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The Association between Sexual Risk Behaviors of Latinos and HIV Knowledge in South Carolina

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THE ASSOCIATION BETWEEN SEXUAL RISK BEHAVIORS OF LATINOS AND HIV KNOWLEDGE IN SOUTH CAROLINA

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DEDICATION

I dedicate this thesis to my husband and family. None of this would have been possible without their constant love and support and to them I am ever indebted.

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ABSTRACT

HIV/AIDS inordinately impacts Hispanics/Latinos, which are the fastest growing minority group in the United States. 16,222 South Carolinians are infected with HIV, with 70 new cases being diagnosed each month. Few studies have been conducted to determine if HIV knowledge is associated with sexual risk behaviors in South Carolina. Bilingual/bicultural interviewers conducted a survey of Latinos living in the Pee Dee and Midlands regions of South Carolina. The survey consisted of questions regarding demographic characteristics, HIV knowledge, and sexual risk behaviors. We enrolled 203 participants in which 193 were eligible for our study (97 females and 96 males). We hypothesized that Hispanics/Latinos with high HIV knowledge would have lower odds of participating in risky sexual behaviors. Results show the most prevalent risky sexual behaviors were inconsistent condom use during oral and vaginal sex, as most of the study population only had one sexual partner in the past 12 months. 87.63% of females and 92.71% of males sometimes or never wore a condom during oral sex which was consistent with condom use during vaginal sex; 91.75% of females sometimes or never wore a condom during vaginal sex and 83.33% of males sometimes or never wore a condom during vaginal sex. The median HIV knowledge score of males and females was 11 out of 18 with 65.8% of the study participants having below average HIV knowledge scores when using a dichotomized variable. Logistic regression found for every correct answer on the HIV knowledge questionnaire, the odds of high sexual risk behavior decreased by 18% when adjusting for age, sex, and years of school completed

(OR: 0.820, OR CI: 0.684-0.982). Five HIV knowledge questions were answered incorrectly by more than 50% of males and females with similar misconceptions found in previous studies. Our study demonstrates a need to focus on prevalent HIV misconceptions during development of new HIV/AIDS education programs as HIV knowledge was found to be associated with sexual risk behaviors.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

HIV Burden in the United States

Human Immunodeficiency Virus (HIV) currently affects 56,000 United States citizens annually.[1] HIV is a virus that attacks one's own immune system identifying regular cells as foreign.[2] More specifically HIV attacks CD4 cells, which are T-cells used to help fight off infection in one's body.[2] If left untreated, HIV will destroy a vast majority of CD4 cells, leaving the body helpless against other infections and diseases.[2] Over time HIV reduces the number of CD4 cells in the body which leads to the last stage of HIV infection- Acquired Immunodeficiency Syndrome (AIDS).[2] As of July 2015, over one million people are currently living with HIV and 13% of people infected, do not realize they have it.[3] While overall HIV diagnosis has remained stable, certain subgroups have seen a rise in recent years, giving a reason to study it.[4] Between 2006 and 2009 racial/ethnic minorities encompassed many of the newly diagnosed HIV cases.[4] As the Latino population continues to increase in the United States it is important to study HIV prevention.[5]

Latinos make up 17% of the United States population, yet account for 21% of HIV/AIDS diagnoses.[6] Hispanics/Latinos made up only 5.4% of the South Carolina population in 2014, but the South Carolina AIDS case rate was 13th highest among states with a confidential HIV/AIDS surveillance program.[7] Those at highest risk of HIV

among Latinos in South Carolina are men who have sex with men followed by those engaging in heterosexual sex.[7] Some authors suggest that culture plays a role in sexual prevention in the Latino population, with their main focus on *machismo* and Catholicism.[7-15]

Multiple studies have suggested decreased HIV knowledge among Latinas (Latino women) and high risk sexual activities among Latino men.[16-23] Yet, no study to-date has looked at how HIV knowledge alone is associated with sexual risk behaviors among Latinos. We hypothesize that those with higher HIV knowledge will demonstrate fewer sexual risk behaviors. Along with determining the association with HIV knowledge and sexual practices, factor analysis will be used to determine the major HIV misconceptions among Latinos. Bivariate analysis will be used to determine sexual practices of highest prevalence.

Objective and Research Questions

The overall objective of this research is to examine if HIV knowledge is associated with risky sexual behaviors among Latinos in South Carolina. The research questions are:

1. What are the most frequent HIV misconceptions among Latinos?
2. What sexual practices are the most prevalent among Latinos?
3. Is there an association between HIV knowledge and sexual risk behaviors among Latinos?

Significance

HIV disproportionately affects Latinos in the United States.[4] While Latinos only make up 4% of the HIV/AIDS cases in South Carolina, their population is the fastest growing in the United States.[5,7] Latinos have the second highest HIV rate in the United States suggesting needs for increased prevention efforts for that population.[1,3,24] To our knowledge no study to-date has examined how HIV knowledge alone is associated with sexual risk behaviors in the Latino population and no study-to-date has assessed this in South Carolina. As knowledge of HIV transmission and prevention is increased, we proposed examining a decrease in sexual risk behaviors. To achieve zero new HIV infections and zero AIDS-related deaths, we need to find productive interventions that reach multiple subgroups of the United States population.[25] Reaching an agreement on the highest misconceptions of HIV transmission can help increase education programs surrounding HIV/AIDS, as it was seen that Latino men from a study conducted in Baltimore City who knew at least two correct HIV transmission routes were more likely to get tested for HIV.[26] Participants for this study were recruited from neighborhoods and venues where Latinos congregated between 2009 and 2010 to assess how HIV knowledge, acculturation, self-perceived risk of HIV, and sexual risk behaviors differed between genders.[26] Increasing knowledge on HIV transmission can potentially diminish HIV/AIDS diagnosis through increased HIV testing.

CHAPTER 2

LITERATURE REVIEW

National HIV Trends

Every 9 ½ minutes a person in the United States receives a Human Immunodeficiency Virus (HIV) diagnosis, with approximately 56,000 people infected annually.[1] Since the start of the AIDS epidemic, 650,000 have died and 92,000 of those deaths occurred through heterosexual contact transmission.[3] While HIV diagnosis has remained relatively stable, certain subgroups have seen a rise in recent years.[4] The highest increase in HIV incidence was seen in the 13-29 year old age category between 2006 and 2009, where HIV incidence increased from 21.8 to 25.8 per 100,000.[4] Out of all HIV diagnoses between 2006 and 2009, 95% are from racial/ethnic minorities, sexual minorities, and injection drug users.[4] HIV testing incidence increased from a relatively stable 40% in 2001-2006 to 45% in 2009. Higher percentage of HIV testing has led to a decrease in late HIV diagnoses in the United States.[1] Late HIV diagnosis is categorized as receiving a HIV positive result within 12 months of AIDS diagnosis.[1]

Latinos make up the most rapidly growing minority group in the United States.[5] Latinos account for 21% of HIV/AIDS diagnoses, while only making up 17% of the United States population.[6] Between 2006 and 2007, Latinos saw a statistically significant 26% increase in HIV incidence, with the highest rate of HIV/AIDS occurring in the South and Northeast regions of the United States.[1,4] Behind African Americans, Latinos have rates of HIV infection three and four times higher than their non-Hispanic white

male and female counterparts, respectively. Along with high infection rates, Latinos are more likely to be diagnosed with HIV late in their infection and in close proximity to AIDS diagnosis.[1,3,24,27] Out of all Latinos living with HIV, approximately 15% are unaware of their status and 35% of those diagnosed will never seek medical care, contributing to one-sixth of all deaths due to AIDS occurring in the Latino population.[6] Unfortunately, many Latinos do not receive HIV testing unless through community health initiatives due to insufficient insurance or fear of deportation.[8]

Trends of HIV in South Carolina

South Carolina is the tenth smallest state with a total population of 4,832,482 people, with 5.4% of the population being of Hispanic/Latino origin.[7] Hispanics/Latinos in South Carolina earn 38% below the average income of $23,687 per capita, with 32% of the Hispanic/Latino population in South Carolina living below the poverty line.[7] South Carolina currently ranks 13th for highest AIDS case rate; dropping from eighth highest in 2011.[7] Contrary to the drop in overall AIDS case rate, South Carolina ranked fourth in percentage of late HIV diagnoses of states participating in a confidential HIV surveillance program.[7] The incidence rate for HIV and AIDS is 17.4 per 100,000 and 10.5 per 100,000, respectively.[7] In 2014, there were 16,222 people living with HIV in South Carolina, with approximately 70 new cases of HIV diagnosed each month.[7] The highest at-risk age group for HIV infection in South Carolina are those aged 20-44 years old.[7] In South Carolina, groups at highest risk of HIV transmission are 52% men who have sex with men (MSM) and 34% heterosexual sex which is congruent with high risk groups identified in the Hispanic/Latino population.[7] Latinas accounted for 75% of South Carolina women diagnosed with HIV/AIDS through heterosexual contact.[7]

