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Correlates of HPV Knowledge in the Era of HPV Vaccination: A Study of Unvaccinated Young Adult Women

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Abstract

Until recently, awareness of the sexually transmitted infection human papillomavirus (HPV)—the virus that causes cervical cancer—was relatively low. The purpose of this study was to identify factors associated with HPV knowledge now that HPV vaccines have become widely available. Young adult women (n = 739; aged 18-26 years) attending Florida State University who had not yet initiated HPV vaccination completed a survey between March-August 2009. The survey assessed HPV awareness, HPV knowledge, demographics, socio-political variables, sexual history, and health history variables. Over 97% of participants were aware of HPV prior to study enrollment; however, knowledge of HPV was only moderate. A multivariate regression analysis examining factors related to HPV knowledge revealed five independent correlates: Latina ethnicity, premarital sex values, number of lifetime sexual partners, history of cervical dysplasia, and HIV testing. These variables accounted for 14% of the variance in HPV knowledge. Less knowledge was observed for Latinas and women opposed to premarital sex. Greater knowledge was observed for women who had been tested for HIV and women with more sexual partners or a history of cervical dysplasia. These findings can inform future HPV vaccination campaigns and may be particularly useful in developing interventions for individuals with the largest deficits in HPV knowledge.

Keywords

human papillomavirus; human papillomavirus vaccines; sexually transmitted diseases; students

Introduction

In June 2006, a quadrivalent human papillomavirus (HPV) vaccine was approved by the U.S. Food and Drug Administration (FDA) for use in females aged 9-26 years. The quadrivalent vaccine provides protection against infection with four types of HPV (16 and 18, 6 and 11), which are responsible for about 70% of all cervical cancers and 90% of genital warts, respectively (Markowitz et al., 2007). In October 2009, a bivalent vaccine targeting HPV types 16 and 18 was approved. In the U.S., HPV vaccine uptake has been highest among 13-17 year-old girls, with approximately 44% reporting receipt of at least one injection (Dorell et al., 2010). Significantly lower uptake has been observed among women aged 18-26 years, with only about 10% initiating the series (Jain et al., 2009).

Until fairly recently, awareness of HPV has been low in the general public (Gerend & Magloire, 2008; Klug et al., 2008; Sandfort & Pleasant, 2009; Tiro et al., 2007). Recent

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increases in HPV awareness and knowledge are likely related to the availability of HPV vaccines. Although findings have been mixed (Brewer & Fazekas, 2007), several studies suggest that greater knowledge of HPV is associated with both greater HPV vaccine acceptability (Jones & Cook, 2008; Woodhall et al., 2007) and uptake (Licht et al., 2010; Mathur et al., 2010). Given the relationship between knowledge and HPV vaccine uptake and the relatively low rates of vaccine uptake in women aged 18-26 years, it is important to understand factors affecting young adult women's knowledge of HPV. The purpose of the present study was to identify factors associated with HPV knowledge now that HPV vaccines have become widely available.

Surprisingly few studies have identified correlates of HPV knowledge. Furthermore, most of this research was conducted prior to the availability of HPV vaccines rendering the findings outdated. Higher HPV knowledge has been associated with being sexually active (Dell et al., 2000; Ramirez et al., 1997) and having a higher number of sexual partners (Sandfort & Pleasant, 2009). Women with a history of HPV infection (e.g., cervical dysplasia) also have reported greater knowledge of HPV (Tiro et al., 2007; Holcomb et al., 2004; Waller et al., 2003). One recent study found a positive correlation between HPV knowledge and exposure to HPV vaccine television commercials (Sandfort & Pleasant, 2009).

