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Gonorrhea/Chlamydia Infections: Role of Age, Sexual Abuse, and Sexual Contact Among African Americans in NC

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This is to certify that the doctoral study by

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Walden University
2025

Abstract

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Among African Americans in NC

by

Thomika Sprenger

MPH, Benedictine University, 2020

BS, North Carolina Central University, 2016

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Public Health

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Abstract

Sexually transmitted infections (STIs) are a significant public health (PH) issue in North Carolina (NC) despite efforts to decrease prevalence. Rates are higher in African American (AA) young adults. Studies have investigated STIs, but little is known about the mediating relationship between factors such as the age of first sexual intercourse, sexual abuse, and sexual contact. The purpose of this quantitative study was to assess if the age of first sexual intercourse and sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among AA young adults in NC. A secondary data analysis was conducted using the 2019 Youth Risk Behavior Survey data (n=1,064). The study was modeled after the Baron and Benny framework to assess whether age of first sexual intercourse and sexual contacts mediate the relationship between sexual abuse and gonorrhea/chlamydia using multivariable logistic regression. After adjusting for education and gender, there was a statistically significant relationship between sexual abuse and gonorrhea/chlamydia infections, with 157% increased odds of gonorrhea/chlamydia among those who have experienced sexual abuse (Adjusted OR= 2.57, 95% CI [1.84, 3.59], *p=<0.001*). This relationship was mediated by age of first sexual intercourse as adjusting for that both reduces the magnitude of the effect and eliminated the statistical significance (*Adjusted OR= 1.26. 95% CI [0.83, 1.93], p= 0.28*) but not by sexual contacts (suggesting that it does not provide a pathway through which the relationship manifests). These findings provide PH professionals with additional considerations in their efforts to help curb the spread of STIs in AA young adults in NC.

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Dedication

In loving memory of my grandmother Doris Chambers, uncles Ronnie Chambers, Clarence Chambers, and Christopher Chambers, Father Henry Lee, and brother Kevin Roseby. Thank you for guiding me throughout my life. I truly wish you all could be here to tell me how proud you are of me for completing this milestone.

To all mothers with children, you got this girl, keep pushing, the sky is the limit. May you succeed in everything that you do.

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Dr. Harrison Ndetan and Dr. Stacy-Ann Christian, my committee, thank you all so much for the ongoing support, guidance, commitment, knowledge, and expertise during this process. It has been a pleasure working with you all and thank you for guiding me to excellence.

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Thank you to my husband, my children, my friends, and my family for being supportive throughout this entire journey. Thank you all for always being a listening ear and a shoulder to cry on when needed. I love each and every one who has been a part of my journey. Thank you!

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Section 1: Foundation of the Study and Literature Review

Introduction

Within the last few years, gonorrhea and chlamydia have been on the rise for African American young adults in North Carolina (NC). According to the North Carolina Department of Health and Human Services (NCDHHS, 2022), in 2021, Black/African American men and women had the highest gonorrhea and chlamydia rates among race/ethnicity groups. They accounted for 39% of people diagnosed with chlamydia and 53% with gonorrhea. The overall age group in NC for Gonorrhea and chlamydia cases is 15-to-29-year-old in both men and women, where chlamydia accounted for 82% and gonorrhea for 67% (NCDHHS, 2022). According to NCDHHS (2022), chlamydia rates from 2019-2021 were as follows: in 2019: 71,401, in 2020: 64,514, and in 2021: 65,107. gonorrhea rates from 2019-2021 were as follows: in 2019: 26,707, 2020: 28,075, and 2021: 29,177; due to COVID-19, 2020 data can be treated cautiously.

There have been many efforts to increase awareness, education, and prevention for sexually transmitted infections (STIs) in NC, but the issue still remains. North Carolina has been in the top 10 for the highest STI rates and currently ranks at number 5 (Wisevoter, 2023). To reduce the rates of gonorrhea and chlamydia infections among African American young adults, there must be effective preventative measures to determine the underlying causes of the increase.

The variables of this study are age of first sexual intercourse, sexual contact (heterosexual, homosexual, and bisexual), sexual abuse, and gonorrhea/chlamydia infections. These variables increase the risk of infection among African American youth in NC. This study aims to evaluate if the age of first sexual intercourse and sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American youth in NC. The dissertation section one includes the background, problem statement, purpose of the study, and research questions and hypotheses. Furthermore, the chapter will discuss the theoretical framework, nature of the study, literature review of the key variables, assumptions, limitations, significance, summary, and conclusions.

Background

STIs will continue to be extensively researched as long as the rates continue to increase and not decrease. Different variables have been addressed concerning the increase in STIs, and there has been no change in the rates reducing. One of the variables in the study is the age of first sexual intercourse. This variable has been assessed by investigating whether the impact of increased gonorrhea/chlamydia infections in black youth in NC is mediated by the age at which individuals first engage in sexual intercourse. According to Chuy et al. (2021), young adults who are sexually active for the first time only consider birth control and condom use; however, many other variables need to be assessed. Chuy et al. provided that additional research is required to determine the underlying cause of the STI increase, and by providing additional research, other variables can be assessed in determining how age at first sexual intercourse affects increased STIs.

Sexual victimization and sexual abuse have also been studied on how they affect the increase of STIs among African American women. About 20% of Black women are raped during their lifetime (Crooks et al., 2022). The authors determined that further research is needed to determine how sexual abuse affects Black women and Black men, transgender people, gay and bisexual people, men who have sex with men (MSM), and women who have sex with women (WSW). Whom individuals decide to have sexual contact with does impact STIs, specifically in MSM. According to Gamarel et al. (2020), expedited partner therapy (EPT) is not recommended for individual sexual partners, and further research can be done to determine the increase of STIs among the LGBT community.

Researchers have found an association among these variables; however, the mediating relationship between these variables has not been assessed. Additional research is needed; this study is to determine how the age of first sexual intercourse and sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections. A quantitative study is done with secondary analysis to conduct this study. Providing public health professionals with additional resources and research on decreasing STIs in NC can alleviate the burden amongst African American young adults. Providing individuals with adequate education, treatment, and preventative measures can also help reduce STI transmission.

Problem Statement

STIs have increased among African American young adults in the past few years and will continue to increase if public health concerns are not addressed. The risk factors influencing STI rates among African Americans are socioeconomic status, health disparities, sexual networks, stigma and discrimination, lack of condom use, and substance abuse (Perez et al., 2021). According to the Centers for Disease Control and Prevention ([CDC], 2022), there is an urgent need to reduce new infections and the long-term consequences of STIs in the United States due to preventable STIs. Researchers have not found how the age of first sexual intercourse influences the long-term risk of STIs for young African American adults. Although authors have researched MSM, there is limited research on WSW and how it affects the increase of STI rates.

This study can bring additional research to the areas needing further investigation to help decrease STI rates. According to the World Health Organization ([WHO], 2022), more than 1 million STIs are acquired every day worldwide, many of which are asymptomatic. Each year, there are an estimated 374 million STIs that are curable, such as chlamydia, gonorrhea, syphilis, and trichomoniasis (WHO, 2022). Identifying how and what is causing the increase of STIs in young African American adults can bring awareness and help reduce STIs. These STIs are curable and can be treated; with the proper resources, they can be prevented.

According to WHO (2022), STIs have a direct impact on sexual and reproductive health through stigmatization, infertility, cancers, and pregnancy complications, along with the increased risk of HIV. Addressing the spread of STIs can help reduce significant health and mental problems that it may cause an individual. Lack of public awareness, lack of training among healthcare workers, and widespread stigma remain barriers to helping with the transmission of STIs (WHO, 2022). This research study specifically explores the exact role (such as the mediating effect) of the age of first sexual intercourse and sexual contact in the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults in NC. Understanding how mediation affects the relationship among the variables can help determine the risk of acquiring gonorrhea/chlamydia infections.

Purpose of Study

The purpose of this quantitative study is to examine whether the age of first sexual intercourse and sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults in North Carolina after controlling for education and gender. For this purpose, the dependent variable under investigation is gonorrhea/chlamydia infections; the independent variables are sexual abuse, age of first sexual intercourse, and sexual contact. The covariates or extraneous variables are education and gender. This study will enable practitioners to collect nuanced data directly from communities, offering insights into local STI challenges and a more accurate representation of the community's needs.

Research Questions and Hypotheses

RQ1: Is there a statistically significant association between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?

$H_0 1$: There is no statistically significant association between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

H_A1: There is a statistically significant association between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

RQ2: Does age at first sexual intercourse mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?

H_02: Age at first sexual intercourse does not mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

H_A2: Age at first sexual intercourse mediates the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

RQ3: Does sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?

H_03: Sexual contact does not mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

H_A3: Sexual contact mediates the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

Theoretical Foundation for the Study

The theoretical framework that grounded this study was Baron and Kenny's framework (1986). Baron and Kenny's framework includes three steps: establishing a significant relationship between the independent variables and the outcome variable, demonstrating a significant relationship between the independent and the mediator, and showing that the mediator has a significant effect on the outcome variable when controlling for the independent variable (Lu et al., 2021). Baron and Kenny's framework (1986) and this study will focus on the mediating role of age at first sexual intercourse, sexual abuse, sexual contact, education, and gender and how it affects gonorrhea/chlamydia infections in African American young adults in NC. The key components of Baron and Kenny's framework include the relationship between the independent variables, dependent variables, and mediator. According to Lu et al. (2021), Baron and Kenny's framework can help provide a framework that will include statistical methods to assess the association between variables while controlling for the covariates.

Baron and Kenny's framework (1986) can help identify potential pathways and mechanisms through which the risk factors influence gonorrhea and chlamydia infections, providing insights for targeted interventions and prevention strategies. For this study, I wanted to establish how age at first sexual intercourse and sexual contact influence sexual abuse and gonorrhea/chlamydia infections in North Carolina for young black adults. The mediating effect would tell me how and why these variables are associated. Using Baron and Kenny's framework, researchers can assess the mediating role of certain variables in the relationship between the risk factors and the likelihood of gonorrhea/chlamydia infections among young African American adults.

