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Factors Associated with PrEP and PEP Uptake Among the LatinX Population

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FACTORS ASSOCIATED WITH PrEP AND PEP UPTAKE AMONG THE LATINX
POPULATION

By

Santiago Gudiño-Rosales

Honors Thesis submitted in partial fulfillment

for the designation of Research and Creative Honors

Public Health

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Abstract

Background: Uptake of PrEP and PEP amongst LatinX population has been low, despite being a population disproportionately affected by the HIV illness. Systemic barriers as well as cultural factors affect general LatinX approaches to healthcare and may also play a large role in uptake of PrEP and PEP. The purpose of this study is to assess the factors that are associated with the likelihood to take PrEP and PEP in the LatinX population. **Methods:** In this cross-sectional study, survey data was collected from 169 LatinX individuals from January 2020 to March 2020. Using the Sexual Health Model as the theoretical framework, the survey measured the following four constructs of the model to identify factors associated with PrEP and PEP uptake: talking about sex, culture and sexual identity, sexual health care and safer sex, and spirituality. Descriptive statistics, chi-square tests, correlations, and logistic regressions were calculated. **Results:** The variable likelihood to take PrEP ($p < 0.001$) significantly predicted the likelihood of taking PrEP if it were free, as did likelihood to take PEP ($p < 0.001$) to the likelihood of taking PEP if it were free. While sexual comfort was not a predictor of the likelihood of taking PrEP or PEP, it had a significant positive correlation with the likelihood of uptake for both. Other factors, such as HIV knowledge, HIV/STI-related behaviors, *Machismo* beliefs, and folk illness beliefs were not statistically significant. **Conclusion:** The findings contribute to the limited literature regarding the barriers of PrEP and PEP uptake among the LatinX population in the United States. In this study, knowledge and uptake of both medications was low. In addition, participants were concerned about potential drug costs and side-effects of the medications. The results suggest that the LatinX community must become better informed of these prevention strategies and mitigate possible worries regarding drug expenses and side-effects.

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Introduction

Over the years, the Human Immunodeficiency Virus (HIV) epidemic has drastically decreased in the United States (U.S.) as HIV has become more treatable due to the growing understanding of the disease and the developments researchers have made in treatment recommendations and prevention strategies. HIV is now recognized as a retrovirus that once in a human host aggressively attacks the individual's immune system such that the virus eventually takes over and makes the host increasingly more vulnerable to other infections over time (Centers for Disease Control and Prevention [CDC], 2019a). However, if the virus is caught early enough through proper screening techniques and with a proper treatment regimen, the illness can be efficiently managed (CDC, 2019a). Only after the virus has gone untreated in the body can the more chronic version of HIV, Acquired Immunodeficiency Syndrome (AIDS), develop and eventually too compromise the host individual as well.

Despite the progress made in understanding and treating the HIV illness since its original outbreak in 1981, the government estimates that the total number of people living with HIV had reached 1.1 million by 2011 (National Prevention Information Network, 2017). Treating those already affected with the disease was not enough to rid the nation of the HIV epidemic, resulting in a desperate need for more successful prevention strategies. As a result of this need, the medication Post-Exposure Prophylaxis (PEP) was developed. This antiretroviral drug grants people an opportunity to protect themselves as long as they adhere to taking the PEP medication within 72 hours of possible exposure to HIV, either through sex or the use of needles (CDC, 2005). Though the Centers for Disease and Prevention (CDC) has reported that PEP is highly effective in preventing HIV acquisition, it does have a major limitation as it should only be used in emergency situations and not as a regular tool for HIV prevention (National Institutes of

Health, 2019). A similar medication known as Pre-Exposure Prophylaxis (PrEP) equally grants people with another HIV prevention strategy by also drastically preventing acquisition of the retrovirus. PrEP has been shown to reduce HIV acquisition from sexual exposure by 99% and from drug usage by 74% (CDC, 2019c). However, unlike PEP which restricts people to both a three day time period and limited usage, PrEP can be integrated as a part of an individual's daily regimen to prevent HIV acquisition (CDC, 2019c).

Research reveals that LatinX uptake of the PrEP medication has been lower than their white counterparts despite being a population more significantly affected by the illness (CDC, 2016b). While research regarding PEP uptake is incredibly limited, one study suggests that uptake of the medication in the LatinX population has also been disproportionately lower than the number of LatinX affected by HIV (Beymer et al., 2014). Though few studies have focused on reasons as to why uptake of PrEP and PEP has been low in this community, barriers to healthcare and cultural beliefs have been reported to impact LatinX approaches to health, and these may also be influencing PrEP and PEP uptake and utilization. Systemic barriers to healthcare such as insufficient insurance coverage, language barriers, and a lack of access to prevention strategies significantly affect the LatinX population (Office of Minority Health, 2019). Studies reviewing cultural elements and their associations to healthcare outline deeper aspects of the traditional Latino culture that also impact the population and their healthcare decisions. Some of these included traditional values such as the '*Machismo*' role for men and the risk factors associated with it as well as the roles of community folk healers in administering health advice and care (Favazza Titus, 2013; Marin, 2003). Though less studied, these systemic and cultural barriers may be playing a significant role in the way the LatinX community understands an illness like HIV and seek prevention strategies like PrEP and PEP.

The proposed research study addressed gaps in the existing literature by examining the impact of traditional Latino beliefs as well as systemic barriers of healthcare utilization in the LatinX population in respect to HIV. Using the Sexual Health Model as the theoretical framework for the research, this study assessed constructs of the model that revealed factors associated with PrEP and PEP uptake. This study specifically examined the following four constructs talking about sex, culture and sexual identity, sexual health care and safer sex, and spirituality to determine how variables related to systemic and cultural factors impact LatinX uptake of the HIV prevention strategies PrEP and PEP.

Descriptive statistics, chi-square tests, correlations, and logistic regressions were calculated for the six independent variables of this study. The variable likelihood to take PrEP ($p < 0.001$) significantly predicted the likelihood of taking PrEP if it were free, as did the likelihood to take PEP ($p < 0.001$) to the likelihood of taking PEP if it were free. While sexual comfort was not a predictor of the likelihood of taking PrEP or PEP, it had a significant positive correlation with the likelihood of uptake for both. Other factors, such as HIV knowledge, HIV/STI-related behaviors, *Machismo* beliefs, and folk illness beliefs were not statistically significant.

Literature Review

Defining LatinX

The United States Census Bureau defines ‘Latino’ or ‘Hispanic’ persons as people who have origins from either Cuba, Mexico, Puerto Rico, or Central or South America (United States Census Bureau, 2018a). A study reviewing Latin America and the term ‘Latino’ defined the demographic similarly by dividing it into three, comparable regions: the Spanish Caribbean, Mesoamerica, and South America (Duranda & Massey, 2010). Despite these attempts for definitions, scholars agree that no true definition of the group exists as no consensus exists as to

what makes someone Latino, Hispanic, or both (Duranda & Massey, 2010; Jaimes, Londono, & Halpern, 2013). A study comparing the usage of the two terms, ‘Latino’ and ‘Hispanic,’ revealed several ambiguities that existed in the literature that was observed and signaled caution in how others use such terms (Jaimes et al., 2013). As such, it should be noted that though this paper recognizes the broad generalization of the ‘Latino’ term, it adheres to the definition used by the U.S. government in order to explore factors associated with the HIV illness within the LatinX community.

Furthermore, in this study, ‘Latino’ and ‘LatinX’ are not used interchangeably. While ‘Latino’ refers to the U.S. government’s definition as it includes indications of origin, it also references traditional and historical cultural values associated with the diverse mixture of Latin American nationalities (Vidal-Ortiz & Martinez, 2018). Alternatively, ‘LatinX,’ while also adhering to the U.S. definition of Latino, refers to a more inclusive definition for the Latin population as traditionally silenced and invisible individuals are now recognized with the term (Vidal-Ortiz & Martinez, 2018). The ‘x’ in LatinX challenges the historic gender binaries of the Spanish language and allows for the inclusion of society’s gender nonconforming, transgender, and other hidden voices of the lesbian, gay, bisexual, transgender, and queer+ (LGBTQ+) community. Though contention still exists about which term is most appropriate in comprehensively describing the population, ‘LatinX’ represents a shifting cultural response within the LatinX community that strives to empower all of its people by using a gender-neutral term to reference the body as a whole (Vidal-Ortiz & Martinez, 2018). Therefore, this study will strictly use ‘Latino’ to refer to traditional culture norms and ‘LatinX’ to refer to the present population.

HIV and the LatinX Population

From the 1970s to the early 2000s, the LatinX population in the United States grew from 9.6 million people to 35 million (Flores, Lopez, & Krogstad, 2019). In 2018, the U.S. Census Bureau reported that the LatinX population had reached a record high of almost 60 million people and accounted for 18% of the total national population (Flores et al., 2019). An examination of the population reveals that the largest subgroup included Mexicans (62.3%) and was followed by Puerto Ricans (9.5%), Central Americans (9.5%), South Americans (6.3%), and Cubans (3.9%) (Office of Minority Health, 2019). Though the LatinX population growth has decreased in the past year (Flores et al., 2019), the overall increase in this group's population over the years has made the LatinX population the largest ethnic minority in the country (United States Census Bureau, 2018b). While these reports suggest that this population represents an important portion of the nation's population, the LatinX community faces a number of serious issues in essential aspects of life including healthcare.

Research focusing on HIV in the LatinX population reveals major disparities within the community regarding the illness. In 2016, the Centers for Disease Control and Prevention (CDC) reported that an estimated 26% of new HIV diagnoses were from the LatinX community (CDC, 2019b). It should be noted that this elevated incidence is not a new occurrence; in 1986 – when HIV was still classified as AIDS– the CDC reported that of the new AIDS diagnoses, the LatinX population made up 14% of them despite comprising only 6% of the national population (CDC, 1986). An analysis of the 2016 HIV diagnoses reveals that within the LatinX diagnoses, men accounted for 87% of them and women for 12% (CDC, 2019b). Moreover, among men, 85% of diagnoses were attributed to homosexual contact. Among women, 88% were attributed to

heterosexual contact (CDC, 2019b). These results suggest that while HIV certainly affects women, the male subgroup is disproportionately more affected.

Issues regarding HIV and LatinX men who have sex with men (MSM) have been studied more comprehensively than HIV and any other subgroup within the LatinX community, and the extant literature reveals specific barriers regarding the LatinX male subgroup. A survey conducted in 2014 revealed that of the reported 157,855 transmissions of HIV within the LatinX community, 83% of the HIV diagnoses originated from LatinX MSM (CDC, 2016a). A previous study published in 2006 highlighted that Latino MSM were also more likely to have never been tested for HIV and suggested that they may have limited access to testing, counseling, and proper care treatments (Rhodes, Yee, & Hergenrather, 2006). A different report further estimated that one in four LatinX MSM will contract HIV at some point in their lives –drastically contrasting from their white counterparts who are estimated at one in eleven (CDC, 2016b). These results demonstrate that HIV drastically affects LatinX MSM despite the preventative measures of PrEP and PEP that currently exist.

Though the limited studies that exist regarding HIV and the LatinX population focus on LatinX MSM, there are reports that suggest that the LatinX female subgroup face their own barriers in dealing with the HIV illness. A recent study reported that LatinX women have four times greater risk of acquiring HIV in their lives than white women (Hess, Hu, Lansky, Mermin, & Hall, 2016). It has also been reported that LatinX women face no major risk factor for HIV besides having intercourse with their male partner (Marin, 2003). As Marin (2003) describes, LatinX males may face higher risks for HIV due to factors associated with the *Machismo* male gender role, yet their sexual behaviors are generally not discussed with partners (Marin, Gomez, Tschann, & Gregorich, 1997). Due to a cultural silence that exists around sex, LatinX females

are not discussing sexual matters (Marin et al., 1997), and they are potentially increasing their risk for HIV by doing so. In a separate study, researchers similarly discovered that women demonstrated a reluctance to discuss sexual matters as well as that HIV was a highly stigmatized illness within the LatinX community (Neff, Amodei, Valescu, & Pomeroy, 2003). Despite these reports, as research regarding the experiences of 32 HIV-positive LatinX women reveals, educational efforts that aim to change sexual behaviors and reduce HIV contractions are usually not promoted to LatinX women but to high-risk groups such as homosexual men instead (Neff et al., 2003). These findings showcase significant barriers towards proper healthcare that LatinX women must overcome in attempting to discuss HIV and obtain knowledge about it.

PrEP and PEP Uptake in the LatinX Population

Research regarding PrEP uptake among LatinX men is limited but two studies showcase disparities regarding usage of the medication. A study reviewing PrEP knowledge of MSM attending a Pride event in New York City revealed that 66.3% of LatinX participants had never heard of PrEP before the survey and only 33.7% of them had (Mantell et al., 2014). However, of the 96 LatinX males that participated in the study, 72% of them reported a strong likelihood of using the PrEP medication after learning about it (Mantell et al., 2014). An analysis of data from the National HIV Behavioral Surveillance system also reported a similar discrepancy regarding PrEP uptake in their research. Though 62% of their LatinX participants had knowledge of PrEP and expressed a willingness to use the medication, only 2.6% of them admitted to using or having used PrEP (Hoots, Finlayson, Nerlander, & Paz-Bailey, 2016). These findings suggest that there may be specific barriers that LatinX MSM face as uptake of PrEP is low within the male subgroup.