Suggested Role of Culture in HIV/AIDS Transmission

Some authors suggest culture plays a role in sexual knowledge, sexual risk behaviors, and STD (Sexually-transmitted disease) testing in the Hispanic/Latino population. Few authors state that *machismo* (male gender role) and *marianismo* (female gender role) have strong influences on relationship behaviors.[9] Rios-Ellis et. al (2010) defines *machismo* as men being dominant and superior figures in all aspects of the relationship, even in sexual decision making.[9] Based on *machismo* and *marianismo*, if a male refuses to use protection during sexual intercourse, the female must accept his decision. HIV testing may also be influenced by gender roles, according to a study in Baltimore City, where Latinas refused to get tested for HIV without their partner's permission.[8] In two studies, Latinas reported fear of communicating with their partner about topics like sexual behavior and sexual decision making due to fear of their partner's anger, domestic violence, or thoughts of infidelity.[10,11] Those in relationships suggested condoms were associated with prostitution, drug use, and adultery.[10,12] Similar male and female gender roles have been seen in African cultures, as well.[13]

Simpatia is another value researchers suggest prevents Latinos from partaking in open conversations regarding sex.[28] *Simpatia* puts emphasis on the family and upholding family-life through creating and maintaining harmonious relationships.[28] Someone exposing their promiscuity, drug use, or sexuality could upset their family and ruin the *simpatia*, according to some researchers.[28] *Familismo* also values high respect and caring for the family.[15] *Familismo* has appeared to impact the sexual risk behaviors of girls more than boys, with young Latino girls disclosing they thought about what their mothers would expect from them more so than boys.[15] According to this study, boys were

influenced by *familismo* through the closeness of their family or wanting to bring honor to their family name.[15]

Researchers propose Catholic religion influences sexual decision making in Latinos.[12,28,29] Catholicism is the most practiced faith in the Hispanic/Latino population and condemns the use of condoms.[12,28,29] Hispanic/Latinos in focus groups conducted in Mexico, Puerto Rico, and the Dominican Republic stated they would not use condoms regardless of the STD protection condoms gave, due to rejection by the church.[12] Fundamentalists and Pentecostal faiths are on the rise with many Latinos, and both religions look down upon homosexuality, female promiscuity, and hold family life in high regard.[28] Catholicism and *machismo* were seen as the two major hindrances to condom use in the Latino population, according to Pérez-Jiménez et al. (2009). [12]

HIV Knowledge and Sexual Risk Behaviors among Latinos

A study conducted in rural South Carolina aimed to address reasons for differing HIV knowledge scores in pregnant Latinas.[16] Pregnant Latinas 18 years and older were recruited after their first visit to prenatal care.[16] A cross-sectional study design was given to eligible participants by bilingual/bicultural surveyors in the language of the participant's choice.[16] The survey included questions regarding: demographics and HIV prevention, testing, and transmission.[16] There were 11 true/false HIV knowledge questions adapted from an already validated study.[16] HIV knowledge score was dichotomized for logistic regression analysis with high HIV knowledge categorized as correctly answering eight or more true/false questions.[16] Those who answered less than eight questions correctly were categorized as having low HIV knowledge.[16] Final analysis

controlled for age and poverty while determining the 95% confidence intervals and adjusted odds ratios.[16] In this study, 76% of pregnant Latinas were categorized in the low HIV knowledge group, answering less than eight questions correctly; eight participants failed to correctly answer at least one.[16] Low HIV knowledge in Latinas was supported by findings in other studies.[16-18] A major HIV misconception identified in this study was mothers with HIV would automatically transmit it to their child.[16]

Higher HIV knowledge was identified in Latino men as demonstrated in a pilot study in eastern North Carolina.[19] Migrant or seasonal male farmworkers already enrolled in a pesticide study were recruited from 11 eastern North Carolina counties.[19] A 57-question survey in Spanish was given to the 120 participants, with questions regarding HIV knowledge, STD knowledge, and condom-use.[19] 11 true/false questions were used in the HIV knowledge section from a Knipper et al study on condom-use in heterosexual Latino men.[19] 60% of participants in the study believed coughing and sneezing could spread HIV and 80% of participants thought they would not contract HIV as long as their partners were chosen wisely.[19] Out of 11 true/false questions, the average HIV knowledge score for this study sample was 8.1.[19] This study demonstrated higher HIV knowledge scores in males than had been seen in previous studies with Latino females.[16-19]

Adolescents' knowledge about STDs, source of STD knowledge, condom-use, and demographic characteristics were assessed in a cross-national study which compared differences between Hispanic/Latinos in Chicago, Illinois and Santo Domingo, Dominican Republic.[20] Parents were asked to give consent for their child in 9^{th}-12^{th} grade to participate in a 33-question survey during their physical education class to determine

high risk groups based off inconsistent condom-use.[20] Chi square analysis was used to detect differences in condom-use between the two sites and logistic regression was used to predict those at high risk of STDs.[20] High risk was categorized as students who stated they would never or had never used a condom during any sexual encounter.[20] 90% of students acknowledged they knew about HIV, but misconceptions were still recognized in both populations.[20] 30% of students across both sites thought a person infected with HIV was easily recognizable through physical characteristics, while only 10% of students knew antiretroviral therapy could treat HIV.[20] Many students in this study claimed they did not use condoms during sexual intercourse simply because they would forget.[20] Only 1% of students from Chicago reported learning about STDs at home and 58% of students learned about STDs at school, leaving 41% of student's STD knowledge source unaccounted for.[20] This provides evidence of a need for better HIV programs that reach all students.[20]

More HIV misconceptions were presented in a study in Baltimore City.[26] This study was conducted in neighborhoods and venues in Baltimore City where many Latinos congregated between 2009 and 2010.[26] After consent was given, Latinos took part in a 20 minute in-person interview with a bilingual surveyor which focused on history of moving to the states, acculturation, self-perceived risk of HIV, HIV knowledge, and sexual risk behaviors.[26] Sexual risk behavior questions were generated from the UNAIDS/ MEASURE Evaluation HIV/AIDS Prevention Indicator Study.[26] Previous HIV testing was the outcome of interest and dichotomized to "yes" or "no/don't know." [26] All statistical analyses (Chi square, univariate logistic models, multivariable logistic models) were stratified by gender to identify differences.[26] A common misconception for Latinos

in Baltimore City was that HIV could spread through sharing utensils or kissing an infected person.[26] Latinas were less likely to have used a condom in any sexual encounter in the previous year and less likely to report condom-use overall compared to Latino men.[26] However, Latino men were more likely to put themselves at higher risk of HIV through riskier sexual behaviors.[26] Latino men acknowledged that their sexual behaviors put them at higher risk for HIV, but performed the behaviors anyway.[26] Increasing HIV knowledge of Latinos would be beneficial, as this study found Latino men identifying two or more correct ways HIV could be transmitted were more likely to get tested for HIV.[26]

In a convenience-sample conducted between January and June of 2003, Spanish-speaking Latino men and women were asked to participate in an open-ended conversation about sexual health knowledge and preventions for STIs (Sexually-transmitted infections), specifically HPV.[21] 10 women and 10 men were interviewed by the same sex, native Spanish-speaking interviewers who openly discussed topics listed above using a topic guide.[21] Instead of asking, "Have you ever performed or done any of these sexual behaviors," interviewers asked, "Has anyone you know done any of these."[21] By asking questions in this manner, researchers hoped social desirability bias would be eliminated.[21] Two interviewers separately coded all answers to find recurring themes.[21] One common theme was Latino men having more sexual partners than Latino women in their lifetime.[21] 40% of Latino men stated knowing other men with three or more sexual partners in the year prior and 80% of men stated they knew men with 3-20 sexual partners over their entire lifetime which was also documented from studies in Kazakhstan.[17, 21]

