Distribution Agreement

In presenting this thesis as a partial fulfillment of the requirements for a degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis in whole or in part in all forms of media, now or hereafter now, including display on the World Wide Web. I understand that I may select some access restrictions as part of the online submission of this thesis. I retain all ownership rights to the copyright of the thesis. I also retain the right to use in future works (such as articles or books) all or part of this thesis.

Marvi Rizwan April 13, 2012

Human Papillomavirus Awareness and Vaccine Acceptability Among College Males

by

Marvi Rizwan

Dr. Ngoc-Cam Escoffery
Adviser

Department of Biology

Dr. Ngoc-Cam Escoffery
Adviser

Dr. Gregg Orloff
Committee Member

Dr. Darrell Stokes
Committee Member

2012

Human Papillomavirus Awareness and Vaccine Acceptability Among College Males

By

Marvi Rizwan

Dr. Ngoc-Cam Escoffery

Adviser

An abstract of
a thesis submitted to the Faculty of Emory College of Arts and Sciences
of Emory University in partial fulfillment
of the requirements of the degree of
Bachelor of Sciences with Honors

Department of Biology

2012

Abstract

Human Papillomavirus Awareness and Vaccine Acceptability Among College Males
By Marvi Rizwan

Objective: As the most common sexually transmitted infection, the Human Papillomavirus (HPV) poses a severe threat and burden on adolescent and adult populations. The purpose of this study is to assess the current levels of HPV-related knowledge and awareness as well as vaccine uptake among male college students.

Participants: The inclusion criterion for this study was undergraduate male students attending Emory University. Students were recruited by distributing the survey in classes, residence halls, and extracurricular club meetings. This study began in August 2010 and was completed in May 2012.

Methods: This study received IRB approval. Male students completed an anonymous survey, which was developed using the Health Belief Model. The survey asked about HPV awareness, susceptibility to genital warts, intent to receive the HPV vaccine, etc.

Results: An overwhelming majority believed that HPV-related diseases are severe. 95.8% of the participants agreed that having HPV-induced genital warts would be upsetting and 91.5% agreed it would be disruptive to their romantic relationships. Although HPV is the most prevalent sexually transmitted infection among the college population, only 1.4% of the respondents believed it to be likely that they will be infected by HPV in the future. Additionally, 63.4% of the participants believed that the HPV vaccine was only for women, and only 2.8% had already received the vaccine. Sources of HPV information included Student Health Services, the internet, and healthcare providers. Participants were more likely to receive the vaccine if their university (93%) encouraged it and if ads for the HPV vaccine were directed toward males (87.3%).

Conclusions: Low levels of HPV susceptibility and HPV vaccine uptake were reported. Student Health Services can help increase HPV-awareness among college males through education and outreach as well as by promoting discussion between students and their healthcare providers. Increasing HPV awareness among males will be a step in the direction toward reducing the widespread prevalence of HPV.

Human Papillomavirus Awareness and Vaccine Acceptability Among College Males

By

Marvi Rizwan

Dr. Ngoc-Cam Escoffery
Adviser

A thesis submitted to the Faculty of Emory College of Arts and Sciences
of Emory University in partial fulfillment
of the requirements of the degree of
Bachelor of Sciences with Honors

Department of Biology

2012

Acknowledgements

I would like to thank my advisor Dr. Escoffery who guided me in this research study from the very beginning and made it a truly learning experience. Her encouragement and advice always directed me in the right direction. I would also like to thank my committee members, Dr. Gregg Orloff and Dr. Darrell Stokes, who had an extremely positive impact on this study. Dr. Orloff was instrumental in providing valuable, constructive advice. Dr. Stokes' motivation and encouraging words led to many great ideas. I am grateful to my advisor and committee members who selflessly instilled upon me many skills that will help me continue to incorporate research into my future.