Nature of Study

In this quantitative study, the specific research design that was used as secondary data using surveillance and strategic plans with a cross-sectional study design to understand how age at first sexual intercourse, sexual abuse, sexual contact, education, and gender can mediate gonorrhea and chlamydia rates among African American young adults in North Carolina. The 2019-2021 Youth Risk Behavior Surveillance (YRBS) measured the variables. The survey collects youth risk and health behaviors while monitoring six categories among young adults: injuries and violent behaviors, sexual behaviors, alcohol and drug use, tobacco use, dietary behaviors, and physical activity. The 2019-20221 Youth Risk Behavior Survey collected in North Carolina will measure the data and contain responses on sexual behaviors. The data were collected by the independent variables, sexual abuse, age at first sexual intercourse, and sexual contact; the dependent variable, gonorrhea/chlamydia infections; and covariates, education, and gender.

Literature Review Search Strategy

A literature review was conducted using the Walden Library to access several databases. The databases used were PubMed, EBSCO, SAGE Journals, Science Direct, UNICEF, ProQuest, and Scholar Works. The key search terms and databases that were used for this study included *Gonorrhea, Chlamydia, sexually transmitted diseases (STDs)*, *sexually transmitted infections (STIs), African American, North Carolina, young adults, STI testing, sexual abuse, sexual contact, sexual intercourse, mediation framework, quantitative,* and *early sexual activity.* Each literature review search only contained articles that were 5 years old or less and published between 2018 and 2023.

Theoretical Framework

The theoretical framework that grounded this study was Baron and Kenny's framework (1986). Baron and Kenny's framework was used to help understand its mediating role on variables. Lu et al. (2021) used Baron and Kenny's framework by using a regression model to understand the mediating role of condomless anal intercourse (CAI) and rectal bleeding on the association of rectal douching (RD) and HIV. They used CAI and rectal bleeding as the mediators, RD as an independent variable, and HIV as the dependent variable. This study used the three steps of Baron and Kenny's framework to help determine the mediating relationship among their variables. The three steps of the framework included establishing a significant relationship, demonstrating a significant relationship, and showing the mediator variable significance to the independent variable. In the previous study, the authors found that their mediators did provide an association between their independent and dependent variables.

Using Baron and Kenny's framework (1986), the presence of the mediator effect is determined, and it has been employed for analyses in which regression analyses are used to help determine how the significance of coefficients can be estimated (Manzoor et al., 2023). According to Manzoor et al. (2023), if the measured coefficient is significantly positive or there is an association between the underlying variables, the following test will be continued. To find mediation, all the following conditions must be met in the study, equation, and variables: the predictor variable must affect the outcome variable, the second equation predictor variable must be proven to affect the mediator variable, and the mediator must influence the outcome variable (Manzoor et al., 2023). According to Manzoor et al., perfect mediation occurs when the independent variable has no influence when the mediator is controlled. Baron and Kenny's framework (1986) was selected for this study because it can help determine the mediating relationship between sexual abuse and gonorrhea/chlamydia infections and the age at first sexual intercourse and sexual contact.

Literature Review Related to Age at First Sexual Intercourse, Sexual Abuse, Sexual Contact, and Gonorrhea/Chlamydia Infections

Age at First Sexual Intercourse

Many young adults become sexually active at an early age. According to NCDHHS (2022), in 2021, 5,989 young male adults aged 15-24 tested positive for gonorrhea in North Carolina, while 7,438 young female adults aged 15-24 tested positive for gonorrhea. In 2021, 11,745 young male adults aged 15-24 tested positive for chlamydia in North Carolina, while 29,302 young female adults aged 15-24 tested positive for chlamydia (NCDHHS, 2022). Many factors, such as age, play a significant role in young adults who lose their virginity for the first time. Previous research has been done on the variable age at first sexual intercourse and its relationship with contraceptives and condom use. According to Chuy et al. (2021), most individuals who have sex for the first time use contraceptives to prevent pregnancy but not condoms to prevent STIs. The authors of the study found that delaying the age of first sexual intercourse by one year can increase the chances of condom usage, which can help reduce the risk of STI transmission (Chuy et al., 2021).

According to Chuy et al. (2021), contraception and condom usage increase with age at first sexual intercourse could be due to increased exposure to sexual education and that individuals who had sexual education before sexual intercourse were less likely to have sex before age 15. In this study, the authors only focused their study on condom usage, contraceptives, education, and how it relates to age at first sexual intercourse. Black/African American students have the lowest percentage of using no method to prevent pregnancy, which means they use no method to prevent STIs (Chuy et al., 2021). The strengths of this study included improving condom usage and contraceptive usage and promoting sexual education at earlier ages to delay the age of first sexual intercourse. The weaknesses in this study were not assessing other forms of STI transmission to understand better why age at first sexual intercourse starts around the age of 15 and only examining condom use to prevent STIs. In the study, other STI transmission forms will be assessed to determine the underlying causes of STI increases among African Americans.

Sexual relationships influence age at first sexual intercourse and may cause long-lasting effects, such as an increased risk of contracting HIV and other STIs (Sing'oei et al., 2023). The authors studied that many social and cultural factors and sexual behaviors influence the age at first sexual intercourse. According to Sing'oei et al. (2023), early sexual debut (ESD) has been linked to key public health issues, such as the increased likelihood of multiple sexual adult relationships, teenage pregnancies, and the increased risk of STIs. Another concern with ESD and the age of first sexual intercourse is that it is more likely to be associated with involuntary, forced, coerced, or unplanned intercourse and is more likely to occur without condom use or contraception (Sing'oei et al., 2023). The strengths of this study provided factors that lead to early sexual behaviors among young adults. The weaknesses of this study include not including education or drug use and using self-reporting for the data.

STIs and age at first sexual intercourse are variables that will always connect when measuring variables. The older an individual is before having sexual intercourse for the first time, the more likely they are to use preventative measures to reduce STI transmission. Research from previous studies shows that age at first sexual intercourse does play a significant role in the increase of STIs. Based on this study, further studies can be done to determine safe sex practices to reduce the risk of STI transmission.

Sexual Abuse

According to Craig-Kuhn et al. (2021), African American youth have disproportionately high rates of STIs, including gonorrhea and chlamydia. Due to the perception of STIs for African Americans, they may develop riskier sexual behaviors and are found to have a fatalist attitude (Craig-Kuhn et al., 2021). The authors found that sex education programs can delay sexual intercourse, reduce sexual risk behaviors in young adults, and reduce STIs and teen pregnancy. Mandating sexual education can help reduce sexual risk behaviors. When individuals are victims of sexual abuse, they may experience

STI fatalism. According to Craig-Kuhn et al., those with lower STI fatalism were likelier to report prior STI testing than those with higher STI fatalism. The weakness of this study is that it only focused on young African American men and not women. The strengths of this study can help identify risky sexual behaviors and include questions about demographics, socioeconomic status, sex education, STI history, sexual behaviors, symptoms, and STI fatalism.

Another research study included how black females are a part of sexual victimization. According to Crooks et al. (2022), Black females in the United States face sociocultural conditions that impact their sexual development and increase their risk for STIs. Black women have the highest STI rates despite having fewer partners, higher condom use, and engaging in less risky sex; about 20% of Black women are raped during their lifetimes (Crooks et al., 2022). Black girls are constantly being judged and labeled and being sexually victimized. Sexual abuse can also be verbal sexual abuse; calling women all types of names can help belittle their character. According to Crooks et al., Black cultural messages such as “fast” or “fast-tailed girl” can create shame in sexual exploration and silence Black girls about sexual health and sex education regarding STIs. In this study, all participants described experiencing or witnessing a traumatic event such as sexual abuse, rape, molestation, or physical abuse. The authors also found that sexual abuse and violence were perpetrated against ethnic minority women, specifically Black girls and women (Crooks et al., 2021). The strengths of this study showed how Black girls are sexually abused and victimized by society and have a higher prevalence amongst other races. The weaknesses of the study were that only women participants with a history of STIs were included in the study, men were not included, and they could be sexually abused as well.

According to Ménard et al. (2021), childhood sexual abuse (CSA) is a global problem and causes serious repercussions for survivors in various domains of adult interpersonal functioning, including sexual risk behaviors. The prevalence of CSA victimization, depending on the abuse and its measurement, may affect up to 36% of girls and 23% of boys, with women being victimized two to three times more often than men (Ménard et al., 2021). The authors found that childhood sexual abuse does affect adult sexual behaviors, which include STI history, transactional sex, increased sex partner, early sexual intercourse, alcohol/substance abuse, and inconsistent condom use. The strength of this study includes the different mediators that influence the increased sexual behaviors of adults. This study's weaknesses include the authors not mentioning any conflicts of interest or limitations they faced accumulating the data.

Discovering ways healthcare providers can incorporate sexual abuse into their screenings is essential. Sexual abuse can affect everyone and majorly affect the increased risk of STIs. All preventative and educational measures to prevent sexual abuse and STIs can be provided and discussed in healthcare settings. Sexual development can be further studied for all individuals to help reduce sexual victimization amongst individuals. According to Yonke et al. (2022), any child diagnosed with gonorrhea or chlamydia infections should be evaluated for sexual abuse; sexual abuse is the most common cause of infection in children. Any child under a specific age range who tested positive for an STI should also be reported to social services and the police.

Sexual Contact

According to Gamarel et al. (2020), EPT is an effective strategy to reduce rates of chlamydia and gonorrhea infection and ensure sexual partners are treated. The EPT is not recommended for gays, bisexuals, and men who have sex with men because of concerns about HIV coinfections (Gamarel et al., 2020). Not providing EPT to the LGBT community has a significant effect on individuals' sexual contact preferences and increases the risk of STI transmissions. If the EPT strategy effectively reduces rates, it could help ensure that those individuals and their sexual partners are treated correctly and accurately. According to Gamarel et al. (2020), providers had concerns with EPT and mentioned that it was not the best practice for treating gonorrhea. The strengths of this study were that an effective method to help reduce STIs and STI transmission was available to patients. Some weaknesses of this study were that it was not provided to everyone, only straight/heterosexual patients. Another weakness of this study was that it may be biased.

Lesbian, gay, and bisexual individuals represent vulnerable populations due to specific healthcare needs and health risks (Klein et al., 2021). According to Klein et al. (2021), healthcare professionals are biased against sexual minorities (less favorable attitudes) and have been identified to influence decision-making verbally and nonverbally in the clinics. The authors found that sexual contact/orientation does have a significant impact on STIs and sexual health. According to Klein et al., bisexual individuals were perceived as more prone to risky sexual behaviors than heterosexual and homosexual patients. The weakness of this study includes bias, as well as individuals not indicating their sexual orientation. Another limitation of this study is that it only included Germany in its results, not the United States. The strength of this study includes examining barriers that cause discrimination against lesbian, gay, and bisexual populations.