Though a review of the literature did not yield any studies regarding PrEP or PEP uptake among LatinX women, there is one study that discusses the use of PrEP among women in the U.S. A qualitative study of 144 at-risk women revealed that 90% had never heard of PrEP prior to the study (Auerbach, Kinsky, Brown, & Charles, 2015). Other key themes that researchers discovered were that participants had mostly good relationships with their OB-GYNs and different ideas of how PrEP could change their sexual lives. Moreover, participants expressed a willingness to turn to their OB-GYNs for PrEP information and demonstrated support for PrEP pills, gels, injectables, and other methods of delivery. However, researchers also revealed a number of barriers such as stigma-related factors about the medical field and healthcare providers as well as concerns about the costs of PrEP, its potential side effects, and being negatively-labeled in the community for taking it. Though some participants shared fears that people would associate taking PrEP as a preventative measure to HIV similarly to the negative stigma associated with those who have the illness, they also expressed that insurance companies should cover the costs so that more women could protect themselves. Most of the participants were frustrated that they were not already receiving proper education about ways they could protect themselves from HIV. This study showcases that though women demonstrate high support for PrEP as well as a strong willingness to take the medication as a preventative measure to HIV, they are not being properly informed about it.

Research regarding PEP uptake is not well documented in the literature, and the proposed study was only able to find one study with relevant data regarding the LatinX population and PEP. A retrospective study regarding PEP uptake and repeat use in a California clinic suggests a potential reason as to why overall PEP usage may be lower than it should be (Beymer et al., 2014). By observing a total of 8,852 patients who met the criteria of being high-risk, HIV-

negative men or women, researchers found that PEP users were more likely to be male and identify as gay/homosexual. Furthermore, those participants who were repeat-PEP users were also those associated with higher number of sexual partners, drug usage, or prior sexually transmitted infections. Researchers also discovered that the proportion of African Americans and the LatinX members who received PEP medication was significantly lower than the proportion of those who ultimately tested HIV-positive in their analysis period. Overall, these findings suggest that PEP usage is confined to a small group of high-risk users beyond the large pool of people who would also benefit from using the medication. PEP is being underutilized by the LatinX community while the population continues to be highly impacted by the HIV disease. PEP can help lessen the HIV epidemic in the LatinX population, but the limited research that exists suggests that uptake of the medication remains low in this community.

PrEP and PEP Barriers in the LatinX Population

While the proposed study found four PrEP studies relevant to barriers the LatinX population faces in regards to uptake and utilization of this medication, it was not able to find any studies regarding barriers to PEP uptake and the LatinX community. However, the study regarding PEP uptake that was discussed in the previous section does highlight that utilization of the medication remains low. Though limited, the PrEP studies suggest reasons as to why uptake of the medication has been so low while also describing some of the systemic barriers that LatinX males and females face in utilizing a prevention strategy like PrEP. Furthermore, the PrEP studies highlight specific areas that future research should explore to expand the knowledge regarding the barriers that impact PrEP and PEP uptake.

In their study involving LatinX MSM and LatinX transgender women, Barreras, Linnemayr, and MacCarthy (2019) explored PrEP knowledge within the LatinX community as

well as common themes about PrEP messaging. Through 9 focus groups that were conducted in both English and Spanish, participants reported a number of common factors that influenced PrEP uptake and utilization within their local communities which generally revolved around major knowledge gaps about PrEP. Several of the participants confused PrEP with PEP, misunderstood the administration of both medications, and expressed doubts about PrEP's efficacy and side effects. Furthermore, most participants also expressed frustration with how healthcare providers promoted PrEP to the LatinX community. They believed PrEP's messaging overtly focused on the negative stereotypes of toxic, Latino culture, such as ideas of hyper-masculinity and homophobia. Participants shared that more people would potentially be interested in the medication if its messaging focused on culturally positive aspects of LatinX culture, such as taking care of one's self to be better for their families or that 'being a man' actually meant being authentic to one's self. Another barrier that some participants noted was that they believed that they had less access to health care and shared fears of not being able to afford the medication without a job that offered reliable insurance. While only one research study, these testimonials do highlight barriers and issues that face the LatinX community.

A study focusing on LatinX MSM perceptions of PrEP revealed other factors that could be influencing its usage within the subgroup. Twenty-nine LatinX men from Los Angeles who were using the PrEP medication Truvada were interviewed in English to explore their experiences with and knowledge of the medication (Brooks, Nieto, Landrian, & Donohoe, 2018). The data analyses identified five themes related to LatinX perceptions of PrEP use which were feelings of protection and sexual freedom, negative and stigmatizing ideas associated with its use, assumptions about sexual behaviors and sexual risks, attitudes related to PrEP use in relationships, and skepticism regarding PrEP. Several of the participants had some knowledge

regarding PrEP and reported hearing that PrEP could reduce the anxiety of acquiring HIV and promote an overall greater peace of mind during sexual activities. However, the majority of men indicated negative perceptions regarding PrEP usage such as being labeled within the LGBTQ+ community with negative terms such as “promiscuous” or “slut.” They also reported that many in the community viewed PrEP as a “party drug” further relating it to ideas of promiscuity and high-risk sexual behavior. In the LGBTQ+ community, MSM who used PrEP were traditionally viewed as being sexually irresponsible; however, there were a few participants that acknowledged this was an old, negative stigma. Nonetheless some participants still expressed that there were major doubts within LatinX MSM regarding PrEP’s overall effectiveness for those that had knowledge of it. Two participants noted that this distrust was particularly high in monolingual Spanish-speaking LatinX MSM that they had encountered.

A separate study reviewing PrEP access for Black and Latino MSM revealed similar findings. Through a self-administered computer survey regarding sexual behavior, Latino MSM reported stigma-related barriers to PrEP including having skepticism regarding the efficacy of PrEP as well as the overall creditability of the medical field in regards to HIV and HIV treatments (Lelutiu-Weinberger & Golub, 2016). Participants reported feeling apprehensive about sharing sexual details with health care providers and that they did not trust the reports about PrEP’s effectiveness. Apart from the distrust of the medical establishment, participants were also less likely to identify as gay. As such, Lelutiu-Weinberger and Golub speculated that the LatinX MSM in the study probably did not seek care at gay-focused healthcare facilities that regularly discuss HIV and promote prevention strategies like PrEP and PEP. Nonetheless, overall beliefs such as the negative labeling of people who take PrEP as well as significant doubts about the medical field and PrEP were documented as significant barriers for LatinX MSM.

A separate study reviewing factors related to how providers prescribe PrEP to heterosexual women also reveals disparities regarding PrEP knowledge and its uptake. Researchers conducted a chart review of HIV-negative women who had received the PrEP medication during their stay at a New York clinic and found that 85.7% of the twenty-one women prescribed the medication were in sero-discordant relationships –meaning that their partners were HIV-positive (Blackstock, Patel, Felsen, Park, & Jain, 2017). Of those women, 83.3% also revealed that their partners were ARV-using which indicated that their partner disclosed that they knew they were HIV-positive and were taking antiretroviral (ARV) medications to treat their illness. This study documents that most women who were taking PrEP were women who were at high-risk for the disease with partners that knew about their HIV illness and who were actively addressing it. Women have been shown to not have substantial knowledge regarding PrEP (Auerbach et al., 2015), and it may be in part due to providers who are not initiating the important conversations that need to be had regarding HIV and HIV prevention strategies. Sexual silence, which will be addressed in the next section, is a major theme that affects LatinX females (Marin, 2003). LatinX women generally do not engage in important discussions regarding sexual behaviors because of sexual silence despite potentially having partners with increased risk for HIV (Marin, 2003), and the findings above suggest that only women who know they are at risk for HIV are using the PrEP medication. PrEP would be an effective tool to keep women safe, however as Blackstock et al. (2017) suggests PrEP is not being disclosed to women that do not already know they are at risk for HIV.

In summary, a review of the existing literature shows many men and women in the LatinX community are not highly knowledgeable about PrEP (Auerbach et al., 2015; Hoots et al., 2019; Mantell et al., 2014). For those who are familiar with the drug, many doubt its efficacy

(Barreras et al., 2019; Brooks et al., 2018; Lelutiu-Weinberger & Golab, 2016) and have concerns about the cost of PrEP, credibility of the medical establishment, and being negatively-labeled in their communities for taking such a medication (Auerbach et al., 2015; Brooks et al., 2018). Information regarding the LatinX community and PEP was not as well documented, but research suggests that PEP uptake is highly underutilized among the LatinX community (Beymer et al., 2014).

While the research studies mentioned above provide important information regarding the LatinX community and their understanding and knowledge of PrEP and PEP, these studies have their limitations and more research is needed to address the gaps that still exist. A major limitation is that only one of the PrEP studies relevant to the LatinX community had a Spanish component to their surveying methods (Barreras et al., 2019). However, in 2015, it was documented that 73% of LatinX people spoke Spanish at home (Krogstad & Lopez, 2017). Furthermore, research regarding factors associated with barriers towards uptake of PrEP and PEP was limited and can be further explored to comprehend what obstacles are affecting views and uptake of these medications in the LatinX population. The proposed study hopes to do this by building on the body of work that currently exists for both the PrEP and PEP medications in regards to the LatinX community. However, for the study to properly address these goals, it is important to expand on the common health beliefs held by the LatinX population. The next section aims to address major health beliefs that may also play a role in PrEP and PEP uptake.

Health Beliefs in LatinX Population

A comprehensive body of literature related to the LatinX population and the health beliefs carried by them towards HIV does not exist. However, there is one study that identifies major marginalization factors and cultural themes related to HIV that influence LatinX beliefs

about Western healthcare and their approaches towards receiving such care. As Marin (2003) documents marginalizing experiences and cultural influences can both have negative impacts on LatinX health and consequently also increase their risk for HIV. In his meta-analysis, three major marginalization factors were identified as increasing risk: racism, poverty, and homophobia. For both men and women in the LatinX community, racism and poverty were noted as having oppressive ways of affecting them and negatively influencing decisions towards their health care. In one study of 900 LatinX MSM that Marin examined, participants that had experienced higher incidents of racism in their lives also reported higher incidents of risky sexual behavior. Poverty was also noted as a marginalization factor influencing HIV risk because many in the LatinX community focus less on sexual awareness and more on simply surviving in a foreign country in which most arrived with nothing but “the clothes on their back” (Martin, 2003). For LatinX men specifically, homophobia was also noted as a marginalization factor as one study reported that the greater levels of homophobia that an individual endured, the higher his sexual risk behavior was.

Beyond these societal marginalization components, other cultural facets have also been documented as affecting the way the LatinX community decides to seek healthcare –which may also have an influence in HIV preventative care and treatment. The first of these facets is the traditional *Machismo* role that Latino culture has historically valued as a gender role that men should grow into (Marin, 2003; Sobralske, 2006). The *Machismo* gender role can have positive elements associated with it, including reinforcements that men are strong protectors of their families (Marin, 2003). However, this gender role can also have a number of negative associations, such as using less condoms in sexual encounter and feeling unimportant when falling ill as well as the need to prove masculinity by having multiple sexual partners and

endorsing shame on women who demonstrate knowledge about sex (Marin, 2003; Sobralske, 2006).

Furthermore, *Machismo* beliefs have been associated with the promotion of sexual silence (Marin, 2003). Sexual silence was a common theme reported by both LatinX men and women as traditional Latino culture does not encourage people to openly discuss sex, safe sex practices, or even homophobic behavior (Marin, 2003). Sexual comfort, which can help explain how individuals feel about discussing sexual matters with their partners, has also been documented as being low in the LatinX community because of sexual silence (Marin, Gomez, Tschann, & Gregorich, 1997). Latino culture prevents safe and open dialogues about sex between partners while also promoting risky sexual behaviors of how men should prove their masculinity. Further research would be needed to understand how *Machismo* ideas and sexual comfort affect PrEP and PEP knowledge and uptake.

A study regarding Mexican men and their healthcare approaches expands on other cultural themes that influence medical decisions and how LatinX men seek preventative care. These beliefs included how men identify manhood, the *Machismo* gender role, ideas of good health and being a good man, and ideas of illness and being a bad man (Sobralske, 2006). By interviewing 28 Mexican American men living in the state of Washington, Sobralske (2006) found that LatinX men are taught from an early age that men should “tough it out” when they feel ill, being an idea that stemmed from the *Machismo* role of men. Working through an illness made a man stronger and going to a doctor because of a weakness would have been seen as a sign of weakness. Participants also reported that they believed a man’s health was everything and that without it he is essentially useless to himself and his family as he can no longer fulfill his obligations to his family. One participant reported that it was only as a last resort and with the

intervention of a family member that most LatinX men would even agree to visit a doctor. While these elements do not directly reference HIV, PrEP, or PEP, they do speak to a larger cultural disempowerment affecting the LatinX community that indirectly relates back to them.