Table of Contents

Introduction

Despite being the most prevalent sexually transmitted infection in the United States, the Human Papillomavirus (HPV) remains relatively unknown among individuals. Approximately twenty million Americans, including both males and females, are currently infected with HPV, and an additional 6 million individuals become newly infected each year.[1] At least half of the sexually active population will be infected by HPV.[1] In 90% of all HPV infection cases, the human immune system can clear HPV naturally within 2 years.[1] However, when the immune system is not able to clear the infection, HPV infection can lead to serious consequences. Both genital warts and warts of the throat (recurrent respiratory papillomavirus) are potential outcomes of HPV infection. Low-risk HPV strains do not cause cancer but can lead to skin warts on or around the genitals or anus. HPV strains 6 and 11 are responsible for 90% of all genital warts.[1]

High-risk or oncogenic HPV strains lead to the development and progression of cancer. There are at least 12 high-risk HPV strains.[1] Specifically, HPV types 16 and 18 cause the majority of HPV-related cancers.[1] These strains lead to the initiation and advancement of several types of cancers. Cancers of the cervix, vulva, vagina, penis, anus, and oropharynx can be caused by HPV infection. Cervical cancer is the most common HPV-associated cancer, and almost all cases of cervical cancer are caused by HPV. The percent of cancer cases caused by HPV are 50%, 65%, 35%, 95%, and 60% of vulvar cancer, vaginal cancer, penile cancer, anal cancer, and oropharyngeal cancers respectively.[1]

HPV causes the highest frequency of HPV-caused cancers in women, and 12,000 women contract HPV-induced cervical cancer per year.[2] Although HPV infections in males receive less attention, HPV leads to a significant amount of cancer cases in males as well. In the United States, 5,600 men contract HPV-associated oropharyngeal cancers, which include cancers of the back of the throat, including the base of the tongue and tonsils, each year.[2] Additionally, HPV-associated anal cancer and HPV-associated penile cancer cause 400 and 1,500 cases of cancer respectively in males in the US each year.[2]

Certain populations are at a higher risk for these diseases. These individuals include those between the ages of 15-24, homosexual and bisexual men, and individuals with weak immune systems (including those with HIV and AIDS).[3] Awareness of HPV testing and HPV vaccination can prevent the emotional and physical stress caused by HPV-related cancers and other HPV-related diseases. Since only palliative, instead of curative, treatments for HPV-related cancers exist, and other HPV-related diseases can be taxing, prevention of HPV infection is key. The FDA first approved an HPV vaccine for females in 2006 and, in 2009, it approved a vaccine for males, which protects against HPV strains 6, 11, 16 and 18.[4] The vaccine is approved for males between the ages of 9-26, but it is recommended for those of younger ages as well.[4] The vaccine series is given in 3 shots over 6 months with an estimated cost of $130 per dose ($390 for the full series).[5,6] The American Academy of Pediatrics added the 3 doses of the HPV vaccine for males to the 2012 recommended childhood and adolescent immunization schedule.[7]

The majority of HPV awareness studies have concentrated on females. Research studies that have been conducted on HPV awareness in males were mostly conducted prior to HPV vaccine approval for males. In 2009, Reiter et al. characterized the

willingness of heterosexual men to get the HPV vaccine and identified correlates of vaccine acceptability. They found that most men had not heard of HPV prior to the study or had low HPV knowledge (81%). There was only a moderate level of willingness to receive the HPV vaccine in the future when it would be available for males (37%). However, the participants were more prone to receive the vaccine if they had a high perceived susceptibility to HPV-related diseases, perceived HPV vaccine effectiveness, or anticipated regret if they did not receive the vaccine and later developed an HPV-related disease. Encouragement from doctors would also increase the likelihood of HPV vaccine uptake among participants.[8]

In the following year, Reiter et al. investigated levels of HPV knowledge and the likelihood to receive the HPV vaccine among homosexual and bisexual men. They found that most homosexual and bisexual men had heard of the HPV vaccine (73%) and were willing to get it (74%). They also concluded that participants were more likely to get the vaccine if their doctor recommended it, had 5 or more lifetime sexual partners, perceived greater severity of HPV-related disease, perceived higher levels of HPV vaccine effectiveness, or reported higher levels of anticipated regret if they developed an HPV infection and did not receive the vaccine.[9] It is interesting to note that the homosexual and bisexual male populations were more aware and likely to receive the vaccine than heterosexual males. This may be due to a higher perceived risk among homosexual and bisexual males than that in heterosexual males. However, both of these studies conducted by Reiter et al. were performed prior to the HPV vaccine approval for males. It is important to investigate how many males actually receive the vaccine as well as

differences found in the rates of uptake among heterosexual versus homosexual and bisexual populations.

