviors) domains. Most of the studies included in the review examined risk factors for substance use including licit or illicit drugs, however only two studies measured outcomes for substance use disorders (Arteaga et al., 2010; Green et al., 2012) and none of the studies examined risk for (nonalcohol) drug use disorders specifically. One study in the review examined risks for prescription drug misuse, however the sample was a group of incarcerated men which limits the generalizability of the results to this population (Wheeler et al., 2019). The results of the review identified a gap in the literature and supported the need for additional research as to whether a family history of substance problems is a risk factor for outcomes related to drug use, (nonalcohol) drug use disorders, and prescription drug misuse in African Americans particularly in adulthood when risk factors may differ from those in adolescence.

The current research study conducted a within-group approach design, versus a comparative approach to another race/ethnic group (i.e., Whites). The importance of the within-group design is that comparative approaches may inhibit the understanding of minority health, and could minimize the importance of these health issues eventually leading to reduced priority for those that influence health research agendas (Bediako & Griffith, 2008). Also, when White subjects (representing the majority) are used as the comparison or control group in research to

explain outcomes in an ethnic minority group there is an assumption that Whites represent a standard from which racial/ethnic minorities deviate (Whitefield et al., 2008). There is also the assumption that when research is examining group differences the underlying processes affecting the outcome of interest are the same; however, those underlying processes might be different for each racial/ethnic group thereby leading to differences in outcomes (Whitefield et al., 2008). The current research study also conducted further subgroup analyses by gender. The importance of a research study designed to focus on a sample of African Americans and conduct subgroup analyses by gender fulfills national policy and National Institute on Drug Abuse recommendations to address the underlying differential processes affecting women and minorities and to ensure that results can be applicable to these groups (Bennett, 1993; Greenfield et al., 2011; NIH, 2001).

For this study, family history was categorized by relationship and density of the family members with substance (alcohol and/or drug) problems: no family history, second-degree relative(s) only, first-degree relative only(s), and both first- and second-degree relatives. Different variations of this family history classification are described in the literature (e.g., McCaul et al., 1991; Pickens et al., 2001; Svikis et al., 1991). First-degree relatives are the mother and/or father, and second-degree relatives are the grandmother and/or grandfather. In this sample of African American adults (mean age 46.1, SD = 12.1), the results of the multivariable analyses for the entire group indicate that a family history density of substance problems is a significant risk factor for recent drug use, drug use disorder, and prescription drug misuse. Those participants who reported a first-degree relative(s) only and both first- and second-degree relatives with substance problems were at an increased risk for drug use, drug use disorder, and prescription drug misuse. Having a second-degree relative(s) only with a history of substance

problems, however, was not a risk factor for any drug outcome for the entire group. Additional results demonstrated that being male and those in the 26 to 44-year age group were at an increased risk for drug use and drug use disorder. Neither education nor the employment variables were significant risk or protective factors in the entire group for drug use, risk for drug use disorder, or prescription drug misuse. For prescription drug misuse the remaining sociodemographic variables (age, gender) were not significant risk or protective factors. The results indicating that men were at an increased risk for drug use and drug use disorder is supported by previous research demonstrating that males are at an increased risk for substance use and substance problems in national surveys (Harrington et al., 2011; Leeman et al., 2016; Morgan et al., 2010) and studies including all African American participants (Arteaga et al., 2010; Green et al., 2012). For prescription drug misuse, previous studies have also indicated that there are no differences in prevalence rates between men and women in both national surveys with predominantly White subjects (Merline et al., 2004) and 100% African American subjects (Rigg & Nicholson, 2019). Previous studies have also indicated that African Americans have higher rates of substance use in their 20s and 30s (Chen & Jacobsen, 2012) and more likely to use illegal drugs by age 35 years (Watt, 2008). Employment status was not significantly related to any drug outcome in the entire group which is contradictory to national surveys that show unemployment increases the risk for substance use, SUDs, and prescription drug misuse (Compton et al., 2014; Merline et al., 2004; Perlmutter et al., 2017). In this study education was not significantly related to any drug outcome which is unlike previous studies with African American adult participants indicating that dropping out of high school increases the risk for SUDs (Arteaga et al., 2010; Green et al., 2012) and graduating from high school or having some college decreased the likelihood of prescription opioid misuse (Rigg & Nicholson, 2019). Other

national surveys of adults however, have found that education was not significantly associated with drug use (Harrington et al., 2011) or prescription drug misuse in Blacks (Harrell & Broman, 2009). The findings from this study that education and employment status were not associated with the drug outcomes in the full sample could be related to a subjective interpretation of social status wherein SES indicators that would be associated with lower SES (i.e., low education levels, unemployment) are found to have the opposite effect. Objective measures of SES (income, education, employment) are found to be associated with a higher level of subjective social status in Whites, but for African Americans those who were unemployed and had lower levels of education perceived themselves higher on a subjective social status scale (Shaked et al., 2016). This could be interpreted as common indicators of SES do not have the same effects on health behavior or health outcomes in African Americans as they do in Whites and African Americans may use different criteria to define social status (Ostrover et al., 2000).