Another significant influence in LatinX healthcare is the use of a *Curandero* in treating sicknesses. *Curanderos* are members of the LatinX community that practice folk medicine usually through the use of natural herbs and spiritual remedies (Curandero, 2015; Favazza Titus, 2013). In a literature review regarding the use of a *Curandero*, researchers revealed specific reasons of why LatinX men and women seek these traditional healthcare providers over American providers (Favazza Titus, 2013). Foremost, *Curanderos* were generally more affordable and usually spoke the Spanish language unlike Western medicine which was usually associated with high costs and language gaps (Favazza Titus, 2013). *Curanderos* were also viewed as health authorities and as such were utilized to treat most illnesses, offer folk remedies, and perform spiritual healing (Favazza Titus, 2013; March & Gong, 2005). Western medicine does not formally recognize many of the folk remedies or spiritual healing, which results in them being mostly unfamiliar to many Western providers (Favazza Titus, 2013; March & Gong, 2005). *Curanderos* feel more familiar to the LatinX community and potentially reduce the community's comfort in seeking care from Western healthcare providers.

Folk beliefs towards illnesses are other major reasons why LatinX members visit and abide to *Curanderos* more than Western healthcare providers. The LatinX population has been documented as being highly fatalistic with their view on illness, believing that most sickness is beyond human control (Cuéllar, Arnold, & Gonzalez, 1995). In a study reviewing spiritual beliefs and health views in LatinX females, researchers revealed that all 47 LatinX women who participated in the study came from strong Christian backgrounds and viewed spirituality as a

vital part of their everyday lives (Jurkowski, Kurlanska, & Ramos, 2010). They also shared that they viewed illness as a punishment from God as a consequence for something that they must have done which was also a common element found in a previously mentioned study (March & Gong, 2005; Jurkowski et al., 2010). Hence, *Curanderos* who are seen as spiritual healers are usually sought more by LatinX people. *Curanderos* could do more to soothe a person's worries and potentially treat their perceived 'fated' illness than Western healthcare providers could. A major issue in this belief and practice, however, is that *Curanderos* are folk healers who are not generally up to date with modern medicine and cannot offer the same level of care that Western medicine can. While *Curanderos* may give LatinX people emotional support and relief, they also make the LatinX community vulnerable to diseases like HIV if not concurrently used with Western healthcare practices.

In summary, while not all of these findings directly stem from HIV research, factors such as the *Machismo* gender role as well as individuals' sexual comfort have been implicated in affecting how LatinX people understand sex, discuss sexual matters, and approach sexual health care (Marin, 2003; Marin et al., 1997). The use of *Curanderos*, folk illness beliefs, and spirituality are also influencing how the LatinX community understands illness and cares for itself (Favazza Titus, 2013; March & Gong, 2005). Systemic barriers were also discussed as the extant literature revealed unique obstacles that affect the LatinX community including knowledge gaps regarding PrEP and PEP, concerns about cost and efficacy of PrEP, credibility of the medical field, and concerns about being negatively-classified (Auerbach et al., 2015; Barreras et al., 2019; Brooks et al., 2018; Mantell et al., 2014). Both the cultural and systemic barriers mentioned may have major consequences for PrEP and PEP acquisition in the LatinX population. Therefore, the proposed study will examine factors that have been noted as

impacting LatinX healthcare utilization and will address them in respect to PrEP and PEP with the use of the Sexual Health Model. By addressing constructs of a healthy sexual lifestyle, this study strives to specifically reveal elements associated with PrEP and PEP uptake among the LatinX community.

Sexual Health Model

To understand how the LatinX community addresses health approaches towards PrEP and PEP uptake, this study will use the Sexual Health Model for its theoretical foundation. The Sexual Health Model was specifically developed from a need to accurately address HIV risk over a long-term scale. As Robinson et al. (2002) explains, the model outlines ten constructs that both recognize established sexual knowledge and integrate sexual, relational, and emotional variables. By acknowledging these ten constructs, people can develop successful strategies to reduce risky sexual behavior and promote a healthy sexual lifestyle. The defining constructs are as follows: (1) Talking about sex; (2) Culture and sexual identity; (3) Sexual anatomy functioning; (4) Sexual health care and safer sex; (5) Challenges; (6) Body image; (7) Masturbation and fantasy; (8) Positive sexuality; (9) Intimacy and relationships; and (10) Spirituality. The constructs of the model that this study will focus on are talking about sex, culture and sexual identity, sexual health care and safer sex, and spirituality.

A major aspect in having a healthy sexual lifestyle is the ability to talk about sex, and as such it is a valuable construct of the Sexual Health Model. This construct is influenced by the comfort level an individual has in speaking about sex either with his or her partner or with others (Robinson et al., 2002). The culture and sexual identity construct references how an individual's culture influences his or her sexuality and sense of self in his or her sexual attitudes and behaviors. The construct sexual health care and safer sex is defined by an individual's physical

health as well as practicing sexual behaviors. This construct addresses how an individual gets tested for sexually transmitted diseases, knows and understands his or her body, and responds to illnesses by seeking medical attention. Spirituality relates to an individual's spiritual and moral beliefs and focuses on understanding how these deeper values affect sexual behavior.

The four constructs talking about sex, culture and sexual identity, sexual health care and safer sex, and spirituality will be used to identify factors that affect a healthy sexual lifestyle among LatinX specifically in regards to PrEP and PEP uptake. Systemic obstacles regarding the credibility of the medical establishment and of PrEP, medication costs, language barriers, and prevention-seeking opportunities have been documented as having an effect on LatinX healthcare utilization. Moreover, the community is also affected by ideas of *Machismo*, issues with sexual comfort and the usage of *Curanderos*, and folk views on health. These specific systemic barriers and cultural beliefs have an influence on general health practices, and they may also be impacting LatinX uptake of PrEP and PEP. The proposed study will examine these elements in regards to PrEP and PEP and reveal factors associated with them.

Research Questions

This research study will strive to answer the following research questions:

- (1) What are the predictors of the likelihood to take PrEP among LatinX in the United States?
- (2) What are the predictors of the likelihood to take PEP among LatinX in the United States?

Methodology

The methodology of this study is composed of four sections: study participants, data collection, survey instrument, and data analysis. The first section, study participants, explains how participants were identified as being eligible for this study and how the final sample size was calculated. The data collection section lies out the methods that were used to recruit

participants. The third section, survey instrument, explains how the online survey was created and is split into the following sub-sections: demographics, HIV/AIDS knowledge, HIV and STI-related behaviors, likelihood to take PrEP, likelihood to take PEP, machismo beliefs, sexual comfort, and folk illness beliefs. Furthermore, the study variables this study used are listed in the final sub-section of the survey instrument section. Finally, data analysis explains how sum scores for each sub-section of the survey instrument were calculated and their chi-square tests of association, correlations, and logistic regressions.

Study Participants

To answer the research questions, this study surveyed LatinX participants residing in the United States through an online cross-sectional questionnaire between January 2020 and March 2020. The eligibility criteria to participate in the research study included (1) individuals who self-reported age of 18 years or older, (2) currently resided in the United States, and (3) identified as Hispanic or Latino(a). At the beginning of the online questionnaire, study eligibility was confirmed through self-reported responses. The online survey initiated yielded a total of 200 participants. However, after removing participants that did not meet inclusion criteria or did not complete the survey, the final sample size was comprised of 169. Moreover, though the original survey was translated and made available in Spanish, the final sample included 161 responses from the English survey and only 8 responses from the Spanish survey.

Data Collection

The research protocol was approved by the UNLV Institutional Review Board before data collection began. Convenience sampling was used to sample LatinX participants residing in the United States. Recruited participants were asked to complete a cross-sectional online survey on the Qualtrics platform.

LatinX organizations and groups located across the U.S. were contacted and asked to post a recruitment flyer which included a QR code and a brief description of the study. The study investigator sent the survey link to fellow LatinX community members to further the reach of this study. The snowball sampling technique was further used to recruit additional participants which included word of mouth and social media recruitment.

To facilitate participant recruitment, the social media platforms Twitter, Instagram, Facebook, and LinkedIn were used. The survey link and the recruitment flyer were posted periodically throughout the course of surveying. While the principal investigator predominantly posted the survey link and additional flyers on social media, the posts on social media were also shared by family and friends. Furthermore, through the UNLV Center for Health Disparities Research and UNLV Registered Student Organizations websites, the principal investigator accessed various professional social media platforms and student organizations and sent them the survey link and flyers.

Survey Instrument

This study references the Sexual Health Model to identify key constructs associated with living a healthy sexual life to prevent a disease like HIV (Robinson, Bocking, Rosser, Miner, & Coleman, 2002). The constructs talking about sex, culture and sexual identity, sexual health care and safer sex, and spirituality were used to assess factors associated with the LatinX population and their uptake of the PrEP and PEP medications. Other studies were referenced to adapt the survey instrument to include questions regarding HIV knowledge (Carey & Schroder, 2002), likelihood of PrEP and PEP uptake (Gersh et al. 2014), and specific scale-metrics such as machismo beliefs, sexual comfort, and folk illness beliefs (Cuéllar, Arnold, & González, 1995; Marin, Gomez, Tschann, & Gregorich, 1997) A Qualtrics survey instrument was created

consisting of a total of 48 questions divided into the following sections: inclusion qualifications (3 items), HIV/AIDS knowledge (18 items), HIV and sexually transmitted infection (STI) history (19 items), likelihood to take PrEP (13 items), likelihood to take PEP (13 items), sexual comfort (7 items), machismo beliefs (17 items), folk illness beliefs (14 items), and demographics (12 items). The survey instrument was made available online in both English and Spanish. Time to complete the survey averaged around 20 minutes.

Demographics

Demographic information was gathered to describe the sample population. Questions regarding demographic information included zip code, gender identity, sexual orientation, age, racial/ethnic identity, LatinX identity (Mexican, Puerto Rican, Cuban, or other), level of education (less than high school, high school graduate or the equivalent, some college – no degree, associate’s degree, bachelor’s degree, completed graduate degree, or vocational/technical training), relationship status, employment status (employed, unemployed, retired), household income, religious preference, and utilization of religious services (attended religious services: one or more times per week, 1-3 times per week, less than once per month, or none). Additionally, participants were asked if their religious and/or spiritual beliefs influenced what they did in terms of preventing HIV. Most demographic questions were close ended, with the exceptions of the zip code question as well as questions which had an “other” option.

HIV/AIDS Knowledge

Questions regarding knowledge of HIV and AIDS were adapted from survey questions from the National HIV Behavioral Surveillance Survey (Carey & Schroder, 2002). Table 1 outlines the Sexual Health Model construct relevant to this section, Sexual Health Care and Safer

Sex, as well as the corresponding questions. Response options to these items were “true” and “false.”

Table 1: Questions Related to HIV/AIDS Knowledge

CONSTRUCT	QUESTIONS
<p><i>Sexual Health Care and Safer Sex</i></p>	<p>Q9:</p> <ul style="list-style-type: none"> - Coughing and sneezing do not spread HIV. - A person can get HIV by sharing a glass of water with someone who has HIV. - Pulling out a penis before a man climaxes keeps the sex partner from getting HIV. - A woman can get HIV if she has anal sex. - Showering or washing one’s genitals/ private parts after sex keeps a person from getting HIV. - All pregnant women infected with HIV will have babies born with AIDS. - People who have been infected with HIV quickly show serious signs of infection. - There is vaccine that can stop people from getting HIV. - People are likely to get HIV by deep kissing, putting their tongue in their partners mouth, if their partner has HIV. - A woman cannot get HIV if she has sex on her period. - There is a female condom that can reduce a woman’s chances of getting HIV. - A natural skin condom works better to prevent HIV than a latex condom. - A person will not get HIV if she or he is taking antibiotics. - Having sex with more than one person can increase one’s chance of getting HIV. - Taking a test for HIV one week after having sex will tell a person if she or he has HIV. - A person can get HIV by sitting in a hot tub or swimming pool with someone who has HIV. - A person can get HIV from oral sex. - Using Vaseline or baby oil with condoms reduces the chances of getting HIV.

HIV and STI-Related Behaviors

Questions regarding HIV and STI-related behaviors were also adapted from survey questions from the National HIV Behavioral Surveillance Survey (CDC, 2003). This section

specifically focused on the construct sexual health care and safer sex. Though eleven of the nineteen items in this section were close-ended and consisted of the response options “yes” or “no” (Table 2), the others were either open ended and required the participant to fill in their answer or used Likert-type responses. Items that were open ended included the questions “How many people have you had sex with in your lifetime?”, “When with sex partners, do you use a condom?”, “When you have sex, do you have sex with men, women, or both?”, and “Have you participated in oral, vaginal, and/or anal sex?” For the question “How comfortable are you discussing issues of sex and HIV with your sex partner(s)?” response options included “very comfortable,” “comfortable,” “not comfortable,” and “not comfortable at all.”