The purpose of the present study was to identify correlates of HPV knowledge approximately three years after approval of the quadrivalent HPV vaccine. To inform future HPV vaccination interventions targeting young adult women, the sample was limited to women ages 18-26 years who had not yet received any HPV shots. Previous research guided the selection of variables examined (Gerend & Magloire, 2008; Tiro et al., 2007; Rosenthal et al., 2008). As in studies conducted prior to release of the quadrivalent HPV vaccine (Tiro et al., 2007; Holcomb et al., 2004; Dell et al., 2000; Ramirez et al., 1997; Waller et al., 2003; Gerend et al., 2007), we examined the extent to which demographic variables, sexual history, and health history variables (e.g., previous experience with HPV infection) were related to HPV knowledge. Furthermore, we broadened our analysis to include additional variables that may be related to HPV knowledge in the era of HPV vaccination. First, we examined the relationship between HPV knowledge and provider recommendation for HPV vaccination because such interactions could serve as ideal opportunities to educate women about HPV. Second, we assessed the extent to which an individual's social and political context might relate to her knowledge about HPV. Because HPV vaccines prevent a sexually transmitted infection (STI), HPV vaccination has been controversial among some groups (e.g., conservative political and religious organizations; Constantine & Jerman, 2007; Zimet et al., 2008). Such groups have expressed concerns that vaccinating girls or adolescents against HPV could lead to sexual disinhibition (having intercourse at an earlier age or failing to use protection during sexual encounters) or be mistaken as implied permission for sexual activity (Zimet et al., 2008). Thus, as recent improvements in HPV awareness and knowledge have been closely tied to the introduction of the HPV vaccines, knowledge of HPV may be affected by political, social, and religious beliefs. In the current study, we examined relationships between HPV knowledge and political affiliation, religious beliefs, and attitudes toward premarital sex.

Methods

Participants and Procedure

Data were drawn from the baseline session of an HPV vaccination intervention study. Female students attending Florida State University were recruited via flyers and announcements posted on Blackboard (the university's web-based course management system). A small number of participants were also recruited through the Psychology Department student pool. Women interested in the study were directed to a webpage for the

link to the screening survey. A total of 2,782 women completed the screening survey, of whom 58% (n = 1,612) met eligibility criteria (female; aged 18-26 years; no prior receipt of any doses of the HPV vaccine; not currently pregnant). All eligible participants were invited to enroll in the study. Invitations were sent via email, and data collection continued until we reached our target sample size of 735 participants. A statistical power analysis determined that we would have sufficient power (.92 to .99) to detect a small-to-medium intervention effect with a total sample of 735 participants. Enrollment was closed after 739 participants completed the baseline session.

Data collection took place between March and August of 2009. After providing informed consent, participants completed a computer-administered questionnaire. HPV awareness and knowledge were assessed prior to delivery of the intervention. Participants recruited from the general student body (n = 692) received $30 for their participation. Participants recruited through the Psychology Department (n = 47) received course credit. The study was approved by the University Human Subjects Committee.

Measures

The questionnaire assessed demographic information (age, race/ethnicity, years of education, personal income, marital status, and whether women were currently involved in a "romantic relationship"). Sexual history variables assessed included sexual orientation, whether participants had ever had sexual intercourse (vaginal sex), age at first intercourse, and number of lifetime sexual partners. Personal experience with cervical dysplasia was assessed with the following questions: "Have you ever been told by a health care professional that you had a precancerous condition of the cervix or cervical cancer?" "Have you ever been treated for a precancerous condition of the cervix or cervical cancer?" Participants also reported whether they had ever received an HIV test and whether a physician or other health care provider had ever recommended that they receive the HPV vaccine. Survey questions had been validated in previous studies (Gerend & Magloire, 2008; Gerend et al., 2007; Gerend & Barley, 2009).

Socio-political variables were assessed with items developed by Rosenthal et al. (2008). Participants indicated their religious affiliation by selecting from the following categories: Catholic, Protestant, Jewish, Muslim, Buddhist, Mormon, Other Christian, None, or Other. Participants also reported whether they considered themselves born-again or evangelical Christian. Political affiliation was selected from the following options: very liberal = 1, somewhat liberal = 2, middle of the road = 3, somewhat conservative = 4, very conservative = 5. Participants reported their attitudes toward premarital sex with the following question: "Which of the following best describes your view on when it is appropriate for a woman to have sexual intercourse?" Response options included: "a woman should not have sexual intercourse until she is married" = 4; "a woman should not have sexual intercourse until she is in a serious relationship and is a young adult" = 3; "a woman should not have sexual intercourse until she is in a serious relationship" = 2; "a woman should explore her sexuality when she is ready as long as she takes care of herself" = 1).

