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Human papillomavirus vaccine acceptance among young men in Bangalore, India

Hrishikesh Kumar Belani, MD, Poorani Sekar, MD, Rajarshi Guhaniyogi, PhD, Anil Abraham, MD, Paul R. Bohjanen, MD, PhD, and Kim Bohjanen, MD

St John's National Academy of Health Sciences, Bangalore, India

Abstract

Background—Human papillomavirus (HPV) is the most common sexually transmitted infection in the world. It can lead to anogenital, cervical, and head and neck cancer, with higher risk of malignant disease in patients with human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) patients. In India, 73,000 of the 130,000 women diagnosed with cervical cancer die annually. Gardasil[®], a vaccine available against HPV types 6, 11, 16, and 18, is approved for use in women in India but not men. A backlash to post-licensure trials has created a negative public opinion of the vaccine for women. Vaccinating boys and men is an alternate approach to prevent cervical cancer in women. This study gauges facilitators and barriers to vaccination acceptance among men in Bangalore, India.

Materials and methods—Young men presenting to a dermatology clinic or an ART center in Bangalore, India, answered a seven-point survey assessing acceptance of the HPV vaccine, perceived barriers to vaccination, and acceptance of vaccination for their children. Ninety-three general dermatology patients and 85 patients with HIV/AIDS participated.

Results—There was a high degree of vaccine acceptance for both groups, 83 and 98%, respectively. Vaccine side effects and cost were cited as key barriers to vaccination, and doctor recommendation and government approval were the main facilitators.

Conclusion—There is potential for high acceptability of the HPV vaccine among men in India. These results can facilitate further study of vaccine acceptance among males and physician opinion and knowledge about HPV vaccine use. Vaccination of males is a hopeful strategy to protect men and women from HPV-related malignancies.

Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the world.¹ In India, HPV-associated anogenital warts affect approximately 1% of the population and contribute to between 5 and 25% of the STI burden.² As well as benign anogenital warts, HPV can manifest as malignant disease, including anal cancer and, most notably, cervical cancer in women. Cervical cancer is the third most common cancer among

women globally, and India accounts for a quarter of these cases.^{3–5} In India, cervical cancer is the most common cancer among women of all ages, with an estimated incidence at 134,420 cases per year and estimated mortality at 74,000 women every year. The cumulative risk of cervical cancer in India is estimated to be 2.8% for women aged 0–74 years, compared with a global cumulative risk of 1.6%.⁶

Human papillomavirus is of particular concern among people living with human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS). HPV is more persistent and more difficult to treat when concomitant with HIV. In India, HIV affects an estimated 2.4 million people.⁷ These patients are also at higher risk for malignancy from HPV infection, even in the setting of antiretroviral therapy, and invasive cervical cancer is an AIDS-defining illness.^{8–10}

Cervical and anal cancers caused by HPV types 16 and 18 are diseases now preventable by the bivalent Cervarix[®] vaccine and the quadrivalent Gardasil[®] vaccine (which additionally covers HPV types 6 and 11). In India, both Cervarix[®] and Gardasil[®] are licensed for use in women. In the USA, Gardasil[®] is now also approved for use in boys and men aged 11–26 years.^{11,12} The HPV vaccine is not yet approved in India for men or boys. Additionally, recent backlash to post-licensure vaccine trials in India has created negative public opinion of the safety of the vaccine among women.¹³

An HPV vaccination program in India would significantly reduce the incidence of HPV-related cancers.¹⁴ In countries with low vaccination coverage, mathematical modeling predicts that vaccinating one sex can be protective of the other.^{15,16} Vaccinating boys and men may be an effective approach for the prevention of cervical cancer in women in India; given that data are limited, though, it is unclear if vaccination will be accepted. This study aims to gauge facilitators and barriers to vaccination acceptance among men in Bangalore, India.

Materials and methods

Study design

St. John's Medical College and Hospital in Bangalore, India, is an academic health center serving more than 500,000 patients, with a daily average of 1379 outpatient visits. The dermatology clinic is a common first point of care for patients of all ages presenting with HPV-associated warts.² St. John's also houses a government-funded antiretroviral therapy center, managing the care and treatment of patients living with HIV/AIDS.

Satyaprakash and Tying² highlight the key role that dermatologists in India can play in HPV vaccine promotion. Dermatologists are experts in identifying and treating cutaneous HPV and, in India, dermatologists have access to patients of all ages, and their partners, who may be at higher risk for oncogenic strains of the virus. For this study, therefore, we surveyed two distinct populations of young men at risk for HPV disease: (1) patients presenting to the walk-in outpatient dermatology clinic; and (2) patients followed at the antiretroviral therapy (ART) center at St. John's.

