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An Examination of Factors Associated with LGBTQ+ College Students' Adoption of Post-Exposure Prophylaxis (PEP) as an HIV Prevention Method

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AN EXAMINATION OF FACTORS ASSOCIATED WITH LGBTQ+ COLLEGE STUDENTS' ADOPTION OF POST-EXPOSURE PROPHYLAXIS (PEP) AS AN HIV PREVENTION METHOD

by

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ABSTRACT

Post-exposure prophylaxis (PEP) is an effective human immunodeficiency virus (HIV) prevention medication taken after exposure, yet it is not widely used in the lesbian, gay, bisexual, transgender, and queer/questioning (LGBTQ+) community. Understanding its acceptability is vital, given this population's increased risk for contracting HIV. Drawing from the Health Literacy Skills Framework and the Theory of Planned Behavior, this study provides an examination of PEP-related awareness and knowledge, as well as intention to request and use PEP. Using a cross-sectional survey design, a convenience sample of 131 LGBTQ+ college students from a Southeastern university was recruited through email and social media. Survey responses were analyzed using chi-square tests, t-tests, and logistic regression to identify factors associated with PEP. Findings indicate that awareness of PEP was significantly related to race, prior HIV-related discussions with providers, previous HIV testing, use of student health services, health literacy, and general health knowledge. To test knowledge, those indicating PEP awareness were asked further questions. However, very few respondents provided correct responses. Intention to *request* a PEP prescription was significantly related to normative and control beliefs, with intention being more likely among those who anticipate less stigma and those who had prior HIV-related discussions with a provider. Intention to *take* PEP was significantly related to normative beliefs, with intention being more likely among those who anticipate less stigma and perceive greater acceptance from others. Overall, these results provide partial support for the relevance of the Health Literacy Skills Framework and the Theory of Planned Behavior in understanding factors related to PEP. Future research is needed to more fully document lack of knowledge and identify predictors of knowledge deficits. Health and

human service systems can utilize these findings when selecting strategies to increase PEP awareness and usage, in hopes of reducing HIV transmission and its related negative impacts.

Keywords: post-exposure prophylaxis, PEP, HIV prevention, LGBTQ+, LGBTQ+ college students

I dedicate this dissertation to my mom, Tanya Scotece, Ph.D. Without your love, support, and guidance, I would not be where I am today. Since day one, you have been the biggest source of inspiration and love in my life. I am so proud of all that you are, and I am grateful every single day that I get to call you mom. I love you forever and always.

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LIST OF ACRONYMS

HIV	human immunodeficiency virus
LGBTQ+	lesbian, gay, bisexual, transgender, and queer/questioning
MSM	men who have sex with men
PEP	post-exposure prophylaxis
PrEP	pre-exposure prophylaxis

CHAPTER ONE: INTRODUCTION

PEP as an HIV Prevention Method

Scientists have developed two biomedical strategies that are utilized to prevent human deficiency virus (HIV) infection in HIV negative persons. Post-exposure prophylaxis (PEP) is "short-term antiretroviral treatment [medications that are utilized] to reduce the likelihood of HIV infection after potential exposure [to the virus]" (World Health Organization (WHO), n.d., para. 1). Specifically, PEP is a prescription oral medication that is taken for 28 days after a person has been exposed to HIV (Centers for Disease Control and Prevention, CDC, 2019b). Studies have shown that PEP is effective at preventing HIV if it is taken within 72 hours of exposure to the virus (CDC, 2005; Tolle & Schwarzwald, 2010). Early evidence of PEP's efficacy was documented in the results of a case-control study by Cardo et al. (1997), which revealed that HIV infection was reduced by approximately 81% among healthcare workers who took PEP after HIV exposure. Studies have also been conducted that reveal PEP's effectiveness among men who have sex with men (MSM). Specifically, among six studies of 1,535 MSM participants who used PEP, only 48 of them became HIV positive after exposure (CDC, 2016a). According to the CDC (2016a), a majority of the 48 "seroconversions" (p.11), or HIV status change, was a result of continued risk after their PEP regimen was completed. Similar success has been documented with groups other than MSM. Among 15 studies of 2,209 participants of mixed populations, including both occupational and non-occupational HIV exposure among adults, adolescents, and children, who completed a PEP regimen, 19 seroconversions were documented but only one case was attributed to medication failure (CDC, 2016a).

Though the current study is focused on PEP, another related medication called pre-exposure prophylaxis (PrEP) is more widely known, and its relation to PEP should be noted. PrEP is a prescription oral pill that is taken once per day by individuals who are at high risk for contracting the virus as a means of preventing them from contracting HIV (CDC, 2019a). Specifically, PrEP may be a good option for those who are engaging in sexual activity with a person who is HIV positive and does not have an undetectable viral load; those who do not always use condoms; those who are engaging in condomless sexual activity with persons with an unknown HIV status; those who have been diagnosed with a sexually transmitted infection (STI) in the past six months; and those who share injection drug needles (CDC, 2019a). Since PrEP is used to prevent HIV, it does not need to be taken once a person is no longer a risk (CDC, 2019a).

While PrEP is highly effective for those taking it as prescribed, PEP is a vital HIV prevention method for those who are not already taking PrEP or using other effective means of HIV prevention (such as condoms). Since not all persons who are at risk for contracting HIV are on PrEP and some who are on PEP may not be adherent to the medication (National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, 2018), it is important to examine the adoption of PEP as an HIV prevention method among at-risk populations.

PEP has the potential to prevent great costs to individuals and society, including physical, psychological, emotional, and economic. Even though the number of new infections has decreased since the epidemic of the 1980s, HIV continues to be a public health concern in the United States and around the world. Worldwide, there are 37.9 million people living with HIV and in the United States there are more than one million people living with HIV (CDC, 2016b; UNAIDS, 2019). In the United States, new HIV infections have remained stable, as there were 39,782 new infections in 2016 (CDC, 2016c), 38,739 new infections in 2017 (CDC, 2017), and

37,832 new infections in 2018 (CDC, 2018). Within the United States, HIV infections are disparate among the different regions of the country. According to the CDC (2018), a majority (52%) of the new HIV infections in the United States are in the South, while 15% occur in the Northeast, 13% in the Midwest, and 19% in the West. Within the Southern region of the country, the state of Florida had the third highest number of new HIV infections in 2018 (Florida Department of Health, 2020). Out of the top 10 metropolitan statistical areas (MSAs) for new HIV infections throughout the United States, four were located in Florida and include the Miami division, the Fort Lauderdale division, Orlando-Kissimmee-Sanford, and Jacksonville (Florida Department of Health, 2020). This persistent and uneven spread of new HIV infections is cause for great concern, as the virus has various physical, psychological, emotional, and economic consequences that have been well documented in the literature (Collins et al., 2019; Dray-Spira et al., 2007; Safarcherati et al., 2016). Physically, HIV weakens the body's immune system and can lead to acquired immunodeficiency virus (AIDS) if left untreated (CDC, 2019c). A deficient immune system is susceptible to opportunistic infections (CDC, 2019c, para. 3), including pneumonia and tuberculosis, among others (CDC, 2019d). Psychologically and emotionally, a person who contracts HIV may be at greater risk for developing a mental illness due to "coping with a chronic and life-threatening illness [and] fear of stigma and discrimination" (Safarcherati et al., 2016, p. 685). Economically, HIV is costly, as HIV care over a lifetime is estimated to be $402,000 (Collins et al., 2019). In addition, loss of employment has been shown to be higher among certain groups of HIV positive individuals, specifically women (Dray-Spira et al., 2007). Thus, HIV has significant negative consequences for individuals and societies.

History of PEP as HIV Prevention

PEP was originally adopted as an HIV prevention method among health care workers following occupational exposure (e.g., accidental needle sticks) in the late 1980s and early 1990s (Henderson, 2001; WHO, 2014). In the early 1990s, the CDC (1998) issued a statement about the use of zidovudine as an HIV prevention medication that could be taken after exposure to the virus. Zidovudine (often better known as AZT) is one of multiple medications that can be used as PEP for HIV prevention (CDC, 2016a). Later, the CDC (1998) issued a set of guidelines for PEP as HIV prevention, which suggested that new medications were safer and more effective than AZT to prevent HIV infection after exposure. In the early 2000s, doctors began prescribing PEP for the general population as an HIV prevention method following exposure to HIV resulting from non-occupational exposure, such as unprotected sexual intercourse and the sharing of injection drug needles (WHO, 2014). In 2005, the United States Department of Health and Human Services released recommendations for PEP usage after non-occupational HIV exposure based on data from animal transmission studies, perinatal clinical trials, occupational PEP studies, and observational studies (CDC, 2005).

In 2010, under the Obama administration, the National HIV/AIDS Strategy for the United States was released, which delineated a plan to achieve three main goals: "1) reducing the number of people who become infected with HIV, 2) increasing access to care and optimizing

health outcomes for people living with HIV, and 3) reducing HIV-related health disparities" (White House Office of National AIDS Policy, 2010, p. vii). PEP was included among a list of ways to achieve the first goal: reducing HIV transmission within the United States. This National Strategy was later updated in 2015 with an even greater emphasis on PEP (White House Office of National AIDS Policy, 2015). The White House argued for expanded access to PEP and presented this strategy as an effective, evidence-based approach to achieve the primary goal of reducing new HIV infections in the United States (White House Office of National AIDS Policy, 2015). In early 2019, the Trump administration launched an initiative titled Ending the HIV Epidemic: A Plan for America, which had a goal of reducing new HIV infections in the United States by 90% by the year 2030 (CDC, 2020). To achieve this significant reduction, this initiative sought to focus on the counties and areas that account for a majority of new HIV cases and those with a "substantial rural burden" (CDC, 2020, para. 3). The four major facets of this initiative were to "diagnose, treat, prevent, and respond" (CDC, 2020, para. 3) to HIV within the United States. While PrEP constitutes a major part of the prevention facet of this initiative, PEP is a vital resource that can prevent individuals from contracting HIV after they have been exposed to the virus in the event individuals were not taking PrEP or PrEP was not being taken as prescribed.

Even though PEP has been shown to be effective at preventing HIV after a potential exposure and is a prevention method that is recognized by the CDC, PEP has not been fully adopted by the medical community or the general public, as it is still not well known and is underutilized as an HIV prevention method (McDougal et al., 2014). There appears to be no data available regarding the number of PEP prescriptions

that are given out and filled in the United States, but there is information available regarding PrEP prescriptions. According to a study that was conducted by the CDC, many American individuals who could benefit from using PrEP as an HIV prevention method did not have a prescription for this medication (National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, 2018). In 2015, it was estimated that over one million Americans were at risk for contracting HIV, yet only 90,000 PrEP prescriptions were filled during that year (National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, 2018). Making this matter more problematic is that African Americans and Latinos are disproportionately impacted. In 2015, it was estimated that 500,000 African Americans and 300,000 Latinos could have benefitted from PrEP, but only 7,000 prescriptions were filled by African Americans and only 7,600 were filled by Latinos (National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, 2018). By comparison, it was estimated that 300,000 White persons could have benefitted from PrEP in 2015 and only 42,000 PrEP prescriptions were filled that year (National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, 2018). While this information is in reference to PrEP, PEP has also been found to be an underutilized HIV prevention method and the diffusion of this innovation needs to be explored further.

Awareness, Knowledge, and Intention to Access and Use PEP

A small body of research has identified factors related to awareness of, knowledge about, and intention to access and use PEP. This research has been conducted with samples of healthcare workers, MSM, transgender women, and cisgender women of color. Health worker populations have been studied because even though occupational transmission of HIV from a patient to a healthcare worker is rare (CDC, 2019c), it is important that healthcare workers be

knowledgeable about HIV prevention and transmission for their health and that of their patients. In addition, MSM, transgender women, and cisgender women of color are at high risk for contracting HIV (CDC 2019e; CDC, 2016b); thus, it is important that these individuals are knowledgeable about effective HIV prevention methods, such as PEP. Even so, researchers have consistently found a lack of both awareness of and knowledge about PEP across various populations in locations across the globe. Specifically, limited awareness of PEP and knowledge about PEP was documented within samples of health care workers in Ethiopia, Nigeria, India, and South Africa (Esin et al., 2011; Makhado & Davhana-Maselesele, 2016; Mathewos et al., 2013; Mukherjee et al., 2013; Ncube et al., 2014), MSM in the United States and South Africa (Dolezal et al., 2015; Hugo et al., 2016; Koblin et al., 2016), and transgender women and cisgender women of color in the United States (Koblin et al., 2016).

In regard to awareness of PEP, which is defined as whether or not a person has heard of PEP before, Makhado and Davhana-Maselesele (2016) found that 40% of a sample of 233 nurses in parts of Africa and India who worked with persons living with HIV did not know what PEP was, even though 60% of the nurses reported that they had been in a situation where they believe they were exposed to HIV. Similarly, among MSM populations, Dolezal et al. (2015) found that of the 228 MSM participants in Boston, Pittsburgh, and San Juan, only 41% had heard of PEP before. Hugo et al. (2016) also found a lack of awareness of PEP among South African MSM. In addition, Mitchell et al. (2016) found that less than one third of men among 275 HIV negative couples and 58 HIV-discordant (a relationship in which one partner is HIV negative and the other is HIV positive) couples were aware of PEP. Finally, among a sample of young MSM of color, transgender women, and cisgender women of color in New York, only

59% had heard of PEP (Koblin et al., 2016). Taken together, these studies indicate that there is a trend of low PEP awareness levels across various populations.

Although awareness of PEP is a critical first step, even individuals who have heard of PEP may have insufficient knowledge about PEP to make informed decisions about its use. In regard to knowledge about PEP, which is defined as how much information a person knows about accessing and taking PEP, Mathewos et al. (2013) found that approximately 37% of the 195 healthcare workers in Ethiopia that were surveyed had "inadequate" (p. 1) knowledge about PEP for HIV prevention. Similarly, Esin et al. (2011) found very low levels of knowledge about PEP among 66 doctors working at a hospital in Nigeria. This lack of knowledge about PEP is also reflected in medical interns and undergraduate students, as Mukherjee et al. (2013) found inadequate levels of knowledge about PEP among 130 interns at a medical college in India, and Ncube et al. (2014) found that only 28% of a sample of 169 medical undergraduate students in South Africa reported knowledge about PEP.

This lack of knowledge and awareness about PEP for HIV prevention among healthcare workers and other high-risk populations is cause for concern. PEP can only be accessed through a prescription from a physician (CDC, 2019b), so a lack of knowledge about the existence of PEP or factors related to its proper usage can lead to both medical professionals and their patients not being able to access this vital medication in the event of exposure to HIV. Since PEP is effective when it is taken within 72 hours of exposure to HIV, delays due to lack of knowledge, lack of provider knowledge, barriers to obtaining an appointment with a provider, or barriers in the ability to fill a prescription can result in lack of or sub-optimal HIV prevention.

While awareness of PEP and knowledge about PEP have been found to be low among varied populations in different locations, some studies have revealed high levels of intention to

use PEP, which is defined as whether or not a person would plan to take PEP in the event that they were exposed to HIV. Dolezal et al. (2015) found that after MSM participants were educated about PEP for HIV prevention, many found PEP to be appealing and stated they would likely utilize PEP in the future. In addition, Mitchell et al. (2016) found that 73% of men among 275 HIV negative couples and 58 HIV-discordant couples were likely to use PEP. Despite the intention to use PEP, research has identified barriers to obtaining PEP. A study conducted by Makhado and Davhana-Maselesele (2016) found that nurses reported the following barriers to obtaining PEP: they did not want to get tested for HIV, they could not access PEP in their workplace, and they did not want to experience side effects that have been associated with taking PEP. In regard to seeking nPEP, according to Hugo et al. (2016), who conducted HIV-related research in Cape Town, South Africa, MSM who are aware of PEP identified limited access to LGBTQ+ friendly healthcare facilities as barriers to accessing the medication. In sum, while a lack of PEP awareness and knowledge has been documented among various populations, intent to use PEP was found to be high once individuals were provided with information about this medication.

LGBTQ+ College Students

Even though past studies have addressed factors related to awareness of, knowledge about, and intention to obtain and use PEP within samples of healthcare workers, MSM, transgender women, and cisgender women of color, there appear to be no studies to date that have examined these important issues among college students in the United States. This gap is concerning since college students are at risk for contracting HIV. According to the CDC (2019f), young persons between the ages of 13 and 24 comprised 21% of all new HIV infections in the

United States in 2017. Going further, youth who contract "HIV are the least likely of any age group to be linked to care in a timely manner and have a suppressed viral load" (CDC, 2019f, para. 1). This lack of access to care can impact the youth's health, as well as the health of their sexual partners, especially if they are unaware that they have contracted the virus. Results of the American College Health Association National College Health Assessment (2019) highlight the risk for HIV among a sample of 30,084 undergraduate college students at 58 schools throughout the country. Of the 11,290 students who reported engaging in oral sex within the last 30 days of taking the survey, 9,945 reported they never use a condom or barrier during oral sex (American College Health Association National College Health Assessment, 2019). Of 11,237 students who reported engaging in vaginal sex during the same timeframe, 35.6% (n=4,005) reported never using a condom or barrier and 9.4% (n=1,056) reported rarely using a condom or barrier (American College Health Association National College Health Assessment, 2019). Due to the high rate of HIV transmission through anal sex, it is cause for even greater concern that out of the 1,120 students who reported engaging in anal sex during the 30 days prior to taking the survey, a majority (615) reported that they never use a condom or barrier during anal sex (American College Health Association National College Health Assessment, 2019). Despite engaging in unprotected sexual activity, 19,970 of the 30,084 students reported that they had never been tested for HIV (American College Health Association National College Health Assessment, 2019).