HPV awareness and knowledge were assessed with items validated in previous research (Gerend & Magloire, 2008; Yacobi et al., 1999; Gerend et al., 2007; Gerend & Barley, 2009). HPV awareness was assessed with the following question: "Before you came here for this study today, had you ever heard of HPV (human papillomavirus)?" HPV knowledge (the primary outcome variable) was assessed with 10 closed-ended true/false items. By HPV knowledge we are referring to the degree to which a person possesses and understands objective information pertinent to a particular subject, in this case, HPV. To discourage guessing, participants were instructed to choose "don't know" if they were not sure of the correct answer. In developing our scale, we selected items validated in previous studies with

a similar population (Gerend & Magloire, 2008; Yacobi et al., 1999; Gerend et al., 2007; Gerend & Barley, 2009). In addition, we included several distracter items that assessed higher-level understanding of HPV infection. These items required women to rule out the connection between HPV and (a) genital herpes and (b) ovarian cancer. We also included slightly more false than true statements, as asking participants to reject false statements has been shown to provide better knowledge discrimination (Jaworski & Carey, 2007). A knowledge summary score was computed by assigning one point for each correct response and zero points for incorrect and "don't know" responses. Points were summed to create a knowledge summary score. Knowledge scores were computed only for women who had previously heard of HPV.

Statistical Analyses

Descriptive statistics were computed for all variables potentially related to HPV knowledge including demographics, socio-political variables, sexual history, and health history variables. Correlations were estimated between the HPV knowledge summary score and all such variables. Pearson Product Moment Correlations were calculated to estimate the relationship between two continuous variables (e.g., age and HPV knowledge) and Point-Biserial correlations were calculated to estimate the relationship between a dichotomous variable (e.g., provider recommendation for the HPV vaccine: yes or no) and a continuous variable (HPV knowledge). Point-Biserial correlations with HPV knowledge were computed for the following variables: Hispanic/Latina (1 = yes; 0 = no), non-white race (1 = non-white; 0 = white), marital status (1 = married; 0 = single), romantic relationship status (1 = currently in a romantic relationship; 0 = not currently in a romantic relationship), heterosexual orientation (1 = heterosexual; 0 = lesbian or bisexual), ever had vaginal sex (1 = yes; 0 = no); history of cervical dysplasia (1 = yes; 0 = no); history of treatment for cervical dysplasia (1 = yes; 0 = no); ever tested for HIV (1 = yes; 0 = no); provider recommended HPV vaccine (1 = yes; 0 = no). A hierarchical multiple regression analysis was then conducted to identify variables that were independently associated with HPV knowledge. Variables correlated with HPV knowledge at $p < .05$ were entered into a multiple regression analysis in four separate steps: Step 1: demographics; Step 2: socio-political variables; Step 3: sexual history; and Step 4: health history variables. The percentage of variance accounted for at each step of the model (R^2) and whether variables entered at each subsequent step of the model accounted for significantly more variance than the previous step (F change statistic and its associated p-value) are reported.

Results

Sample Characteristics and Potential Correlates

The mean age of participants was 21 years (SD = 1.8) (Table 1). Sixteen percent of participants were Hispanic/Latina and approximately 28% of the sample self-identified as non-white. Over half of participants reported that they were currently in a romantic relationship; however, only a small percentage of participants (4%) were married. Political affiliation was distributed across the five categories, with more women identifying as politically liberal (46%) than conservative (28%). Over one quarter of participants identified as born-again or evangelical Christian. Sixteen percent indicated that it was not appropriate for a woman to have intercourse until she was married. Nearly 80% had ever engaged in sexual intercourse, with a mean age of first intercourse of 17 years. Approximately 5% had a history of cervical dysplasia, 2% had been treated for cervical dysplasia, and almost half had received a recommendation from their physician or another health care provider for HPV vaccination.