When subgroup analysis by gender was conducted, men and women had different results. Similar for the entire group, education was not significantly associated with any drug outcome in both men and women. For women, being unemployed was marginally significant as a risk factor for drug use, and family history density of substance problems was a significant risk factor for all drug outcomes. Those women ages 18 to 25 and 26 to 44 years were at an increased risk for drug use and drug use disorder but not prescription drug misuse. Similar for the entire group, having a first-degree relative only and both first- and second-degree relatives with substance problems increased the risk in women for drug use, drug use disorder, and prescription drug misuse. For the men, only family history density remained a significant risk factor for drug use and risk for drug use disorder in the final models. No level of family history density of substance problems was significant in men for prescription drug misuse. None of the sociodemographic variables

(age, education, employment) were significant among the males for any drug outcome. Having a first-degree relative only and both first- and second-degree relatives with substance problems increased the risk for drug use. Interestingly, only for men were all levels of family history density of substance problems (second-degree only, first-degree only, both first- and second-degree) significant for risk of drug use disorder. In the full group analyses, having a second-degree relative only was not significant for any drug outcome. A unique finding for the men in the subgroup analyses was that those that reported a second-degree relative(s) only with a history of substance problems were at increased risk for drug use disorder and this risk was nearly similar as the group reporting both first- and second-degree relatives. A possible mechanism associated with this result could be related to the subject's relationship with their second-degree relatives (grandparents) as in some African American family's grandparents may function in the role of surrogate parent (Bertera & Crewe, 2013), however this perspective has not been explored in relation so drug use. Previous studies, however, have indicated that family and parenting factors have been associated with increased risks for drug use in African Americans (Doherty et al., 2008; Friedman & Glassman, 2000).

Results of this study indicate that family history density of substance problems increased the risk for all drug outcomes in the full sample, but the results for men and women were different. A family history density of substance problems increased the risk for drug use and drug use disorder for both women and men, but it was only a significant risk factor for prescription drug misuse in women. None of the predictor variables were significant risk or protective factors in the men for prescription drug misuse. Other risks for prescription misuse not explored in this study that have been found to have a variable effect among men and women include perceptions of overall health status, other mental health disorders, and other substance use (Nicholson &

Vincent, 2019). Previous studies that have conducted separate analyses by gender have found that a family history density of alcohol or drug use disorders increased the risk of drug use disorders for both women and men (McCabe et al., 2022). Also, national surveys and a study with a sample of majority Black/African American subjects, indicated a family history of SUDs increased the likelihood of prescription drug misuse and SUD from prescription drug misuse, however, these studies did not conduct separate analyses by gender (Liebschutz et al., 2010; Schepis et al., 2022). The results from the current study demonstrate the gender differences in risk for drug use, drug use disorder, and prescription drug misuse, and that there are other factors among men not measured that raise their risk for prescription drug misuse and warrant further exploration.

Limitations

The findings from this research study should be interpreted with caution due to several limitations. First, family history data for substance problems was based on participants reports on family members, the family members were not interviewed directly; however, reporting on a family member's substance problems has high reliability and validity (Hardt & Frank, 2007). Second, many published studies using family density measure of family history focus on parents and siblings for first-degree relatives and aunts/uncles and grandparents for second-degree relatives. The present study limited assessment to parents (first-degree) and grandparents (second-degree). Had these other categories of relatives been included (siblings, aunts/uncles) the findings may have varied. Third, participants may not know whether their family members have a problem with drugs or alcohol, or they may underreport or misreport their family history status. While the rates of missing data were very low, any case with missing values was excluded from the analyses which may reduce statistical power and result in bias (Graham, 2009).

When conducting secondary data analyses there are threats to reliability from the accuracy of the data collection and coding of variables in the original study. Fourth, the cross-sectional design of the study limits interpretation of the results to association and should not infer causation between family history of substance problems and the drug outcomes. Fifth, since only self-report measures were used the results may be affected by underreporting and social desirability bias. Social desirability bias occurs when participants answer the questions from a survey or questionnaire in a manner that they view as socially acceptable (Polit & Beck, 2017). Threats of underreporting and social desirability bias were minimized by administering the survey with a tablet computer, providing privacy and assuring the participants the survey was anonymous. Lastly, because the sample population was limited to adult non-Hispanic African Americans, the results may not be generalizable to other age groups or racial/ethnic groups.

