

Attitude and hesitancy of human papillomavirus vaccine among Saudi parents

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ABSTRACT

Background: Human papillomavirus (HPV) is closely associated with cervical cancer. The HPV vaccine is expected to protect against two-thirds of cervical cancer cases in Saudi Arabia. **Objectives:** To determine the awareness and attitude regarding the HPV vaccine among Saudi parents attending family medicine clinics in Riyadh. **Materials and Methods:** All Saudi parents of patients of Family Medicine Pediatric Clinics, King Faisal Specialist Hospital and Research Centre (KFSH&RC), Riyadh, were invited to participate in this study between November 2019 and May 2020. A culturally sensitive and specially designed questionnaire was administered using an interview-based model. The data collected included sociodemographic information, knowledge of HPV and its vaccine, and attitudes regarding HPV acceptance. **Results:** A total of 296 study participants completed our questionnaire on the HPV vaccine. About 70.6% of the participants were not aware of the HPV vaccine and the majority of them either did not know or did not associate HPV as an etiology for cervical cancer (38.8 and 37.8%, respectively). Only 28.6% of the participants were aware that cervical cancer can be prevented by a vaccine and 89.5% of the study participants did not receive the HPV vaccine for themselves or their children. The employee status was significantly associated with a history of receiving the HPV vaccine ($X^2(2) = 10.607, P = 0.005$), while age and the level of education had a statistically significant relationship with planning on having the HPV vaccine ($X^2(9) = 51.841, P < .001$) and ($X^2(12) = 23.977, P = 0.02$), respectively). The level of awareness of the HPV vaccine was significantly associated with a history of having the HPV vaccine; ($X^2(1) = 38.486, P < .001$) as well as with planning on having the HPV vaccine ($X^2(1) = 38.486, P < .001$). Moreover, the reasons for hesitancy were a statistically significant factor for unvaccinated respondents who were not planning to have the HPV vaccine ($X^2(21) = 97.689, P < .001$) while it was not significantly associated with the unvaccinated respondents who were planning to have the HPV vaccine ($X^2(9) = 6.989, P = .63$). **Conclusion:** Our study clearly demonstrated a poor level of awareness and attitude toward the HPV vaccine among Saudi parents. A higher level of awareness of the HPV vaccine was significantly associated with planning on having the vaccine. There is a need for effective awareness programs for better HPV-related education in order to increase the acceptance of the HPV vaccine among Saudi parents.

Keywords: HPV, prevalence, Saudi Arabia, vaccine hesitancy

Introduction

The human papilloma virus (HPV) is a group of viruses with over 200 serotypes. HPV infection is the most common sexually transmitted infection and skin-to-skin contact is sufficient for viral transmission.^[1] HPV types 16 and 18 are considered high risk and responsible for more than 70% of all cervical cancers in females and genital and oropharyngeal cancers in both males and females. Serotypes 6 and 11 are known to cause 90% of genital

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warts. The worldwide prevalence of HPV infection in cervical cancer is between 85 and 95%.^[2] According to Global Cancer Incidence, Mortality and Prevalence (GLOBOCAN) 2020 statistics, cervical cancer is the fourth leading cause of cancer among females, with an estimated 6,04,000 new cases and 3,42,000 deaths in 2020.^[3] As per the Saudi Cancer registry report, cervical cancer ranks as the 11th most frequent cancer and the 9th most frequent cancer among women of 15–44 years of age.^[4]

HPV vaccines are proven to prevent infection and reduce the incidence of cervical cancer in females and anogenital cancers in both genders. The vaccination against high-risk HPV subtypes is safe and effective and is recommended routinely for females and males starting at age 11 or 12 years.^[5,6] The bivalent HPV vaccine (Cervarix) targets subtypes 16 and 18. The quadrivalent vaccine (Gardasil) extends this coverage by additionally targeting subtypes 6 and 11. The countries that have achieved high coverage with the HPV vaccine have seen dramatic reductions in genital warts and infection with HPV 16 and 18.^[7] A new 9-valent HPV vaccine was approved by the Food and Drug Administration (FDA) in December 2014 for females aged 9–26 and males aged 9–15. It includes five additional oncogenic HPV subtypes (31, 33, 45, 52, and 58), which cause an additional 15% of cervical cancer.

