

Chinese Vaccine Providers' Perspectives on the HPV Vaccine

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Abstract

China approved a human papillomavirus (HPV) vaccine in 2018. Recommendations from health care providers can positively impact vaccine receipt. This study characterized vaccine providers' attitudes toward the HPV vaccine and contrasted attitudes by the providers' demographic characteristics. In total, 120 vaccine providers in Shanghai, China, completed a questionnaire. Associations between essential characteristics of the HPV vaccine and providers' urbanicity and working length were explored using the Kruskal-Wallis test. Doctors with ≤ 5 years' work experience were more likely to think it important to emphasize that HPV is a sexually transmitted disease compared to doctors with longer work experiences ($P = .0231$). More suburban than urban providers thought that China should include the HPV vaccine into the publicly funded Expanded Program on Immunization ($P = .0315$). Differences in attitudes toward HPV could lead to variation in how providers talk to parents and adolescents about the HPV vaccine, with disparities in vaccine uptake as a result.

Keywords

China, HPV, vaccines, providers, sexually transmitted disease

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What do we already know about this topic?

How doctors talk about the HPV vaccine can affect uptake.

How does your research contribute to the field?

By asking doctors in Shanghai, China, how they promote the HPV vaccine, we were able to describe if they thought it was important to talk about HPV as a sexually transmitted disease or cancer.

What are your research's implications toward theory, practice, or policy?

As China and other countries introduce the HPV vaccine, they should consider training doctors to emphasize the vaccine's ability to prevent cancers

vulvar, penile, vaginal, and throat cancers. More than 270 000 women die of cervical cancer worldwide each year, and over 85% of these deaths occur in low- and middle-income countries.¹ Cervical cancer is the third most common female cancer for women in China, and about 106 430 new cases are diagnosed annually in China.²

The World Health Organization (WHO) recommends HPV vaccines as part of routine vaccinations in all countries. HPV vaccination programs for pre-adolescent girls in high income countries such as Australia, Canada, New Zealand, and the U.K. have made significant progress in cervical cancer control and prevention.³ There

Introduction

The human papillomavirus (HPV) is the most common sexually transmitted infection in the world. Nearly all men and women will acquire least one type of HPV at some point in their lives. Many HPV strains can cause warts but do not need any treatments and resolve themselves, but high-risk HPV types can cause cervical, anal,

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has also been a reduction in the incidence of vaccine-preventable strains of HPV and a decrease in genital wart diagnoses.⁴

Despite the known effectiveness of the HPV vaccine, there are still many populations that do not have the opportunities to get vaccinated. Low- and middle-income countries have adopted the vaccine later than in high income countries.⁵ Rapid introduction of HPV vaccine in the middle and low-income countries might be the best way to narrow the present inequalities in HPV related diseases. Gavi, the Vaccine Alliance, has supported the introduction of HPV vaccines in 18 countries.⁶ However, only low-income and 40% of lower-middle-income countries meet Gavi criteria, and non-eligible countries, including China, are facing obstacles of including the HPV vaccine into national immunization programs.⁵

China has not yet introduced the HPV vaccine onto its list of publicly funded vaccines, the Expanded Program on Immunization (EPI).⁷ The China Food and Health Administration approved the 9-valent HPV vaccine for use in 2018, and it requires payment from vaccine recipients. There is likely to be low levels of awareness of the disease and vaccine in the country. In 2011, only 28% of employed women and 12% undergraduate students in China had heard of HPV, and only 21% of employed women and 7.2% of students knew that HPV is related to cervical cancer.⁸ There are still many misunderstandings about HPV and HPV vaccines among the public. HPV infection was related with significant adverse impact on self-esteem by the public.⁹ Lessons learned from the introduction of the HPV vaccine in China are applicable and valuable to many other low- and middle-income countries.

Healthcare providers are considered a reliable source of information by parents and can have a positive impact on parental vaccine decision-making.¹⁰ Accurate knowledge and appropriate communication strategies from health care providers could increase vaccine uptake. As the roll-out of the HPV vaccine is in the early stage in China, it is important to understand vaccine providers' beliefs on HPV and the HPV vaccine. This information can be used to create training programs, communication strategies and vaccine campaigns. In a survey of health care providers at vaccination clinics in Shanghai, China, this study characterizes vaccine providers' attitudes toward the HPV vaccine, and contrasts attitudes by demographic characteristics.

