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## HPV Knowledge, Attitudes, and Vaccination Among Hispanic/ Latino College Students in the USA

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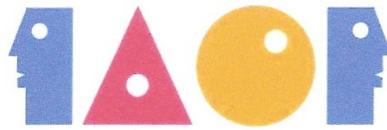
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## HPV KNOWLEDGE, ATTITUDES, AND VACCINATION AMONG HISPANIC/LATINO COLLEGE STUDENTS IN THE USA

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### Abstract

This study evaluated Human Papillomavirus-related knowledge and attitudes, vaccination practices, and explored associated factors among Hispanic/Latino college students in the United States of America. Using a self-administered survey, a descriptive, cross-sectional quantitative study was conducted in 2018 at colleges and universities in the United States of America. Our results indicate that Hispanic/Latino college students had a low level of HPV-related knowledge, a moderately positive attitude, and a moderate rate of HPV vaccination. Students who were in a health-related major, married/divorced, and had health insurance had greater knowledge and more positive attitudes towards HPV and its vaccines. This study is important due to the disproportionate high rate of HPV associated cervical cancers among Hispanic/Latinos when compared to other races and ethnicities. Our findings will inform the development of innovative intervention to promote HPV vaccination uptake across educational institutions.

Key words: College students, HPV knowledge, HPV attitudes, HPV vaccine, Latino/Hispanic

## Introduction

Worldwide, 70% of cervical cancers and precancerous cervical lesions are linked to the Human Papillomavirus (HPV) and more specifically type 16 and 18.<sup>1</sup> HPV infections are also associated with cancers of the anus, vulva, vagina, penis and oropharynx.<sup>1</sup> The Advisory Committee on Immunization Practices (ACIP) in the United States of America (USA) recommended the use of the quadrivalent HPV vaccine against four strains in 2006 and more recently the use of a vaccine against nine strains of HPV.<sup>2</sup> Both vaccines protect against HPV types 6, 11, 16, and 18 with the latter having additional protection against HPV types 31, 33, 45, 52, and 58. The ACIP recommends vaccination for all girls and boys at 11 or 12 years of age, as well as for unvaccinated men and women between the ages of 13 to 26.<sup>2</sup>

Hispanic/Latino women and men in the USA have the greatest rates of HPV associated cervical cancer and penile cancer when compared to other races and ethnicities.<sup>3</sup> However, HPV vaccination rates among Hispanic/Latino college students in the USA were lower than Caucasian students and students of other ethnicities (40.9% vs. 62.7% & 50.8%).<sup>4</sup> Given that HPV knowledge and attitudes can influence vaccination behavior,<sup>4</sup> assessing relationships among HPV knowledge, attitudes, and vaccination among Hispanic/Latino college students may provide insights for developing education interventions to reduce disparities in HPV-related conditions. The purposes of the study were to (a) evaluate the knowledge, attitudes, and vaccination practices, and (b) explore factors

associated with HPV-related knowledge and attitudes, and vaccination among Hispanic/Latino college students in the USA.

## Methods

A cross-sectional, paper-based survey was used to collect quantitative data in 2018. Participants were recruited using snowball sampling, in-person recruitment, and referrals. The criteria were self-identification as Hispanic or Latino college students, age 18 or older, and able to read English or Spanish.

### *Ethical Considerations and Procedures*

The investigator started data collection after receiving approval from the Institutional Review Board. After receiving verbal consent from the potential participants, they were given an introductory letter elucidating details of the study and questionnaire. Completed surveys were returned to the recruiting investigators at the site or were mailed to the principal investigator. The participants were also asked to recruit others to participate in the study. The information letter and questionnaire were provided to those who agreed to recruit potential participants. No personal identifiers were collected.

### *Measurements*

The survey instruments were available in English and Spanish. Participants could choose their preferred language. The self-administered questionnaire consisted of three sections, including (a) demographics and HPV vaccination practices, (b) knowledge about HPV

and its vaccine, and (c) attitudes toward HPV vaccination.

#### *Demographics and HPV Vaccination*

Information collected included age, gender, place of birth, academic year, major, student status, marital status, and religious preferences. Participants were also asked if they had health insurance and a primary care provider, how many HPV vaccinations they had received, and at what age and in what country they received their first HPV vaccine.

#### *Knowledge about HPV and Its Vaccine*

Knowledge about HPV was measured using 13 questions<sup>5</sup> with three additional items related to the connections between HPV vaccine, cancers, and Pap smear. Participants answered each item by choosing from the following options: true, false or don't know. Each correct answer was worth one point. Points were summed, divided by 16 (total item number), and multiplied by 100. Higher scores represent better knowledge (range = 0-100).