In addition, Gerend et al. assessed whether informing men about the benefits of male HPV vaccination for their female sexual partner(s) increased interest in the HPV vaccine beyond informing them about the benefits to men alone. Gerend et al. found moderate interest in the HPV vaccine. Informing men about the potential benefits male HPV vaccination can have on their sexual partners, such as reducing cervical cancer risk in women, did not boost men's interest in the vaccine. They identified several independent predictors of HPV vaccine acceptability such as sexual activity, perceived susceptibility to HPV, perceived benefits of the vaccine, perceived hassle and cost of vaccination, self-efficacy for vaccination, and perceived norm for vaccination. This study too, however, was performed prior to the FDA approval of the HPV vaccine for males.[10] It is important to understand the current attitudes and beliefs about the HPV vaccine in order to inform interventions to promote HPV vaccine uptake.

The purpose of this study is to assess the current levels of HPV knowledge and vaccine acceptability among college males at Emory University. Only a few research studies have examined men's intent to receive the HPV vaccine compared to that of women's. Understanding men's perceptions of the vaccine is crucial to the reduction of genital warts as well as cervical, penile, and anal cancers. We explore current awareness, attitudes, and beliefs about HPV and methods that would be most effective in increasing awareness. Additionally, we assess attitudes about the HPV vaccine as well as vaccine uptake levels and intentions.

Methods

Approval for this research study was received from the Emory Institutional Review Board. A questionnaire was administered to male undergraduate students from January 2011 to April 2012. The inclusion criterion was undergraduate males attending Emory University. The participants were contacted via various recruitment strategies including extracurricular activity meetings, residence halls, fraternities, classes, and sport team meetings. The prospective participants were orally explained the purpose of this study and reassured that the surveys would be anonymous. As an incentive, students could enter a raffle for an iPod. Whether or not the student decided to participate, he was given a chance to enter the raffle via placing his name and email address on a drawing form which was kept completely separate from the survey and informed consent. The individuals were then given the informed consent and asked to complete the survey.

The 31-item survey collected demographic information as well as sexual preference and history data. The Health Belief Model formed the theoretical basis of the questionnaire, and some questions were modified from previous studies.[9, 10] Used as a model to predict and explain health behaviors, the Health Belief Model serves as a way to better understand HPV vaccine acceptability.[11] Subsections of the questionnaire included perceived susceptibility of HPV, perceived severity of HPV, and perceived barriers and costs associated with the HPV vaccine. Questions from these subsections asked how susceptible they were to contracting HPV, how likely they were to get the vaccine in the future, and what factors influenced their decisions in receiving the vaccine. Another

section included questions that tested knowledge about HPV prevention and HPV-related diseases in a true/false format. For instance, participants were asked if condoms fully protect against HPV and whether genital HPV can be asymptomatic. Additionally, the participants were asked if they had already received the vaccine and how many doses of the vaccine they had received. Additional items assessed what would help to make students more informed about HPV and the HPV vaccine as well as what would increase the likelihood of them receiving the HPV vaccine in the future.

Data was entered into Microsoft Excel and exported to SPSS. Descriptive statistics, including frequencies and means, were run on the data.

Results

71 college males completed the survey. The mean age of the participants was 20 years old, and they ranged from freshmen to seniors. The majority were heterosexual and not dating at the time of the survey. Of the 71 participants, 52.1% had heard of the HPV vaccine. Of the participants who indicated where they heard or read about the vaccine, TV ads (100%), doctor or healthcare provider (81%), the internet (76.2%), friends (71.4%), and family (33.3%) were the top sources from which students had heard of or read about HPV (Table 1). However, of all the participants, only 9 (12.7%) had seen an ad about the HPV vaccine directed toward males, and 45 (63.4%) believed that HPV vaccines are only for women.

