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HPV Risk Perception and Risk Behavior among Minority Women

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HPV Risk Perception and Risk Behavior among Minority Women

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An abstract of
a thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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Abstract

HPV Risk Perception and Risk Behavior among Minority Women
By Sarah Maness

Introduction: HPV is the most common sexually transmitted infection in the United States and high risk strains have been found to be a major cause of cervical cancer. The burden of cervical cancer is greater among minority women, with incidence rates 32% and 70% higher in African American and Latina women respectively. **Objective:** The main goal of this study is to assess whether a relationship exists between HPV risk perception and risk behaviors among minority women. **Methods:** This study used a cross-sectional design and convenience sampling to survey African American and Latino women ages 19-45 years, who utilize the Grady Health System. **Results:** Results indicated no significant relationships exist between perceived HPV severity and risk behaviors or ever having been tested for an STI, including HPV. No significant relationships were found between perceived HPV severity and risk behaviors or ever having been tested for an STI, including HPV. **Conclusions:** Results supported previous literature in populations of college women that indicated no relationship between condom use behavior and HPV risk perception. The lack of significant relationships between risk behaviors and perceived HPV susceptibility and severity indicate the need for further research and education surrounding minority women's' perception and understanding of HPV and its health implications.

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Chapter 1: Introduction

Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States (CDC, 2010). Approximately 20 million Americans currently have HPV and at least 50% of sexually active men and women will contract HPV at some point during their lifetime (CDC, 2010). There are more than 40 types of HPV that affect the genitals, including strains that can cause genital warts (CDC, 2010). There is presently no treatment for HPV (ACS, 2010). Strains of HPV have been classified as low and high risk depending on the likelihood of the strain to develop lesions that carry the risk of causing cervical cancer (NCI, 2008). HPV infection is necessary but not sufficient for cervical cancer incidence, however high risk strains of HPV have been found to be a major cause of cervical cancer (Schiffman et al., 1993; Walboomers et al., 1999; Bosch et al., 2002).

A person can remain infected with HPV for years after primary infection (CDC, 2010; NCI, 2008). Most people infected with HPV are not aware of their infection and may not experience any symptoms (CDC, 2010). The majority of HPV strains do not lead to persistent infections, but strains that are not fought off by the immune system have the potential to cause pre-cancerous cell changes in the cervix (Ho et al., 1998; Bulkmans et al., 2007). HPV genotypes 16 and 18 have been identified to cause 70% of cervical cancers and strains 6 and 11 to cause 90% of genital warts (CDC, 2008; Munoz et. al, 2003). Therefore, those infected may be at risk of spreading HPV to subsequent sexual partners as well as personally developing adverse health outcomes (CDC, 2010). Each year 12,000 women are diagnosed with cervical cancer in the United States (CDC, 2010). In addition, each year, nearly 4,000 women die from cervical cancer (CDC, 2009).

HPV has an especially large burden on populations of minority women, as reflected in rates of cervical cancer. Incidence rates of cervical cancer are 32% higher in African American women than in White women and 70% higher in Latina women than in White women (ACS, 2009). African American and Latina women are more likely to be diagnosed with late stage disease and each around twice as likely as White women to die from cervical cancer (ACS, 2009).

Risk factors for HPV include young age, low educational attainment, racial or ethnic minority, increased number of sexual partners, and suppressed immune system (Cothran & White, 2002; Ho et al., 2002; Ho et al., 1998; Kahn et al., 2002; Mayo Clinic, 2010). Women can help protect themselves from HPV infection through several measures. A reduced number of sexual partners can decrease a woman's likelihood of contracting HPV (CDC, 2010). Condom use has also been shown to reduce, although not prevent, the chance of HPV transmission (Buchell et al 2010; CDC, 2010; Epstein, 2005; Manhard & Koutsky, 2002; Nielson et al., 2010, Winer et al 2006).

Detection of cervical cell changes from HPV infection can be found by a Papanicolau (Pap) screening test (CDC, 2009). If caught in the early stages of pre-cancerous or cancerous cell changes, cervical cancer is highly treatable. However, higher deaths due to cervical cancer among minority women have been attributed to low utilization of pap screening tests and lack of follow up after pap results (CDC, 2009; Eggleston et al., 2007). Pap screening tests can also be cost prohibitive as two billion dollars a year in the United States alone is spent on cervical screening and follow-up care (CDC, 2009). In addition to cost, education, and access, physician communication is associated with patient follow up on abnormal pap tests (Eggleston, et al., 2007).

In 2006, the FDA approved an HPV vaccination, Gardasil, for women ages 9-26 (FDA, 2006). Gardasil vaccinates against both high risk HPV strains that cause cervical cancer, 16 and 18, as well as the strains that cause genital warts, 6 and 11 (Merck & Co., 2010). However, this vaccination is not approved for women of all ages, and cannot eliminate an HPV infection that is already present (CDC, 2009; Merck & Co., 2010). Despite these available measures of prevention, HPV prevalence rates remain high.

Theoretical Framework

This study will use constructs from the Health Belief Model (HBM). The HBM is widely used in behavioral science research and was originally developed to help understand why people do not participate in disease prevention programs (Glanz et al, 2008; Rosenstock, 1974). Constructs of the HBM are designed to show that individuals are more likely to take action in certain health behaviors if they; a) feel that there is a high probability of contracting the negative health outcome, b) feel that the negative outcome will be serious, c) believe that behavioral action will change the negative outcome to a more favorable occurrence, and d) believe that they are able to achieve self-mediated action in this process (Burak & Meyer, 1997). Therefore, the HBM can be used to understand how people's beliefs and perceptions affect HPV risk related health behaviors (Ingledue, 2004).