While young people in general are a population at risk for contracting HIV, members of the LGBTQ+ community, specifically young gay men, bisexual men, and transgender women, are all at an even higher risk (Gay, Lesbian, & Straight Education Network, 2015). According to the CDC (2019f), 93% of the new HIV infections among youth in 2017 were due to male-to-

male sexual contact, compared to heterosexual contact, injection drug use, or a combination of male-to-male sexual contact and injection drug use. Studies that have examined sexual health risks and behaviors among LGBTQ+ college students have found low levels of HIV prevention and testing despite high-risk behaviors, similar to that of the general college population. Lindley et al. (2003) found that, among a sample of 436 LGBT college students, 44.6% of the students reported having multiple sex partners (more than six) during their lifetime, 72.4% stated that they did not use a condom or other barrier during their most recent sexual encounter, and only 44.6% had ever been tested for HIV (Lindley et al., 2003). Kerr et al. (2013) found that bisexual female college students were less likely to use condoms or barriers during oral or vaginal sex, compared to heterosexual female college students. In addition, bisexual female college students were more likely to report engaging in anal sex, compared to lesbian or heterosexual female college students (Kerr et al., 2013). Similarly, Lindley et al. (2007) found that among lesbian and bisexual female college students, approximately 14% of the participants who had ever had penile-vaginal sex sometimes used condoms and 19% of same participants never used condoms. In addition, a majority (approximately 61%) of the sample of 230 women had never been tested for HIV (Lindley et al., 2007). These results are concerning, as these behaviors put these individuals at higher risk for contracting HIV. While MSM are at the highest risk for contracting HIV, as they comprised 63% of all new HIV cases in the U.S. in 2010 (CDC, 2016b), these study results show that bisexual females also engage in risky sexual behaviors that put them at an increased risk for HIV.

Contribution of this Study and Research Aims

This study was designed to address a significant gap in the existing literature, as there appears to be no studies to date that have examined factors related to PEP as an HIV prevention method among LGBTQ+ college students. Since this population is at high risk for contracting HIV, it is vital that factors related to the adoption of effective biomedical strategies, such as PEP, be examined to inform future design of effective HIV prevention methods for this population. Specifically, this study sought to contribute to the existing literature regarding factors related to the acceptability of PEP among LGBTQ+ college students, which supports the field's determinations regarding PEP as a viable HIV prevention method for this population.

While the risk for HIV among LGBTQ+ college students is documented in the literature, little is known about the factors related to this population's awareness of, knowledge about, and intention to obtain and use PEP. It is imperative that these topics are explored in order to promote effective HIV prevention methods among LGBTQ+ college students. Thus, the current study aimed to identify factors associated with (1) awareness of PEP among LGBTQ+ college students, (2) knowledge of PEP among LGBTQ+ college students, (3) intention to ask a healthcare provider for a PEP prescription among LGBTQ+ college students, and (4) intention to use PEP for HIV prevention among LGBTQ+ college students.

CHAPTER TWO: LITERATURE REVIEW & THEORETICAL FOUNDATION

This study draws from the Health Literacy Skills Framework and the Theory of Planned Behavior to guide an examination of factors associated with awareness of, knowledge about, and intention to access and take PEP among LGBTQ+ college students. The Health Literacy Skills Framework describes factors related to health literacy skills, which include the ability to acquire, appraise, and apply health-related information to inform health decision making. Thus, this framework is utilized in the current study to explore factors related to awareness of PEP and knowledge about PEP. The Theory of Planned Behavior describes various beliefs that are associated with intention to engage in certain behaviors. Hence, this theory is used to explore factors related to intention to ask a healthcare provider to prescribe PEP and intention to use PEP.

Awareness and Knowledge of PEP

Health Literacy Skills Framework

Squiers and colleagues (2012) developed the Health Literacy Skills Framework, which describes the factors that lead to health literacy skills and ultimately impact health-related behavior and outcomes. According to Sørensen et al. (2012):

> Health literacy is linked to literacy and entails people's knowledge, motivation, and competence to access, understand, appraise and apply health information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention, and health promotion to maintain or improve quality of life during the life course. (p. 3)

Health literacy includes three main components: (1) print literacy, including the ability to read, write, and compute math, (2) communication, including speaking, listening, and negotiating, and (3) information seeking (Squiers et al., 2012). According to this framework, health literacy is impacted by demographic characteristics, individual resources, capabilities, and prior knowledge (Squiers et al., 2012). Demographics include factors such as age, race, ethnicity, income, educational attainment, gender, and sexual identity. Individual resources include finances, assets, social support, culture, education, language, and literacy. Capabilities include vision, hearing, memory, and other cognitive functioning abilities. Prior knowledge encompasses knowledge that a person holds regarding "disease and illness experiences, conceptual knowledge of health and health care, and familiarity with health care vocabulary" (Squiers et al., 2012, p. 48). Health literacy is hypothesized to influence one's comprehension of health-related information and, ultimately, their health-related behaviors and outcomes (Squiers et al., 2012). The Health Literacy Skills Framework is employed in the current study to understand the impact of demographic characteristics, individual resources, capabilities, and prior knowledge on awareness of PEP and knowledge about PEP for HIV prevention. Specifically, demographic characteristics, individual resources, capabilities, and prior knowledge may impact a person's health literacy, and thus, influence their awareness of and knowledge about a biomedical intervention such as PEP. Definitions and relevant research for each of the four domains within the Health Literacy Skills Framework are presented below.

Demographics

Although the authors of the Health Literacy Skills Framework (Squires et al., 2012) do not provide a specific definition of demographics, the authors list age, race, ethnicity, income,

and gender as examples to denote the relevant aspects of demographics that influence health literacy. The relationship between demographics and health literacy is further outlined by the U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion (2010):

> Limited health literacy affects people of all ages, races, incomes, and education levels, but the impact of limited health literacy disproportionately affects lower socioeconomic and minority groups. It affects people's ability to search for and use health information [and] adopt healthy behaviors. (p. 1)

Research has found that demographic characteristics, including age, race, ethnicity, income, educational attainment, gender, and religious beliefs are found to be associated with levels of health literacy (Christy et al., 2017; Hicks et al., 2006). In regard to age, Christy et al. (2017) found that those of older age were more likely to have higher levels of health literacy, compared to those who were younger. White individuals were found to have higher levels of health literacy, compared to members of racial/ethnic minority groups. Women were found to have higher levels of health literacy, compared to men. In addition, individuals who held fewer religious beliefs were found to have higher levels of health literacy, compared to those with greater religious beliefs. Within the PEP literature, demographic factors have been found to impact PEP awareness and knowledge. However, research regarding PEP awareness points to the opposite direction, with marginalized groups having higher levels of awareness. Among transwomen, those who were Black, young, and within the lower income range had greater PEP awareness; whereas transwomen who identified as gay has lower PEP awareness (Koblin et al., 2018). Within samples of MSM, those who identified as gay were found to be more knowledgeable about PEP than those who did not identify as gay (Hugo et al., 2016). Geographic

location also impacted PEP awareness, as Dolezal et al. (2015) found that awareness of PEP was lowest among study participants in San Juan, while higher levels of awareness of PEP were found among study participants in Boston. Given the conflicting information from the theoretical and empirical literature regarding the impact of demographic characteristics on health literacy, additional research on these relationships is warranted. Thus, this study will address the following two research questions:

RQ 1: Are demographic characteristics associated with awareness of PEP?

RQ 2: Are demographic characteristics associated with knowledge of PEP?

Resources

Squires et al. (2012) define individual resources as both tangible and intangible resources, such as finances, assets, social support, culture, and education. Having more of these resources can positively influence health literacy through promoting one's ability to develop and hone the skills that comprise health literacy: print skills (such as reading and writing), communication skills, and information navigating skills (such as the ability to seek information through online websites). Research has found that some individual resources are related to PEP awareness and knowledge. Koblin et al. (2018) found that health care providers, community-based organizations, and friends were found to be key sources of PEP information. Thus, a person's resources, both tangible, in regard to the financial ability and/or medical insurance status to be able to access healthcare providers, and intangible, in regard to social support from friends can impact PEP-related awareness and knowledge. In addition, those with higher educational levels were found to have higher levels of PEP awareness (Koblin et al., 2018). Thus, as the Health Literacy Skills framework hypothesizes, the individual resource of education can be related to

awareness and knowledge through the bolstering of one's health literacy. The existing literature regarding individual resources informed the next two research questions in the current study:

RQ 3: Are individual resources associated with awareness of PEP?

RQ 4: Are individual resources associated with knowledge of PEP?

Capabilities

Squires et al. (2012) describe capabilities as vision, hearing, memory, and other cognitive functioning abilities. These capabilities, similar to the other components of the Health Literacy Skills Framework, promote health literacy through bolstering one's ability to employ reading and writing skills, communication skills, and information navigating skills. Alternatively, impairments to one or more of these capabilities can diminish a person's health literacy through tapering their ability to obtain, understand, and evaluate health-related information. Thus, capability impairments may negatively impact awareness of PEP and knowledge about PEP. Research has found that capabilities, including memory and cognitive functioning, are related with general health literacy levels (Yost et al., 2013; Wolf et al., 2012; Federman et al., 2009). According to results of a study conducted by Federman et al. (2009), "abnormal cognitive function was strongly associated with inadequate health literacy: immediate recall…delayed recall…and verbal fluency" (p. 1-2). In addition, Wolf et al. (2012) found that "fluid and crystallized cognitive abilities" (p. 1300) were associated with health literacy. The relationship between capabilities and factors related to PEP appear to be understudied in the area of HIV research. Thus, the relationship between capabilities and general health literacy informed the following research questions of the current study:

RQ 5: Are capabilities associated with awareness of PEP?

RQ 6: Are capabilities associated with knowledge of PEP?

Prior Knowledge

Prior knowledge is defined as "disease and illness experiences, conceptual knowledge of health and health care, and familiarity with health care vocabulary" (Squiers et al., 2012, p. 48). Specifically, prior knowledge about a health-related topic is said to:

> Influence the degree to which health literacy skills need to be used to understand a stimulus. For example, someone with more conceptual knowledge of health (e.g., how the body works, how bacteria can cause infection) will find it easier to understand a stimulus that references their current knowledge base. (Squiers et al., 2012, p. 48).

According to the results of a study conducted by Sun et al. (2013), prior knowledge is associated with health literacy. In other words, "a person with more health knowledge is better able to obtain, comprehend and use health information" (Sun et al., 2013, p. 7). Thus, it is plausible that a person who has prior knowledge about HIV prevention and transmission would have increased health literacy, making them more likely to be aware of PEP and understand various factors about the medication, including where to obtain it, how long to take it for, etc. However, this assertion has yet to be tested and reported in the literature. The research on the relationship between prior knowledge and general health literacy skills informed the following two research questions:

RQ 7: Is prior knowledge associated with awareness of PEP?

RQ 8: Is prior knowledge associated with knowledge of PEP?

The studies related to the components of the Health Literacy Skills Framework, including the author(s), date of publication, sample, design, measure(s), and findings are outlined in Table 1.

Table 1: Relevant Research on the Health Literacy Skills Framework

Author(s)/ Date	Sample	Design	Measure(s)	Findings
Christy et al. (2017)	416 50-to-75-year-olds who are at average risk for colorectal cancer (CRC) and who are not up to date with CRC screenings	In-person interviews	Health literacy, Preventative Health Model variables, CRC awareness, decisional conflict, cancer fatalism, perceived discrimination, trust in healthcare system, and demographics	Men, those from a racial/ethnic minority group, and those who have greater religious beliefs have lower levels of health literacy
Dolezal et al. (2015)	228 men engaging in condomless anal sex	Computer-assisted self-interview (CASI)	Demographics, sexual behavior, HIV testing history, STIs, and PrEP/PEP	Those living in Boston or Pittsburgh have higher levels of PEP awareness than those living in San Juan
Federman et al. (2009)	414 adults ages 60 and older	In-person interviews	Short Test of Functional Health Literacy in Adults (S-TOFHLA), Wechsler Memory Scale II, Animal Naming, and the Mini Mental Status Exam	Abnormal cognitive function is positively associated with inadequate health literacy
Hicks et al. (2006)	372 patients at a public hospital urgent care center	Survey	Rapid Estimate of Adult Literacy in Medicine (REALM) scale and a 22-item questionnaire regarding HIV/AIDS knowledge	Greater HIV/AIDS knowledge is positively associated with health literacy

Author(s)/ Date	Sample	Design	Measure(s)	Findings
Hugo et al. (2016)	408 MSM	Survey	Demographics, medical care/experience, HIV testing behavior, knowledge and previous use of PEP, and sexual risk data	MSM who identified as gay are more likely to have previous knowledge of PEP, compared to those who did not
Koblin et al. (2018)	177 young MSM of color, 182 transgender women, and 170 cisgender women of color in New York City	Survey	Awareness of PEP, knowledge about PEP, access to PEP, and use of PEP	PEP awareness is significantly higher among younger women, those who were Black, those with lower income and those not employed, but lower among those who identified as gay or same gender loving; access to health care providers, community-based organizations, and friends are key sources of PEP information; those with higher educational levels were found to have higher levels of PEP awareness
Sun et al. (2013)	3222 Chinese adults	Survey	Demographics, knowledge of infectious respiratory diseases, and individual health-related behaviors	Greater level of prior knowledge is positively associated with health literacy
Wolf et al. (2012)	882 adults ages 55 to 74	Two face-to-face structured interviews one week apart	Rapid Estimate of Adult Literacy in Medicine (REALM), Test of Functional Health Literacy in Adults (TOFHLA), Newest Vital Sign (NVS), and cognitive tests	Greater health literacy is positively associated with fluid and crystallized cognitive abilities

Author(s)/ Date	Sample	Design	Measure(s)	Findings
Yost et al. (2013)	574 primary care patients	Survey using Health Literacy Assessment Using Talking Touchscreen Technology (Health LiTT)	Prose, document, and quantitative literacy skills	Overall cognitive ability and education are positively associated with health literacy

Intention to Access and Use PEP

Theory of Planned Behavior

This theory was developed by Icek Ajzen in 1985 as an expansion of the Theory of Reasoned Action (Ajzen, 1985). This theory aims to explain human motivation and its relationship with human behavior through three key factors: behavioral beliefs, normative beliefs, and control beliefs (Ajzen, 1991; Ajzen, 1985). These factors are said to interact and impact a person's intention to perform a behavior. Behavioral beliefs are the attitudes that a person holds toward a certain behavior, specifically in regard to their perception of its effectiveness (Ajzen, 1985). Behavioral beliefs are the internal (personal) component of human behavior motivation, according to this theory. Normative beliefs, on the other hand, are attitudes held by others about the behavior (Ajzen, 1985). These beliefs can be the source of social pressure, influencing a person to feel that they should or should not perform the behavior. Control beliefs refer to the "presence or absence of requisite resources and opportunities" (Ajzen, 1991, p. 196). These factors relate to perceived behavioral control, or the belief that a person can actually perform a certain behavior. Ajzen (1991) hypothesized that individuals who have more

resources and opportunities and perceive little to no barriers to performing a behavior will perceive greater control over performing said behavior. Combined, a person's individual perception of behavior, the external perceptions of the behavior held by others, and perceived individual control are used in the Theory of Planned Behavior to explain a person's intention to perform a behavior.

The Theory of Planned Behavior is used in the current study to understand the impact of the following independent variables on intention to ask a healthcare provider to prescribe PEP and intention to take PEP: a person's individual perception of PEP (e.g., whether or not they think that the behavior is effective, etc.), perceptions of others (e.g., what others believe about the behavior, etc.), and the person's perceived control in taking PEP (e.g., the person's level of self-efficacy, whether the person has medical insurance, etc.). Definitions and relevant research for each of the three domains within the Theory of Planned Behavior are presented below.

Behavioral Beliefs

Ajzen (1985) defines behavioral beliefs as "the beliefs that underlie a person's attitude toward the behavior" (p. 14). Ajzen (1985) posits those individuals who attribute positive outcomes to a certain behavior will be more likely to perform said behavior and vice versa. In regard to intention to ask a healthcare provider to prescribe PEP and intention to take PEP, those who believe that accessing and taking the medication is beneficial and effective will be more willing to access and take it than a person who does not view the medication as beneficial or effective. Studies examining factors related to taking PrEP, which is analogous to PEP in that it is the other biomedical HIV prevention option, have found that individuals' perceptions of the medication were related to their intention to take it. One study by Restar et al. (2017) found that

a sample of sex workers in Kenya were willing to take PrEP, in part, because they believed that "PrEP would provide protection and improve their capacity to take an active personal role in protecting themselves against their high occupational risks" (p. 8). Thus, their positive view of the impact of PrEP bolstered their intention to use the medication. Research on the relationship between behavioral beliefs and intention to take biomedical HIV prevention medications has informed the following research questions:

RQ 9: Are behavioral beliefs associated with intention to ask a healthcare provider to prescribe PEP?

RQ 10: Are behavioral beliefs associated with intention to use PEP?

Normative Beliefs

Normative beliefs account for the social pressures a person may experience from others. These are defined as "the person's belief that specific individuals or groups think he should or should not perform the behavior" (Ajzen, 1985, p. 14). In other words, if a person perceives that important people in the social network (friends, family members, etc.) believe that a behavior should be performed, the person will be more likely to comply and vice versa. Previous research has identified PrEP-related stigma, which can be analogized to PEP-related stigma, as an impediment that reduces intention to take PrEP for HIV prevention (Biello et al., 2017; Chakrapani et al., 2015; Eaton et al., 2017). A study conducted by Eaton et al., (2017) regarding perceptions of PrEP found that those who believed promiscuous people use PrEP were less likely to express a desire to use PEP. Similarly, Biello et al., (2017) found a major barrier to taking PrEP was fear of stigma from sexual and romantic partners. Specifically, fear of stigma included: [That a] main partner would think participant has HIV if took PrEP, casual partners would be

unsupportive of PrEP use, casual partners would judge if used PrEP, casual partners would think participant has HIV if took PrEP, and casual partners would not understand motivations for taking PrEP (Biello et al., 2017, p. 4).

Thus, stigma from others, or negative normative beliefs, surrounding HIV prevention medications can impact a person's intention to access and take the medication due to a lack of comfortability. The existing research on the relationship between normative beliefs and intention to use PrEP has informed the following two research questions:

RQ 11: Are normative beliefs associated with intention to ask a healthcare provider to prescribe PEP?

RQ 12: Are normative beliefs associated with intention to use PEP?