HPV Awareness and Knowledge

Only 3% of the sample (n = 21) had not heard of HPV prior to their participation in the study. Of those participants familiar with HPV (n = 718), the mean HPV knowledge score was 4.9 out of 10 (SD = 2.4). The knowledge item answered correctly by most participants (84%) concerned the link between genital HPV infection and cervical cancer (Table 2). Knowledge of the causal relationship between HPV and genital warts and the transient nature of HPV infection was quite low, with only 30% and 16%, respectively, answering those items correctly. Sixty percent incorrectly believed that HPV could cause ovarian cancer. For several items, a relatively large percentage of participants (as high as 58%) selected “don't know”; however, this might be expected, as participants were instructed not to guess on items for which they were unsure of the correct answer.

Correlations with HPV Knowledge

Several variables were significantly correlated with HPV knowledge. Older women and women who had completed more years of education reported greater HPV knowledge, as did women who were currently in a romantic relationship (Table 3). Lower knowledge scores were observed among Hispanic/Latina women, more politically conservative participants, and participants who identified as born-again or evangelical Christian. In addition, participants who were more opposed to premarital sex were significantly less knowledgeable about HPV infection. Greater knowledge scores were observed among women who had ever had sexual intercourse and women who reported higher numbers of lifetime sexual partners. Women with a history of cervical dysplasia and women previously treated for cervical dysplasia were more knowledgeable about HPV. Positive correlations were observed between HPV knowledge and both HIV testing and provider recommendation of HPV vaccine; women who had been previously tested for HIV and women who had received a recommendation for the HPV vaccine from their health care provider had higher knowledge scores relative to women who had not been tested or had not received a recommendation for HPV vaccination from their provider.

Hierarchical Multivariate Regression Analysis

Variables that were significantly correlated with HPV knowledge were entered into a hierarchical multiple regression analysis in four separate steps (Table 4). Given the significant correlation between age and education (r = .81, $p < .001$), only age was entered into the multivariate analysis. Results were identical if education was entered in place of age. At step 1, all three demographic variables (Hispanic/Latina ethnicity, age, and romantic relationship status) were significantly associated with HPV knowledge, accounting for 3% of the variance in HPV knowledge. With the addition of socio-political variables at step 2, all three demographic variables remained statistically significant. Of the socio-political variables, only ‘premarital sex values’ was significantly related to HPV knowledge. At step 2, variables in the model accounted for 7% of the variance. Sexual history variables were entered at step 3 (R^2 = .10). Number of lifetime partners was the only sexual history variable significantly related to HPV knowledge. Health history variables associated with HPV knowledge were entered at the fourth and final step of the model. With all of the variables in the model, the following emerged as independent correlates of HPV knowledge: Hispanic/Latina ethnicity, premarital sex values, number of lifetime sexual partners, history of cervical dysplasia, and history of HIV testing. The final model accounted for 14% of the variance in HPV knowledge. Moreover, adding additional variables at each step resulted in a significant F change statistic at all four steps of the model.

In a set of supplemental analyses, we examined potential interactions between model variables and both age and provider recommendation. No significant interactions were observed with age. We observed only an unpredicted interaction between provider

recommendation and number of lifetime sexual partners such that the relationship between lifetime partners and HPV knowledge was stronger for women who had not received a recommendation (r = .30) relative to those who had (r = .21).

Discussion

The present study provided novel insight into factors related to HPV knowledge in the era of HPV vaccination. Most participants in this sample of unvaccinated young adult women were aware of HPV prior to study enrollment; however, considerable gaps in participants' understanding of the nature and consequences of HPV infection were observed. In addition, several new correlates of HPV knowledge were identified. For example, Hispanic/Latina women and women with strong values against premarital sex were less knowledgeable about HPV. Greater understanding of these relationships is essential for the development of successful HPV prevention interventions.

A large proportion of young adult women are aware of HPV infection. Less than 3% of the sample had not heard of HPV prior to enrolling in the study. The high degree of awareness is even more striking in light of the fact that none of the women in this study had been vaccinated for HPV, a behavior that increases HPV awareness (Caskey et al., 2009). Findings from the present study are consistent with national trends showing a substantial increase in HPV awareness over the past several years (Gerend & Magloire, 2008; Tiro et al., 2007).