Methods

Study Population

We selected a convenience sample of 120 vaccine providers from 40 immunization clinics in the summer 2019

(May-July) in Shanghai. Immunization clinics are embedded in community health centers in China, which provide a variety of health care services, including vaccines, to residents of the surrounding community. Forty townships were first selected based on the size of their population according to the 2010 Census. All districts in Shanghai, except Chongming district, a less-populated island district relatively far away from the city center, were part of the sampling frame. The immunization clinics were randomly selected according to the population size of the township they are located in. Three providers were then randomly selected as a convenient sample at each clinic.

Our sample size was designed to estimate a confidence interval of 8 percentage points around an estimate of 80%, the assumed proportion of providers who would want to include the HPV vaccine on the list of publicly available vaccines. The sample size of providers is limited by the number of clinics ($n=40$), but because we are sampling few providers from each clinic, the design effect is assumed to be negligible.

Questionnaire Design

The questionnaire included questions on perceived importance of different characteristics of HPV, the use of the HPV vaccine in different ages, future vaccine promotions, and the provider's demographic background. Providers were first asked about how important they think about 3 characteristics of HPV when talking with adolescents and parents. The 3 characteristics are "HPV is a sexually transmitted disease," "HPV can cause cervical cancer," and "HPV can cause cancer other than cervical cancer." They were measured on a 5-point Likert scale. Vaccine providers were also asked to roughly recall what is the typical age of someone coming for an HPV vaccine. Providers were then asked several questions about future HPV vaccine promotion, including what's the ideal age of initiating HPV vaccine, how important it is for China to make HPV vaccine available for men, and how important to include the HPV vaccine into EPI. Finally, basic demographic information including gender, working length, and location of clinic was collected. The questionnaire is available online: <https://doi.org/10.6084/m9.figshare.12980042>.

Derived Variables

The main outcomes were the ideal age of initiating HPV vaccine, how important is it to make HPV vaccine available for men, and how important to include HPV vaccine into EPI. The main explanatory variables were the working length of providers and the urbanicity of location of the clinic. The working length of providers were categorized into 3 categories: less than 5 years, 6 to 10 years,

Table 1. Distribution of Vaccine Providers by Categories of Attitudes Toward the HPV Vaccine, and by Selected Demographic Characteristics.

Variable	N	%
Urbanicity		
Suburban	84	70
Urban	36	30
Provider's work length		
≤5 years	47	39
6-10 years	40	33
≥11 years	33	28
HPV is sexually transmitted		
Unsure	3	3
Somewhat important	29	24
Very important	88	73
HPV causes cervical cancer		
Unsure	1	1
Somewhat important	22	18
Very important	97	81
HPV cause cancers other than cervical cancer		
Not at all important	2	2
Not very important	2	2
Unsure	13	11
Somewhat important	27	23
Very important	75	63
Typical age of someone coming in for an HPV vaccine		
9-13 years	1	1
14-18 years	2	2
19-23 years	15	13
24 years or older	102	85
Ideal age to initiate HPV vaccination		
9-13 years	24	21
14-18 years	53	45
19-23 years	33	28
24 years or older	7	6

Some variables had missing values which are not included in the denominator for the percentages.

and more than 11 years. Providers were categorized into urban and suburban areas based on their clinic locations by districts. Providers' gender was also collected.

Statistical Analysis

Data were managed and analyzed using SAS version 9.4 (SAS Institute, Cary, NC). The proportion of providers' attitudes toward each HPV characteristic and HPV vaccine are reported. The ideal age to initiate HPV vaccination was categorized into 4 groups: 9 to 13 years, 14 to 18 years, 19 to 23 years, and 24 years or older. Associations between outcome variables and providers' urbanicity and working length were explored using the Kruskal-Wallis test.

Ethical Approval and Informed Consent

The study was approved by the Health Sciences and Behavioral Sciences Institutional Review Board at the University of Michigan (#HUM00155864) and the Shanghai Centers for Disease Control and Prevention Ethical Review Committee (#2019-17). Vaccine providers selected at an immunization clinic were given a written informed consent form. Providers provided signed informed consent prior to starting the paper questionnaire.

Results

Table 1 shows the sample distribution of vaccine providers by categories of the attitude toward the HPV vaccine, and basic demographic variables included in the analyses. All 120 vaccine providers approached to participate agreed to participate. Among the 120 vaccine providers, only 2 were males. Most (70%) providers were from suburban districts. Around 39% percent of providers worked ≤5 years, and 28% of providers had worked ≥11 years. For most providers (85%), the most common age for individuals who came into the clinic for HPV vaccine were 24 years old or older. For the attitude toward the basic HPV characteristics, most of the providers thought it was very important to address that HPV was sexually transmitted (73%), that HPV can cause cervical cancer (81%), and that HPV can cause cancers other than cervical cancer (63%). Two-thirds (66%) of the providers believed the ideal age to initiate the HPV vaccine was ≤18 years old, with the plurality (45%) recommending 14 to 18 years, and less (21%) recommending 9 to 13 years.