Sexual risk behaviors and HIV knowledge were assessed through three studies conducted in the Los Angeles or San Diego, CA area.[9,14,22] One study used three bilingual/bicultural females to conduct focus groups with 461 participants.[9] HIV risk and HIV knowledge were determined using an 11 question true/false HIV knowledge survey to identify content areas to use during interventions.[9] Logistic regression was used to gauge how attrition changed before and after implementation of the intervention plan.[9] Many participants in this study expressed they were unaware of their sexual partner's HIV status.[9] The more alarming discovery was that 11% of Latinos either knew their sexual partner was infected with HIV or did not ask because they stated not caring.[9] Contrary to findings from this study, another study conducted in Los Angeles, found many HIV-positive Latinas participated in low-risk sexual behaviors.[22] Between January 2005 and October 2006, 214 participants were recruited in Los Angeles, California to determine HIV transmission risk of mothers infected with HIV.[22] Number of lifetime sexual partners of HIV-infected women was predicted using ordinary least squares with logarithmic transformation.[22] Researchers found most Latinas had been infected with HIV through heterosexual contact, which was replicated in another study with older Latinas.[22,28] Many of the women in this study contracted HIV from men they were married to and seemed to engage in less unprotected sex than Latinas without HIV.[22] Lastly, a randomized control trial in Los Angeles County identified the need for HIV education starting before high school age.[14] Over 300 participants, all of which were couples, were randomized to the intervention or control group.[14] The study aimed to determine if parental protectiveness in an intervention setting would decrease the risky sexual behavior of couples.[14] Inclusion criteria consisted of the following: (1) between

the ages of 14 and 25, (2) in their current relationship for over 3 months, and (3) have a child over 3 years old.[14] The intervention focused on condom-use, sexual negotiations in the relationship, protection, and attitudes and beliefs surrounding barrier protection during sex.[14] Through this study, couples declared Latinos aged 14-25 had an average of about six lifetime sexual partners for males compared to about three lifetime sexual partners for females.[14] Many of the Latinos stated they engaged in their first sexual activity by the age of 14, showing a need for HIV education before students enter high school.[14]

Studies conducted in Alabama, Georgia, North Carolina, and South Carolina were assessed in a qualitative review to determine HIV burden in Latino men.[23] Migrant Latino men appeared to be at higher risk for HIV/STDs with the burden of infection unknown.[23] Heterosexual contact seemed to be a recurring issue among sexual behaviors that increased Latino men's HIV burden.[23] Another study conducted in accordance with the Latino Families HIV Needs Assessment project identified Durham, NC as the site with the lowest condom-use.[10] Over 90% of participants stated they had not used a condom during any sexual encounter in the previous two years.[10] This qualitative study was conducted using data from surveys in 14 cities across the United States and Puerto Rico.[10] Cities were picked if they had high AIDS case rates (>25 per 100,000), high incidence of substance abuse among Latinos, had a large population of Latinos close to the US/Mexico border, or had an increased Latino immigrant population within the last ten years.[10]

Many different studies assessed HIV knowledge and sexual risk behaviors, but none deciphered the association between HIV knowledge and sexual risk behaviors.

Other studies included HIV knowledge and sexual risk behaviors but had other exposures and outcomes of major interest. According to previous studies, low HIV knowledge was seen in many Latino women compared to high HIV knowledge seen in Latino men.[16-19] Multiple HIV misconceptions were identified between studies: (1) A mother will automatically transmit HIV to her child, (2) coughing/sneezing, sharing utensils, or kissing an infected individual will transmit HIV, (3) antiretroviral therapy is not used to treat HIV, and (4) someone with HIV is easily recognizable.[16,19,20,26]

Latino males seem to partake in higher sexual risk behaviors than women, yet women were found less likely to wear a condom in previous sexual encounters.[23,26] This might lead to high transmission of HIV through heterosexual contact in Latinas as identified in two different studies.[22,24] Part of the higher sexual risk behaviors in Latino males is due to males having significantly more sexual partners than females, which was replicated in a study in Kazakhstan.[14,17,21] Identifying how Latinos in South Carolina compare to other studies conducted will help to create well-rounded HIV education programs which focus on major HIV misconceptions. Heightening HIV awareness may lead to a decrease in sexual risk behaviors ultimately lowering the HIV burden seen in the Latino population.

CHAPTER 3

METHODS

The Study to Assess Beliefs and Evaluate Risks (SABER) was conducted from March 2014 to February 2015 by the University of South Carolina, specifically the Consortium for Latino Immigration Studies in the Arnold School of Public Health. SABER is a cross-sectional convenience sample of 203 Latino men and women recruited from the Midlands and Pee Dee regions of South Carolina. SABER was designed to determine HIV knowledge and sexual risk behaviors among a sample of Latinos in South Carolina.

Participants

Latinos were recruited at community sites such as flea markets, auto shops, hospitals, clinics, and other community areas in South Carolina and invited to participate in the SABER study. Inclusion criteria were persons 18 years and older who self-identified as Hispanic/Latino. After completing the survey, participants received a $20 incentive for their time. The study procedures were submitted and reviewed by the Institutional Review Board (IRB) at the University of South Carolina in which it was classified as exempt, given that no identifiable information was collected from study participants.

Measures

The SABER survey consisted of three domains: demographic characteristics, HIV knowledge, and sexual practices. Information about the following demographic characteristics was collected: age, city and country of birth, length of stay in the United States, years of education completed, city and country of current residence, family income, occupation, medical insurance coverage (yes,no), and racial/ethnic background of the participants' previous sexual partners (Caucasian, American Indian or Alaskan Native, Asian or Pacific Islander, Hispanic or Latino/a, Black or African American, Other). To assess HIV knowledge an adapted Spanish 18-item true/false questionnaire (HIV-KQ-18) was used.[30] Some sample items included: "Coughing and sneezing DO NOT spread HIV," "A woman cannot get HIV if she has sex during her period," "A person can get HIV from oral sex." Measures of sexual practices were comprised of 41 questions ascertaining types of sexual activity (anal, oral, vaginal), frequency of sexual activity (how often participant participated in anal, oral, or vaginal sex), age at first sexual encounter, number of sexual partners (how many sexual partners did you have anal/oral/vaginal sex with in the last 3, 6, or 12 months), condom/barrier use (type, frequency, duration during sexual activity, location condom was from), and risk factors associated with HIV (having sex for money, using alcohol/drugs, and HIV/STD status of partner). The sexual practice items were adapted from NHANES and the National HIV Behavioral Surveillance Round 3 Questionnaire.[31] The full survey, including demographic questions, HIV knowledge questions, and sexual practices, can be found in Appendix A. Participants were excluded from final analysis if they failed to answer

questions based on type of sex, condom-use, and frequency of sexual partners in the past 12 months.

Demographic Characteristics

Medians and interquartile ranges (IQR) were computed for all continuous variables and stratified by sex. Statistical significance (p-value < 0.05) was determined for continuous variables between male and females using the Wilcoxon Rank-Sum Test. Bivariate analysis was conducted on categorical variables and frequencies were calculated. Chi-square test was used to test statistical significance; Fisher-Freeman-Halton test or Fisher's exact test was used in frequency tables with less than five expected counts.

Research Question 1

1. What are the most frequent misconceptions about HIV among Latinos?

Bivariate analysis was performed to determine differences in answers on HIV knowledge questions between males and females. Pearson's Chi square test was used to determine if the difference in number of correct answers between males and females for each of the 18 questions was statistically significant.

The 18 item HIV knowledge questionnaire was subject to exploratory factor analysis using SAS® version 9.4. To assess appropriateness of our data for factor analysis, the Kaiser-Meyer-Olkin statistic was used with a preferred value greater than 0.80 and a p-value above 0.05 for Bartlett's sphericity test. Once suitability of factor analysis was assessed, simple factor analysis with varimax rotation was performed.

To estimate the correct number of factors Cattell's scree test and the interpretability criterion were used.[32] Each variable was tested for fit in a given factor based on the simple factor structure. Any variables cross-loading on multiple factors or any factor with less than three variables significantly loading to it were dropped from analysis. Factor loadings of 0.40 or higher were considered significant.[33] Once the correct number of factors were identified, Pearson correlation was used to identify HIV knowledge factor loading scores for each variable.

Research Question 2

2. What sexual practices seem to be the most prevalent among Latinos?

To determine prevalent sexual practices among Latinos, bivariate analysis was used to assess sexual practices amongst differing genders. Percentages were computed using the sexual practice question items and those attaining the highest percentages were considered the most prevalent. The Chi Square and the Fisher-Freeman-Halton test assessed if prevalence of sexual behaviors were statistically significantly different between genders.