Table 1: Participant Demographics and HPV Awareness

Variable	n (%)
Mean age,(SD)	19.94 (SD: 1.39; range 18-26)
Race	
White	33 (46.5)
Black or African American	8 (11.3)
Asian	29 (40.8)
Other	1 (1.4)
Year in College	
Freshman	18 (25.4)
Sophomore	23 (32.4)
Junior	21 (29.6)
Senior	8 (11.3)
Other	1 (1.4)
Sexual Orientation	
Heterosexual	68 (95.8)
Homosexual	3 (4.2)
Relationship Status	
Not dating	34 (47.9)
Single, but dating	23 (32.4)
Single, but in a committed relationship	14 (19.7)
Sexual History	
Ever had sex	25 (35.2)
Have current sexual partner	11 (15.5)
Mean age at first intercourse	16.63 (SD: 3.3; range 15-22)
Mean number of lifetime partners	3.49 (SD: 5.2; range: 0-29)
Source of HPV awareness*	
TV ad	21 (100)
Internet	16 (76.2)
Doctor/healthcare provider	17 (81.0)
Friends	15 (71.4)
Family	7 (33.3)
Other	11 (52.4)

Note: *Source of HPV awareness was answered by 21 participants (n = 21)

Surprisingly, HPV-related knowledge was high, and the majority of participants answered the true/false questions correctly. 78.9% (56 individuals) correctly knew that genital HPV can appear without visible signs or symptoms, and 74.6% (53 participants) correctly answered that HPV can led to penile and anal cancers (Table 2).

Table 2: HPV-related Knowledge

Knowledge Question	Answered Correctly
There is a vaccine to prevent the HPV infection that is available to both men and women (True)	57 (80.3)
Condoms fully protect against HPV (False)	49 (69.0)
HPV can cause cancer of the penis or anus in men (True)	53 (74.6)
Most people with genital HPV have no visible signs or symptoms (True)	56 (78.9)

87.4% (62) of the participants believed it is very unlikely to unlikely that they will contract genital HPV in the future, and the same percentage also believed it is very unlikely to unlikely that they will contract genital HPV in the next 10 years (Table 3).

Table 3: Perceived Susceptibility

Variable	n (%)
Perceived likelihood of getting genital HPV in future	
Very unlikely	56 (78.9)
Unlikely	6 (8.5)
Neutral	8 (11.3)
Likely	1 (1.4)
Very likely	0 (0)
Perceived likelihood of getting genital HPV in next 10 years	
Very unlikely	57 (80.3)
Unlikely	5 (7.0)
Neutral	8 (11.3)
Likely	1 (1.4)
Very likely	0 (0)

Out of all the participants surveyed, only 2 (2.8%) had received the HPV vaccine (one participant received 1 dose and the other received 2 doses so far). However, only 5 (7%) held beliefs against vaccines in general. Over 87% (62) had taken the vaccines and immunizations required by Emory University (e.g., measles, rubella). 93% (66) of participants said they would be more likely to receive the HPV vaccine if Emory

University required or encouraged the HPV vaccine for males. 87.3% (62) of males surveyed would be more interested in the vaccine if ads for the vaccines were directed toward males.

35.2% (25) of the participants were not at all likely to get the vaccine and 56.3% (40) were somewhat likely to get the vaccine. Only 8.5% (6) were very likely to get the HPV vaccine the future. However, 50.7% (36) would be very likely, 43.7% would be somewhat likely, and only 5.6% (4) would be very unlikely to get the HPV vaccine if they were told that receiving the vaccine would reduce the likelihood of their sexual partners from getting HPV-related diseases, such as cervical cancer. 91.6% (65) said they would be very likely or somewhat likely to get the vaccine if their peers were receiving the HPV vaccine.