STIs have been on the rise for the LGBT community within the United States. In most cases, the LGBT community is mostly known for the increase in syphilis/HIV cases. However, gay, bisexual, and other LGBT individuals often get other STIs, including gonorrhea and chlamydia infections (CDC, 2021). According to the CDC (2021), all sexually active gay, bisexual, and other men who have sex with men should be tested for STIs regularly for all STIs. Understanding the risk of STIs is essential, but it is essential for men who have sex with men, and the increase of STI testing should be considered more frequently. STIs will continue to rise if there aren't better protocols and procedures in place to help individuals of the LGBT community become more open and less ashamed of receiving STI testing.

Gonorrhea/Chlamydia Infections

According to Tuddenham et al. (2022), approximately 1 in 5 adults in the United States had an STI in 2018; over the course of 2015-2019, gonorrhea, chlamydia, and syphilis increased, while from 1999-2016, herpes decreased. Higher STI rates include individuals younger than 25, sexual and gender minorities such as men and transgender women, and racial and ethnic minorities (Tuddenham et al., 2022). Receiving STI screenings regularly is significant, especially for those with multiple sex partners. According to Tuddenham et al., annual screening is recommended for individuals who have multiple sex partners, transactional sex, drug misuse, or a history of STI or incarceration. The weaknesses of this study include not covering all aspects of STIs and including other bacteria, such as bacterial vaginosis and human papillomavirus. The strengths of this study were that it provided effective treatment options for all STIs.

Structural racism affects the health and well-being of racial/ethnic minorities in the USA (Ibragimov et al., 2020). According to Ibragimov et al. (2020), the American Public Health Association recognized police brutality as a public health issue that disproportionately affected the health of racial/ethnic minorities. Structural racism does play a significant role in the health of Black people, and it can affect the rise of STIs. The authors found that psychological distress may lead to risky sexual practices (Ibragimov et al., 2020). The strengths of this study included determining new mechanisms that can be related to the increase of STIs among African Americans. This study's weaknesses include limited data, underreporting of police Black killings and STIs, and biased findings.

The incidence of syphilis, gonorrhea, chlamydia, and herpes simplex has increased over the last decade despite the numerous prevention strategies (Scurtu et al., 2022). According to Scurtu et al. (2022), gonorrhea is often coinfected with chlamydia and is more frequent in men who have sex with men. Untreated gonorrhea and chlamydia can lead to serious health concerns, specifically in women. Long-term consequences such as infertility, seronegative arthritis, and neurological disorders are associated with STIs (Scurtu et al., 2022). The authors also focused on the treatments and drug resistance that some STIs may have. According to Scurtu et al., gonococcal primary site of infections is the urethral mucosa, inner part of the cervix, anal canal, pharynx, and conjunctiva.

Chlamydia infects the urethral epithelia in both sexes and endocervical epithelia in women (Scurtu et al., 2022). The strengths of this study include identifying the immunopathogenic mechanisms of STIs and discussing the challenges of STIs. The limitation of this study consists of the authors declaring no conflict of interest while conducting the study.

According to Chung et al. (2023), acquiring one STI may increase the chance of infection with another STI; for example, contracting syphilis or gonorrhea was correlated with the likelihood of concurrent chlamydia. Due to some STIs having mild or no symptoms at all, asymptomatic concurrent infections can be missed if only symptom-based clinical testing is performed (Chung et al., 2023). The authors found that evaluating STI coinfections and repeat infections can help facilitate early and timely treatment to reduce the spread of STIs. According to Chung et al., young age has been consistently shown to be associated with the risk of coinfection and risker sexual behaviors. The strengths of this study include the authors' determination of the causes of STI coinfection and how to treat them. The limitations of this study include only studying STIs in Hong Kong and not studying specific sexual behaviors associated with STI coinfection rates. Multi-STI and regular STI testing with asymptomatic individuals may help identify early STIs and allow adequate time for treatment, which leads to reducing STIs.

Racism does impact the rise of gonorrhea/chlamydia infections in African Americans. Gonorrhea/Chlamydia infections will continue to rise and increase in Black people if different strategies and approaches are not taken. STIs will continue to be a significant public health issue, and identifying the barriers can help reduce the spread.

Providing resources and advocacy on STIs within the Black community can help improve the STI rates.

Gender

According to NCDHHS (2022), In 2021, 15,600 men tested positive for gonorrhea, and 13,576 women tested positive for gonorrhea in North Carolina. 21,724 men tested positive for chlamydia, and 43,382 women tested positive for chlamydia in North Carolina (NCDHHS, 2022). Women are more likely to have higher chlamydia results, and men are more likely to have higher gonorrhea results; however, gender bias in gonorrhea is not considered to be too large. With chlamydia favoring women, more women should receive adequate testing, especially young Black women. Gender does play a vital role in signs and symptoms and how it affects the individual body.

According to Yonke et al. (2022), gender-diverse individuals have a higher risk of STIs. Supportive spaces where patients feel safe sharing information by using open-ended questions and avoiding assumptions regarding sexual preferences, practices, and gender/sex by normalizing diverse sexual experiences (Yonke et al., 2022). Regarding gender, there are many different approaches to take, which can affect the reporting of gonorrhea/chlamydia infections. According to Yonke et al., cisgender, transgender, and nonbinary identities all play a role in the screening methods for STIs. The strengths of this study provided essential information about gonorrhea resistance, pregnancy, neonatal infections, and practical strategies to help improve STI testing, such as home-based testing and treatment into telehealth.

Sexual and gender minorities, compared with non-sexual and gender monitories, were more likely to be tested for HIV among those diagnosed with STIs (Saleem et al., 2023). According to Saleem et al. (2023), despite long-standing global guidelines, HIV testing among people tested for STIs or presenting with STI symptoms in diverse healthcare settings remains suboptimal. The authors found barriers to HIV/STI testing, such as attitudes or perceptions, fear and knowledge, confidentiality, bureaucracy, and access. Fear of STI/HIV testing, such as needles, leads to common refusal of STI testing (Saleem et al., 2023). Individuals with gender identity issues can be affected by STI testing and results. The strengths of this study include studying gender-diverse populations for STIs. The limitations of this study include cost-effectiveness for STI testing and sample variability.

The way an individual identifies does affect the results of STI testing. According to Fix et al. (2019), gender can be used as a moderator to mediate the relationship between sexual behaviors and STI contraction. If a male identifies as female and has an STI, it could result in a bias for female STI results. If a female identifies as a male, it can affect male STI results. Adding the appropriate gender identities to data collection for STI testing can give more accurate results, and those specific populations can be studied if the STI results are higher. Data collection is essential for STI testing, and the appropriate categories can help simplify results and help reduce the spread of STIs.

Education

Educational levels do impact the increase of STIs. According to Mcharo et al. (2022), attainment of higher-level education can positively determine sexual behavior against STIs. Educating young people on key symptoms of STIs and their consequences and promoting timely medical care-seeking behavior can help identify symptoms of STIs (Mcharo et al., 2022). The more educated the individual is, the less likely they are to have risky sexual behaviors. According to Mcharo et al., awareness and knowledge about STIs are essential to behavior change; misconceptions about the level of perception of risk to STIs may result from a lack of comprehensive sexual education from an early age.

According to McMann and Trout (2021), rural populations face many challenges that may impact young adult STI risks, such as limited access to care, lower rates of insurance, higher rates of uninsured, lower incomes, less education, higher rates of health risk behaviors, and overall poorer health than urban areas. About 20% of participants reported they never received any type of sexual health education, 63% reported receiving STI-related education in high school, and only 42% in middle school (McMann & Trout, 2021). The authors found that higher-level education played a role in reducing STIs and that rural colleges needed more safe sex practices and sexual education. According to McMann and Trout, campus health clinics will play an essential role in developing interventions that aim to increase the rates of birth control, education interventions on sexual health, and deliver STI testing. The strengths of this study include providing more resources to rural populations to reduce STIs. This study’s limitations were self-reported results, and the study population was white and female rural college students.

Providing younger adults with more access to resources about sexual encounters can help reduce STI rates. The authors also found that young adults and other at-risk groups need targeted education on safer sexual practices, such as proper, consistent, and negotiation of condom use, as well as a reduction in sexual partners (Mcharo et al., 2022). According to Mcharo et al. (2022), studies have shown that highly educated people have more sexual partners than those with a lower educational level. The weaknesses of this study include only using university students, bias, and those who have been affected by STIs. The study also did not include PrEP or contraception use. The strengths of this study include measuring precise sexual behaviors to help identify those with a higher risk of STI transmission.

Mediation

Mediation analysis helps determine the relationship among variables. This study used mediation analysis to determine the relationship between minimum wage and gonorrhea and chlamydia infections (Ibragimoy et al., 2020). The minimum wage has a protective effect on STI rates and how mediators were used in establishing the relationship. According to Ibragimoy et al. (2020), a preliminary exploration of covariates that might mediate the relationship of the variables is significant in current and future research. Mediation analysis is used in the study to determine the effect of the independent variable on the outcome and the mediating variable. The weaknesses of this study include mediation findings that may be subject to bias and under-testing, and incomplete reporting may have caused errors in the reporting. The strengths of this study included finding out variables such as finances influencing the increase of STIs.

In this study, the authors used a statistical method to minimize potential confounding and selection bias and causal mediation analysis to evaluate possible pathways between suspension and STIs (Rosenbaum, 2020). According to Rosenbaum

(2020), public health workers reach adolescents through their schools for essential health services, such as health screenings and school-based clinics. Understanding the mediating relationship between education and disciplinary policies and the increase of STIs can help clinicians with better health assessments in youth. The weaknesses of this study include some children being suspended during the investigation, not all STIs being associated with suspension, and asymptomatic infections not being included. The strengths of this study included how to further evaluate STI prevention methods because some STI prevention methods only reduce specific STIs and not others.

According to Fix et al. (2019), evaluating the relationship between the variables and mediational pathways can help understand how the variables affect each other. The authors also found that individuals with mental health problems have higher rates of STIs compared with those without reported or diagnosed mental health issues (Fix et al., 2019). Mental health issues can cause an increase in STIs, and the authors wanted to understand the mediating relationship between mental health and STIs. The authors also suggest that further research be done specifically for Black women on mental health, sexual abuse, depressive symptomatology, and nonmedical prescription drug use. The limitations of the study include missing data, self-reporting, and not clearly defining gender/sex. The strength of this study includes identifying other issues that increase STIs, such as depression, mental health, and nonmedical prescription use.

