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Abstract: *Purpose: Examine sexual health beliefs, sexual experiences and young adults' experience with HPV vaccine series completion. Method: Anonymous data was collected on approximately 1768 young people attending an urban university in the southeastern United States from 2012-14. Binary logistic regression examined predictors of HPV vaccination and significant demographic variables. Results: Logistic regression results showed that gender, ethnicity, perceived barriers, perceived benefits, condom use self-efficacy related to partner disapproval and condom use consistency significantly predicted HPV vaccination intention. These results inform research and practice where cultural diversity is key to implementing health programs, policy formulation and the pursuit of research.*

Key Words: *Beliefs; Health Habits; HPV Vaccination*

Beliefs, Health Habits, and HPV Vaccination

INTRODUCTION

In 2006, the Food and Drug Administration (FDA) approved the Human Papillomavirus (HPV) vaccine for females and the Advisory Committee for Immunization Practices (ACIP) followed with recommendations for providers soon afterward (Prevention, 2010). In 2009, the same vaccine was approved for use in males, again followed by ACIP recommendations for males to be vaccinated with the quadrivalent HPV vaccine between the ages of 11 to 26 (Prevention, 2010). Unfortunately, in 2018 rates of HPV vaccine series completion continue; and persistently low rates of vaccine completion translates into more than 79 million persons currently infected and approximately 14 million newly infected annually in the United States (Dunne et al., 2014).

As of February 2015, there was a 9-valent HPV vaccine that was approved by the FDA and recommended for use in both males and females (Administration, 2014a; Joura et al., 2015). This new vaccine, also known as Gardasil 9, was licensed for use in females ages 9-26 and males ages 9-15 and provides the same protection against HPV 6, 11, 16 and 18 with additional protection against HPV 31, 33, 45, 52 and 58 (Administration, 2014a). At the February meeting of the ACIP, Gardasil 9 received full committee approval.

Unfortunately, in the 12 years following the recommendations of June of 2006, HPV immunization completion has remained well below the projected rates of 90 percent for both males (less than 21%), females (less than 60%), and, most alarming among ethnic minority groups (CDC, 2011) (Pierre Joseph et al., 2014). In the United States, the incidence and mortality rates of HPV related cancer is much higher in African Americans (25% and 95%) and Hispanics (53% and 41%) compared to Caucasians and this persists into the second decade since HPV vaccine approval for both males and females (Jemal, 2013; Wilson, 2015). The concern regarding increasing rates of HPV related cancers has been the subject of numerous studies; even the 2014 President's Cancer Panel (PCP) made low rates of HPV vaccine series completion a focus of concern and an action priority for 2015 (Azvolinsky, 2013; Simon, 2014).

The purpose of this study was to examine the sexual health beliefs, sexual experiences and young adults' experience with HPV vaccine series completion associated with intention to receive the HPV vaccine. Data presented from this study elucidates these phenomena and informs cultural approaches to increasing HPV vaccine series completion.

Persistently low completion rates can be attributed to the gaps in scientific evidence for effective and culturally competent interventions intended to increase HPV vaccinations should focus on cancer prevention rather than STD prevention (Bednarczyk, Davis, Ault, Orenstein, & Omer, 2012; Das et al., 2010; Thomas, Strickland, Dicle-

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mente, & Higgins, 2013). There is a dearth of information about HPV vaccine series completion and the culturally specific attitudes toward it in young people whom self-identify from racial/ethnic minority communities. But research findings reveal that cultural barriers can be addressed with tailored information aimed at specific ethnic minority groups (Marlow, 2009). Data generated from a study exploring these specific ethnic minority groups of young adults, could provide more accurate and effective intervention points to increase HPV vaccine series initiation and also improve completion. Examine the sexual health beliefs, sexual experiences and experience with HPV vaccine series completion in young adults four years after HPV vaccine approval for both males and females.