Interestingly, despite the extremely low number of participants who received the vaccine, many individuals agreed or strongly agreed that having HPV-related diseases such as genital warts would be upsetting and disruptive to their health (Table 4).

Table 4: Perceived Severity of Genital Warts

Having genital warts interferes with everyday activities , n (%)	
Strongly disagree	1 (1.4)
Disagree	8 (11.3)
Neutral	18 (25.4)
Agree	13 (18.3)
Strongly Agree	31 (43.7)
Having genital warts is very upsetting	
Strongly disagree	1 (1.4)
Disagree	0 (0)
Neutral	5 (7.0)
Agree	12 (16.9)
Strongly Agree	53 (74.6)
Having genital warts is disruptive to health	
Strongly disagree	1 (1.4)
Disagree	1 (1.4)
Neutral	8 (11.3)
Agree	23 (32.4)
Strongly Agree	38 (53.5)
Having genital warts is disruptive to romantic relationships	
Strongly disagree	1.4 (1)
Disagree	0 (0)
Neutral	2 (2.8)
Agree	24 (33.8)
Strongly Agree	44 (62.0)

A significant number of participants were unaware of the potential benefits of the HPV vaccine. Most were neutral when asked if the HPV vaccine is equally effective in both males and females. The same neutral attitude was also observed when asked if the HPV vaccine is effective in preventing genital HPV infection (Table 5).

Table 5: Perceived Benefits of the HPV Vaccine

The HPV vaccine is equally effective in both males and females, n (%)	
Strongly disagree	2 (2.8)
Disagree	3 (4.2)
Neutral	31 (43.7)
Agree	18 (25.4)
Strongly Agree	17 (23.9)
The HPV vaccine protects people from getting HPV	
Strongly disagree	4 (5.6)
Disagree	5 (7)
Neutral	14 (19.7)
Agree	35 (49.3)
Strongly Agree	13 (18.3)
The HPV vaccine is effective in preventing genital HPV infection	
Strongly disagree	2 (2.8)
Disagree	3 (4.2)
Neutral	25 (35.2)
Agree	32 (45.1)
Strongly Agree	9 (12.7)

Table 6 displays potential barriers to receiving the HPV vaccine. Common barriers included cost and potential side effects of the vaccine.

Table 6: Perceived Barriers and Costs

Getting vaccinated required a lot of effort, n (%)	
Most unlikely to prevent	14 (19.7)
Unlikely to prevent	6 (8.5)
Neutral	13 (18.3)
Likely to prevent	23 (32.4)
Most likely to prevent	15 (21.1)
Getting vaccinated required a lot of time	
Most unlikely to prevent	15 (21.1)
Unlikely to prevent	7 (9.9)
Neutral	10 (14.1)
Likely to prevent	22 (31)
Most likely to prevent	17 (23.9)
Getting vaccinated required a lot of money	
Most unlikely to prevent	7 (9.9)
Unlikely to prevent	11 (15.5)
Neutral	8 (11.3)
Likely to prevent	16 (22.5)
Most likely to prevent	29 (40.8)
Health insurance did not cover the cost of vaccine	
Most unlikely to prevent	3 (4.2)
Unlikely to prevent	8 (11.3)
Neutral	11 (15.5)
Likely to prevent	28 (39.4)
Most likely to prevent	21 (29.6)
Numerous potential side effects of vaccine	
Most unlikely to prevent	2 (2.8)
Unlikely to prevent	4 (5.6)
Neutral	14 (19.7)
Likely to prevent	11 (15.5)
Most likely to prevent	40 (56.3)
Having enough information to make a decision about the vaccine	
Most unlikely to prevent	20 (28.2)
Unlikely to prevent	12 (16.9)
Neutral	22 (31)
Likely to prevent	12 (16.9)
Most likely to prevent	5 (7.0)

Popular sources of health- related information among participants were the Center for Disease Control website (71.4%) or other government health agencies, as well as Emory Student Health Services (42.9%) or other medical offices (Table 7).