Study Rationale

Due to the widespread infection and documented health risks of HPV, it is important to understand how women perceive their risk of HPV infection. Perception of risk will help inform how women perceive HPV as it relates to potential effects on personal health. Because HPV risk reduction measures do exist, it is equally important to study how HPV risk perception relates to high risk sexual behavior. The aim of this research study is to assess HPV perception and high

risk behaviors of African American and Latina women in the metro-Atlanta area. Research will target African American and Latina women due to the greater burden of HPV on minority women. Specifically research will address the following: 1) associations between perceived susceptibility and sexual risk taking; 2) associations between perceived severity and sexual risk taking; 3) association between perceived susceptibility and self-reported diagnosis of STIs including HPV; and 4) association between perceived severity and self-reported diagnosis of STIs, including HPV.

The main hypotheses of this research are the following: 1) low perceived HPV susceptibility is a predictor of high risk behaviors; 2) low perceived HPV severity is a predictor of high risk behaviors; 3) low perceived HPV susceptibility is a predictor of ever having been tested for STIs including HPV; and 4) low perceived HPV severity is a predictor of ever having been tested for STIs including HPV.

Chapter 2: Literature Review

Epidemiology

HPV research is imperative because it is the most common sexually transmitted infection (STI) and has the potential to cause cervical cancer (Walboomers et al., 1999; Bosch et al., 2002). HPV is transmitted by mucosal skin to skin contact, most commonly through vaginal sexual intercourse (Veldhuijzen et al., 2010). Other forms of genital mucosal skin contact can also transmit HPV (CDC, 2010; Veldhuijzen et al., 2010). The lifetime risk of HPV infection for a woman has been estimated as high as 80% (Syrjanen et al., 1990). Although HPV infection rates are high, 90% of infections are cleared by the body through mainly cell-mediated immune responses within two years of first infection (Ho et al., 1998; Bulkmans et al., 2007). However, strains that are not cleared by the body may place a woman at risk for cervical cancer. High risk HPV strains 16 and 18 have been found to cause up to 70% of all cervical cancers (Muñoz et al, 2003).

HPV is an especially relevant topic among minority women in the United States due to higher rates of infection and cervical cancer among both African American and Latina women compared to White women. Incidence rates are 32% and 70% higher for African American and Latina women respectively and they are also around twice as likely to die from cervical cancer and more likely to be diagnosed with late stage disease (ACS, 2009). Despite these statistics, little research has been conducted specifically on minority women and HPV risk perception.

Risk Behaviors and Prevention Measures

Sexual risk behaviors that increase a woman's risk of HPV infection include an increased number of sexual partners, early age of sexual initiation, and unprotected sexual intercourse

(Burk et al., 1996; Cothran & White, 2002; Ho et al., 2002; Kahn et al., 2002). HPV rates have been found to be highest in young women and those in newly formed heterosexual relationships (Burchell et al., 2010; Rodriguez et al., 2010).

Studies have shown that an increased number of lifetime sexual partners is correlated with an increased risk of HPV infection (Burk et al. 1996; Cothran & White, 2002; Tarkowski et al., 2004). It has been suggested that this risk factor is higher for younger women whose lifetime number of partners reflects a shorter time period than women of an older age (Burk et al. 1996). One longitudinal study of university women found that an introduction of a new sexual partner was associated with increased likelihood of HPV infection (Winer et al., 2003). This study also suggested that the risk of infection was more strongly associated with a new partner rather than existing partners (Winer et al., 2003). Another study of adolescent girls in an urban Atlanta setting, found 64% (n=300) of participants to be positive for HPV infection and an independent risk factor to be lifetime number of partners (Tarkowski et al., 2004).

Early sexual initiation is also an important risk factor for HPV infection (Kahn et al., 2002; Moscicki et al. 1989). Delaying first sexual intercourse can decrease the risk of HPV infection. HPV infection has been found to be highest in women after the first few years of first sexual intercourse (Manhart et al., 2006; Revzina & DiClemente, 2005). One 2007 study found highest rates of HPV infection among women in the United States to be between the ages of 20 and 24 years (Dunne et al., 2007). Early sexual initiation may increase women's susceptibility to HPV infection because in adolescents the cervix has not matured and is vulnerable to viral infection and cellular transformation (Cothran & White, 2002; Moscicki et al., 1989). One study of university women investigated mediating factors to HPV infection and young age, finding an association mediated by number of sexual partners in the past six months, STI history, partner's

number of sexual partners, and alcohol and drug use related to sexual behavior (Kahn et al., 2002).

Female adolescents who engaged in unprotected sexual activity have been found to be at higher risk for HPV than those who abstain or use protection (Roye et al., 2003). HPV transmission can be significantly reduced by consistent and correct condom use (Buchell et al 2010; Epstein, 2005; Manhard & Koutsky, 2002; Nielson et al., 2010, Winer et al 2006). However, research suggests that condom use has been compromised by low perceived susceptibility of acquiring HPV (Lopez & McMahan, 2007). In fact, some studies suggest that among female adolescents, those who do not use condoms have a higher probability of contracting HPV than their peers who remain abstinent or have protected sex (Roye et al, 2003).

Another form of primary prevention currently available to women ages 9-26 years is vaccination against four strains of HPV (Merck & Co., 2010). However, the vaccine does not protect against an HPV infection that has already occurred (Merck & Co., 2010). If the body does not clear itself of HPV infection, there is no medical cure. The reason for this has been researched but is not yet fully understood (Bulkmans et al., 2007). If women do not perceive HPV as a health risk, they may not adequately protect themselves or utilize resources to reduce the risk of HPV infection or progression to cervical cancer (Gerhardt, 2000).

