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A DNP Quality Improvement Project Addressing Low HIV Testing Rates of College Students

Kimberly Griffin
scottkimgriffin@gmail.com

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Georgia College and State University

Jennifer Goldsberry, DNP, MSN, FNP-BC, APRN, CNE, Committee Chair

Sallie Coke, PhD, APRN, C-PNP, C-FNP, PMHS, Committee Member

Scott Butler, PhD, MPH, ACS, Committee Member

Laura Durr, MSN, FNP-C, APRN, Committee Member

Table of Contents

Abstract

The overall HIV testing rate is very low in the United States. HIV is easily preventable with safe sexual practices, and early HIV screening is effective in identifying individuals affected and assuring linkage to care. The rate of HIV testing among college students reflects the low numbers of the national average. This quality improvement project evaluated attitudes towards HIV testing of undergraduate college students. The project aimed to determine attitudes of college students towards testing as well as relationships between demographic factors, frequency of HIV testing, and attitudes towards testing. A total of 99 undergraduate college students participated in the study. Instruments measured demographic characteristics and specific factors of attitude about HIV testing including friends' and family's responses, public opinion, and confidentiality. Data indicated a low positive correlation between previously being tested for HIV and positive attitudes towards HIV testing ($r = .28$, $p < .01$). There was also a low positive correlation between age and positive attitudes towards HIV testing ($r = .33$, $p < .01$). Further results noted a low positive correlation between sex with opposite-gender partners and sex risk ($r = .31$, $p < .05$) and a weak positive correlation between sex with transgender partners and sex risk (r .21, p = < .050 . Additionally, there was a low positive correlation between history of drug use and sex risk ($r = .30$, $p < .01$). Similar to previous research, results support HIV testing should target younger undergraduate students who have sex with opposite-gender or transgender partners, and students with a history of drug use.

Keywords: college students, undergraduates, HIV testing, HIV screening, Health Belief Model

Chapter I

Human immunodeficiency virus (HIV) is an incurable disease that is transmitted primarily through sexual contact. Screening for HIV is a crucial measure to improve health outcomes for undiagnosed HIV infected individuals and reduce the transmission of HIV (Centers for Disease Control and Prevention [CDC], 2019). A 2017 CDC report found that 27% of new cases of HIV in 2017 occurred in the 13 -24 years of age group (CDC, 2020). Further findings of the 2017 study revealed that only nine percent of this group received HIV screening (CDC, 2020) and an estimated 51% were unaware of their HIV positive status ("HIV in the United States," 2019). When compared to other age groups, HIV positive youth experience delays in diagnosis, linkage to care, and ineffective viral suppression (CDC, 2020).

Problem Statement

Georgia College and State University (GC&SU) is a public university located in the center of Milledgeville, Georgia. It is described as a rural, liberal arts university that promotes a culture of diversity and inclusiveness ("Public liberal arts university," 2019). There are currently over 7,000 undergraduate and graduate students enrolled (Georgia College, n.d.). Greek life is prevalent with more than 27 fraternity and sorority organizations on campus ("Public liberal arts university," 2019).

The Office of Health Promotion at GC&SU provides health education programs, events, and activities to create a safer and healthier campus and reduce high risk behaviors on campus (Georgia College, 2020). The health educator at GC&SU, Rachel Pope, was contacted to discuss HIV testing rates specific to GC&SU students. Mrs. Pope stated that the Office of Health Promotion facilitates the distribution and collection of a national online student survey every two

years with data containing information about HIV testing rates and that she would provide the most recent results (R. Pope, personal communication, 2019).

The survey is conducted through the American College Health Association (ACHA) and examines data concerning student's health habits, behaviors, and perception (ACHA, 2020). The most recent ACHA health assessment survey was Spring 2019. This student survey was completed by 17.1% of the students enrolled at the time ("Georgia College Executive Summary," 2019). Results of the survey concluded that only 21.2 % of students had previously been tested for HIV and more than half reported inconsistent use or no use of a protective barrier method with sexual intercourse ("Georgia College Executive Summary," 2019). Over 90% of the respondents were single, attended college full time, and were between 18 and 24 years of age ("Georgia College Executive Summary," 2019).

The Northcentral Health District (NCHD) is the district office for the health departments of 13 central Georgia counties (NCHD, 2020). Included in this district is GC&SU, located in Baldwin county. The NCHD is comprised of a leadership team of various specialties (NCHD, n.d.). The lead epidemiologist, Amber Erickson, is a member of the leadership team responsible for all surveillance programs in all 13 counties (NCHD, n.d.). Surveillance programs include general reportable diseases, tuberculosis, sexually transmitted infections, HIV, and emerging public health threats (NCHD, n.d.).

Information was requested from A. Erickson concerning Central Georgia HIV testing rates and new HIV cases compared to state and national averages. She provided valuable data for comparison and analysis, particularly the incidence of HIV in Central Georgia compared to state averages (A. Erickson, personal communication, 2019). The Department of Public Health (DPH) report states that rates of new HIV cases have trended down over the last couple of years, but

during the first quarter of 2019, new HIV cases increased by 40% compared to 2018 ("HIV and STD trends," 2019). The incidence of new HIV infection for the central Georgia region is 1.29%, with a 0.52% rate for the entire state of Georgia ("HIV and STD trends," 2019).

Purpose

The purpose of this quality improvement initiative was to measure attitudes about HIV testing in hopes to decrease barriers of HIV testing events for college students. This project aimed to increase HIV testing rates in the college population. The proposed quality-based initiative addressed the following specific aims and clinical questions:

Specific Aim 1

This project aims to determine what demographic factors are associated with college students' willingness to participate in an HIV survey.

Specific Aim 2

This project aims to determine the overall attitudes of college student regarding HIV testing.

Specific Aim 3

This project aims to determine the demographic factors of college students associated with positive attitudes toward HIV testing.

Specific Aim 4

This project aims to determine barriers associated to HIV testing among college students.

Specific Aim 5

This project aims to determine recommendations to improve HIV testing among college students.

Clinical Question 1

What are the demographic factors associated with the willingness to participate in an HIV survey?

Clinical Question 2

What are the overall attitudes of college students about HIV testing based on HTAS scores?

Clinical Question 3

What demographic factors are associated with positive attitudes towards HIV testing measured by the HTAS facilitator score?

Clinical Question 4

What are the barriers identified to HIV testing by the respondents as measured by the HTAS barrier score?

Clinical Question 5

What recommendations can be made to improve HIV testing based on the data from the online survey?

Background Information

Human immunodeficiency virus (HIV) is a predominantly sexually transmitted disease (STD) and continues to be a dominant presence in the United States. Recent advances in modern medicine have reduced HIV from a certain death sentence to a chronic and manageable disease. HIV is currently incurable and requires lifetime management. The incidence of HIV screening continues to be low despite long-standing CDC recommendations for HIV testing (Febo-Vaquez, Copen, & Daugherty, 2018). Youth between the ages of 13 to 24 accounted for 27% of new HIV cases in 2017, and only 9% of this age group were screened for HIV (“HIV and

youth,"2019). The purpose of the literature review and synthesis is to address the following question: In college students, what are the overall attitudes and identified barriers toward HIV testing?

Supporting Data: Summary of Expert Evidence

The United States initiative to end the HIV epidemic was announced at the 2019 State of the Union address, Ending the HIV Epidemic: A Plan for the United States (Fauci et al., 2019). The initial goal of the initiative was to reduce the rate of new infections by 75% within five years and 90% within 10 years (Fauci et al., 2019). The plan consisted of four pillars based on early diagnosis of HIV, treatment, prevention, rapid detection, and response to clusters of HIV infection (Fauci et al., 2019). The success of the initiative continues to be dependent on active partnerships with city, county, and state public health departments, as well as community partners (Fauci et al., 2019).

The CDC estimates 1.1 million people were infected with HIV at the end of 2016 and 50,900 were youth (CDC, 2020). Youth have the lowest rate of viral suppression of all age groups infected with HIV (CDC, 2020). High rates of other STDs, socioeconomic challenges, low rates of HIV testing, and low rates of medicine to prevent HIV, are some of the challenges youth face in reducing the risk of contracting HIV and obtaining access to care for treatment (CDC, 2020).

HIV has claimed more than 32 million lives worldwide and continues to be a leading global public health issue (The World Health Organization {WHO}, 2019). The WHO (2019) reported 37.9 million people worldwide in 2018 were infected with HIV. An estimated 770,000 died from HIV-related causes and 1.7 million were infected with HIV because of gaps in HIV services (WHO, 2019).