Table 7: Resources for health related information (n= 21)

Resource	n (%)
Center for Disease Control (CDC) website or other government health agency	15 (71.4)
Medical Journals	8 (38.1)
Magazines	2 (9.5)
Medical Blogs on the Internet	1 (4.8)
Websites run by physicians	6 (28.6)
Other website	5 (23.8)
TV shows/news	3 (14.3)
Emory SHS or other medical offices	9 (42.9)
Other	0 (0)

43.7% (31) of the participants were neutral when asked about the safety of the vaccine and 9.8% (7) believed the vaccine is unsafe. This may be indicative of a lack of awareness about the vaccine. Trusted sources of information included healthcare providers and Emory University Student Health Services.

Conclusion

The direct medical cost associated with HPV infection in 15-24 year old Americans has been estimated to be $2.9 billion and is growing as HPV infections and HPV-related diseases are on the rise.[12] Increasing HPV awareness and vaccination rates can reduce this economic burden.[12] The Center for Disease Control and Prevention (CDC) reported that only 1.4% of males aged 13 through 17 received at least one dose of the HPV vaccine in 2010 compared to 48.7% of females.[13] Because HPV is the most common sexually transmitted infection in the US, this low rate warrants public health action. This current survey sought to investigate levels of awareness among the male college population as well as to understand beliefs and level of knowledge about HPV and the vaccine.

The low rate of HPV vaccination seen nationally was also observed in this study's population (3%). The American College Health Association-National College Health Assessment promotes healthy behaviors on college campuses as well as investigates health trends on college campuses. In the recent 2011 American College Health Survey, 40.4% of respondents received the HPV vaccine. 51% of those who received the vaccine were females, only 19% were males (the remaining individuals were unsure if they had received the vaccine). The overall uptake of HPV vaccines is therefore lower than other vaccines among this population (i.e., 71.1% of the total participants had reported receipt of the Hepatitis B vaccine), and HPV vaccine uptake is especially low among males.[14]

Although HPV is most prevalent among adolescents and college-aged individuals, these populations remains unaware of their vulnerability to this disease as well as the potential consequences of this infection. In this study, over 87% of males believed it is very unlikely to unlikely that will contract genital HPV in the future. Previous studies have found similar low levels of vaccine uptake and perceived susceptibility. A study of adolescent males and females in underserved regions of New York City found that only 33% had received the vaccination, and out of those who were not vaccinated 36% were unsure and 12% were not wiling to get the vaccine.[15] Additionally, only 4% believed they were susceptible to HPV infection. They also found that females were more likely to have received the vaccine than males.[15] This highlights the need to inform young males of the potential severity and widespread prevalence of HPV among males.

Similarly, this current study demonstrates that male students believe HPV affects mostly women and therefore is not much of a concern for them. This attitude may explain their lack of motivation to get the vaccine. When the males were informed,

however, that getting vaccinated could help prevent HPV-related diseases in their sexual partners (such as cervical cancer), they became more likely to receive the HPV vaccine. Previous studies also indicate that men would receive the vaccine if they were aware that it would help prevent cancer in their sexual partners, prevent anal, penile, and head and neck cancers, and help to keep them healthy.[16] This result is promising because it demonstrates that increasing education about HPV causes and effects can help to reduce the spread of this common STI.

There remains a significant difference in the level of HPV awareness in males and females. In a study conducted among women aged 18-49 years old, awareness of HPV was an impressive 84.3% and the vaccine uptake was also high at 78.9%.[17] This disparity may be due to the earlier approval of the HPV vaccine for females than for males, and therefore 3 years of more advertising targeted toward females. Therefore, a way to increase numbers of HPV awareness and vaccine uptake in males would be to expand advertising and research focused on males. As seen in this current study, most males perceive HPV as a disease that affects mostly females, and they would be more likely to receive the vaccine if HPV vaccine ads were directed toward males.