Table 2 presents the unadjusted values of urbanicity and work experience in attitudes toward HPV characteristics, and future promotion plan of the HPV vaccine. According to unadjusted analyses, doctors with ≤5 years' work experience thought that it was more important to emphasize that HPV is a sexually transmitted disease (on a 5-point Likert scale, 4.81 ± 0.07) compared to doctors with a longer work experience (4.73 ± 0.10 for those working 6-10 years and 4.55 ± 0.08 for those working ≥11 years, $P=.0231$). More suburban providers thought that China should make the HPV vaccine an EPI vaccine (4.58 ± 0.08 , $P=.0315$) compared to urban providers (4.33 ± 0.12). For other attitudes, such as HPV is sexually transmitted, HPV can cause cervical cancer, HPV can cause cancers other than cervical cancer, and make the HPV vaccine available for males, there were no significant differences by urbanicity or work length.

Table 2. Unadjusted Analysis of Urbanicity and Working Experience in Attitudes Toward HPV Characteristics, and Future Promotion Plan of the HPV Vaccine.

	Urbanicity			Work length			
	Urban	Suburban	P-value ^a	<5 years	6-10 years	≥11 years	P-value ^a
HPV is sexually transmitted	4.64 ± 0.10	4.74 ± 0.06	.2904	4.81 ± 0.07	4.73 ± 0.10	4.55 ± 0.08	.0231
HPV causes cervical cancer	4.83 ± 0.05	4.79 ± 0.05	.6324	4.87 ± 0.06	4.80 ± 0.07	4.70 ± 0.06	.1485
HPV cause cancers other than cervical cancer	4.47 ± 0.13	4.42 ± 0.11	.6347	4.62 ± 0.12	4.40 ± 0.13	4.22 ± 0.14	.1057
Ideal age to initiate vaccination	15.75 ± 0.93	17.54 ± 0.72	.0966	17.07 ± 0.71	17.49 ± 1.08	16.30 ± 0.98	.4034
Make the HPV vaccine available for males	4.28 ± 0.15	4.44 ± 0.09	.4333	4.43 ± 0.12	4.43 ± 0.10	4.30 ± 0.12	.7519
Make the HPV vaccine an EPI vaccine	4.33 ± 0.12	4.58 ± 0.08	.0315	4.57 ± 0.09	4.58 ± 0.10	4.33 ± 0.11	.0934

^aFrom Kruskal-Wallis Test.

Discussion

Overall, vaccine providers in Shanghai are very positive about the HPV vaccine, and they would like it included in the EPI. The World Health Organization position paper recommends countries to add the 2-dose schedule of HPV vaccine into routine immunization programs for girls 9 to 14 years old, and 3 doses for girls ≥15 years old.¹¹ However, in low- and middle-income countries, expensive new vaccines may only be available to those who can afford them in the private sector (non-EPI) long before they are included in the EPI.¹² The EPI in low- and middle-income countries have fewer resources to introduce new vaccines and many new vaccines are competing for these limited resources. Vaccines against significant sources of morbidity and mortality, such as the Hib vaccine, may be considered more urgent to introduce into a publicly funded program. Moreover, the decision to introduce a new vaccine into the EPI is a complex problem that needs academic, clinical, public health, economic, regulatory, and ethical considerations.¹² Comprehensive discussions from different groups of stakeholders and decision makers can ensure that the introduced vaccine contributes effectively and efficiently to disease control efforts within the country.

The findings in this study showed that most doctors recommend making the vaccine available for males, but currently, the HPV vaccine in China is only for females. Gavi, the Vaccine Alliance, also only supports the HPV vaccine for females in low-income countries. Introducing the HPV vaccine for males is not only based on the burden of disease, but the safety and effectiveness of the vaccine and the estimated cost-effectiveness of vaccination also needs to be considered, especially in low- and

middle-income countries.¹² Cervical cancer is estimated to cause 91% of HPV related cancer deaths. Thus, its control is a higher priority globally. Further modeling is needed to evaluate the potential added benefits and costs from making HPV vaccine available for males in low- and middle-income countries.