Giroir (2020) reiterated the success of the national initiative to end HIV requires a collaborative effort of partners from the national to the local level. Collaborations with civil society is required for solutions to challenges in ending HIV (Giroir, 2020). The funding and technical support allow for personalization of programs based on the unique needs of communities (Giroir, 2020).

Critical Analysis of Expert Evidence

The experts note the complexity and magnitude of the HIV epidemic worldwide. HIV cases have declined significantly in the past several decades but there has been no significant progress in prevention of new infections in current times. The reduction, and eventual eradication, of HIV is reliant on partnerships with local and state health agencies to expand access to testing, medication, and rapid response to potential outbreaks.

Conceptual Theory

The proposed project implemented the Health Belief Model (HBM) to address the specific aims and research questions. The HBM is a widely recognized pioneer theory of health behavior ("Theory at a glance," 2018). The HBM theorizes that individuals' beliefs about susceptibility to disease and their perception of the benefits of avoiding disease determine their behavior or readiness to act ("Theory at a glance," 2018). Willis et al. (2018) successfully implemented the HBM to increase awareness of HIV among young people, the seriousness of contracting HIV, and improve health-protective behaviors.

The Health Belief Model

The HBM was developed in the 1950s by a group of social psychologists that were employed by the U.S. Public Health Service ("Theory at a glance," 2018). The core elements focus on the theory that health beliefs of an individual determine their health-related

behaviors ("The Health Belief Model," 2005). The HBM is comprised of six main concepts that influence an individual's decision to act, prevent, screen for, and control illness (Theory at a Glance, 2018*)*. A person must believe they are susceptible or vulnerable to a condition, the condition has a serious consequence, taking action would reduce susceptibility to the condition, and the cost of taking action is outweighed by the benefits. The person must be exposed to factors that encourage or motivate action and be confident in their ability to perform an action (Theory at a Glance, 2018). Health motivation is the central theme of the HBM and provides a framework for the design of short- and long- term behavior change initiatives (Theory at a Glance, 2018).

Chapter II

Review of Literature

A systematic review of the literature was performed employing the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) checklist (Moher et al., 2009). The Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medical Literature Analysis and Retrieval System Online (MEDLINE), and ProQuest databases were searched for current evidence. The search words included college students, undergraduates, HIV testing, HIV screening, and the Health Belief Model. Limitations applied to the search included only peer-reviewed articles, written in the English language, human subjects, published during years of 2014-2019, and participant age range of 18 – 22 years.

Barriers related to HIV Testing

Several studies were descriptive in design and identified several factors associated with low testing HIV rates of college students. The primary barriers identified were low perceived vulnerability, perceived social stigma, fear of HIV-positive test results, confidentiality concerns, cost of testing, transportation to testing sites, and knowledge deficits (Anwuri et al., 2017; Grover & Miller, 2014; Haile et al., 2017; Leichliter et al., 2017; Lin et al., 2017). Lindong et al. (2017) concluded that gender influenced HIV testing rates and that young, college-aged men were more likely to be tested than women. Another study, Gillen and Markey (2014) examined how body image, race/ethnicity, and gender affect HIV testing rates of college students. Results indicated that the female gender and African Americans were more likely to have an HIV test. Individuals with more positive evaluation of personal appearance were more likely to ask a partner's HIV status and ask a partner to get tested (Gillen & Markey, 2014).

Low Perceived Vulnerability. Haile et al. (2016) examined the perception of HIV risk of 184 college students and determined that 81.5% of students perceived they were not at risk for HIV. The inclusion criteria were enrolled at college of interest, single, and at least 18 years of age (Haile et al., 2017). The demographics were mostly white, non-Hispanic, female, heterosexual, and sophomore (Haile et al., 2017). The mean age was 21 years (Haile et al., 2017). Students not in a relationship were 2.89 times more likely to report increased perceived vulnerability for HIV compared to students in a relationship (Haile et al., 2017).

Anwuri et al. (2017) documented similar results of a study that examined the factors that affect HIV screening of college students in Maryland and determined 33% of students surveyed reported low perception of risk of contracting HIV. Lin et al. (2017) utilized a focus group method in a large Northwestern University to collect data. Findings concluded that male students were more inclined to have a low perception of risk compared to female students (Lin et al., 2017). Lindong et al. (2017) and Long-White et al. (2017) both correlated with previous study findings of college students' low perceived vulnerability of HIV and identified African American youth with disproportionately high diagnoses of HIV and low testing rates.

Brouwer et al. (2019) investigated HPV vaccination status among 241 college-aged men and women and its association with sexual behavior. The reported mean for the cohort was 2.2 for the lifetime number of sexual partners (Brouwer et al., 2019). The study concluded HPV vaccination status was not an independent predictor, whereas race or alcohol were predictors of sexual behavior (Brouwer et al., 2019).

Lemley et al. (2017) examined predictors of alcohol and sexual risk behavior of 108 college students. The lifetime total sexual partners were a median of four (IQR = 2, 8.5) (Lemley et al., 2017). Lemley et al. (2017) identified alcohol and sexual decision-making processes

contributed to alcohol consumption and sexual risk behavior. However, alcohol consumption was not a significant predictor of sexual risk behavior (Lemley et al., 2017).

Social Stigma. Lin et al. (2017) conducted focus groups of college students that concluded social stigma, actual or perceived, associated with HIV testing elicited fear of social discrimination and impeded testing. Social stigma is described as other people being judgmental or looking down on individuals that choose to get tested for HIV (Lin et al., 2017). Participants in the study described that social status would suffer if tested for HIV and found to be positive (Lin et al., 2017). Students with no prior history of HIV testing experienced more social stigma than students with previous HIV testing (Lin et al., 2017).

Condom use is associated with a decreased risk of transmission of STDs that include HIV. Social stigma or embarrassment is a barrier to condom acquisition (Reeves et al., 2016). Butler et al. (2018) evaluated a mail-order condom delivery system at a private university in the Northeast. The study compared traditional condom distribution programs to a mail-order system for students to determine if the barriers of accessibility and embarrassment were decreased (Butler et al., 2018). The mail-order condom delivery system was compared to six other distribution methods and was rated higher in comfort and convenience than traditional distribution methods (Butler et al., 2018).

Knowledge Deficits. Lin et al. (2017) identified the cost of testing, lack of information (not knowing where to go for testing), and fear of test results as college students' barriers to HIV testing. A meta-analysis determined computer-technology-based education improved knowledge and decreased youth barriers (Lin et al., 2017). Jones et al. (2017) concurred with college students' knowledge deficits, with 18.1% of students surveyed rating low knowledge and

awareness of HIV transmission, 32.6% being unaware of HIV testing sites, and only 50.4% considering HIV testing to be moderately important.

Goldsberry et al. (2016) evaluated the effectiveness of a brief sexually transmitted disease (STD) intervention targeting fraternity and sorority members at a central Georgia university. The 30-minute educational session was conducted as a face-to-face group discussion, and the post-intervention questionnaire link was emailed to the participants one week after the intervention (Goldsberry et al., 2016). The increase in STD knowledge from baseline (M = 10.0, SD = 6.5) to one week after the intervention (M = 20.27, SD = 4.9) t (131) = -13.53 was significant, and attitudes towards safe sex behaviors trended upwards with increased knowledge (Goldsberry et al., 2016).

Confidentiality. Leichliter et al. (2017) examined CDC data from the 2013-2015 National Survey of Family Growth and found privacy concerns inhibited sexual and reproductive health care in 13.5% of females and 12% of males, 18-25 years of age, who were covered by a parent's health plan. These students expressed concerns about their parents finding out. The current health care system in the United States allows for dependent children to remain on a parent's health insurance plan until the child turns 26 years of age (Leichliter et al., 2017). Adolescents and young adults are hesitant to seek sensitive medical care such as STD testing because of concerns of confidentiality and parents finding out about medical services because of medical claims (Leichliter et al., 2017).

Synthesis of Evidence

There were 11 articles identified that met the criteria for synthesis after duplicate items were excluded. There was a consensus among the evidence that identified low HIV testing rates at college campuses throughout the United States. Most of the literature reviewed was research

conducted on community and university campuses in the Southeastern and Northeastern United States. The participants were adolescents or undergraduate students. The studies were performed from 2006 to 2018. Five studies evaluated the use of peer-led HIV prevention programs and noted a significant improvement of HIV testing rates on college campuses (Ali et al., 2017; Eastman-Mueller et al., 2019; Jones et al., 2017; Long-White, Calloway, & Robertson, 2017; Milligan et al., 2014).