All male patients aged 18–45 years seeking care at one of these clinics were offered a survey on HPV vaccine acceptability. Data collection occurred in November 2010 and again in February 2011. Once a participant agreed to a survey, verbal consent was sought and obtained. No incentive was offered for completing the survey. Surveys were printed in English. Respondents who were literate and fluent in English responded to the survey themselves. A member of the data collection team administered the survey in English, Kannada, or Tamil to respondents who could not speak and/or read or write English. There were only four interviewers; all were persons of Indian origin, two local residents and two non-residents. The institutional review boards of both the University of Minnesota and St. John's Medical College and Hospital granted ethical approval for this study.

The questionnaire used was a seven-point survey with theoretical grounding in the Health Belief Model, with the goal of assessing perceived seriousness, susceptibility, benefits, barriers, modifying variables, and cues to action.¹⁷ The survey questions were derived from previous studies conducted in similar settings: a 2010 survey by Pitts *et al.*¹⁸ aimed to understand knowledge of HPV and the HPV vaccine in Australia; Moraros and colleagues¹⁹ assessed vaccine acceptance in Juarez, Mexico; and Hernandez and colleagues²⁰ recently studied acceptability of the HPV vaccine among men in Hawaii.

Men were questioned about their basic knowledge of HPV with the following questions: “Are you aware of the human papillomavirus?”; “Are you aware that the human papillomavirus can cause genital and anal warts and cancer in women and men?” (possible response: yes/no). Questions gauged acceptance of the vaccine: “If there was a vaccine injection available to prevent contraction of some strains of HPV, would you use it?” (possible response: yes/no); with follow-up questions, “If you answered yes, please select why you would get the HPV vaccine” (possible responses: to protect myself from disease, to protect my sexual partners from disease, to help reduce cancer in women and men, other), and “If you answered no, please select why you would not get the HPV vaccine” (possible responses: I do not need it, it may not be safe, my friends and/or family would not approve of its use, other). Men were queried about facilitators and barriers to vaccination acceptance: “What would you want to know about the HPV vaccine before getting it?” (possible responses: if the vaccine is safe, what does the vaccine cost, what the side-effects of the vaccine are, how well the vaccine works, how many doses of the vaccine are needed, if other people are getting the vaccine, other), and “What would stop you from getting the HPV vaccine?” (possible responses: nothing, fear of needles, fear of vaccines, side effects, cost, transportation to the clinic is difficult, time away from work or school to get the vaccine, other), and “What would make you more likely to get the HPV vaccine?” (possible responses: if your doctor recommends it, if it is free or paid by insurance, if your sexual partner wants you to get it, if the government approves it, other). Finally, men were asked regarding allowance of the vaccine for their child older than age 11 years: “Would you allow the HPV vaccine for children aged 11 or older?” (possible response: yes/no).

The surveys were administered to participants along with educational information about HPV and its spread, information about the Gardasil® vaccine, and brief counseling about how to prevent contraction and spread of HPV. There was a specific order to the educational component of the survey, with information about HPV introduced only following response

to the questions about HPV knowledge, and information about the vaccine introduced only following response to the questions about vaccine acceptance.

Demographics

In addition to the survey, we collected demographic information on age, marital status, education, employment status, sexual behavior, condom use, and tobacco use. Demographic data are listed in Table 1.

Differences between the two groups of patients were determined with parametric statistics, using *t*-tests and Chi square tests. Associations between HPV knowledge and respondent education level were also determined via Chi square test. Inferential statistics were used to measure the effects of different descriptive variables on vaccine acceptance. Qualitative responses were transformed to quantitative categorical variables, and the data were analyzed with a Probit regression model.

Results

A total of 178 male patients aged 18–45 years responded to the surveys. Ninety-three respondents were patients at the walk-in general dermatology outpatient clinic, 85 respondents were patients with HIV/AIDS being seen at the ART center. Survey results are listed in Table 2.

Knowledge of HPV and acceptance of vaccine

The majority of participants (68%) had no knowledge of HPV or the diseases it can cause. Knowledge of the virus was higher among the general dermatology patients, the more educated of the two groups. However, there was no significant correlation between patient education level and knowledge of HPV ($P = 0.0974$).

Vaccine acceptance was very strong in both groups. Eighty-three percent of general dermatology patients indicated that they would seek vaccination if it was available, with only 17% indicating they would not. Self-protection (59%) was the main motivating factor to use the vaccine. Of those respondents not accepting of the vaccine, lack of trust in the safety of the vaccine (38%) and lack of perceived need (38%) were the main reasons for rejecting the vaccine, with one respondent writing “I’m a good boy” as why he does not need the vaccine. Concern with vaccine safety was also emphasized in subjects’ report of what information they required before seeking the vaccine: with vaccine safety (72%) and potential side effects (60%) most important among general dermatology patients. When correlating acceptance with risk behaviors, dermatology patients who used condoms were more likely to accept the vaccine ($P = 0.006$). Dermatology patients were nearly split in indicating acceptance of vaccination for their own children, with 59% ($n = 55$) reporting they would allow vaccination for their child at age 11 years or greater.