The Saudi FDA approved Gardasil and Cervarix in 2010 for females aged 11–26 years. However, the uptake of this vaccine remains very low due to several factors most notably lack of awareness of vaccine safety and efficacy and vaccine hesitancy. The World Health Organization (WHO) has defined vaccine hesitancy as a delay or refusal to accept the vaccination despite the availability of the services. It is influenced by factors such as complacency, convenience, and confidence.^[8] It varies based on the education level, socioeconomic status, and personal beliefs. Many studies have been done to evaluate the attitudes of the patients and healthcare providers regarding the HPV vaccine.^[9,10] However, parents and guardians play a key role in the receipt of vaccines in the younger population. Understanding these dynamics will help in developing strategies for effective communication with parents, thus, improving the vaccination rates in this vulnerable population.

To date, this is the first primary care-based study to evaluate the parental attitudes and understanding toward HPV vaccines and to measure the vaccine hesitancy in this group.

The primary objective of this study is to measure the prevalence of HPV vaccine hesitancy among Saudi parents. The secondary objective is to identify the reasons behind HPV vaccine hesitancy and the attitudes and barriers for the acceptance of the vaccine among Saudi parents.

Materials and Methods

All Saudi parents who came to the Family Medicine Department, KFSH&RC, were invited to participate in this study from November 2019 to May 2020, according to the

eligibility criteria. The criterion for inclusion was being Saudi parents. The exclusion criteria were non-Saudi nationality of the parents. A totally anonymous, culturally sensitive, and specially designed questionnaire was administered using an interview-based model. The questionnaire included questions related to the awareness of HPV infection, its link with cervical cancer, knowledge about the HPV vaccine and its ability to give protection against cervical cancer, and other HPV-related diseases. The questionnaire also included the sociodemographic data and the reasons for rejection or acceptance of the HPV vaccine.

This study was approved by the ethics committee at KFSH&RC. A study-specific verbal informed consent was obtained from each participant before enrollment in the study. The Institutional Review Board (IRB) exempted this study from written consent for less than minimal risk. The participants' consent was documented according to the IRB guidelines.

The questionnaire was distributed by the treating physicians in the Family Medicine Pediatric Clinics of KFSH&RC, Riyadh, Saudi Arabia. The participants answered coded questions. Anonymity and confidentiality were maintained. The study included 296 participants of varying ages and levels of education.

All data were analyzed using the software package SPSS version 20 by Body mass index (BMI). Descriptive statistics for the continuous variables were reported as mean \pm standard deviation (SD) while categorical variables were compared by the Chi-square test. The level of significance for all variables was set at 0.05. The participants were divided into groups based on different demographic variables (age, gender, employee status, education, social status). The Chi-square was performed to examine the demographic differences between the participants who received the HPV vaccine and acceptance of the HPV vaccine.

Results

Demographics

During the summer of 2019, 296 parents completed our questionnaire on the HPV vaccine. All participants were Saudi nationals, and of those, 80.7% were mothers while 18.3% were fathers. The majority of the parents were relatively young: 39% aged between 20 and 30 years old and 46% aged between 31 and 40 years old. About 70% of the participants had higher education (Bachelor's degree and above), 90% of them were married, while only 59.2% of them were employees and dependents at KFSH&RC at the time of conducting our study [Table 1].