Despite relatively high awareness, HPV knowledge was only moderate, with participants answering about half of the knowledge items correctly. Nearly 85% acknowledged the causal relation between HPV infection and cervical cancer. This finding is encouraging, as knowledge of the HPV-cervical cancer link is essential for making informed decisions about sexual activity, cervical screening, and HPV vaccination. As demonstrated previously (Caskey et al., 2009; Gerend & Magloire, 2008), confusion about the relationship between HPV and genital warts, as well as the transient nature of HPV infection, was observed. Furthermore, despite increases in knowledge of the HPV-cervical cancer link, knowledge of the causal relationship between HPV and genital warts has remained relatively low. This may not be surprising as the media (e.g., news stories, articles in women's magazines) and even the medical community (Zimet et al., 2008) have often referred to the quadrivalent HPV vaccine as a “cervical cancer vaccine,” thus downplaying the additional protection afforded against HPV infection with types 6 and 11, which account for most cases of genital warts (Lacey et al., 2006).

Several correlates of HPV knowledge were identified. Although some of these relationships had been observed previously (Gerend & Magloire, 2008; Tiro et al., 2007), several others were new to this literature, such as political and religious affiliation, attitudes toward premarital sex, and provider recommendation for HPV vaccination. As demonstrated previously (Tiro et al., 2007; Sandfort & Pleasant, 2009; Holcomb et al., 2004; Dell et al., 2000; Ramirez et al., 1997; Waller et al., 2003), we observed significant associations between HPV knowledge and prior experience with sexual intercourse, number of lifetime sexual partners, and history of cervical dysplasia. Women with more sexual partners might be expected to possess more knowledge of HPV infection due to increased opportunities for exposure to STI-related information through providers and partners. History of cervical dysplasia was one of the strongest correlates of HPV knowledge. Until quite recently, diagnosis with HPV infection or cervical dysplasia may have been the primary means by which women learned about HPV infection and its consequences. Indeed, previous research conducted before approval of the quadrivalent HPV vaccine (Tiro et al., 2007) suggested that many women become informed about HPV only *after* receiving an HPV diagnosis.

Although diagnosis with HPV will likely remain an important opportunity for HPV education, women now have additional opportunities to learn about HPV through HPV vaccination.

In the final step of the multivariate model, five variables were independently correlated with HPV knowledge (Latina ethnicity, premarital sex values, number of lifetime sexual partners, history of cervical dysplasia, and HIV testing) and accounted for 14% of the variance in HPV knowledge. Latina women had less knowledge of HPV. That this relationship persisted even after controlling for other important variables, such as sexual history and history of cervical dysplasia, suggests something unique about the experiences of Latina women that rendered them less knowledgeable about HPV. As Latinas have some of the highest rates of cervical cancer in the United States (Saraiya et al., 2007), it is essential that future studies attempt to replicate this finding and identify reasons underlying this knowledge gap. Effective communications aimed at improving understanding of HPV infection and its consequences are greatly needed for Latina women.

Women opposed to premarital sex had less knowledge of HPV, even after controlling for other variables in the model. One possible explanation is that women with strong values against premarital sex had friends who held similar views, and therefore may have had fewer opportunities to discuss STI-related issues in their day-to-day social interactions. Similarly, women with conservative beliefs about premarital sex may have been less likely than other women to seek out information from places where STI information tends to be disseminated (e.g., family planning clinics). Another possible explanation is that women opposed to premarital sex were exposed to HPV-related information, but they did not pay attention to or deeply process that information because they did not see it as personally relevant to their lifestyle. A large body of research suggests that people tend not to process information deeply if they do not see it as personally relevant (Chaiken, 1980; Petty & Cacioppo, 1984). Additional research is needed to further understand the link between HPV knowledge and sexual values.