Acceptance was even higher among ART clinic patients, with 98% ($n = 83$) indicating acceptance of the vaccine and only 2% ($n = 2$) not in favor. Self-protection (89%) was also the main motivating factor for vaccination among this group. Of the two respondents who indicated they would not accept the vaccine, one (1%) indicated he did not believe he needs

the vaccine, and the other (1%) indicated he would not have family approval to use it. Like the general dermatology patients, ART clinic patients indicated that information about vaccine safety (68%) and side effects (42%) were the most influential in making the decision to accept the vaccination. ART clinic patients were also almost all (93%) in favor of vaccinating their own children aged 11 years or greater.

Barriers and facilitators to acceptance

Most (42%) general dermatology patients indicated potential vaccine side effects as a key potential barrier to seeking the vaccine. Cost also was identified as a barrier to vaccination by several (24%) respondents but was less frequent. Among ART clinic patients, however, cost was identified (53%) as the key barrier to vaccination, with lack of transportation to the clinic also an important factor (34%).

In both groups, physician recommendation for vaccination was most frequently identified as a key factor in the decision to seek vaccination: 76% ($n = 71$) of general dermatology patients and 81% ($n = 69$) of ART clinic patients. Government approval of the vaccine was also an important facilitator among general dermatology patients (39%, $n = 36$).

Discussion

In a country where topics related to sex are traditionally taboo, and the licensing and introduction of HPV vaccination for women is met with opposition and controversy, it is encouraging to see strong acceptance of the vaccine in two distinctly different populations of young men at risk for HPV in Bangalore.

Acceptance was high in both groups, though higher among the ART clinic patients compared with the general dermatology patients. The general dermatology patients demonstrated greater skepticism of the vaccine's safety as well as less perceived need for vaccination, which likely factored into their lower rate of acceptance. Additionally, the patients with HIV/AIDS may have greater dependence on and/or trust in medical interventions, as they rely upon government-provided care to control their HIV. With less awareness of HPV and its complications prior to taking the survey, the ART clinic patients were more accepting of an intervention they learned would help them. On the other hand, the ART clinic patients may also have assumed that the vaccine, if made available, would be provided free by the government, which may have contributed to their likelihood of acceptance. ART clinic patients were also more open to vaccinating their own children (93% acceptance) than patients in the dermatology clinic (59% acceptance). This may represent a stronger belief in the benefits of preventive medicine in a population that was both older and affected by a preventable disease.

Respondents identified two key barriers that could compromise acceptance: cost and vaccine side effects. These barriers were, again, split between the two populations, with the general dermatology patients concerned more about side effects and the ART clinic patients concerned more with cost. Cost was identified as an obstacle by only 24% of general dermatology patients compared with 53% of the ART clinic patients. The general dermatology patients represent a population with a higher level of education and income

than the ART clinic patients, their response is a hopeful indication that middle class young men at risk will be willing to pay out of their own pocket for the vaccine. While personal or employer health insurance is becoming more prevalent, it is still quite rare in India, and out-of-pocket payment is the main mode of healthcare financing in the country.^{21,22}

The general dermatology patients were more concerned with vaccine safety. Given the backlash to the vaccine in India, which was partly related to safety, assuaging these doubts may be difficult.¹³ Data from safety trials (although not from India) have shown the quadrivalent HPV vaccine to be a considerably safe vaccine with few to no side effects, and ongoing safety monitoring continues to show low rates of adverse events.^{23,24} Lack of trust in vaccination is often secondary to lack of good information, and patient education will be integral to improving vaccine uptake. The responsibility of outlining the basic benefits and costs of vaccination to better inform patients lies almost entirely with healthcare providers, thus physician education is also imperative.^{2,25}

This study demonstrates that physicians can be the key influence on whether or not a patient chooses to seek vaccination. Both the general dermatology patients and ART patients indicated physician recommendation of the vaccine as the number one facilitator of vaccine acceptance. It is likely that, while there are many opinions, there is a dearth of understanding of cost, efficacy, and safety of the vaccine among the medical community.²⁶ Proper dissemination of accurate information among providers about the high benefit to cost ratio of the vaccine will be necessary for successful vaccine rollout.