#### *Attitudes toward HPV Vaccination*

Seven questions were included in the questionnaire to assess participants' attitude about HPV vaccination.<sup>5</sup> Five ordered response levels were used, from 1-Strongly agree to 5-Strongly disagree. Scores from each participant were averaged (range 1-5). Lower scores correlated with a more positive attitude.

#### *Statistical Analysis*

SPSS version 25 was used to analyze data. Descriptive statistics were applied to describe demographic data, HPV knowledge and attitude, and HPV vaccination practices. Analysis of Variance and multiple logistic regression model were utilized to explore the factors associated with HPV knowledge and attitude, and vaccination. A p-value of < 0.05 was considered statistically significant.

## Results

### *Characteristics of Participants*

Of the 210 returning valid surveys, one was completed in Spanish and was excluded. The remaining 209 sets were included in the final data analysis. The mean age was 20.89 (SD = 3.14, range = 18-36). Most were female (66.5%,  $n = 139$ ), born in the USA (78.5%,  $n = 164$ ), studying in undergraduate programs (94.3%,  $n = 197$ ), in non health-related majors (56.9%,  $n = 119$ ), full-time students (83.3%,  $n = 174$ ), never married (93.8%,  $n = 196$ ), and self-identified as Catholic (64.1%,  $n = 134$ ). Most had health insurance (78.9%,  $n = 165$ ) and had a primary care provider (61.2%,  $n = 128$ ). More than half reported having received one to three doses of HPV vaccine (52.1%,  $n = 109$ ). Among vaccinated participants, 105 (96%) received their first dose in the USA and the mean age was 14.90 years (SD = 3.34, range 10-26).

### *Knowledge about HPV and Its Vaccine*

Participants had an average knowledge score of  $40.64 \pm 27.26$ . As shown in Table 1, only 29.7% correctly identified the association between cervical

cancer and HPV infection. (Editor's Note: All tables in this article are found at the end of the text.) Only 40.7% knew that genital warts are related to HPV infections. Around half knew that HPV vaccine is best taken before initiating sexual activities (55.5%) and can be taken after the age of 18 years (45.9%). Only 35.9% knew the HPV vaccines are to protect against cervical cancer. About half knew women still need to get Pap smears even after receiving HPV vaccination (51.2%).

#### *Attitudes toward HPV and Its Vaccine*

The HPV attitude mean score was  $2.38 \pm .56$ . As shown in Table 2, only 16.7% agreed that they have risks for HPV infections. About half believed that the HPV vaccine is capable of preventing cervical cancer (53.6%). Less than half perceived the HPV vaccines as affordable (43.0%) and 45.9% perceived that the side effects are reasonable. Most would recommend HPV vaccines to their friends (70.3%) and believed that all health care providers should encourage HPV vaccination (72.7%).

#### *Factors Associated with HPV Knowledge, Attitude, and Vaccination*

As shown in Table 3, the following groups displayed significantly higher levels of HPV knowledge, which include (a) participants over age 22 years, (b) studying health-related majors, (c) studying full-time, (d) ever married, (e) non-Catholics, (f) had health insurance, and (g) had a primary care provide. Regarding HPV attitudes, participants older than 22 had a more positive attitude than those who were under 22. Participants in health-related majors had a more posi-

tive attitude than those who were in non health-related majors. The attitude score was more positive among those who had ever been married, comparing to those who had never been married. Participants who reported having health insurance had better attitude than those who had no health insurance.

Results from multivariate logistic regression analysis found that participants with a higher knowledge score [OR = 1.02 (95% CI = 1.01, 1.04),  $p = .003$ ] being more likely to have been vaccinated, while participants with more negative attitude [OR = .34 (95% CI = .20, .76),  $p = .006$ ] being less likely to have received the vaccine. No other factors were associated with HPV vaccination behaviors.

#### Discussion

The HPV related knowledge was low to moderate, and attitudes were moderately positive among our study participants. Our findings are congruent with a study conducted in Utah, USA among 119 Hispanic/Latino individuals.<sup>6</sup> Only one third of the participants knew that the HPV vaccine can protect against cervical cancer and less than half knew that it can also be obtained after the age of 18. Base on the fact that Hispanic/Latino population in the USA had a greater HPV associated cervical and penile cancer,<sup>6,7</sup> our finding is concerning since a poor HPV knowledge may place this population at a greater possibility of obtaining HPV infections and its related diseases.

Although most had health insurance, less than half agreed that the HPV vac-

cine was affordable. A possible explanation is that participants did not understand what services are covered by their health insurance. A previous study reported 24.4% of college students delayed medical care due to a lack of understanding regarding health insurance.<sup>8</sup> Given that immunizations and other preventative care services are often covered by insurance, there is a knowledge gap that could be addressed with educational interventions based on healthcare, insurance coverage and importance of preventative care. For instance, evidence-based PowerPoint presentation customized for ethnically diverse students should be implemented across educational institution with an aim to increase HPV related knowledge.<sup>9</sup>

Participants who were older held a more positive attitude and were more knowledgeable about HPV and HPV vaccines, which is consistent with a previous study conducted among college students.<sup>10</sup> The increase in positive attitudes could be due to social pressures experienced by younger Hispanic students. Research identified social pressure and perception of feeling in control of an action were significant predictors for HPV vaccination intention among college males.<sup>11</sup> It is also possible that older college students are affected less by social pressures and therefore held a more positive attitude.