Control Beliefs

Control beliefs are defined as the "presence or absence of requisite resources and opportunities" (Ajzen, 1991, p. 196). Specifically, control beliefs relate to one's perceived control over performing the behavior, which has been termed self-efficacy. According to Ajzen (1991), "the more resources and opportunities individuals believe they possess, and the fewer obstacles or impediments they anticipate, the greater should be their perceived control over the behavior" (p. 196). Previous research has shown that access to resources and an affirming healthcare provider impact a person's ability to access PrEP (Hubach et al., 2017). Hubach et al. (2017) found in their sample of MSM a belief that the area where they lived "dictated which resources were available to them to access providers, PrEP, and sexual health programming" (p. 322). Going further, these individuals noted significant barriers when they utilized the healthcare system (Hubach et al., 2017), in that many of the respondents were weary of discussing their

sexual orientation with a healthcare provider. Thus, access to resources may significantly impact a person's intention to access PEP. This literature informed the final two research questions in the current study:

RQ 13: Are control beliefs associated with intention to ask a healthcare provider to prescribe PEP?

RQ 14: Are control beliefs associated with intention to use PEP?

The studies related to the components of the Theory of Planned Behavior, including the author(s), date of publication, sample, design, measure(s), and findings are outlined in Table 2.

Table 2: Relevant Research-Theory of Planned Behavior

Author(s)/ Date	Sample	Design	Measure(s)	Findings
Biello et al. (2017)	237 MSM	Survey	Demographics, alcohol/drug dependence, and hypothetical barriers to PrEP use	Fear of partner stigma was found to be a barrier to taking PrEP
Chakrapani et al. (2015)	61 MSM	Semi-structured focus groups	Demographics, PrEP acceptability, awareness of PEP, detection of PrEP use by others, condom usage, intimacy/love, perceptions of PrEP users, PrEP cost and access, PrEP side effects, and risk compensation	Fear of stigma related to using PrEP was a concern of participants
Eaton et al. (2017)	387 men and 6 transgender women	Survey	Demographics, healthcare factors, PrEP use, awareness, and interest, PrEP	Believing PEP is for promiscuous individuals was a barrier to taking the medication

Author(s)/ Date	Sample	Design	Measure(s)	Findings
			stigma/conspiracy beliefs, and sexual behaviors	
Hubach et al. (2017)	20 MSM	Semi-structured interviews	Demographics, attitudes towards PrEP, barriers in accessing PrEP, how they gathered sexual health information, and their interactions with medical providers	MSM identified environments not accepting of their sexual orientation and lack of quality, LGBT+ friendly healthcare as barriers to taking PrEP
Restar et al., (2017)	44 male and female sex workers	In-depth interviews	Interviews	Positive views of PrEP influenced intention to take the medication

CHAPTER THREE: RESEARCH METHODOLOGY

The purpose of this study is to understand the factors that influence the awareness of, knowledge of, and intention to access and use PEP among LGBTQ+ college students in order to inform future efforts to promote the use of effective HIV prevention methods among this population. Specifically, this study aims to examine the following: (1) awareness of PEP among LGBTQ+ college students, (2) knowledge of PEP among LGBTQ+ college students, (3) intention to ask a healthcare provider for a PEP prescription among LGBTQ+ college students, and (4) intention to use PEP for HIV prevention among LGBTQ+ college students.

Research Hypotheses

The study's research hypotheses for each of the four dependent variables are listed in Tables 3 through 6.

Table 3: Research Hypotheses for Awareness of PEP

Hypotheses	Related Research Questions
H_1: Participants who are younger are significantly more likely to be aware of PEP than participants who are older	Are demographic characteristics associated with awareness of PEP?
H_2: Participants who were born in the South are significantly less likely to be aware of PEP than participants born elsewhere	Are demographic characteristics associated with awareness of PEP?
H_3: Participants who are Hispanic/Latinx are significantly more likely to be aware of PEP than participants who are not Hispanic/Latinx	Are demographic characteristics associated with awareness of PEP?
H_4: Participants of color are significantly more likely to be aware of PEP than White participants	Are demographic characteristics associated with awareness of PEP?

Hypotheses	Related Research Questions
H_5: Cisgender participants are significantly more likely to be aware of PEP than participants who are not cisgender	Are demographic characteristics associated with awareness of PEP?
H_6: Gay and bisexual male participants are significantly more likely to be aware of PEP than participants of other sexual identities	Are demographic characteristics associated with awareness of PEP?
H_7: Bisexual female participants are significantly more likely to be aware of PEP than female participants of other sexual identities	Are demographic characteristics associated with awareness of PEP?
H_8: Participants who have medical insurance are significantly more likely to be aware of PEP than participants without medical insurance	Are individual resources associated with awareness of PEP?
H_9: Participants who have a regular medical doctor are significantly more likely to be aware of PEP than participants without a regular medical doctor	Are individual resources associated with awareness of PEP?
H_{10}: Participants who have discussed HIV prevention with a healthcare provider are significantly more likely to be aware of PEP than participants who have not discussed HIV prevention with a healthcare provider	Are individual resources associated with awareness of PEP?
H_{11}: Participants who have ever been tested for HIV are significantly more likely to be aware of PEP than participants who have not ever been tested for HIV	Are individual resources associated with awareness of PEP?
H_{12}: Participants who have a higher level of connection to the LGBT community are significantly more likely to be aware of PEP than participants with lower levels of connection to the LGBT community	Are individual resources associated with awareness of PEP?
H_{13}: Participants who are members of the Pride Student Association and/or Pride Commons are significantly more likely to be aware of PEP than participants who are not members of the Pride Student Association and/or Pride Commons	Are individual resources associated with awareness of PEP?

Hypotheses	Related Research Questions
H_{14}: Participants who use Student Health Services are significantly more likely to be aware of PEP than participants who do not use Student Health Services	Are individual resources associated with awareness of PEP?
H_{15}: Participants who do not have difficulties with sensory and/or cognitive abilities are significantly more likely to be aware of PEP than participants who have difficulties with sensory and/or cognitive abilities	Are capabilities associated with awareness of PEP?
H_{16}: Participants who have higher levels of knowledge about HIV/AIDS are significantly more likely to be aware of PEP than participants who have lower levels of knowledge about HIV/AIDS	Is prior knowledge associated with awareness of PEP?
H_{17}: Participants who have higher levels of general public health knowledge are significantly more likely to be aware of PEP than participants who have lower levels of general public health knowledge	Is prior knowledge associated with awareness of PEP?

Table 4: Research Hypotheses for Knowledge of PEP

Hypotheses	Related Research Questions
H_{18}: Participants who are younger are expected to have higher levels of knowledge about PEP than participants who are older	Are demographic characteristics associated with knowledge of PEP?
H_{19}: Participants who were born in the South are expected to have higher levels of knowledge about PEP than participants born elsewhere	Are demographic characteristics associated with knowledge of PEP?
H_{20}: Participants who are Hispanic/Latinx are expected to have higher levels of knowledge about PEP than participants who are not Hispanic/Latinx	Are demographic characteristics associated with knowledge of PEP?
H_{21}: Participants of color are expected to have higher levels of knowledge about PEP than White participants	Are demographic characteristics associated with knowledge of PEP?

Hypotheses	Related Research Questions
H_{22}: Cisgender participants are expected to have higher levels of knowledge about PEP than participants who are not cisgender	Are demographic characteristics associated with knowledge of PEP?
H_{23}: Gay and bisexual male participants are expected to have higher levels of knowledge about PEP than male participants of other sexual identities	Are demographic characteristics associated with knowledge of PEP?
H_{24}: Bisexual female participants are expected to have higher levels of knowledge about PEP than female participants of other sexual identities	Are demographic characteristics associated with knowledge of PEP?
H_{25}: Participants who have medical insurance are expected to have higher levels of knowledge about PEP than participants without medical insurance	Are individual resources associated with knowledge of PEP?
H_{26}: Participants who have a regular medical doctor are expected to have higher levels of knowledge about PEP than participants without a regular medical doctor	Are individual resources associated with knowledge of PEP?
H_{27}: Participants who have discussed HIV prevention with a healthcare provider are expected to have higher levels of knowledge about PEP than participants who have not discussed HIV prevention with a healthcare provider	Are individual resources associated with knowledge of PEP?
H_{28}: Participants who have ever been tested for HIV are expected to have higher levels of knowledge about PEP than participants who have not ever been tested for HIV	Are individual resources associated with knowledge of PEP?
H_{29}: Participants who have a higher level of connection to the LGBT community are expected to have higher levels of knowledge about PEP than participants with lower levels of connection to the LGBT community	Are individual resources associated with knowledge of PEP?
H_{30}: Participants who are members of the Pride Student Association and/or Pride Commons are expected to have higher levels of knowledge	Are individual resources associated with knowledge of PEP?

Hypotheses	Related Research Questions
about PEP than participants who are not members of the Pride Student Association and/or Pride Commons	
H_{31}: Participants who use Student Health Services are expected to have higher levels of knowledge about PEP than participants who do not use Student Health Services	Are individual resources associated with knowledge of PEP?
H_{32}: Participants who do not have difficulties with sensory and/or cognitive abilities are expected to have higher levels of knowledge about PEP than participants who have difficulties with sensory and/or cognitive abilities	Are capabilities associated with knowledge of PEP?
H_{33}: Participants who have higher levels of knowledge about HIV/AIDS are expected to have higher levels of knowledge about PEP than participants who have lower levels of knowledge about HIV/AIDS	Is prior knowledge associated with knowledge of PEP?
H_{34}: Participants who have higher levels of general public health knowledge are expected to have higher levels of knowledge about PEP than participants who have lower levels of general public health knowledge	Is prior knowledge associated with knowledge of PEP?

Table 5: Research Hypotheses for Intention to Ask Healthcare Provider to Prescribe PEP

Hypotheses	Related Research Questions
H_{35}: Participants who have a more positive personal attitudes toward PEP are significantly more likely to intend to ask a healthcare provider to prescribe PEP than study participants who have more negative personal attitudes toward PEP	Are behavioral beliefs associated with intention to ask a healthcare provider to prescribe PEP?
H_{36}: Participants who have more positive partner subjective norms toward PEP are significantly more likely to intend to ask a healthcare provider to prescribe PEP than study participants who	Are normative beliefs associated with intention to ask a healthcare provider to prescribe PEP?

Hypotheses	Related Research Questions
have more negative partner subject norms toward PEP	
H_{37}: Participants who have more positive friend subjective norms toward PEP are significantly more likely to intend to ask a healthcare provider to prescribe PEP than study participants who have more negative friend subject norms toward PEP	Are normative beliefs associated with intention to ask a healthcare provider to prescribe PEP?
H_{38}: Participants who have lower levels of anticipated PEP stigma are significantly more likely to intend to ask a healthcare provider to prescribe PEP than participants who have higher levels of anticipated PEP stigma	Are normative beliefs associated with intention to ask a healthcare provider to prescribe PEP?
H_{39}: Participants who have medical insurance are significantly more likely to intend to ask a healthcare provider to prescribe PEP than participants without medical insurance	Are control beliefs associated with intention to ask a healthcare provider to prescribe PEP?
H_{40}: Participants who have a regular medical doctor are significantly more likely to intend to ask a healthcare provider to prescribe PEP than participants without a regular medical doctor	Are control beliefs associated with intention to ask a healthcare provider to prescribe PEP?
H_{41}: Participants who have discussed HIV with a healthcare provider are significantly more likely to intend to ask a healthcare provider to prescribe PEP than participants who have not discussed HIV with a healthcare provider	Are control beliefs associated with intention to ask a healthcare provider to prescribe PEP?
H_{42}: Participants who have higher levels of trust of healthcare providers are significantly more likely to intend to ask a healthcare provider to prescribe PEP than participants who have lower levels of trust of healthcare providers	Are control beliefs associated with intention to ask a healthcare provider to prescribe PEP?

Table 6: Research Hypotheses for Intention to Use PEP

Hypotheses	Related Research Questions
H_{43}: Participants who have a more positive personal attitudes toward PEP are significantly more likely to intend to use PEP than study participants who have more negative personal attitudes toward PEP	Are behavioral beliefs associated with intention to use PEP?
H_{44}: Participants who have more positive partner subjective norms toward PEP are significantly more likely to intend to use PEP than study participants who have more negative partner subject norms toward PEP	Are normative beliefs associated with intention to use PEP?
H_{45}: Participants who have more positive friend subjective norms toward PEP are significantly more likely to intend to use PEP than study participants who have more negative friend subject norms toward PEP	Are normative beliefs associated with intention to use PEP?
H_{46}: Participants who have lower levels of anticipated PEP stigma are significantly more likely to intend to use PEP than participants who have higher levels of anticipated PEP stigma	Are normative beliefs associated with intention to use PEP?
H_{47}: Participants who have medical insurance are significantly more likely to intend to use PEP than participants without medical insurance	Are control beliefs associated with intention to use PEP?
H_{48}: Participants who have a regular medical doctor are significantly more likely to intend to use PEP than participants without a regular medical doctor	Are control beliefs associated with intention to use PEP?
H_{49}: Participants who have discussed HIV with a healthcare provider are significantly more likely to intend to use PEP than participants who have not discussed HIV with a healthcare provider	Are control beliefs associated with intention to use PEP?
H_{50}: Participants who have higher levels of trust of healthcare providers are significantly more likely to intend to use PEP than participants who have lower levels of trust of healthcare providers	Are control beliefs associated with intention to use PEP?

Research Design

This study employed a cross-sectional design. Data were gathered through an online survey using Qualtrics (n.d.) (https://www.qualtrics.com). This method of data collection was chosen due to the sensitivity of the topic and the nature of the sample. According to previous research regarding the health of LGBTQ+ persons, "modes of data collection that foster participants' sense of confidentiality or anonymity may yield higher rates of disclosure" (Institute of Medicine, 2011, p. 93). This study was approved by the university's Institutional Review Board (IRB). The first page of the survey included the explanation of research that outlined details about the study, followed by the survey questions and a list of PEP-related resources. See Appendix A, Appendix B, and Appendix C for details. Due to the sensitive nature of the questions asked in the survey, participation was anonymous. Specifically, IP addresses, names, and other identifying information were not collected to ensure anonymity of the respondents.

Recruitment took place through two methods – email and social media. The portion of the study conducted through email relied on a modification of the method recommended by Dillman et al. (2014). They propose a procedure for emailing potential survey respondents, which includes initially sending an invitation email that is clear and to the point and then sending follow up emails. The authors suggest that the invitation email should include "what is being asked of respondents, why they were selected, what the survey is about, who is conducting it, and how sample members can contact someone to get any questions they have answered" (Dillman et al., 2014, p. 466). In addition, the invitation email should obviously include the URL link to the survey. The authors specify that the follow-up emails that are sent should not be duplicates of the invitation email, but should, instead, "emphasize the importance of the recipient's response" (Dillman et al., 2014, p. 466). This method was followed with one

exception. Since participation was anonymous, it was not possible to selectively send follow up emails to non-responders. Thus, the follow up emails were sent to everyone.

The other portion of the study focused on potential respondents who are not connected with on-campus LGBTQ+ services. This group was recruited through various social media sites (Facebook, Instagram, LinkedIn, Reddit, and Twitter) and tagging the university in postings. A recruitment graphic with study information, eligibility criteria, survey description and link, IRB information, researcher contact information, and a QR code (see Appendix D) was posted along with a blurb summarizing the study information on the researcher's personal social media accounts. Recruitment advertisements were posted a total of 20 times on the researcher's personal Facebook, Instagram, LinkedIn, and Twitter accounts between August 25, 2020, and January 12, 2021. Advertisements were also posted 17 times from the researcher's personal Reddit account on both the university and local city's Reddit pages between September 1, 2020, and January 12, 2021. Following the initial recruitment-related posts, reminders were posted on the social media sites to increase the response rate.

Population and Sample Selection

Students enrolled at a large university in a Southeastern state who identify as members of the LGBTQ+ community are the population of interest for the current study. This population was selected because studies have shown that members of the LGBTQ+ community are at high risk for contracting HIV (CDC, 2016; Gay, Lesbian, & Straight Education Network, 2015), and college students often have low HIV risk perception, despite engaging in high-risk behaviors (Haile et al., 2017). Thus, LGBTQ+ college students are an important population to study in regard to HIV prevention medications, such as PEP. The specific university was selected due to

its large and diverse student body. A convenience sampling method was employed. Specifically, the researcher worked with the university's on-campus LGBTQ+ hub, Pride Commons, and an on-campus student organization, the Pride Student Association, to distribute the online survey link to LGBTQ+ students. Coordinators of these groups distributed the survey invitation and online survey link to their membership lists via email. In order to reach LGBTQ+ students who are not connected with LGBTQ+ services, the researcher shared the link to the online survey on social media and tagged the university in postings. Additionally, the researcher posted on the university Reddit account, as well as the local city's Reddit account to further reach LGBTQ+ students.

This study employed a purposive sampling method, which is a type of nonprobability sampling in which each member of the population (in this case, LGBTQ+ college students at a large Southeastern university) does not have a known and equal probability of being selected for participation (Battaglia, 2008). According to Battaglia (2008),

> One limitation of purposive sampling is that another expert would likely come up with different sampled elements from the target population in terms of important characteristics and typical elements to be in the sample. Given the subjectivity of the selection mechanism, purposive sampling is generally considered most appropriate for the selection of small samples often from a limited geographic area or from a restricted population definition, when inference to the population is not the highest priority. (p. 2)

While it is important to be aware of this potential bias, due to the exploratory nature of this study, as well as the lack of a sampling frame for the population of college students who identify as LGBTQ+, it was not feasible to conduct a survey of LGBTQ+ college students using

a probability sampling method. Thus, the results of the current study should be considered within the context of this limitation.

A power analysis was conducted using the software G*Power (Faul et al., 2009) to determine the smallest sample size needed to perform statistical analyses (UCLA Institute for Digital Research & Education, n.d.). Based on the nature of the dependent variables in the current study, one power analysis was conducted for multiple linear regression, and another was conducted for logistic regression. For a test of the full model of PEP-related knowledge using multiple linear regression, with a standard alpha of 0.05 and power of 0.80, the minimum sample size needed is 101. For a test of the full model of PEP-related awareness, intention to obtain PEP, and intention to use PEP, the two-tailed logistic regression statistical power analysis yielded a minimum sample size of 177, assuming a standard alpha of 0.05 and power of 0.80. Thus, the goal was a sample size of 177. The sample size of the current study is 131. Due to the small sample size obtained, the analytic strategy was adjusted with an emphasis on more concise models.