HPV Risk Perception

In studies among general populations, HPV risk perception has been found to be low (Ramirez et al., 2007; Denny-Smith et al., 2005; Indledue, 2004). Studies suggest that the recent technological advances in HPV screening and prevention have not been matched at pace with education about the disease itself (Ramirez et al., 1997; Daley et al, 2008). One study found

young women's perception of risk for HPV to be unrelated to actual risk as determined by an HPV clinical test (Ramirez et al., 1997). Participants, who were sexually active, did not perceive themselves to be at risk even when demonstrating several risk factors as well as low general knowledge about HPV.

The majority of literature on perceptions of HPV has been among university students (Denny-Smith et al., 2005; Gerend, 2008; Ingledue, 2004; Lopez and McMahan, 2007; Phillips, 2003; Ramirez et al., 1997). Recent HPV related studies among university women have found high risk-behaviors, low HPV knowledge, low perceived seriousness of HPV, and low perceived susceptibility to HPV or cervical cancer (Denny-Smith et al., 2005; Ingledue, 2004). In one study of female nursing students Denny-Smith et al. (2005) concluded that participants engaged in high-risk behaviors, had low knowledge levels, low perceived susceptibility, and low perceived seriousness of HPV. The study also found that knowledge and perceived susceptibility were positively related to number of sexual partners indicating that women who engage in riskier behavior may be more knowledgeable about HPV and its risks.

Similar results of low perceived susceptibility were found in older women (Montgomery et al., 2010). A recent study of HPV health beliefs in older women using a scale to assess perceived susceptibility and perceived severity of HPV found that 50% of women were worried about getting cervical cancer, but only 32% were concerned about getting HPV. More than 60% of the participants incorrectly believed that there is a cure for HPV. The study also found that only 13% of participants felt at risk for HPV (Montgomery et al., 2010).

Few HPV risk perception studies have analyzed specifically minority populations, yet those that included minority populations in their samples found low perceived susceptibility

(Gerend, 2008; Lopez and McMahan, 2007). One study of a racially diverse sample of university students found participants to have low HPV risk perceptions, where 56% of participants disagreed with the statement that they were at risk for HPV infection (Gerend, 2008). The study found higher perceptions of risk for HPV among sexually active persons as well as those with multiple sexual partners (Gerend, 2008). In a second racially diverse study, Lopez and McMahan (2007) sought information about intent to decrease future risk of HPV transmission in a study sample of an ethnically-mixed university population. This population showed high perceived severity of HPV and low perceived susceptibility. A total of 83.1% of participants (n=148) indicated that contracting an HPV infection would be severe while 84.4% did not feel susceptible to HPV infection. Furthermore, 49.5% of participants did not use a condom during the last sexual encounter, and only 41.2% intended to use condoms at their next sexual encounter to decrease risk of HPV transmission.

Summary

Research has shown low levels of perceived susceptibility and mixed levels of perceived severity of HPV in college aged women (Denny-Smith et al., 2005; Ingledue, 2004). In addition, despite studies linking condom use to lower rates of HPV infections, additional studies have shown low rates of condom use and high rates of risky sexual behaviors (Denny-Smith et al., 2005; Ingledue, 2004; Lopez & McMahan, 2007). Research has also largely been limited to university students. In addition, no studies looked specifically at minority populations. Current data on minority populations are derived from studies with ethnically mixed samples. No studies have addressed HPV risk perceptions and behaviors among minority populations specifically.

The relationship between sexual history and HPV risk perception is important to examine because of the sexually transmitted nature of HPV. If women do not perceive HPV as a risk, they may not make appropriate health decisions for protection against HPV, including delayed first intercourse, condom use, decreased number of sexual partners, or choosing to receive HPV vaccination. Few studies have researched HPV risk perception or risk behavior among minority women outside of a university student population. With elevated prevalence of cervical cancer due to HPV and increased mortality rates due to cervical cancer diagnosis among minority women, it is imperative to study HPV risk perception in this population. Therefore, the purpose of this study is to determine whether low perceived HPV susceptibility and low perceived HPV severity are predictors of high risk behaviors and history of STI testing including HPV.

Chapter 3: Methods

Participants

Participants in this study were African American and Latina women utilizing the Grady Health System. Eligibility criteria included self-identifying as African American or Latina, female, and between19 -45 years of age. Participants were recruited from three Grady Health System clinics including Lindbergh Women and Children's Center, DeKalb-Grady Health Center, and primary care waiting rooms at the main Grady Hospital. Exclusion criteria included women who did not self identify as African American or Latina, did not provide informed consent, did not speak either English or Spanish, or were not within the age range of 19-45 years. Data collection for this study occurred between April 2009 and February 2010. The sample size for this study was 200 participants; 100 African American women and 100 Latina women. This study received human subjects approval by the Emory University Institutional Review Board.

Procedures

The study used a cross-sectional design. Graduate research assistants recruited participants to the study by convenience sampling. Potential participants were approached in medical office waiting rooms between the hours of 8am and 5pm and asked to fill out a screener for eligibility into the study. The screener was available in both English and Spanish, as participants were given the option to participate in the study in either language. The screener read, "The doctors in this office are participating in a study about women's health. We are asking everyone to complete a brief screening questionnaire. When you're done, please give it back to me." Flyers with information about the study were also distributed in clinic waiting rooms to

inform women and to increase participation of eligible participants not approached by study staff.

If participants were eligible based on the screener and interested in participation, research assistants gave participants further information about the study. Participants were invited to a separate room to complete the study while waiting or after their clinic appointment. The duration of the study for each participant lasted approximately 1.5 hours. Participants were allowed to begin the study while waiting for their appointment and return to finish the survey upon completion of their appointment at the clinic. If participants chose to reschedule participation on a future date, a MARTA card was given to the participant to cover transportation costs to return to the clinic.