Conclusions

The systematic review of the literature found that for African Americans a family history of alcohol and/or drug use or problems are risk factors for substance use, including drug use, in adolescence and young adulthood, but may not be as much of risk factor for substance use or SUDs by mid-or late-adulthood. The findings from the review indicating that family history may not be as much of a risk factor by mid- or late-adulthood may be related to the data collected on family history in which those studies collected a family history of substance use and not substance problems. While both types of family history represent sources of risk in relation to substance use and SUDs in the offspring, a family history of substance problems represents a direct risk factor that can modulate the effect of other risk factors (Kendler, 2001). Findings from the current research study indicate that for African American adults family history density of substance problems is associated with recent drug use, risk for drug use disorder, and

prescription drug misuse. When men and women were examined separately, family history density remained significant among women for all drug outcomes but was not significant among men as a risk for prescription drug misuse. Additional unique findings were that neither education nor employment were significantly associated with the drug outcomes for the entire sample, but in the subgroup analysis unemployment was marginally significant for drug use in women. Also unique to the women were the significant associations for the 18 to 25-year age group with drug use and risk for drug use disorder. The results from this study support the evidence that there are differences between men and women in risk for substance use and in the development of SUDs (McHugh et al., 2018; Morgan et al., 2010; Vasilenko et al., 2017). Collectively, the results of the systematic review and the findings from the research study demonstrate a need for further research focusing on risk factors in African Americans. Future research should further explore whether a family history of substance problems is a risk factor for drug use, including prescription drug misuse, and disorders in African Americans, particularly in later adulthood past the 20s and early 30s and into the 40s where risk factors may be different. Other risk factors may have a stronger influence on risk for substance use and related problems in African American adults such racial discrimination (Clark, 2014; Zapolski et al., 2020), and those related to the family (e.g., relationships, conflict, abuse) and peer influence and should be further explored (Arteaga et al., 2010; Doherty et al., 2008). Given the scarcity of studies examining a family history of substance problems for the systematic review, and results of this study indicating differences in risk between women and men, additional research is warranted in this population of the risks related to drug use, risk for drug use disorders, and prescription drug misuse.

Implications

The results of the systematic review and findings from the research study suggests the continued need for additional research that focuses on sociocultural risk factors for substance use and SUDs; particularly for outcomes related to drug use, drug use disorders and prescription drug misuse, relevant to the African American adult population. There are several previous studies that indicate risk models for drug use, SUDs, and prescription drug misuse have distinct predictors for racial/ethnic minority groups and they are not the same as those for Whites (Brown et al., 2004; Ellickson & Morton, 1999; Galaif et al., 2007; Harrell & Broman, 2009; Vanyukov et al., 2009). The findings from the current study that found the two measures of SES were not associated with any drug outcome, and unemployment status only marginally significant in women in the subgroup analyses, could be related to subjective interpretation of those SES indicators which affect African Americans differently (Ostrover et al., 2000). Subjective social status has been shown to be more highly related to health outcomes that objective measures (education, income, employment) of SES (Singh-Manoux et al., 2005), however, research is lacking if this relationship applies to outcomes related to drug use. In addition, the results of the study also support the need for continued subgroup analysis by gender in research studies to elucidate the different risk and protective factors for men and women.

The findings of this study support an increased risk for drug use and risk for drug use disorder in those with a family history density of substance problems and the risk increases with a higher family density. For prescription drug misuse no degree of family history density was a significant risk factor for men. This finding highlights the necessity to examine risks separately within men and women. Understanding individual risk factors can be a determinant in prevention and a motivator for change in health behavior to reduce that risk (Claassen et al., 2010). Perceptions of risk may motivate individuals to engage in preventative behavior which may in