Awareness of the HPV vaccine

Out of the 296 study participants, 91.9% were up to date with vaccinations for themselves and their children. However, 70.6% of the participants were not aware and had never heard about the HPV vaccine. Of those who were aware of the HPV

Table 1: Sociodemographic of the study participants

	Percentage of variables (n=296)
Relationship to child	
Mother	238 (80.7%)
Father	54 (18.3%)
Other	3 (1%)
Age	
20-30 years	115 (39.4%)
31-40 years	137 (46.9%)
41-50 years	34 (11.6%)
Above 50 years	6 (2.1%)
Gender	
Male	53 (18%)
Female	242 (82%)
Nationality	
Saudi	296 (100%)
Non-Saudi	0 (0%)
Level of education	
Primary	8 (2.7%)
Intermediate	3 (1%)
Secondary	34 (11.5%)
Higher Education	250 (84.8%)
Employee status	
Employee	149 (51%)
Dependent	24 (8.2%)
Other	119 (40.8%)
Social status	
Married	290 (98.6%)
Divorced	2 (0.7%)
Widowed	2 (0.7%)

vaccine, information from the medical staff accounted for 49% as the source of information [Figure 1]. Only 23.5% of the participants were aware of the association between HPV and cervical cancer, while the majority of them either did not know or did not associate HPV as an etiology for cervical cancer (38.8 and 37.8%, respectively, Figure 2). Moreover, only 28.6% of the participants were aware that cervical cancer can be prevented by a vaccine [Figure 3].

Attitude toward the HPV vaccine

About 89.5% of the study participants did not receive the HPV vaccine for themselves or their children. Of those who received the vaccine, 36.7% had it once, 30% had it twice, and 33.3% had it thrice. Among the participants who did not receive the vaccine, only 44% indicated that they were planning to have the vaccine (for themselves or their children). On the other hand, for the participants who indicated that they were not planning or did not know if they will have the vaccine, the most common reason for not doing so was that “they didn’t hear about it before” (68.1%, Figure 4). For the participants who indicated planning for the HPV vaccination, the most common reasons in doing so were the “Belief that vaccine is safe” and “Doctor recommendation” (65.8 and 26.8%, respectively, Figure 5). About 26.6% of the participants indicated that they may have the HPV vaccine in the future but not at present and the median number