When comparing results from the present study to previous research, it is important to consider the manner in which HPV knowledge was assessed. We chose to measure HPV knowledge with closed-ended true/false items. Data from a recent systematic review (Klug et al., 2008) suggested that higher HPV knowledge is typically observed with use of closed-ended questions rather than open-ended questions that require participants, for example, to name risk factors for cervical cancer. Closed-ended questions can be problematic in that responses are often affected by guessing. In the present study, guessing was explicitly discouraged by asking participants to select “don't know” on items for which they did not know the correct answer. Thus, the current study extends and improves upon previous studies aimed at assessing HPV knowledge.

Limitations and Future Directions

Limitations of the present study should be acknowledged along with directions for future research. Although the sample size and proportion of minority women (e.g., Latinas and African American women) were relatively large, study participants were recruited from a university setting, which limits the generalizability of the findings. Results may not extend to young adult women who have not attended college. Furthermore, study participants were recruited from the southeastern United States, which may overestimate the role of characteristics prevalent in this region of the country (e.g., conservative and religious beliefs). Also, we assessed knowledge using closed-ended questions. In future studies, it would be interesting to examine whether use of open-ended questions leads to similar findings. Unfortunately, we did not inquire about women's sources of information about HPV. Assessing women's primary information sources related to HPV (such as the media,

friends, and health care providers) may shed further light on the current findings. It would also be informative to assess whether women actively seek information about HPV or are passive recipients of such information. As mentioned previously, additional research is needed to provide better understanding of the knowledge gaps observed among Latinas and women with strong values that preclude premarital sex.

Conclusion

Findings from the present study shed light on important factors associated with young women's knowledge of HPV in the era of HPV vaccination. Previous studies have shown that women with greater HPV knowledge tend to have more favorable attitudes toward HPV vaccination and are more inclined to receive the HPV vaccine (Licht et al., 2010; Jones & Cook, 2008; Woodhall et al., 2007; Mathur et al., 2010). Although knowledge alone is probably insufficient to elicit behavior change, it is often an important first step in this process. Thus, findings from the present study may be useful in informing future HPV vaccination campaigns, particularly campaigns targeting women at highest risk for cervical cancer (Latinas and African Americans; Saraiya et al., 2007). In addition, these findings could be especially valuable in developing interventions for individuals with the largest deficits in HPV knowledge.

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Table 1

Sample characteristics for demographic variables, socio-political variables, sexual history, and health history variables (N = 739)

Variable	n (%)	Mean (SD)
Age (range: 18-26 years)		20.9 (1.8)
Hispanic/Latina	121 (16)	
Race		
White	501 (68)	
Asian	19 (3)	
Black or African American	142 (19)	
Native Hawaiian or other Pacific Islander	2 (<1)	
American Indian or Alaska Native	3 (<1)	
Multi-racial	38 (5)	
Not reported	11 (2)	
Unknown	23 (3)	
Education level		
College freshman	96 (13)	
College sophomore	98 (13)	
College junior	176 (24)	
College senior	272 (37)	
College graduate	35 (5)	
Graduate student	62 (8)	
Married	30 (4)	
In a “romantic relationship”	431 (58)	
Annual household income		
$0	118 (16)	
$1 - $5000	330 (45)	
$5001 - $10,000	142 (19)	
>$10,000	142 (9)	
Not reported	7 (<1)	
Political leaning		
Very conservative	47 (6)	
Somewhat conservative	151 (20)	
Middle of the road	190 (26)	
Somewhat liberal	220 (30)	
Very liberal	118 (16)	
Not reported	13 (2)	
Religion		
Catholic	168 (23)	
Protestant	95 (13)	
Jewish	23 (3)	
Muslim	4 (<1)	

Variable	n (%)	Mean (SD)
Buddhist	4 (<1)	
Mormon	3 (<1)	
Other Christian	275 (37)	
None	132 (18)	
Other	24 (3)	
Not reported	11 (2)	
Born-again or evangelical Christian	189 (26)	
Premarital sex values		
Not until married	116 (16)	
Not until in a serious relationship & young adult	241 (33)	
Not until in a serious relationship	93 (13)	
When she is ready as long as she takes care of herself	279 (38)	
Sexual orientation		
Heterosexual	710 (96)	
Lesbian	9 (1)	
Bisexual	18 (2)	
Ever had vaginal sex	585 (79)	
Age at first intercourse		17.2 (2.0)
No. lifetime sexual partners		4.4 (5.5)
Ever told have cervical dysplasia	39 (5)	
Ever treated for cervical dysplasia	18 (2)	
Ever tested for HIV	291 (39)	
Provider recommended HPV vaccine	362 (49)	

Note: SD = standard deviation.