Eastman-Mueller et al. (2019) evaluated a national "Get Yourself Tested" campaign and its effects on HIV testing rates of college students and noted an improvement in HIV testing rates. Willis et al. (2018) determined that using a preventive HIV motion comic increased awareness of HIV among high school and college students but did not increase the intention to obtain HIV testing. A study conducted by Grover and Miller (2014) determined an increase in HIV testing after college students read literature concerning the dangers of HIV. The literature was intended to make the participant perceive they had a low or high vulnerability to HIV (Grover & Miller, 2014) . The participants were asked to write about death or an aversive control topic after reading the article about HIV (Grover & Miller, 2014).

The six remaining studies were descriptive and investigated motivating factors for college students to obtain HIV testing. Influencing factors identified were gender, sexual orientation, risk perceptions, health behaviors, and risk factors (Kort et al., 2017; Dennison et al., 2014; Gillen & Markey, 2014; Haile et al., 2017; Heller & Sarmiento, 2016; Lindong et al., 2017). The literature concluded there are numerous factors influencing college student's decision to obtain HIV testing.

Limitations of Current Evidence

A systematic search protocol was used, but it is possible that not all relevant articles were identified. The search was limited to only articles written in English. There were articles identified in the search that appeared to be relevant after reading the title and abstract, but the full article could not be obtained through interlibrary loan.

An abundance of research was available evaluating attitudes and behaviors of undergraduate college student in the United States, though most data was obtained through questionnaires. The accuracy of self-reported data is uncertain and recall bias may pose an issue. Generalizability of the data is difficult because of low to modest sample size of most of the studies and limitation to one college campus population instead of numerous college campuses throughout the United States. Most of the participants of the research identified as white, female, and heterosexual. Long-White et al. (2017) targeted African American college students specifically and Jones et al. (2017) focused primarily on Hispanic college students.

Strengths of Current Evidence

The current evidence is moderate. Most of the research was conducted with a convenience sample from a university or college campus. However, the literature provided vast amounts of evidence-based information specific to college students' attitudes towards HIV and HIV testing. The research guides determining effective educational interventions for the typical undergraduate student with consideration of gender, age, ethnicity, and common misconceptions about HIV that affect attitudes towards HIV preventive behaviors. There is a consensus in current evidence to educate the public, especially young adults, about HIV and preventive measures. The literature explores various avenues to increase access to HIV testing of college students. Still, it emphasizes the need to educate students on the importance of HIV testing as a

vital measure in HIV prevention. There is strong expert and literature evidence supporting HIV testing and HIV preventive behaviors to decrease the incidence of HIV in college-age students.

Conclusion

The literature concluded that HIV testing rates are below acceptable values in college students, and a multi-faceted approach is indicated to address the issue. Six of the 17 selected studies discussed various HIV prevention programs to increase testing rates and knowledge of HIV. There is a need to incorporate effective strategies from each and implement an effective and personalized HIV prevention program for college campuses. The six descriptive studies identified sexuality, gender, racial, and cultural aspects that must be considered to develop an effective HIV prevention program. The literature's validity and reliability provide a foundation of research to build upon to promote further research of interventions to increase HIV testing rates of college students.

Chapter III

Methodology

This quality improvement project evaluated attitudes towards HIV testing of undergraduate college students. The original study design was a quality-based initiative to evaluate the use of an on-campus HIV testing site for college students to determine if on-site testing attracts more participants than HIV testing at the student health center. The project aimed to determine attitudes of college students toward HIV testing, as well as relationships between demographic factors and frequency of HIV testing and attitudes towards HIV testing. The goal of this quality improvement project was to increase the number of college students who receive HIV testing and education. A secondary goal was to determine if an ongoing, on-site HIV testing program on a college campus would be beneficial to the early detection and prevention of HIV. This project added to the literature data on low-HIV testing adoption among college students and explored options that communicated HIV testing is a positive and routine element of health maintenance.

Baseline assessment of college students' attitudes about HIV testing was obtained during the month of August 2020 through an online survey offered to all enrolled or accepted undergraduate students at the university who were 18 years old or older. The participants were provided a link to complete the online survey by the last day of August 2020. The survey was extended an additional two weeks to allow all students to complete the survey. Results of the online survey were analyzed and compiled using SPSS statistical software. Data from the online survey was used to determine if future HIV community testing events at the university would be successful.

The second part of the project intended to provide two separate testing HIV event dates at the university. The first testing event was scheduled for an evening during the week in September 2020 and the second testing date in October 2020. A voluntary, anonymous, online, Qualtrics survey was planned at the conclusion of each testing event to evaluate participant perceptions of the event and HIV testing. Comparative data of number of students tested for HIV at the college student health center for the months of September and October of the previous year were to be compared with number of eligible students tested at the HIV testing events.

Protection of Human Subjects

The PI obtained institutional review board approval from the Department of Public Health and the participating public university prior to the project. The project participants in the online survey were anonymous and voluntary and completion of an online consent was required to participate in the survey. Participants could elect not to participate or withdraw from the project at any time. The anticipated participants for the planned HIV community testing event were coordinated to be voluntary and confidential and participants attending the HIV testing events could participate or withdraw from the project at any time. Participants not electing to participate in the proposed project would not be hindered in their ability to participate in the HIV testing event. HIV testing was scheduled to be available for university staff, non-student attendees, and students that chose not to participate in the project.

The HIV counselors scheduled to conduct the HIV testing were instructed to immediately refer any person testing HIV positive to the local health department for confirmatory HIV testing and to the appropriate facility for evaluation and treatment of HIV. Written contact information for additional testing at the local health department and counseling services were to be available at the student counseling center and provided to the student at the

time of HIV testing by the HIV counselor. The HIV counselor was to be responsible for linkage to appropriate care and follow up at the time of testing.

There was no monetary compensation for participation in the project. Participants attending the HIV testing event were to have access to donated and give away items from the Department of Public Health and local businesses. A minimum of 12 donated items were to be available at each testing event. Free item examples were water bottles, coffee mugs, educational instructional material, and gift cards to local restaurants. Benefits to participants were thoughtful consideration of personal values and beliefs of HIV testing and gained awareness of HIV status. Removing barriers of HIV testing of college students will likely increase testing rates, identify HIV positive students, and provide linkage to care to decrease the incidence and transmission of HIV.

An on-line informed consent was obtained prior to the Qualtrics survey. The principal investigator's name and contact information was provided in the consent for questions or concerns arising from the participation in the study. Content of the consent clearly stated that participants could withdraw or choose not to answer questions of the study without penalty.

Instruments

The HIV-Antibody Testing Attitude Scale (HTAS) (Appendix C) was entered into a Qualtrics survey and distributed to participants through an online link. The 32-item instrument included items related to demographic data and used a Likert-type scale with a high internal consistency and Cronbach's alpha of 0.88. The HTAS scale was developed from studies involving heterosexual college students to provide a tool to use for designing and evaluating HIV interventions that focus on HIV testing. Specific factors of attitude measurements of the HTAS

scale were concerns about HIV testing and friend's responses, family's responses, public opinion, and confidentiality.

The demographic data tool (Appendix B) was created by the PI to capture similar demographic data from the Qualtrics HIV testing attitude survey and HIV testing event survey. Data gathered with the demographic form included gender, gender identity, age, ethnicity, previous history of HIV testing, sexual history, and previous drug use. The demographic data tool provided information to compare survey respondents' attitudes of HIV testing and students attending the previously scheduled HIV testing event.

The HIV testing event Qualtrics survey was adapted from the CDC toolkit (Appendix C) and evaluated patient perspectives on the HIV testing experience. The questionnaire was free for use and was adaptable and modified. The planned events would have allowed students access to the online Qualtrics survey from their phone or available iPad at the HIV testing event. The Qualtrics survey was to have evaluated attitudes of HIV testing and the HIV testing survey offered at the scheduled HIV testing events and was configured as to not collect IP addresses of participants to ensure anonymity.

Attitudes

The HIV Antibody Testing Attitude Scale (HTAS) was implemented to assess attitudes towards HIV testing and was developed by Boshamer and Bruce (1999). This 32-item scale used a 5-point Likert-type format to measure self-reported HIV testing and intention to be tested (Boshamer & Bruce, 1999). The four factors of attitude measured with the HTAS scale were concerns with friend's responses, concerns with family's responses, belief about public opinion of testing, and concerns about confidentiality of testing (Boshamer & Bruce, 1999). Responses

ranged from strongly agree, agree, neutral, disagree, and strongly disagree (Boshamer & Bruce, 1999).