Eligible participants took part in a computer based survey. Potential risks for this study were identified as minimal. Risks included possible psychological stress such as anxiety or embarrassment due to the sensitive nature of survey questions. Before beginning study procedures, participants read and signed an informed consent and HIPAA statement informing them of their rights as study participants. These documents ensured that participants' information would be linked to the study using only a unique identifier. Participants were informed that they could decline to participate in the study at any time and that participation in the study would not affect treatment at the clinic. A copy of the informed consent and HIPAA statement was given to each participant.

Before beginning data collection, basic instructions were given on the use of the laptop and study procedures. If any participant asked for additional information about HPV, a CDC pamphlet was given to the participant following completion of the study survey.

The survey consisted of two parts: one part was interviewer based and the second part was self-administered. During the interviewer based portion of data collection, research assistants read survey questions aloud and submitted answers. The portion of the survey with sensitive topics concerning sexual activity and substance use was self- administered by participants using Audio-Computer Assisted Self Interviewing (ACASI) with headphones.

Incentive for participation in the study was a $20 gift card to Kroger. Women received one $10 gift card for participation in the survey portion and another $10 gift card for the vaginal swab. Following completion of the survey, study staff transferred the digital survey data on to an external drive. This external drive, along with any identifying paperwork was stored in a secured file cabinet in the Emory University School of Medicine Grady Campus faculty office building.

Measures

The current study is a sub-study of a larger research project investigating barriers to HPV vaccination among African American and Latina Women in the metro-Atlanta area. Participants were given the option to take the survey in either English or Spanish. To ensure accuracy, the English survey was translated to Spanish and back translated prior to data-collection by a study hired translator. The structured interview included the following fifteen sections: demographics, living situation, family structure, social support, religiosity and spirituality, culture and beliefs, Hispanic acculturation, alcohol and drug use, sexual behavior, history of sexually transmitted diseases, attitudes and knowledge of HPV, transportation, access to healthcare, current health status, and vaccine acceptance. Several sections, including religiosity and spirituality and Hispanic acculturation varied in content depending on whether the participant identified as either African American or Latina. This secondary analysis will assess survey questions from sections

including demographics, sexual behavior, history of sexually transmitted diseases, and attitudes and knowledge of HPV.

Hypothesized Predictor Variables:

Assessment of HPV risk perception was guided by the HBM constructs of perceived susceptibility and perceived severity of HPV infection.

Perceived Susceptibility. Perceived Susceptibility was assessed by two questions: "I worry about the possibility of getting HPV." and "I worry about the different ways I could get HPV." Response choices included Strongly Agree, Agree, Disagree, and Strongly Disagree. Responses were dichotomized into high and low perceived susceptibility for analysis. High perceived susceptibility was categorized as respondents who selected Strongly Agree for both questions. Participants with other responses were categorized as low perceived susceptibility.

Perceived Severity. Perceived severity was assessed by the following question: "I would become very depressed if I found out I was infected with HPV." Response options include Strongly Agree, Agree, Disagree, and Strongly Disagree. Responses were dichotomized into high and low perceived severity for analysis. High perceived severity was categorized as participants who selected Strongly Agree. Participants responding to any of the other response options were categorized in the low perceived severity category.

Hypothesized Outcome Variables:

Frequency of Condom Use with Primary Partner. The frequency of condom use with primary partner was assessed by the question, "How often do you use condoms with your primary or main partner?" Response choices included, Always, Sometimes, Never, Don't Know, and Refuse to Answer. Responses were dichotomized to Always and Not Always for analysis.

Last Use of Condom with Primary Partner. The last condom use with a primary partner was assessed by the question, "Did you use condom the LAST time you had sex with your primary or main partner?" Response options included Yes, No, Don't Know, and Refuse to Answer. Response options of Yes and No were included in analyses.

Casual Partners. To assess whether participants have casual partners, the following question was asked, "In the past 6 months, did you have one or more casual partners, that is, a partner who was a one night stand, a friend that you had sex with, or other person you may have had sex with who was not your primary partner?" Response options were Yes, No, or Refuse to Answer. Response options of Yes and No were entered into analyses.

Frequency of Condom Use with Casual Partners. The frequency of condom use with a casual partner was assessed by the question, "How often do you use condoms with your casual partners?" Response choices include Always, Sometimes, Never, Don't Know, and Refuse to Answer. Responses were dichotomized into Always and Not Always for purposes of analysis.

Last Use of Condoms with Casual Partner. To assess whether participants used a condom during their last sexual encounter the following question was asked, "Did you use a

condom the LAST time you had sex with a casual partner?" Response options include Yes, No, Don't Know, and Refuse to answer. Response options of Yes and No were entered into analyses.

Ever Tested for STIs. Whether a participant had ever been tested by a physician for an STI was measured by the question, "Did a health care provider ever examine you for a sexually transmitted disease (often called an STD) such as syphilis, gonorrhea, or Chlamydia?" Response options included, Yes, No, Don't Know and Refuse to Answer. Responses were dichotomized to Yes and No for the analysis.

Self Reported History of HPV. Self reported history of HPV was assessed by the question, "Did a healthcare provider ever tell you that you were infected with HPV?" Response choices were Yes, No, and Refuse to Answer. Responses of Yes and No were entered into statistical analyses.

Data Analytic Plan

Data were exported from the Questionnaire Development System (QDS) software to Excel and cleaned. SPSS 17 for Windows was used to analyze all data. First, descriptive statistics were run for continuous and categorical variables. Second, bivariate tests were run between predictors of interests (perceived susceptibility and perceived severity) and the 7 hypothesized outcome variables. Additionally, differences in demographic characteristics, other theoretically important variables and the main predictors were assessed to determine the presence of potential covariates. Dichotomized variables were analyzed using chi square tests while continuous variables were analyzed by using independent T-tests. Variables reaching a significance level of $p<.20$ were included in multivariate analyses as covariates. Finally, separate

Logistic regression models were run to determine whether perceived HPV susceptibility and perceived HPV severity predicted the 7 hypothesized outcomes.