Participants studying health related majors were more likely to have greater HPV knowledge and more positive attitudes about HPV. It could be that those in health related majors have a greater understanding about preventative care and its importance. Greater health liter-

acy was correlated with greater HPV knowledge among US college students.<sup>12</sup> Further research about health literacy differences between those who are in health related majors and those who are not could help identify methods to increase HPV awareness in the course of study.

Participants who had never been married were more knowledgeable and held more positive attitudes about HPV and its vaccines compared to unmarried ones, which is coinciding with a previous study.<sup>10</sup> In the Hispanic culture, discussion about sexuality and sexual issues is considered taboo and is not discussed openly.<sup>13</sup> It is possible that married participants were more openly discussing sexual issues and preventative care since the negative stigma of premarital sex is no longer a concern.

Participants who identified as Catholic were less knowledgeable about HPV and its vaccines. This may be a result of the opposition towards premarital sex embedded in Catholic religious values.<sup>14</sup> For instance, sex and sexual health are viewed as sinful or tabooed topics according to societal norms, thus leading to low levels of knowledge and limit safe sex practices among Hispanics.<sup>15</sup> Discussion of safe sex practices and sexual activity is considered taboo among most traditional Hispanic/Latino families. The Hispanic/Latino parents were also less likely than non Hispanics/Latinos to discuss sexually transmitted infections with their children.<sup>13</sup> It is possible that there is little discussion between Hispanic/Latino college students and their more traditional parents about sexually transmitted infections, and that the sinful

view of sex and its discussion can limit inquiry and thus knowledge about any sexually related topic.

Participants with a primary care provider had a greater HPV knowledge; suggesting that primary care provider's recommendation is important. Congruent with prior studies, college students were more likely to obtain the vaccine if they have had a discussion within the last year with a healthcare provider.<sup>16,17</sup> Emphasis about importance of preventative care, such as yearly check-ups and immunization schedules, is important to assure health maintenance and to promote HPV knowledge. It is also crucial that not only healthcare providers recommend vaccination but that it is done in a culturally competent manner, as research suggests that culturally competent information is necessary to reduce mistrust with healthcare providers among Hispanic college women who are unvaccinated.<sup>18</sup>

Greater knowledge score and a more positive attitude were associated with vaccination uptake among study participants. This is in accordance with a study conducted among 190 male college students in the USA, which reported that vaccination intention was influenced by the HPV knowledge.<sup>19</sup> Another study reported that Hispanic women with greater HPV knowledge were more likely to have an increased willingness to be vaccinated.<sup>20</sup> Among college men, research showed that those with more positive attitudes were more likely to complete the vaccine series.<sup>21</sup> Unvaccinated college students are at a pivotal point since they are in the early stages of deciding whether or not to obtain the

catch up HPV vaccine.<sup>22</sup> Further emphasize on improving HPV knowledge and attitudes among Hispanic/Latino college students must be included in health promotion interventions.

Several limitations should be noted. The study participants were recruited in colleges in the Western United States. This convenience sampling method limits the generalizability of study results to college students in other regions. Due to the nature of self-reported data, the responses may be subjected to social desirability bias or recall biases.

## Conclusion

This study highlighted the low to moderate HPV knowledge, moderately positive attitudes towards HPV and its vaccines, and a modest HPV vaccination coverage among Hispanic/Latino college students. Our findings could be valuable for intervention design targeting Hispanic college students at the national and international levels. Culturally and innovatively educational programs for Hispanic/Latino college students aiming to increase HPV knowledge, promote positive attitudes and HPV vaccination rates are urgently needed.

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Table 1. Participants Knowledge about Human Papilloma Virus and its Vaccination (N = 209)