The questions were divided into two categories reflecting attitudes that facilitate testing and barriers to HIV testing. Items 2, 3, 5, 11, 13, 17, 18, 20, 21, 22, 24, 27, 29, 31, and 32 were considered facilitators of HIV testing and items 4, 6, 7, 8, 9, 10, 12, 14, 15, 16, 19, 23, 25, 26, 28, and 30 were scored as barriers of HIV testing (Boshamer & Bruce, 1999). Items were added and higher scores indicated a more favorable attitude toward testing (Boshamer & Bruce, 1999). The total scale reliability was reported as adequate with a Cronbach's alpha score of .88 and corrected item-total correlations ranged from .14 to .72 (Boshamer & Bruce, 1999). Reliability was reported as discriminate by Boshamer & Bruce (1999) because though HTAS scores did find a correlation with intention to test for HIV, r = .47, p = .0001, there was not a correlation with other types of reported risk reduction behaviors such as condom use and alcohol or other drugs, r = .99, p = .001 (Boshamer & Bruce, 1999).

Perceptions

The patient questionnaire was adapted from the CDC toolkit to evaluate patient perspective on the HIV testing experience. The questionnaire was free to use, adapted, modified, and edited (CDC, 2012). The CDC evaluation toolkit was created to assess the effect expanded HIV screening activities had on patient attitudes toward and HIV testing (CDC, 2012). The 25-item questionnaire used a 5-point-Likert type scale and nominal level items that included preferred HIV pre-test information, barriers to HIV testing, HIV testing satisfactions, and testing procedures (CDC, 2012). Test eligibility was not reported, though the CDC (2012) states the validity increased with increased numbers of participants and showed 65% - 83% confidence limit with 100 participants and 68% - 81% confidence limit with 200 participants.

Demographics

The demographic data tool was created by the PI to capture similar demographic data from the HIV testing form completed by DPH staff at the time of HIV testing. Data gathered with the demographic form included gender, gender identity, age, ethnicity, previous history of HIV testing, sexual history, and previous drug use. The demographic data provided information to compare demographic data of survey respondents to attitudes of HIV testing.

Recruitment

Recruitment for the survey and the HIV testing was completed through convenience sampling. Information about the DNP project and survey link for completion of the survey and upcoming HIV testing events was posted online on the university newspaper, Front Page, and social media sites. A paper announcement flier was posted around campus and at local businesses frequented by students, allowing for the announcement of events beginning the first two weeks of August 2020. The link for the survey contained a brief description of the quality improvement project, informed consent, and the online survey. The importance of anonymity was explained and assured. The time frame to complete the survey was the second week of September 2020.

Announcement fliers for the proposed confidential and free HIV testing events were to be posted two weeks prior to each event around campus and at local establishments in the downtown area. A campus wide announcement would have posted to Front Page approximately one week prior to each event. A digital announcement flier was scheduled to be posted on social media sites during the same time.

The announcement flier for the online HIV testing event survey (Appendix F) was to be posted on the information tables at the HIV testing event with the hyperlink and QR code. The

flier was to be posted at several tables containing educational material and at the exit area of the room. Event volunteers were to provide iPads to eligible participants to use to complete the survey or students could have chosen to use their personal phone. The volunteers would not have had access to any survey responses of the participants.

HIV Testing Event

There were two separate testing HIV event dates at the university scheduled to be performed after the completion of the online survey. The first testing event was to be conducted during September 2020 followed by a second testing date in October 2020. Each event was to be held during the evening hours for about two hours each. Students would have been welcomed by a greeter at the entrance to the room and provided a raffle ticket for door prizes. Eligible students for the project would have been provided one color raffle ticket and all other attendees provided a different color raffle ticket. This process would have enabled the PI to determine the number of eligible students who attended the event compared to how many eligible students obtained HIV testing.

Every 30 minutes there would have been a door prize drawing and a ten question Kahoot game for participants to test their knowledge about HIV. All attendees would have been eligible for door prizes and participation in the Kahoot game. Each winner of the Kahoot game would have received a prize. Tables were to be set up throughout the room with educational materials about HIV prevention, nutrition, exercise, and free blood pressure screenings would have been offered. Volunteers from a campus sorority, students from the Schools of Public Health and Nursing, and staff from the Department of Public Health (DPH) were scheduled to operate the tables. There were three counselors from DPH scheduled to perform free HIV testing, counseling, and linkage to care in a private environment nearby. A voluntary, anonymous, online

Qualtrics survey would have been available at each testing event to evaluate participant perceptions of the event and suggestions to improve. The survey would have been accessible by an available iPad at the testing event or participants may have completed the survey on their personal phone.

The in-person HIV testing events were canceled the week of the first scheduled event because of COVID-19 pandemic concerns. The CDC (2020) defined large in- person event gatherings where it is difficult to maintain at least six foot spacing as highest risk for transmission of COVID-19. It would not be possible to conduct the testing event in a manner to maintain the safety of the college students and the volunteers. The health educator of the University and all volunteers were contacted by phone or email a week before the first scheduled HIV testing event and notified of the cancellation until further notice. The researcher intends to perform a quality-based research project in the future once it is safe for gatherings.

Analysis Plan

1. Descriptive and analytical statistics were used to determine the overall attitudes of college students using the HTAS instrument. The mean HTAS score (N = 99) of survey respondents was 106.73 (SD = 5.56) with a range of 71 to 141.
2. Descriptive and analytical statistics were used to determine the demographic factors of undergraduate students who completed the online HTAS survey. The mean demographic factors of age (M = 20.2, SD = 1.2) and number of lifetime number of sex partners (M = 3.2, SD = 5.2) were of students that completed the online HTAS survey.
3. A correlation analysis was performed to test the hypothesis that there is a relationship between age and attitudes towards HIV testing. Results of the Pearson correlation

indicated that there was a low positive association between age and attitudes of HIV testing, ($r = .33$, $p = .01$).

Power Analysis

Participants for the HIV Attitudes Survey were recruited by convenience sampling from all enrolled undergraduate students at the university. Current undergraduate student enrollment is 5,766 (*Fall Enrollment*, 2020). A response rate of 25 to 30 percent was anticipated based on research related to online survey response (Fincham, 2008). A power analysis and determination of adequate sample size was performed to minimize Type 1 or Type II errors. A priori power analysis was performed to determine the minimum required sample size of 112 participants to obtain a small effect size of 0.10 for a Pearson's correlation coefficient (Soper, n.d.)

Data Analysis

The PI obtained all descriptive data and test results data from the HTAS survey. Comparison data, including the number of HIV tests performed at the student health center, would have been considered in the data analysis. An assessment for missing data was conducted using the Statistical Package for Social Sciences (SPSS) software, version 25 and standard data cleaning was performed. All data was tested for normality and distribution with histograms, skewness, and kurtosis to determine normal distribution. Descriptive statistics were used to analyze the demographic data. For comparison data with relationship variables that appear to be normally distributed, parametric testing in the form of a Pearson correlation was used. Means and standard deviations were used to report continuous variables, frequency counts, and percentages for nominal and ordinal values.

Chapter IV

Results

The results of this descriptive correlational clinical project on the factors influencing attitudes towards Human Immunodeficiency Virus (HIV) testing rates are discussed in this chapter. Reported findings include descriptive information concerning undergraduate college students and HIV testing rates, instruments' reliability, and data addressing the clinical questions. Data screening was conducted before performing the statistical analysis. Data were verified by examining all continuous variables using descriptive statistics for central tendency and Fisher's exact for skewness and kurtosis, histogram, Q-Q normality plots, Kolmogorov-Smirov test, and Shapiro-Wilk test. All variables were reviewed for missing data points using Statistical Package for the Social Sciences (SPSS) version 25.

Data Screening

The study's findings were examined for missing data. When participants had less than 20% of scores missing on the HIV Antibody Testing Scale (HTAS), the sample means were substituted for missing items. These items were HTAS item 15 (n = 1) and HTAS item 23 (n = 1). Some scores were not used, as greater than 20 % of the data were missing for the HTAS tool (n=28).

There were missing data noted for interval demographic data of age (n = 2) and the total number of lifetime sexual partners (n = 3). The mean age of 20 was used for age, and the mean of 3 was used for the lifetime number of sexual partners. Additional missing data identified were gender (n = 1), gender identification (n = 1), ethnicity (n = 1), and sex with someone of opposite sex (n = 1) and were not used for the statistical analysis. Four participants chose not to respond to the inquiry of past drug use and were not used for statistical analysis. Data were examined for

outliers, and one participant reported an age of 5. This was replaced with the sample mean of 20. The remaining responses of the participant were evaluated for out of range or missing data. The lifetime number of sexual partners was not reported (n = 3), and the mean of three was used for this missing data. The remainder of the respondents' survey was complete (n = 95), and there were no additional identified irregularities.