The FDA approved 9-valent HPV vaccine, also known as Gardasil 9, was licensed for use in females ages 9-26 and males ages 9-15 and provides the same protection against HPV 6, 11, 16 & 18 with additional protection against HPV 31, 33, 45, 52 and 58 (Administration, 2014b). At the February 2015 meeting of the Advisory Council on Immunization Practice, Gardasil 9 received full committee approval as the Gardasil 9 vaccine has a 97% efficacy compared to the original Gardasil and also protects against more HPV-related cancers for both females and males (Walker, 2015).

A systematic review by the Cochrane Collaboration in 2013 examined randomized controlled trials for the efficacy of face-to-face interventions used for educating parents and patients about vaccinations. Most recently in 2014, Fu and colleagues conducted a systematic review of educational interventions to increase HPV vaccination acceptance (Fu, Bonhomme, Cooper, Joseph, & Zimet, 2014). They also concluded that more studies are required to determine the potential successfulness of culturally competent interventions reaching diverse populations (Fu et al., 2014).

The purpose of this study was to examine students' sexual health beliefs, experiences and, most specifically, their completion of the HPV vaccine series in the proceeding years after the vaccine was approved for both males and females. The hope was that data generated from a study exploring the obstacles that arise from cultural influences could provide possible intervention points to increase HPV vaccine series initiation and also improve completion.

METHOD

Procedure

In 2013, when the HPV vaccine had been approved for both males and females for over 4 years, a descriptive project was conducted on a large urban university with an ethnically diverse student enrollment of mostly Hispanic and African Caribbean students. This research used an exploratory design to determine correlates of HPV vaccine completion and behaviors that promote health for individuals in this age group. After Institutional Review Board (IRB) approval, a convenience sample of 1768 college students was targeted for recruitment through the Department of Psychology research pool. In order to provide information about the purpose, goals and eligibility for participation in the study, an IRB approved announcement (online information email) was dispersed to prospective participants. Inclusion criteria were limited to anyone who could read English. There was limited risk and no information was obtained from a database or archive. Participants were asked to provide confidential information about their sexual health and HPV vaccine series completion using an anonymous online survey, which took approximately 45 minutes to complete. There were no identifiers to link responses to participants. If at any point in the participants wanted to stop participating or did not want to answer particular questions, they could choose to do so. As all participation was voluntary, those who declined were not penalized in any way. All anonymous survey data was

Table 1. Sample Demographic Descriptive Statistics

Variable	Mean	SD	Min	Max	Alpha
Age	22.50	2.11	18	29	--
Years lived in the United States	17.54	5.16	0	28	--
# of sexual partners in the last 12 months	1.55	1.89	0	20	--
# times used alcohol and engaged in sex	3.89	10.86	0	111	--
# times consumed 5 drinks or more at once	8.67	24.60	0	400	--
# of times drank alcohol in past 2 weeks	1.49	2.12	0	28	--
Student HPV Survey					
HPV Total – 13 Item	41.84	5.54	21	52	.703
Perceived Vulnerability & Severity	32.58	4.70	10	44	.593
Perceived Benefits	24.78	3.54	8	32	.492
Perceived Barriers	15.73	3.07	7	32	.525
MEIM					
MEIM Mean	2.02	0.49	1	4	.891
Commitment	1.81	0.53	1	4	.900
Ethnic Identity Search	2.32	0.56	1	4	.732
CUSE Scale					
CUSES Total	12.63	9.56	0	56	.916
Mechanics	2.06	2.16	0	12	.596
Partner Disapproval	2.43	3.27	0	18	.848
Assertive	1.47	1.88	0	12	.631
Intoxicants	2.85	2.50	0	12	.819