<b>Knowledge statement</b>	<b>Correct answer</b>	<b>True n (%)</b>	<b>False n (%)</b>	<b>Do not know n (%)</b>
The type of cancer highly associated with HPV infection is:	Cervical	62 (29.7%)*	21 (10.1%)	126 (60.3%)
Human papilloma virus can cause herpes	False	50 (23.9%)	42 (20.1%)*	117 (56.0%)
Human Papilloma virus can lead to genital warts	True	85 (40.7%)*	17 (8.1%)	107 (51.2%)
HPV can be transmitted through vaginal, anal, and oral sex as well as genital to genital contact	True	137 (65.6%)*	9 (4.3%)	63 (30.1%)
In most cases, HPV infected persons do not show symptoms	True	112 (53.6%)*	18 (8.6%)	79 (37.8%)
All HPV infections are caused by the same type of virus	False	27 (12.9%)	78 (37.3%)*	104 (49.8%)
Only females can be infected with HPV and show symptoms	False	20 (9.6%)	118 (56.5%)*	71 (34.0%)
HPV can be transmitted from a carrier to his/her partner only if the carrier shows symptoms	False	24 (11.5%)	98 (46.9%)*	87 (41.6%)
A normal Pap smear implies that the woman is free of HPV	False	36 (17.2%)	53 (25.4%)*	120 (57.4%)
There is no current cure or therapy for HPV infection	True	46 (22.0%)*	44 (21.1%)	119 (56.9%)
HPV vaccines have the same effect whether the female takes it before or after being infected with HPV	False	16 (7.7%)	73 (34.9%)*	120 (57.4%)
HPV vaccine is best taken before starting to have sexual activities	True	116 (55.5%)*	12 (5.7%)	81 (38.8%)
HPV vaccine can only be taken after the age of 18 years	False	18 (8.6%)	96 (45.9%)*	95 (45.5%)
HPV vaccines protect against cervical cancer	True	75 (35.9%)*	28 (13.4%)	106 (50.7%)
HPV vaccines do not protect against all HPV infections that cause cancer	True	61 (29.2%)*	26 (12.4%)	122 (58.4%)
Women who receive HPV vaccine still have to get Pap smear	True	107 (51.2%)*	9 (4.3%)	93 (44.5%)

Table 2. Participants' Attitudes toward HPV and Vaccination (N = 209)

<b>Attitude assessing statement</b>	<b>Strongly Agree <i>n</i> (%)</b>	<b>Agree <i>n</i> (%)</b>	<b>Neutral <i>n</i> (%)</b>	<b>Disagree <i>n</i> (%)</b>	<b>Strongly Disagree <i>n</i> (%)</b>
Based on my lifestyle, I believe that I am susceptible for the HPV infection and must get the vaccine	7 (3.3%)	28 (13.4%)	89 (42.6%)	45 (21.5%)	40 (19.1%)
I believe that contracting HPV virus is serious and life threatening	69 (33.0%)	90 (43.1%)	44 (21.1%)	4 (1.9%)	2 (1.0%)
I believe that the current HPV vaccine is capable of preventing the occurrence of cervical cancer	28 (13.4%)	84 (40.2%)	84 (40.2%)	9 (4.3%)	4 (1.9%)
I believe that the price of the vaccine is affordable given the benefits it offers	26 (12.4%)	64 (30.6%)	95 (45.5%)	20 (9.6%)	4 (1.9%)
I believe that the side effects of the vaccine are reasonable and will not deter me from taking the vaccine	33 (15.8%)	63 (30.1%)	99 (47.4%)	12 (5.7%)	2 (1.0%)
I would recommend this vaccine for my friends whether or not they come from conservative families	69 (33.0%)	78 (37.3%)	60 (28.7%)	1 (0.5%)	1 (0.5%)
I believe that all gynecologists and primary care providers should recommend the vaccine to their patients, whether or not they come from conservative families	77 (36.8%)	75 (35.9%)	55 (26.3%)	1 (0.5%)	1 (0.5%)

Table 3. Analysis of Variance Results for Knowledge Scores and Attitude Scores

<b>Variable</b>	<b>Knowledge Score (Mean ± SD)</b>	<b>P</b>	<b>Attitude Score (Mean ± SD)</b>	<b>P</b>
<b>Age<sup>a</sup></b>				
<= 22	36.4 ± 25.4	< .001	2.42 ± .55	.041
> 22	58.6 ± 27.8		2.22 ± .58	
<b>Major</b>				
Health-related	51.3 ± 26.6	< .001	2.18 ± .58	< .001
Otherwise	34.2 ± 25.7		2.51 ± .52	
<b>Student Status</b>				
Part-time	40.9 ± 27.9	.010		
Full-time	42.7 ± 31.2			
<b>Marital Status</b>				
Never Married	38.9 ± 26.4	< .001	2.41 ± .55	.011
Ever Married	67.2 ± 26.4		2.00 ± .63	
<b>Religion</b>				
Catholic	37.3 ± 27.6	.016		
Otherwise	46.7 ± 225.8			
<b>Had Health Insurance</b>				
Yes	43.1 ± 27.5	.010	2.33 ± .54	.003
No	31.3 ± 24.5		2.61 ± .62	
<b>Had a Care Provider</b>				
Yes	43.7 ± 26.3	.044		
No	35.9 ± 28.2			

Note. <sup>a</sup>Median = 22 was used as a cutoff point.