Table 2: Questions Related to HIV and STI-Related Behaviors

CONSTRUCT	QUESTIONS
<i>Sexual Health Care and Safer Sex</i>	Q18 Have you ever experienced intimate partner or domestic violence? Q19 Have you ever exchanged drugs or money for sex? Q20 Have you ever had sex with someone that you know injects illegal drugs? Q21 Have you used a needle to inject illegal drugs in the last year? Q22 Have you ever had sex with someone that you know has HIV/AID? Q23 Have you used meth, speed, crank, crystal, cocaine, or crack in the last year? Q24 Do you smoke cigarettes? Q25 Have you ever been in jail for more than 24 hours or been sentenced to prison? Q26 Have you ever had an HIV test? Q59 Have you been asked, or have you asked your female sex partners to use any type of birth control? Q28 Did you use a condom at your last sexual encounter?

A skip pattern was utilized for the remaining questions so that participants only answered questions that were relevant to them. For example, participants who selected “no” to the question “Have you had sex in the past 6 months” skipped the question “How many people have you had

sex with in your lifetime?” Those that answered “yes” were asked the follow-up question which required the participants to fill in their answer. Furthermore, for the question “Did you use a condom at your last sexual encounter”, the answer also indicated whether participants were asked a follow-up question. Those that answered “yes” skipped the question, while those that answered “no” were asked “What is the primary reason for not using a condom?” where they again had to fill in their response.

Likelihood to Take PrEP

Questions regarding PrEP were adapted from the Pre-Exposure Prophylaxis for Prevention of HIV Survey (Gersh et al. 2014). The questions that were selected for this proposed study were modified to fit the purpose of this research. Participants were asked their knowledge of PrEP as well as their likelihood to take PrEP. The majority of the questions used a 5-point Likert-type scale to assess likelihood to take PrEP with its associated costs, side-effects, administration frequencies, and drug efficacies (Table 3). The response options ranged as follows: “definitely,” “very likely,” “somewhat likely,” “not very likely,” and “definitely not.”

Table 3: Questions Assessing Likelihood to Take PrEP

CONSTRUCT	QUESTIONS
<i>Sexual Health Care and Safer Sex</i>	Q35: <ul style="list-style-type: none"> - How likely would you take PrEP if it was provided free of charge? - How likely would you take PrEP if it cost you money out-of-pocket each month (estimate \$500/month)? - How likely would you be to take PrEP if it had side effects affecting your kidneys, liver, and bones, and including diarrhea, nausea, dizziness, headaches, and rash? - How likely would you be to take PrEP if it had to be taken every day, missing as few pills as possible? - How likely would you be to take PrEP if this medication was 50% effective at preventing HIV infection? - How likely would you be to take PrEP if you were in a monogamous relationship with a partner who have HIV positive?

	<ul style="list-style-type: none"> - How likely would you be able to take PrEP if you had casual sexual partners whose HIV status you didn't know? - How likely would you be to use condoms if you were taking PrEP? - How likely would you be to engage in less cautious sexual behavior, such as use condoms less or have more sexual partners, if you were taking PrEP? - How likely are you to use PrEP if someone who was credible and you liked and trusted was also a user?
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Three additional questions were added in which the response options were “yes” or “no.” These questions included “Before today, have you ever heard of people who do not have HIV by taking PrEP (anti-HIV medication) to keep them from getting HIV?”, “Have you ever taken PrEP?” and “Do you know how to get PrEP?”

Likelihood to Take PEP

Questions regarding PEP were also adapted from the Pre-Exposure Prophylaxis for Prevention of HIV Survey (Gersh et al. 2014) but were adapted to fit the PEP medication. Participants were asked their knowledge of PEP as well as their likelihood to take PEP. Similar to the previous section, the majority of the questions used a 5-point Likert-type scale to assess likelihood to take PrEP with its associated costs, side-effects, administration frequencies, and drug efficacies (Table 4). The response options again used the 5-point Likert-type scale. For the questions, “Before today, have you ever heard of people who do not have HIV by taking PEP (anti-HIV medication) to keep them from getting HIV?”, “Have you ever taken PEP?” and “Do you know how to get PEP?” the response options were “yes” or “no.”

Table 4: Questions Assessing Likelihood to Take PEP

CONSTRUCT	QUESTIONS
<i>Sexual Health Care and Safer Sex</i>	Q40: <ul style="list-style-type: none"> - How likely would you take PEP if it was provided free of charge?

<i>Sexual Health Care and Safer Sex</i>	<ul style="list-style-type: none"> - How likely would you take PEP if it cost you money out-of-pocket each month (estimate \$1000/month)? - How likely would you be to take PEP if it had side effects affecting your kidneys, liver, and bones, and including diarrhea, nausea, dizziness, headaches, and rash? - How likely would you be to take PEP if it had to be taken every day, missing as few pills as possible? - How likely would you be to take PEP if this medication was 50% effective at preventing HIV infection? - How likely would you be to take PEP if you were in a monogamous relationship with a partner who have HIV positive? - How likely would you be able to take PEP if you had casual sexual partners whose HIV status you didn't know? - How likely would you be to use condoms if you were taking PEP? - How likely would you be to engage in less cautious sexual behavior, such as use condoms less or have more sexual partners, if you were taking PEP? - How likely are you to use PEP if someone who was credible and you liked and trusted was also a user?
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Machismo Beliefs

To assess *Machismo* views, the Multiphasic Assessment of Cultural Constructs – Short Form (MACC-SF) was referenced as it outlines five cultural constructs relevant to LatinX culture: familism, fatalism, machismo, folk beliefs, and personalismo (Cuéllar et al., 1995). The Machismo subscale of the MACC-SF consists of sixteen items. Table 5 displays the construct and the corresponding questions. The response options were “true” and “false” as dictated by the subscale of the MACC-SF.

Table 5: Questions Related to Machismo

CONSTRUCT	QUESTIONS
<i>Culture and Sexual Identity</i>	Q55: <ul style="list-style-type: none"> - A man should not marry a woman who is taller than him. - It is the mother's responsibility to provide her children with proper religious training. - Boys should not be allowed to play with dolls and other girls' toys.

<p><i>Culture and Sexual Identity</i></p>	<ul style="list-style-type: none"> - Parents should maintain stricter control over their daughters than their sons. - There are some jobs that women simply should not have. - It is important for a woman to learn how to take care of the house and family than it is for her to get a college education. - A wife should never contradict her husband in public. - Men are more intelligent than women. - No matter what people say, women really like the dominant men. - Some equality in marriage is a good thing, but by and large the father ought to have the main say so in family matters. - For the most part, it is better to be a man than a woman. - Most women have little respect for weak men. - I would be more comfortable with a male boss than a female boss. - It is important for a man to be strong. - Girls should not be allowed to play with boys' toys such as soldiers and footballs. - Wives should respect the man's position as head of the household. - The father always knows what is best for the family.
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Sexual Comfort

Sexual comfort was measured using the Sexual Comfort Scale that was developed from an extant iteration of a sexual comfort scale (Marin, Gomez, Tschann, & Gregorich, 1997). The central idea of sexual comfort emphasizes that individuals must have a certain degree of comfort with their partners to promote safe sexual behavior –which corresponds with the ideology of the SHM construct. Table 6 outlines the seven items participants were asked to answer related to their comfort with issues regarding sex and their own sexuality. Response options used a 4-point Likert-type scale which included the following options: “very uncomfortable,” “uncomfortable,” “comfortable,” and “very comfortable.”

Table 6: Questions Regarding Sexual Comfort

CONSTRUCT	QUESTIONS
<i>Talking About Sex</i>	Q41: <ul style="list-style-type: none"> - How would you feel being naked in front of your partner? - How would you feel teaching your partner what feels pleasurable to you during sex? - How would you feel discussing your sexual desires and fantasies with your partner? - How would you feel having sex with lights on? - How would you feel touching your partners genitals? - How would you feel having someone put a condom on you? - How would you feel masturbating in front of your sexual partner?

Folk Illness Beliefs

To observe folk illness beliefs, the proposed study referenced the Folk Illness Belief Subscale of the MACC-SF (Cuéllar et al., 1995). The scale consists of fourteen items. Table 7 showcases the questions where the response selections consisted of “true” and “false” options.

Table 7: Questions Related to Folk Illness Beliefs

CONSTRUCT	QUESTIONS
<i>Spirituality</i>	Q56: <ul style="list-style-type: none"> - I believe it is possible to place a hex on someone (embruja a alguien). - I have been hexed (embrujado) in the past. - Mental illness cannot be caused by witchcraft and evil spirits. - I have been treated for “empacho.” - My family and I have used the services of curanderos, curanderas in the past. - I have been treated by a curandero(a) more than once. - I would take my child to a curandero if needed. - When I was young, I was treated for “susto.” - When I was young, I was treated for “mal de ojo.” - For some illnesses a curandero is better than a doctor. - Caida de mollera (fallen fontanelle) happens mostly to a very young infant. - If a person has special powers to do good or evil, they should not be used too much. - Physicians should accept gratuities rather than charge a fee for their services. - It is essential to involve the family in healing a sick relative.

Study Variables

Six independent variables and two dependent variables were measured in this study. The independent variables included HIV/AIDS knowledge, HIV and STI-related behaviors, likelihood to take PrEP, likelihood to take PEP, machismo beliefs, sexual comfort, and folk illness beliefs. The dependent variables included the likelihood of taking PrEP if it were free of charge and the likelihood of taking PEP if it were free of charge.

Data Analysis

Data analysis incorporated descriptive, bivariate, and multivariate methods of statistical analysis. All analyses were conducted using SPSS (version 25). Data analysis included descriptive statistics, sum scores, chi-square tests of association, correlations, and logistic regressions.

Descriptive Statistics

Descriptive statistics were calculated for demographic variables to describe the sample population that was surveyed. The demographic variables included zip code, gender identity, sexual orientation, age, racial/ethnic identity, LatinX identity, level of education, relationship status, employment status, religious preference, and utilization of religious services. The mean and standard deviation was calculated for age, and for the other variables only the frequency was calculated.

Sum Scores

Sum scores were composed where point distributions depended on the response types. For HIV/AIDS knowledge, “true” and “false” responses were recoded into binary 1 and 0 values where correct answers received a point of 1 and incorrect received 0 points. Similarly, for

machismo and folk illness beliefs, “true” and “false” responses were recoded into binary 1 and 0 values where “true” responses received a point of 1 and “false” responses received 0 points.

Response options related to sexual comfort were given the following point distributions: “very uncomfortable” received 1 point, “uncomfortable” received 2 points, “comfortable” received 3 points, and “very comfortable” received 4 points.

Similar to a previous study (Gersh et al., 2014), Likert responses to the questions related likelihood to take PrEP and PEP were collapsed into two categories, “likely” and “unlikely,” to calculate their sum scores. To do this, the response options “definitely,” “very likely,” and “somewhat likely” were grouped into the “likely” category, and the response options “not very likely” and “definitely not” were grouped into the “unlikely” category. Responses that fell into the “likely” category received a point of 1 and “unlikely” responses received 0 points.

Chi-Square Tests of Association

To identify possible associations between the independent variable HIV and STI-related behaviors and the dependent variables (likelihood of taking PrEP if it were free of charge and likelihood of taking PEP if it were free of charge), the chi-square test of association was calculated. Respondents answered nineteen questions regarding HIV and STI-related behaviors. For the scope of this project, this study only analyzed six of these questions (See Table 2; Q18, Q19, Q20, Q22, Q26, Q28), which were deemed as being most pertinent during statistical analyses. This was based on their perceived relationship to the construct sexual health care and safer sex of the Sexual Health Model which specifically addresses an individual’s practicing sexual behaviors and how s/he seeks medical treatment. Because these questions were categorical in nature, chi-square tests of association were calculated for them.

Correlations

Correlations were calculated using the sum scores for each of the following independent variables: HIV/AIDS knowledge, likelihood to take PrEP, likelihood to take PEP, machismo beliefs, sexual comfort, and folk illness. This was done to assess strength of linear relationship between each of these and the dependent variables. The means and standard deviations were also calculated for each.

Logistic Regressions

Independent variables that were identified as having statistically significant relationship with the dependent variable likelihood to take PrEP if it were free were used to calculate a logistic regression model. This was done using the chi-square tests of association and correlations. Similarly, the independent variables that were identified as having statistically significant relationship with the dependent variable likelihood to take PEP if it were free were also used to calculate a logistic regression model.