Chapter 4: Results

Demographic Information

Demographic data were collected for a total of 201 participants enrolled in this study (Table 1.) The majority of participants were under 30 years (m=29.02; sd=6.60). Nearly half of the participants (48.3%; n=97) identified as African American and 51.2% (n=103) identified as Latina. Responses to the questions assessing educational levels indicated that 33.0% (n=66) of participants obtained a high school diploma or GED and that 34.5% (n=69) had some college or technical training. Over half of participants reported a personal income of less than $5,000 per year (55.3%; n=99) and 64.2% (n=111) reported a household income of less than $19,999 per year. Over half of all participants (50.2%; n=101) identified as currently being single. Therefore, this population of African American and Latino women was predominately low income, younger adults, and most commonly identifying as single, legally married 24.9% (n=50), or unmarried and living with a partner 18.3% (n=18).

Risk Behaviors

Descriptive data of sexual risk behaviors are presented in Table 2. The mean age of first sexual intercourse among participants was 17.16 years (sd=3.32). The average lifetime number of sexual partners was 5.01 (sd=7.14). The majority of participants reported their sexual orientation as heterosexual (92.7%; n=177) and 94.2% (n=161) had previously had vaginal sex in their lifetime. The most frequent time period of recent sexual activity was 0-3 months ago (76.8%; n=142). The majority of participants had a primary partner in the past six months (87.7%; n=150). Of participants with a primary partner, 69.9% (n=121) did not use a condom

during their last sexual intercourse with a primary partner and 81.8% (n=139) did not consistently use condoms with their primary partner. Fewer participants reported having one or more casual partners in the past six months (14.6%, n=25) and of these participants 48% (n=12) used a condom at their last encounter with a casual partner. The majority of participants had never been tested for STIs (53.4%; n=101) and 95.8% (n=183) reported no history of HPV diagnosis.

Perceived susceptibility to HPV was somewhat low with 74% (n=111) of responses categorized as low perceived susceptibility. Over half of responses to the question measuring perceived severity were categorized as low perceived severity (59.6%, n=115). This population reported overall low perceived susceptibility and perceived severity.

Perceived HPV Susceptibility and Risk Behaviors

Two sets of bivariate tests were conducted: first, associations between the predictor variable (perceived HPV susceptibility) and the 7 outcome variables were assessed; second, associations between demographic and other relevant variables with the predictor variable were assessed to determine covariates to be included in the logistic regression models. Variables associated with perceived HPV susceptibility reaching a significance level of $p \leq .20$ were entered into the logistic regression models as covariates. Results of bivariate tests are presented in Tables 3 and 4. Based on bivariate results, for multivariate logistic models using perceived HPV susceptibility as the main predictor, lifetime number of partners ($p=.02$) was the only empirically derived covariate that was included (Table 4). While no other demographic variables showed a significant relationship with perceived susceptibility in bivariate tests (Table 5), the logistic

regression model also controlled for age based on previous research indicating age as a risk factor for HPV infection. Finally, based on bivariate results, three of the hypothesized outcome variables, did not have sufficient variability to proceed with multivariate modeling. These three variables included "history of HPV diagnosis", "last condom use with casual partner" and "frequency of condom use with casual partner". Therefore, only 4 multivariate logistic models were constructed.

Results of the logistic regression models suggest that perceived susceptibility was not a significant predictor of frequency of condom use with a primary partner (p=.996), having had a casual partner in the past six months (p=.96) or ever being tested for an STI (p=.96). However, a trend toward significance was observed for perceived susceptibility and last condom use with a primary partner (p=.09), suggesting that perceived susceptibility to HPV does play a role in condom use (Table 6).

Perceived HPV Severity and Risk Behaviors

Two sets of bivariate tests were conducted: first, associations between the predictor variable (perceived HPV severity) and the 7 outcome variables were assessed; second, associations between demographic and other relevant variables with the predictor variable were assessed to determine covariates to be included in the logistic regression models. Variables associated with perceived HPV susceptibility reaching a significance level of $p \leq .20$ were entered into the logistic regression models as covariates. Results of bivariate tests are presented in Tables 3 and 4. Based on bivariate results, for multivariate logistic models using perceived HPV severity as the main predictor, lifetime number of partners (p=.10) was the only empirically derived covariates that were included (Table 4). Although no other demographic variables

showed a significant relationship with perceived susceptibility in bivariate tests (Table 5), based on previous research indicating age as a risk factor for HPV infection the logistic regression model also controlled for age. Finally, based on bivariate results, three of the hypothesized outcome variables, did not have sufficient variability to proceed with multivariate modeling. These three variables included “history of HPV diagnosis”, “last condom use with casual partner” and “frequency of condom use with casual partner”. Therefore, only 4 multivariate logistic models were constructed.

Results of the logistic regression models suggest that perceived severity was not found to be a significant predictor of frequency of condom use with a primary partner (p=.60), condom use at last sex with primary partner (p=.38), having had a casual partner in the past six months (p=.74) or ever being tested for an STI (p=.82) (Table 6).

Chapter 5: Discussion

Due to the high prevalence among minority women and documented health risks resulting from HPV infection, as well as low perceived risks for HPV, this study aimed to analyze how HPV risk perception relates to high risk sexual behavior. Specifically, this study looked at possible relationships between perceived susceptibility and risk behavior as well as perceived severity and risk behavior. Perceived susceptibility and perceived severity were also examined with the outcome of ever having been tested for an STI and self-reported history of HPV diagnosis.