Table 2. Socio-Demographic Characteristics

Variable	*n*	%
Gender/Sex		
Male	461	34.2
Female	887	65.8
Racial Identity		
Black/African descent	165	12.2
Hispanic/Latin American	937	69.5
White non-Hispanic/Caucasian	152	11.3
Indigenous/Native American or Asian	47	3.5
Other	47	3.5
Ethnicity		
Hispanic/Latino	937	69.5
Non-Hispanic	411	30.5
Class Standing		
Freshman	400	29.7
Sophomore	220	16.3
Junior	393	29.2
Senior	319	23.7
Grad Student	4	0.3
Other	12	0.9
Is a Parent (has a child/children)		
Yes	36	2.7
No	1312	97.3
Relationship status		
Single	652	48.4
In committed relationship/Engaged/Married	696	51.6
Previously received HPV Vaccine		
No	436	32.3
Not sure	382	28.3
Yes	456	33.8
Yes- but did not complete the series	74	5.5
Sexual Orientation		
Gay or Lesbian/Homosexual	52	3.9
Bisexual	54	4.0
Straight/Heterosexual	1225	90.9
Other	17	1.3
Previous History of or Current Evaluation for STI		
Chlamydia	33	2.4
Gonorrhea	7	0.5
Herpes	14	1.0
HPV	41	3.0
Yeast infection	135	10.0
Bacterial Vaginosis	51	3.8
None	1057	78.4
Frequency of condom use		
Never or inconsistent condom use	952	70.6
Always consistent condom use	396	29.4
Intent to vaccinate		
No	329	24.4
Yes	1019	75.6
If choose not to vaccinate, reasons why		
Cost	567	42.1
Time	372	27.6
Don't know where to get vaccine	262	19.4
Don't know what the vaccine is	310	23.0
Importance of someone to discuss health issues		
Extremely Important	695	51.6
Very Important	447	33.2
Neither Important nor Unimportant	174	12.9
Unimportant	32	2.3

downloaded from a locked research lab computer and kept in a file cabinet accessible by study personnel only.

Participants. A total of 1768 people responded to the survey, but only participants between the ages of 18 and 29 who had complete data were retained for analyses. The final sample consisted of 1348 participants. Demographics data for the final sample are presented in Tables 1 and 2.

Measures

The Student HPV Survey. The Student HPV Survey (Thomas, Dalmida, S. & Higgins, 2015) was designed to assess respondents' knowledge of and their attitudes toward HPV vaccination. The Student HPV Survey is a 27-item measure comprised of 3 subscales. Participants are asked to respond to each item on a scale from 1 (*Disagree*) to 4 (*Agree*). Thirteen HPV Survey items were added together to create an overall index score (Student HPV Survey Total – 13 Items). Subscales were computed by adding together the items for the following facets: Perceived Vulnerability and Perceived Severity (11 items), Perceived Benefits (8 items) and Perceived Barriers (8 items). Higher scores indicate higher self-efficacy related to HPV vaccination.

Condom use. The Condom Use Self-Efficacy Scale (CUSES) was used to assess participants' beliefs about and usage of condoms (Brafford, 1991). The CUSES is a 27-item measure comprised of 4 of subscales. Participants respond to each item on a scale from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). All CUSES items were averaged together to create an overall index score (CUSES Total). Subscales were computed by averaging together the items for the following facets: Mechanics (# items), Partner Disapproval (# items), Assertive (# items) and Intoxicants (# items). Higher scores indicate higher self-efficacy related to condom use.

Ethnic Identity. The Multigroup Ethnic Identity Measure (MEIM) was designed to assess identity development and identity statuses of racial/ethnic minority individuals (Chakawa, Butler, & Shapiro, 2015). The CUSES is a 12-item measure comprised of 2 of subscales. Participants responded to each item on a scale from 1 (*Strongly Agree*) to 4 (*Strongly Disagree*). All MEIM items were averaged together to create an overall index score (MEIM Total). Additionally, seven of the items were averaged together to create a "Commitment" subscale, and five items were added together to create a "Ethnic Identity Search" subscale. Higher scores indicate low identity development and identity status.