Summary of Sample Characteristics and Statistical Tests

A total of 99 participants completed the study's instruments. The mean age of those completing the survey was 20.2 years, with a range of 18 to 36. A majority of the participants were non- Hispanic, Caucasian (n = 88, 88.9 %) and female (n = 90, 90.9 %). Most respondents reported a history of sex with the opposite gender (n = 63, 63.6 %) and no history of drug use (n = 93, 93.9 %). There was a small percentage of participants who identified as transgender (n = 5, 4.7 %), whereas the majority identified as female (n = 89, 89.9 %) or male (n = 8, 8.1 %). The mean number of lifetime sexual partners was 3.2, with a range of 0 to 26. Most participants reported no prior history of HIV testing (n = 78, 78.8 %).

Central tendency and testing for normal distributions were conducted on the interval-ratio level data. This clinical project focused on the opinions of college students between the ages of 18 to 22. Nine participants were older than 22 and were removed from the analysis. The variable, age, of the final sample (n = 99) was normally distributed. One participant did not identify as male or female, and that participant's score was not used when gender was needed as a variable. The total number of lifetime sexual partners for the sample ranged from 0 to 26, with a mean of 3.2 and a standard deviation of 5.1. This variable was not normally distributed with a Fisher's Exact with a skewness of 11.67 and kurtosis of 2.57. Attempts to transform the variable by removing outliers and using the natural log and Z scores were unsuccessful. Therefore, a new

variable was created based on a literature review of the typical mean number of lifetime sexual partners for a college-age student, noted as three or fewer (Brower et al., 2019; Lemley et al., 2017). The variable was transformed into a dichotomy with zero equals zero to three for the average number of lifetime sexual partners and one equals greater than three for an above-average number of lifetime sexual partners for this age group.

Attitudes toward HIV testing were measured using the HTAS instrument, which was a 32-item Likert-type scale (Boshamer & Bruce, 1999). The HTAS analyzed the degree of individuals' attitudes towards HIV testing, and scores ranged from 34.4 to 93, with higher scores indicating positive attitudes towards HIV testing (Boshamer& Bruce, 1999). Cronbach's alpha for the sample was an acceptable .88 (Boshamer & Bruce, 1999).

The items in the HTAS scale were divided into two subscales as facilitator items (n = 15) and barrier items (n = 17). Reverse scoring was used for barrier items per the instrument developer’s instructions. Cronbach's alpha was conducted separately for the subscales and reported unacceptable as .42 for facilitator items and acceptable .86 for barrier items (Taber, 2017). The items in the facilitator subscale were examined, and three questions indicated they were problematic.

21. My friends would look down on me if I were tested for HIV

29. It would not bother me if someone I know sees me going to get an HIV test.

32. My job would be in danger if my boss found out I was tested for HIV.

Analysis indicated that if these three facilitator items were removed, the Cronbach's alpha would be an acceptable .74. The overall Cronbach's alpha improved from .82 to .88. A Cronbach alpha score of .70 or better is recommended to indicate an acceptable level of internal consistency (Taber, 2017).

Tests were performed to determine if the interval level data met the assumption of collinearity (see Table 1). Pearson correlation statistics evaluated parametric data, and nonparametric data were assessed with Spearman's Rho correlation. The results obtained from Pearson correlation and Spearman's Rho correlation indicated multicollinearity was not a concern.

Table 1

Collinearity	VIF
Number of sexual partners	1.54
Same sex partners	1.19
Opposite sex partners	1.33
Trans sex partners	1.07
History of drug use	1.11
Ever tested	1.33
Age	1.11
Gender ID	1.06

Clinical Questions

1. What are the demographic factors associated with the willingness to participate in an HIV survey?

   Pearson's correlational analysis was used to determine demographic factors associated with the willingness to participate in an HIV survey. Initial data screening indicated all variables except for the total number of sexual partners were near normally distributed. Data indicated a low positive correlation between ever being tested for HIV and attitudes towards HIV testing ($r = .28$, $p < .01$). This finding suggests students who have been tested for HIV in the past are more likely to have positive attitudes towards HIV testing. There was also a low positive correlation between age and positive attitudes

towards HIV testing ($r = .33$, $p < .01$), indicating older students are more likely to have positive attitudes towards HIV testing.

Initial data screening indicated the total number of sexual partners was not normally distributed; therefore, Spearman's Rho was used to determine if there was a correlation between the number of sexual partners and attitudes towards HIV testing. There was no significant correlation identified. The number of sexual partners was created into a dichotomy of zero to three partners equals average and greater than three partners equal above average to obtain a normal distribution. A Pearson correlation was then used to determine if there was a significant correlation between the number of sexual partners and attitudes towards HIV testing. There was no significant correlation identified (see Table 2).

Table 2

Demographic Table and Correlations

Variable	*N* (%)	Mean (SD)	Range	*r*
Gender	98			-.14
Male	8 (8.1)			
Female	90 (90.9)			
Gender ID	97			-.14
Male	8 (8.1)			
Female	89(89.9)			
Ethnicity	98			.06
Caucasian	88 (88.9)			
Other	10 (10.1)			
Age	99	20.2 (1.2)	18-22	.33**
Lifetime number of sex partners	99	3.2 (5.2)	0-26	*rs* = .04
Avg (0) to above avg (1)				*r* = .09
Same sex partners	99			.03

No	87 (87.9)	
Yes	12 (12.1)	
Opposite sex partners	98	.01
No	35 (35.4)	
Yes	63 (63.6)	
Trans sex partners	99	.08
No	98 (99.0)	
Yes	1 (1.0)	
History of drug use	95	.09
No	93 (93.9)	
Yes	2 (2.0)	
Ever tested for HIV	99	.28**
No	78 (78.8)	
Yes	21(21.2)	

**p < .05, **p < .01*

2. What are the overall attitudes of college students about HIV testing based on HTAS scores?

A Pearson's correlational analysis was used to determine the overall attitudes of college students about HIV testing based on HTAS score. Initial data screening indicated all variables except for the total number of sexual partners was near normally distributed. Data indicated a weak positive correlation between same-sex partners and age ($r = .20$, $p < .05$). This finding indicates students who have sex with same-sex partners and are more likely to be older. There was also a low positive correlation between participants who reported sex with opposite-sex partners and the total number of lifetime partners ($r = .31$, $p < .01$), indicating those with opposite-sex partners tend to have a higher number of lifetime partners. A weak positive correlation was noted among sex with transgender partners and the total number of lifetime partners ($r = .21$, $p < .05$), indicating those students with transgender

partners tend to have a higher number of lifetime partners. Observed findings were individuals who had sex with opposite-sex partners and individuals who had sex with transgender partners had increased sex risk of three or more lifetime partners. A low positive correlation was noted between the increased number of total lifetime partners and history of HIV testing ($r = .31$, $p < .01$), indicating as the total number of lifetime partners increased, so did the rate of HIV testing. Age was identified as another weak positive correlation to having ever been tested for HIV ($r = .21$, $p < .05$), indicating older undergraduate students were more likely to report increased rates of being tested for HIV in the past.

Spearman's Rho was used to determine if there was a correlation between the number of sexual partners and overall attitudes towards HIV testing. There was no significant correlation identified ($r = .04$). There was a strong positive correlation between total number of sexual partners and sex with opposite sex ($r = .74$, $p < .01$) and a low positive correlation between total number of sex partners and sex with same-sex partners ($r = .27$, $p < .01$). A low positive correlation was noted between the total number of sexual partners and a history of HIV test ($r = .41$, $p < .01$). Undergraduate students with an increased number of partners and sex with opposite-sex partners or same-sex partners were more likely to report a history of HIV testing.

Table 3

Pearson Correlations for Demographic Variables and Total HTAS Score

Variable	1	2	3	4	5	6	7	8	9	10	11
1. HTAS score	—										
2. Gender	-.14	__									

3. Gender ID	-.14	1.00**	__								
4.Ethnicity	.06	-.39**	-.39**	__							
5. Age	.33**	-.01	-.01	.09	__						
6. Sex risk	.09	-.04	-.04	.09	.11	__					
7. Same sex partners	.03	-.12	-.12	-.02	.20*	.13	__				
8. Opp sex partners	.01	.17	.17	-.03	.02	.31**	-.05	__			
9. Trans sex partners	.08	.03	.03	-.03	.16	.21*	-.04	.08	__		
10. Hx of drug use	-.09	.04	.04	-.05	-.15	.30**	-.06	.11	-.02	__	
11. Ever tested	.28**	-.27	-.03	.07	.21*	.31**	.11	.29**	.10	-.10	_

**p < .05, **p < .01*

3. What demographics are associated with positive attitudes towards HIV testing measured by the HTAS Facilitator score?

A Pearson correlational analysis was used to determine what demographics were associated with facilitating positive attitudes measured by the HTAS facilitator subscale score. Initial data screening indicated all variables except for the total number of sexual partners was near normally distributed. There were no statistically significant correlations identified between demographic variables and the HTAS facilitator subscale (see Table 4). Spearman's Rho was used to determine if there was a correlation between the number of sexual partners and overall attitudes towards HIV testing. There was no significant correlation identified (r = -.04)).