Perceived Susceptibility

Perceived Susceptibility and Frequency of Condom Use with Primary Partner

A significant result association was not found between perceived susceptibility and frequency of condom use with a primary partner. The literature has reported among college women a low perception of risk despite being sexually active and demonstrating sexual risk behavior (Ramirez et al., 1997; Denny-Smith et al., 2005). A previous study among college aged nursing students found no relationship between perceived susceptibility and condom use, where condom use was rated on the same scale as used in this study (Denny-Smith et al., 2005). Results from this study are in accordance with previous studies in that there is discordance between perceived susceptibility and behavior in terms of condom use.

Perceived Susceptibility and Last Condom Use with Primary Partner

Perceived susceptibility was not found to be a predictor of last condom use with a primary partner. However, the results of the logistic regression indicated a p-value of .09, which

is approaching significance. Previous studies have reported high risk sexual behavior, including condom use, as not having a significant relationship with perceived HPV susceptibility (Ramirez et al., 1997; Denny-Smith et al., 2005). It is possible that with a larger sample size, significance may have been reached. However in this sample, in accordance with earlier studies, a significant relationship was not found between perceived susceptibility and last condom use with a primary partner.

Perceived Susceptibility and Casual Partner in Past Six Months

Perceived susceptibility was not found to have a significant association with having had a casual partner in the past six months. Past research has indicated that perceived susceptibility is related to an increased number of sexual partners and this study controlled for lifetime number of partners; however research has not looked specifically at having one or more casual partners (Denny-Smith et al., 2005; Gerend, 2008). The number of participants in this study reporting having a casual partner in the past six months was also low, which affected the validity of results (n=25). It is difficult to draw conclusions about the lack of association between perceived susceptibility and having a casual partner in the past six months when the sample size for this question was a fourth of the original number of respondents.

Perceived Susceptibility and Ever Tested For an STI

Perceived susceptibility was not found to be a predictor of ever having been tested for an STI. Although looking specifically at HPV testing rather than testing for STIs in general, a related study among college women found no relationship between perceived susceptibility and results of an HPV clinical test (Ramirez et al., 1997). Additionally, equal percentages of participants who indicated they either felt at risk or not at risk for HPV had a positive HPV test

result. Although the present study asks specifically about ever having been tested for an STI and not HPV, many behavioral risk factors for HPV can put women at risk for other STIs as well. A loose conclusion could be drawn from these results that high perceived HPV susceptibility may not directly result in seeking a clinical test. Further research is needed to conclude what the barriers are to STI testing on the individual level in terms of perceived necessity and on the structural level in terms of access.

Perceived Severity

Perceived Severity and Frequency of Condom Use with Primary Partner

Results of the logistic regression indicated that perceived severity is not a predictor of condom use with a primary partner. Supporting these results, a previous study found no relationship between condom use and perceived severity (Ingledue, 2004). The previous study which analyzed a sample of college women found low perceived risk and a lack of preventative behaviors. The previous study did find a relationship between perceived HPV severity and number of sexual partners, which was controlled for in the analysis in this study. This study supports previous work among college women in that minority women also display no relationship between perceived severity and frequency of condom use with a primary partner.

Perceived Severity and Last Condom Use with Primary Partner

Perceived severity was not found to have a significant association with last condom use with a primary partner. Similarly, previous studies have found no relationship between condom use and perceived severity (Ingledue, 2004). These results further support that condom use; whether in terms of frequency or use at last sex, have no relationship with perceived severity.

Perceived Severity and Casual Partner in Past Six Months

Results of the logistic regression indicated that perceived severity is not a predictor of having had a casual partner in the past six months. No known previous studies have specifically looked at perceived severity of HPV infection and having had a casual partner in the past six months. One previous study analyzed perceived seriousness of HPV and number of partners in the past month, finding no relationship between the two variables (Ingledue, 2004). However, the question asking whether a participant had one or more casual partners in the past month does not give us information regarding number of partners, only the type of sexual relationship. The number of participants in this study reporting a casual partner in the past six months was also low, which affects the validity of results (n=25).

Perceived Severity and Ever Tested For an STI

Results of the logistic regression indicated that perceived severity is not an indicator for ever having been tested for an STI (p=.82). Previous studies have not specifically analyzed perceived HPV severity and past history of STI testing. The results of this study indicate that participants may not relate their perceived severity of HPV to a personal decision to be tested for STIs. Further research is required to analyze reasons for never being tested for an STI and whether that reason is due to choice, access, or other.

Strengths and Limitations of Study and Findings

This study included both strengths and limitations. One strength of the study was that African American and Latina women were able to be exclusively sampled, when previous studies included few minority women. The original (parent study) survey asked a wide variety of

demographic and behavioral questions. Although the current research study was a secondary data analysis, a multitude of questions were able to be used to answer an original research question.

Contrary to the strengths of this study, it also had several limitations. First, this study utilized secondary data analysis and the original questionnaire was not designed to answer the research questions specific to this analysis. If this study had been designed with an original survey, more questions to analyze perceived susceptibility and perceived severity could have been included. Convenience sampling was also used; the majority of Latino women were recruited at one clinic site while the majority of African American women were recruited from two other clinics. Due to the sampling technique that was used, the responses of the women sampled may not accurately reflect the responses of the larger population of Latina or African American women.

Although the total sample size consisted of 200 participants, many participants did not answer some of the particularly sensitive sexual risk behavior questions. In addition, questions analyzing condom use related to casual partners elicited a poor response rate as only 25 participants reported having had a casual partner. Finally, there was limited variability in scores for some of the main outcome variables, preceding multivariate analyses. Due to its limitations, the results of this study may not be generalizable to other populations.

Implications for Behavioral Sciences Research and Public Health

This study showed relatively low levels of perceived HPV susceptibility and HPV severity among minority women. It is imperative to continue HPV education as a vital part of

public health in order to inform this population about the prevalence of HPV and its potential adverse health effects.