ANALYSIS

All data were analyzed using IBM SPSS software package version 23. A total of 1768 participants completed the study. Due to the age-specific nature of the HPV vaccine, we limited analysis to data from participants between the ages of 18 and 29. Additionally, participants who did not have complete data used in analyses were removed. This left us with a final sample size of 1348.

The following variables were dummy-coded for analysis: gender (0 = Female, 1 = Male), ethnicity (0 = Hispanic/Latino, 1 = non-Hispanic), relationship status (0 = Single, 1 = In a Relationship/Engaged/Married), parental status (0 = No children, 1 = Have children), frequency of condom usage (0 = 70% of the time or less, 1 = Always) and intention to vaccinate for HPV (Disagree/Somewhat Disagree, 1 = Somewhat Agree/Agree). Associations between social and demographic factors and HPV vaccination intention were examined using chi-square analyses. Correlates between HPV vaccination intention and the Student HPV Survey, CUSES, and MEIM scores were examined using Spearman's rho correlations. Normality was assessed using Shapiro-Wilk and Kolmogorov-Smirnov normality tests, histograms and box plots. Binary logistic regression examined predictors of HPV vaccination intention, while accounting for demographic variables of interest. The logistic regression model was used to estimate the factors that influenced HIV intent to vaccinate. A 5% criterion of statistical significance was used for all analyses ($p < .05$).

RESULTS

Sample demographic and socio-demographics characteristics are presented in Tables 1 and 2. Of particular interest is that 33.8% of participants indicated that they had already received the HPV vaccine. Additionally, 75.6% of participants expressed intention to receive the HPV vaccine.

Factors Related to HPV Vaccination Intention

A series of chi-square analyses revealed that participants who intended to receive the HPV vaccination were significantly more likely to be female than male, $\chi^2(1) = 32.25$, $p < .001$, and were more likely to use a condom 70% of the time or more frequently than use condoms less frequently or never use condoms, $\chi^2(1) = 6.04$, $p = .014$. Additionally, Hispanics were significantly more like to express intention to receive the HPV vaccination than non-Hispanics, $\chi^2(1) = 7.36$, $p = .007$. The percentage of participants with an intention to vaccinate did not differ by relationship status ($\chi^2(1) = 0.24$, $p = .623$), parent status ($\chi^2(1) = 0.23$, $p = .633$), racial identity ($\chi^2(5) = 8.08$, $p = .152$), class standing ($\chi^2(5) = 8.54$, $p = .129$) or successful condom use self-efficacy ($\chi^2(1) = 0.53$, $p = .466$).

Correlations showed that a number of factors were significantly associated with intentions to vaccinate for HPV (see Table 3). Specifically, intentions to vaccinate were correlated with higher scores on the Student HPV Survey Total scores, as well as the perceived vulnerability

Table 3. Spearman's Rho Correlations between Intention to Vaccination and Student HPV Survey, MEIM, and CUSES

Variable	r_s	p
Student HPV Survey		
HPV Total – 13 Item	.33	< .001
Perceived Vulnerability & Severity	.21	< .001
Perceived Benefits	.35	< .001
Perceived Barriers	-.23	< .001
MEIM		
MEIM Mean	-.08	.006
Commitment	-.06	.018
Ethnic Identity Search	-.08	.004
CUSE Scale		
CUSES Total	-.09	.001
Mechanics	-.06	.036
Partner Disapproval	-.10	< .001
Assertive	-.08	.005
Intoxicants	-.10	< .001

Table 4. Logistic Regression Predicting Intention to Vaccinate from Gender, Ethnicity, Condom Use Frequency, the Student HPV Survey Total, and the CUSES Total

Predictor	*B*	Wald χ^2	*p*	Odds Ratio
Gender	0.51	13.60	< .001	1.68
Ethnicity	0.43	8.96	.003	1.54
Condom Use Frequency	-0.37	5.46	.019	0.69
Student HPV Total – 13 Item	0.15	114.64	< .001	1.16
CUSES Total	-0.005	0.56	.455	1.00

and severity and perceived benefits subscales. However, higher scores on the perceived barriers subscale of the Student HPV Survey, the CUSES (and its subscales), and the MEIM (and its subscales) were linked to intentions to not vaccinate.