Definitions

Age at first sexual intercourse: The average age at which adolescents/young adults become sexually active. In this study, age at first sexual intercourse is a categorical ordinal variable.

Gonorrhea/chlamydia infections: Gonorrhea and chlamydia are two STIs an individual can get during vaginal, anal, or oral sex. Chlamydia is known as *Chlamydia trachomatis* and is the most common STI in the United States (Tuddenham et al., 2022). Gonorrhea is known as *Neisseria gonorrhoeae* (Tuddenham et al., 2022). In this study, gonorrhea/chlamydia infections are a nominal categorical variable.

Education: The highest level of education or degree that each young adult has obtained or earned. In this study, education is a categorical ordinal variable.

Gender: The male or female sex. Gender can also be associated with sex and how an individual may identify. In this study, gender is a binary nominal categorical variable.

Mediation analysis: The relationship between the mediation of the independent and dependent variables (Ibragimov et al., 2019).

Sexual abuse: An abusive sexual encounter by one person upon another person. Being involved or witnessing a traumatic event, such as sexual abuse, rape, molestation, or physical abuse (Crooke et al., 2022). In this study, sexual abuse is a binary nominal categorical variable.

Sexual contact: Whom the individual had sexual contact with, such as male or female, or male and female. In this study, sexual contact is a nominal categorical variable.

Sexually transmitted infections (STIs): A STI can be transmitted from person to person and are spread through unprotected sexual encounters, and can be spread vaginally, orally, or anally (Tuddenham et al., 2022).

Young adults: Individuals in their teens or early twenties range from 13-25. This term can also be used as adolescent or youth.

Youth Risk Behavior Surveillance (YRBS): The youth risk behavior surveillance system track behaviors in young adults/adolescents in the United States (Healthy People 2030).

Assumptions

There are a few assumptions in this study. One of the assumptions is the respondents of the study. The study respondents were expected to answer each question honestly and voluntarily. This study is presumed random without bias. Another assumption of the study is that the confounding or covariate variables affect the study's results. The assumptions above were necessary for the study because they contribute to the interpretation of the data by providing a context for understanding the results and helping researchers analyze the study's findings.

Scope and Delimitations

In this study, a cross-sectional quantitative study analysis was done using secondary data. The study focused on gonorrhea/chlamydia infections, age at first sexual intercourse, sexual abuse, and sexual contact among young African American adults in North Carolina. The 2019-2021 YRBS was used for the data related to the variables. The study was limited to African American young adults in NC. The 2019-2021 YRBS also provided the variables for age at first sexual intercourse, sexual abuse, and sexual contact, and the data for the covariates education and gender that affected gonorrhea/chlamydia infections.

There were also delimitations to consider in this study. The data was secondary and measured in North Carolina, which cannot represent the United States. The sample size and target population delimited the study as the sample only included ages 11 and 18, and only African American responses were collected. The validity of the respondents' answers to the questionnaire also delimits the study, as there may have been privacy concerns. The study was limited to the appropriate population for this quantitative, cross-sectional data.

Limitations

There were several limitations of this study. One limitation of this study includes stigmatization/biased results and students not answering questions honestly. The results of this study could have been biased, as it could not have been made to represent the entire population. The results did not specify or indicate whether everyone participated in the study or individuals who may have been absent during the questionnaire. By the study, including biased results, could lead to inaccurate or misreported results and affect the data collection process.

Another limitation of this study includes delays in reporting. Delays in reporting could cause the data not to be accurately justified. If all students were not included in the study or turned their results in late, the accuracy of this data may be inconsistent. The true incidence and validity of gonorrhea/chlamydia infections in young African American adults could not be accurate, and additional studies may need to be done. Reasonable measures to these limitations include placing any missing or late data in its only category within the study.

Significance

The study addresses the mediating relationship between the variables age at first sexual intercourse, sexual abuse, sexual contact, education, gender, and gonorrhea/chlamydia infections among African American young adults. STIs continued to increase among young Black adults in North Carolina, which identified this population as a significant public health issue. Black people accounted for a significant amount of gonorrhea/chlamydia infections in NC as they were the highest population. By identifying and understanding the mediating factors, researchers and public health professionals can develop targeted interventions to reduce the risk of gonorrhea/chlamydia infections in African American young adults in North Carolina.

Potential contributions to social change include identifying how this relationship manifested and how this population manifested heavily with STIs. According to WHO (2023), to help control the spread of STIs, sexual behaviors and health services should be included. Access to this study, information, and research can provide identified barriers to access to care and improve the availability and utilization of sexual health services. The findings of this study will contribute to the development of evidence-based interventions to reduce STIs in this population. Creating this type of positive social change will acknowledge, identify, and improve STIs among Black people and help reduce the risk of STI transmission while reducing the rates. Positive social change can not only help the Black community but also help reduce STI rates in general in North Carolina.

Summary and Conclusions

The purpose of this quantitative study was to determine the mediating relationship between age at first sexual intercourse, sexual abuse, sexual contact, and gonorrhea/chlamydia infections among African American young adults in North Carolina after controlling for education and gender. More than 1 million STIs are acquired every day in the United States (WHO, 2023). To better help understand the increase of gonorrhea/chlamydia infections among young African American adults, this study was conducted to determine the mediating relationship amongst the variables. Chapter 1 included the problem statement, purpose of the study, research questions, theoretical framework, and an extensive literature review.

The literature reviews of the study provided different studies that help show the relationship among the variables of the study. Findings from this study presented why STIs should be reduced by providing an understanding of how the age at first sexual intercourse and sexual contact influence sexual abuse and gonorrhea/chlamydia infections among young Black adults in North Carolina. Previous studies have investigated this issue but have not explored the topic by the exact role (mediating effect) of the variables and the population. Understanding the mediating effect of these variables can help provide insight into more effective strategies for African American youth, leading to better outcomes in reducing STIs. The conclusion of this study provides the underlying mechanisms of how one variable influences another in the increased STI rates among young Black people in NC.

Chapter 2 of this study will introduce the research design, data collection, and methodology. The research design and data collection will include the study's independent, dependent, covariate, and mediating variables. The methodology will consist of many different sections, such as population, data analysis plan, validity, and ethical procedures.

Section 2: Research Design and Data Collection

Introduction

This study evaluated whether the age of first sexual intercourse and sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults in North Carolina after controlling for education and gender. Section 1 highlighted the introduction to the study, problem statement, purpose of the study, research questions, theoretical framework, and an extensive literature review. Section 2 will explain the research design, rationale, methodology, and data analysis, and it will go into further detail on how the methodology of this section shows each variable and how it relates to this research study. The instrumentation and operationalization of constructs, data analysis plan, and the threats of validity will also be discussed in Section 2.

Research Design and Rationale

A quantitative cross-sectional research design was used in this study. This study used secondary data from the 2019-2021 YRBS for North Carolina to support the statistical analysis of the variables. The data consisted of the independent variables (sexual abuse, age at first sexual intercourse, and sexual contact), the dependent variable (gonorrhea/chlamydia infections), and covariates (education and gender). The cross-sectional design did not include any time or resource constraints. This research design is consistent with design choice by predicting the likelihood of the mediating factors amongst gonorrhea/chlamydia infections among African American youth in North Carolina.

Methodology

Target Population

The target population consisted of African American young adults/adolescents in North Carolina. The 2019-2021 YRBS survey was completed by high school students, both male and female, who were enrolled in school. The ages of the student participants were 11-18 years. The target population size included 6,893 students.

Sampling Procedure

The 2019-2021 North Carolina YRBS selected 40 schools systematically with probability proportional to enrollment in Grades 9 through 12. Systematic equal probability sampling with random start was used for each school to determine which classes were eligible for the survey. In 2019, the schools had a 92% response rate, while in 2021, the schools had a 45% response rate. Of the eligible schools, 36 of 39 participated in 2019, whereas 18 out of 40 participated in 2021. In 2019, the students had a 71% response rate; in 2021, only 66% had a response rate. The overall response rate in 2019 was 92% * 71% = 66%, and in 2021, it was 45% * 66% = 30%. In 2019, 3,145 of the 4,301 sampled students submitted questionnaires; after data editing, only 3,056 could be used for the data collection. In 2021, 1,759 of the 2,592 sampled students submitted questionnaires; only 1,720 were usable after data editing.

Data collection in 2021 included nonresponse bias analyses; please refer to Table 1. Data collection in 2019 does not include any nonresponse bias analyses. Weight was included in the data. In these questionnaires, the weight reflects the probability of sampling each student and reduces bias and nonresponse patterns. The weight used the formula:

$$W = W1 * W2 * f1 * f2 * f3$$

Weighted results can be essential in conclusions to assess health-risk behaviors in the questionnaire.

Table 1

Nonresponse Bias Analyses

Analysis	Significant of difference?
Responding schools vs. nonresponding schools by	
school enrollment size category	No
poverty measure	No
locale type	Yes
Responding students vs. nonresponding students by student grade	No
Weighted sample % vs. population % by	
student sex	No
student grade	No
student race/ethnicity	Yes

Note. Table shows the nonresponse bias analyses from the 2021 YRBS for North Carolina. This table was included in the 2021 YRBS results.

Inclusion and Exclusion Criteria

The study's inclusion criteria include young African American adults aged 11-18 and older. The gender consists of both males and females. The specific demographic of the study is the state of North Carolina. The study's exclusion criteria included young adults who were not African American and did not live in North Carolina. Young adults cannot be older than 18 years of age. The young adults also must be sexually active, or they cannot participate in the study.