Results

Descriptive Characteristics of Sample

Descriptive data for the participants is presented in Table 8. The sample included 169 participants that ranged in age from 18 to 53 years old with the mean being 23 years of age ($SD = 5.71$). For a number of the variables in this survey, several responses were missing or incomplete, so the total frequency for each variable was different. Out of the 169 respondents, only 76 disclosed their zip code. The majority of participants were from Nevada (57.9%) followed by Tennessee (10.5%), California (9.2%), and Texas (6.6%). Out of the 169 respondents, only 144 self-reported their gender where 45 (31.3%) were male, 97 (67.4%) were female, and 2 (1.4%) reported themselves as other. In regard to sexual orientation, 144

participants also answered the question where 105 identified as straight (72.9%), which made up the majority, but were followed by 21 (14.6%) that identified as bisexual, 16 (11.1%) as gay, and 2 (1.4%) as other. Most of the participants identified as Hispanic or Latino(a) (84.6%) and when subsequently prompted to specify the nationality predominantly noted Mexican (83.9%). Most respondents were also single and never married (80.6%) and had at least some college education or above (71.6%). While 28 (19.6%) respondents reported being unemployed, 115 (80.5%) were employed either full-time (39.2%) or part-time (41.3%). Despite employment, the majority of participants (74.9%) noted a total household income ranging from less than \$25,000 to \$50,000. For a family of four living in the United States, income below \$54,000 is considered low-income (Department of Housing and Urban Development, 2017).

Table 8: Demographic Characteristics of the Study Population

VARIABLE	FREQUENCY (N)	PERCENTAGE (%)
Gender		
- Male	45	31.3%
- Female	97	67.4%
- Other	2	1.4%
Sexual Orientation		
- Bisexual	21	14.6%
- Straight	105	72.9%
- Gay	16	11.1%
- Other	2	1.4%
Racial/Ethnic Identity		
- White	12	7.1%
- Hispanic or Latino(a)	143	84.6%
- American Indian or Alaska Native	4	2.4%
- Asian	3	1.8%
- Native Hawaiian	0	0%
- Black or African American	3	1.8%
- Other	2	1.2%
LatinX Identity (if participants identified as Hispanic or Latino(a))		
- Mexican	120	83.9%
- Puerto Rican	4	2.8%
- Cuban	3	2.1%
- Other	16	11.2%

Education Level		
- Less than high school diploma	5	3.5%
- High school graduate or equivalent	36	25%
- Some college, no degree	32	22.2%
- Associate degree	9	6.3%
- Bachelor's degree	35	24.3%
- Completed graduate degree	5	3.5%
- Vocational/Technical training	2	1.4%
- Some Bachelor's degree, no degree	20	13.9%
Marital Status		
- Single, never married	116	80.6%
- Married or domestic partnership	24	16.7%
- Divorced	2	1.4%
- Separated	2	1.4%
Employment Status		
- Employed (Full-time)	56	39.2%
- Employed (Part-time)	59	41.3%
- Unemployed	28	19.6%
Household Income		
- Less than \$25,000	54	37.8%
- \$25,000 to \$35,000	26	18.2%
- \$35,000 to \$50,000	27	18.9%
- \$50,000 to \$75,000	14	9.8%
- \$75,000 to \$100,000	5	3.5%
- \$100,000 to \$125,000	3	2.1%
- Greater than \$125,000	4	2.8%
- Unsure	10	7%

Table 9 presents the additional demographic characteristics of the study population. Out of 143 responses for religious preference, while 113 (79%) noted a religion, the majority of responses for attendance of religious ceremonies or services indicated that no services were being attended within a month (52.1%). Moreover, out of 144 respondents, 74 (51.4%) and 27 (18.8%) reported that they strongly disagreed or disagreed, respectively, to the statement that their religion and/or spiritual beliefs influenced what they did in terms of HIV prevention. The majority of respondents also reported that they had health insurance (73.4%),

Table 9: Additional Demographic Characteristics of the Study Population

VARIABLE	FREQUENCY (N)	PERCENTAGE (%)
Health Insurance		
- Yes	105	73.4%
- No	38	26.6%
Religious Preference		
- Christian	18	12.6%
- Catholic	77	53.8%
- Islam	1	0.7%
- Buddhism	2	1.4%
- Mormon	3	2.1%
- Agnostic	7	4.9%
- None	30	21.0%
Attendances of Religious Services		
- One or more times per week	15	10.4%
- 1-3 times per month	16	11.1%
- Less than once per month	38	26.4%
- None	75	52.1%

Characteristics of Study Variables

Sum scores were composed where for the following variables: HIV/AIDS knowledge, likelihood to take PrEP, likelihood to take PEP, machismo beliefs, sexual comfort, and folk illness beliefs (See Table 10 below). For HIV/AIDS knowledge, 165 responded to these questions where the mean sum score was 15 points out of 18 possible points and the standard deviation was 2.32 demonstrating a high score for HIV knowledge.

Table 10: Characteristics of Study Variables

VARIABLE	ITEMS	POTENTIAL RANGE	Participants (n = 169)		
			<i>N</i>	<i>M</i>	<i>SD</i>
HIV/AIDS Knowledge	18	0-18	165	15	2.32
Likelihood to take PrEP	10	0-10	157	6.51	2.08

Likelihood to take PEP	10	0-10	145	6.55	2.36
Machismo Beliefs	17	0-17	148	2.57	2.70
Sexual Comfort	7	0-28	149	20.17	4.82
Folk Illness Beliefs	14	0-14	149	4.91	3.06

For machismo beliefs, 148 participants responded to these items where the mean sum score was 2.57 points out of a possible 17 points and the standard deviation was 2.70. This was a low score for the scale. For the questions related to folk illness beliefs, 149 participants responded to them. The mean sum score for this variable was 4.91 points out of a possible 14 points and the standard deviation was 3.06, which was also a low score for the scale. This suggests that individuals did not endorse machismo-related beliefs or cultural folk remedies to their healthcare.

For the sexual comfort scale, 149 participants responded to these items where the mean sum score was 20.17 points out of a possible 28 points and the standard deviation was 4.82. This demonstrated a high score for the items suggesting that individuals held a high comfort level when discussing sexual matters with their partners.

Out of 169 participants, 157 participants answered the questions related to likelihood to take PrEP and 145 answered those related to likelihood to take PEP. For PrEP, the average mean sum score was 6.51 points and the standard deviation was 2.08. For PEP, the average mean was 6.55 points and the standard deviation was 2.36. Both represent a slightly higher than average score for likelihoods to take PrEP and PEP.

Respondents also answers nineteen questions regarding HIV and STI-related behaviors. This study only analyzed six of these questions (See Table 2; Q18, Q19, Q20, Q22, Q26, Q28),

which were deemed as being most pertinent during statistical analyses. This was based on their perceived relationship to the construct sexual health care and safer sex of the Sexual Health Model. The frequencies to the answers of these questions are listed in Table 11 and were later used to calculate the chi-square test of association, which is presented later in this study.

Table 11: HIV and STI-Related Behaviors

VARIABLE	FREQUENCY (N)	PERCENTAGE (%)	
		Yes	No
Have you ever experienced intimate partner or domestic violence?	164	19.5%	80.5%
Have you ever exchanged drugs or money for sex?	165	5.5%	94.5%
Have you ever had sex with someone that you know injects illegal drugs?	164	5.5%	94.5%
Have you ever had sex with someone that you know has HIV/AIDS?	165	3.6%	94.1%
Have you ever had an HIV test?	165	43.8%	53.8%
Did you use a condom at your last sexual encounter?	156	40.2%	52.1%

Research Question 1: What are the predictors of the likelihood to take PrEP among LatinX in the United States?

Dependent Variable

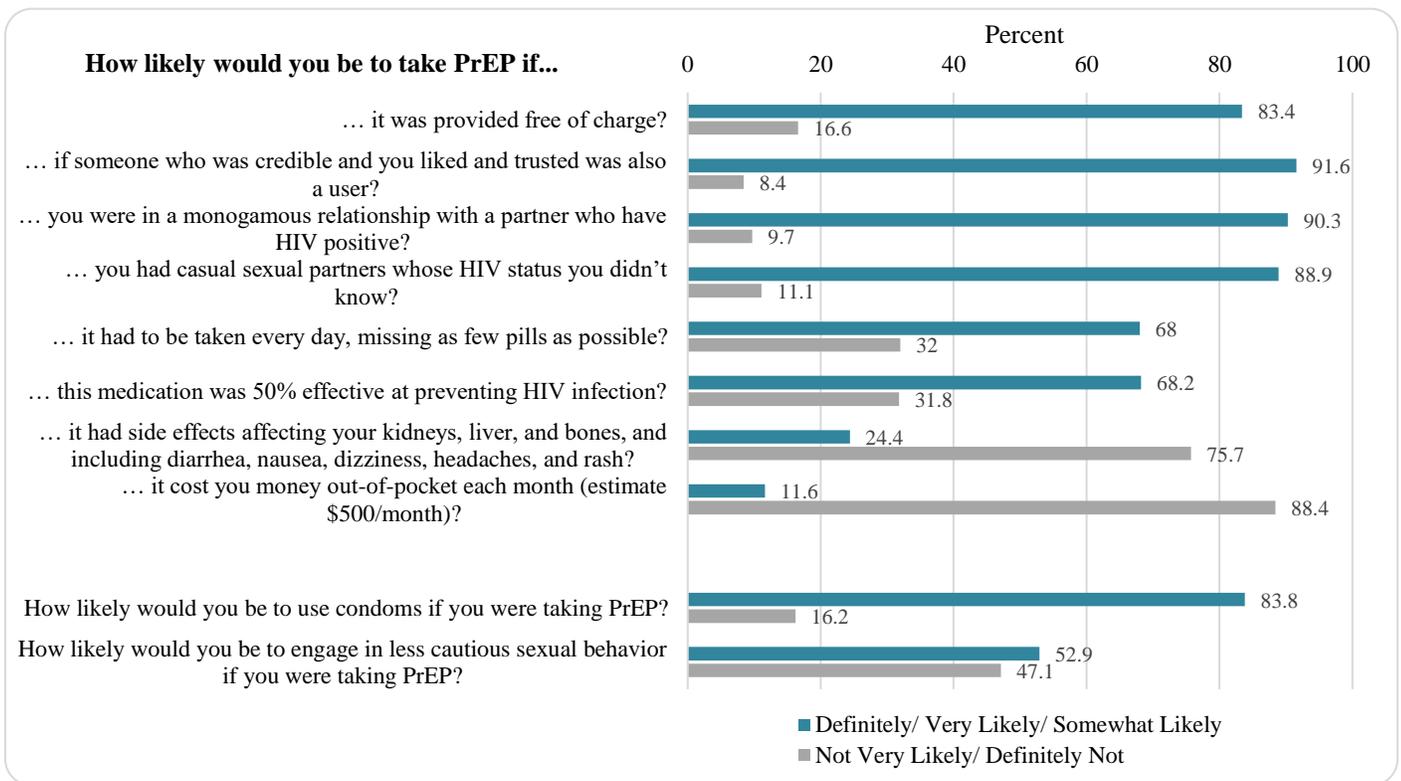
Participants were asked six questions related to their knowledge of PrEP and PEP: “Before today, have you ever heard of people who do not have HIV by taking PrEP/PEP (anti-HIV medication) to keep them from getting HIV?”, “Have you ever taken PrEP/PEP?”, and “Do you know how to get PrEP/PEP?” Table 12 shows the response counts and the frequencies for these questions, where the majority of participants reported that they had not heard of either PrEP or PEP prior to the study (63.9%, 73.9%), had not ever taken them (94.3%, 98.0%), nor knew how to get them (79.6%, 85.7%).

Table 12: Frequencies of PrEP and PEP Knowledge and Uptake

Knowledge	PrEP (n=158)		PEP (n=148)	
	Yes	No	Yes	No
Before today, have you ever heard of people who do not have HIV by taking PrEP/PEP (anti-HIV medication) to keep them from getting HIV?	57 (36.1%)	101 (63.9%)	39 (26.4%)	109 (73.6%)
Have you ever taken PrEP/PEP?	9 (5.7%)	149 (94.3%)	3 (2.0%)	145 (98.0%)
Do you know how to get PrEP/PEP?	32 (20.3%)	126 (79.7%)	21 (14.3%)	126 (85.7%)

Because the majority of participants reported that they had never heard of PrEP, never taken PrEP, nor knew how to get PrEP, none of these questions regarding PrEP knowledge could be used as the dependent variable for this study. However, the majority of participants (83.4%) did report a likelihood to take PrEP if it was provided free of charge (see Figure 1 below).

Figure 1: Percentage of PrEP Likelihood



As a result of this, the likelihood of taking PrEP if it was free of charge was used as the dependent variable for research question 1: what are the predictors of the likelihood to take PrEP among LatinX in the United States?

Chi-Square Tests of Association

The Pearson Chi-square test was computed for the selected questions regarding HIV and STI-related behaviors revealed no statistical significance between them and the dependent variable, likelihood of taking PrEP if it were free of charge. These included, “Have you ever experienced intimate partner or domestic violence?”, χ^2 [0.000, $p=1.000$, $df=1$, $n=156$], “Have you ever exchanged drugs or money for sex?”, χ^2 [1.895, $p=0.169$, $df=1$, $n=157$], “Have you ever had sex with someone that you know injects illegal drugs?”, χ^2 [0.205, $p=0.651$, $df=1$, $n=157$], “Have you ever had sex with someone that you know has HIV/AIDS?”, χ^2 [0.000, $p=0.994$, $df=1$, $n=157$], “Have you ever had an HIV test?”, χ^2 [2.628, $p=0.105$, $df=1$, $n=157$], and “Did you use a condom at your last sexual encounter?”, χ^2 [0.999, $p=0.318$, $df=1$, $n=148$].