Limitations

This survey is limited by its small sample size and also by the possibility of recall bias, non-respondent bias, and interviewer error, which are inherent limitations of a survey. Another limitation of the study includes the possibility of misinterpretation of survey questions due to language barriers. Subjects who claimed they could understand written English took the survey on their own (with research staff available to answer any questions), and those who could not were administered the survey either in English, Kannada, or Tamil, depending on their preference. This screen should have ensured comprehension of the survey questions, but it is possible that some subjects responded without fully understanding the questions.

Conclusions

This study joins a small cohort of investigations assessing HPV vaccine acceptance among males in resource-constrained and middle-income countries and is one of the first in India. The vaccine has the potential for high acceptability among young males in Bangalore, in both the general population and those living with HIV/AIDS. These results can facilitate further study of vaccine acceptability among men in India. It can also guide analysis of physician opinion and knowledge about vaccine use among men. This study will ideally add to the discussion concerning HPV vaccine approval for men and boys. HPV vaccination, especially of girls and women, is a controversial topic worldwide. However, the HPV vaccine is a proven prevention tool, and vaccination of young men and boys may be a

strategy to protect both men and women from cervical, anogenital, and head and neck cancers.

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Table 1

Demographic statistics

	General dermatology patients (N = 93)	ART clinic patients (N = 85)	P-value
Mean age (years)	26	37	<0.001
Marital status	74% single 21% married 1% other	15% single 80% married 5% widowed	<0.001
Education	14% 1–12th grade 59% Bachelor's degree 24% post-graduate degree	4% Kindergarten 61% 1–12th grade 21% Bachelor's degree 8% post-graduate degree	<0.001
Employment	74% employed 22% students 3% unemployed	98% employed 2% unemployed	<0.001
Sexual behavior	37% not active 55% active with female partners 8% no response	12% not active 88% active with female partners ^a	<0.001
Condom use	23% always use 25% sometimes use 18% never use 33% no response ^b	16% always use 28% sometimes use 48% never use	0.004
Tobacco use	28% yes 70% no 2% no response	24% yes 76% no	0.45

^aNo participants indicated sexual relationships with male partners.

^b27/31 who did not respond to the question about condom use indicated they were “not sexually active”.

Table 2

Survey results

	General dermatology clinic (N = 93)	ART center (N = 85)	P-value
Knowledge of HPV and HPV disease			0.22
Aware of HPV	49% (n = 46)	15% (n = 14)	
Aware that HPV causes warts and cancer	44% (n = 41)	15% (n = 13)	
Acceptability of HPV vaccine			1.00
Would use HPV vaccine	83% (n = 77)	98% (n = 83)	
Would use to protect themselves	59% (n = 55)	87% (n = 74)	
Would use to protect partners	39% (n = 36)	44% (n = 37)	
Would use to reduce cancer burden	44% (n = 41)	46% (n = 39)	
Would not use HPV vaccine	17% (n = 16)	2% (n = 2)	
Do not need the vaccine	6% (n = 6)	1% (n = 1)	
Do not trust the vaccine safety	6% (n = 6)	–	
Do not have family approval 2% (n = 2)	1% (n = 1)	–	
Cannot afford the cost	2% (n = 2)	–	
Information required before use			0.67
Safety of vaccine	72% (n = 62)	68% (n = 58)	
Side effects of vaccine	65% (n = 60)	42% (n = 36)	
Efficacy of vaccine	60% (n = 56)	38% (n = 32)	
Cost of vaccine	31% (n = 29)	38% (n = 32)	
If other people are using vaccine	20% (n = 19)	5% (n = 4)	
Number of doses required	–	11% (n = 9)	
Barriers to vaccination			0.68
Potential vaccine side effects	42% (n = 39)	27% (n = 23)	
Cost	24% (n = 22)	53% (n = 45)	
No barriers to use	22% (n = 20)	27% (n = 23)	
Time off work to get vaccine	13% (n = 12)	–	
Fear of vaccines	13% (n = 12)	4% (n = 3)	
Fear of needles	9% (n = 8)	2% (n = 2)	
Transportation to clinic	6% (n = 6)	34% (n = 29)	
Necessity of vaccine	3% (n = 4)	–	
Potential inefficacy of vaccine	1% (n = 1)	–	
Facilitators to vaccination			0.69
Physician recommendation of use	76% (n = 71)	81% (n = 69)	
Government approval of vaccine	39% (n = 36)	16% (n = 14)	
Free or insurance-coverage of vaccine cost	17% (n = 16)	20% (n = 17)	
Partner request of use	13% (n = 12)	1% (n = 1)	
Acceptability for children age 11 years			
Would allow for child 11 years	59% (n = 55)	93% (n = 79)	
Would not allow for child 11 years	26% (n = 24)	4% (n = 3)	

HPV, human papillomavirus.