Measurement

Survey Construction

The theoretical frameworks for this study served as the guide for the selection of variables and survey items. The main concepts within the Health Literacy Skills Framework and the Theory of Planned Behavior and their relation to the current study's variables are outlined in Table 7. Following a review of the literature, measures from past studies were selected for inclusion. Prior to distributing the survey, three LGBTQ+ college students and one Pride Commons graduate research assistant reviewed the survey to ensure comprehension of survey

questions. Feedback included suggestions to alter gender identity question responses, clarify the wording of some survey questions, and include alternative answer choices. After editing the survey questions based on reviewers' feedback, the researcher uploaded the survey into Qualtrics (n.d.). This final version of the survey included 90 items, 88 of which were closed-ended (including yes/no, true/false, and Likert-type items) and two of which were open-ended.

Table 7: Theoretical Frameworks and Study Variables

Theory Concept	Concept Definition	Study Variable(s)
Health Literacy Skills Framework		
Demographic characteristics	Personal factors including age, race, ethnicity, income, educational attainment, gender, sexual identity	Age, birthplace, ethnicity, gender identity, race, sex assigned at birth, sexual identity
Individual resources	Finances, assets, social support, culture, education, language, and literacy	Healthcare access, previous HIV testing, connection to the LGBT community, Pride Student Association member, connection to Pride Commons, use of Student Health Services
Capabilities	Vision, hearing, memory, and other cognitive functioning abilities	Sensory and cognitive abilities
Prior knowledge	Knowledge that a person holds regarding disease, health and healthcare, and related vocabulary	HIV/AIDS knowledge, public health literacy knowledge
Theory of Planned Behavior		
Behavioral beliefs	Attitudes that the person holds toward a certain behavior	Personal attitudes toward PEP
Normative beliefs	Attitudes held by others about the behavior	Partner subjective norms, friend subjective norms, anticipated PEP stigma
Control beliefs	Factors that may facilitate or inhibit a behavior	Healthcare access, mistrust of healthcare provider (includes items regarding personal behavior and that of the provider)

Operationalization of Study Variables

This section describes the dependent and independent variables included in the current study. The variable type, classification, and measure are outlined in Table 8.

Table 8: Measurement of Study Variables

Variable	Variable Type	Variable Classification	Measure	
			Question	Answers
Age	Independent	Nominal	What is your age?	1= 17 or younger 2= 18 or older
Birthplace	Independent	Nominal	Where were you born?	1=Northeast; 2=Midwest; 3=South; 4=West; 5=Outside the U.S.
Race	Independent	Nominal	Which racial group do you mostly identify with?	1=Alaskan Native; 2=Asian; 3=Black/African American; 4=Native American; 5=Pacific Islander; 6=White; 7=more than one race; 8=other
Ethnicity	Independent	Nominal	Are you Hispanic/Latino?	0=no; 1=yes
Sex assigned at birth	Independent	Nominal	What sex were you assigned at birth?	1=male; 2=female
Gender identity	Independent	Nominal	What is your current gender identity?	1=male; 2=female; 3=gender queer/gender non-conforming; 4=something else
Sexual identity	Independent	Nominal	What is your sexual identity?	1=lesbian; 2=gay/homosexual;

Variable	Variable Type	Variable Classification	Measure	
			Question	Answers
				3=bisexual; 4=queer; 5=pansexual; 6=demisexual; 7=asexual; 8=questioning; 9= something else
Use of Student Health Services	Independent	Nominal	Do you use Student Health Services?	0=no; 1=yes
Sensory and cognitive abilities	Independent	Nominal	Do you have any of the following: difficulties with seeing (even if wearing glasses), difficulties hearing (even if using a hearing aid), difficulties remembering/concentrating?	0=no; 1=yes
Pride Student Association member	Independent	Nominal	Are you a member of the Pride Student Association?	0=no; 1=yes
Connection to Pride Commons	Independent	Nominal	Are you connected with Pride Commons?	0=no; 1=yes
Connection to the LGBT community	Independent	Interval	Connection to the LGBT Community Scale (Frost & Meyer, 2012)	8 (lesser connection)-32 (greater connection)
Healthcare access: medical insurance	Independent	Nominal	Do you have medical insurance?	0=no; 1=yes

Variable	Variable Type	Variable Classification	Measure	
			Question	Answers
Healthcare access: regular provider	Independent	Nominal	Do you have a regular medical provider?	0=no; 1=yes
Healthcare access: HIV prevention	Independent	Nominal	Have you discussed HIV prevention with a medical provider?	0=no; 1=yes
Previous HIV testing	Independent	Nominal	Have you ever been tested for HIV?	0=no; 1=yes
Mistrust of healthcare provider	Independent	Interval	Mistrust of healthcare provider scale (Shangani, Naanyu, Operario, & Genberg, 2018)	Sum of seven items with responses: 1=strongly disagree; 2=disagree; 3=agree; 4=strongly agree
General health literacy	Independent	Interval	BRIEF Health Literacy Screening Tool (Haun, Luther, Dodd, & Donaldson, 2012)	Sum of four items with responses: 1=always; 2=often; 3-occasionally; 4=extremely (fourth item reverse coded)
Awareness of PEP	Dependent	Nominal	"Have you read or heard about the idea of HIV negative people taking anti-HIV medications…**after** a high-risk exposure, such as anal [or vaginal] sex without a condom, in order to keep from getting infected with HIV?" (Hugo et al., 2016)	0=no; 1=yes
Knowledge about PEP	Dependent	Ratio	6 knowledge-based multiple-choice questions, such as	0=0 correct responses; 1=1 correct response; 2=2 correct responses;

Variable	Variable Type	Variable Classification	Measure	
			Question	Answers
			"How long do you take PEP?" (Koblin et al., 2018)	3=3 correct responses; 4=4 correct responses; 5=5 correct responses; 6=6 correct responses
Personal attitudes toward PEP	Independent	Interval	Adaptation of the Attitudes toward PrEP Scale (Jaspal, Lopes, & Maatouk, 2019)	Sum of 14 items with responses: 1=strongly disagree; 2=disagree; 3=agree; 4=strongly agree (seven items reverse coded)
Intention to ask a healthcare provider to prescribe PEP	Dependent	Nominal	I plan to ask a healthcare provider to prescribe PEP for me if I am ever exposed to HIV.	0=no; 1=yes
Intention to use PEP	Dependent	Nominal	I plan to obtain and take PEP if I am ever exposed to HIV.	0=no; 1=yes
Partner subjective norms	Independent	Ordinal	If I tell my partner (or future partner) I have taken PEP, it might make my partner (or future partner) not want to have sex with me. If I use PEP, it will look like I don't trust my partner (or my future partner). (Rosario, Mahler, Hunter, and Gwadz, 1999)	1=strongly disagree; 2=disagree; 3=agree; 4=strongly agree
Friend subjective norms	Independent	Ordinal	Most of my friends would use PEP. (Rosario et al., 1999)	1=strongly disagree; 2=disagree; 3=agree; 4=strongly agree

Variable	Variable Type	Variable Classification	Measure	
			Question	Answers
Anticipated PEP stigma	Independent	Ordinal	"Others would think that I am having too much sex or sex with the wrong kind of people if they knew that I took PEP." (Koblin et al., 2018)	1=strongly disagree; 2=disagree; 3=agree; 4=strongly agree
Qualitative feedback about reasoning for survey responses	Independent	Open-ended question	Please describe the key factors influencing your awareness of, knowledge about, willingness to use, and willingness to get prescribed PEP.	Qualitative responses
HIV/AIDS knowledge	Independent	Ratio	HIV/AIDS Knowledge Scale (HIV-KS) (Espada, Huedo-Medina, Orgilés, Secades, Ballester, & Remor, 2009)	0=0 correct responses; 1=1 correct response; 2=2 correct responses; 3=3 correct responses; 4=4 correct responses; 5=5 correct responses; 6=6 correct responses; 7=7 correct responses; 8=8 correct responses; 9=9 correct responses; 10=10 correct responses
Public health literacy knowledge	Independent	Ratio	Public Health Literacy Knowledge Scale (Pleasant & Kuruvilla, 2008)	0=0 correct responses; 1=1 correct response; 2=2 correct responses; 3=3 correct responses; 4=4 correct responses; 5=5 correct responses; 6=6 correct responses; 7=7 correct responses; 8=8 correct responses; 9=9 correct responses; 10=10 correct responses; 11=11

Variable	Variable Type	Variable Classification	Measure	
			Question	Answers
				correct responses; 12=12 correct responses; 13=13 correct responses; 14=14 correct responses; 15=15 correct responses; 16=16 correct responses; 17=17 correct responses
Other pertinent feedback	Independent	Open-ended question	Is there anything else that you think is important for researchers studying this topic to know?	Qualitative responses

Dependent Variables

This study includes four dependent variables: (1) awareness of PEP for HIV prevention, (2) knowledge about PEP for HIV prevention, (3) intention to ask a healthcare provider to prescribe PEP, and (4) intention to use PEP for HIV prevention.

Awareness of PEP is assessed through the following survey question: "Have you read or heard about the idea of HIV negative people taking anti-HIV medications/ARV's [anti-retroviral medications] after a high-risk exposure, such as anal or vaginal sex without a condom, in order to keep from getting infected with HIV?" (Hugo et al., 2016, p. S352). Answers are binary, with no being coded as 0 and yes being coded as 1. Other researchers have asked survey respondents if they know about PEP in more simple terms, such as "Do you know what post-exposure prophylaxis (PEP) is?" (Makhado & Davhana-Maselesele, 2016, p. 4). Since the question presented by Hugo et al. (2016) is more specific, as it provides a definition of what PEP is, it

may prevent survey respondents from confusing PEP and PrEP. This is an important distinction, as the current study focuses on factors related to PEP and not PrEP.

Knowledge of PEP is assessed through participant scores on a six-item test measure, including: (1) "What is the longest time after an exposure to HIV that PEP can be started?" (Laboratory of Infectious Disease Prevention New York Blood Center, 2017, p.11). Potential responses include 24 hours, 72 hours, two weeks, and one month, with 72 hours being the correct response. (2) "How long do you take PEP" (Laboratory of Infectious Disease Prevention New York Blood Center, 2017, p.1). Potential answers include seven days, fourteen days, 28 days, and 60 days, with 28 days being the correct response. (3) "PEP will help prevent other STDs besides HIV." (Laboratory of Infectious Disease Prevention New York Blood Center, 2017, p.11). Potential responses are true and false, with false being the correct response. (4) "PEP is covered by Medicaid" (Laboratory of Infectious Disease Prevention New York Blood Center, 2017, p.11). Potential responses are true and false, with true being the correct response. (5) "Some private insurance plans cover PEP" (Laboratory of Infectious Disease Prevention New York Blood Center, 2017, p.11). Potential responses are true and false, with true being the correct response. (6) "Some drug companies provide medications for PEP through a patient assistance program" (Laboratory of Infectious Disease Prevention New York Blood Center, 2017, p.11). Potential responses are true and false, with true being the correct response. Each correct response equates to one point, with the lowest score possible being 0 (coded as 0) and the highest score possible being 6 (coded as 6).

Intention to ask a healthcare provider to prescribe PEP can be assessed through the following statement: I plan to ask a healthcare provider to prescribe PEP for me if I am ever exposed to HIV. Answers are posed on a Likert-type scale, with options as follows: very unlikely

(coded as 1), unlikely (coded as 2), likely (coded as 3), and very likely (coded as 4). These categories were recoded into a binary variable of unlikely, including both very unlikely and unlikely (coded as 0) and likely, including likely and very likely (coded as 1).

Intention to use PEP for HIV prevention can be assessed through the following statement: I plan to obtain and take PEP if I am ever exposed to HIV. Answers are posed on a Likert-type scale, with options as follows: very unlikely (coded as 1), unlikely (coded as 2), likely (coded as 3), and very likely (coded as 4). These categories will be recoded into a binary variable of unlikely, including both very unlikely and unlikely (coded as 1) and likely, including likely and very likely (coded as 2).

Independent Variables: Awareness and Knowledge of PEP

The independent variables for the models explaining awareness of PEP and knowledge about PEP include demographics, connection to the LGBT community, healthcare access, Pride Student Association membership, connection to Pride Commons, use of Student Health Services, Student Accessibility Services accommodations, and the HIV/AIDS Knowledge Scale (HIV-KS).

Demographics include age, which is a continuous variable that was measured by the question, “What is your age?” Responses included 17 or younger (coded as 1) and 18 or older. Birthplace is a categorical variable that was measured by the question, “Where were you born?” Responses were originally coded to standard U.S. Census definitions: Northeast (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont) (coded as 1), Midwest (Iowa, Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin) (coded as 2), South

(Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, Washington, D.C., West Virginia) (coded as 3), West (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Utah, Nevada, Oregon, Washington, Wyoming) (coded as 4), or born outside of the U.S. (coded as 5). However, the categories were collapsed due to small cell sizes. The final categories for birthplace included 0=South and 1=all other birthplaces. Ethnicity is a categorical variable that was measured by the question, "Are you Hispanic/Latino?" Answers were dichotomous, with no coded as 0 and yes coded as 1. Sex assigned at birth is a categorical variable that was measured by the question, "What sex were you assigned at birth?" Possible answers were male (coded as 1) or female (coded as 2) (GenIUSS Group, 2014). Gender identity is a categorical variable that is measured by the question, "What is your current gender identity?" (GenIUSS Group, 2014). Possible answers included male (coded as 1), female (coded as 2), gender queer/gender non-conforming (coded as 3), or something else (coded as 4). Due to small cell sizes for some responses, the variable was recoded as 1=male, 2=female, and 3=transgender, and 4=gender queer/agender. Note that those whose sex assigned at birth was female and gender identity was male, as well as those whose sex assigned at birth was male and gender identity was female, comprised the transgender category. Race is a categorical variable that was measured by the question, "Which racial group do you mostly identify with?" Possible answers included Alaskan Native (coded as 1), Asian (coded as 2), Black/African American (coded as 3), Native American (coded as 4), Pacific Islander (coded as 5), White (coded as 6), more than one race (coded as 7), and other (coded as 8). This variable was recoded to 0=White and 1=all other races. Lastly, sexual identity is a categorical variable that was measured by the question, "What is your sexual identity?" Possible answers included lesbian (coded as 1), gay/homosexual (coded as 2),

bisexual (coded as 3), queer (coded as 4), pansexual (coded as 5), demisexual (coded as 6), asexual (coded as 7), questioning (coded as 8), or something else (coded as 9). This variable was recoded to the following categories: 1=lesbian, 2=gay, 3=bisexual, and 4=all other sexual identities.

Connection to the LGBT community was assessed through a scale that was adapted from the eight-item "Connection to the LGBT Community" scale presented in Frost and Meyer (2012). Frost and Meyer (2012) conducted a confirmatory factor analysis (CFA) to ensure that this scale measured the construct it was intended to measure. The scale was also determined to be reliable, as the Cronbach's alpha for the total sample was 0.81 (Frost & Meyer, 2012). In addition, the scale also demonstrated good levels of convergent and discriminant validity (Frost & Meyer, 2012). The wording of the eight survey items included in the scale were modified for the university's location: "(1) you feel you're a part of [the Orlando] LGBT community, (2) participating in [Orlando's] LGBT community is a positive thing for you, (3) you feel a bond with the LGBT community, (4) you are proud of [Orlando's] LGBT community, (5) it is important for you to be politically active in [Orlando's] LGBT community, (6) if we work together, gay, bisexual, and lesbian people can solve problems in [Orlando's] LGBT community, (7) you really feel that any problems faced by [Orlando's] LGBT community are also your own problems, and (8) you feel a bond with other [LGBT individuals]" (Frost & Meyer, 2012, p. 19). The response set was presented as Likert-type options, with 1 being strongly disagree, 2 being disagree, 3 being agree, and 4 being strongly agree. Scores were aggregated and recoded onto a continuous scale, in which lower scores represent a lesser connection with the LGBT community and higher scores represent a greater connection. Within this study's sample, the Cronbach alpha for the Connection to the LGBT Community scale is 0.87.

Healthcare access was assessed through three survey questions: (1) Do you have medical insurance? (2) Do you have a regular medical provider? and (3) Have you discussed HIV prevention with a medical provider? Answers for all three questions are binary, with no being coded as 0 and yes being coded as 1. Previous HIV testing was assessed through the following question: Have you ever been tested for HIV? Answers are binary, with no being coded as 0 and yes being coded as 1.

HIV/AIDS knowledge was assessed through the 10-item HIV/AIDS Knowledge Scale (HIV-KS) presented in Espada et al. (2009). Espada et al. (2009) state that the "factors that are evaluated with the questionnaire are shown as good predictors of the level of knowledge [of HIV/AIDS]" (p. 160). The 10 items included in the scale are presented as true/false statements: "(1) Drinking from a glass that has been used by a person with HIV represents a risk, (2) It is dangerous to share food or water with people with HIV/AIDS, (3) Giving a wet kiss to a person with HIV is a risk for HIV transmission,…[4] The window period is the time it takes the body to produce antibodies after HIV transmission, [5] The window period lasts one week… (6) People who have been infected by HIV go through an asymptomatic period of 6 months, (7) HIV is transmitted through the air, (8) HIV is transmitted through vaginal and seminal secretions and blood, (9) It is advisable to stop visiting a person with HIV to prevent transmission of HIV, and (10) Washing your clothes with those of an HIV or AIDS sufferer implies a risk of contracting the disease" (Espada et al., 2009, p. 161). Correct responses were given one point each and incorrect items were given zero points. Scores were aggregated and presented on a continuous scale, in which lower scores represented lower levels of knowledge about HIV/AIDS and higher scores represented higher levels of knowledge. Within this study's sample, the Cronbach alpha for this scale is 0.57.

Sensory and cognitive abilities were assessed through the following question, which was adapted from the Washington Group on Disability (2010) census questions on disabilities: Do you have any of the following: difficulties with "seeing (even if wearing glasses)…hearing (even if using a hearing aid)…remembering/concentrating"? (p. 1). Answers are binary, with no being coded as 0 and yes being coded as 1. Use of Student Health Services was assessed through the question: Do you use Student Health Services? Answers are binary, with no being coded as 0 and yes being coded as 1. Pride Student Association membership is assessed through: Are you a member of the Pride Student Association? Answers are binary, with no being coded as 0 and yes being coded as 1. Connection to Pride Commons is assessed through: Are you connected with Pride Commons? Answers are binary, with no being coded as 0 and yes being coded as 1.