Correlations

Correlations were calculated for the sum scores of the following independent variables: HIV/AIDS knowledge, likelihood to take PrEP, machismo beliefs, sexual comfort, and folk illness beliefs. This was done to assess strength of linear relationship between each of these and likelihood of taking PrEP if it were free of charge. For HIV/AIDS knowledge, machismo beliefs, and folk illness beliefs, no statistically significant relationship was found between the sum scores and the dependent variable. For HIV/AIDS knowledge the results displayed χ^2 [-0.069, $p=0.398$, $n=165$], and for machismo and folk illness beliefs they demonstrated χ^2 [-0.102, $p=0.218$, $n=147$] and χ^2 [0.061, $p=0.471$, $n=145$], respectively. Alternatively, the sum score of likelihood to take PrEP did show statistical significance with the likelihood of taking PrEP if it were free of

charge, χ^2 [0.590, $p=0.000$, $n=157$], as well as the sum score of sexual comfort, χ^2 [0.218, $p=0.008$, $n=149$]. The independent variable likelihood to take PEP was omitted from these correlation tests due to the dependent variable only measuring the likelihood of PrEP usage and not that of PEP usage.

Regression Analysis

A logistic regression was performed to assess the impact of likelihood to take PrEP and sexual comfort on the likelihood that participants would take PrEP if it were free of charge. The overall model containing both predictors was statistically significant, χ^2 [2, $n=148$] = 57.1, $p < 0.001$ indicating that the model was able to distinguish between respondents who would and would not take PrEP if it were free of charge. The model as a whole explained between 32.0% (Cox and Snell R square) and 52.9% (Nagelkerke R squared) of the variance in taking up PrEP, and correctly classified 87.2% of cases. As shown in Table 13, only likelihood to take PrEP made a significant contribution in predicting likelihood to take PrEP if it was free of charge. However, sexual comfort was not significant. The odds ratios for this variable was 2.56, indicating that participants who endorsed taking PrEP in relation to other factors (Figure 1) were twice as likely to use PrEP if it were free of charge.

Table 13: Results of Logistic Regression Analyses of PrEP Likelihood and Sexual Comfort on Likelihood to Take PrEP if Free of Charge

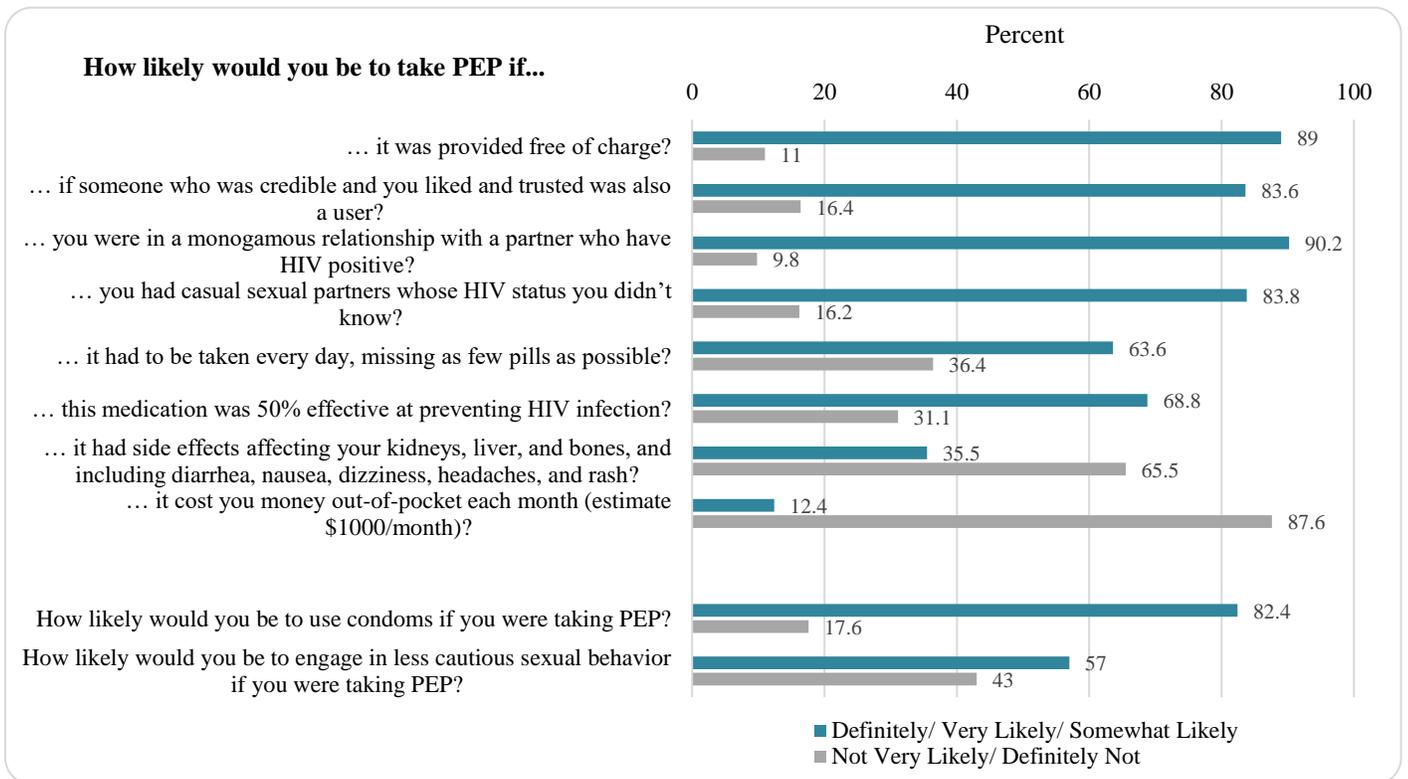
Variables	<i>B</i>	S.E	Wald	df	Sig	Odds Ratio	95% CI of OR
PrEP Likelihood	0.941	0.191	24.168	1	0.000	2.563	1.761
Sexual Comfort	0.106	0.65	2.69	1	0.100	1.112	0.980
Constant	-5.902	1.658	12.667	1	0.000	0.003	-

Research Question 2: What are the predictors of the likelihood to take PEP among LatinX in the United States?

Dependent Variable

To answer research question 2, the dependent variable was determined similarly to research question 1. Because the majority of participants reported that they had never heard of PEP, never taken PEP, nor knew how to get PEP (see Table 12), none of these questions regarding PEP usage could be used as the dependent variable for this study. However, the majority of participants (89%) did report a likelihood to take PEP if it was provided free of charge (see Figure 2). Because of this, the likelihood of taking PEP if it was free of charge was used as the dependent variable for research question 2: what are the predictors of the likelihood to take PEP among LatinX in the United States?

Figure 2: Percentage of PEP Likelihood



Chi-Square Tests of Association

Again, chi-square tests for questions regarding HIV and STI-related behaviors revealed no significant correlation between them and the dependent variable. These included, “Have you ever experienced intimate partner or domestic violence?”, χ^2 [3.032, $p=0.082$, $df=1$, $n=144$], “Have you ever exchanged drugs or money for sex?”, χ^2 [1.050, $p=0.305$, $df=1$, $n=145$], “Have you ever had sex with someone that you know injects illegal drugs?”, χ^2 [0.000, $p=0.994$, $df=1$, $n=145$], “Have you ever had sex with someone that you know has HIV/AIDS?”, χ^2 [0.202, $p=0.653$, $df=1$, $n=145$], “Have you ever had an HIV test?”, χ^2 [0.007, $p=0.932$, $df=1$, $n=145$], and “Did you use a condom at your last sexual encounter?”, χ^2 [0.559, $p=0.455$, $df=1$, $n=137$].

Correlations

Correlations were additionally calculated for the sum scores of the mentioned independent variables and likelihood of taking PEP if it were free of charge. Once more, for HIV/AIDS knowledge, machismo beliefs, and folk illness beliefs, there was no statistically significant relationship was found between their sum scores and the dependent variable. For HIV/AIDS knowledge the results displayed χ^2 [0.045, $p=0.592$, $n=145$], and for machismo and folk illness beliefs they demonstrated χ^2 [-0.064, $p=0.451$, $n=145$] and χ^2 [0.007, $p=0.937$, $n=145$], respectively. The sum score of likelihood to take PEP did show statistical significance with the likelihood of taking PEP if it were free of charge, χ^2 [0.588, $p=0.000$, $n=145$], as did the sum score of sexual comfort, χ^2 [0.180, $p=0.031$, $n=145$]. The independent variable likelihood to take PrEP was omitted from these correlation tests due to the dependent variable only measuring the likelihood of PEP usage and not that of PrEP usage.

Regression Analysis

A logistic regression was performed to assess the impact of likelihood to take PEP and sexual comfort on the likelihood that participants would take PEP if it were free of charge. The overall model containing both predictors was statistically significant, $\chi^2 [2, n=143] = 48.7, p < 0.001$ indicating that the model was able to distinguish between respondents who would and would not take PrEP if it were free of charge. The model as a whole explained between 28.9% (Cox and Snell R square) and 57.3% (Nagelkerke R squared) of the variance in taking up PrEP, and correctly classified 94.4% of cases. As shown in Table 14, only likelihood to take PEP made a significant contribution in predicting likelihood to take PEP if it was free of charge. Sexual comfort again did not. The odds ratios for attitudes and perceived barriers to PEP was 2.47, indicating that participants who endorsed taking PEP in relation to other factors (Figure 2) were twice as likely to use PEP if it were free of charge.

Table 14: Results of Logistic Regression Analyses of PEP Likelihood and Sexual Comfort on Likelihood to Take PEP if Free of Charge

Variables	<i>B</i>	S.E	Wald	df	Sig	Exp(B)	95% CI of OR
PEP Likelihood	0.904	0.197	21.099	1	0.000	2.470	1.679
Sexual Comfort	0.085	0.089	0.931	1	0.335	1.089	0.916
Constant	-4.140	1.924	4.632	1	0.031	0.016	-

Discussion

The primary purpose of this study was to assess factors that would predict the likelihood of taking PrEP and PEP among the LatinX population in the U.S. To achieve this goal, this study created a survey instrument that adapted questions related to HIV, PrEP, and PEP from extant studies (Gersh et al. 2014), while also adding particular scales that would account for potential cultural barriers unique to LatinX communities (Cuéllar, Arnold, & González, 1995; Marin,

Gomez, Tschann, & Gregorich, 1997). Because the LatinX population is a growing community that presently makes up the largest ethnic minority in the nation (United States Census Bureau, 2018b), no states were notably targeted in this study. Instead, this study strived to sample a national population and be inclusive to any participant that met the inclusion criteria of the research. Furthermore, this study also aimed to be mindful of language barriers and constructed a Spanish version of the survey instrument for potential Spanish-speaking participants.

Similar to previous studies, knowledge and uptake of PrEP and PEP among LatinX participants were low. Only 36.1% of participants had heard of PrEP prior to this study and 26.1% had heard of PEP, which was comparably similar to the Mantell et al. (2014) and Auerbach et al. (2015) studies. Despite these few respondents having some knowledge regarding PrEP and PEP, like participants in the Hoots et al. (2016) study, very few individuals reported ever taking PrEP (5.7%) or PEP (2.0%). It should be noted that unlike past studies, which either surveyed LatinX men who have sex with men (MSM) or a widespread sample of females in the U.S., this research study comprehensively surveyed individuals of LatinX descent without restrictions to gender identity or sexual orientation. Ultimately because of this, the gender breakdown was 67.4% female and 31.3% male, and the sexual orientation was predominantly straight (72.9%) –which to this study’s knowledge makes it the first of its kind.

Though limited, the extant literature regarding barriers to PrEP uptake in the LatinX community noted that doubts regarding PrEP efficacy were significant obstacles (Barreras et al., 2019; Brooks et al., 2018; Lelutiu-Weinberger & Golab, 2016) as were concerns about the cost of PrEP, potential side-effects of it, and credibility of the medical establishment (Auerbach et al., 2015; Brooks et al., 2018). Barriers regarding PEP have not been as well explored and its uptake has also been drastically low. These barriers may also be playing a role in PEP’s usage. While

this study did not seek to explore each of these systemic obstacles, statistically significant relationships were found between the likelihood to take PrEP if it were free of charge and the likelihood to take PrEP questions (Table 3) as well as between the likelihood to take PEP if it were free of charge and the likelihood to take PEP questions (Table 4). While individuals endorsed a strong likelihood of taking PrEP (83.4%) or PEP (89%) if they were free of charge, potential monthly out-of-pocket costs (e.g., \$500 for PrEP and \$1000 for PEP) and drug side-effects were noted as particular concerns. Alternatively, descriptive statistics in the present study show individuals were more likely to take PrEP or PEP if it had been endorsed by someone they found credible, if they were in a serodiscordant monogamous relationship, or if they had casual sexual partners with unknown HIV statuses.