Data Collection

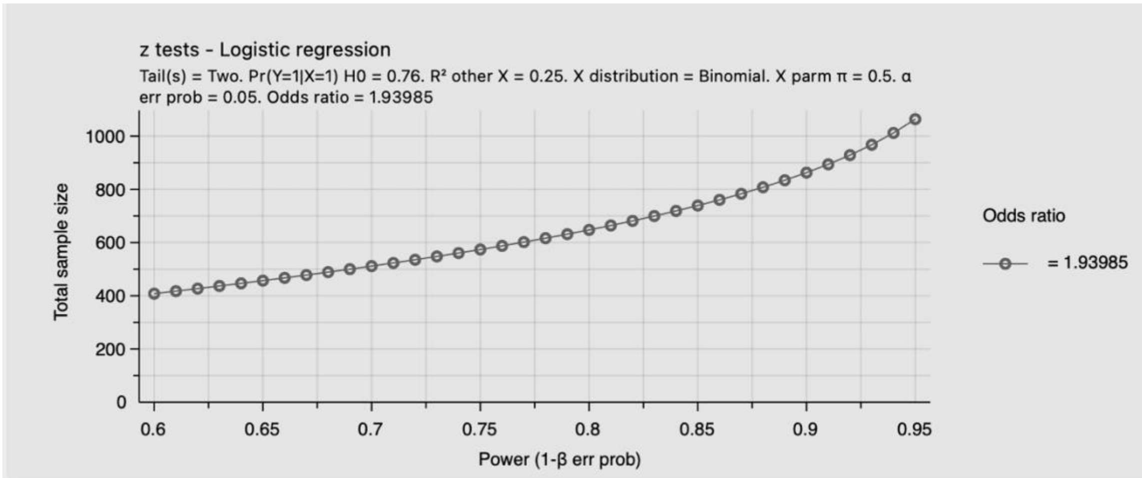
The study used secondary data from the CDC's 2019-2021 YRBS. The CDC obtained parental permission before administering the YRBS in any school district (CDC, 2013). According to the CDC (2013), some schools used active permission while others used passive permission. Active permission means parents must send back to the school a signed form indicating their approval before their child can participate (CDC, 2013). According to the CDC, passive permission means that parents only send back a signed form if they do not want their child to participate in the study. The data in this study are current and up to date and show how the data from the questionnaire were collected. Students who were absent on the day the surveys were administered had a chance to take a survey at a later date, and these data were included in the study. Including make-up data collection helped provide data representative of all the high school students in the survey (CDC, 2013). According to the CDC, the CDC edits the data using the Survey Data Management System.

Power Analysis

The power analysis was conducted by using G*Power Version 3.1.9.6. In this study, a z-test was used with a sample size (N= 1,064), alpha level (0.05), and R^2 (0.25). Using G*Power, the statistical method was logistic regression. The actual power of the output parameter is 0.95. The sample size is 1,064 for each group and will gain the power of 0.95 as pictured in Figure 1.

Figure 1

G Power Analysis*



Instrumentation and Operationalization of Constructs

Data were collected from two datasets from the YRBS. One of the YRBS was published in 2019, and the other was published in 2021. The two YRBS datasets were developed by the Centers for Disease Control and Prevention for each state in the United States. The two data sets were chosen because they include the variables for sexual behavior: gonorrhea/chlamydia infections, sexual abuse, age at first sexual intercourse, sexual contact, education, and gender. The CDC established the study's validity and reliability, which was done to help exterminate any false or biased responses from the students.

The study's dependent variable is gonorrhea/chlamydia infections, and it was measured with yes and no responses. The independent variables of the study were sexual abuse (measured with yes and no responses), age at first sexual intercourse (measured with 11 years old or younger, 12 years old, 13 years old, 14 years old, 15 years old, 16 years old, and 17 years old or older), and sexual contact (measured with females, males, and females and males). The covariates of the study included education (measured with ninth grade, 10th grade, 11th grade, 12th grade, and ungraded or other grades and gender (measured with female and male). In Table 2, each variable is broken down with the survey question, scripted variable, and variable category, and this helps understand how each variable is measured.

Table 2

Data Elements and Coding

Variable	Survey question	Variable script	Variable category
Gonorrhea/chlamydia infections	Have you ever tested for gonorrhea or chlamydia infections?	A. Yes=1 B. No=0	Binary nominal categorical
Sexual abuse	Have you ever been physically forced to have sexual intercourse when you did not want to?	A. Yes=1 B. No=0	Binary nominal categorical variable
Age at first sexual intercourse	How old were you when you had sexual intercourse for the first time?	A. 11/12 years old or younger=1 B. 13/14 years old=2 C. 15/16 years old=3 D. 17 years old or older=4	Categorical/ordinal
Sexual contact	During your life. With whom have you had sexual contact?	A. Heterosexual B. Homosexual C. Bisexual	Nominal/categorical
Education	In what grade are you?	A. 9th grade=1 B. 10th grade=2 C. 11th grade=3 D. 12th grade=4	Categorical/ordinal
Gender	What is your gender?	A. Female=1 B. Male=2	Binary Nominal Categorical

Data Analysis Plan

Data were examined by using Statistical Package for Social Sciences Version 25 (SPSS) to analyze the data sets. Missing data was not included in the study, as the variable “Have you ever had sexual intercourse?” removed participants from the study.

Research Questions and Hypotheses

RQ1: Is there a statistically significant association between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?

$H_0$1: There is no statistically significant association between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

H_A1: There is a statistically significant association between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

RQ2: Does age at first sexual intercourse mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?

$H_0$2: Age at first sexual intercourse does not mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

H$_A$2: Age at first sexual intercourse mediates the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

RQ3: Does sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?

H$_0$3: Sexual contact does not mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

H$_A$3: Sexual contact mediates the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

Table 3 describes the research questions, independent variables, dependent variable, covariates, and statistical tests that were done for each research question.

Table 3

Research Questions, Variables (Independent/Dependent, Covariates), and Statistical Tests

Research questions	Independent variables	Dependent variable	Covariates	Statistical tests
RQ1: Is there a statistically significant association between sexual abuse and gonorrhea/chlamydia	Sexual abuse	Gonorrhea/ chlamydia infections	Education, gender	Multivariable logistic regression analysis

infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?				
RQ2: Does age at first sexual intercourse mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?	Sexual abuse; Age of first sexual intercourse	Gonorrhea/ chlamydia Infections	Education, gender	Multivariable logistic regression analysis
RQ3: Does sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who had sexual intercourse in North Carolina after adjusting for education and gender?	Sexual abuse; Sexual contact	Gonorrhea/ chlamydia Infections	Education, gender	Multivariable logistic regression analysis

Source: Research Questions, for illustration purposes only

Multivariable Logistic Regression Analysis

Multivariable logistic regression analysis was used to determine the mediation between the independent and dependent variables of the study. According to Kalan et al.

(2020), multivariate logistic regression is used for analysis with more than one outcome and multiple independent variables. This statistical test best fits the categorical and discrete independent variables of sexual abuse, age at first sexual intercourse, and sexual contact; the binary categorical variable of gonorrhea/chlamydia infections; and the covariates education and gender. For the dependent variable, the students were asked, "Have you ever tested positive for gonorrhea or chlamydia infections," which led to yes or no responses.

Mediation analysis also plays a significant role in why this logistic regression analysis method was used in this study. According to Feingold et al. (2020), mediation analysis is a statistical method commonly used to examine interrelations among independent, mediating, and dependent variables to obtain the direct and indirect effects of an independent and dependent variable. This study demonstrated methods of mediation analysis with binary outcomes by examining the direct and indirect effects of gonorrhea/chlamydia infections among African American young adults in North Carolina. Regression analysis is a method that investigates the relationship between an outcome and independent variables (Kalan et al., 2020).

Multivariable logistic regression will assess the significance of each independent variable separately to determine how each independent variable is significant to the dependent variable. Using multivariable logistic regression, the odds ratio (OR) and 95% confidence interval were included in the study to interpret the results. According to Feingold et al. (2020), a Monte Carlo study using mediation analysis requires (a) the effect of the mediator on the outcome (y on m), (b) the effect of the predictor on the outcome (y on x), and (c) the effect of the predictor on the mediator (m on x). Multivariable logistic regression will assess the mediating effect of a variable in the relationship between independent and dependent variables.

Threats to Validity

Addressing the threats to validity in this study is essential. According to Bhandari (2020), external validity is the extent to which you can generalize the findings of a survey to other measures. In this study, population validity is one threat to validity. The population is not technically diverse, as it focuses on one specific population, African American young adults. Another threat to external validity is cultural and demographic differences. As mentioned, only one population is studied, which can limit this study's findings. The threats to external validity can be addressed by broadening the population and demographics and determining how STIs affect other populations and demographics and what they use to help reduce STI rates among their populations.

Internal validity is the extent to which you can be confident that a cause-and-effect relationship established within a study can be further explained (Bhandari, 2020). In this study, one internal threat to validity is selection bias. Selection bias is a threat because each grade level or age of the student can lead to biased results depending on how much education they have received on STIs. According to Bhandari (2020), it is essential to recognize and counter research if there is a threat to internal validity. Another threat to internal validity is testing. Due to the students having to be tested for STIs, this could lead to inaccurate results among the students. The results could be lower because all students have not been tested; therefore, they are unaware they have an STI.

Threats to construct could include the participants' responses changing if the students take the test repeatedly each time it is given to the school. The testing process could influence their responses and not what is being measured. To help prevent this from happening, the questions can be changed and worded differently each time so that students' responses can be different each time.

Ethical Procedures

When conducting a study, ethical procedures need to be followed. The IRB already approved it, as the CDC did, since they are the ones who conducted the data. This is secondary de-identified data that can be accessible to the public. Permission was gained to access the North Carolina data by submitting a form. Permission was needed for the students, and the parents signed a form which could not be accessed. Although parents did grant permission, the respondents remained anonymous throughout the study.

There were no identifiers used in the study. Names, addresses, phone numbers, email addresses, social security numbers, or any personal identification were used in the study. Protections for this confidential data were stored on a password-protected file on my personal computer at home. Several measures were taken in the study to anonymize or de-identify the data to ensure the participants' privacy. No one will have access to this personal data. Using a password-protected file ensures that the data will always be protected, and no one who does not have a password can access the data. The data will be destroyed by secure deletion 5 years after the study or in conformity with the requirements of the IRB.

Summary

Section 2 of this study discussed the research design and rationale, methodology, instrumentation and operationalization of constructs, data analysis plan, threats to validity, and ethical procedures. The target population was discussed: young African American adults in North Carolina. The independent and dependent variables were discussed, and the data analysis plan will be used to complete each research question. The data analysis plan will help determine if there is a mediating effect among the variables. Sampling procedures were also included in this section. The sampling procedures helped identify the type of sampling strategy and the reputability of the dataset.