turn lower their personal risk perception (Brewer, et al., 2004). Knowledge of a family history of a disease or disorder is associated with perceived risk and perceived severity, and strongly associated with adherence to health promotion behaviors to reduce risk (Hunt, et al., 2000). Perceptions of risk, or susceptibility, to a particular health condition is one of the key beliefs of the Health Belief Model which is a method of understanding the processes of why people modify their behavior and make lifestyle changes to reduce their own personal risk (Rosenstock, 1966/2005). Family history influences all dimensions of the Health Belief Model and knowledge of one's family history is able to motivate lifestyle changes (Prom-Wormley et al., 2019). While a family history of substance problems is not necessarily a direct measurement of the biological, psychological, and social/environmental factors that contribute to the multitude of variables that affect the risk of substance use and SUDs, it can serve as an indicator of those potential contributing factors thereby serving as a marker of risk. The implications from the findings of this study can inform future research and preventative measures including screening for risk for substance use and substance use disorders, particularly within the African American population. Recommendations for future research include exploring the relevance of whether objective measures of SES are the appropriate method of examining risk in African Americans and whether determinants affecting subjective social status may be more appropriate. Future research and prevention efforts should also consider the role of a family history of substance problems in screening for risk for drug use, drug use disorder, and prescription drug misuse among African Americans. Additional studies are also needed to explore the gender differences in risks related to substance use outcomes so that preventative efforts are tailored to the appropriate needs of these demographic groups.

References

Arteaga, I., Chen, C.-C., & Reynolds, A. J. (2010). Childhood predictors of adult substance abuse. *Children and Youth Services Review, 32*(8), 1108-1120. https://doi.org.10.1016/j.childyouth.2010.04.025

Bediako, S. M., & Griffith, D. M. (2008). Eliminating racial/ethnic health disparities: reconsidering comparative approaches. *Journal of Health Disparities Research and Practice, 2*(1), 49-62.

Bennett, J. C. (1993). Inclusion of women in clinical research trials – policies for population subgroups. *The New England Journal of Medicine, 329*(4), 288-292. https://doi.org/10.1056/NEJM199307223290428

Bertera, E. M., & Crewe, S. E. (2013). Parenthood in the twenty-first century: African American grandparents as surrogate parents. *Journal of Human Behavior in the Social Environment, 23*(2), 178-192. https://doi.org/10.1080/10911359.2013.747348

Brewer, N. T., Weinstein, N. D., Cuite, C. L., & Herrington, Jr., J. E. (2004). Risk perceptions and their relation to risk behavior. *Annals of Behavioral Medicine, 27*(2), 125-130. https://doi.org/10.1207/s15324796abm2702_7

Brown, T. L., Flory, K., Lynam, D. R., Leukefeld, C., & Clayton, R. R. (2004). Comparing the developmental trajectories of marijuana use of African American and Caucasian adolescents: Patterns, antecedents, and consequences. *Experimental and Clinical Psychopharmacology, 12*(1), 47–56. https://doi.org/10.1037/1064-1297.12.1.47

Camplain, R., Camplain, C., Tronner II, R. T., Pro, G., Sabo, S., Eaves, E., Peoples, M., & Baldwin, J. A. (2020). Racial/ethnic differences in drug- and alcohol-related arrest

outcomes in a southwest county from 2009 to 2018. *American Journal of Public Health, 110*(S1), S85-S92. https://doi.org/10.2105/AJPH.2019.305409

Chen, P., & Jacobson, K. C. (2012). Developmental trajectories of substance use from early adolescence to young adulthood: Gender and racial/ethnic differences. *Journal of Adolescent Health, 50*(2), 154-163. https://doi.org/10.1016/j.jadohealth.2011.05.013

Claassen, L., Henneman, L., Janssens, A. C. J. W., Wijdenes-Pilj, M., Qureshi, N., Walter, F. M., Yoon, P. W., & Timmermans, D. R. M. (2010). Using family history information to promote healthy lifestyles and prevent diseases; a discussion of the evidence. *BMC Public Health, 10*(1), 248. http://www.biomedcentral.com/1471-2458/10/248

Clark, T. T. (2014). Perceived discrimination, depressive symptoms, and substance use in young adulthood. *Addictive Behaviors, 39*(6), 1021-1025. https://doi.org/10.1016/j.addbeh.2014.01.013

Compton, W., Gfoerer, K., Conway, K., & Finger, M. S. (2014). Unemployment and substance outcomes in the united states 2002 – 2010. *Drug and Alcohol Dependence, 142*, 350-353. https://doi.org/10.1016/j.drugalcdep.2014.06.012

Demuth, S., & Steffensmeier, D. (2004). Ethnicity effects on sentence outcomes in large urban courts: Comparisons among White, Black, and Hispanic defendants. *Social Sciences Quarterly, 85*(4), 994–1011. https://doi.org/10.1111/j.0038-4941.2004.00255.x

Des Jarlais, D. C., Arasteh, K., McKnight, C., Feelemyer, J., Tross, S., Perlman, D., Friedman, S., Campbell, A. (2017). Racial/ethnic disparities at the end of an HIV epidemic: Persons who inject drugs in New York City, 2011-2015. *American Journal of Public Health, 107*(7), 1157-1163. https://doi.org/10.2105/AJPH.2017.303787