The path of making the HPV vaccine available for males in the U.S. has been complicated. In 2006, the HPV vaccine was first approved by the FDA. It was then recommended by the Advisory Committee on Immunization Practices (ACIP) only for women. Three years later, the FDA approved the vaccine for males, and ACIP issued a weaker “permissive recommendation” for males, later upgraded to “routine recommendation” in 2011.¹³ Although oropharyngeal cancer rates caused by HPV virus have now surpassed cervical cancer rates in the U.S., surveillance data on vaccinated women in both pre- and post-marketing studies on HPV infection and the prevalent screening test for cervical cancer keep the women in the center of the stage.¹⁴ Accordingly, there is a lower sense of urgency and less concern for achieving high rates of HPV vaccination among males. In addition, the initial HPV vaccine campaign focused almost exclusively on cervical cancer prevention, with almost no mention of genital warts or other cancers that may affect males, further hindering the awareness about the utility of HPV vaccine in males.¹⁵ A more gender-neutral and more comprehensive approach to policies and communication about HPV vaccination is needed to raise the awareness and uptake rate of HPV vaccines for males.

Currently, China’s HPV vaccination rate is relatively low due to a lack of awareness, inadequate vaccine supply, and high costs. According to our survey, most

people came into the clinic for the HPV vaccine were 24 years old or older, at which age they can make vaccination decisions themselves. However, the WHO recommends a vaccination age of 9 to 14, during which age parents usually make vaccination decisions. Thus, if we should promote the HPV vaccine as a sexually transmitted disease (STD) or as a cancer vaccine is a crucial component to improve vaccine uptake. Previous studies have shown that besides the effectiveness and safety concern of the vaccine itself, concerns about moral purity and the linkage of the HPV vaccine with sexual activity were the most common reasons that hindered parents from vaccinating their children.¹⁶ With the current media advertising emphasizing the sexually transmitted character of the HPV virus, general messaging around cancer prevention did not always defeat parents' concern about a perceived link between vaccination and sexual activity. Some parents might even view their children's feelings of the HPV vaccine as a "gauge of their intent for sexual activity."¹⁷ Thus, promoting the HPV vaccine as a cancer vaccine may be advantageous to increase vaccine uptake, in the case of those parents who believe that HPV vaccination may lead to increased promiscuity, that protection against STD is not relevant to their children.¹⁸ Additional studies on the disadvantages of desexualizing the vaccine, to what extent, and the method of how to desexualize the vaccine are needed. Vaccine providers play an essential role in influencing vaccine decision-making. They have the opportunity and responsibility to emphasize the vaccine prevention against cancers, and to refocus the utility of HPV vaccine to prevent diseases that may affect both males and females and deemphasize the perceived risk based on gender. Training for vaccine providers on how to communicate with parents about the sexual aspects when they bring it up is also needed. This study found that many vaccine providers in Shanghai believed that the vaccine should be given to teenage girls, however, most individuals getting vaccinated are in older ages. Most vaccine providers agreed that emphasizing the vaccine as a way to prevent cancer, and further developing communications that highlight cancers, including non-cervical cancers, could be one way to promote the vaccine among younger women.

Providers in our study recommend an early initiation age than what they perceived to be the most common age at vaccination. Studies of the prophylactic efficacy of the quadrivalent HPV vaccine indicated that the HPV vaccine should be given before sexual debut for maximum benefit.¹⁹ Although the legal marriage age in China is 20 years old, previous studies have shown that the average age of sexual debut of Chinese females was around 16 years old, and it had a downward trend.²⁰

Furthermore, the study also showed an increased trend of risky sexual behavior in young Chinese women, such as having more sexual partners, and having sex with partners who have multiple partners.²⁰ The combination of early sexual debut and risky sexual behavior increases the probability of HPV infection and cervical cancer. Thus, the initiation of HPV vaccination at earlier ages should be considered in China. Additional studies on policies, social acceptance, and delivery strategies are needed to determine the best way to promote the HPV vaccine.

Strengths and Limitations

This is one of the first studies explored the attitudes of vaccine providers about HPV and HPV vaccine and used a sample of providers from nearly all districts of Shanghai. However, there are limitations. Only 3 providers were selected from each clinic, the small sample size may decrease the power of the study. The questionnaire was designed for this study and has not yet been validated. We could not draw causal conclusion from our findings due to the nature of the cross-sectional study.

Conclusion

Our study indicated that overall providers were positive about the HPV vaccine. Differences in attitudes how to promote the HPV vaccine and discuss HPV—in emphasizing it as a sexually transmitted infection versus as a cancer-causing infection—could lead to different communication strategies when talking with parents and adolescents about the HPV vaccine. This could in turn affect HPV uptake in the population. Education on HPV and the HPV vaccine, and training about best communication strategies for vaccine providers with parents will need to be developed.

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Author Contributions

MJ wrote the first draft and did the data analysis. HZ, JR, and SD supervised data collection and revised the manuscript for important content. ALW conceived of the study design and revised the manuscript for important content. All authors agreed to the publication of the article.

Declaration of Conflicting Interests

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