The main public health implications from this research are in accordance with past studies of university women. In particular, among this subgroup of minority women, no relationship was found between HPV perceived susceptibility and condom use or perceived severity of HPV infection and condom use. This indicates a need for greater education about HPV, its risks, and measures of protection to prevent the transmission of HPV.

The lack of significant findings between perceived HPV susceptibility and perceived HPV severity with ever having been tested for an STI, also have public health implications. If a woman engages in behavior that places her at risk for HPV, then she may also be at risk for other STIs. It is important to emphasize STI testing in health education programs targeting both African American and Latina women.

Areas of Future Research

Areas of future research could include further analysis on the disconnect between perceived severity/perceived susceptibility and individual risk behavior. Future studies could explore whether the disconnect is related to lack of education or other factors and ultimately inform public health interventions and HPV education initiatives. Future studies could also investigate other factors surrounding condom use such as partner negotiation which is independent of perceived risk or perceived severity.

The limitations of this study could be addressed in a prospective study by using random sampling as well as designing the study specifically to answer the intended research questions as opposed to doing secondary data analysis. A greater sample size could also be used in order to

have a larger number of participants that respond in subsets of measured behaviors, such as having had a casual partner in the past six months. Such a study could also operationalize more constructs from the Health Belief Model as well as include a wider variety of questions to measure perceived susceptibility and perceived severity.

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Table 1
Demographics of study participants (N=201)

	mean	SD
Age	29.02	6.60
	N	%
Race		
Black/African American	97	48.3
Hispanic/Latino	103	51.2
Both	1	0.5
Formal Education		
8th grade or less	28	14.0
Some high school	31	15.5
High school diploma/GED	66	33.0
Some college/technical training	69	34.5
College degree- BA/BS	6	3.0
Personal Income		
< $5,000	99	55.3
$5,000-$9,999	36	20.1
$10,000-$19,999	20	11.2
$20,000-$29,999	15	8.4
$30,000 to $59,999	8	4.5
$60,000 to $100,000	1	0.6
More than $100,000	0	0.0
Household Income		
< $5,000	38	22.0
$5,000-$9,999	34	19.7
$10,000-$19,999	39	22.5
$20,000-$29,999	30	17.3
$30,000 to $59,999	23	13.3
$60,000 to $100,000	8	4.6
More than $100,000	1	0.6
Current Relationship Status		
Single	101	50.2
Legally Married	50	24.9
Divorced	4	2.0
Widowed	1	0.5
Broken up from informal union	6	3.0
Living with partner (not married)	37	18.3
Other	2	1.0

Table 2
Descriptive statistics of sexual behavior (N=201)

	mean	SD
Age of First Sex	17.16	3.32
Lifetime number of partners	5.01	7.14
	N	%
Sexual orientation		
Heterosexual	177	92.7%
Lesbian or Homosexual	2	1.0%
Bisexual	4	2.1%
Other	8	4.2%
Ever had vaginal sex		
Yes	161	94.2%
No	10	5.8%
Last time of sexual activity		
0-3 months ago	142	76.8%
3-6 months ago	7	3.8%
6+ months ago to 1 year ago	9	4.9%
More than 1 year ago	8	4.3%
Never	19	10.3%
Primary Partner in past 6 months		
Yes	150	87.7%
No	21	12.3%
Last condom use with primary partner		
Yes	52	30.1%
No	121	69.9%
Frequency of condom use with primary partner		
Always	31	18.2%
Not always	139	81.8%
Casual Partner/s in past 6 months		
Yes	25	14.6%
No	146	85.4%
Last condom use with casual partner		
Yes	12	48.0%
No	12	48.0%
Frequency of Condom use with casual partner/s		
Always	13	52.0%
Not always	12	48.0%
Ever examined for STDs		
Yes	88	46.6%
No	101	53.4%
History of HPV diagnosis		
Yes	8	4.2%
No	183	95.8%

Perceived HPV Susceptibility		
High perceived susceptibility	39	26.0%
Low perceived susceptibility	111	74.0%
Perceived HPV Severity		
High perceived severity	78	40.4%
Low perceived severity	115	59.6%

Table 3
Cross-tabulation of HPV perceived susceptibility/severity and risk behaviors (N=201)

	High Perceived Susceptibility	**Low Perceived Susceptibility**	**p-value**
	Frequency (%)	Frequency (%)	
Primary Partner in past 6 months			
Yes	31 (93.9%)	85 (86.7%)	.26
No	2 (6.1%)	13 (13.3%)	
Last condom use with primary partner			
Yes	33 (33.0%)	6 (18.2%)	.11
No	67 (67.0%)	27 (81.8%)	
Frequency of condom use with primary partner			
Always	17 (17.2%)	6 (18.2%)	.90
Not always	82 (82.8%)	27 (81.8%)	
Casual Partner/s in past 6 months			
Yes	5 (14.7%)	14 (14.4%)	.97
No	29 (85.3%)	83 (85.6%)	
Last condom use with casual partner			
Yes	0 (0.0%)	9 (69.2%)	.009
No	5 (100.0%)	4 (30.8%)	
Frequency of Condom use with casual partner/s			
Always	2 (40.0%)	9 (64.3%)	.35
Not always	3(60.0%)	5 (35.7%)	
Ever examined for STIs			
Yes	17 (44.7%)	51 (48.1%)	.72
No	21 (55.3%)	55 (51.9%)	
History of HPV diagnosis			
Yes	0 (0.0%)	7 (6.5%)	.11
No	38 (100.0%)	100 (93.5%)	
	High Perceived Severity	**Low Perceived Severity**	**p-value**
	Frequency (%)	Frequency (%)	
Primary Partner in past 6 months			
Yes	67 (95.7%)	80 (81.6%)	.007
No	3 (4.3%)	18 (18.4%)	
Last condom use with primary partner			
Yes	18 (25.7%)	32 (32.3%)	.35
No	52 (74.3%)	67 (67.7%)	
Frequency of condom use with primary partner			