In Section 3, accessing the data set for secondary analysis and results will be discussed. The timeframe for the data set being drawn, any discrepancies, univariate analysis, descriptive statistics, and statistical analysis will be discussed and collected. A summary will be provided to establish the results and presentation.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of this study was to evaluate if the age of first sexual intercourse and sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults in NC. In this study, we aim to understand how age at first sexual intercourse, sexual abuse, and sexual contact influences the rise in gonorrhea/chlamydia infections in Black youth in NC. In the previous section, we carefully presented the research designed that was applied in answering the above RQs including sample size requirements, operationalization of the key underlying variables and the statistical methods. In this section, I will briefly summarize the available data, access model assumptions for the statistical methods, and present the results for each of the research questions. The research questions and hypotheses are:

RQ1: Is there a statistically significant association between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?

> $H_0$1: There is no statistically significant association between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.
>
> H_A1: There is a statistically significant association between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

RQ2: Does age at first sexual intercourse mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?

$H_0$2: Age at first sexual intercourse does not mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

H_A2: Age at first sexual intercourse mediates the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

RQ3: Does sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?

$H_0$3: Sexual contact does not mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

H_A3: Sexual contact mediates the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

In Section 3, data set/data collection, results, and summary will be discussed. In this study, I hoped to develop a nuanced understanding of the relationship among age at first sexual intercourse, sexual abuse, and sexual contact and how it affects the rise of gonorrhea/chlamydia infections in North Carolina. I anticipated that there may be many variations after adjusting for education and gender.

Accessing the Data Set for Secondary Analysis

Secondary data analysis was used for this study. Analysis was performed using only 2019 data. The participants in the YRBS study were high school students from ninth-12th grade. There was a total of 40 schools selected containing regular and charter schools from the 2019 YRBS survey. The schools had a 92% response rate, with 36 of the 39 eligible sample schools participating. Seventy-one percent response rates were students, 3,145 out of 4,301 sampled students submitted questionnaires, and only 3,056 questionnaires were usable after data editing. The overall response rate for the 2019 YRBS was 66% (92% * 71%). There are no discrepancies in the use of that data set. A weight was associated with each questionnaire to reflect the likelihood of sampling and to reduce bias for the differing patterning of nonresponse. Missing data was excluded from the data set. The total number of participants in the 2019 YRBS data is 3,056.

Table 4

Descriptive and Demographic Characteristics of the 2019 YRBS Variables

Variable	N	% (Weighted)
Gender	1,613	48.9
Female	1,401	51.1
Male		
Education		
9th Grade	1,012	26.3
10th Grade	747	25.9
11th Grade	639	24.6
12th Grade	612	23.1
Ungraded or other grade	7	0.2
Race		
American Indian or Alaskan Native	61	0.9
Asian	143	3.3
Black or African American	664	24.6
Native Hawaiian or Other Pacific Islander	16	0.3
White	1,292	50.4
Hispanic/Latino/Other	770	20.3
Age at First Sexual Intercourse		
I have never had sexual intercourse	1,627	59.2
11/12 years old or younger	87	3.0
13/14 years old	296	11.7
15/16 years old	488	20.5
17 years old or older	127	5.7
Gonorrhea/Chlamydia		
Yes	358	14.2
No	2,172	85.8
Sexual Abuse		
Yes	395	8.4
No	4,285	91.6
Sexual Contact		
Heterosexual	1,265	43.1
Homosexual	695	28.5
Bisexual	628	22.5

Table 4 shows the descriptive and demographic characteristics of the 2019 YRBS survey. In the data set, there were more female than male participants. Most participants in the study were ninth-grade students. Most participants were White, with Black or African American as the second highest. Race was combined on the SPSS dataset as *raceeth* and coded as 1= Am Indian/Alaska Native, 2= Asian, 3=Black or African American, 4= Native Hawaiian/Other PI, 5=White, 6=Hispanic/Latino, 7= Multiple-Hispanic, and 8= Multiple-Non-Hispanic. Most of the participants were 15/16 years of age.

The demographics and descriptive statistics for the variables are listed in Table 4. The missing variables for each category are not included in the dataset and study. Gonorrhea/Chlamydia has 274 missing variables, along with the 252 not sure responses. Sexual abuse has 66 missing variables. Sexual contact has 289 missing variables, along with the variable I have never had sexual intercourse, which has 1,265 variables. Age at first sexual intercourse has 431 missing variables, along with the variable I have never had sexual intercourse, which includes 1,627 variables. The variable education has 45 missing variables. The education variable has an ungraded category that is not included in the study. Gender has 42 missing variables. Race has 110 missing variables, including multiple- Hispanic and multiple non-Hispanic, which include 513 missing variables.

In Table 4, the variable sexual abuse indicates that more people have not been sexually abused than they have been abused. The variable sexual contact indicates that most of the participants engaged in sexual activity with females more than males, and only a select amount engaged in sexual activity with both males and females. The variable age at first sexual intercourse indicates most participants had sex for the first time at 15/16 years of age. The variable gonorrhea/chlamydia indicates that most participants said no to being tested for gonorrhea and chlamydia.

Assumptions of Statistical Methods

The statistical method used for all three research questions was multivariable logistic regression in additional to mediation analyses for RQ2 and RQ3 using the Baron and Kenny method (1986). According to Chartered Financial Analyst (CFA, 2024), multivariable regression allows better predictions and if not used correctly it can lead to bias and poor understanding of relationships. According to Statistics Solutions (2024), before conducting multivariable logistic regression analysis, several assumptions must hold true: categorical dependent variable, independence between independent variables, independence of observations, adequate sample size, homoscedasticity not required, and absence of strongly influential outliers. In addition to the aforementioned data requirements for the model fit will be assessed for each specific model applied to answer the RQs, reporting the model fit parameters (Nagelkerke R-square).

My data meets these requirements, and multivariable logistic regression can be performed on RQ1, RQ2, and RQ3. As demonstrated in Section 2, the dependent variable (gonorrhea/chlamydia infection) is binary categorical. The independent variable (sexual abuse), the two mediating variables for RQ2 (age at first sexual intercourse) and RQ3 (sexual contacts) as well as the covariates are all categorical.

In addition to the general requirements for multivariable logistic regression, RQ2 and RQ3 have additional requirements to assess mediation based on the Baron and Kenny method (1986). The Baron and Kenny method provides a structured framework for analyzing the relationship between the casual variable (X), outcome variable (Y), and mediating variable (M; Kenny, 2024). According to this method, for a variable M to be a mediator in a relationship between and independent variable (X) and a dependent variable (Y), the following must be true:

i) there must be a statistically significant relationship between X and Y

ii) there must be a statistically significant relationship between X and M

iii) there must be a statistically significant relationship between M and Y

iv) If the above are satisfied only then can we assess the mediation using this fourth criteria: In a model with X and M as predictors of Y, the magnitude of the relationship between X and Y must be smaller compared to the magnitude in the relation between X and Y in model with only X in the model (as in i above). In fact, when the magnitude of the relationship between X and Y simply reduces with M in the model, then M is a partial mediator and when the relationship vanishes totally, then M is a complete mediator. These assumptions/assertions will be assessed below.

Research Question 1 Results

RQ1: Is there a statistically significant association between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?

$H_0 1$: There is no statistically significant association between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

$H_A 1$: There is a statistically significant association between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

Binary logistic regression was performed to establish the relationship between the dependent variable, gonorrhea/chlamydia, and the independent variable, sexual abuse, and the covariates education and gender. Tables 5 provides the crude OR, adjusted OR, p-value, and 95% confidence interval levels of sexual abuse and gonorrhea and chlamydia infections along with the covariates gender and education. The reference category is no for this table, and the yes category was used to determine the data.

The model fit parameter is 2.4% (Nagelkerke R-square = 0.024). The Nagelkerke R-square explains 2.4% of the dependent variable, which is relatively low, but does not invalidate the findings of the study. There is room for improvement, and potentially exploring other influencing factors beyond those included in the study. In Table 5, binary logistic regression shows a statistical significance relationship between sexual abuse and gonorrhea/chlamydia infections in African American young adults in NC (Adjusted OR= 2.57, 95% CI [1.84, 3.59], $p=0.000$) after adjusting for education and gender. Based on the results from Tables 5, those who experience sexual abuse were more likely (with 157% increased odds) to have gonorrhea/chlamydia infections. Thus, based on this result, the null hypothesis can be rejected, indicating there is a statistically significant association between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

Table 5

The Likelihood [Odds ratio (OR) and 95% Confidence Interval (CI)] of Gonorrhea/Chlamydia Infections Based on Exposure and Sociodemographic Characteristics Among Young Adults in NC

Variable		Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Sexual abuse	Yes	2.77 (2.00, 3.80)	0.000	2.57 (1.84, 3.59)	0.000
	Ref: No				
Gender	Female	1.04 (0.83, 1.31)	0.716	1.05 (0.83, 1.32)	0.692
	Ref: Male				
Education	9^{th} Grade	0.84 (0.58, 1.12)	0.193	0.76 (0.54, 1.06)	0.103
	10^{th} Grade	1.29 (0.94, 1.77)	0.120	1.27 (0.92, 1.75)	0.143
	11^{th} Grade	1.75 (1.30, 2.34)	0.000	1.72 (1.28, 2.32)	0.000
	Ref: 12^{th} Grade				

Research Question 2 Results

RQ2: Does age at first sexual intercourse mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?

$H_0 2$: Age at first sexual intercourse does not mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

*H*A2: Age at first sexual intercourse mediates the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

Table 6 provides the adjusted OR, p-value, and mediation analysis of sexual abuse, age at first sexual intercourse, and gonorrhea and chlamydia infections, along with the covariates gender and education.