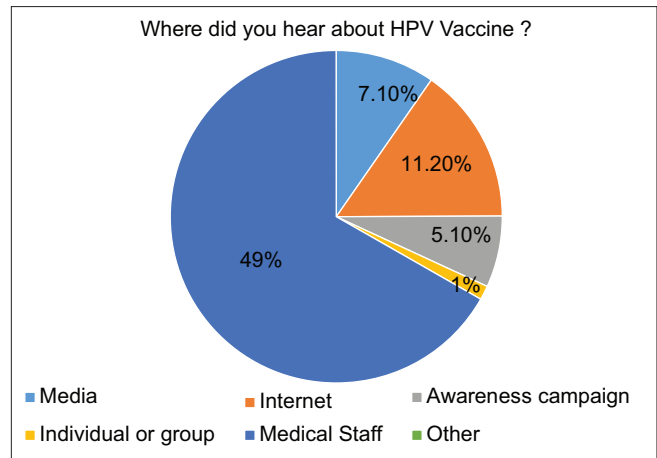


Figure 1: Source of information about the HPV vaccine

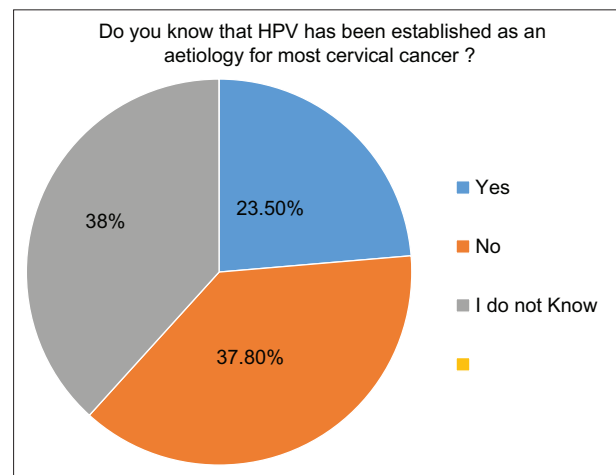


Figure 2: Awareness about HPV as an etiology for cervical cancer

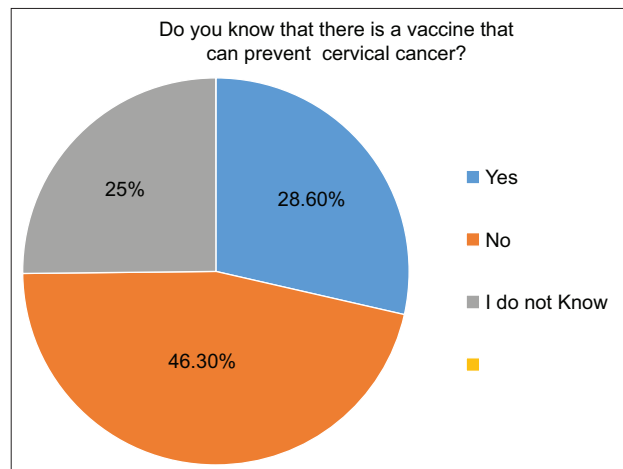


Figure 3: Awareness about the HPV vaccine in preventing cervical cancer

of years for having the vaccine among those respondents was 15 years. Finally, 79.6% of the study participants gave a positive response in trusting information given by the Saudi Ministry of Health.

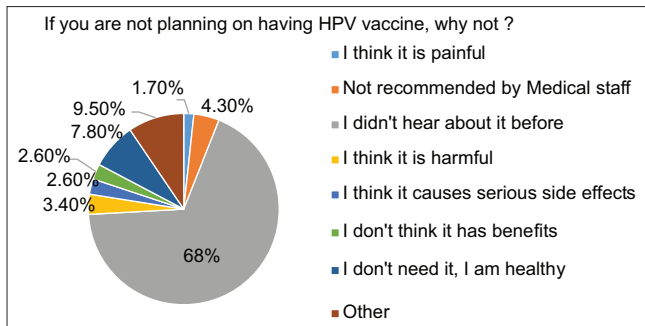


Figure 4: Reasons for not planning on having the HPV vaccine (hesitancy)

Relationship between the history of receiving the HPV vaccine and demographics

The employee status was significantly associated with a history of receiving the HPV vaccine ($X^2 (2) = 10.607, P = 0.005$) and the employees were more likely to have had a history of receiving the HPV vaccine for themselves or their children. Otherwise, no statistically significant association between the demographics (relationship to child, age, gender, level of education, and social status) and history of receiving the HPV vaccine was found [Figure 6].

Relationship between planning to have the HPV vaccine and demographics

Only age and level of education had a statistically significant relationship with planning on having the HPV vaccine ($X^2 (9) = 51.841, P < .001$) and ($X^2 (12) = 23.977, P = 0.02$), respectively). Respondents aged 31–40 and the participants with a higher education level (Bachelor's degree) were more likely to plan on having the HPV vaccine [Figure 7 and 8].

Relationship between the history of receiving the HPV vaccine and awareness

The level of awareness of the HPV vaccine was significantly associated with a history of having the HPV vaccine. Those who have heard about the HPV vaccine were more likely to have a history of receiving the HPV vaccine, while the majority of the respondents who did not have a history of the HPV vaccine had not heard about it ($X^2 (1) = 38.486, P < .001$).

The respondents who did not receive the HPV in the past were more likely to not have been aware that the HPV vaccine can prevent cervical cancer. While the majority of the respondents who had a history of receiving the HPV vaccine were aware that the HPV vaccine can prevent cervical cancer ($X^2 (2) = 51.939, P < .001$).

The respondents who did not receive HPV in the past were more likely to not have known or believed that HPV is an etiology for cervical cancer while the majority of the respondents who had a history of receiving the HPV vaccine were aware of the etiology between HPV and cervical cancer ($X^2 (2) = 50.436, P < .001$).