Table 4

Pearson Correlations for Demographic Variables and Facilitator (+) HTAS Score

Variables	1	2	3	4	5	6	7	8	9	10	11
1. + HTAS	___										
2.Gender	-.09	__									
3. Gender ID	-.10	1.00**	__								
4. Ethnicity	.06	-.39**	-.39**	__							
5. Age	.12	-.01	-.01	.09	__						
6. Sex risk	.07	-.04	-.04	.09	.11	__					
7. Same sex Partners	-.04	-.12	-.12	-.02	.20*	.13	__				
8. Opp sex partners	.04	.17	.17	-.03	-.02	.31**	-.05	__			
9. Trans sex partners	.06	.03	.03	-.03	.16	.21*	-.04	.08	__		
10. Hx of drug use	.07	.04	.04	-.05	-.15	.30**	-.06	.11	-.02	__	
11. Ever tested	.14	-.03	-.03	.07	.21*	.31**	.11	.28**	.20	.10	_ __

**p < .05, **p < .01*

4. What are the barriers identified to HIV testing by the respondents as measured by the HTAS Barrier score?

A Pearson correlational analysis was used to determine what demographics were associated with barriers to HIV testing measured by Barrier HTAS subscale score. Initial data screening indicated all variables except for the total number of sexual partners was near normally distributed. There was a low positive correlation between the Barrier HTAS subscale and the

variables of age (r =.40, p <.01) and ever being tested for HIV (r = .32, p < .01). Undergraduate students who were older or had a previous HIV test reported decreased barriers to HIV testing (see Table 5). Spearman's Rho was used to determine if there was a correlation between the number of sexual partners and barriers towards HIV testing. There was no significant correlation identified (r = .04).

Table 5

Pearson Correlations for Demographic Variables and Barrier(-) HTAS Score

Variable	1	2	3	4	5	6	7	8	9	10	11
1.(-) HTAS	__										
2. Gender	-.15	__									
3. Gender ID	-.15	1.00**	__								
4.Ethnicity	.06	-.39**	-.39**	__							
5. Age	.40**	-.01	-.01	.09	__						
6. Sex risk	.09	-.04	-.04	.09	.11	__					
7. Same sex partners	.07	-.12	-.12	-.02	.20*	.13	__				
8. Opp sex partners	-.02	.17	.17	-.03	-.02	.31**	-.05	__			
9. Trans sex partners	.01	.03	.03	-.03	.16	.21*	-.04	.08	__		
10. Hx of drug use	-.17	.04	-.05	-.15	-.14	.30**	-.06	.11	-.02	__	
11. Ever	.32**	-.03	-.03	.07	.21*	.31**	.11	.28**	.20	.10	__

Tested	

**p < .05, **p < .01*

5. What recommendations can be made to improve HIV testing based on the data from the online survey?

Age and history of HIV testing were correlated with the total HTAS score and the Barrier HTAS subscale. There was a positive correlation between sex with opposite-sex partners and sex risk ($r = .31$, $p < .01$). A weak positive correlation was identified between sex with transgender partners and sex risk ($r = .21$, $p < .05$). There was a low positive correlation between the history of drug use and sex risk ($r = .30$, $p < .01$). Based on the statistical analysis, HIV testing should target younger undergraduate students that have sex with opposite-sex partners, sex with transgender partners, and students with a history of drug use. A history of past HIV testing is an expected statistically significant finding for positive correlation with the total HTAS score.

There are several significant correlations determined in the analysis of the data. These findings are discussed in Chapter 5. Recommendations to nursing leaders are provided and suggestions for further research are explored.

Chapter V

The findings of the descriptive correlational study assessing low HIV testing screening rates of college students are presented in this chapter. The demographics of the study are compared to the overall demographics of the university where the study was conducted as well as to national statistics. Previous research findings are compared to the study findings. Strengths and implications for future research and limitations of this study are discussed in this chapter.

Participants in the study were predominantly non-Hispanic Caucasian (88.9 %), female (90.9 %), and reported a history of sex with the opposite gender (63.6 %). These demographics are comparable to those reported by the American College Health Assessment II (ACHA II) conducted at this university in 2019 (Caucasian-87.0 %, female-77.9 %, and heterosexual-85.1%). The 2018 National Health Interview Survey conducted by the National Center of Health Services (2018) indicated 97.0 % of Americans 18 years of age and older identified as heterosexual. Therefore, demographics from this study are comparable to the nation except for a greater percentage of non-heterosexual participants in this study. Findings indicate that these demographic factors correspond with previous research conducted on HIV testing attitudes (Anwuri et al., 2017; Grover & Miller, 2014; Haile et al., 2017; Leichliter et al., 2017; Lin et al., 2017).

The HTAS (Boshamar & Bruce, 1999) was used in the current study to assess students' attitudes towards HIV testing. Specific factors of attitude measurement were individual and friends' concerns about HIV testing, family's responses, public opinion, and confidentiality. The original HTAS instrument developed by Boshamer and Bruce (1999) used a standardized score from 0 to 100 with higher scores indicating a more favorable attitude towards HIV testing.

The modified HTAS scale of 29-145 in the current study (M = 106.73) used 29 of the 32 original items in the instrument for a possible score of 29 to 145 (M = 106.43). Comparable adaptations of the HTAS Attitude survey were used in a study by Ball (2016) to examine culture mistrust, conspiracy theories, and attitudes towards HIV testing among African Americans. The Ball (2016) study was based on an HTAS scale of 22-110 ($M = 92.83$). Frias et al. (2016) also used a modified HTAS scale to examine the attitudes of college students and professors at a college campus in Portugal and used an HTAS scale of 18-90 (M = 76.48).

Regarding positive attitudes toward HIV testing, the current study found no statistically significant correlational findings between demographic variables and the HTAS facilitator subscale. Several previous studies found gender, sexual orientation, health behaviors, and risk factors can be motivating factors for college students to obtain HIV testing (Kort et al., 2017; Dennison et al., 2014; Gillen & Markey, 2014; Hailey et al., 2017; Heller & Sarmiento, 2016; Lindong et al., 2017). The current study may not have shown significant correlations because of its small sample size as compared to other studies.

The current study reinforces the findings of previous studies in that participants were younger and those with no previous history of HIV testing were less likely to be tested and have increased barriers to HIV testing. These findings correlate with the previous studies of Dennison et al. (2014) and Haller et al. (2016), which concluded age as the most significant barrier factor associated with HIV testing attitudes. The decrease in age of the college students was associated with an increased barrier to HIV testing. James and Ryan (2018) found that a history of previous HIV testing in college students correlated with a decrease in stigma towards HIV testing.

Further studies by Haile et al. (2017) identified low-risk perception of college students as a barrier, regardless of prominent risk factors such as multiple sex partners, alcohol, and drug

use, and inconsistent or no use of condoms. Lindong et al. (2017) and Gillen et al. (2014) findings collaborated with Haile et al. (2017) regarding the low individual perceived perception of risk in college students. Furthermore, stigma and fear of a positive result were the dominant barriers to HIV testing (Jones et al., 2018).

HIV testing should target younger undergraduate students who have sex with opposite-gender partners. Traditional HIV testing opportunities and education have not proven to be useful in increasing HIV testing rates of younger students and students that identify as having sexual partners of the opposite gender. These findings correlate with the low perceived risk of HIV discussed in the studies of Haile et al. (2017) and Gillen et al. (2014). The implementation of community-based prevention programs (Lindong et al., 2017) and social media campaigns to promote awareness of the importance of HIV testing (Jones et al., 2018) would be useful to decrease barriers towards HIV testing and facilitate positive attitudes towards HIV testing.

Miscellaneous Findings

This study found a slightly significant positive correlation between participants who reported transgender partners and those who reported more than three lifetime sexual partners. A moderate to high correlation was noted between students who have sex with opposite-sex partners and those who report more than three lifetime sex partners. Sex risk was described in this study as participants who reported more than three-lifetime sexual partners.