Doherty, E. E., Green, K. M., Reisinger, H. S., & Ensminger, M. E. (2008). Long-term patterns of drug use among an urban African-American cohort: The role of gender and family. *Journal of Urban Health, 85*(2), 250-267. https://doi.org/10.1007/s11524-007-9246-7

Ellickson, P., & Morton, S. (1999). Identifying adolescents at risk for hard drug use: Racial/ethnic variations. *Journal of Adolescent Health, 25*(6), 382-395. https://doi.org/10.1016/S1054-139X(98)00144-X

Friedman, A. S., & Glassman, K. (2000). Family risk factors versus peer risk factors for drug abuse: A longitudinal study of an African American urban community sample. *Journal of Substance Abuse Treatment, 18*(3), 267-75. https://doi.org/10.1016/S0740-5472(99)00072-0

Galaif, E. R., Newcomb, M. D., Vega, W. A., & Krell, R. D. (2007). Protective and risk influences of drug use among a multiethnic sample of adolescent boys. *Journal of Drug Education, 37*(3), 249-276. https://doi.org/10.2190/DE.37.3.c

Graham, J. W. (2009). Missing data analysis: making it work in the real world. *Annual Review of Psychology, 60*(1), 549–576. https://doi.org10.1146/annurev.psych.58.110405.085530

Green, K. M., Zebrak, K. A., Fothergill, K. E., Robertson, J. A., & Ensminger, M. E. (2012). Childhood and adolescent risk factors for comorbid depression and substance use disorders in adulthood. *Addictive Behaviors, 37*(11), 1240-1247. https://doi.org/10.1016/j.addbeh.2012.06.008

Greenfield, S. F., Rosa, C., Putnins, S. I., Green, C. A., Brooks, A. J., Calsyn, D. A., Cohen, L. R., Erickson, S., Gordon, Sl. M., Haynes, L., Killeen, T., Miele, G., Tross, S., & Winhusen, T. (2011). Gender research in the National Institute on Drug Abuse Clinical

Trials Network: A summary of findings. *American Journal of Drug and Alcohol Abuse, 37*(5), 301-312. https://doi.org/10.3109/00952990.2011.596875

Hardt, J., & Franke, P. (2007). Validity, reliability and objectivity of the family history method in psychiatry: A meta analysis. *European Psychiatry, 22*(1), 49-58. https://doi.org/10.1016/j.eurpsy.2006.10.003

Harrell, Z. A. T., & Broman, C. L. (2009). Racial/ethnic differences in correlates of prescription drug misuse among young adults. *Drug and Alcohol Dependence, 104*(3), 268-271. https://doi.org/10.1016/j.drugalcdep.2009.05.017

Harrington, M., Robinson, J., Bolton, S-L., Sareen, J., & Bolton, J. M. (2011). A longitudinal study of risk factors for incident drug use in adults: Findings from a representative sample of the US population. *Canadian Journal of Psychiatry, 56*(11), 686-695. https://doi.org/10.1177/070674371105601107

Hunt, K., Davison, C., Emslie, C., & Ford, G. (2000). Are perceptions of a family history of heart disease related to health-related attitudes and behaviour? *Health Education Research, 15*(2), 131-143. https://doi.org/10.1093/her/15.2.131

Kendler, K. S. (2001). Family history information in biomedical research. *The Journal of Continuing Education in the Health Professions, 21*(4), 215-223. https://doi.org/10.1002/chp.1340210405

Leeman, R. F., Sun, Q., Bogart, D., Beseler, C. L., & Sofuoglu, M. (2016). Comparisons of cocaine-only, opioid-only and users of both substances in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *Substance Use & Misuse, 51*(5), 553-564. https://doi.org/10.3109/10826084.2015.1122063

Lichtenstein, B. (2009). Drugs, incarceration, and HIV/AIDS among African American men: A critical literature review and call to action. *American Journal of Men's Health, 3*(3), 252-264. https://doi.org/10.1177/1557988308320695

Liebschutz, J. M., Saitz, R., Weiss, R. D., Averbuch, T., Schwartz, S., Meltzer, E. C., & Samet, J. H. (2010). Clinical factors associated with prescription drug use disorder in urban primary care patients with chronic pain. *The Journal of Pain, 11*(11), 1047–1055. https://doi.org/10.1016/j.jpain.2009.10.012

McCabe, S. E., Hughes, T. L., Fish, J. N., Hoak, S., Kcomt, L., Evans-Polce, R. J., Engstrom, C. Leary, K., Veliz, P., West, B. T., McCabe, V. V., & Boyd, C. J. (2022). Is it all in the family? Sexual identity differences in DSM-5 alcohol and other drug use disorders and associations with alcohol and other drug misuse history among parents, offspring, and other relatives. *Substance Abuse, 43*(1), 1277-1285. https://doi.org/10.1080/08897077.2022.2095080