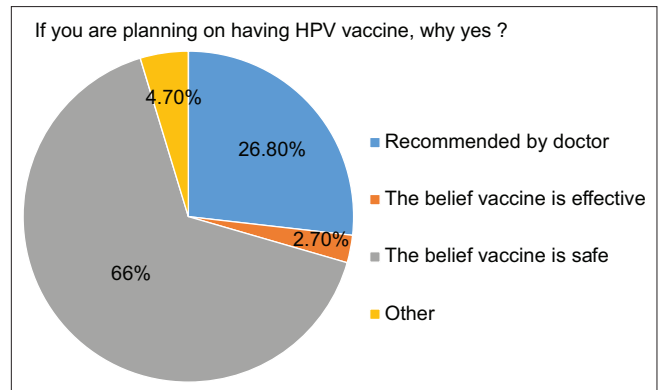


Figure 5: Reasons for planning on having the HPV vaccine (acceptance)

The history of receiving the HPV vaccine did not have a statistically significant association with being up to date with vaccination nor with the source of information on the HPV vaccine ($X^2 (2) = 0.908, P = 0.63$) and ($X^2 (5) = 8.805, P = .117$), respectively).

Relationship between the history of receiving the HPV vaccine and the number of vaccines

No statistically significant relationship was found between the history of having the HPV vaccine and the number of HPV received ($X^2 (2) = 2.414, P = 0.299$).

Relationship between planning to have the HPV vaccine and awareness

The level of awareness of the HPV vaccine was significantly associated with planning on having the HPV vaccine. The majority of the respondents who were not planning on having the HPV vaccine had not heard about it ($X^2 (1) = 38.486, P < .001$). Also, they were more likely to not have known or believed that HPV is an etiology for cervical cancer ($X^2 (6) = 93.670, P < .001$).

The respondents who were not planning to receive the HPV vaccine were more likely to not have been aware that the HPV vaccine can prevent cervical cancer while the majority of the respondents who were planning on receiving the HPV vaccine were aware that the HPV vaccine can prevent cervical cancer ($X^2 (6) = 45.909, P < .001$).

The attitude of planning on having the HPV vaccine did not have a statistically significant association with being up to date with vaccination nor with the source of information on the HPV vaccine ($X^2 (6) = 9.132, P = 0.166$) and ($X^2 (15) = 7.340, P = 0.948$), respectively).

Relationship between planning to have the HPV vaccine and the reasons for hesitancy

The reasons for hesitancy were a statistically significant factor for unvaccinated respondents who were not planning to have the HPV vaccine ($X^2 (21) = 97.689, P < .001$) while it was not

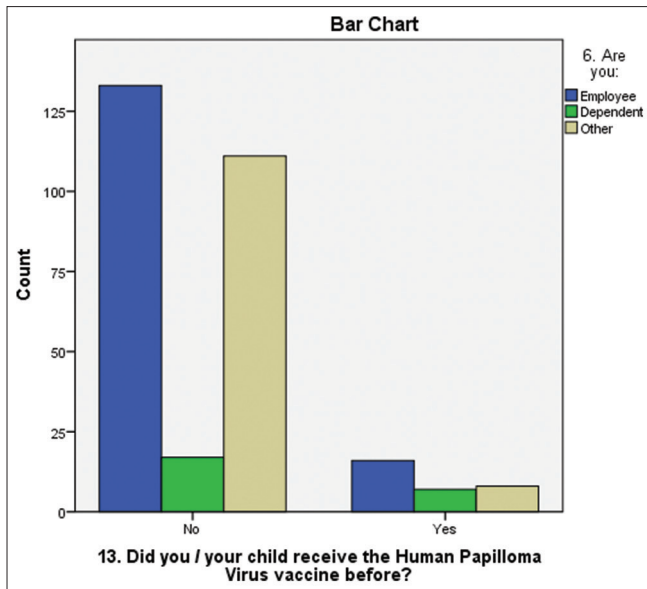


Figure 6: Relationship between a history of having the HPV vaccine and employment status

significantly associated with unvaccinated respondents who were planning to have the HPV vaccine ($X^2 (9) = 6.989, P = 0.63$). The most common reason for hesitancy for unvaccinated respondents who were not planning to have the HPV vaccine was that they “didn’t hear about it before”. On the other hand, the most common reasons for unvaccinated respondents who planned on having the HPV vaccine were “Belief that the vaccine is safe” and “Doctor’s recommendation” [Figures. 4 and 5].