The model fit parameter is 37.9% (Nagelkerke R-square = 0.379). The Nagelkerke R-square explains 37.9% of the dependent variable based on the predictors, which represents moderate explanatory power, remains unexplained, and needs further improvement. There is room for further considerations. As alluded to previously (in RQ1 above), results from multivariable logistic regression is indicative of statistically significant relationship between sexual abuse (X) and gonorrhea/chlamydia (Y) after adjusting for education and gender. In addition, as depicted in table 6 below, there is a statistically significant relationship between sexual abuse (X) and age at first sexual intercourse (M) after adjusting for education and gender (*Adjusted OR= 0.49, 95% CI [0.31, 0.76], p= 0.001*) as well as between age at first sexual intercourse (M) and gonorrhea/chlamydia, Y (*Adjusted OR= 0.63, 95% CI [0.43, 0.93], p= 0.021*). Based on these results which satisfy the preliminary assumptions for mediation analysis, age at first sexual intercourse was then assessed as a mediator between sexual abuse and gonorrhea/chlamydia infections. According to the outcome of that analysis (Table 6), the magnitude of the effect of sexual abuse on gonorrhea/chlamydia infections was not only reduced but was also not statistically significant after adjusting for education and gender *(Adjusted OR=1.26, 95%CI [0.83, 1.93], p=0.28)*, indicating that there is a complete mediating effect of age at first sexual intercourse in the relationship between for sexual abuse and gonorrhea/chlamydia infections after adjusting for education and gender. As such, the null hypothesis was rejected, holding true the claim that age at first sexual intercourse mediates the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

Table 6

Direct Effects of Sexual Abuse (X) on Chlamydia/Gonorrhea Infections (Y) and Age at First Sexual Intercourse (M) after Adjusting for Education and Gender in African American Young Adults in NC

Relationships	Adjusted OR (95%CI)	p-value
i. Sexual Abuse & Gonorrhea/Chlamydia Infections	2.57(1.84, 3.59)	<0.001
ii. Sexual Abuse & Age at First Sexual Intercourse	0.49(0.31, 0.76)	0.001
iii. Age at First Sexual Intercourse & Gonorrhea/Chlamydia Infections	0.62(0.42, 0.91)	0.015
iv. Sexual Abuse & Gonorrhea/Chlamydia Infections controlling for Age at First Sexual Intercourse	1.26(0.83, 1.93)	0.28

* All the models are adjusted for Education and Gender

Research Question 3 Results

RQ3: Does sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender?

$H_0$3: Sexual contact does not mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

H_A3: Sexual contact mediates the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

Table 7 provides the adjusted OR, p-value, and mediation analysis of sexual contact, age at first sexual intercourse, and gonorrhea and chlamydia infections, along with the covariates gender and education.

The model fit parameter is 10.8% (Nagelkerke R-square = 0.108). The Nagelkerke R-square explains 10.8% of the dependent variable, which explains some relationship between the predictors and outcomes, but most remains unexplained. It could be meaningful depending on the context, along with adding more relevant predictors. As previously noted, multivariable logistic regression shows that sexual abuse is statistically significantly related to gonorrhea and chlamydia infections (Adjusted *OR= 2.57, 95% CI [1.84, 3.59], p=0.000*) after adjusting for education and gender. Sexual contact has two levels; level 1 (Heterosexual; Adjusted *OR= 0.73, 95% CI [0.38, 1.42], p=0.36*) and level 2 (Bisexual; Adjusted *OR= 1.49, 95% CI [0.98, 2.27], p=0.06*), neither is significant to gonorrhea and chlamydia infections. Based on these results, there is a statistically significant relationship between sexual abuse (X) and sexual contact (M). However, as depicted in Table 7, there is no significant association between sexual contact (M) and gonorrhea/chlamydia infections, Y *(Adjusted OR = 0.83, 95%CI= [0.40, 1.72], p=0.62).* Thus, the assumption to assess the role of sexual contacts as a potential mediator in the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender, fails. As such, the null hypothesis cannot be rejected, thus holding on the claim that sexual contact does not mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults who have had sexual intercourse in North Carolina after adjusting for education and gender.

Table 7

Direct Effects of Sexual Abuse (X) on Chlamydia/Gonorrhea Infections (Y) and Sexual Contact (M) after Adjusting for Education and Gender in African American Young Adults in NC

Relationships	Adjusted OR (95%CI)	p-value
i. Sexual Abuse & Gonorrhea/Chlamydia Infections	2.57(1.84, 3.59)	<0.001
ii. Sexual Abuse & Sexual Contact (Level 1)	0.78(0.41, 1.49)	0.46
ii. Sexual Abuse & Sexual Contact (Level 2)	1.60(1.06, 2.40)	0.02
iii. Sexual Contact & Gonorrhea/Chlamydia Infections	0.83(0.40, 1.72)	0.62
iv. Sexual Abuse & Gonorrhea/Chlamydia Infections controlling for Sexual Contact (Level 1)	0.73(0.38, 1.42)	0.36
iv. Sexual Abuse & Gonorrhea/Chlamydia Infections controlling for Sexual Contact (Level 2)	1.49(0.98, 2.27)	0.06

*All the models are adjusted for Education and Gender

Summary

In Section 3, the results of the statistical analyses performed to answer the three research questions were presented, starting first with the descriptive statistics of the analytical sample. I sought to investigate whether age at first sexual intercourse and sexual contacts mediate the relationship between sexual abuse and gonorrhea/chlamydia infections. The key analytical approach employed was multivariable logistic regression following analyses of mediation based on the Baron and Kenny method (1986). The results were indicative of a statistically significant relationship between sexual abuse and gonorrhea/chlamydia infections, with 157% increased odds of having Gonorrhea/Chlamydia infections among those who had experienced sexual abuse (Adjusted OR= 2.57, 95% CI [1.84, 3.59], p=<0.001). The requirements for mediation analysis were satisfied by age at first sexual intercourse which further showed to completely mediate the underlying relationship (between sexual abuse and gonorrhea/chlamydia infections). However, sexual contacts did not satisfy the requirements for mediation as there was no statistically significant relationship between sexual contact and gonorrhea/chlamydia infections *(Adjusted OR = 0.83, 95%CI= [0.40, 1.72], p=0.62),* thus indicating that sexual contacts was not a mediator.

In Section 4, the results of the analysis will be discussed with interpretation of the findings, limitations of the study, recommendations for future research, public health practice and field-based products, and the critical essence of the study.

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

Introduction

The purpose of this quantitative study was to evaluate if the age of first sexual intercourse and sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults in NC. The study used secondary data that was collected from the 2019 YRBS. The variables in the study included age at first sexual intercourse, sexual contact, sexual abuse, and gonorrhea/chlamydia infections. The study was conducted using mediation analysis to determine if age at first sexual intercourse and sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults in North Carolina. The key findings indicate that after adjusting for education and gender, there was a statistically significant relationship between the independent variables sexual abuse and age at first sexual intercourse and the dependent variable. Specifically, individuals who experienced sexual abuse had 157% increased odds of having Gonorrhea/Chlamydia infections (Adjusted OR = 2.57, 95% CI [1.84, 3.59], $p < 0.001$). However, this relationship appeared to be mediated by age at first sexual intercourse. When age at first sexual intercourse was adjusted for, the magnitude of effect was reduced, and the statistical significance was eliminated (Adjusted OR = 1.26, 95% CI [0.83, 1.93], $p = 0.28$). Notably, this mediation effect did not appear to be influenced by sexual contacts.

Interpretation of the Findings

The findings of this study are very significant to the literature and provide noteworthy findings. The analysis revealed that there is a statistically significant association between age at first sexual intercourse amongst sexual abuse and gonorrhea/chlamydia infections among African American young adults in NC after adjusting for education and gender. However, not by sexual contacts. The dependent variable of the study is gonorrhea/chlamydia infections. The independent variables are age at first sexual intercourse, sexual contact, and sexual abuse. The covariates are education and gender.

The findings for the data collected for the dependent variable gonorrhea/chlamydia infections in this study showed that many of the participants answered no to testing for gonorrhea/chlamydia infections. Previous studies indicated that gonorrhea/chlamydia infections are on the rise in African American young adults in North Carolina. The findings from this study are inconsistent with the data collected on gonorrhea/chlamydia infections for the NC Department of Health and Human Services. According to NCDHHS (2022), the COVID-19 pandemic affected STD testing, and testing decreased in 2020, and diagnoses did not return in 2021 to pre-2020 numbers. Due to diagnoses not returning, this data could have been affected, and participants could not have been properly tested to know their STD status. STIs fluctuate due to testing availability and accurate reporting; this could change the results drastically.

Sexual abuse and gonorrhea/chlamydia infections were determined by multivariable logistic regression. Multivariable logistic regression analysis revealed a statistically significant relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults in North Carolina, even after adjusting for education and gender. Sexual abuse had yes and no responses. More participants chose “no” that they have never been physically forced to have sexual intercourse when they did not want to. However, after analysis sexual abuse is significant (p= <0.001). Previous studies indicated that African American youth have higher rates of gonorrhea/chlamydia and may develop risker sexual behaviors.

Findings from this study indicate that students could have been afraid to answer correctly or that they have never tested positive for an STI. The amount of positive gonorrhea and chlamydia infections in NC with this age group does not match what the study collected. There are many different reasons why the data does not match. It is great that these types of studies are conducted in young adults/adolescents. Gonorrhea and chlamydia cases are continuing to rise in this specific age group, and research shows it could result in many different ways on how the adolescents are transmitting these infections.

Limitations of the Study

There are several limitations of the study to consider that could have affected the results of the study. The initial intention was to use two rounds of data (2019 and 2021). However, because data on the dependent variable was not collected for 2021, the analysis was performed only for 2019. However, since the intended study was cross-sectional and not longitudinal, and the 2019 data had the requisite sample size, it grants the study enough statistical power; this did not technically affect the results of the RQs. One limitation of the study is that it did not include all schools, and not all the students answered the survey correctly. There was no specific way to determine whether there was truthfulness within the study or whether the students answered accurately or inaccurately. Students have the option to choose that they have never had sexual intercourse, and this could have affected the study because it eliminated a lot of the sample size.

Another limitation of the study included students being absent from school and having a different day to answer the survey. The students who were absent on the original day of the study could have also been absent on the retake, which means all students may not have had a chance to answer the questionnaire, which also affects the study's sample size. Students could have missed school specifically due to them not wanting to participate in the study. The survey also had missing values, which reduced the sample size.

Due to missing values and potential bias within the study, the study could not accurately determine if age at first sexual intercourse, sexual abuse, and sexual contacts had a significant effect on gonorrhea/chlamydia infections in African American young adults in North Carolina. Bias should not be allowed, and the questionnaire should be answered truthfully to determine better if it influences the community. Providing participants with the security the questionnaire will be anonymous can enable individuals to answer with honesty.

Recommendations for Future Research

Previous studies indicated that further research should be considered in age at first sexual intercourse, sexual abuse, and sexual contacts. Recommendations for further research would be to research further the cause of STIs continuing to increase within North Carolina among adolescents. Providing other possibilities for STI increases would provide young adults with other causes to help determine the issue. Other possibilities could include the causes of STIs and, within that same cause, how it could be prevented.