Predictors of HPV Vaccination Intention

Binary logistic regressions were performed to examine predictors of an intention to vaccinate. For all logistic regressions, the effects of gender, ethnicity and condom use frequency were entered as predictors. The first logistic regression also entered the Student HPV Survey Total and CUSES Total as predictors. To explore how each of the subscales predicted intention to vaccinate, a second logistic regression entered each of the Student HPV Survey and CUSES subscales as predictors.

For the first logistic regression, results indicated that the logistic regression model was statistically significant, $\chi^2(5) = 186.84$, $p < .001$. The model explained 19.3% (Nagelkerke R^2) of the variance in intention to vaccinate, exhibited adequate model fit (Hosmer & Lemeshow goodness-of-fit test) and correctly classified 76.6% of the cases.

Table 4 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors in the first logistic regression. Employing a .05 criterion for statistical significance, gender, ethnicity, condom use frequency, and the Student HPV Total score all predicted vaccination intentions. Specifically, females were 1.68 times more likely than males to express intention to receive the HPV vaccine. Hispanics were 1.54 times more likely than non-Hispanics to express intention to receive the HPV vaccine. Those who always used condoms were 0.69 times more likely than those who rarely or never used condoms to express intention to receive the HPV vaccine. Finally, a one-point increase in Student HPV Survey Total score increased the odds of expressing intention to receive the HPV vaccine by 1.16. The CUSES Total did not predict intention to vaccinate.

For the second logistic regression, results indicated that the logistic regression model was statistically significant, $\chi^2(10) = 242.89$, $p < .001$. The model explained 24.6% (Nagelkerke R^2) of the variance in intention to vaccinate, exhibited adequate model fit (Hosmer & Lemeshow goodness-of-fit test) and correctly classified 78.0% of the cases.

Table 5 shows the logistic regression coefficient, Wald test and odds ratio for each of the predictors in the second logistic regression. Employing a .05 criterion for statistical significance, gender, ethnicity, condom use frequency and each of the Student HPV subscales predicted vaccination intentions. Specifically, females were 1.70 times more likely than males to express intention to receive the HPV vaccine. Hispanics were 1.47 times more likely than non-Hispanics to express intention to receive the HPV vaccine. Those who always used condoms were 0.68 times more likely than those who rarely or never used condoms to express intention to receive the HPV vaccine. A one-point increase in the HPV Perceived Vulnerability and Severity and HPV Perceived Benefits increased the odds of expressing intention to receive the HPV vaccine by 1.07 and 1.25, respectively. However, a one-point increase in the HPV Perceived Barriers decreased the odds of expressing intention to receive

Table 5. Logistic Regression Predicting Intention to Vaccinate from Gender, Ethnicity, Condom Use Frequency, the Student HPV Survey Subscales, and the CUSES Subscales

Predictor	*B*	Wald χ^2	*p*	Odds Ratio
Gender	0.53	12.05	.001	1.70
Ethnicity	0.38	6.67	.010	1.47
Condom Use Frequency	-0.39	5.74	.017	0.68
Student HPV Survey				
Perceived Vulnerability & Severity	0.06	16.67	< .001	1.07
Perceived Benefits	0.23	98.68	< .001	1.25
Perceived Barriers	0.02	12.29	< .001	0.92
CUSE Scale				
Mechanics	0.04	0.24	.625	1.02
Partner Disapproval	0.03	2.07	.151	1.04
Assertive	0.05	0.008	.928	1.00
Intoxicants	0.03	1.62	.203	0.68

the HPV vaccine by 0.92. None of the CUSES subscales predicted intention to vaccinate.