Relationship between the history of receiving the HPV vaccine and planning to have the HPV vaccine with trust in the Saudi Ministry of Health (MOH) information

No statistically significant relationship was found between the attitude of receiving the HPV vaccine in the past and trust in the information given by the Saudi MOH ($X^2 (1) = 6.299, P = 0.12$). On the other hand, a statistically significant relationship was found between the attitude of planning on having the HPV vaccine and trust information given by the Saudi MOH ($X^2 (3) = 119.092, P < .001$). The majority of unvaccinated respondents who expressed planning on having HPV expressed trust in MOH. While the majority of those not trusting the information given by the MOH deferred having HPV at present [Figure 9].

Discussion

HPV is the most common sexually transmitted disease (STD).^[11,12] There are over 200 types of HPV viruses.^[9] Forty types of HPV are responsible for causing infection in the anogenital areas.^[9] HPV viruses are also responsible for common warts.^[13] It can spread from skin-to-skin contact.^[14] There is a strong association between HPV and cancers of the cervix, vagina, vulva, anus, and throat.^[15] The good news is that all of the scary talks about

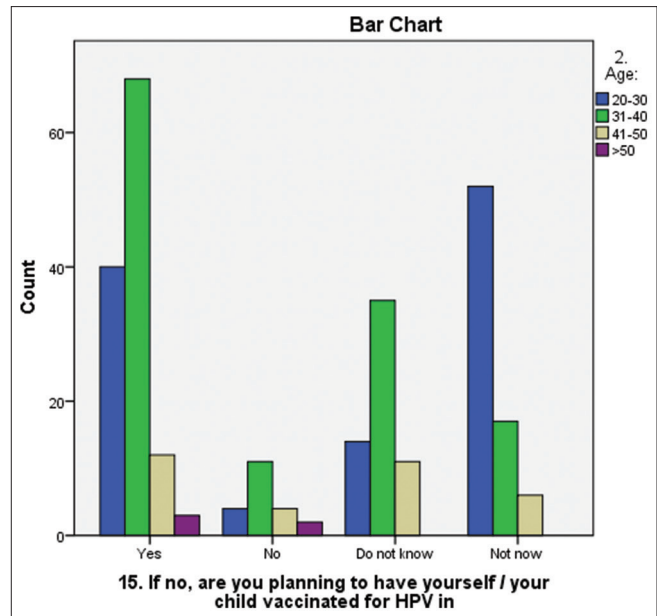


Figure 7: Relationship between planning to have the HPV vaccine and age

HPV and being a common cause of infections and cancers is that there are available vaccines to prevent them. It protects against nine types of HPV.^[6]

Cervical cancer is unique. It is different from other types of female genital tract cancers. It has different processes from ovarian and uterine cancers. All cervical cancers arise from an HPV infection with a higher risk form of HPV.^[16] So you would need HPV infection to, over time, develop cervical cancer.^[17] Using Pap smear testing improved early detection of precancerous lesions and decreased cervical cancer rates over the past 50 years.^[18] It used to be the most common cancer in women, but now it is the fourth most common cancer in women.^[19] It is recommended to start doing Pap smears in female patients at the age of 21, and this is regardless of whether the female is sexually active or not. From age 25, it is recommended to start checking for HPV and continue doing that regularly until the age of 60.^[20]

Although there are over 200 types of HPV, many do not do anything. Some just cause warts. Common cancer-causing types are 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68, 69 and 82;^[21] 16 and 18 account for 70% of the cervical cancers and 90% of anal cancers;^[22,23] 31, 33, 45, 52, 58 account for an additional 20% of cervical cancers.^[24] Common non-cancer-causing types are 6, 11, 40, 42, 43, 44, 54, 61, 72 and 81;^[24] 6 and 11 account for 90% of the anogenital warts.^[25]