Research Question 3

3. Is there an association between HIV knowledge and sexual risk behaviors among Latinos?

Sexual risk was categorized using answers from the following questions: "In the past 12 months how many different people have you had sex with?" "When you have vaginal sex, do you use a condom?" "When you have oral sex, do you use a condom?" Questions regarding the number of sexual partners a participant had in the past three

months, six months, and 12 months were collapsed into one category and labeled as "Number of sexual partners in the past 12 months." The highest number of sexual partners out of the three, six, and 12 month time frame was used as the sexual frequency variable. For example, if someone stated they had two sexual partners in the past three months but stated only one sexual partner in the past 12 months their sexual frequency variable would be 'more than one'. Participants' sexual risk behavior was marked 'at-risk' if they fell into any of the following criteria: had sex with more than one person in the past 12 months or if they had sex with one person in the past 12 months but did not wear a condom during vaginal sex. Participant's sexual risk behavior was marked 'low risk' if they fell into any of the following criteria: had sex with only one person and used protection during oral and vaginal sex; had sex with one person and used protection during vaginal sex but not oral sex. High risk sexual activity is categorized as having more than one sexual partner or not using protection during sexual intercourse. Those who did not use protection during oral sex were categorized in the low risk category, because it was identified through three studies that the transmission risk of HIV through unprotected oral sex was close to zero.[34]

HIV knowledge score was determined by assigning a score of '1' to every question answered correctly and '0' to every question answered incorrectly or marked "I don't know." HIV scores were summed for each participant to create an HIV knowledge score. HIV knowledge was split into two categories 'average and above' or 'below average'. Those who correctly answered 13 questions were marked as 'average or above' and those who incorrectly answered less than 13 questions were marked as 'below average'. When developing the HIV-KQ-18 questionnaire it was noted that the

proportion of correct answers out of over 2,000 participants was 0.72.[30] This number was used to determine that 13 questions correct out of 18 yielded a proportion of 0.72 which was then used to define the category criteria. A 2X2 frequency table was made and Fisher's exact test was used to test a significant association between HIV knowledge and sexual risk behaviors. An odds ratio and 95% confidence interval were calculated.

To differentiate between highest sexual risk behaviors and medium sexual risk behaviors, HIV knowledge and sexual risk behaviors were categorized into three groups. HIV knowledge scores were given categories of 'above average', 'average', and 'below average'. Participants fell in the 'average' category if their HIV knowledge score fell between 10 and 16. In the HIV-KQ-18 questionnaire the average proportion of correct answers was 0.72. This proportion had a standard deviation of 0.18 which was used to determine the average HIV knowledge score.[30] One standard deviation was added to the average proportion of 0.72 to get 0.90 and one standard deviation was subtracted from the average proportion to get 0.54. These two proportions (0.54, 0.90) were used to calculate the range for scores expected in the average HIV knowledge group. 10-16 correct answers on our HIV knowledge questionnaire corresponded to proportions with a range of 0.54-0.90 and were therefore categorized as having 'average' HIV knowledge. Those who correctly answered less than ten questions were marked as having a 'below average' HIV knowledge score and those who correctly answered more than 16 items were marked as having an 'above average' HIV knowledge score. For sexual risk behaviors individuals were divided into three categories 'high risk', 'medium risk', or 'minimal/no risk'. Participants were marked as 'low risk' if any of the following criteria were met: had never had sex , only had protected sex in the last 12 months with one individual, or had

sex in the last 12 months with one individual and used a condom during vaginal sex but not oral sex. Reason for including the last criteria in the minimal to no risk category was due to very rare transmission of HIV through oral sex compared to vaginal sex.[34] Participants were marked as 'medium risk' if any of the following criteria applied: had sex with more than one person in the past 12 months but used condoms during oral and vaginal sex, had sex with only one individual in the past 12 months but did not use a condom during vaginal intercourse, had sex with more than one person in the last 12 months but did not use protection during oral intercourse but did for vaginal intercourse, or had sex with only one individual in the last 12 months and never used a condom during oral or vaginal intercourse. Participants were marked as 'high risk' if they had sex with more than one person and did not wear protection during vaginal intercourse. The nonzero correlation Chi Square statistic was used to calculate the p-value for statistical significance of the association between HIV knowledge and sexual risk behaviors divided into three categories while taking order into account.

Logistic regression was performed on the dichotomized sexual risk behavior variable categorized as 'low risk' or 'high risk'. HIV knowledge was the main predictor and kept as a continuous variable in logistic regression with a scale from 0-18. Every correctly answered HIV knowledge question was given a '1' with a score of 18 demonstrating a perfect score. From previous readings on HIV knowledge, we knew that age of a person, their sex, and number of years of school completed were all confounders and therefore were included in our final logistic model despite showing no statistical significance.[8,10,15] A stepwise selection process was used to determine other potential confounders with a p-value of 0.05 needed for inclusion. Each variable was added in

separately, leaving in the variables found from previous readings, to assess the significance of the p-value. If a variable was not significant, the procedure was rerun using the next variable until all demographic variables were assessed as potential confounders. No other covariates were identified. SAS® version 9.4 was used to perform all statistical analyses.

CHAPTER 4

RESULTS

Demographic Characteristics

193 participants (97 females and 96 males) were included in the final analysis of our study. Demographic characteristics of males and females are summarized in Table 4.1. For females, the median of the following were found: age was 34 years old, number of years living in the US was 12 years, years of school education completed was 9.5 years and monthly household income was $450. Males had medians of the following: 33 years old, 13 years living in the US, 8 years of school education completed and a monthly household income of $500. Significant differences between males and females were seen in years of school completed and average household monthly income with p-values of 0.0051 and 0.0323, respectively. Females tended to complete more years of school than males in our sample and males reported higher monthly household incomes. 70.10% of females and 75% of males in our study reported their country of birth as Mexico; 72.16% of females and 73.96% of males reported living in South Carolina for 6-15 years; 85.57% of females and 92.71% of males reported having no insurance; 81.44% of females and 70.53% of males reported having sexual relationships with Hispanic/Latinos. Statistical significance was seen only in occupation (p-value = <0.0001). 100% of males in our study were employed compared to 72.16% of females employed. We found men were statistically significantly more likely to be employed than females in our study.

HIV Knowledge Misconceptions

Table 4.2 summarizes the correct and incorrect answers on the HIV knowledge questionnaire by males and females. Several questions were incorrectly answered by bothmales and females. 81.44% of females and 78.13% of males incorrectly answered all pregnant women infected with HIV would automatically have a baby born with AIDS. 65.98% of females and 71.88% of males incorrectly answered that HIV could be transmitted through deep kissing. 74.23% of females and 76.04% of males incorrectly answered that there was not a female condom that could be worn to reduce the risk of HIV for females. 65.98% of females and 60.42% believed natural skin condoms work better for protecting against HIV than latex condoms. 69.07% of females and 77.08% of males believed that HIV status could be determined by taking a test one week after having sex with an individual infected with HIV. Lastly, 61.86% of women correctly answered that a person can still get HIV when on antibiotics compared to only 46.88% of males demonstrating a statistically significant difference (p-value= 0.0367).

Factor analysis was completed for the 18-item HIV knowledge scale. A Kaiser-Meyer-Olkin value of 0.855 and a p-value of <0.0001 on Bartlett's test of sphericity demonstrated that our data was suitable for factor analysis. Five factors were identified through factor analysis having eigenvalues greater than 1; 5.44, 2.21, 1.13, 1.09, 1.02. Even though the eigenvalues suggested five factors, the scree plot demonstrated a clear elbow at three factors (Figure 4.1). The interpretability criterion was applied during principal component analysis to determine that two factors were to be included instead of three or five. Only two factors had three or more variables significantly loading on them

and therefore only two factors were included in our final analysis. Factors 1 and 2 combined represented 42% of the total variance (30% plus 12%, respectively).

Factor loading scores for each question on the HIV-KQ-18 questionnaire are presented in Table 4.3. Looking at the rotated factor pattern, questions were said to load on a specific factor if the factor loading was 0.40 or higher for that factor and less than 0.40 for the other factor. After removing variables that were not found to load significantly on either factor or variables that significantly cross-loaded we found that Factor 1 included ten questions and Factor 2 included five questions. Factor 1 encompassed questions regarding HIV transmission, symptoms and testing, whereas Factor 2 encompassed HIV sexual transmission. Factor analysis demonstrated inconclusive evidence suggesting the number of questions in the HIV-KQ-18 questionnaire, adapted for the SABER study, was sufficient.