General health literacy was assessed through an adaptation of the BRIEF Health Literacy Screening Tool (Haun, Luther, Dodd, & Donaldson, 2012). Adaptions of the four questions on the tool are as follows: (1) "How often do you have someone help you read [health-related] materials?" (p. 146), (2) How often do you have problems learning about health-related information "because of difficulty understanding written information"? (p. 146), (3) "How often do you have a problem understanding [health-related information]?" (p. 146), and (4) How confident are you seeking out health-related information? These items were presented on Likert-type scales, with questions one through three having the following response options: 1 being always, 2 being often, 3 being occasionally, and 4 being never. Question four has the following response options: 1 being not at all, 2 being a bit, 3 being quite a bit, and 4 being extremely. Scores are aggregated, resulting in a range of two-20, with lower scores representing higher levels of health literacy and vice versa.

Public health literacy knowledge was assessed through the Public Health Literacy Knowledge Scale (Pleasant & Kuruvilla, 2008). The 17 items included in the scale are presented as true/false statements: "(1) For a healthy pregnancy and birth, all pregnant women should visit a health worker before the baby is born, (2) Births that are not assisted by a skilled birth attendant are as safe as births that are assisted by a skilled birth attendant, (3) It is normal if children below the age of 1 year weigh the same over a 2-month period, (4) Children who are vaccinated are protected from dangerous diseases, (5) Overall, vaccination has more risks than benefits, (6) Children learn a lot by playing, (7) Most injuries and accidents cannot be prevented, (8) If a child is breathing rapidly or has difficulty breathing, the child should be taken immediately to a health-care provider, (9) Many diseases can be prevented by washing hands before touching food, (10) Using condoms when having sex can prevent the spread of [HIV/]AIDS, (11) Using mosquito nets helps prevent malaria, (12) Exercise helps prevent heart disease, (13) Coughs and colds only get better with medicine, (14) It is the father's gene that decides whether the baby is a boy or a girl, (15) Antibiotics kill viruses as well as bacteria, (16) Cigarette smoking causes lung cancer, (17) All bacteria are harmful to humans" (Pleasant & Kuruvilla, 2008, p. 156). Correct responses are given one point each and incorrect items are given zero points. Scores were aggregated and presented on a continuous scale, in which lower scores represented lower levels of public health literacy knowledge and higher scores represented higher levels of public health literacy knowledge. This scale was originally tested in China, Mexico, Ghana, and India (Pleasant & Kuruvilla, 2008) and demonstrated good reliability, with a 0.80 Cronbach alpha. While this scale has not been widely examined within the United States, Hansen (2019) tested this scale with a sample of parents, teachers, and medical students regarding knowledge of autism spectrum disorder and found it to not be highly reliable, as the

Cronbach alpha was 0.47. Within this study's sample, the Cronbach alpha for this scale is 0.67, which demonstrates moderate reliability.

This survey also includes two open-ended questions: (1) Please describe the key factors influencing your awareness of, knowledge about, willingness to use, and willingness to get prescribed PEP and (2) Is there anything else that you think is important for researchers studying this topic to know? These questions will allow survey respondents to provide any other pertinent information that may not have been directly mentioned in the survey.

Independent Variables: Intention to Access and Use PEP

The models of intention to ask a healthcare provider to prescribe PEP and intention to use PEP included the following independent variables: personal attitudes toward PEP (behavioral beliefs), anticipated PEP stigma (normative beliefs), partner and friend beliefs (normative beliefs), health care access (discussing HIV prevention with a medical provider and having medical insurance) (control beliefs), and the mistrust of healthcare provider scale (control beliefs).

Personal attitudes toward PEP, which represent behavioral beliefs, are measured by an adaptation of the Attitudes toward PrEP scale presented in Jaspal et al. (2019). The 14 items in the scale were modified for college students and reads as follows: (1) "[College students] should take [PEP], (2) [PEP] is likely to work, (3) [PEP] will probably have serious side effects, (4) College students ought to be worried about [PEP], (5) [PEP] will be too expensive for general use, (6) The government should fund [PEP], (7) [PEP] is an exciting breakthrough in medical science, (8) [PEP] is more dangerous than good, (9) [PEP] will encourage college students to take sexual risks, (10) If college students take [PEP], they will probably stop using condoms

altogether, (11) If college students take [PEP], they will probably have sex with lots of different people, (12) College students will probably take [PEP] consistently, (13) The researchers who developed [PEP] are to be admired, [and] (14) I would like to learn more about this field of medical research" (Jaspal et al., 2019, p. 202). The response set relies on Likert-type options, with 1 being strongly disagree, 2 being disagree, 3 being agree, and 4 being strongly agree. Items 3, 4, 5, 8, 9, 10, and 11 were reverse coded and each of the 14 items were aggregated to produce a total score, ranging from 25 (more negative attitude toward PEP) to 61 (more positive attitude toward PEP) (Jaspal et al., 2019). Within this study's sample, the Cronbach alpha for this scale is 0.78.

Partner subjective norms, which represent normative beliefs, are assessed through the following two statements which were adapted from measures presented in Rosario et al. (1999): (1) "If I [tell my partner (or future partner) I have taken PEP], it might make my partner [or future partner] not want to have sex with me [and] (2) If I [use PEP], it will look like I don't trust my partner [or future partner]" (p. 280). Respondents were asked to respond on a 4-point Likert-type scale indicating strongly disagree (coded as 1), disagree (coded as 2), agree (coded as 3), or strongly agree (coded as 4). The two items were combined into one continuous variable, ranging from 2 (low partner subjectivity) to 8 (high partner subjectivity).

Friend subjective norms are assessed through the following statement: Most of my friends would use PEP. Respondents were asked to respond on a 4-point Likert-type scale indicating strongly disagree (coded as 1), disagree (coded as 2), agree (coded as 3), or strongly agree (coded as 4).

Anticipated PEP stigma is assessed through respondents' beliefs about the stigma that they anticipate from others if they were to take PEP (Koblin et al., 2018). Anticipated PEP-

related stigma from others if they were to take PEP was assessed through asking respondents the following statement, which was adapted from the measures described in Koblin et al. (2018): "Others would think that I am having too much sex or sex with the wrong kind of people if they knew that I took PEP." Respondents were asked to respond on a 4-point Likert-type scale indicating strongly disagree (recoded as 1), disagree (recoded as 2), agree (recoded as 3), or strongly agree (recoded as 4).

Healthcare access was assessed through three survey questions: (1) Do you have medical insurance? (2) Do you have a regular medical provider? and (3) Have you discussed HIV prevention with a medical provider? Answers for all three questions are binary, with no being coded as 0 and yes being coded as 1. Previous HIV testing was assessed through the following question: Have you ever been tested for HIV? Answers are binary, with no being coded as 0 and yes being coded as 1.

Mistrust of healthcare providers was assessed through an adaptation of a seven-item scale presented in Shangani, Naanyu, Operario, & Genberg (2018). This scale demonstrated excellent reliability, as the Cronbach's alpha was 0.90 in past research (Shangani, 2018). The seven items included in the scale are as follows: "(1) I feel comfortable discussing my sexual practices with [my] healthcare provider, (2) I feel safe discussing my sexual orientation with [my] healthcare provider, (3) I am comfortable asking [my] healthcare provider questions about my health, (4) The healthcare provider understands my problems well, (5) I feel like my confidence is protected during the meeting with [my] healthcare provider, (6) I feel like [my] healthcare provider does have adequate knowledge about [LGBT people], and (7) I feel like [my] healthcare provider answers my questions well" (Shangani et al., 2018, p. 481). The response set was presented using Likert-type options, with 1 being strongly agree, 2 being agree, 3 being disagree, and 4 being

strongly disagree. Scores were aggregated and recoded onto a continuous scale, in which lower scores represent a greater trust of their healthcare provider and higher scores represent a lower level of trust of their healthcare provider. Within this study's sample, the Cronbach alpha for this scale is 0.92.

Data Analysis

All quantitative analyses were conducted using Stata (n.d.) software. First, descriptive statistics were produced for the demographic characteristics of the sample. Due to the high percentage of non-response for the knowledge of PEP dependent variable, descriptive statistics were produced that outlined the correct, incorrect, and missing responses to the knowledge of PEP scale, but further analyses were not conducted to examine factors associated with this dependent variable. Second, bivariate analyses were conducted to assess relationships between the independent and dependent variables (Allen, 2017). Two types of bivariate tests were utilized in this study, based on the level of measurement of the variables. Specifically, t-tests were employed to examine the relationships between continuous independent variables and each of the three dependent variables. Additionally, chi-square tests were employed to determine the relationship between binary independent variables and the three dependent variables (Allen, 2017).

Third, logistic regression with simultaneous entry was used to examine the impact of the independent variables that were shown to be significant during bivariate analyses. Logistic regression is an appropriate statistical tool to use, as these three dependent variables are dichotomous in nature (Hosmer, Lemeshow, & Sturdivant, 2013). For each model, the coefficients, odds ratios, and p values were examined to assess for the direction, strength, and

significance of relationships. Hosmer-Lemeshow tests were also conducted to assess goodness-of-fit for the logistic regression models (Hosmer et al., 2013). Additionally, variance inflation factors (VIFs) were calculated to detect multicollinearity among variables in the regressions (The Pennsylvania State University, 2018a). Multicollinearity refers to the existence of "two or more predictors in a regression model [that] are moderately or highly correlated with one another" (The Pennsylvania State University, 2018b, para. 1). Models where multicollinearity was present were re-tested by rerunning the regression without one problematic variable at a time, then rerunning the regression with neither problematic variable.

CHAPTER FOUR: RESULTS

These results provide an examination of PEP awareness and knowledge, in addition to intentions regarding its use, within a sample of LGBTQ+ college students. One hundred and seventy-seven individuals responded to the online survey. One response was removed due to the participant identifying as a faculty member, two responses were removed due to the participants being under the age of 18, and 43 responses were removed due to non-response. Non-response included respondents who did not respond to any survey items or who only responded to demographic questions. These respondents were removed through listwise deletion. The final sample consisted of 131 LGBTQ+ college students.

Descriptive Analysis

The mean age of study participants was 21.67 years old. A majority of study participants were born in the South (n=88, 67.18%), with smaller numbers born in the Northeast (n=17, 12.88%), Midwest (n=11, 8.33%), West (n=4, 3.03%), and outside of the U.S. (n=12, 9.09%). Most respondents classified their race as White (n=97, 74.05%), with 1 (0.76%) identifying as Alaskan Native, 8 (6.11%) identifying as Asian, 12 (9.16%) identifying as Black/African America, and 13 (9.92%) identifying as more than one race or other. A small percentage of this sample identified as Hispanic/Latinx (n=29, 22.14%), with approximately 3/4 not identifying as Hispanic/Latinx (n=102, 59.23%). More participants identified as women (n=58, 44.27%) than any other gender identity. Additionally, more participants identified as bisexual (n=43, 33.08%) than any other sexual identity. Table 9 shows a detailed breakdown of the sample demographics.

Table 9: Descriptive Statistics for Sample Demographics (n=131)

Variable	M	SD
Age (n=124)	21.67	4.60
	N	%
Birthplace		
Northeast	17	12.88%
Midwest	11	8.33%
South	88	66.67%
West	4	3.03%
Outside the U.S.	12	9.09%
Race		
Alaskan Native	1	0.76%
Asian	8	6.11%
Black/African American	12	9.16%
Native American	0	0%
Pacific Islander	0	0%
White	97	74.05%
More than one race with other	13	9.92%
Ethnicity		
Not Hispanic/Latinx	102	77.86%
Hispanic/Latinx	29	22.14%
Sex assigned at birth		
Male	53	40.77%
Female	77	59.23%
Gender identity		
Cisgender male	39	29.77%
Cisgender female	48	36.64%
Transgender	26	19.85%
Gender queer/agender	18	13.74%
Sexual identity		
Lesbian	23	17.69%
Gay/homosexual	29	22.31%
Bisexual	43	32.08%
Queer	10	7.69%
Pansexual	11	8.46%
Demisexual	1	0.77%
Asexual	9	6.92%

Variable	N	%
Questioning	2	1.54%
Something else	2	1.54%

Due to small cell sizes, independent variable categories were collapsed for bivariate and multivariate analysis. Birthplace was collapsed into a binary variable, with 0=South and 1=all other birthplaces. Race was also collapsed into a binary variable, with 0=White and 1=all other races. Gender identity was collapsed into three categories: 1=male, 2=female, 4=transgender, and 4=gender queer/agender. Lastly, sexual identity was collapsed into four categories: 1=lesbian, 2=gay, 3=bisexual, and 4=all other sexual identities.

PEP Knowledge

Descriptive Analysis

Knowledge regarding PEP was one of the primary variables of interest and was originally intended to serve as one of the dependent variables. Four study research questions were related to the relationship between PEP knowledge and the following four Health Literacy Skills Framework components: demographic characteristics, individual resources, capabilities, and prior knowledge. Only participants who indicated that they were aware of PEP received questions regarding PEP-related knowledge through the use of display logic in Qualtrics. Specifically, 81 respondents stated they had heard of PEP and 29 respondents had not. These 81 respondents received six items that represented knowledge of PEP. Missing data for these six PEP knowledge items was extensive. Each item was skipped by at least half of the 81 respondents who received these items.

Of the participants who did respond, a majority answered items one (n=21, 26%), three (n=31, 38%), four (n=9, 11%), five (n=32, 40%), and six (n=25, 31%) correctly. In regard to item two, a minority of participants responded correctly (n=5, 6%), compared to 15 (19%) who answered incorrectly. Table 10 outlines the descriptive statistics related to PEP knowledge. Note that bold items indicate the correct answer. Due to the large percent of missing data on this variable, further analysis was not conducted. Thus, it was not possible to support or refute the hypotheses associated with the research questions for this dependent variable noted above.

Table 10: Descriptive Statistics for PEP Knowledge (n=39)

PEP Knowledge Scale Items	N	%	Valid %
1. What is the longest time after an exposure to HIV that PEP can be started?			
24 hours	12	14.8%	36.36%
72 hours	**21**	**25.9%**	**63.64%**
2 weeks	0	0%	0%
1 month	0	0%	0%
Non-response	48	59.3%	
2. How long do you take PEP?			
7 days	5	6.2%	26.3%
14 days	8	9.9%	42.1%
28 days	**5**	**6.2%**	**26.3%**
60 days	1	1.2%	5.3%
Non-response	62	76.5%	
3. PEP will help prevent other STDs besides HIV.			
True	8	9.9%	20.5%
False	**31**	**38.3%**	**79.5%**
Non-response	42	51.9%	
4. PEP is covered by Medicaid.			
True	**9**	**11.1%**	**60%**
False	6	7.4%	40%
Non-response	66	81.5%	

PEP Knowledge Scale Items	N	%	Valid %
5. Some private insurance plans cover PEP.			
True	**32**	**39.5%**	**97%**
False	1	1.2%	3%
Non-response	48	59.3%	
6. Some drug companies provide medications for PEP through a patient assistance program.			
True	**25**	**30.9%**	**96.2%**
False	1	1.2%	3.9%
Non-response	55	67.9%	

Awareness of PEP

Descriptive Analysis

The second dependent variable represents awareness of PEP. Survey respondents were asked, "Have you read or heard about the idea of HIV negative people taking anti-HIV medications…**after** a high-risk exposure, such as anal [or vaginal] sex without a condom, in order to keep from getting infected with HIV?" (Hugo et al., 2016). Of the final sample, 81 (73.6%) participants were aware of PEP, compared to 29 (26.36%) who were not aware of PEP. Four study research questions were related to the relationship between PEP awareness and the following four Health Literacy Skills Framework components: demographic characteristics, individual resources, capabilities, and prior knowledge.

Bivariate Analysis

To identify significant relationships between awareness of PEP and the independent variables comprising the Health Literacy Skills Framework, chi-square tests and t-tests were performed. Table 11 shows the results of the chi-square tests and Table 12 shows the results of

the t-tests that were conducted. A standard of .10 was used in deciding whether independent variables were added to the full logistic regression model. This lower standard was used because the models were under-powered due to the small sample size and significant relationships are more difficult to detect when models are under-powered.

Table 11: Awareness of PEP Bivariate Analysis: Chi-square tests (n=110)

	Aware of PEP	Not aware of PEP	Total	x^2	*p*
Birthplace					
South	54	22	76	0.85	0.36
All other birthplaces	27	7	34		
Race					
White	65	18	83	3.81	**
All other races	16	11	27		
Ethnicity					
Hispanic/Latinx	14	8	22	1.42	0.23
Non-Hispanic/Latinx	67	21	88		
Gender Identity					
Male	26	6	32	2.08	0.56
Female	27	13	40		
Transgender	17	5	22		
Genderqueer/Agender	11	5	16		
Sexual Identity	16	5	21	2.53	0.47
Lesbian	21	4	25		
Gay/Homosexual	25	10	35		
Bisexual	19	10	29		
All other sexual identities					
	69	25	94	0.02	0.89
Insurance	12	4	16		
Yes					
No					
Provider					
Yes	54	22	76	0.85	0.36
No	27	7	34		

	Aware of PEP	Not aware of PEP	Total	x^2	*p*
HIV Prevention					
Yes	17	2	19	2.97	**
No	64	27	91		
HIV Test					
Yes	31	5	36	4.29	*
No	50	24	74		
PSA Member					
Yes	13	5	18	0.02	0.88
No	68	24	92		
Pride Commons					
Yes	23	6	29	0.65	0.42
No	58	23	81		
Student Health					
Yes	31	8	39	1.07	**
No	50	21	71		
Disability					
Yes	38	15	53	0.20	0.66
No	43	14	57		

** =p < .05; * =p < .10

Table 12: Awareness of PEP Bivariate Analysis: T-tests (n=109)

	N	M	SD	*t*	*p*
Age					
Aware of PEP	77	21.96	5.09	-0.86	0.39
Not aware of PEP	28	21.07	3.41		
LGBT Community Scale					
Aware of PEP	81	24.03	5.02	-0.44	0.66
Not aware of PEP	28	23.57	3.67		
HIV Knowledge Scale					
Aware of PEP	64	7.21	1.35	-0.97	0.34
Not aware of PEP	22	6.86	1.83		

	N	M	SD	*t*	*p*
Public Health Scale					
Aware of PEP	60	15.37	1.31	-1.99	**
Not aware of PEP	23	14.44	2.95		
Health Literacy Scale					
Aware of PEP	81	7.10	1.99	1.73	*
Not aware of PEP	29	7.90	2.50		

** =p < .05; * =p < .10

Six factors were identified as having significant associations with PEP awareness at the bivariate level. Results from the chi-square tests reveal that four binary independent variables had a statistically significant association with awareness of PEP. In regard to demographic characteristics, there was a statistically significant association between PEP awareness and race (p=0.05), with a greater percentage of White respondents being aware of PEP. There was a significant association between PEP awareness and speaking about HIV prevention with a healthcare provider (p=0.09), with a greater percentage of participants who had such discussions being aware of PEP. There was also a significant association between PEP awareness and having been tested for HIV in the past (p=0.04), with a greater percentage of respondents who had previously been tested for HIV being aware of PEP. Furthermore, there was a significant association between PEP awareness and use of student health services (p=0.03), with a greater percentage of participants who use student health services being aware of PEP. Additionally, t-test results show that two continuous independent variables had statistically significant relationships with PEP awareness. Specifically, those who were aware of PEP had significantly higher levels of public health knowledge (p=0.05), which is positively coded, and health literacy (p=0.09), which is negatively coded. Each of the aforementioned independent variables that were

shown to be statistically significant at the bivariate level were included in the full model described below.

