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Association of Sexual Abuse with Incident High-Risk Human Papillomavirus Infection among Young African-American Women

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Abstract

Background—Genital human papillomavirus (HPV) is the most common sexually transmitted infection in the United States. Noticeably absent from the known risk factors for HPV infection is history of sexual abuse. The present study examined the association between sexual abuse and incident high-risk HPV among young adult African-American women.

Methods—This longitudinal study was part of a larger HIV/STI randomized controlled behavioral trial that randomly recruited eligible participants from October 2002 through March 2006. At baseline and 12-month follow-up, 665 African-American women, 18–29, completed a survey assessing known HPV risk factors and history of sexual abuse, and provided specimens that were assayed for high-risk HPV. Incident high-risk HPV infection was defined as a laboratory-confirmed test for high-risk HPV at 12-month follow-up after testing HPV-negative at baseline.

Results—The prevalence of high-risk HPV was 38.9%. Age-stratified multiple regression analyses examined sexual abuse that occurred over the 12 month follow-up and acquisition of high-risk HPV; known risk factors for HPV were entered as covariates. Women 18–24 with a history of sexual abuse in the past year, relative to participants without a history, were 4.5 times more likely to test positive for an incident high-risk HPV infection ($P < .007$). This relationship was not significant for the overall sample or for women 25–29.

Discussion—This is one of the first analyses demonstrating exposure to sexual abuse as a predictor of high-risk HPV. HPV vaccination recommendations for African-American women 18–24 years of age with a history of sexual abuse warrant special consideration.

Keywords

sexual abuse; HPV; African-American; women

INTRODUCTION

Genital human papillomavirus (HPV) is the most common sexually transmitted infection in the United States with an estimated 6.2 million persons newly infected every year.¹ While the

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majority of infections cause no symptoms and are self-limited, persistent genital HPV infection can cause cervical cancer and is also associated with anogenital cancers such as cancer of the vulva, vagina, penis and anus.^{2,3} The association of genital types of HPV with nongenital cancer is less well established, but studies support a role in a subset of oral cavity and pharyngeal cancers.⁴ For effective prevention and control of genital HPV, deepening our understanding of risk factors associated with this infection is crucial.

Genital HPV infection is primarily transmitted through sexual intercourse.⁵ Traditionally, aside from smoking^{6,7}, diverse measures of sexual activity have been cited as factors associated with HPV infection, including, number of recent and lifetime male sexual partners^{6,8,9}, younger age of first sexual intercourse^{9,10}, male partner's risky sexual behavior^{3,9}, oral contraceptive use^{6,11} and, history of non-viral STIs.¹² Consideration of the size and nature of these associations is necessary for the design of efficacious intervention strategies.

Noticeably absent from the known risk factors for HPV infection is an examination of a woman's history of sexual abuse. The present study sought to examine the association between experience of sexual abuse in the past year and incident high-risk HPV among African-American women, 18–29 years of age, a subgroup that has the highest rate of high-risk HPV infection.¹³

MATERIALS AND METHODS

Participants

The current longitudinal study was part of a larger HIV/STI randomized controlled behavioral trial that randomly recruited 848 eligible participants from October 2002 through March 2006 from the three local Kaiser Permanente Centers in Atlanta, GA having the greatest number of African-Americans. Eligibility criteria included being an African-American female, 18–29 years of age, unmarried, sexually active in the prior 6 months and provided informed consent. However, HPV specimen collection was initiated 5-months after the trial began. Thus, all analyses in this report are based on data derived from the 665 participants who provided HPV specimens. Participants were compensated \$50 for their time and effort. The Emory University Institutional Review Board (IRB) approved the study protocol prior to implementation.

Data Collection

Data collection occurred at baseline, 6- and 12-months follow-up. At each assessment participants completed a 40-minute Audio Computer-Assisted Survey Interview (ACASI) which assessed sociodemographic characteristics, history of sexual abuse, smoking, oral contraceptive use, and HPV-associated sexual behaviors, and provided self-collected swab specimens that were tested for three non-viral sexually transmitted pathogens (*Neisseria gonorrhoeae*, *Chlamydia trachomatis*, and *Trichomonas vaginalis*). At the baseline and 12-month follow-up assessments participants provided a vaginal swab specimen that was assayed for HPV.