Sexual Risk Prevalence

Sexual behaviors of males and females is presented in Table 4.4. 98.97% of females and 93.75% of males expressed having vaginal sex in their lifetime. Males in our study were more likely to give and receive oral sex than females ($p=0.0220$ and $p=0.0013$, respectively). 77.32% of female participants in stated giving oral sex compared to 89.58% of males. 71.13% of females received oral sex compared to 89.58% of males. Males in our study were more likely to have given anal sex (p-value = <0.001) and females were more likely to receive anal sex (p-value= 0.0124). 40.63% of males declared giving anal sex compared to 4.12% of females and 7.29% of males stated receiving anal sex compared to 19.59% of females. 91.19% of participants had only one

sexual partner within the last 12 months, yet 90.16% and 87.56% of participants sometimes or never used a barrier method during oral sex or vaginal sex, respectively. Statistical significance was not identified between number of sexual partners or condom-use during oral or vaginal sex. 93.81% of females and 88.54% of males had only one sexual partner in the last 12 months. 87.63% of women and 92.71% of men stated sometimes or never wearing condoms during oral sex compared to 91.75% of females and 83.33% of males sometimes or never wearing condoms during vaginal sex.

Association of HIV Knowledge and Sexual Risk Behaviors

Out of 18 points possible on the HIV knowledge questionnaire, the median number of correct answers was 11 out of 18 questions for both males and females as seen in Table 4.1. Chi square analysis revealed a significant association between HIV knowledge and sexual risk behaviors (Table 4.5). 65.80% of participants answered less than 13 items correctly on the HIV knowledge questionnaire and 88.60% of participants were categorized as ‘at-risk’ for HIV due to their sexual behavior. An ‘average or above average’ HIV knowledge score was associated with a decrease in risky sexual behaviors compared to those with below average HIV knowledge scores (p-value = 0.0089). An odds ratio of 0.3110 (95% CI: 0.125-0.772) was obtained suggesting those with average or above average HIV knowledge scores have 0.3110 times lower odds of partaking in at-risk sexual behaviors compared to those who have below average HIV knowledge scores. HIV knowledge and sexual risk behaviors were subsequently split into three categories: HIV knowledge (below average, average, above average) and sexual risk (minimal/none, medium, high). Using this categorization scheme, 38.34% of participants answered less than ten items correctly on the HIV knowledge questionnaire and were marked as having

'below average' HIV knowledge and 88.6% of participants were categorized as at medium or high risk for HIV due to their sexual behaviors. A statistically significant association (p-value =0.0068) between HIV knowledge and sexual risk behavior was observed when each variable was split into three categories (Table 4.6).

Among Latinos in our sample, after multivariate adjustment was performed (age, sex, years of school completed), higher HIV knowledge was statistically significantly associated with lower sexual risk behaviors as seen in Table 4.7 (p-value = 0.0312). For every correct answer on the HIV knowledge questionnaire, the odds of high sexual risk behavior decreased by 18% when adjusting for age, sex, and years of school completed.

Table 4.1: Socio-Demographic Characteristics by Sex in Participants 18 Years and Older, SABER 2014

Characteristics	Female (n =97)	Male (n = 96)	P-value[a]
Age			
Median(IQR), y	34 (27-40)	33 (27-38.5)	0.4741[b]
Country of Birth			
Mexico, No. (%)	68 (70.10)	72 (75.00)	
United States, No. (%)	4 (4.12)	9 (9.38)	0.1037
Other, No. (%)	25 (25.77)	15 (15.63)	
Years Living in the United States			
Median(IQR), y	12 (9-15)	13 (9-15)	0.4082[b]
Years Living in South Carolina			
< 5 years, No. (%)	18 (18.56)	20 (20.83)	
6-15 years, No. (%)	70 (72.16)	71 (73.96)	0.5352
>15 years, No. (%)	9 (9.28)	5 (5.21)	
Years of Education Completed			
Median(IQR), y	9.5 (6-12)	8 (6-11)	0.0051[b]
Residence Region			
Midlands, No. (%)	52 (53.61)	48 (50.00)	
Pee Dee, No. (%)	43 (44.33)	47 (48.96)	0.7078[c]
Other, No. (%)	2 (2.06)	1 (1.04)	
Monthly Family Salary			
Median(IQR)	450 (300-915)	500 (400-1000)	0.0323[b]
Medical Insurance			
Yes, No. (%)	14 (14.43)	7 (7.29)	0.1112
No, No. (%)	83 (85.57)	89 (92.71)	
Occupation			
Employed, No. (%)	70 (72.16)	96 (100.00)	<0.0001
Unemployed, No. (%)	27 (27.84)	0 (0.00)	
Race/Ethnicity of Dating Partners			
Hispanic/Latino, No. (%)	79 (81.44)	67 (70.53)	
White, No. (%)	1 (1.03)	1 (1.05)	0.1423[c]
More than one race, No. (%)	17 (17.53)	27 (28.42)	
HIV Knowledge Score			
Median(IQR)	11 (7-14)	11 (7-13)	0.6916[b]

Abbreviations: IQR, Interquartile Range

[a]: P-values were calculated using Chi-Square Test

[b]: P-values were calculated using Wilcoxon Rank Sum Test

[c]: P-values were calculated using Fisher-Freeman-Halton Test

Table 4.2: HIV Knowledge by Sex in Participants 18 years and older, SABER 2014

	Female (n=97) No. (%)		Male (n=96) No. (%)		P-value[a]
HIV Knowledge Question	**Correct**	**Incorrect**	**Correct**	**Incorrect**	
Coughing and sneezing DO NOT spread HIV.	51 (52.58)	46 (47.42)	45 (46.88)	51 (53.13)	0.4282
A person can get HIV by sharing a glass of water with someone who has HIV.	61 (62.89)	36 (37.11)	57 (59.38)	39 (40.63)	0.6168
Pulling out the penis before a man climaxes/cums keeps a woman from getting HIV during sex.	67 (69.07)	30 (30.93)	71 (73.96)	25 (26.04)	0.4521
A woman can get HIV if she has anal sex with a man.	79 (81.44)	18 (18.56)	86 (89.58)	10 (10.42)	0.1084
Showering, or washing one's genitals/private parts, after sex keeps a person from getting	77 (79.38)	20 (20.62)	78 (81.25)	18 (18.75)	0.7441
All pregnant women infected with HIV will have babies born with HIV.	18 (18.56)	79 (81.44)	21 (21.88)	75 (78.13)	0.5660
People who have been infected with HIV quickly show serious signs of being infected.	56 (57.73)	41 (42.27)	54 (56.25)	42 (43.75)	0.8353
There is a vaccine that can stop adults from getting HIV.	78 (80.41)	19 (19.59)	78 (81.25)	18 (18.75)	0.8825
People are likely to get HIV by deep kissing if their partner has HIV.	33 (34.02)	64 (65.98)	27 (28.13)	69 (71.88)	0.3763
A woman cannot get HIV if she has sex during her period.	56 (57.73)	41 (53.95)	61 (63.54)	35 (36.46)	0.4088
There is a female condom that can help decrease a woman's chance of getting HIV.	25 (25.77)	72 (74.23)	23 (23.96)	73 (76.04)	0.7706
A natural skin condom works better against HIV than does a latex condom.	33 (34.02)	64 (65.98)	38 (39.58)	58 (60.42)	0.4230
A person will NOT get HIV if she or he is taking antibiotics.	60 (61.86)	37 (38.14)	45 (46.88)	51 (53.13)	0.0367
Having sex with more than one partner can increase a person's risk of being infected with HIV.	86 (88.66)	11 (11.34)	89 (92.71)	7 (7.29)	0.3335
Taking a test for HIV one week after having sex will tell a person if she or he has HIV.	30 (30.93)	67 (69.07)	22 (22.92)	74 (77.08)	0.2098
A person can get HIV by sitting in a hot tub or a swimming pool with a person who has HIV.	55 (56.70)	42 (43.30)	45 (46.88)	51 (53.13)	0.1720
A person can get HIV from oral sex.	63 (64.95)	34 (35.05)	58 (60.42)	38 (39.58)	0.5151
Using Vaseline or baby oil with condoms lowers the chance of getting HIV.	66 (68.04)	31 (31.96)	76 (79.17)	20 (20.83)	0.0797

[a]: P-values were calculated using Chi-Square Test

Table 4.3: Factor Loading Scores and Variability for Each HIV Knowledge question, SABER 2014