While the aforementioned systemic barriers are important obstacles to PrEP and PEP uptake, this study strived to address three other important facets of LatinX culture that may have also been impacting uptake of PrEP and PEP which were the following variables: machismo beliefs, sexual comfort, and folk illness beliefs. Marin et al. (1997) found that machismo beliefs in men could impact sexual comfort levels between partners and influence how they discussed sexual matters. Ultimately, this study did not find that machismo beliefs were significant barriers to PrEP or PEP uptake. Contrastingly, this study did find that participants had high levels of sexual comfort which correlated with PrEP and PEP uptake. A potential reason for machismo beliefs not being endorsed at significant levels could have been due to the sample of this survey that consisted of a young, female majority demographic. Nonetheless, individuals did endorse feeling safe when discussing sexual matters representing a shift from previous studies (Marin, 2003; Marin, Gomez, Tschann, & Gregorich, 1997).

While studies related to barriers toward PrEP and PEP uptake had not measured LatinX folk beliefs towards illnesses, such as spirituality, the usage of *Curanderos*, and folk remedies, have been noted to affect how LatinX people seek Western healthcare (Favazza Titus, 2013; March & Gong, 2005). While the majority of participants (79%) in this study did report some type of religion, folk illness beliefs were not a significant barrier to PrEP or PEP uptake as there was no significant correlation between this variable and either medication. The mean age of the participants was 23 years of age, which could give insight to these findings. A survey assessing spirituality in LatinX adults across different age groups in the U.S. found that millennial LatinX adults were more detached from religious institutions than their elders (Martinez & Lipka, 2014). While 72% of the participants in that study reported being affiliated with a religion, only 31% attended worship services at least weekly (Martinez & Lipka, 2014). In this study, while 79% noted affiliation with a religion, only 10.4% attended at least one religious service in a week. In relation to PrEP and PEP uptake, this study also found that 70.2% of participants strongly disagreed and/or disagreed that their religious and/or spiritual beliefs impacted what they did in terms of HIV prevention. Collectively, these findings suggest that religion and/or spiritual beliefs did not influence the lack of uptake of PrEP or PEP as a prevention strategy amongst those that were surveyed.

Implications

This study utilized the Sexual Health Model as the theoretical framework as the model addresses HIV risk over a long-term scale through ten constructs that recognize established sexual knowledge and integrate sexual, relational, and emotional variables. From the ten defining constructs, this study specifically focused on four of them which were talking about sex, culture and sexual identity, sexual health care and safer sex, and spirituality. Ultimately, statistical

analyses and logistic regressions found that only sexual health care and safer sex was influenced by the variables in this study. The construct sexual health care and safer sex explores individuals' physical health and their practicing sexual behaviors by addressing how they get tested for sexually transmitted diseases and respond to illnesses by seeking healthcare. A potential reason the other constructs did not demonstrate statistical significance may have been due to the limitations of the sample population of this study. While this is expanded on later in limitations of the study, the sample of this study was notably young and cannot comprehensively account for the LatinX population. This may have been why they reported low scores on both scales the machismo beliefs and folk illness beliefs.

While this study explored sexual health care and safer sex by addressing HIV/AIDS knowledge, HIV and STI-related behaviors, likelihood to take PrEP, and likelihood to take PEP, only the variable relates to likelihood to take PrEP and PEP were statistically significant in being potential predictors for uptake of PrEP and PEP. Very few individuals noted having heard about PrEP and PEP prior to this study, but a majority of them were likely to take PrEP and/or PEP if it were free of charge, endorsed by someone they found credible, if they were in a serodiscordant monogamous relationship, and if they had casual sexual partners with unknown HIV status. However, participants were less likely to use PrEP and/or PEP if it required out-of-pocket costs or potential side effects. This is important for practice as healthcare providers and HIV prevention strategists should be aware of these barriers and help mitigate them. Providers, strategists, and community partners should better advertise these medications to the LatinX community and mitigate possible worries associated with potential costs and drug side effects.

Limitations of the Study

This study has a number of limitations that should be considered. To gather results, this survey used convenience sampling. Unlike other sampling techniques, convenience sampling may not always be representative of the target population. Only those persons that chose to participate in the survey make up the sample, leaving individuals of LatinX descent that did not choose to participate left out of the survey.

This survey was only accessible as an online instrument. Individuals who may have met the criteria for the survey but who did not have access to internet or to a technological device were not able to participate. Furthermore, individuals who may not be familiar with online surveys may not have participated. This limitation is particularly possible for individuals who are low-income or older. These persons may have also been people that may have potentially reported higher on the cultural scales that this study assessed. Though this survey was translated into Spanish, respondents primarily chose to complete it in English. The limitation of the survey being solely online could also be a potential reason why more Spanish-speaking individuals did not fill out the survey.

This survey also took around twenty minutes to complete imposing another limitation to those who could have potentially added to the results. Those who may not have had twenty minutes to spare were possibly deterred for that reason. This influenced those that ultimately did take the survey, where the majority of respondents were in their early twenties. Lastly, this study also had a small sample size, and therefore cannot conclusively account for the entire LatinX population or those outside of the United States.

Conclusions and Recommendations

Despite this study having its limitations, it is currently one of few studies that assessed factors related to PrEP uptake as well as PEP uptake in the LatinX population within the United States (Barreras et al., 2019; Brooks et al., 2018; Lelutiu-Weinberger & Golab, 2016). The findings reveal that factors related to the likelihood to take PrEP or PEP, such as out-of-pocket costs and drug side effects, were significant predictors of likelihood to take PrEP and PEP among this population. Sexual comfort also showed statistical significance with the likelihood to take PrEP and PEP despite not being a predictor in the regression models. Health professionals must understand that as HIV continues to disproportionately affect the LatinX community while PrEP and PEP uptake remains low. Efforts towards raising the uptake of these potentially life-saving medications among the LatinX should focus on mitigating fears and decreasing concerns regarding potential medication expenses and secondary drug effects.

Future research should further assess the three LatinX cultural facets that this study reviewed in relation to PrEP and PEP uptake and utilization. As noted, a limitation of this survey included a small sample size, a young age in the sample, and a possible exclusion of solely Spanish-speaking individuals. *Machismo* beliefs, sexual comfort, and folk illness beliefs may play a more significant role in LatinX people not represented by this study's sample, but this research cannot conclusively determine that.

Future research should examine these cultural factors in relation to conversations being had about HIV and STI-related behaviors between the LatinX community and health providers. A clearer picture is needed to determine if PrEP and PEP uptake remains low due to potential lack of HIV screening during appointments in conjunction with cultural barriers in populations over than twenty years of age. A larger and more inclusive sample size as well as the refinement

of the questions that were asked in this study may yield results that more accurately represent the LatinX population and the barriers they face in taking up PrEP and PEP. Ultimately, this study along with the extant literature regarding PrEP and PEP barriers in the LatinX community can serve as the foundation for more culturally aware patient care that serves to teach LatinX patients about existing HIV prevention strategies and helps decrease the HIV epidemic in this population.

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Appendix A – Online Survey

TITLE OF STUDY: Assessing Factors Associated with PrEP and PEP Uptake among the LatinX Population

Start of Block: Informed Consent

Purpose of the Study

You are invited to participate in a research study. The purpose of this study is to conduct an HIV needs assessment among the Hispanic/Latino population in the United States in order to identify service gaps, develop comprehensive plans, and create strategies to engage the community.

Participants

You are being asked to participate in this study because you fit this criteria: 1) Age: 18 years or older 2) Currently reside in the United States, and 3) Race/Ethnicity: Hispanic and/or Latino(a)

Procedures

If you volunteer to participate in this study, you will be asked to do the following: Complete an online survey using the Qualtrics platform.

Benefits of Participation

There will be no direct benefits to you as a participant in this study. However, we hope to learn more about the needs of LatinX persons in the US regarding HIV services. We hope that the results will then be used to provide services that will best meet the HIV-related service needs of LatinX persons in the US.

Risks of Participation

There will be no anticipated risks in this study. While there are not anticipated risks associated with completing the survey, personal questions are asked, which make you feel a little uncomfortable. Given the survey does not ask identifying information such as name, address, and phone number, your answers will not be readily linked to you. In addition, all results will be reported as a group. Individual responses will not be reported.

Cost/Compensation

There will be no financial cost to you to participate in this study. The study will take about 10-15 minutes of your time.

Confidentiality

All information gathered in this study will be kept as confidential as possible. No reference will be made in written or oral materials that could link you to this study. All records will be stored in

a locked facility at UNLV for 3 years after completion of the study. After the storage time, the information gathered will be destroyed as appropriate by the investigators.

Voluntary Participation

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with UNLV. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Participant Consent:

I have read the above information and agree to participate in this study. I have been able to ask questions about the research study. I am at least 18 years of age.

Q2 Do you provide consent to participate in this study?

- Yes (1)
- No (2)

Skip To: End of Survey If Do you provide consent to participate in this study? = No

End of Block: Informed Consent

Start of Block: Screening Questions

Q3 The next set of questions will ask you about your eligibility for this study. Thank you for your responses.

Q63 Do you identify as Hispanic and/or Latino(a)?

- Yes (1)
- No (2)
-

Q64 Do you currently reside in the United States?

Yes (1)

No (2)

Q4 Are you 18 years of age or older?

Yes (1)

No (2)

Skip To: End of Survey If Are you 18 years of age or older? = No

End of Block: Screening Questions

Start of Block: HIV / AIDS Knowledge

Q8 This next set of questions ask about what you know about HIV. For each statement, please check "True," or "False."

Q9 For each statement, please check "True" or "False."

	True (1)	False (2)
Coughing & sneezing do not spread HIV. (1)	<input type="radio"/>	<input type="radio"/>
A person can get HIV by sharing a glass of water with someone who has HIV? (2)	<input type="radio"/>	<input type="radio"/>
Pulling out a penis before a man climaxes keeps the sex partner from getting HIV. (3)	<input type="radio"/>	<input type="radio"/>
A woman can get HIV if she has anal sex. (4)	<input type="radio"/>	<input type="radio"/>
Showering or washing one's genitals / private parts after sex keeps a person from getting HIV. (5)	<input type="radio"/>	<input type="radio"/>
All pregnant women infected with HIV will have babies born with AIDS. (6)	<input type="radio"/>	<input type="radio"/>
People who have been infected with HIV quickly show serious signs of infection. (7)	<input type="radio"/>	<input type="radio"/>
There is a vaccine that can stop people from getting HIV. (8)	<input type="radio"/>	<input type="radio"/>
People are likely to get HIV by deep kissing, putting their tongue in their partners mouth, if their partner has HIV. (9)	<input type="radio"/>	<input type="radio"/>
A woman cannot get HIV if she has sex on her period. (10)	<input type="radio"/>	<input type="radio"/>
There is a female condom that can reduce a woman's chances of getting HIV. (11)	<input type="radio"/>	<input type="radio"/>
A natural skin condom works better to prevent HIV than a latex condom. (12)	<input type="radio"/>	<input type="radio"/>

A person will not get HIV if she or he is taking antibiotics. (13)

Having sex with more than one partner can increase one's chance of getting HIV. (14)

Taking a test for HIV one week after having sex will tell a person if she or he has HIV. (15)

A person can get HIV by sitting in a hot tub or swimming pool with someone who has HIV. (16)

A person can get HIV from oral sex. (17)

Using Vaseline or baby oil with condoms reduces the chances of getting HIV. (18)

End of Block: HIV / AIDS Knowledge

Start of Block: HIV and STI-related Behaviors

Q10 The next set of questions will ask about your sexual behaviors. Please answer these questions accurately and as honestly as possible and remember that this survey is anonymous. No one will know what you choose. You may skip any question you are not comfortable in answering.

Q11 Have you had sex in the past 6 months?

Yes (1)

No (2)

Skip To: Q13 If Have you had sex in the past 6 months? = No

Q12 How many people have you had sex with in the past 6 months?

Q13 How many people have you had sex with in your lifetime?

Q14 When with sex partners (e.g., steady, new, or non-steady), do you use a condom?

- Always (1)
 - Most of the time (2)
 - Sometimes (3)
 - Rarely (4)
 - Never (5)
-

Q15 When you have sex, who do you have sex with:

- Men (1)
 - Women (2)
 - Both (3)
-

Q56 Have you participated in the following? Check all that apply:

- Oral sex (1)
- Vaginal sex (2)
- Anal sex (3)

Skip To: Q17 If Have you participated in the following? Check all that apply: = Anal sex

Q17 If you have participated in anal sex, have you participated in the following?

- Top - Insertive (1)
- Bottom - Receptive (2)
- Both (3)
-

Q18 Have you ever experienced intimate partner or domestic violence?

- Yes (1)
- No (2)
-

Q19 Have you ever exchanged drugs or money for sex?

- Yes (1)
- No (2)
-

Q20 Have you ever had sex with someone that you know injects illegal drugs?