Multivariate Analysis

A logistic regression model was created and tested to identify factors related to awareness of PEP. This model was composed of six variables identified through the bivariate tests as having significant associations with PEP awareness (see Model 4 in Table 13). The Hosmer-Lemeshow goodness-of-fit test (Hosmer, Lemeshow, & Sturdivant, 2013) was not significant, which indicates that the model was a good fit (IBM, n.d.) The variance inflation factor (VIF) statistics indicated multicollinearity within the model. Upon further investigation, the race (VIF 17.68) and public health scale (VIF 20.11) variables were found to have high levels of multicollinearity. The regression model was then rerun without the race variable (Model 2), without the public health scale variable (Model 3), and also without either the race or public health scale variables (Model 1). None of the independent variables had significant coefficients when using the standard of .05 for the p-value. However, the coefficient for prior HIV testing was significant at the .10 level in the full model (model 4). Using this lower standard for the p-value, those who had prior HIV testing were three and a half times more likely to be aware of PEP than those who had never been tested. Race, previous HIV prevention discussions, use of student health, scores on the health literacy scale, and scores on the public health scale were not related to awareness of PEP in any of the models. Thus, there was partial support for three of the four related study research questions pertaining to the relationship between demographic, resources, and prior knowledge with PEP awareness. Additionally, there was no support for the fourth research question pertaining to the relationship between capabilities and PEP awareness.

Table 13 shows the results of the logistic regressions conducted for the awareness of PEP dependent variable.

Table 13: Multivariate Analysis: Factors Associated with Awareness of PEP

	Model 1		Model 2		Model 3		Model 4	
	b	Exp(b)	b	Exp(b)	B	Exp(b)	b	Exp(b)
HIV Prevention	0.84	2.31	-0.07	0.94	0.86	2.37	-0.04	0.95
HIV Test	0.72	2.06	0.68	2.84	0.79	2.21	1.27*	3.55
Student Health	0.43	1.54	0.66	1.95	0.50	1.65	0.81	2.24
Health Literacy Scale	-0.12	0.88	0.14	0.93	0.11	0.88	-0.09	0.92
Race	---	---	---	---	-0.15	0.86	-0.32	0.72
Public Health Scale	---	---	0.17	1.19	---	---	0.23	1.25
Model Summary								
Hosmer & Lemeshow x^2	9.09		6.02		4.52		9.01	
df	8		8		8		8	
p Value	0.34		0.65		0.81		0.34	

*p<.10, **p<.05, ***<.01

Intention to Ask a Healthcare Provider to Prescribe PEP

Descriptive Analysis

The next dependent variable represents intention to obtain a prescription for PEP from a healthcare provider. Survey respondents were asked to respond to the statement, “I plan to ask a healthcare provider to prescribe PEP for me if I am ever exposed to HIV.” Of the final sample,

77 (83.7%) participants intended to ask a healthcare provider to prescribe PEP, compared to 15 (16.3%) who did not intend to do so. Three study research questions were related to the relationship between intent to ask a healthcare provider to prescribe PEP and the following three Theory of Planned Behavior components: behavioral beliefs, normative beliefs, and control beliefs.

Bivariate Analysis

In order to identify significant associations between intention to request a prescription for PEP and variables representing the Theory of Planned Behavior, chi-square tests and t-tests were conducted. Tables 14 and 15 show the results of the chi-square tests and t-tests, respectively.

Table 14: Intention to ask for PEP Prescription Bivariate Analysis: Chi-square tests (n=92)

	Intending to ask for prescription	Not intending to ask for prescription	Total	x^2	*p*
Insurance					
Yes	65	12	77	0.18	0.67
No	12	3	15		
Provider					
Yes	57	10	67	0.34	0.56
No	20	5	25		
HIV Prevention					
Yes	14	0	14	3.22	**
No	63	15	78		

* =p < .10; ** =p < .05

Table 15: Intention to ask for PEP Prescription Bivariate Analysis: T-tests (n=92)

	N	M	SD	*t*	*p*
Personal PEP Scale					
Intending to ask for prescription	56	36.62	4.11	-0.56	0.58
Not intending to ask for prescription	8	35.75	4.10		
Partner Norm Scale					
Intending to ask for prescription	77	4.13	1.24	0.01	0.99
Not intending to ask for prescription	15	4.13	1.36		
Friend Norm					
Intending to ask for prescription	77	2.64	0.83	-1.59	0.11
Not intending to ask for prescription	15	2.67	0.80		
Anticipated PEP Stigma					
Intending to ask for prescription	77	2.27	0.84	1.93	*
Not intending to ask for prescription	15	2.73	0.88		
Health Provider Mistrust					0.16
Intending to ask for prescription	75	20.07	4.65	-1.43	
Not intending to ask for prescription	15	18.07	6.32		

* =p < .10, ** =p < .05

Results from the chi-square tests reveal a statistically significant association between intention to request a PEP prescription and having had previous discussions regarding HIV prevention with a healthcare provider (p=0.07). All respondents who had these discussions reported an intention to request PEP. Results from the t-tests reveal that those who intend to request PEP perceived significantly lower levels of PEP-related stigma (p=0.06). Due to the absence of any respondents who discussed HIV prevention with a provider but would not request a PEP prescription, the regression model only included the variable representing anticipated PEP stigma.

Multivariate Analysis

A logistic regression model was tested to examine the association between anticipated PEP stigma and intention to ask a healthcare provider for a PEP prescription. Results show that anticipated PEP stigma was not significantly related to intention to request a PEP prescription, if a standard of .05 is used for the p-value. If a lower standard of .10 is used for the p-value, the coefficient would then be considered significant. Those who perceived greater levels of PEP-related stigma are at 0.53 (53%) lower odds of intending to request a prescription compared to those who perceived lower levels of PEP-related stigma. The results of a Hosmer-Lemeshow goodness-of-fit test (Hosmer, Lemeshow, & Sturdivant, 2013) were non-significant, which indicates that the model is a good fit (IBM, n.d.). A variance inflation factor (VIF) was not calculated since the regression model only included one predictor variable. There was partial support for two of three related study research questions pertaining to the relationship between normative and control beliefs and intent to obtain a PEP prescription. Additionally, there was no support for the research question related to the relationship between behavioral beliefs and intent to obtain a prescription for PEP. Table 16 shows the results of the logistic regression model for intention to ask a provider for a PEP prescription.

Table 16: Multivariate Analysis: Factors Associated with Intention to Ask a Healthcare Provider to Prescribe PEP

	B	Exp(b)	Std. Err.	Z	P>|z|	95% C.I.
Anticipated PEP Stigma	-0.63	0.53	0.34	-1.87	*	-1.31-0.31
Model Summary						
Hosmer & Lemeshow x^2	0.00					
df	1					
p Value	0.96					

*p<.10, **p<.05, ***<.01

Intention to take PEP

Descriptive Analysis

The next dependent variable represents intention to take PEP. Survey participants were asked to respond to the statement, "I plan to obtain and take PEP if I am ever exposed to HIV." Of the final sample, 85 (91.4%) participants intended to take PEP if needed, compared to 8 (8.6%) who did not intend to take PEP. Three study research questions were related to the relationship between intent to use PEP and the following three Theory of Planned Behavior components: behavioral beliefs, normative beliefs, and control beliefs.

Bivariate Analysis

To identify variables for the model of intention to take PEP, chi-square tests and t-tests were conducted. Tables 17 and 18 show the results of the chi-square tests and t-tests that were conducted, respectively.

Table 17: Intention to take PEP Bivariate Analysis: Chi-square tests (n=93)

	Intending to take PEP	Not intending to take PEP	Total	x^2	*p*
Insurance					
Yes	69	8	77	1.82	0.18
No	16	0	16		
Provider					
Yes	60	7	67	1.04	0.31
No	25	1	26		
HIV Prevention					
Yes	14	1	15	0.09	0.77
No	71	7	78		

* =p < .10; ** =p < .05

Table 18: Intention to take PEP Bivariate Analysis: T-tests (n=91)

	N	M	SD	*t*	*p*
Personal PEP Scale					
Intending to take PEP	62	36.42	3.87	0.38	0.71
Not intending to take PEP	3	37.33	8.50		
Partner Norm Scale	85	4.04	1.26	1.82	*
Intending to take PEP	8	4.88	1.13		
Not intending to take PEP					
					**
Friend Norm	85	2.66	0.71	-3.12	
Intending to take PEP	8	1.75	0.80		
Not intending to take PEP					
					**
Anticipated PEP Stigma	85	2.27	0.84	2.34	
Intending to take PEP	8	3	0.93		
Not intending to take PEP					
					0.42
Health Provider Mistrust	84	19.56	4.93	0.81	
Intending to take PEP	7	21.14	5.73		
Not intending to take PEP					

* =p < .10; ** =p < .05

Results from the chi-square tests reveal no significant associations between intention to take PEP and insurance coverage (p=0.18), having a healthcare provider (p=0.31) or previously discussing HIV prevention with a healthcare provider (p=0.77). T-test results reveal significant differences with respect to three independent variables. Specifically, those who intended to take PEP perceived partners to have significantly less judgmental attitudes towards taking PEP (p=0.07). Respondents who intended to take PEP perceived that their friends would take PEP (p<.01). Finally, those who intended to take PEP anticipated significantly lower levels of PEP stigma (p=0.02). As previously stated, each of the aforementioned independent variables that

were shown to be statistically significant at the bivariate level were included in the full model described below.

Multivariate Analysis

A logistic regression model was tested to examine intent to take PEP. This model was composed of three variables (see Model 4 in Table 19). The Hosmer-Lemeshow goodness-of-fit test (Hosmer et al., 2013) was non-significant, which indicates that the model was a good fit (IBM, n.d.). The variance inflation factor (VIF) statistics indicated multicollinearity within the model. Upon further investigation, the variables representing partner norms (VIF 12.05) and PEP stigma (VIF 11.44) contributed to multicollinearity. The regression model was then rerun without the anticipated PEP stigma variable (Model 2), without the partner norm scale variable (Model 3), and without either the anticipated PEP stigma or partner norm scale variables (Model 1). Results show that the friend norm variable, which represents the degree to which respondents believed their friends would take PEP, was consistently related to intention to take PEP. Specifically, respondents who more strongly believed that their friends would take PEP are at 5.08 (408%) greater odds of intending to take PEP compared to those who did not. The level of anticipated PEP stigma was significantly related to intention to take PEP only when the standard for the p-value was lowered to the .10 level. The score representing partner norms was not significantly related to intention to take PEP in any of the models. Thus, there was support for one of the study research questions related to the relationship between normative beliefs and intent to use PEP. In addition, there was no support found for the other two research questions pertaining to the relationship between normative and control beliefs and intent to use PEP.

Table 19 shows the results of the logistic regression models for intention to take PEP.

Table 19: Multivariate Analysis: Factors Associated with Intention to Take PEP

	Model 1		Model 2		Model 3		Model 4	
	B	Exp(b)	B	Exp(b)	b	Exp(b)	b	Exp(b)
Friend Norm	1.50***	4.50	1.42**	4.14	1.57**	4.80	1.63**	5.08
Partner Norm Scale	---	---	-0.30	0.74	---	---	0.11	1.11
Anticipated PEP Stigma	---	---	---	---	-0.90*	0.41	-0.99*	0.37
Model Summary								
Hosmer & Lemeshow x^2	0.09		3.16		3.33		2.40	
df	1		7		6		8	
p Value	0.77		0.87		0.77		0.97	

*p<.10, **p<.05, ***<.01

CHAPTER FIVE: DISCUSSION

This study provides an examination of PEP-related awareness and knowledge, as well as intention to request and use this medication for HIV prevention among LGBTQ+ college students at a Southeastern university. Based on the Health Literacy Skills Framework, demographics, individual resources, capabilities, and prior knowledge were tested as predictors of PEP awareness and PEP knowledge among this population. Additionally, based on the Theory of Planned Behavior, behavioral beliefs, normative beliefs, and control beliefs were tested as predictors of intent to obtain a prescription for PEP and use PEP for HIV prevention. This chapter contains a review and interpretation of study findings in regard to the 50 study hypotheses, as well as a discussion regarding implications for theory, research, and practice.

Awareness of PEP

Based on the Health Literacy Skills Framework (Squiers et al., 2012), this study examined the impact of demographic characteristics, individual resources, capabilities, and prior knowledge on awareness of PEP. In regard to demographic characteristics, race was shown to have a significant relationship with awareness of PEP at the bivariate level, but not at the multivariate level. Specifically, a greater percentage of White respondents were aware of PEP, compared to respondents of color. This result aligns with prior research, as Christy et al. (2017) found individuals of color to be at greater risk for lower levels of health literacy than White individuals. Having lower health literacy can negatively impact the ability to make informed decisions regarding healthcare and overall health (Sørensen et al., 2012).

In regard to individual resources, HIV prevention discussions, prior HIV testing, and use of student health services were associated with PEP awareness at the bivariate level, but not at

the multivariate level. Greater percentages of respondents who had heard of PEP had conversations with a healthcare provider regarding HIV prevention, had been tested for HIV, and utilized student health services. These findings align with past literature which shows that medical resources can have a positive impact on being knowledgeable about HIV prevention methods such as PEP, as Koblin et al. (2018) found that healthcare providers were key sources of PEP information.

In regard to capabilities, a respondents' difficulties with hearing, seeing, or cognition/memory were not significantly related to awareness of PEP on either the bivariate or multivariate level. Additionally, in regard to prior knowledge, respondents who were aware of PEP had significantly higher levels of public health knowledge and health literacy at the bivariate level, but not at the multivariate level. While Sun et al. (2013) found that prior knowledge is associated with health literacy, which relates to the significance of scores on both the public health scale and health literacy scale, this relationship related specifically to awareness of PEP has not been tested nor documented in the literature.

None of the independent variables remained significant during multivariate analyses if using a p-value of .05. However, if a lower standard for the p-value is used, then prior HIV testing does have a significant relationship with PEP awareness. Overall, this research provides partial support for the components of the Health Literacy Skills Framework that represent demographics, individual resources, and prior knowledge. Table 20 shows the results of hypothesis testing related to awareness of PEP. Note that partial support indicates a variable that was significant at the bivariate level but did not remain significant at the multivariate level.

Table 20: Awareness of PEP Hypothesis Testing Results

Hypotheses	Support, partial support, no support, unable to assess
H_1: Participants who are younger are significantly more likely to be aware of PEP than participants who are older	No support
H_2: Participants who were born in the South are significantly less likely to be aware of PEP than participants born elsewhere	No support
H_3: Participants who are Hispanic/Latinx are significantly more likely to be aware of PEP than participants who are not Hispanic/Latinx	No support
H_4: Participants of color are significantly more likely to be aware of PEP than White participants	Partial support
H_5: Cisgender participants are significantly more likely to be aware of PEP than participants who are not cisgender	No support
H_6: Gay and bisexual male participants are significantly more likely to be aware of PEP than participants of other sexual identities	No support
H_7: Bisexual female participants are significantly more likely to be aware of PEP than female participants of other sexual identities	No support
H_8: Participants who have medical insurance are significantly more likely to be aware of PEP than participants without medical insurance	No support
H_9: Participants who have a regular medical doctor are significantly more likely to be aware of PEP than participants without a regular medical doctor	No support
H_{10}: Participants who have discussed HIV prevention with a healthcare provider are significantly more likely to be aware of PEP than participants who have not discussed HIV prevention with a healthcare provider	Partial support
H_{11}: Participants who have ever been tested for HIV are significantly more likely to be aware of PEP than participants who have not ever been tested for HIV	Partial support

Hypotheses	Support, partial support, no support, unable to assess
H_{12}: Participants who have a higher level of connection to the LGBT community are significantly more likely to be aware of PEP than participants with lower levels of connection to the LGBT community	No support
H_{13}: Participants who are members of the Pride Student Association and/or Pride Commons are significantly more likely to be aware of PEP than participants who are not members of the Pride Student Association and/or Pride Commons	No support
H_{14}: Participants who use Student Health Services are significantly more likely to be aware of PEP than participants who do not use Student Health Services	Partial support
H_{15}: Participants who do not have difficulties with sensory and/or cognitive abilities are significantly more likely to be aware of PEP than participants who have difficulties with sensory and/or cognitive abilities	No support
H_{16}: Participants who have higher levels of knowledge about HIV/AIDS are significantly more likely to be aware of PEP than participants who have lower levels of knowledge about HIV/AIDS	No support
H_{17}: Participants who have higher levels of general public health knowledge are significantly more likely to be aware of PEP than participants who have lower levels of general public health knowledge	Partial support

PEP Knowledge

Also based on the Health Literacy Skills Framework (Squiers et al., 2012), this study sought to examine the impact of demographic characteristics, individual resources, capabilities, and prior knowledge on knowledge of PEP. Only participants who indicated that they were aware of PEP were asked questions that represented PEP-related knowledge. Missing data for the PEP knowledge variable was extensive and further analysis regarding study hypotheses 18 through 34 could not be completed due to the small sample size. It is possible that while

respondents had heard of PEP prior to taking the study survey, respondents did not have detailed knowledge regarding PEP and, therefore, skipped the knowledge questions altogether. Further research regarding this high non-response rate is warranted to determine the reason for non-response. If respondents simply did not know enough about PEP to respond to the questions and thus skipped them, it is important that changes be made within the public health realm to increase knowledge about PEP in general and especially within the LGBTQ+ community due to HIV risk. Even if respondents have heard of PEP before, a lack of knowledge regarding how the medication works, when to obtain it, and how to obtain are all crucial aspects in making informed decisions regarding HIV prevention. Table 21 shows the hypotheses testing results related to knowledge of PEP.