Factor 1	Factor 2	h^2	Questions
0.53	-0.27	0.34	Coughing and sneezing DO NOT spread HIV
0.70	0.05	0.49	A person can get HIV by sharing a glass of water with someone who has HIV.
0.32	0.49	0.55	Pulling out the penis before a man climaxes/cums keeps a woman from getting HIV during sex.
-0.02	0.69	0.49	A women can get HIV if she has anal sex with a man.
0.75	0.15	0.57	People who have been infected with HIV quickly show serious signs of being infected.
0.42	0.43	0.33	There is a vaccine that can stop adults from getting HIV.
0.60	-0.24	0.44	People are likely to get HIV by deep kissing, putting their tongue in their partners mouth, if their partner has HIV.
0.50	0.30	0.31	A woman cannot get HIV if she has sex during her period.
0.58	-0.19	0.40	There is a female condom that can help decrease a woman's chance of getting HIV.
0.56	0.18	0.35	A natural skin condom works better against HIV than does a latex condom.
0.75	-0.07	0.58	A person will NOT get HIV if she or he is taking antibiotics.
-0.01	0.62	0.37	Having sex with more than one partner can increase a person's chance of being infected with HIV.
0.55	-0.01	0.34	Taking a test for HIV one week after having sex will tell a person if she or he has HIV.
0.64	-0.13	0.60	A person can get HIV by sitting in a hot tub or a swimming pool with a person who has HIV.
-0.00	0.58	0.34	A person can get HIV from oral sex.

h^2: Communality estimates

Table 4.4: Sexual Risk Behavior Prevalence by Sex, SABER 2014				
Characteristics	**Female (n =97)**	**Male (n = 96)**	**Total**	**P-value[a]**
Had Vaginal Sex				
Yes, No. (%)	96 (98.97)	90 (93.75)	186 (96.37)	0.0525
No, No. (%)	1 (1.03)	6 (6.25)	7 (3.63)	
Given Oral Sex				
Yes, No. (%)	75 (77.32)	86 (89.58)	161 (83.42)	0.0220
No, No. (%)	22 (22.68)	10 (10.42)	32 (16.58)	
Received Oral Sex				
Yes, No. (%)	69 (71.13)	86 (89.58)	155 (80.31)	0.0013
No, No. (%)	28 (28.87)	10 (10.42)	38 (19.69)	
Given Anal Sex				
Yes, No. (%)	4 (4.12)	39 (40.63)	43 (22.28)	<0.0001
No, No. (%)	93 (95.88)	57 (59.38)	150 (77.72)	
Received Anal Sex				
Yes, No. (%)	19 (19.59)	7 (7.29)	26 (13.47)	0.0124
No, No. (%)	78 (80.41)	89 (92.71)	167 (86.53)	
Number of Sexual Partners in the Past 12 Months				
0 sexual partners, No. (%)	1 (1.03)	3 (3.13)	4 (2.07)	
1 sexual partner, No. (%)	91 (93.81)	85 (88.54)	176 (91.19)	0.3781[b]
More than 1 sexual partner, No. (%)	5 (5.15)	8 (8.33)	13 (6.74)	
Use of Barrier Method During Oral Sex				
Always use protection or never had oral sex, No. (%)	12 (12.37)	7 (7.29)	19 (9.84)	0.2363
Sometimes or Never, No. (%)	85 (87.63)	89 (92.71)	174 (90.16)	
Use of Barrier Method During Vaginal Sex				
Always use protection or Never had oral sex, No. (%)	8 (8.25)	16 (16.67)	24 (12.44)	0.0764
Sometimes or Never, No. (%)	89 (91.75)	80 (83.33)	169 (87.56)	

[a]: P-values were calculated using Chi Square Test
[b]: P-values were calculated using Fisher-Freeman-Halton Test

Table 4.5: Association between dichotomized HIV Knowledge Score and Sexual Risk Behavior, SABER 2014

	Sexual Risk Behavior		
HIV Knowledge Score	At-risk, No. (%)	Minimal/ No Risk, No. (%)	Total, No. (%)
Below Average	118 (61.14)	9 (4.66)	127 (65.80)
Average or above	53 (27.46)	13 (6.74)	66 (34.20)
Total	171 (88.60)	22 (11.40)	193 (100)
Chi Square	6.382[a]		

[a]: p-value = 0.0089

Table 4.6: Association between HIV Knowledge Score and Sexual Risk Behavior using three categories, SABER 2014

	Sexual Risk Behavior			
HIV Knowledge Score	High risk, No. (%)	Medium Risk, No. (%)	Minimal/ No Risk, No. (%)	Total, No. (%)
Below average	5 (2.59)	67 (34.72)	2 (1.04)	74 (38.34)
Average	4 (2.07)	87 (45.08)	19 (9.84)	110 (56.99)
Above Average	0 (0.00)	8 (4.15)	1 (0.52)	9 (4.66)
Total	9 (4.66)	162 (83.94)	22 (11.40)	193 (100)
Chi Square	7.3212[a]			

[a]:p-value = 0.0068

Table 4.7: Logistic Regression Analysis of Sexual Risk Behavior, SABER 2014

Variable	**$\hat{\beta}$**	**SE $\hat{\beta}$**	**OR**	**OR 95% CI**	**P-value[a]**
HIV knowledge	-0.1988	0.0924	0.820	0.684, 0.982	0.0315
Age in years	0.0116	0.0269	1.012	0.960, 1.066	0.6656
Years of School Completed	-0.1014	0.0784	0.904	0.775, 1.054	0.1962
Sex					
Male	Reference	Reference	Reference	Reference	
Female	0.5648	0.5470	1.759	0.602, 5.139	0.3018

Abbreviations: β, Parameter Estimate; SE, Standard Error; OR, Odds Ratio; CI, Confidence Interval

[a]: P-value calculated using Chi Square Test

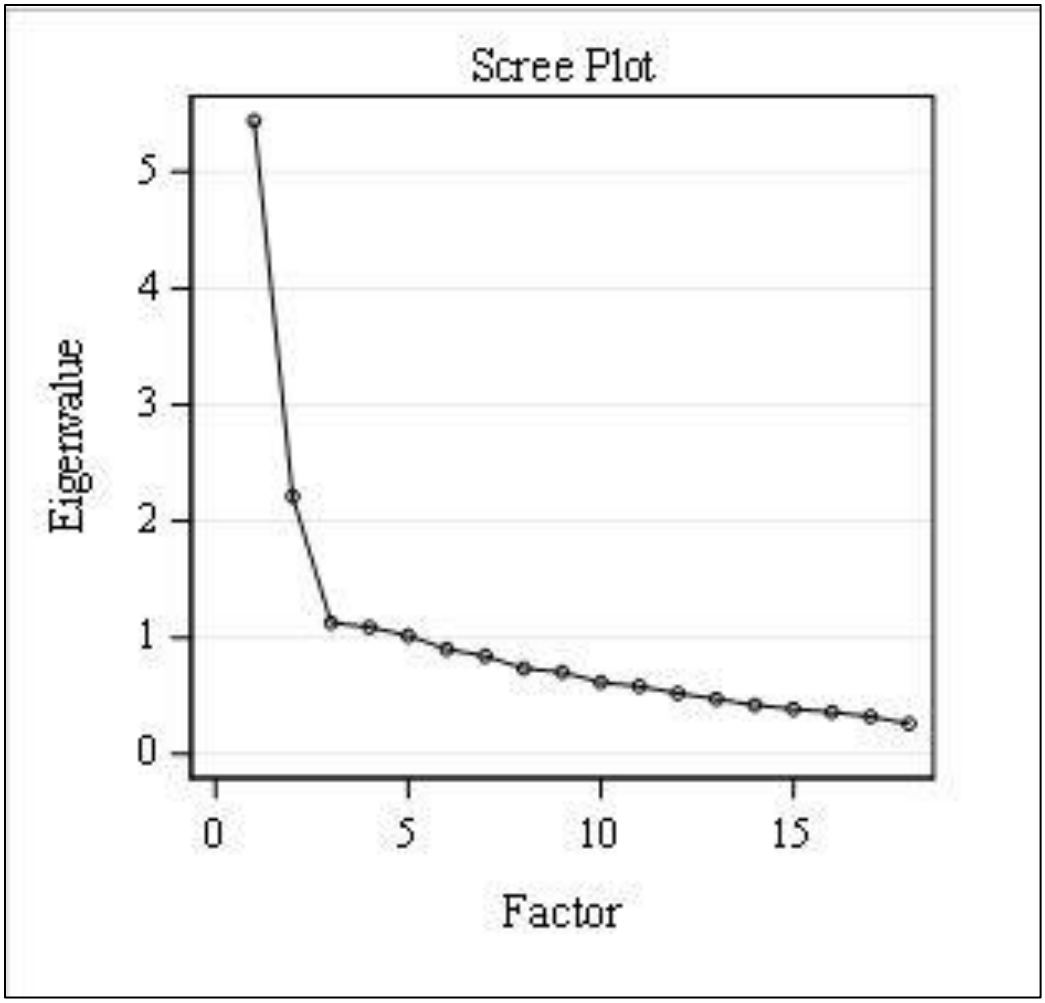

Figure 4.1 Eigenvalues from HIV knowledge factor analysis using Cattel's Scree Plot.