Intervention Methods

The HIV/STI intervention consisted of two 4-hour group sessions, with an average of 10 participants per session, implemented on consecutive Saturdays, and facilitated by two trained African-American female health educators. The general health condition consisted of one 4-hour group session that emphasized nutrition and exercise. The HIV/STI intervention applied Social Cognitive Theory (SCT)¹⁴ and the Theory of Gender and Power¹⁵ to enhance HIV/STI knowledge, condom use, negotiation skills, and norms supportive of healthy relationships. In addition to these skills, the intervention sought to reduce STI acquisition by emphasizing the importance of enhancing condom use, abstaining from sex until completion of STI therapy,

reducing number of male sexual partners, and encouraging STI treatment for male partners.^{16,17}

Measures

History of sexual abuse—The primary exposure variable, history of sexual abuse, was assessed by asking participants if in the past 6 months a male sexual partner made them have vaginal sex when they did not want to? Participants responding affirmatively to this item at the 6-month or 12-month assessment were defined as having a history of sexual abuse in the past 12 months.¹⁸

Human papillomavirus—Incident high-risk (cancer-associated) human papillomavirus (HPV) infection was defined as a laboratory-confirmed test for a high-risk HPV type at the 12-month follow-up assessment after testing HPV-negative at baseline assessment. Participants provided a vaginal swab specimen at baseline that was assayed for HPV. Those testing negative for HPV at baseline were re-screened on all types at the 12-month follow-up assessment (HPV was not assessed at the 6-month follow-up assessment). If at 12 months follow-up those who were negative at the initial (baseline) assessment were positive at the 12 months assessment, then these individuals were identified as having an incident HPV infection. Swabs were tested by polymerase chain reaction (PCR)/reverse blot strip assay (Roche Diagnostics, Indianapolis, Ind). This assay uses nondegenerate primer pairs to amplify 19 oncogenic HPV types (types 16, 18, 26, 31, 33, 35, 39, 45, 51, 52, 55, 56, 58, 59, 68, 73, 82, 83 and 84). All women who tested positive for high-risk HPV types were referred to their primary care provider at Kaiser Permanente for further counseling and follow-up.

Behaviors—Behaviors assessed included: history of smoking and self-reported sexual behaviors at 12 month assessment. Sexual behaviors assessed included, having had multiple male sexual partners during the 6 months prior to 12 month assessment, having a male sexual partner who had concurrent female sexual partners (nonmonogamous) in the 6 months prior to 12 month assessment, and a history of oral contraceptive use reported at 12 month assessment.

History of non-viral STIs—History of a nonviral STI was defined as having a laboratory-confirmed test for either a chlamydia, gonorrhea, or trichomonas infection at baseline. One swab was evaluated for *Neisseria gonorrhoeae* (GC) and *Chlamydia trachomatis* (CT) using the Becton Dickinson ProbeTec ET *Chlamydia trachomatis* and *Neisseria gonorrhoeae* Amplified DNA Assay (Sparks, MD). A second vaginal swab was tested for *Trichomonas vaginalis* (TV) using Taq-Man PCR. All assays were conducted at the Emory University, Department of Pathology Research Laboratory. Women testing STI positive were provided directly observable single-dose treatment and received appropriate counseling per CDC recommendations.

Statistical Analysis

Univariate analyses described the prevalence of HPV at baseline. Subsequent bivariate analyses examined the relationship among history of sexual abuse, potential covariates, including behavioral factors, presence of a non-viral STI, study condition, and testing positive for HPV at the 12-month follow-up. Variables significantly associated ($P < .05$) with testing positive for HPV at the 12-month follow-up in bivariate analyses were included in logistic regression analyses. Given prior research indicating a higher prevalence of HPV among young adult women 18–24, the study sought to examine the strength of association between history of sexual abuse and high-risk HPV among different age groups.¹³ Thus, separate logistic regression analyses were conducted for participants 18–24 and for those 25–29 years of age.