Two previous studies examined the total number of lifetime sexual partners in college students. Brouwer et al. (2019) examined Human Papilloma Virus (HPV) vaccinations and their effects on the sexual activity of college students. The researchers followed the participants for three years and reported a mean number of lifetime sexual partners for females of 2.1 with a standard deviation of 3.2 (Brouwer et al., 2019). Male participants reported a slightly increased

mean of lifetime sexual partners at 2.8 with a standard deviation of 3.2 (Brouwer et al., 2019). Brouwer et al.(2019) did not report the range of total sexual partners in the research findings.

Zelin et al. (2015) examined perceptions and misperceptions of sexual behavior in heterosexual first-year college students. Freshman females reported zero to 14 total lifetime sexual partners with a mean of 1.87 and a standard deviation of 2.64 (Zelin et al., 2015). The total number of lifetime sexual partners for males was zero to 23 partners with a mean of 2.37 and a standard deviation of 3.71 (Zelin et al., 2015).

The overall mean of 3.2 lifetime sexual partners with a standard deviation of 5.2 in the current study was slightly higher than findings in the Brouwer et al. (2019) and Zelin et al. (2015) research. The differences could be due to Zelin et al. (2015) examining only freshmen and Brouwer et al. (2019) following a cohort for three years. The present study examined all undergraduates and was a cross-sectional design.

Strengths and Limitations

This study adds to the limited research of college students' attitudes towards HIV testing. Most studies cast a broad net to capture multiple barriers of HIV testing of college students (Ali et al., 2017; Dennison et al., 2014; James and Ryan, 2018; Jones et al., 2018). Only one study was found that evaluated HIV risk perception (Haile et al., 2016). This study analyzed the association between HIV risk perception and four measures of perceived severity of HIV, perceived benefits of safe sex, perceived barriers to safe sex, and self-efficacy (Haile et al., 2016).

There are several strengths to the present study, including the fact that it focuses entirely on attitudes towards HIV testing of undergraduate college students and targeted demographics with the greatest need for HIV testing. The use of the HBM as a theoretical foundation for the

current study and the use of a valid and reliable instrument (HTAS Attitude scale) also contributed strength to the project. The present study results support that tailored HIV testing event opportunities can increase HIV testing rates and improve attitudes towards HIV testing.

This study was originally planned prior to the COVID-19 pandemic and was designed as a two-part project. Due to the pandemic, only the first phase of the project was able to be completed, utilizing an online survey to assess college students' attitudes towards HIV testing. The second portion of the project was to include an in-person HIV testing event for college students at the university. However, safety concerns of the pandemic prohibited the in-person element of the study. Therefore, the on-line portion of this study was the only portion completed.

Another major limitation of this study was the use of self-reported data. There is no control for over- or under-reporting of data. The attitudes of the students may have been impacted by the pandemic. The survey length was short compared to other surveys; however, many students completed the demographic portion of the survey and left the HTAS Attitude survey portion completely blank. Also, the sample population embodied rural demographics and may not represent other university populations in suburban or rural locations. Lastly, the relative number of the sample size was modest. This was a cross-sectional design and prevented causal inferences about relationships among variables.

Implications for Practice

The current study results have shown a relationship between age, history of previous HIV testing, and attitudes towards HIV testing. However, students who have sexual intercourse with partners of the opposite gender or those who have sexual intercourse with transgender partners report a high-risk sexual behavior with greater than three-lifetime sexual partners. All age categories of undergraduate college students could benefit from HIV testing and education. A

testing initiative should focus on younger students and students that report having sexual intercourse with opposite-gender or transgender partners. Healthcare providers must determine alternative ways to offer HIV testing and safe sex education to college students who have sexual intercourse with the opposite gender and transgender persons. College health educators should collaborate with Greek, campus life and community partners, such as the local health department, to coordinate HIV testing events in conjunction with educational sessions. College student health centers are poised to provide sexual health knowledge and additional resources to students of available services at the local health department through brochures and face-to-face encounters. Effective education strategies and media campaigns of availability of resources are needed for college health educators to improve HIV testing rates for college students.

Conclusion

Findings suggest both age and a reported history of previous HIV testing affect attitudes towards HIV testing. Furthermore, students who have sexual intercourse with opposite-gender partners and students who have sexual intercourse with transgender partners, report a high-risk sexual behavior of having greater than three lifetime sexual partners. All newly enrolled adult students in college could benefit from interventions to increase their willingness to obtain an HIV test and decrease or abstain from high-risk sexual behavior that may increase their risk of exposure to HIV. Future studies should examine student demographics and attitudes of those who participate in HIV testing events and compare these to the demographics and attitudes of HIV testing of the general student population. Regardless of age, all college students should receive HIV testing at least once. This should be a priority for all college health professionals to reduce the risk of exposure to HIV for this population.

Appendix A

GCSU student HIV Testing Attitude Survey

Q1 **INFORMED CONSENT** Addressing low HIV testing rates of college students: A quality improvement DNP project You are being invited to participate in a research study about ways to improve HIV testing rates of college students. This study is being conducted by Kimberly Griffin and Dr. Jennifer Goldsberry at Georgia College. Preferred contact information for Kimberly Griffin is email at kimberly.griffin@bobcats.gcsu.edu. Alternative contact information is cell phone at 478-451-7484. You were selected as a possible participant in this study because you are a undergraduate college student enrolled at Georgia College and State University and you are 18 years of age or older. The questionnaire(s) will take about 10 minutes to complete. This survey is anonymous. Do not indicate your name on the survey. The survey results are not linked to an IP address and there are no identifiable indicators to reveal your identity. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study. This research project is being conducted because of its potential benefits, either to individuals or to humans in general. The expected benefits of this study include use for designing and evaluating HIV interventions that focus on HIV testing. You are not likely to experience physical, psychological, social, or legal risks beyond those ordinarily encountered in daily life or during the performance of routine examinations or tests by participating in this study. Your participation in this study is voluntary. By selecting the "continue to the survey" option, you are voluntarily agreeing to participate, and you are acknowledging that you are **18 years of age or older**. You are free to stop answering questions at any time or to decline to answer any particular question you do not wish to answer for any reason. If you are younger than 18, do not proceed. **Research at Georgia College involving human participants is carried out under the oversight of the Institutional Review Board. Address questions or problems regarding these activities to the GC IRB Chair, email: irb@gcsu.edu.**

○ Continue to the survey (1)

Appendix B

Demographic Questions

Q2 What is your gender?

- ○ Male (1)
- ○ Female (2)

Q3 What is your current gender identity?

- ○ Male (1)
- ○ Female (2)
- ○ Transgender Male to Female (3)
- ○ Transgender Female to Male (4)
- ○ Transgender Unspecified (5)

Q4 What is your current age?

- ○ Click to write Choice 1 (1) _____

Q5 What is your ethnicity?

- ○ African American (Black) (1)
- ○ Caucasian Non-Hispanic (white) (2)
- ○ Latino (3)
- ○ Asian Pacific Islander (4)
- ○ Native American (5)
- ○ Don't Know (6)

Q6 Total number of sexual partners in the past 5 years?

- ○ Click to write Choice 1 (1) _____

Q7 Have you had sex with someone that was the same sex as you in the past 5 years?

- ○ Yes (1)
- ○ No (2)

Q8 Have you had sex with someone the opposite sex from you in the past 5 years?

- ○ Yes (1)
- ○ No (2)

Q9 Have you had sex with a transgender person in the past 5 years?

- ○ Yes (1)
- ○ No (2)

Q10 Have you injected drugs or substances in the past 5 years?

- ○ Yes (1)
- ○ No (2)
- ○ Prefer not to answer (3)

Q11 Have you ever been tested for HIV?