Table 2

Mean (SD) HPV knowledge summary score and percent responding correctly and “don't know” to the 10 individual HPV knowledge items

Knowledge Item	% Responding Correctly	% Responding Don't Know
HPV can cause genital herpes. (F)	25	53
Having one type of HPV means that you cannot acquire new types. (F)	55	42
Genital HPV infection can cause ovarian cancer in women. (F)	9	31
An abnormal Pap smear may indicate that a woman has HPV. (T)	66	32
Most genital HPV infections do not clear up on their own. (F)	16	45
Most women with genital HPV have visible signs or symptoms. (F)	66	31
HPV is the least common sexually transmitted infection in the U.S. (F)	60	38
Genital warts are caused by HPV infection. (T)	30	58
Genital HPV infection can cause cervical cancer in women. (T)	84	15
A Pap test (Pap smear) is used to find precancerous cells on the cervix. (T)	79	20
HPV knowledge summary score		4.9 (2.4)

Note: HPV knowledge was examined for those women who had heard of HPV prior to study entry (n = 718). An HPV knowledge summary score was created for each participant by assigning one point for each correct response and zero points for incorrect and “don't know” responses. Points were summed to create a knowledge summary score. Summary scores could range from 0 to 10. T = True. F = False.

Table 3

Correlations between independent variables and HPV knowledge

Variable	Correlation with HPV Knowledge
Demographics	
Hispanic/Latina [a]	−.08*
Non-White race [a]	−.02
Age	.10**
Year in college	.10**
Married [a]	.00
Romantic relationship [a]	.13**
Annual income	.07
Socio-Political variables	
Conservative political leaning	−.08*
Born-again or evangelical Christian	−.12**
Opposed to premarital sex	−.20**
Sexual history	
Heterosexual orientation [a]	−.03
Ever had sex [a]	.22**
No. lifetime sexual partners	.26**
Health history variables	
Ever told have cervical dysplasia [a]	.20**
Ever treated for cervical dysplasia [a]	.14**
Ever tested for HIV [a]	.23**
Provider recommended HPV vaccine [a]	.07*

Note: Correlations were estimated for those women who had heard of HPV prior to study entry. (n = 718).

[a]Correlations with this superscript are Point-Biserial correlations. All other correlations are Pearson Product Moment Correlations.

*$p \leq .05$

**$p \leq .01$

Table 4

Hierarchical multivariate regression model of factors related to HPV knowledge in four separate steps

	Standardized Regression Coefficients			
Variables in the model	**Step 1**	**Step 2**	**Step 3**	**Step 4**
Demographics				
Hispanic/Latina	−.07*	−.07*	−.07*	−.08*
Age	.09*	.10**	.05	.05
Romantic relationship	.11**	.10**	.06	.07
Socio-Political variables				
Conservative political leaning		−.00	.00	.02
Born-again or evangelical Christian		−.07	−.06	−.06
Opposed to premarital sex		−.17**	−.08	−.09*
Sexual history				
Ever had sex			.08	.05
No. lifetime sexual partners			.17**	.10*
Health history variables				
Ever told have cervical dysplasia				.13**
Ever treated for cervical dysplasia				.01
Ever tested for HIV				.12**
Provider recommended HPV vaccine				.04
F change	6.74**	10.41**	13.15**	6.46**
R^2	.03	.07	.10	.14

Note: The multivariate model was estimated for those women who had heard of HPV prior to study entry (n = 718).

* $p \leq .05$

** $p \leq .01$