RESULTS

At baseline, participants' average age was 22.2 ($SD=3.71$) years. The majority of women reported completing some college (40.6%), followed by 26.8% graduating from high school, 18.3% graduating from college, 9.9% completing some high school (9th–11th grade), and 4.4% having graduate school training. In terms of their living situation, the majority of participants reported living with parent(s) (51.2%), with 21.2% living alone, 12.5% living with a roommate, 6.2% living with their boyfriend, 5.6% living with another relative, and 3.3% living with their children. Finally, the majority of women obtained their spending money from their job (91.5%) and 8.5% receiving an allowance from parent(s) or boyfriend, public assistance, or school financial aid. The primary exposure, history of recent sexual abuse, was reported by 22.4% ($N=95$) of participants. The results indicated that prevalence of incident high-risk HPV infection among study participants was 38.9% ($N=259$), 42.4% among participants 18–24 ($N=197$), and 31% among participants 25–29 ($N=62$).

Among participants 18–24 years of age, age-stratified multiple logistic regression analyses, adjusting for significant covariates, observed that participants with a history of sexual abuse in the past 12 months, relative to participants without a history of sexual abuse in the past 12 months, were 4.5 times more likely to test positive for an incident high-risk HPV infection. This relationship was not significant for the overall sample or for women 25–29 years of age (Table 1).

DISCUSSION

This is among the first studies to demonstrate an association between recent experience of sexual abuse and infection with high-risk HPV among young women 18–24 years of age. Specifically, this study indicated that women who experienced a history of sexual abuse in the past 12 months had a four-and-a-half fold increase in high-risk HPV incidence at the 12-month follow-up. Moreover, the association between history of sexual abuse and high-risk HPV infection persisted after adjusting for traditional HPV risk factors.

The prevalence of high-risk HPV in this study corroborates findings observed in other studies.¹⁹ The current study suggests that health care providers should routinely screen young adults for a history of sexual abuse, and those identified with this experience should be tested for HPV. Furthermore, young adult women reporting a history of abuse should be referred for appropriate counseling. Given the greater vulnerability of African-American women for high-risk HPV acquisition,^{13,19} the considerable prevalence of sexual abuse in the population,²⁰ and the association observed between sexual abuse and HPV acquisition, HPV vaccination recommendations for African-American women 18–24 years of age warrant special consideration.

African-American women in this age group could benefit greatly from HPV vaccination. However, if African-American women are uninsured or their health insurance does not include coverage for vaccines, and they cannot afford the vaccine, existing racial disparities could worsen.¹³ What is needed is a health policy that provides for unfettered access to these medical advances. Together, advances in medical technology, such as the advent of efficacious vaccines (e.g., HPV), and health policy that provides for unfettered access to these medical advances, can effectively reduce health disparities among women.

The study has several limitations. First, the measure used to assess the primary exposure, recent sexual abuse, was crude and did not assess the frequency and severity of sexual abuse. The present study examined cross-sectional analyses; therefore, the causal and temporal associations between recent sexual abuse and incident high-risk HPV infection cannot be assessed. Additionally, this study was limited to African-American women, 18–29 years of

age. Subsequent studies should assess the observed relationship among non-African-American women and with younger samples.

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Unadjusted and adjusted analyses measuring the association between history experience of sexual abuse and high-risk HPV at 12-months follow-up, by age group.

Table 1

Age	Unadjusted Analyses				Multivariate Analyses [†]		
	Recent history sexual abuse (%)	No recent history sexual abuse (%)	PR ^a	(95% CI) ^b	P	OR ^c	(95% CI)
18–29	22.4	77.6	2.37		.03	2.12	(.97–4.65)
18–24	21.3	78.7	4.16	(1.55–11.15)	.005	4.50	(1.51–13.42)
25–29	24.6	75.4	0.98	(0.27–3.52)	.98	0.99	(0.25–3.86)

^aPrevalence ratio

^b95% Confidence interval

^cOdds ratio adjusted by intervention group, history of nonviral STIs reported at baseline, oral contraceptive use, smoking, multiple sexual partners, and male partner having concurrent sexual partners reported at 12 month assessment.