- ○ Yes (1)
- ○ No (2)

Appendix C

Q12
The following questions examine attitudes of HIV testing

HIV-antibody testing is not confidential

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q13 HIV testing information is kept very confidential by the medical staff who do the testing.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q14 My family would support me if I decided to be tested for HIV.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q15 I would not want anyone to know if I got an HIV test

- Strongly disagree (1)
- Disagree (2)
- Neutral (3)
- Agree (4)
- Strongly agree (5)

Q16 My friends would not look down on me if I were tested for HIV

- Strongly disagree (1)
- Disagree (2)
- Neutral (3)
- Agree (4)
- Strongly agree (5)

Q17 Anyone who is tested for HIV is disgusting

- Strongly disagree (1)
- Disagree (2)
- Neutral (3)
- Agree (4)
- Strongly agree (5)

Q18 I would be afraid to get an HIV test because people who test positive cannot get health insurance.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q19 People assume that everyone who is tested for HIV is infected with HIV.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q20 My parents would be upset if they knew I was planning to get tested for HIV.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q21 Admitting that you should be tested for HIV means that you have engaged in immoral behavior.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q22 My friends would support my decision to get an HIV test.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q23 I am afraid that if I were tested for HIV, my name would go into public records.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q24 HIV tests give accurate results

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q25 Anyone who is tested for HIV is dirty.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly Agree (5)

Q26 It would be embarrassing to get tested for HIV.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q27 I would not consider getting an HIV test because I would be asked about things I have done that could get me in trouble.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q28 I can talk to my friends about making medical decisions

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q29 I would be comfortable talking to an HIV counselor about personal behaviors that place me at risk for HIV infection.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q30 People would assume I have HIV if I decided to get tested

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q31 I could talk to my friends about making the decision to get an HIV test.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q32 My friends would look down on me if I were tested for HIV

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q33 My friends would not treat me differently if I were tested for HIV

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q34 I am afraid someone would find out if I was tested for HIV

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q35 Anyone who is tested for HIV is smart.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q36 I would be embarrassed if my friends find out that I decided to have an HIV test.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q37 I would not get tested for HIV because I would be asked information that was too personal.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q38 I trust the HIV counselors and nurses to keep my information confidential.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q39 I do not have time to get an HIV test.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q40 It would bother me if someone I know sees me going to get an HIV test.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q41 My friends would treat me badly if I were tested for HIV.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q42 I could easily discuss HIV-antibody testing with my family.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q43 My job would be in danger if my boss found out I was tested for HIV.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Boshamer, C. B., & Bruce, K. E. (1999). A scale to measure attitudes about HIV-Antibody testing: Development and psychometric validation. *AIDS Education and Prevention*, *11*(5), 400–413. proquest.com

Appendix D

HIV testing online event questionnaire

Demographic questions same as Attitude Assessment Survey

Q12 Were you tested for HIV today?

- ○ Yes (1)
- ○ No (2)

Q13
The following questions are about your attitudes towards HIV testing

If you DID NOT get an HIV test today, why not? Check all that apply

- ☐ I don't think I am at risk for HIV infection (1)
- ☐ I was recently tested for HIV (2)
- ☐ I am already HIV positive (3)
- ☐ I'm worried about confidentiality (4)
- ☐ I don't want to be tested at this event (5)
- ☐ I am afraid of finding out that I am HIV positive (6)
- ☐ I'm afraid of the finger prick and/or needles (7)
- ☐ Other(describe) (8)

Q14 If you DID GET an HIV test today, what was the result of your test?

- Negative (1)
- Positive (2)
- Indeterminate (3)

Q15 If your test result is negative, do you think you will take another HIV test in the future?

- Yes (1)
- No (2)
- I don't know (3)

Q16 How much did the following affect your decision to get an HIV test today?

a. I was worried about learning the result of my HIV test.

- ○ Not at all (1)
- ○ A little (2)
- ○ A moderate amount (3)
- ○ Quite a lot (4)
- ○ A great deal (5)

Q17 b. I was worried someone else might learn about my test result.

- ○ Not at all (1)
- ○ A little (2)
- ○ A moderate amount (3)
- ○ Quite a lot (4)
- ○ A great deal (5)

Q18 c. I felt like I should take an HIV test

- ○ Not at all (1)
- ○ A little (2)
- ○ A moderate amount (3)
- ○ Quite a lot (4)
- ○ A great deal (5)

Q19 d. I was worried about getting health insurance or life insurance if I learned I had HIV.

- ○ Not at all (1)
- ○ A little (2)
- ○ A moderate amount (3)
- ○ Quite a lot (4)
- ○ A great deal (5)

Q20 e .I did not know how long it would take to get an HIV test.

- ○ Not at all (1)
- ○ A little (2)
- ○ A moderate amount (3)
- ○ Quite a lot (4)
- ○ A great deal (5)

Q21 f. I did not know how long it would take to get my HIV test results back.

- ○ Not at all (1)
- ○ A little (2)
- ○ A moderate amount (3)
- ○ Quite a lot (4)
- ○ A great deal (5)

Q22 For you, how important are the following procedures in HIV testing?

a. I have a chance to give my permission to be tested in writing

- Not at all important (1)
- Slightly important (2)
- Moderately important (3)
- Very important (4)
- Extremely important (5)

Q23 b. My HIV test is completely private

- Not at all important (1)
- Slightly important (2)
- Moderately important (3)
- Very important (4)
- Extremely important (5)

Q24 c. My HIV test is free of charge.

- Not at all important (1)
- Slightly important (2)
- Moderately important (3)
- Very important (4)
- Extremely important (5)

Q25 d. I am able to receive my results the same day (today).

- Not at all important (1)
- Slightly important (2)
- Moderately important (3)
- Very important (4)
- Extremely important (5)

Q26 The following questions are about your experience with HIV testing today. How true or false are the following statements?

a. My HIV test was done in private.

- Definitely true (1)
- Mostly true (2)
- Neither true nor false (3)
- Mostly false (4)
- Definitely false (5)

Q27 b. I was satisfied with the amount of time it took to receive my results.

- Definitely true (1)
- Mostly true (2)
- Neither true nor false (3)
- Mostly false (4)
- Definitely false (5)

Q28 Did you receive materials to read about HIV or HIV testing today?

- Yes (1)
- No (2)

Q29
How true of false are the following statements about the materials you received, if any?

a. I could understand the information I was given about taking an HIV test

- Definitely true (1)
- Mostly true (2)
- Neither true nor false (3)
- Mostly false (4)
- Definitely false (5)

Q30 b. The materials I received explained how to get or give HIV.

- Definitely true (1)
- Mostly true (2)
- Neither true nor false (3)
- Mostly false (4)
- Definitely false (5)

Q31 c. I had a chance to ask questions about the materials I received.

- ○ Definitely true (1)
- ○ Mostly true (2)
- ○ Neither true nor false (3)
- ○ Mostly false (4)
- ○ Definitely false (5)

Q32 Overall, how would you rate your experience with HIV testing today?

- ○ Poor (1)
- ○ Fair (2)
- ○ Good (3)
- ○ Very good (4)
- ○ Excellent (5)
- ○ Don't know (6)

Q33 Do you feel you are at risk for HIV?

- ○ Yes (1)
- ○ No (2)

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Appendix E

Announcement for online HIV testing attitudes survey

So… what do you think????

You are invited to participate in an anonymous online survey about undergraduate college students' attitudes about HIV testing. Your input will provide valuable information in planning HIV testing events tailored for college students. The survey will only take about 10 minutes and you can complete it on your phone or computer. Just click on the link below and get started. Stay tuned for a quick, fun HIV testing event coming your way in the next month based on your responses. Thank you for taking your time to share your opinion.

The survey will be available until 8/31/2020. You must be at least 18 to participate. For more information, you can contact the student , Kimberly Griffin, in charge of the project at kimberly.griffin@bobcats.gcsu.edu

https://gcsu.co1.qualtrics.com/jfe/form/SV_ePNuLucmsQICdeZ

Appendix F

Announcement for HIV testing event

Gotta minute?

For your health

Free one- minute HIV testing and health screening

Confidential and convenient screening on the front lawn on main campus from 6pm-8pm on 9/02/2020.

Join us for free door prizes and the opportunity to learn about ways to stay healthy

You are invited to participate in a fellow students' doctoral project examining attitudes and demographic factors that influence HIV testing behaviors of college students with a voluntary anonymous survey.

For more information, please contact the student, Kimberly Griffin, at kimberly.griffin@bobcats.gcsu.edu

Appendix G

Announcement for online survey at testing event

So… what do you think????

You are invited to participate in an anonymous online survey about undergraduate college students' attitudes and perceptions about HIV testing. Your input will provide valuable information in planning future HIV testing events tailored for college students. The survey will only take about 10 minutes and you can complete it on your phone or iPad. Just click on the link or QR code below and get started. Thank you for taking the time to share your opinion.

The survey will be available for the next 24 hours. You must be at least 18 years old and enrolled as an undergraduate to participate. For more information, you can contact the student , Kimberly Griffin, in charge of the project at kimberly.griffin@bobcats.gcsu.edu

https://gcsu.co1.qualtrics.com/jfe/form/SV_1NX4MWrAEmqJg0J

Appendix H

Education and Giveaway Examples

Appendix I

Referral Resources

Baldwin County Health Department

953 Barrows Ferry Road
Milledgeville, GA 31061
(478) 445-4264

Office Hours: Monday through Friday 8 a.m. to 4:30 p.m.

Counseling Services of Georgia College

Suite 210 Wellness and Recreation Center
134 West Campus Drive
Campus Box 61
Milledgeville, GA 31061
Phone 478-445-5331
evelyn.palm@gcsu.edu

Office Hours: Monday through Friday 8 a.m. to 5 p.m.

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