The good news is that there is a vaccine available. All vaccines usually comprise virus-like particles. In terms of the HPV vaccine, it is the L1 virus-like particle.^[23] The HPV vaccine was started in 2006.^[26] At that time, there were two types which were available—bivalent HPV vaccine which targets HPV types 16, 18 and quadrivalent HPV vaccine which targets HPV types

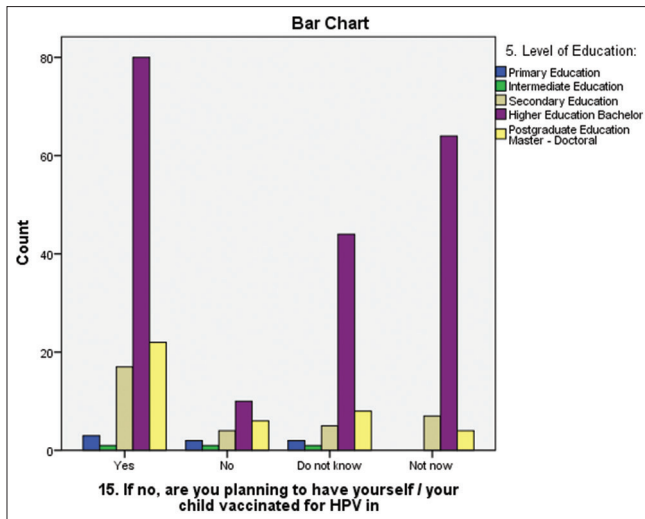


Figure 8: Relationship between planning to have the HPV vaccine and education level

6, 11, 16, and 18.^[22] More recently a third type of vaccine was introduced in the market which is a 9-valent vaccine against types 6, 11, 16, 18, 31, 33, 45, 52, and 58.^[27,28] This type is the only type given to children in pediatric clinics these days in the USA.^[29] These vaccines are designed to safely prevent the initial HPV infections and subsequently the HPV-associated diseases such as warts and cervical cancers.^[30-32] It is recommended that both males and females get vaccinated.^[11,33] In the male population, it does provide a direct benefit in reducing penile cancers, anal cancers, and throat cancers.^[27] The other reason for vaccinating males is because it does promote herd immunity.^[13] These vaccines prevent HPV infection, but they will not help you get rid of an HPV infection if it is already there.^[22] There are some vaccines and medications that are in the works that are being tested and researched to maybe help in getting rid of the HPV infection.

Among females, the recommendation is to give the HPV vaccine by age 11–12 years. It can be given to girls as young as 9 years of age. If you cannot give it to them at 11–12 years of age, there is a catch-up vaccination. It can be given from 13 to 26 years of age.^[11,16,26,33] We do not routinely recommend it beyond the age of 26 because there is a lower benefit. However, in certain situations, for example, in women who have never been sexually active, there may be a potential benefit for them getting the vaccine even after 26 years if there is a chance that they will be exposed to HPV in the future.^[34] You can give the vaccine to patients who want to get it even though they are older than 26. It is not going to harm them as long as they are not older than 45 years of age.^[34]

For the boys, we recommend vaccinating in the same age range—11–12 years. It can be given to boys as young as 9 years.^[11,33] Catch-up vaccination can also be done from the age of 13 to 21 years. It is recommended in males of 2–26 years if they have sex with men or are immunocompromised.^[11,33]

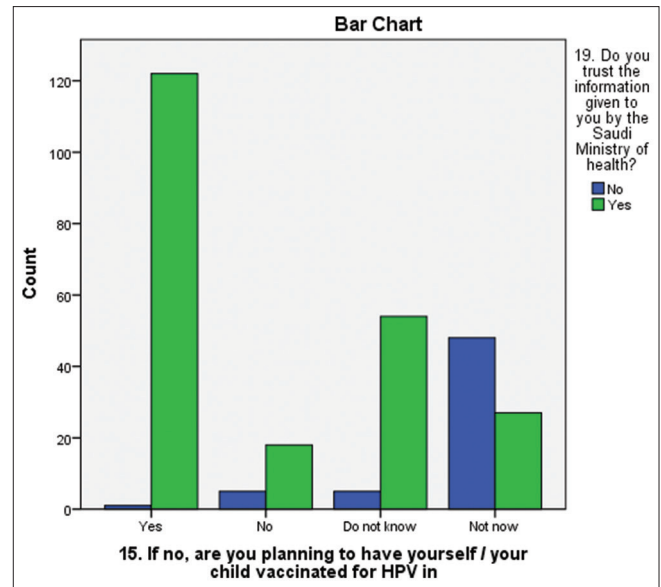


Figure 9: Relationship between planning to have the HPV vaccine and trust in the Saudi MOH