In addition to increasing awareness, males said that it would be helpful to receive a calendar with recommended dates of vaccine uptake and a reminder sent to their college emails about getting the vaccine from Student Health Services (SHS). Since the majority of males in this study received the vaccinations required by their university, it is probable that HPV vaccination rates will increase if colleges increased the amount of information they distributed to their students about HPV. Students trusted information they received from their university, and they took the recommendations of other vaccines given by their

university seriously. Being trusted sources of information, universities can help disseminate information and thereby increase HPV awareness among males.

Participants reported Emory Student Health Services (SHS) to be one source of information regarding health information that they frequently use. Other sources of health information were government agencies (e.g., CDC), medical blogs, physicians, and the Internet. However, the most popular secondary source remained the university's Student Health Services. This result demonstrates the important role of college health services to help students make informed decisions about getting the HPV vaccine; thus, it calls for making the student health services more active in spreading awareness about this sexually transmitted infection. Distributing pamphlets with information about HPV prevention, and follow-up emails to students can help to reduce the rates of HPV infection among college males.

Additionally, participants stated that they are willing to seek advice from healthcare providers and professors. Previous studies also indicate an increase in likelihood to receive the vaccine if recommended by physicians or healthcare providers. In a study conducted among parents with 1 to 6 children aged 3 to 33, physician recommendations heavily influenced parental views on the vaccine.[18] Acceptance of the HPV vaccine was found to be associated with vaccine efficacy, cost, physician recommendation, positive beliefs about vaccines, and knowledge.[19, 20, 21] Similar barriers to vaccine uptake were found in this study. Common barriers found in this study were cost and potential side effects of the vaccine. Furthermore, a substantial number of participants were neutral towards the safety of the vaccine. This highlights the need to inform individuals about the safety of the vaccine and its potential to decrease the number

of cases of HPV. Therefore, information to reduce these barriers, such as vaccine safety or costs, may increase HPV vaccine uptake in this male population.

Student Health Services (SHS) can actively promote discussion between college males and their healthcare providers via several strategies. First, by informing more students about the potential effects of HPV, SHS can make college males more likely to bring up this conversation at their next doctor's appointment or actively make an appointment to discuss HPV and ways to prevent it. Second, by reaching out to family physicians and informing them of the low level of HPV awareness and perceived susceptibility, SHS can make physicians more likely to discuss this with their patients, thereby increasing awareness among college males and potentially their families.

Another potential method for helping males become informed about the prevalence and severity of HPV is by increasing HPV information targeted towards males. Only 13% of males in this study had seen an ad about the HPV vaccine directed toward males. They reported they would be more likely to receive the HPV vaccine if more ads were directed toward males. They also stated that it seems to them that the HPV vaccine is directed only toward females. Therefore, it is crucial to expand the scope of media campaigns to include males.

A limitation of this study is that it was conducted at only one southern university and that the sample was not very diverse. This study was limited to male undergraduate students from one university. Comparing different health education and outreach programs on HPV as well as the rates of awareness and vaccinations between different colleges would be helpful to understand level of awareness among college males and highlight effective methods to increase HPV-related knowledge. Males of bisexual and

homosexual sexual orientation are at a higher risk for contracting HPV. However, the sample of this current study included a vast majority of heterosexuals. It would be beneficial to see if individuals with different sexual orientations are more aware about the prevalence and effects of HPV, and if they are more likely to receive the vaccine.

The current study found moderate levels of HPV awareness, and participants believed that genital warts and HPV-related cancers would be disruptive to their routines and health. However, extremely low levels of vaccine uptake and perceived susceptibility were reported. This study suggests that further education and intervention to promote HPV vaccination among males are needed to reduce the spread of HPV and reduce genital warts and cancers among men.