McCaul, M. E., Turkkan, J. S., Svikis, D. S., & Bigelow, G. E. (1991). Familial density of alcoholism: Effects on psychophysiological responses to ethanol. *Alcohol, 8*(3), 219-222. https://doi.org/10.1016/0741-8329(91)90870-3

McHugh, R. K., Votaw, V. R., Sugarman, D. E., & Greenfield, S. F. (2018). Sex and gender differences in substance use disorders. *Clinical Psychology Review, 66*, 12-23. https://doi.org/10.1016/j.cpr.2017.10.012

Merikangas, K. R., Stolar, M., Stevens, D. E., Goulet, J., Preisig, M. A., Fenton, B., Zhang, H., O'Malley, S. S., & Rounsaville, B. J. (1998). Familial transmission of substance use disorders. *Archives of General Psychiatry, 55*(11), 973-979. https://doi.org/10.1001/archpsyc.55.11.973

Merline, A. C., O'Malley, P. M., Schulenberg, J. E., Bachman, J. G., & Johnston, L. D. (2004). Substance use among adults 35 years of age: Prevalence, adulthood predictors, and impact of adolescent substance use. *American Journal of Public Health, 94*(1), 96-102. https://doi.org/10.2105/AJPH.94.1.96

Miller, T., & Hendrie, D. (2008). *Substance Abuse Prevention Dollars and Cents: A Cost-Benefit Analysis,* DHHS Pub. No. (SMA) 07-4298. Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration. https://www.samhsa.gov/sites/default/files/cost-benefits-prevention.pdf

Morgan, P. T., Desai, R. A., & Potenza, M. N. (2010). Gender-related influences of parental alcoholism on the prevalence of psychiatric illnesses: Analysis of the National Epidemiologic Survey on Alcohol and Related Conditions. *Alcoholism: Clinical and Experimental Research, 34*(10), 1759-1767. https://doi.org/10.1111/j.1530-0277.2010.01263.x

Mustaquim, D., Jones, C. M., & Compton, W. M. (2021). Trends and correlates of cocaine use among adults in the United States, 2006-2019. *Addictive Behaviors, 120,* 106950. https://doi.org/10.1016/j.addbeh.2021.106950

National Institutes of Health. (2001). *NIH policy and guidelines on the inclusion of women and minorities as subjects in clinical research*. https://grants.nih.gov/policy/inclusion/women-and-minorities/guidelines.htm

National Institute on Drug Abuse. (2003, September 1). *Drug use among racial/ethnic minorities*. https://archives.drugabuse.gov/publications/drug-use-among-racialethnic-minorities

Nicholson, H. L., & Rigg, K. K. (2021). Prescription opioid misuse among Black and White older adults. *Addiction Research & Theory*, 1-7. https://doi.org/10.1080/16066359.2021.1902508

Ostrove, J. M., Adler N. E., Kuppermann, M., & Washington, A. E. (2000). Objective and subjective assessments of socioeconomic status and their relationship to self-rated health in an ethnically diverse sample of pregnant women. *Health Psychology, 19*(6), 613–618. http://doi.org/10.1037/0278-6133.19.6.613

Perlmutter, A. S., Conner, S. C., Savone, M., Kim, J. H., Segura, L. E., & Martins, S. S. (2017). Is employment stat us in adults over 25 years old associated with nonmedical prescription opioid and stimulant use? *Social Psychiatry and Psychiatric Epidemiology, 52*(3), 291-298. https://doi.org/10.1007/s00127-016-1312-6

Pickens, R. W., Preston, K. L., Miles, D. R., Gupman, A. E., Johnson, E. O., Newlin, D. B., Soriano, J., van den Bree M. B., & Umbricht, A. (2001). Family history influence on drug abuse severity and treatment outcome. *Drug and Alcohol Dependence, 61*(3), 261-270. https://doi.org/10.1016/S0376-8716(00)00146-0

Polit, D. F., & Beck, C. T. (2017). *Nursing research: Generating and assessing evidence for nursing practice* (10th ed.). Lippincott Williams & Wilkins.

Polak, K., Haug, N. A., Drachenberg, H. E. & Svikis, D. S. (2015). Gender considerations in addiction: Implications for treatment. *Current Treatment Options Psychiatry, 2*(3), 326-338. https://doi.org/10.1007/s40501-015-0054-5

Pollack, C. D. (1999). Methodological considerations with secondary analysis. *Outcomes Management for Nursing Practice, 3*(4), 147-152.