DISCUSSION

Results from this study provide needed information regarding beliefs, health habits and HPV vaccination in young adults. Our findings substantiate research in young adult populations with varied gender and socioeconomics and further indicate a need for improved communication regarding HPV as levels of knowledge and understanding (Unger, 2015). Overall knowledge of HPV was low even though there was an awareness of the vaccine and other studies substantiate that young adults in the United States know little about transmission, treatment or long-term sequelae such as cancer (Marlow, 2013). In addition, our data also substantiates other research that implies education and information on HPV transmission and subsequent HPV vaccination rates are much lower in the southern United States (Rahman, 2015). As such, efforts to educate patients, providers and communities are imperative.

Other important points of intervention were identified regarding gender, ethnicity and safer sexual practices. Research on HPV vaccination and gender over the last ten years has provided fairly consistent data with our results. Females in our study were more likely to report vaccination against HPV and intentions to receive the HPV vaccine compared to males. Nonetheless, our results support findings from other studies that encourage future studies focused on both sexes/males and females to support effective HPV vaccine completion because it is lowest among males (Newman, 2013; Rahman, 2015).

Current research findings imply a gender gap in beliefs, health habits and HPV knowledge and our results substantiate these findings (Thomas et al., 2013). Men with less HPV knowledge have been shown to have higher levels of shame and to be less likely to engage in preventive health behaviors such as vaccination (Gerend & Magloire, 2008). Further, research suggests that HPV vaccine acceptability may be even lower among males from ethnic minorities, such as Latino cultural sub-groups and geographically isolated areas (Thomas, Higgins, Stephens, & Johnson-Mallard, 2016). Thus, an understanding of the individual's cultural values and norms are crucial in health education regarding health habits and prior to discussing HPV vaccination.

Since 2007, scientific evidence has shown that, despite the ongoing argument that it encourages promiscuous behavior; the HPV vaccine does not promote sexual risk-taking (Bednarczyk et al., 2012; Gattoc, Nair, & Ault, 2013; Stewart, 2007). And yet, encouraging the health promoting use of condoms in the same breath is apt to send mixed messages. The best approach to ensure understanding instead of confusion when discussing the HPV vaccine is for nurses to point out that vaccination neither condones nor leads to sexual activity as indicated by Liddon et al. (2011). Once it has been established that there is no correlation between vaccine administration and risk-taking behavior, the next important research step is to test interventions to integrate learning for providers, practice staff at clinics who serve young adults and these potential patients. Learning to incorporate these intervention points will likely lead to an increase HPV knowledge, motivation and behavioral skills to overcome barriers to HPV vaccine series initiation.

CONCLUSIONS

More studies are required to determine the potential intervention points to deliver culturally appropriate messages and culturally competent interventions reaching diverse populations in relation to beliefs, health habits and HPV vaccination (Fu et al., 2014). Establishing a good line of communication is the first and most important step to an effective healthcare provider/patient relationship. Fostering an environment of respect without judgment must be a priority before any healthcare discussion begins as research has shown that, without clear and open communication, misinformation is extremely likely (Wilson, 2015). It is also crucial that providers and clinical practice staff familiarize themselves with up-to-date research and information concerning the HPV vaccine so that they can be the best possible resource of health promotion and cancer prevention for their patients (Thomas, 2008). Once trust is established, any interdisciplinary team of health providers may also encourage young adults to be vaccinated and complete the series, especially those culturally diverse groups that may be suffering from health disparities, such as ethnic minorities or those in geographically isolated communities or economically disadvantaged.

As healthcare professionals, it is imperative that we help patients to see the HPV vaccine in the same light as the Hepatitis B series vaccine or recommended Tdap or Meningococcal vaccine: it is a normal and routine part of health promotion. The HPV vaccine is a health care innovation that can be recommended in many settings. Interdisciplinary teams focused on health and well-being of young adults can use the identified intervention points to provide individuals a future free of cancer. With these results, HPV focused studies concerning knowledge, gender, culturally-specific language, and approaches that embrace cultural diversity can lead to a HPV –related cancer free future for young adults.

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