Table 21: Knowledge of PEP Hypothesis Testing Results

Hypotheses	Support, partial support, no support, unable to assess
H_{18}: Participants who are younger are expected to have higher levels of knowledge about PEP than participants who are older	Unable to assess
H_{19}: Participants who were born in the South are expected to have higher levels of knowledge about PEP than participants born elsewhere	Unable to assess
H_{20}: Participants who are Hispanic/Latinx are expected to have higher levels of knowledge about PEP than participants who are not Hispanic/Latinx	Unable to assess
H_{21}: Participants of color are expected to have higher levels of knowledge about PEP than White participants	Unable to assess
H_{22}: Cisgender participants are expected to have higher levels of knowledge about PEP than participants who are not cisgender	Unable to assess
H_{24}: Bisexual female participants are expected to have higher levels of knowledge about PEP than female participants of other sexual identities	Unable to assess

Hypotheses	Support, partial support, no support, unable to assess
H_{25}: Participants who have medical insurance are expected to have higher levels of knowledge about PEP than participants without medical insurance	Unable to assess
H_{26}: Participants who have a regular medical doctor are expected to have higher levels of knowledge about PEP than participants without a regular medical doctor	Unable to assess
H_{27}: Participants who have discussed HIV prevention with a healthcare provider are expected to have higher levels of knowledge about PEP than participants who have not discussed HIV prevention with a healthcare provider	Unable to assess
H_{28}: Participants who have ever been tested for HIV are expected to have higher levels of knowledge about PEP than participants who have not ever been tested for HIV	Unable to assess
H_{29}: Participants who have a higher level of connection to the LGBT community are expected to have higher levels of knowledge about PEP than participants with lower levels of connection to the LGBT community	Unable to assess
H_{30}: Participants who are members of the Pride Student Association and/or Pride Commons are expected to have higher levels of knowledge about PEP than participants who are not members of the Pride Student Association and/or Pride Commons	Unable to assess
H_{31}: Participants who use Student Health Services are expected to have higher levels of knowledge about PEP than participants who do not use Student Health Services	Unable to assess
H_{32}: Participants who do not have difficulties with sensory and/or cognitive abilities are expected to have higher levels of knowledge about PEP than participants who have difficulties with sensory and/or cognitive abilities	Unable to assess
H_{33}: Participants who have higher levels of knowledge about HIV/AIDS are expected to have higher levels of knowledge about PEP than participants who have lower levels of knowledge about HIV/AIDS	Unable to assess

Hypotheses	Support, partial support, no support, unable to assess
H_{34}: Participants who have higher levels of general public health knowledge are expected to have higher levels of knowledge about PEP than participants who have lower levels of general public health knowledge	Unable to assess

Intention to Ask for PEP Prescription

Based on the Theory of Planned Behavior (Ajzen, 1985), this study examined the impact of behavioral beliefs, normative beliefs, and control beliefs on intention to ask a healthcare provider to prescribe PEP. In regard to normative beliefs, anticipated PEP stigma was found to be related to intention to ask for a PEP prescription at the bivariate level. This result aligns with prior research findings, which indicate that normative beliefs (Ajzen, 1985), or perceptions of others regarding a certain behavior, impact engagement in such behavior. Further, prior research has found that stigma related to taking HIV prevention medications can impact intention to take them (Biello et al., 2017; Chakrapani et al., 2015; Eaton et al., 2017), which also presumably includes intention to obtain a prescription for such medication.

In regard to control beliefs, previous discussions regarding HIV prevention with a healthcare provider was found to be related to intention to ask for a PEP prescription at the bivariate level. Further, all respondents who had these discussions reported an intention to request PEP. These results align with prior research findings, which indicate that control beliefs (Ajzen, 1985), or the presence of relevant resources, impact behavior. Prior research has indicated that access to resources impact a person's ability to access PrEP (Hubach et al., 2017), which can be likened to accessing PEP. Thus, aligning with the bivariate results that a respondent who has had conversations regarding HIV prevention with a healthcare provider in

the past can be assumed to have higher control beliefs regarding their intention to obtain a prescription for HIV prevention medications, including PEP.

Due to missing values in the chi-square results for the HIV prevention variable, only anticipated PEP stigma was included in the multivariate analysis. Results of the analysis reveal that anticipated PEP stigma did not remain significantly related to intention to ask for a PEP prescription if using a p-value of .05. However, if a lower standard for the p-value is used, then anticipated PEP stigma does have a relationship with intent to ask for a PEP prescription. There appear to be no studies to date that have examined the relationship between anticipated PEP stigma and intent to use PEP; prior studies have focused solely on stigma related to intent to use PrEP. Overall, these results provided some support for the relevance of normative beliefs and control beliefs in understanding the intention to request a prescription for PEP, but not support the relevance of behavioral beliefs. Table 22 shows the results of hypothesis testing related to intention to obtain a prescription for PEP. Note that partial support indicates a variable that was significant at the bivariate level but did not remain significant at the multivariate level.

Table 22: Intention to Ask a Healthcare Provider to Prescribe PEP Hypothesis Testing Results

Hypotheses	Support, partial support, no support, unable to assess
H_{35}: Participants who have a more positive personal attitudes toward PEP are significantly more likely to intend to ask a healthcare provider to prescribe PEP than study participants who have more negative personal attitudes toward PEP	No support
H_{36}: Participants who have more positive partner subjective norms toward PEP are significantly more likely to intend to ask a healthcare provider to prescribe PEP than study participants who have more negative partner subject norms toward PEP	No support

Hypotheses	Support, partial support, no support, unable to assess
H_{37}: Participants who have more positive friend subjective norms toward PEP are significantly more likely to intend to ask a healthcare provider to prescribe PEP than study participants who have more negative friend subject norms toward PEP	No support
H_{38}: Participants who have lower levels of anticipated PEP stigma are significantly more likely to intend to ask a healthcare provider to prescribe PEP than participants who have higher levels of anticipated PEP stigma	Partial support
H_{39}: Participants who have medical insurance are significantly more likely to intend to ask a healthcare provider to prescribe PEP than participants without medical insurance	No support
H_{40}: Participants who have a regular medical doctor are significantly more likely to intend to ask a healthcare provider to prescribe PEP than participants without a regular medical doctor	No support
H_{41}: Participants who have discussed HIV with a healthcare provider are significantly more likely to intend to ask a healthcare provider to prescribe PEP than participants who have not discussed HIV with a healthcare provider	Partial support
H_{42}: Participants who have higher levels of trust of healthcare providers are significantly more likely to intend to ask a healthcare provider to prescribe PEP than participants who have lower levels of trust of healthcare providers	No support

Intention to Take PEP

Based on the Theory of Planned Behavior (Ajzen, 1985), this study also examined the impacts of behavioral beliefs, normative beliefs, and control beliefs on intention to take PEP for HIV prevention. Results suggest that normative beliefs were relevant in understanding intention to take PEP. At the bivariate level, partner norms, friend norms, and anticipated PEP stigma were shown to be significantly associated with intention to take PEP. This aligns with prior research

done regarding PrEP, another biomedical HIV prevention option, which found that PrEP-related stigma can impede interest in taking PrEP (Biello et al., 2017; Chakrapani et al., 2015; Eaton et al., 2017). In other words, if a person perceives that other people (friends, romantic partners, etc.) will negatively assess their decision to use an HIV prevention medication, they are less likely to plan to use it. In the reverse, if a person believes that others would also use HIV medications and/or support their decision to use such medications, they are more likely to plan to use them. Friend norms, or the degree to which a respondent believed their friends would use PEP, was found to remain significant at the multivariate level, which aligns with prior research regarding normative beliefs (Ajzen, 1985). Thus, these results provide evidence to support hypothesis 45 which states, "Participants who have more positive friend subjective norms toward PEP are significantly more likely to intend to use PEP than study participants who have more negative friend subject norms toward PEP." Anticipated PEP stigma did not remain significant at the multivariate level if using a p-value of 0.05. However, if a lower standard for the p-value is used, then anticipated PEP stigma does have a relationship with intent to use PEP. Partner norms did not remain significant at the multivariate level, regardless of p-value standard. Insurance, medical provider, previous discussions regarding HIV, and level of health provider mistrust (control beliefs), as well as personal attitudes toward PEP (behavioral beliefs), were consistently non-significant. Previous studies have found control beliefs and behavioral beliefs to be related to intention to use PrEP, the other biomedical HIV prevention option, but none have specifically analyzed these relationships with PEP. Overall, this study provided support for the relevance of normative beliefs with regard to intention to use PEP but did not provide support for the relevance of behavioral beliefs or control beliefs. Table 23 shows the results of the hypothesis

testing related to intention to use PEP. Note that partial support indicates a variable that was significant at the bivariate level but did not remain significant at the multivariate level.

Table 23: Intention to Use PEP Hypothesis Testing Results

Hypotheses	Support, partial support, no support, unable to assess
H_{43}: Participants who have a more positive personal attitudes toward PEP are significantly more likely to intend to use PEP than study participants who have more negative personal attitudes toward PEP	No support
H_{44}: Participants who have more positive partner subjective norms toward PEP are significantly more likely to intend to use PEP than study participants who have more negative partner subject norms toward PEP	Partial support
H_{45}: Participants who have more positive friend subjective norms toward PEP are significantly more likely to intend to use PEP than study participants who have more negative friend subject norms toward PEP	Support
H_{46}: Participants who have lower levels of anticipated PEP stigma are significantly more likely to intend to use PEP than participants who have higher levels of anticipated PEP stigma	Partial support
H_{47}: Participants who have medical insurance are significantly more likely to intend to use PEP than participants without medical insurance	No support
H_{48}: Participants who have a regular medical doctor are significantly more likely to intend to use PEP than participants without a regular medical doctor	No support
H_{49}: Participants who have discussed HIV with a healthcare provider are significantly more likely to intend to use PEP than participants who have not discussed HIV with a healthcare provider	No support
H_{50}: Participants who have higher levels of trust of healthcare providers are significantly more likely to intend to use PEP than participants who have lower levels of trust of healthcare providers	No support

Limitations

This study had limitations that may have impacted the study results. First, this study employed a purposive sampling method, a type of nonprobability sampling (Battaglia, 2008). A potential limitation of this type of sampling method is that the study results may lack generalizability (Allen, 2017). Specifically, these results may not be applicable to the larger LGBTQ+ college student population. Another limitation of this study is the sample size (n=131), as it did not meet the minimum threshold of 177 that was identified through power analysis. According to Button and colleagues (2013), "a study with low statistical power has a reduced chance of detecting a true effect" (p. 365). Additionally, the current study utilized a higher p-value of .10 for detecting significance at the bivariate level due to the under-powered model, which could be avoided with a sufficiently powered model. Lastly, non-response was a major limitation in the current study. Due to non-response, analyses could not be conducted with one of the four dependent variables, knowledge of PEP. The reason for non-response on the questions regarding PEP knowledge is unknown, and future research is warranted to gain a better understanding.

Implications for Theory and Research

This study employed both the Health Literacy Skills Framework (Squiers et al., 2012) and the Theory of Planned Behavior (Ajzen, 1985). Specifically, the Health Literacy Skills Framework was used to examine factors related to LGBTQ+ college students' awareness of and knowledge about PEP, while the Theory of Planned Behavior was utilized to examine factors related to the sample's intention to obtain a prescription for PEP and take the medication. The Health Literacy Skills Framework describes various factors that lead to health literacy skills and,

in turn, impact health-related behavior and outcomes (Squiers et al., 2012). Results provide partial support for the components of the Health Literacy Skills Framework that represent demographics, individual resources, and prior knowledge in regard to PEP awareness. It is possible that the aforementioned study limitations impacted lack of full support for these theory components. Additionally, it is possible that the capabilities component of the Health Literacy Skills Framework remained non-significant in this study because the survey only included one general question regarding this component: "Do you have any of the following: difficulties with seeing (even if wearing glasses), difficulties hearing (even if using a hearing aid), difficulties remembering/concentrating?" Further investigation into capabilities may yield richer results regarding their impact on PEP awareness.

The Theory of Planned Behavior aims to explain human motivation and its relationship with human behavior through behavioral beliefs, normative beliefs, and control beliefs (Ajzen, 1991; Ajzen, 1985). Overall, this study provided support for the relevance of normative beliefs with regard to intention to use PEP but did not provide support for the relevance of behavioral beliefs or control beliefs. While behavioral beliefs, or one's own attitudes toward a behavior, and control beliefs, or access to relevant resources related to a behavior have been shown to impact intention to take medications in existing research studies, it is plausible that respondents did not have strong beliefs about PEP due to lack of knowledge about the medication's existence or function. Perhaps, results of a study that focused solely on opinions of respondents who had a great deal of knowledge about PEP would indicate a relationship between behavioral beliefs and intention to be prescribed and use PEP for HIV prevention. Also, while access to relevant resources (control beliefs), such as health insurance and having a medical provider, could aid in the logistics of a person intending to ask for a prescription for PEP and take the medication, these

variables may not be significant within the current study because the opinions of others appear to have a greater impact on behavior and respondents could access PEP without such resources in place. For example, respondents with neither medical insurance nor a regular healthcare provider could access PEP through utilization of community resources. In addition, it is possible that the study limitations impacted this lack of evidence for the relationship between behavioral beliefs/control beliefs and intention to take and ask a healthcare provider for a PEP prescription.

Future research should be conducted to further examine factors related to the adoption of PEP among the LGBTQ+ college student community. These studies should take into account the limitations of the current study in an effort to mitigate their impacts. It is important to note that obtaining a sufficient sample size to run analyses can be difficult to achieve due to the focus on such a specific minority population. Additionally, the length of the study survey may have also impacted respondents' completion of the survey items. Two strategies may mitigate this issue: providing incentives to study participants and/or reducing the number of items on future surveys to encourage survey completion.

While it may not be feasible to employ random sampling methods for practical reasons, it would be beneficial to obtain a larger sample size that may be more so representative of the LGBTQ+ college student sample in the current study. If possible, conducting a nationwide study may achieve this goal in part. Also, having a larger sample size would mitigate the impacts of a lack of power. Additionally, it is vital to investigate the non-response evident in the current study related to knowledge of PEP. This could be done through studies focusing solely on participants' knowledge of PEP to determine the reason for non-response. Both the results of the current study and those of future studies related to the adoption of PEP as an HIV prevention method also have important practical contributions, as discussed below.

Implications for Practice

Results regarding the relevance of friend norms, anticipated PEP stigma, HIV prevention discussions with healthcare providers, and race have practical implications for efforts to increase awareness of PEP and intention to request and use this prevention medication. It is important that accurate and relevant information about PEP be provided to the general public (especially members of the LGBTQ+ community) through various interventions.

First, due to the significant impact of friend norms on intentions to obtain and take PEP, public health messaging interventions could be employed that target friend groups on college and university campuses. Interventions could utilize peer educators in universities and community organizations to not only inform individuals about PEP and its purpose, but also to send the message that others hold positive views of taking PEP for HIV prevention. According to Hahn-Smith and Springer (2005), social norms theory, which posits that behavior is influenced by perceptions of how others think and act that may be incorrect (Berkowitz, 2004), can be utilized to inform interventions for behavior change. Specifically, Hahn-Smith and Springer (2005) delineate three types of interventions: universal, which are directed at all population members, selective, which target specific at-risk groups within the population, and indicated, which target individuals already affected by the issue. While the interventions discussed by Hahn-Smith and Springer (2005) are focused on substance abuse, it can be argued that these interventions can also be employed for PEP, as universal interventions can be targeted at all college students, selective interventions can be targeted at the LGBTQ+ college population and indicated interventions can be targeted at those LGBTQ+ individuals who have previously been exposed to HIV. Hahn-Smith and Springer (2005) suggest that universal interventions involve public service

announcements and posters, and that selective and indicated-level interventions involve more direct contact with individuals.

Second, it is vital to reduce PEP stigma through societal public health messaging related to sexuality and HIV prevention. One example of this type of campaign was rolled out in the United Kingdom during which PEP advertisements were posted in relevant news sources and posters were hung in venues (Carter, 2004). These advertisements and posters described PEP, its function, and offered a list of local organizations where men could obtain the medication (Carter, 2004). In addition, the campaign provided "training packages to help HIV prevention workers establish the availability of PEP in their area. The training package includes possible answers to arguments frequently encountered against the availability of PEP for sexual HIV exposure, including the effectiveness of PEP [and] the cost of PEP" (Carter, 2004, para. 9). This campaign could be employed as a model for others to be done within the United States. Different campaigns could be tailored to various at-risk populations in order to ensure the information is appropriate and relevant.

Third, HIV testers and other healthcare professionals should provide PEP information to all clients, including LGBTQ+ college students, as well as engage them in open dialogue regarding HIV prevention. It is vital that the presentation of such information and engagement in these types of conversations be done with the goal of empowering the patient to take care of their sexual health. This intervention not only provides patients with information regarding PEP in the event that they or someone they know needs it for HIV prevention, but also establishes the norm that others are accepting of taking PEP. According to the Human Rights Campaign's (HRC) (n.d.) comprehensive guide for HIV on college and university campuses, it is recognized that student health centers play a vital role in HIV prevention and care for students, as they are often

the on-campus providers of HIV testing services, as well as other treatment and care for HIV. Thus, the HRC (n.d.) recommends that universities hire healthcare providers who are "comfortable, passionate, and confident in their discussion and treatment of various sexual health issues" (p. 11). Additionally, they recommend that all campus healthcare providers are provided training to remain up to date on recommendations from the CDC and other recognized institutions regarding HIV prevention and treatment. Through these actions, university healthcare professionals and HIV testers can provide the highest level of sexual healthcare to all college students, especially those identifying as LGBTQ+, in order to help prevent HIV infection.