Prom-Wormley, E. C., Clifford, J. S., Bourdon, J. L., Barr, P., Blondino, C., Ball, K. M., Montgomery, J., Davis, J. K., Real, J. E., Edwards, A. C., Thiselton, D. L., Creighton, G. C., Wilson, D., & Newbille, C. (2019). Developing community-based health education strategies with family history: Assessing the association between community resident family history and interest in health education. *Social Science & Medicine, 271*, 112160. https://doi.org/10.1016/j.socscimed.2019.02.011

Rigg, K. K., & Nicholson, H. L. (2019). Prescription opioid misuse among African-American adults: A rural-urban comparison of prevalence and risk. *Drug and Alcohol Dependence, 197*, 191-196. https://doi.org/10.1016/j.drugalcdep.2019.01.023

Rosenstock, I. M. (1966/2005). Why people use health services. *The Millbank Quarterly, 83*(4), 1-32. https://doi.org/10.1111/j.1468-0009.2005.00425.x (Reprinted from *The Milbank Memorial Fund Quarterly*, 44(3), Pt. 2, 1966, pp. 94–124).

Ryan, B. M. (2018). Lung cancer health disparities. *Carcinogenesis, 39*(6), 741-751. https://doi.org/10.1093/carcin/bgy047

Schepis, T. S., Wastila, L., & McCabe, S. E. (2022). Family history of substance use disorder and likelihood of prescription drug misuse in adults 50 and older. *Aging & Mental Health*. Advance online publication. https://doi.org/10.1080/13607863.2022.2084711

Shaked, D., Williams, M., Evans, M. K., & Zonderman, A. B. (2016). Indicators of subjective social status: Differential associations across race and sex. *SSM – Population Health, 2*, 700-707. https://doi.org/10.1016/j.ssmph.2016.09.009

Singh-Manoux, A., Marmot, M. G., & Adler, N. E. (2005). Does subjective social status predict health and change in health status better than objective status? *Psychosomatic Medicine, 67*(6), 855-861. https://doi.org/10.1097/01.psy.0000188434.52941.a0

Svikis, D. S., McCaul, M. E., Turkkan, J. S., & Bigelow, G. E. (1991). Effects of item correction on Michigan Alcoholism Screening Test scores in college men with and without a family history of alcoholism. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 3*(4), 654-659. https://doi.org/10.1037/1040-3590.3.4.654

Unger, J. B. (2012). The most critical unresolved issues associated with race, ethnicity, culture, and substance use. *Substance Use & Misuse, 47*(4), 390-395. https://doi.org/10.3109/10826084.2011.638017

Vanyukov M. M., Kirisci L., Moss L., Tarter R. E., Reynolds M. D., Maher B. S., Kirillova, G. P., Ridenour, T., & Clark, D. B. (2009). Measurement of the risk for substance use disorders: Phenotypic and genetic analysis of an index of common liability. *Behavior Genetics, 39*(3), 233–244. https://doi.org/10.1007/s10519-009-9269-9

Vasilenko, S. A., Evans-Polce, R. J., & Lanza, S. T. (2017). Age trends in rates of substance use disorders across ages 18-90: Differences by gender and race/ethnicity. *Drug and Alcohol Dependence, 180,* 260-264. https://doi.org/10.1016/j.drugalcdep.2017.08.027

Warner, L. A., Kessler, R. C., Hughes, M., Anthony, J. C., & Nelson, C. B. (1995). Prevalence and correlates of drug use and dependence in the United States: Results from the National Comorbidity Survey. *Archives of General Psychiatry, 52*(3), 219–229. https://doi.org/10.1001/archpsyc.1995.03950150051010

Watt, T. T. (2008). The race/ethnic age crossover effect in drug use and heavy drinking. *Journal of Ethnicity in Substance Abuse, 71*(1), 93-114. https://doi.org/10.1080/15332640802083303

Wells, K., Klap, R., Koike, A. & Sherbourne, C. (2001). Ethnic disparities in unmet need for alcoholism, drug abuse, and mental health care. *American Journal of Psychiatry, 158*(12), 2027–2032. https://doi.org/10.1176/appi.ajp.158.12.2027

Wheeler, P. B., Stevens-Watkins, D., Moody, M., Dogan, J., & Lewis, D. (2019). Culturally relevant risk and protective factors for nonmedical use of prescription opioids among incarcerated African American men. *Addictive Behaviors, 93*, 46-51. https://doi.org/10.1016/j.addbeh.2019.01.014

Whitefield, K. E., Allaire, J. C., Belue, R., & Edwards, C. L. (2008). Are comparisons the answer to understanding behavioral aspects of aging in racial and ethnic groups? *Journal of Gerontology: Psychological Sciences, 63B*(5), P301-P308.