Recommendations could also involve administering the questionnaire to all young adults within the specified age range to comprehensively assess the effect of age at first sexual intercourse, sexual abuse, and sexual contacts and how it affects the STI increase. By making it available to all young adults, it will increase not only the sample size, but it will increase the accuracy. I would suggest possibly providing this survey at the time of STI testing to compare the results. It also allows clinicians and other public health professionals to be involved and help educate the youth who may have questions or concerns about what they are being asked.

Another recommendation would be to make the questions more precise, enabling young adults to gain a clear and comprehensive understanding of each question. By making it more specific, the participants can answer honestly and truthfully and know exactly what they are being asked. Broadening the age group included in this study could enhance its precision. The age group is narrow due to the questionnaire only accessible to high school students, college students could also benefit from this questionnaire.

Public Health Practice and Field-Based Products

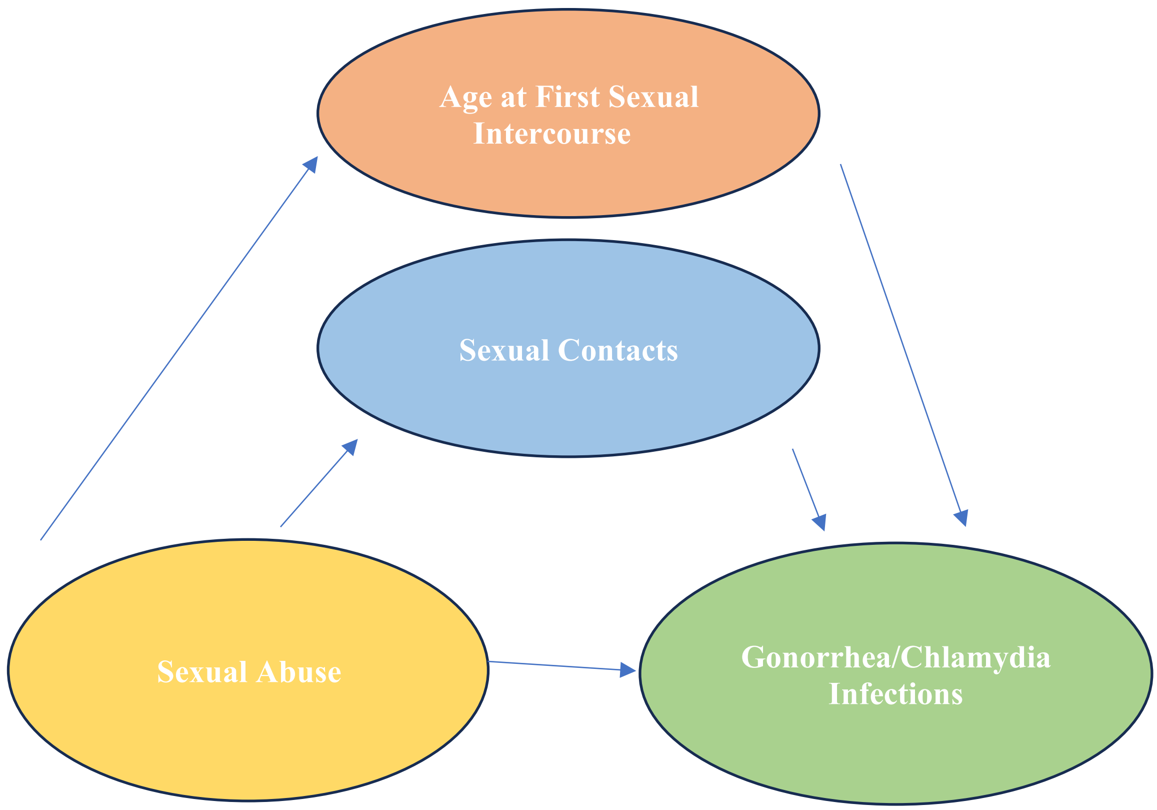
Reducing STIs among all young adults is essential. Regarding recommendations for public health practice, this study identified a statistically significant association between the mediation of sexual abuse and age at first sexual intercourse among African

American young adults in North Carolina after adjusting for education and gender, not sexual contacts. This study indicated that further investigation into additional research variables is necessary to better understand the factors contributing to the increase of STIs in NC.

The CDC provides guidelines for sexual abuse, and STIs. According to the CDC (2021), trichomoniasis, BV, gonorrhea, and chlamydia are the most frequently diagnosed infections among women who have been sexually abused or assaulted. Post examination presents an essential opportunity for identifying or preventing an STI (CDC, 2021). Post-sexual abuse on male, female, nonbinary, and LGBT+ should be provided STI testing to help reduce the risk of further transmission. Below, I have provided two figures to contribute to the public health field-based products. Figure 2 describes the community health plan, and Figure 3 describes the information/fact sheet.

Figure 2

Community Health Intervention Plan - Sexually Transmitted Infections in African American Young Adults: Addressing the Prevention of Gonorrhea/Chlamydia Infections



Age at First Sexual Intercourse	**Sexual Contact**	**Gonorrhea/Chlamydia Infections**	**Sexual Abuse**
• Identifying the age at first sexual intercourse can help determining how soon young adults start becoming sexually active. • Teaching youth about abstinence until marriage can possibly help prevent the early aged sexually active adolescents and reduce the spread of STIs. • Helps provides awareness to STIs at a young age.	• Identifying the sexual status of the individual can help determine which group of individuals has the highest STI rate. • For example, men who have sex with men (MSM), have a higher risk of STIs, and prevention techniques can come into place to help reduce the transmission. • Helps educate the LGBT+ community.	• Understanding how common STIs are can help reduce the spread of transmission. • Gonorrhea/Chlamydia are the most common STIs among young adults. • Frequent screenings are recommended, but the recommendation should be every 3-6 months to reduce the transmission.	• Providing the adequate protocols and testing to young adults that have been sexually abused can help identify how sexual abuse and STIs are connected. • Allowing young adults to feel safe, can bring awareness to not only STIs, but those who have been sexually abused.

Figure 3

Information/Fact Sheet

Gonorrhea/Chlamydia Infections in African American Young Adults in North Carolina

WHAT IS GONORRHEA AND CHLAMYDIA?

Gonorrhea: An STI that can cause infection in the genitals, rectum, and throat. It is very common, especially among young people ages 15-24 years (CDC, 2024).

Chlamydia: Is a common STI that can cause infection among men and women. It can cause permanent damage to a woman's reproductive system, making it difficult to conceive. Chlamydia can also cause a potentially fatal ectopic pregnancy (pregnancy that occurs outside the womb)(CDC, 2024).

Symptoms:

- Increased vaginal discharge
- Painful or burning sensation when peeing
- Discharge from penis

Risk Factors:

Sexually active people can get gonorrhea/chlamydia through vaginal, anal, or oral sex without a condom with a partner who has gonorrhea/chlamydia.

Prevention:

Condom Use
Abstinence
Get Tested

Who is Affected:

Young Adults 15-24
Minority Groups
Gay & Bisexual Individuals

- In 2021, there was 65,107 chlamydia cases and 29,177 gonorrhea cases in NC.
- Untreated STIs can cause significant health problems such as pelvic inflammatory disease (PID), and pain to the testicles and lead to infertility.
- Increase the risk of developing HIV

Centers for Disease Control and Prevention. (2024). *About gonorrhea.* Centers for Disease Control and Prevention. https://www.cdc.gov/gonorrhea/about/index.html

Centers for Disease Control and Prevention. (2024). *About chlamydia*. Centers for Disease Control and Prevention. https://www.cdc.gov/chlamydia/about/index.html

Positive Social Change

In helping reduce sexually transmitted infections, positive social change can help reduce the stigma, encourage abstinence, improve access to health, and encourage individuals to have more open conversations about sexual abuse, heterosexual, and STI relations. Providing participants to be open and answering honestly to the questionnaires about their sexual preference and providing sexual education can help promote healthier choices when becoming sexually active. Encouraging STI testing every 3-6 months for all young adults can help with reducing STI transmission amongst other individuals. Knowing your partner's STI status and having honest conversations can lead to the possibility of being tested together. Positive social change on the individual level can reduce the transmission of STI rates. Positive social change can involve connecting with African American young adults to help them understand why their ethnic group have a higher prevalence of STIs. This approach can also educate them on strategies to reduce STIs within their community. At the state level, such efforts can raise awareness, provide targeted education, and promote regular STI testing to prevent and lower STI rates not only with African American ethnic groups, but also across broader populations.

Conclusion

The continuous rise of STIs in African American young adults in North Carolina is still a significant public health issue. This quantitative study was to examine whether the age of first sexual intercourse and sexual contact mediate the relationship between sexual abuse and gonorrhea/chlamydia infections among African American young adults in North Carolina after controlling for education and gender. The results demonstrated a statistically significant between sexual abuse and gonorrhea/chlamydia infections, with individuals who had experienced sexual abuse showing 157% higher odds of having gonorrhea/chlamydia infections (Adjusted OR= 2.57, 95% CI [1.84, 3.59], p=<0.001). The criteria for conducting mediation analysis were met by age at first sexual intercourse, which was further shown to fully mediate the observed relationship between sexual abuse and gonorrhea/chlamydia infections. However, the variable sexual contacts did not fulfill the conditions required for mediation since no statistically significant association was found between sexual contacts and gonorrhea/chlamydia infections *(Adjusted OR = 0.83, 95%CI= [0.40, 1.72], p=0.62).* This indicates that sexual contacts do not act as a mediator in this context.

Previous studies have shown some relation among the variables but have not demonstrated how these variables are related. The exact role (mediating effect) of the variables and the African American young adults have not been explored. The findings of previous studies do show that age at first sexual intercourse and risker sexual behaviors do influence the increase in STIs in Black young adults. This quantitative study shows that further research should be done to address this public health issue, as some of the variables had no significance.

The strengths and limitations of applying the Baron and Kenny framework (1986) showed the mediating effect of the independent variables on the dependent variable and how each variable affects gonorrhea/chlamydia infections. The YRBS did provide issues as some of the responses may have provided bias. A public health policy that influences positive social change can help educate and reduce the transmission of STI rates among

African American youth. Healthcare and public health professionals must implement frequent STI testing and STI awareness to minimize the spread amongst not only this population but all young adults. By implementing these changes, the gap between age at first sexual intercourse, sexual abuse, and sexual contacts can help reduce gonorrhea/chlamydia infections and provide prevention techniques to all young adults.

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