CHAPTER 5

DISCUSSION

From 2000-2010, the Hispanic/Latino population in South Carolina grew by 147.9%, with continued increases seen every year since.[35] It is imperative to understand the misconceptions about HIV and content areas where education programs should focus, as Hispanics/Latinos have the second highest HIV incidence rate behind African-Americans.[1,3,24] We found that males and females did not differ in their HIV knowledge score with a median of 11 correctly answered questions out of 18 possible. This finding was different than other studies which demonstrated males have higher HIV knowledge scores compared to females.[16-19] Females in our study had statistically significant higher median years of education completed, which could have been a reason we saw the same HIV knowledge median score among males and females in our study. Five questions on the HIV knowledge questionnaire were answered incorrectly by more than 50% of males and females in our population and should be explicitly addressed in HIV education classes and clinics, as it was seen that similar misconceptions have been identified in previous studies.[16,19,20,26]

While HIV knowledge median scores did not differ between sexes, 65.80% of participants in our study had below average HIV knowledge scores. A similar study of pregnant Latinas in South Carolina found 76% of participants had low HIV knowledge.[16] Low HIV knowledge scores might be due to underlying social determinants like access to

good education systems. Males and females in our study reported average monthly incomes below the poverty line (Table 4.1) and unfortunately those in poverty also have a more difficult time finding good education systems which influences HIV knowledge.[19] This is problematic since our study found evidence that those with lower HIV knowledge were at statistically significant higher odds of partaking in riskier sexual behaviors (OR: 1.22, CI: 1.02, 1.46). For sexual risk behaviors, 88.60% of participants in our study participated in sexual behaviors that put them at higher risk for HIV, with the most prevalent sexual risk behaviors being sometimes or never using a condom during oral (87.63% for females and 92.71% for males) or vaginal sex (91.75% for females and 83.33% for males). This is similar to the finding among 9^{th}-12^{th} graders, where inconsistent condom use in Hispanics/Latinos was attributed to forgetfulness during intercourse.[20] The most prevalent answer for the number of past sexual partners in the past twelve months was one (93.81% for females and 88.54% for males). Number of sexual partners did not differ significantly between males and females in our study, which provided contrasting information from other studies which identified females had statistically significant fewer sexual partners than males.[14,17,21] Marriage was not assessed in our study and could be the reason the highest prevalence of sexual partners was one between males and females, as our study could have been highly populated with married persons. Even though, a majority of our population stated they only had one sexual partner, the status of concurrent relationships of their partner were unknown. Due to being unaware of the sexual activities of the partners, many could still be at risk due to no barrier protection used during sexual activities. 88.60% of participants in our study were categorized in the ‘at-risk’ sexual behavior category, mostly due to sometimes or never

using protection during vaginal sex. It is important to work with community partners and faith-based organizations to provide supplemental materials for HIV education targeting HIV knowledge misconceptions and expressing the importance of condom-use, even if the individual only has one sexual partner.[29]

Upon completing factor analysis our results were inconclusive. Originally, the HIV-KQ questionnaire had 45 questions and factor analysis reduced the questions that seemed to depict the same overall theme. Once factor analysis was performed, three factors were left, including 18 different questions.[30] In our analysis, two factors were needed; however, the factors did not depict the same overall theme. Factor 1 had variables loading to it that described HIV general transmission, HIV testing, and HIV prevention, whereas factor 2 had an overall theme that could be depicted- sexual transmission of HIV. With two factors, only 42% of total variance was explained, which is not very beneficial to determine the overall theme of HIV misconceptions in the Hispanic/Latino population. When comparing factor loading scores by question with each factor, it was found that most of them loaded similarly on both factors or did not follow the interpretability criterion. The interpretability criterion states variables should load on one factor significantly and barely load on the other.[32] From our findings, we did not find any evidence to report reduction of questions in HIV-KQ-18 and were unable to come up with an overarching theme for misconceptions presented in our study sample. This demonstrates the survey was sufficient in testing HIV misconceptions and assessing a wide array of HIV knowledge.

Many strengths were presented in this research. First, our study was conducted in two regions of South Carolina with the highest AIDS prevalence.[7] Second, factor analysis

was used to note if HIV-KQ-18 was sufficient to use in further studies which we were able to confirm. Third, the SABER survey assessed race/ethnicity of sexual partners which authors suggest might give insight into HIV risk within a community. Authors suggest certain racial/ethnic groups have tight-knit social networks making it easier for HIV to spread compared to people in larger social groups.[36,37] This might share insight on why certain race/ethnicities seem to be disproportionately infected with HIV even when partaking in low-risk sexual activities. Lastly, as the Hispanic/Latino population continues to grow in South Carolina it is important to study this population to stay ahead of potential health concerns, one being HIV.

This study also presented a few limitations. Our study design was cross-sectional in which temporality between exposure of HIV Knowledge and outcome of sexual risk behavior could not be addressed. Second, sexual orientation was not asked to participants which could have helped us further explain the association between HIV knowledge and sexual risk behaviors. Third, due to the nature of our questionnaire, many participants did not answer most of the sexual behavior questions. The sexual behavior questionnaire had 41 questions in which only 10 provided substantial numbers for analysis. Some of the questions not answered included: “Did you or your partner use the condom the entire sexual act or only at the end of the act?” “When you have anal sex do you use a condom?” “Before or during the last time you had sex with this partner did you use alcohol, drugs or both alcohol and drugs?” “The last time you had sex with a partner, did you know his/her HIV status and, if so, what was his/her HIV status?” The unanswered questions would have been beneficial in our analysis to explain prevalent sexual risk behaviors and also explore condom use efficiency, alcohol/drugs, and partner’s HIV

status. These questions would have helped in the categorization of sexual behaviors among participants. Fourth, social desirability could have biased our results. Participants could have lessened the number of partners they had sex with in the past 12 months, not stated what type of sexual acts they really participated in, or falsely stated they used a condom because they wanted to demonstrate they practiced safe sexual behaviors. Fifth, all statistical analyses assumed independence, however it is unknown if participants were family members which would make some of our data correlated. Lastly, our study population was 193 Hispanic/Latinos from two regions in South Carolina and may not be representative of the United States population limiting generalizability from our study.

Future studies should focus on gathering a nationally representative sample of the United States population while taking into account sexual orientation. A cross-sectional study design should be administered to determine the differences between race/ethnicities and sexual orientation preferences when it comes to HIV knowledge and sexual risk behavior. This would allow us to determine if our findings are specific to the Hispanic/Latino population or if they can be generalized to other race/ethnicities. As the Hispanic/Latino population in the United States keeps increasing, it is important to find ways to improve HIV/AIDS education to help reduce the risk of HIV.

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APPENDIX A

SABER QUESTIONNAIRE ENGLISH

"Hello, my name is _____ and I work as a surveyor at the University of South Carolina."

"The University of South Carolina is doing a health research study about the HIV knowledge and types of sex (we call it "*sexual practices"*) Latinos in South Carolina are having. Latinos are being asked to take part in a survey so we can better understand what sexual practices may or may not be putting Latinos at risk for HIV and sexually transmitted infections. The survey takes about 20 minutes to be completed and we give you a $20 for your time. Some of the questions may seem very personal to you but you are not required to answer any questions that make you feel uncomfortable and you may stop the survey at any time. Before we do the survey though, we first need to ask you a few questions to see if you are eligible to take part in the study. Your answers will be kept very private because I will not write your name on this form. The questions we will ask you will not identify who you are but will help us find out if you can take part in the study. It will take three minutes of your time to answer these questions. If you want me to, I can ask you these questions now and then if you are eligible for the study, I can then ask you the survey questions."

If participant is not interested say: "OK, I appreciate your taking this time to talk with me, goodbye."