Fourth, there is a need to reach out to students of color regarding PEP for HIV prevention. The current study results show partial support for race having a relationship with awareness of PEP. Specifically, a greater percentage of White respondents were found to be aware of PEP, compared to respondents of color. This disparity can contribute to people of color, especially members of the LGBTQ+ community, being at higher risk of contracting HIV. In order to address this serious problem, campaigns focused on providing PEP information to LGBTQ+ persons of color need to be designed and implemented in culturally appropriate ways. The Human Rights Campaign (n.d.) suggests that colleges and universities partner with people of color organizations to ensure that LGBTQ+ students of color are receiving inclusive and culturally appropriate sexual health programming. Organizations such as NMAC (n.d.), formerly known as the National Minority AIDS Council, Latino Commission on AIDS (n.d.), and Black AIDS Institute (n.d.) can be collaborated with the achieve such goals. Additionally, What Works in Youth HIV (n.d.) offers suggestions for colleges and universities to promote sexual health among LGBTQ+ students of color: assess barriers for LGBTQ+ students of color to access HIV-

related services, creating a Safe Space on campus, and establish peer support groups for LGBTQ+ students of color.

These interventions aim to promote education and reduce stigma regarding PEP use for HIV prevention. If more people know about and understand PEP as an HIV prevention tool, others may actually utilize the medication as needed if they perceived that other people would do the same and that society, in general, is accepting of this behavior.

Conclusion

This study addressed a significant gap in the existing literature, as there appear to be no studies to date that have examined factors related to PEP for HIV prevention among LGBTQ+ college students. Findings indicate that friend norms regarding HIV prevention medications impact intention to use such medications. Findings also indicated partial support for predictors of intent to obtain and use PEP. Specifically, results provide partial support for relationships between awareness of PEP and previous HIV prevention discussions, prior HIV testing, use of student health services, and greater public health knowledge. Results indicate partial support for relationships between intent to ask a healthcare provider to prescribe PEP and anticipated PEP stigma and previous discussions regarding HIV prevention. Results also show partial support of a relationship between anticipated PEP stigma and intent to use PEP. In addition, non-response related to PEP knowledge in the current study points to a potential lack of knowledge about the medication and its function. While future studies are needed to further understand LGBTQ+ college students' adoption of PEP as an HIV prevention method, this exploratory study aimed to set the foundation for which to do so. In the meantime, health and human service systems can utilize the findings of this study to design and implement PEP information programming to

increase knowledge and reduce stigma about the medication, with the hopes of reducing HIV transmission and its related negative impacts among the larger LGBTQ+ population.

APPENDIX A: EXPLANATION OF RESEARCH

UNIVERSITY OF CENTRAL FLORIDA

EXPLANATION OF RESEARCH

Title of Project: An Examination of Factors Associated with LGBTQ+ College Students' Adoption of HIV Prevention Methods

Principal Investigator: Shayna Forgetta

Faculty Supervisor: Dr. Julie Steen

You are being invited to take part in a research study. Whether you take part is up to you.

Recent years have seen the proliferation of new HIV prevention methods. However, little is known about the thoughts and opinions regarding these new methods and/or whether they would consider using them. As a member of the LGBTQ+ community, your voice and opinion on this subject is crucial.

You will be asked to complete an online survey, which will involve questions such as demographics (i.e., age, race, ethnicity, sexual identity, etc.), connection to various on-campus services and organizations, experience with medical providers, knowledge about general health and HIV/AIDS, and views of the HIV prevention methods. It is expected that the survey will take approximately 10 to 20 minutes to complete.

Your participation in this study is voluntary. You are free to withdraw your consent and discontinue participation in this study at any time without prejudice or penalty. Your decision to participate or not participate in this study will in no way affect your relationship with UCF, including continued enrollment, grades, employment or your relationship with the individuals who may have an interest in this study.

This survey is anonymous. The research results will be publicly released, but your name will not be attached to these results. UCF retains data for five years in a locked room and/or a password protected. The only people who will have access to it are the researchers.

To be eligible to participate in this study, you must identify as a member of the LGBTQ+ community, be a current student at UCF, be age 18 or older, and be able to read and write in English.

Study contact for questions about the study or to report a problem: If you have questions, concerns, or complaints: Shayna Forgetta, Graduate Student, Public Affairs Ph.D. Program, College of Community Innovation and Education, (941) 416-0225 or Dr. Julie Steen, Faculty Supervisor, School of Social Work at (407) 823-6452 or by email at julie.steen@ucf.edu.

IRB contact about your rights in this study or to report a complaint: If you have questions about your rights as a research participant, or have concerns about the conduct of this study, please contact Institutional Review Board (IRB), University of Central Florida, Office of Research, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901, or email irb@ucf.edu.

To participate in the survey, please click on the arrow at the bottom of this page.

APPENDIX B: SURVEY INSTRUMENT

1. What is your age?
   A. 17 or younger
   B. 18 or older (please specify): _____

   If A (17 or younger) is selected, skip to the end of the survey

2. Where were you born?
   A. Northeast (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont)
   B. Midwest (Iowa, Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin)
   C. South (Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, Washington, D.C., West Virginia)
   D. West (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Utah, Nevada, Oregon, Washington, Wyoming)
   E. Outside of the U.S.

3. Which racial group do you mostly identify with?
   A. Alaskan Native
   B. Asian
   C. Black/African American
   D. Native American
   E. Pacific Islander
   F. White
   G. More than one race
   H. Other (please specify):___

4. Are you Hispanic/Latino?
   A. Yes
   B. No

5. What sex were you assigned at birth?
   A. Male
   B. Female

6. What is your current gender identity?
   A. Male
   B. Female
   C. Gender queer/gender non-conforming
   D. Something else (please specify):_____

7. What is your sexual identity?

A. Lesbian
B. Gay/Homosexual
C. Bisexual
D. Queer
E. Pansexual
F. Demisexual
G. Asexual
H. Questioning
I. Something else (please specify): _____

8. Do you use Student Health Services?
   A. Yes
   B. No

9. Do you have any of the following: difficulties with seeing (even if wearing glasses), difficulties hearing (even if using a hearing aid), and/or difficulties remembering/concentrating?
   A. Yes
   B. No

10. Are you a member of the Pride Student Association?
    A. Yes
    B. No

11. Are you connected with Pride Commons?
    A. Yes
    B. No

12. Please indicate whether you strongly agree, agree, disagree, or strongly disagree with the following statements.

    A. You feel you're a part of the [city name] LGBT community.
       - Strongly agree
       - Agree
       - Disagree
       - Strongly disagree

    B. Participating in [city name's] LGBT community is a positive thing for you.
       - Strongly agree
       - Agree
       - Disagree
       - Strongly disagree

    C. You feel a bond with the LGBT community.
       - Strongly agree

- Agree
- Disagree
- Strongly disagree

D. You are proud of [city name]'s LGBT community.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

E. It is important for you to be politically active in [city name]'s LGBT community.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

F. If we work together, gay, bisexual, and lesbian people can solve problems in [city name]'s LGBT community.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

G. You really feel that any problems faced by [city name]'s LGBT community are also your own problems.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

H. You feel a bond with other LGBT individuals.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

13. Do you have medical insurance?
    A. Yes
    B. No

14. Do you have a regular medical provider?
    A. Yes
    B. No

15. Have you discussed HIV prevention with a medical provider?
    A. Yes
    B. No

16. Have you ever been tested for HIV?
    A. Yes
    B. No

17. Please indicate whether you strongly agree, agree, disagree, or strongly disagree with the following statements.

    A. I feel comfortable discussing my sexual practices with my healthcare provider.
        - Strongly agree
        - Agree
        - Disagree
        - Strongly disagree

    B. I feel safe discussing my sexual orientation with my healthcare provider.
        - Strongly agree
        - Agree
        - Disagree
        - Strongly disagree

    C. I am comfortable asking my healthcare provider questions about my health.
        - Strongly agree
        - Agree
        - Disagree
        - Strongly disagree

    D. My healthcare provider understands my problems well.
        - Strongly agree
        - Agree
        - Disagree
        - Strongly disagree

    E. I feel like my confidence is protected during the meeting with my healthcare provider.
        - Strongly agree
        - Agree
        - Disagree
        - Strongly disagree

    F. I feel like my healthcare provider does have adequate knowledge about LGBT people.

- Strongly agree
- Agree
- Disagree
- Strongly disagree

G. I feel like my healthcare provider answers my questions well.
- Strongly agree
- Agree
- Disagree
- Strongly disagree

18. How often do you have someone help you read health-related materials?
    1. Always
    2. Often
    3. Occasionally
    4. Never

19. How often do you have problems learning about health-related information because of difficulty understanding written information?
    1. Always
    2. Often
    3. Occasionally
    4. Never

20. How often do you have a problem understanding health-related information?
    1. Always
    2. Often
    3. Occasionally
    4. Never

21. How confident are you seeking out health-related information?
    1. Not at all
    2. A bit
    3. Quite a bit
    4. Extremely

Directions: The next set of questions will ask you about something called post-exposure prophylaxis (PEP), which is medication that is taken after exposure to HIV in emergency situations to prevent infection. Please note that this is different than pre-exposure prophylaxis (PrEP), which is medication taken over time prior to exposure to HIV to prevent infection.

22. Have you read or heard about the idea of HIV negative people taking anti-HIV medications **after** a high-risk exposure, such as anal or vaginal sex without a condom, in order to keep from getting infected with HIV (called post-exposure prophylaxis [PEP])?

A. Yes
B. No

IF NO, skip to question #30

23. What is the longest time after an exposure to HIV that post-exposure prophylaxis (PEP) can be started?
    A. 24 hours
    B. 72 hours
    C. Two weeks
    D. One month

24. How long do you take PEP?
    A. 7 days
    B. 14 days
    C. 28 days
    D. 60 days

25. PEP will help prevent other STDs besides HIV.
    A. True
    B. False

26. PEP is covered by Medicaid.
    A. True
    B. False

27. Some private insurance plans cover PEP.
    A. True
    B. False

28. Some drug companies provide medications for PEP through a patient assistance program.
    A. True
    B. False

29. Please indicate whether you strongly agree, agree, disagree, or strongly disagree with the following statements.

    A. College students should take PEP
        1. Strongly disagree
        2. Disagree
        3. Agree
        4. Strongly agree

    B. PEP is likely to work
        1. Strongly disagree

2. Disagree
3. Agree
4. Strongly agree

C. PEP will probably have serious side effects
    1. Strongly disagree
    2. Disagree
    3. Agree
    4. Strongly agree

D. College students ought to be worried about PEP
    1. Strongly disagree
    2. Disagree
    3. Agree
    4. Strongly agree

E. PEP will be too expensive for general use
    1. Strongly disagree
    2. Disagree
    3. Agree
    4. Strongly agree

F. The government should fund PEP
    1. Strongly disagree
    2. Disagree
    3. Agree
    4. Strongly agree

G. PEP is an exciting breakthrough in medical science
    1. Strongly disagree
    2. Disagree
    3. Agree
    4. Strongly agree

H. PEP is more dangerous than good
    1. Strongly disagree
    2. Disagree
    3. Agree
    4. Strongly agree

I. PEP will encourage college students to take sexual risks
    1. Strongly disagree
    2. Disagree
    3. Agree
    4. Strongly agree

J. If college students take PEP, they will probably stop using condoms altogether
    1. Strongly disagree
    2. Disagree
    3. Agree
    4. Strongly agree

K. If college students take PEP, they will probably have sex with lots of different people
    1. Strongly disagree
    2. Disagree
    3. Agree
    4. Strongly agree

L. College students will probably take PEP consistently
    1. Strongly disagree
    2. Disagree
    3. Agree
    4. Strongly agree

M. The researchers who developed PEP are to be admired
    1. Strongly disagree
    2. Disagree
    3. Agree
    4. Strongly agree

N. I would like to learn more about this field of medical research
    1. Strongly disagree
    2. Disagree
    3. Agree
    4. Strongly agree

30. I plan to ask a healthcare provider to prescribe PEP for me if I am ever exposed to HIV.
    A. Yes
    B. No

31. I plan to obtain and take PEP if I am ever exposed to HIV.
    A. Yes
    B. No

32. Please indicate whether you strongly agree, agree, disagree, or strongly disagree with the following statements.

    A. If I tell my partner (or future partner) I have taken PEP, it might make my partner (or future partner) not want to have sex with me.

- Strongly agree
- Agree
- Disagree
- Strongly disagree

B. If I use PEP, it will look like I don't trust my partner.
    1. Strongly agree
    2. Agree
    3. Disagree
    4. Strongly disagree

C. Most of my friends would use PEP.
    1. Strongly agree
    2. Agree
    3. Disagree
    4. Strongly disagree

D. Others would think that I am having too much sex or sex with the wrong kind of people if they knew that I took PEP.
    1. Strongly agree
    2. Agree
    3. Disagree
    4. Strongly disagree

33. Please describe the key factors influencing your awareness of, knowledge about, willingness to use, and willingness to get prescribed PEP.

34. Please indicate whether the following items are true or false.

A. Drinking from a glass that has been used by a person with HIV represents a risk.
    - True
    - False

B. It is dangerous to share food or water with people with HIV/AIDS.
    - True
    - False

C. Giving a wet kiss to a person with HIV is a risk for HIV transmission.
    - True
    - False

D. The window period is the time it takes the body to produce antibodies after HIV transmission.

- True
- False

E. The window period lasts one week.
   - True
   - False

F. People who have been infected by HIV go through an asymptomatic period of 6 months.
   - True
   - False

G. HIV is transmitted through the air.
   - True
   - False

H. HIV is transmitted through vaginal and seminal secretions and blood.
   - True
   - False

I. It is advisable to stop visiting a person with HIV to prevent transmission of HIV.
   - True
   - False

J. Washing your clothes with those of an HIV or AIDS sufferer implies a risk of contracting the disease.
   - True
   - False

35. Please indicate whether the following items are true or false.

A. For a healthy pregnancy and birth, all pregnant women should visit a health worker before the baby is born.
   - True
   - False

B. Births that are not assisted by a skilled birth attendant are as safe as births that are assisted by a skilled birth attendant.
   - True
   - False

C. It is normal if children below the age of 1 year weigh the same over a 2-month period.
   - True
   - False

D. Children who are vaccinated are protected from dangerous diseases.
   - True
   - False

E. Overall, vaccination has more risks than benefits.
   - True
   - False

F. Children learn a lot by playing.
   - True
   - False

G. Most injuries and accidents cannot be prevented.
   - True
   - False

H. If a child is breathing rapidly or has difficulty breathing, the child should be taken immediately to a health-care provider.
   - True
   - False

I. Many diseases can be prevented by washing hands before touching food.
   - True
   - False

J. Using condoms when having sex can prevent the spread of HIV/AIDS.
   - True
   - False

K. Using mosquito nets helps prevent malaria.
   - True
   - False

L. Exercise helps prevent heart disease.
   - True
   - False

M. Coughs and colds only get better with medicine.
   - True
   - False

N. It is the father's gene that decides whether the baby is a boy or a girl.
   - True

- False

O. Antibiotics kill viruses as well as bacteria.
   - True
   - False

P. Cigarette smoking causes lung cancer.
   - True
   - False

Q. All bacteria are harmful to humans.
   - True
   - False

36. Is there anything else that you think is important for researchers studying this topic to know?

APPENDIX C: RESOURCE LIST PROVIDED AFTER SURVEY COMPLETION

UCF Wellness and Health Promotion Services (WHPS)
Phone: (407) 823-5841
Website: https://whps.sdes.ucf.edu

UCF Student Health Services
Phone: (407) 823-2701
Website: https://studenthealth.ucf.edu

The LGBT+ Center Orlando
Phone: (407) 228-8272
Website: http://www.thecenterorlando.org

PEP Information: https://www.cdc.gov/hiv/basics/pep.html

APPENDIX D: RECRUITMENT GRAPHIC

RESEARCHER LOOKING FOR UCF STUDENTS WHO ARE MEMBERS OF THE LGBTQ+ COMMUNITY

BACKGROUND: Recent years have seen the proliferation of new HIV prevention methods. However, little is known about the thoughts regarding these new methods and/or whether they would consider using them. As a member of the LGBTQ+ community, your voice and opinion on this subject is crucial.

ELIGIBILITY: You must identify as a member of the LGBTQ+ community, be a current student at UCF, be age 18 or older, and be able to read and write in English.

SURVEY: This study involves taking an online survey, which will take approximately 15-20 minutes. If you would like to participate in this study, please click on the following link: http://ucf.qualtrics.com/jfe/form/SV_e3RrOQKoagGFGqF

This study has been approved by the UCF Institutional Review Board (IRB), which can be contacted with any research-related concerns at (407) 823-2901 or irb@mail.ucf.edu.

CONTACT INFORMATION:
SHAYNA FORGETTA, MSW
PHONE: (941)-416-0225
EMAIL: SFORGETTA@KNIGHTS.UCF.EDU

SCAN ME

APPENDIX E: INSTITUTIONAL REVIEW BOARD APPROVAL

UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board
FWA00000351
IRB00001138, IRB00012110
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

EXEMPTION DETERMINATION

July 20, 2020

Dear Shayna Forgetta:

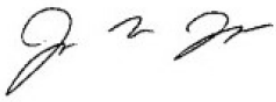
On 7/20/2020, the IRB determined the following submission to be human subjects research that is exempt from regulation:

Type of Review:	Initial Study, Category 2
Title:	An Examination of Factors Associated with LGBTQ+ College Students' Adoption of HIV Prevention Methods
Investigator:	Shayna Forgetta
IRB ID:	STUDY00001989
Funding:	None
Grant ID:	None
Documents Reviewed:	• Faculty Advisor Review Form, Category: Faculty Research Approval; • Consent Form.pdf, Category: Consent Form; • Protocol.docx, Category: IRB Protocol; • Recruitment-Email.docx, Category: Recruitment Materials; • Recruitment-Social Media Flyer.pdf, Category: Recruitment Materials; • Recruitment-Social Media Invitations.docx, Category: Recruitment Materials; • Survey Instrument.docx, Category: Survey / Questionnaire;

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made, and there are questions about whether these changes affect the exempt status of the human research, please submit a modification request to the IRB. Guidance on submitting Modifications and Administrative Check-in are detailed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system. When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,



Racine Jacques, Ph.D.
Designated Reviewer

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