References:

1. National Cancer Institute at the National Institutes of Health. HPV and Cancer. Available at http://www.cancer.gov/cancertopics/factsheet/Risk/HPV. Accessed February 7, 2012.
2. Centers for Disease Control and Prevention. Genital HPV infection – Fact Sheet. Available at http://www.cdc.gov/std/HPV/STDFact-HPV.htm#common. Accessed February 7, 2012.
3. Centers for Disease Control and Prevention. HPV and Men – Fact Sheet. Available at http://www.cdc.gov/std/hpv/STDFact-HPV-and-men.htm. Accessed February 7, 2012.
4. U.S. Department of Health and Human Services. FDA U.S. Food and Drug Adminstration. Vaccines, Blood, and Biologics. Gardasil. Available at http://www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/UCM094042. Accessed February 7, 2012.
5. Centers for Disease Control and Prevention. HPV Vaccine Information for Young Women – Fact Sheet. Available at http://www.cdc.gov/std/hpv/stdfact-hpv-vaccine-young-women.htm. Accessed February 7, 2012.
6. Chesson H, Ekwueme D, Saraiya M, Markowitz L. Cost-effectiveness of Human Papillomavirus Vaccination in the United States. Centers for Disease Control and Prevention. Cost-effectiveness of Human Papillomavirus Vaccination in the United States. Emerging Infections Diseases. 2008;14.2;244-251.

7. Committee on Infectious Diseases. Recommended Childhood and Adolescent Immunization Schedule—United States, 2012. Pediatrics: Official Journal of the American Academy of Pediatrics. 2012;129.2;385-386. Available at http://pediatrics.aappublications.org/content/129/2/385.full?rss=1. Accessed February 17, 2012.
8. Reiter P, Brewer N, Smith J. Human Papillomavirus Knowledge and Vaccine Acceptability Among a National Sample of Heterosexual Men. Sexually Transmitted Infections. 2009;86;241-246.
9. Reiter P, Brewer N, McRee A, Gilbert P, and Smith J. Acceptability of HPV Vaccine Among a National Sample of Gay and Bisexual Men. Sexually Transmitted Diseases. 2010;37.3;197-203.
10. Gerend M, Barley J. Human Papillomavirus Vaccine Acceptability Among Young Adult Men. Sexually Transmitted Diseases. 2008;36.1;58-62.
11. Theory at a Glance. National Cancer Institute; 1997.
12. Nandwani, M. Men's knowledge of the human papillomavirus vaccine. The Nurse Practitioner. 2010;35.11;32-39.
13. Centers for Disease Control and Prevention. National and State Vaccination Coverage Among Adolescents Aged 13 Through 17 Years—United States, 2010. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6033a1.htm. Accessed February 7, 2012.
14. American College Health Association. American College Health Assocation—Natinal College Health Assessment II: Reference Group Data Report Fall 2011. Hanover, MD: American College Health Association; 2012. Available at

http://www.acha-ncha.org/docs/ACHA-NCHA II_ReferenceGroup_DataReport_Fall2011.pdf. Accessed March 13, 2012.

15. Blumenthal J, Frey M, Worley M, Tchabo N, Soren K, Slomovitz, B. Adolescent Understanding and Acceptance of the HPV Vaccination in an Underserved Population in New York City. Journal of Oncology. 2012;2012;1-8.
16. Nandwani, M. Men's knowledge of the human papillomavirus vaccine. The Nurse Practitioner. 2010;35.11;32-39.
17. Jain N, Euler G, Shefer A, Lu P, Yankey D, Markowitz L. Human Papillomavirus (HPV) Awarness and Vaccination Initiation Among Women in the United States, National Immunization Survey—2007. Preventive Medicine. 2009;48.5;426-431.
18. Olshen E, Woods E, Austin S, Luskin M, Bauchner, H. Parental Acceptance of the human papillomavirus vaccine. Journal of Adolescent Health. 2005;37;248-251.
19. Davis K, Dickman E, Ferris D, Dias J. Human Papillomavirus Vaccine Acceptability Among Parents of 10- to 15-year-old Adolescents. Journal of Lower Genital Tract Disease. 2004;8.3; 188-194.
20. Kahn J, Rosenthal S, Hamann T, Bernstein D. Attitudes About Human Papillomavirus Vaccine in Young Women. International Journal of STD and AIDS. 2003;14;300-306.
21. Zimet G, Mays R, Winston Y, Kee R, Dickes J, Su L. Journal of Women's Health Gender-based Medicine. 2000;9.1;47-50.