2. IF INTERESTED, ASK SCREENING QUESTIONS.
3. IF RESPONDENT MEETS ELIGIBILITY CRITERIA, SAY: **"Based on your answers, you are eligible to take part in the study.** HAVE HIM/HER SIGN CONSENT FORM and say: **Can I ask you the survey questions now?"**

4. IF RESPODENT DOES NOT MEET ELIGIBILITY CRITERIA, SAY: **"Based on your answers, you are NOT eligible to take part in the study right now. Thank you for your time." University of South Carolina Consortium for Latino Immigration Studies**

SABER SCREENING FORM

Date _____ Recruiter ID# _____ Screening ID# _____

Where was participant recruited from? _____

1. Is participant Male ____ Female _____

2. Do you consider yourself to be Hispanic/Latino? N Y

3. Have you ever been asked these questions for this study before? N Y

4. Where were you born? _____ (country)

5. Date of birth: _____ (mm/yyyy)

6. How old are you? _____

A. Demographic Information

First, I'd like to ask you a few questions about yourself. The answers for some of the questions may seem obvious to you, but I do need to ask every question to be sure I collect the correct information.

1. How old are you? _____

2. Where were you born?

   Country _____ City _____

3. For how long have you been in the US? _____

4. How many years of Education do you have? _____

5. Where do you live now? City: _____ County: _____

6. What is your family income? $_____

   □ per week □ every other week □ monthly

7. What is your job? _____

8. Do you have medical insurance? □ Yes □ No

9. **If yes**. ¿which one?
_____

10. ¿Do you have Medicaid? □ Yes □ No

11. Which of the following best describes the racial or ethnic background **of the people you date/have dated?** (check all that apply)

American Indian or Alaskan Native _____

Asian or Pacific Islander_____

Hispanic or Latino/a _____

Black or African American_____

Other (specify)_____

B. Knowledge about HIV

Next, I am going to read a set of questions about HIV, AIDS, and HIV counseling and testing. Please answer questions using the following scale: True (T), False (F), Don't Know (DK)

		T	F	DK
B1.	Coughing and sneezing DO NOT spread HIV.			
B2.	A person can get HIV by sharing a glass of water with someone who has HIV.			
B3.	Pulling out the penis before a man climaxes/cums keeps a woman from getting HIV during sex.			
B4.	A woman can get HIV if she has anal sex with a man.			
B5.	Showering, or washing one's genitals/private parts, after sex keeps a person from getting HIV.			
B6.	All pregnant women infected with HIV will have babies born with AIDS.			
B7.	People who have been infected with HIV quickly show serious signs of being infected.			
B8.	There is a vaccine that can stop adults from getting HIV.			
B9.	People are likely to get HIV by deep kissing, putting their tongue in their partner's mouth, if their partner has HIV.			
B10.	A woman cannot get HIV if she has sex during her period.			
B11.	There is a female condom that can help decrease a woman's chance of getting HIV.			
B12.	A natural skin condom works better against HIV than does a latex condom.			

B13.	A person will NOT get HIV if she or he is taking antibiotics.			
B14.	Having sex with more than one partner can increase a person's chance of being infected with HIV.			
B15.	Taking a test for HIV one week after having sex will tell a person if she or he has HIV.			
B16.	A person can get HIV by sitting in a hot tub or a swimming pool with a person who has HIV.			
B17.	A person can get HIV from oral sex.			
B18.	Using Vaseline or baby oil with condoms lowers the chance of getting HIV.			

C. Sexual Practices

Now I would like to ask you some questions about sex.

Remember that these questions will be kept private.

	Have **you ever….**	No	Yes	Refused to answer
C1.	**given** oral sex?			
C2.	**received** oral sex?			
C3.	had vaginal sex?			
C4.	**given** anal sex?			
C5.	**received** anal sex?			

If respondent answered NO to questions QC1-QC5 then FINISH Survey

	How often do you **have:**	1. Every time I have sex	2. Only sometimes when I have sex	3. Have only done it a few times when I had sex	4. Other (specify)	5.Never
C6.	Oral sex					
C7.	Vaginal sex					
C8.	Anal sex					
	How often do you **receive**:					
C9.	Oral sex					
C10.	Vaginal sex					
C11.	Anal sex					

C12. How old were you the first time you had any type of sex? _____ (age)

	In the past 3 months…	Number	Don't know	Refused
C13.	how many different people have you had sex with?			
C14.	how many of these different people did you have **oral sex** with?			
C15.	how many of these different people did you have **vaginal sex** with?			
C16.	how many of these different people did you have **anal sex** with?			

	In the past 6 months…	Number	Don't know	Refused
C17.	how many different people have you had sex with?			
C18.	how many of these different people did you have **oral sex** with?			
C19.	how many of these different people did you have **vaginal sex** with?			
C20.	how many of these different people did you have **anal sex** with?			

	In the past 12 months…	Number	Don't know	Refused
C21.	how many different people have you had sex with?			
C22.	how many of these different people did you have **oral sex** with?			
C23.	how many of these different people did you have **vaginal sex** with?			
C24.	how many of these different people did you have **anal sex** with?			

C25. When you have **oral sex**, do you use a condom or another type of a barrier method? **(Interviewer:**
DO NOT read options 1, 5, or 6 to the participant).

1. I have never had oral sex.
2. Always **(Go to next Q AND ask Q C33)**
3. Sometimes **(Go to Next Q AND ask Q C32 and C33)**
4. Never **(Go to Q C20 AND ask Q C32)**
5. Don't know **(Go to Q C28)**
6. Refused **(Go to Q C28)**

C26. Which type of method do you use?

1. Male condom
2. Female condom
3. Dental dam (what dentists use)
4. Saran wrap
5. Other(specify)_____

C27. Did you or your partner use the condom/barrier method the entire sexual act or only at the end of the act?

1. During the entire sexual act
2. Only at the end of the sexual act
3. Don't know/remember
4. Refused to answer

C28. When you have **vaginal sex,** do you use a condom? **(Interviewer: DO NOT read options 1, 5, or 6 to the participant).**

1. I have never had **vaginal sex**
2. Always **(Go to next Q AND ask Q C33)**
3. Sometimes **(Go to Next Q AND ask Q C32 and C33)**
4. Never **(Skip Next Q AND ask Q C32**)
5. Don't know **(Skip Next Q)**
6. Refused **(Skip Next Q)**

C29. Did you or your partner use the condom the entire sexual act or only at the end of the act?

1. During the entire sexual act
2. Only at the end of the sexual act
3. Don't know/remember
4. Refused to answer

C30. When you have **anal sex**, do you use a condom? **(Interviewer: DO NOT read options 1, 5, or 6 to the participant).**

1. I have never had **anal sex**
2. Always **(Go to next Q AND ask Q C33)**
3. Sometimes **(Go to Next Q AND ask Q C32 and C33)**
4. Never **(Skip Next Q AND ask Q C32)**
5. Don't know **(Skip Next Q)**
6. Refused **(Skip Next Q)**

C31. Did you or your partner use the condom the entire sexual act or only at the end of the act?

1. During the entire sexual act
2. Only at the end of the sexual act
3. Don't know/remember
4. Refused to answer

C32. Why do you not use condoms at all or all the time?

1. Wish to become pregnant
2. Didn't have one on hand
3. Expensive
4. Partner didn't want to use
5. Don't like to use them
6. Don't think it is necessary
7. Didn't think of it
8. Other (please write)_____
9. Difficult to answer

C33. Why do you use a condom?

1. To not get pregnant
2. To not get infected with a sexually transmitted infection
3. To not get infected with HIV
4. Other (please write)_____

C34. Where did you or your partner get the condom?

1. Drugstore or Pharmacy
2. Clinic
3. Friend
4. Other (please write)_____

C35. Before or during the last time you had sex with this partner, did you use:

1. Alcohol
2. Drugs
3. Both alcohol and drugs
4. Neither one
5. Refused to answer
6. Don't know

C36. The last time you had sex with a partner, did you know his/her HIV status?

1. No **(go to QC38)**
2. Yes **(go to next Q)**
3. Refused to answer **(go to QC38)**

C37. What was his/her HIV status?

1. HIV negative
2. HIV positive
3. Indeterminate (Don't know or not sure)
4. Refused to answer

C38. The last time you had sex with a partner; did you know whether he/she had any sexually transmitted diseases?

1. No **(go to QC40)**
2. Yes **(go to next Q)**
3. Refused to answer **(go to QC38)**

C39. What was his/her sexually transmitted disease status?

1. Did not have any sexually transmitted diseases
2. Had a sexually transmitted disease..

   Please write the STD here _____
3. Indeterminate

C40. Have **you ever been given** things like money or drugs in exchange for sex?

1. No
2. Yes
3. Don't know/remember
4. Refused to answer

C41. Have **you ever given** things like money or drugs in exchange for sex?

1. No
2. Yes
3. Don't know/remember
4. Refused to answer

These are all of the questions that we have for you….Thank you so much for participating in this survey