Yes (1)

No (2)

Q21 Have you used a needle to inject illegal drugs in the last year?

Yes (1)

No (2)

Q22 Have you ever had sex with someone that you know has HIV/AIDS?

Yes (1)

No (2)

Q23 Have you used meth, speed, crank, crystal, cocaine, or crack in the last year?

Yes (1)

No (2)

Q24 Do you smoke cigarettes?

Yes (1)

No (2)

Q25 Have you ever been in jail for more than 24 hours or been sentenced to prison?

Yes (1)

No (3)

Q26 Have you ever had an HIV test?

Yes (1)

No (2)

Q28 Did you use a condom at your last sexual encounter?

Yes (1)

No (2)

Skip To: Q29 If Did you use a condom at your last sexual encounter? = No

Q29 What is the primary reason that you do not use a condom? (Select all that apply)

- Married (1)
 - Partner refused (2)
 - I was drunk or high (3)
 - Shyness or uncomfortable (4)
 - Did not know how to use (5)
 - Condoms are expensive and I cannot afford them (6)
 - I forgot (7)
 - Preferred sex without a condom (8)
 - I didn't think it was necessary to use one (9)
 - Religious or spiritual beliefs (10)
 - Allergic to latex condoms (11)
 - Cultural beliefs (12)
 - Other (13) _____
-

Q30 How comfortable are you discussing issues of sex and HIV with your sex partner(s)?

- Very comfortable (1)
- Comfortable (2)
- Not comfortable (3)
- Not comfortable at all (4)

End of Block: HIV and STI-related Behaviors

Start of Block: PrEP Knowledge

Q31 PrEP Uptake Questions: The next set of questions asks you about PrEP medication or Pre-Exposure Prophylaxis (PrEP). PrEP is a daily oral medication for preventing HIV infection. PrEP medication (anti-HIV medication) is used to keep HIV negative people from becoming infected with HIV. Please answer these questions accurately and as honestly as possible. Remember that this survey is anonymous. No one will know your responses.

Q32 Before today, have you ever heard of people who do not have HIV by taking PrEP (anti-HIV medication) to keep them from getting HIV?

- Yes (1)
 - No (2)
-

Q33 Have you ever taken PrEP?

- Yes (1)
 - No (2)
-

Q34 Do you know how to get PrEP?

Yes (1)

No (2)

Q35 For each statement, please check "Definitely," "Very Likely," "Somewhat Likely," "Not Very Likely", or "Definitely Not."

	Definitely (1)	Very Likely (2)	Somewhat Likely (3)	Not Very Likely (4)	Definitely Not (5)
How likely would you take PrEP if it was provided free of charge? (1)	<input type="radio"/>				
How likely would you take PrEP if it cost you money out-of-pocket each month (estimate \$500/month)? (2)	<input type="radio"/>				
How likely would you be to take PrEP if it had side effects affecting your kidneys, liver, and bones, and including diarrhea, nausea, dizziness, headaches, and rash? (3)	<input type="radio"/>				
How likely would you be to take PrEP if it had to be taken every day, missing as few pills as possible? (4)	<input type="radio"/>				

How likely would you be to take PrEP if this medication was 50% effective at preventing HIV infection? (5)

How likely would you be to take PrEP if you were in a monogamous relationship with a partner who was HIV positive? (6)

How likely would you be to take PrEP if you had casual sexual partners whose HIV status you didn't know? (7)

How likely would you be to use condoms if you were taking PrEP? (8)

How likely would you be to engage in less cautious sexual behavior, such as use condoms less or have more sexual partners, if you were taking PrEP? (9)

How likely are you to use PrEP if someone who was credible and you liked and trusted was also a user? (10)

End of Block: PrEP Knowledge

Start of Block: PEP Knowledge

Q36 PEP Uptake Questions: The next set of questions asks you about PEP medication or Post-Exposure Prophylaxis (PEP). PEP is a daily oral medication that is used for preventing HIV infection after being exposed to HIV. PEP medication (anti-HIV medication) is used to keep HIV negative people from becoming infected with HIV. Please answer these questions accurately and as honestly as possible and remember that this survey is anonymous. No one will know your responses.

Q37 Before today, have you ever heard of people who do not have HIV by taking PEP (anti-HIV medication) to keep them from getting HIV?

Yes (1)

No (2)

Q38 Have you ever taken PEP?

Yes (1)

No (2)

Q39 Do you know how to get PEP?

Yes (1)

No (2)

Q40 For each statement, please check "Definitely," "Very Likely," "Somewhat Likely," "Not Very Likely", or "Definitely Not."

	Definitely (1)	Very Likely (2)	Somewhat Likely (3)	Not Very Likely (4)	Definitely Not (5)
How likely would you take PEP if it was provided free of charge? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How likely would you take PEP if it cost you money out-of-pocket each month (estimate \$1,000/month)? (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How likely would you be to take PEP if it had side effects affecting your kidneys, liver, and bones, and including diarrhea, nausea, dizziness, headaches, and rash? (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How likely would you be to take PEP if it had to be taken every day, missing as few pills as possible? (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How likely would you be to take PEP if this medication was 50% effective at preventing HIV infection? (5)

How likely would you be to take PEP if you were in a monogamous relationship with a partner who was HIV positive? (6)

How likely would you be to take PEP if you had casual sexual partners whose HIV status you didn't know? (7)

How likely would you be to use condoms if you were taking PEP? (8)

How likely would you be to engage in less cautious sexual behavior, such as use condoms less or have more sexual partners, if you were taking PEP? (9)

How likely are you to use PEP if someone who was credible and who you liked and trusted was also a user?
(10)



A horizontal scale consisting of five empty circles, evenly spaced, used for selecting a response option.

End of Block: PEP Knowledge

Start of Block: Sexual Comfort

Q41 For each statement, please check "Very Uncomfortable," "Uncomfortable," "Comfortable," or "Very Comfortable."

	Very Uncomfortable (1)	Uncomfortable (3)	Comfortable (4)	Very Comfortable (5)
How would you feel being naked in front of your partner? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How would you feel teaching your partner what feels pleasurable to you during sex? (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How would you feel discussing your sexual desires and fantasies with your partner? (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How would you feel having sex with lights on? (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How would you feel touching your partners genitals? (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How would you feel having someone put a condom on you? (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How would you feel masturbating in front of your sexual partner? (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Sexual Comfort

Start of Block: Machismo

Q55 The next set of questions are statements that reflect opinions on a wide range of topics. While in different situations different responses may be appropriate, please respond to each question as honestly as possible.

Please select true or false for each statement.

	True (1)	False (2)
A man should not marry a woman who is taller than him. (1)	<input type="radio"/>	<input type="radio"/>
It is the mother's special responsibility to provide her children with proper religious training. (2)	<input type="radio"/>	<input type="radio"/>
Boys should not be allowed to play with dolls and other girls' toys. (3)	<input type="radio"/>	<input type="radio"/>
Parents should maintain stricter control over their daughters than their sons. (4)	<input type="radio"/>	<input type="radio"/>
There are some jobs that women simply should not have. (5)	<input type="radio"/>	<input type="radio"/>
It is more important for a woman to learn how to take care of the house and the family than it is for her to get a college education. (6)	<input type="radio"/>	<input type="radio"/>
A wife should never contradict her husband in public. (7)	<input type="radio"/>	<input type="radio"/>
Men are more intelligent than women. (8)	<input type="radio"/>	<input type="radio"/>
No matter what people say, women really like dominant men. (9)	<input type="radio"/>	<input type="radio"/>
Some equality in marriage is a good thing, but by and large the father ought to have the main say so in family matters. (10)	<input type="radio"/>	<input type="radio"/>
For the most part, it is better to be a man than a woman. (11)	<input type="radio"/>	<input type="radio"/>

Most women have little respect for weak men. (12)	<input type="radio"/>	<input type="radio"/>
I would be more comfortable with a male boss than a female boss. (13)	<input type="radio"/>	<input type="radio"/>
It is important for a man to be strong. (14)	<input type="radio"/>	<input type="radio"/>
Girls should not be allowed to play with boys' toys such as soldiers and footballs. (15)	<input type="radio"/>	<input type="radio"/>
Wives should respect the man's position as head of the household. (16)	<input type="radio"/>	<input type="radio"/>
The father always knows what is best for the family. (17)	<input type="radio"/>	<input type="radio"/>

End of Block: Machismo

Start of Block: Folk Illness Beliefs

Q56 The next set of questions are statements that reflect opinions on illnesses. Please respond to each question as honestly as possible.

Please select true or false for each statement.

	True (1)	False (2)
I believe it is possible to place a hex on someone (embruja a alguien). (1)	<input type="radio"/>	<input type="radio"/>
I have been hexed (embrujado) in the past. (4)	<input type="radio"/>	<input type="radio"/>
Mental illness cannot be caused by witchcraft and evil spirits. (2)	<input type="radio"/>	<input type="radio"/>
I have been treated for "empacho." (5)	<input type="radio"/>	<input type="radio"/>
My family and I have used the services of curanderos, curanderas in the past. (6)	<input type="radio"/>	<input type="radio"/>
I have been treated by a curandero(a) more than once. (7)	<input type="radio"/>	<input type="radio"/>
I would take my child to a curandero if needed. (8)	<input type="radio"/>	<input type="radio"/>
When I was young I was treated for "Susto." (9)	<input type="radio"/>	<input type="radio"/>
When I was young, I was treated for "Mal de Ojo." (10)	<input type="radio"/>	<input type="radio"/>
For some illnesses a curandero is better than a doctor. (11)	<input type="radio"/>	<input type="radio"/>
Caida de Mollera (fallen fontenelle) happens mostly to a very young infant. (12)	<input type="radio"/>	<input type="radio"/>
If a person has special powers to do good or evil they should not be used too much. (13)	<input type="radio"/>	<input type="radio"/>
Physicians should accept gratuities rather than charge a fee for their services. (14)	<input type="radio"/>	<input type="radio"/>

It is essential to involve the family in healing a sick relative. (15)

End of Block: Folk Illness Beliefs

Start of Block: Demographic Information

Q42 These next questions ask about you.

Q43 What is the zip code where you live? Responses will be used to identify where survey participants are from.

Q44 Do you identify as:

Male (1)

Female (2)

Transgender (Male-to-Female) (3)

Transgender (Female-to-Male) (4)

Other (5) _____

Q45 Which of the following best describes your sexual orientation?

- Bisexual (1)
- Straight (2)
- Gay (3)
- Other (4) _____
- Prefer not to say (5)
-

Q46 What is your current age?

Q47 How do you identify? (select all that apply)

- White (1)
- Hispanic or Latino(a) (2)
- American Indian or Alaska Native (3)
- Asian (4)
- Native Hawaiian or Pacific Islander (5)
- Black or African American (6)
- Other (7) _____
-

Q48 If Hispanic or Latino(a): (select N/A if non-applicable)

- Mexican (3)
- Puerto Rican (5)
- Cuban (7)
- Other (8) _____
- N/A (9)
-

Q49 What is the highest level of school you have completed? *If currently enrolled, highest degree received.*

- Less than high school diploma (1)
- High school graduate or the equivalent (3)
- Some college, no degree (5)
- Associate degree (6)
- Some Bachelor's, no degree (11)
- Bachelor's degree (7)
- Completed graduate degree (9)
- Vocational/technical training (10)
-

Q50 Are you currently:

- Single, never married (1)
 - Married or domestic partnership (2)
 - Widowed (3)
 - Divorced (4)
 - Separated (5)
-



Q51 Which statement best describes your current employment status?

- Employed (Full-time) (1)
 - Employed (Part-time) (9)
 - Unemployed (2)
 - Retired (3)
-

Q52 Information about income is very important to understand. Would you please give your best guess? Please choose the answer that includes your entire household income (last year) before taxes.

- Less than \$25,000 (1)
 - \$25,000 to \$35,000 (3)
 - \$35,000 to \$50,000 (4)
 - \$50,000 to \$75,000 (6)
 - \$75,000 to \$100,000 (7)
 - \$100,000 to \$125,000 (8)
 - Greater than \$125,000 (9)
 - Unsure (10)
-

Q66 Do you have health insurance?

- Yes (1)
 - No (2)
-

Q53 What is your religious preference?

- Christian (1)
 - Catholic (2)
 - Jewish (3)
 - Islam (4)
 - Buddhism (5)
 - Mormon (6)
 - Agnostic (7)
 - None (8)
 - Other (9) _____
-

Q54 Over the past 3 months, how often have you attended religious services or ceremonies?

- One or more times per week (1)
 - 1-3 times per month (2)
 - Less than once per month (3)
 - None (4)
-

Q67 For the following question, indicate how strongly you agree with the following statement:
My religion and/or spiritual beliefs influence what I do in terms of HIV prevention.

- Strongly Agree (1)
- Agree (2)
- Undecided (3)
- Disagree (4)
- Strongly Disagree (5)

End of Block: Demographic Information

Start of Block: End of Survey Text

Q57 You have reached the end of the survey. Thank you very much for participating. We really appreciate your time!

End of Block: End of Survey Text