Always	11 (14.1%)	20 (16.3%)	.68
Not always	67 (85.9%)	103 (83.7%)	
Casual Partner/s in past 6 months			
Yes	9 (12.7%)	16 (16.0%)	.54
No	62 (87.3%)	84 (84.0%)	
Last condom use with casual partner			
Yes	3 (33.3%)	9 (60.0%)	.21
No	6 (66.7%)	6(40.0%)	
Frequency of Condom use with casual partner/s			
Always	11 (15.9%)	18 (18.6%)	.66
Not always	58 (84.1%)	79 (81.4%)	
Ever examined for STIs			
Yes	37 (48.7%)	51 (47.2%)	.85
No	39 (51.3%)	57 (52.8%)	
History of HPV diagnosis			
Yes	2 (2.7%)	6 (5.4%)	.37
No	73 (97.3%)	105 (94.6%)	

Table 4
T-tests of HPV perceived susceptibility/severity and continuous variables (N=201)

	High Perceived Susceptibility	**Low Perceived Susceptibility**	**p-value**
	Mean (SD)	Mean (SD)	
Age	29.26 (6.71)	29.50(7.02)	.42
Lifetime number of partners	3.61 (2.26)	5.05 (5.87)	.02
Age of first sex	16.52 (3.66)	17.44 (3.05)	.56
	High Perceived Susceptibility	**Low Perceived Susceptibility**	**p-value**
	Mean (SD)	Mean (SD)	
Age	28.97 (6.63)	29.03 (6.73)	.40
Lifetime number of partners	4.46 (4.26)	5.41 (4.73)	.10
Age of first sex	17.56 (3.66)	16.93 (3.10)	.25

Table 5

Cross-tabulations of HPV perceived susceptibility/severity and SES characteristics (N=201)

	High Perceived Susceptibility	**Low Perceived Susceptibility**	**p-value**
	Frequency (%)	Frequency (%)	
Race			
African American/Black	18 (46.2%)	52 (46.8%)	.94
Latino/Hispanic	21 (53.8%)	59 (53.2%)	
Formal Education			
High school or less	26 (66.7%)	69 (62.7%)	.66
College or more	13 (33.3%)	41 (37.3%)	
Personal Income			
<$5,000	29 (85.3%)	90 (89.1%)	.55
>$5,000	5 (14.7%)	11 (10.9%)	
Family Income			
<$19,999	22 (64.7%)	62 (66.0%)	.90
>$19,999	12 (35.3%)	32 (34.0%)	
Relationship Status			
Single	20 (51.3%)	52 (46.8%)	.59
Legally Married	7 (17.9%)	29 (26.1%)	
Other	12 (30.8%)	30 (27.0%)	
	High Perceived Severity	**Low Perceived Severity**	**p-value**
	Frequency (%)	Frequency (%)	
Race			
African American/Black	37 (47.4%)	58 (50.4%)	.45
Latino/Hispanic	40 (51.3%)	57 (49.6%)	
Both	1 (1.3%)	0 (0.0%)	
Formal Education			
High school or less	46 (59.0%)	71 (62.3%)	.65
College or more	32 (41.0%)	43 (37.7%)	
Personal Income			
<$5,000	57 (82.6%)	92 (88.5%)	.28
>$5,000	12 (17.4%)	12 (11.5%)	
Family Income			
<$19,999	40 (60.6%)	67 (67.0%)	.40
>$19,999	26 (39.4%)	33 (33.0%)	
Relationship Status			
Single	39 (50.0%)	58 (50.4%)	.63
Legally Married	21 (26.9%)	26 (22.6%)	
All others	18 (23.1%)	21 (27.0%)	

Table 6

Logistic Regression model for HPV perceived susceptibility/severity and risk behaviors (N=201)

Outcome	**High Perceived Susceptibility** N(%)	**Low Perceived Susceptibility** N(%)	**AOR**	**95% CI**	**p-value**
Frequency of condom use with primary partner					
Always	17 (17.2%)	6 (18.2%)	1.00	.35, 2.85	.996
Not Always	82 (82.8%)	27 (81.8%)			
Last condom use with primary partner					
Yes	33 (33.0%)	6 (18.2%)	2.344	.87, 6.3	.09
No	67 (67.0%)	27 (81.8%)			
Casual partner in last 6 months					
Yes	5 (14.7%)	6 (18.2%)	1.00	.32, 3.11	.995
No	29 (85.3%)	27 (81.8%)			
Ever tested for an STI					
Yes	17 (44.7%)	51 (48.1%)	1.02	.45, 2.36	.96
No	21 (55.3%)	55 (51.9%)			
Outcome	**High Perceived Severity** N(%)	**Low Perceived Severity** N(%)	**AOR**	**95% CI**	**p-value**
Frequency of condom use with primary partner					
Always	11(14.1%)	20 (16.3%)	.78	.31, 1.96	.60
Not Always	67 (85.9%)	103 (83.7%)			
Last condom use with primary partner					
Yes	18 (25.7%)	32 (32.3%)	1.40	.67, 2.92	.38
No	52 (74.3%)	67 (67.7%)			
Casual partner in last 6 months					
Yes	9 (12.7%)	16 (16.0%)	1.18	.46, 3.05	.74
No	62 (87.3%)	84 (84.0%)			
Ever tested for an STI					
Yes	37 (48.7%)	51 (47.2%)	.92	.46, 1.85	.82
No	39 (51.3%)	57 (52.8%)			

Adjusted for age, lifetime number of partners, and relationship status