Zapolski, T. C., Pedersen, S. L., McCarthy, D. M., & Smith, G. T. (2014). Less drinking, yet more problems: Understanding African American drinking and related problems. *Psychological Bulletin, 140*(1), 188–223. https://doi.org/10. 1037/a0032113

Zapolski, T. C. B., Yu, T., Brody, G. H., Banks, D. E., & Barton, A. W. (2020). Why now? Examining antecedents for substance use initiation among African American Adolescents. *Development and Psychopathology, 32*(2), 719-734. https://doi.org/10.1017/S0954579419000713

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EDUCATION

September 1992- June 1995	Washington State Community College, Marietta, Ohio Associate Degree in Nursing, June 2, 1995
March 1996- June 1998	Ohio University, Athens, Ohio Bachelor of Science in Nursing, June 6, 1998 *Cum Laude*
August 2002- December 2004	Georgetown University, Washington, DC Master of Science, Nurse Anesthesia, December 31, 2004
August 2017- December 2022	Virginia Commonwealth University, Richmond, Virginia PhD in Nursing, December 10, 2022

PROFESSIONAL EXPERIENCE

January 2017- Present *Kaiser Permanente Tysons Corner, Certified Registered Nurse Anesthetist*, McLean, VA

- Staff CRNA at Kaiser Permanente's ambulatory surgery center.
- Administration and management of general and monitored anesthesia care for pediatric and adults for a variety of cases including but not limited to ENT, gynecological, ophthalmology, orthopedic, podiatry, and urology.

June 2013- Present *Northstar Anesthesia, Certified Registered Nurse Anesthetist*, Fredericksburg, VA

- Staff CRNA for Northstar Anesthesia providing anesthesia services at the Surgi-Center of Central Virginia.
- Administration and management of general and monitored anesthesia care primarily for adults.

January 2005- October 2019 *Mary Washington Healthcare, Certified Registered Nurse Anesthetist,* Fredericksburg, VA

- Staff CRNA at Mary Washington Hospital, Stafford Hospital Center, and Fredericksburg Ambulatory Surgery Center.
- Administration and management of general anesthesia for cardiac, neurology, robotic, obstetric, gynecological, ambulatory, endoscopy, thoracic, trauma, orthopedic, urology, and pediatric surgery.
- Administration and management of anesthesia techniques in remote locations.
- Regional anesthesia administration and management of epidural and spinal techniques for labor and delivery.
- Administration and management of monitored anesthesia care and postoperative pain management.

March 1998- March 2003 *Sentara Norfolk General Hospital, Registered Nurse,* Norfolk, VA

- Staff nurse, Cardiovascular-Thoracic Intensive Care Unit.

June 1994 - February 1998 *Camden-Clark Memorial Hospital, Registered Nurse,* Parkersburg, WV

- Staff nurse, Intensive Care step-down/Telemetry Unit and Coronary Care Unit.
- Nursing technician

PRESENTATIONS AND PUBLICATIONS

Mahrs-Gould, R., Kelpin, S., Polak, K., Alvanzo, A. H., Villalobos, G., Dillon, P., Ondersma, S., & Svikis, D. (2019, April). *Family history of alcohol problems as a marker in men and women for other health risks.* Poster session presented at the VCU Institute for Women's Health Women's Health Research Day, Richmond, VA.

Christ, J., Cutler, R., **Mahrs, R**., Jasinski, D., & Pearson, J. (2006). A published student journal: Effect on graduate students of nurse anesthesia. *AANA Journal, 74*(6), 433-439.

PROFESSIONAL AND HONOR SOCIETIES

- American Nurses Association
- American Association of Nurse Anesthetists
- Southern Nursing Research Society
- The Honor Society of *Phi Theta Kappa* at Washington State Community College, December, 1993
- The Honor Society of *Phi Kappa Phi* at Ohio University, May 3, 1998
- The Honor Society of Nursing *Sigma Theta Tau*, Lambda Omega Chapter, October 5, 1997

LICENSURE AND CERTIFICATIONS

Commonwealth of Virginia, Registered Nurse, exp. October 31, 2023
Commonwealth of Virginia, Nurse Practitioner-Nurse Anesthetist, exp. October 31, 2023
NBCRNA Certification, exp. July 31, 2023
BLS (Basic Life Support) exp. February 2024
ACLS (Advanced Cardiac Life Support) exp. February 2024
PALS (Pediatric Advanced Life Support) exp. February 2024