The HPV vaccine schedule for children younger than 15 years of age, both boys and girls, are recommended to get two doses.^[35] The first dose is at 0 months and the next dose at 6–12 months.^[35] It is recommended to get three doses for patients who are 15 years or older.^[36] The first dose at 0 months, the second dose at 1–2 months after, and the third dose 6 months after.^[36] For immunocompromised patients, it is recommended to get three doses regardless of age.^[36] The HPV vaccine can be given together with other age-appropriate vaccines as long as it is given at a different body site.^[37]

The vaccine has been around since 2006. There is substantial evidence that these vaccines are very effective in general use.^[33,38] There are data both on the levels of infections, prevention of genital warts, and prevention of cervical lesions.^[33,38] One study shows that in the younger age group, in which 50% are vaccinated, there was a 50% reduction in the prevalence of HPV 16 and 18 in the population.^[38] Another study shows that in under 18-year-olds, the rate of high-grade precancerous cervical lesions is declining rapidly since the start of vaccination.^[38,39] The vaccination rate among girls is only 50%. As mentioned, you can imagine that we can get this to go down even further by improving the vaccination rate. Since the vaccine has only been around since 2006, it is too early to see what the effects are in cervical cancer. It does take many years to develop cervical cancer, so that is something likely we will see further down the road.^[18]

Taking the HPV vaccine by teens is still an issue.^[26,40] The providers can do various things. The first thing is when they get their first dose, remind them that they need one or two additional doses to complete the series. The second thing is doing reminders and reminder calls. Reminders of any sort are going to be helpful to get a second and third dose in.^[26,27] Also, the providers can remember to use every visit that the adolescents

come in to immunize.^[25,26] The other thing is quick visits so that when they come in to get their second and third dose, they do not have to wait and have a complete visit. They can just come in for their vaccination. There is solid data that one of the most important things is a strong provider recommendation.^[26,27] Having a recommendation from a provider for any vaccination is one of the most important predictors of getting vaccinated.^[26,33] During a clinic visit, the most crucial thing providers should talk about with the patient and the parents is to convince them to take the HPV vaccine and that this is an anti-cancer vaccine, it is very effective, it is one of our most effective vaccines.^[26,40] It is recommended for both boys and girls at 11 or 12 years, and this is a great age to give the vaccine. We know that the immune response to the vaccination is excellent at this age, and it can be delivered before any potential exposure to the virus.^[26,40]

Despite the positive attitude of 54% of the parents in the present study toward HPV vaccination, only a minority (10.5%) had received the vaccine themselves or given it to their children. These findings were similar to what was reported by other investigators in the country.

Our study revealed a widespread lack of knowledge among parents concerning the HPV infection and vaccination with only 23.5% of the participants being aware of the association between HPV and cervical cancer, and only 28.6% being aware that cervical cancer can be prevented by the HPV vaccine.

Our participants' level of awareness was much lower than those from developed countries. The present study revealed that only 30% of the Saudi parents were aware of the HPV virus, and nearly, the same proportion was aware of the HPV vaccine.

Using various media platforms to educate the public about the vaccine's safety and efficacy will raise public awareness of the vaccine. More research is needed to improve the role of family physicians in increasing public acceptance of the HPV vaccine.

Conclusion

Our study clearly demonstrated a poor level of awareness and attitude toward the HPV vaccine among the study participants. The level of awareness of the HPV vaccine was significantly associated with planning on having the vaccine while reasons for hesitancy were a significant factor for unvaccinated participants not planning to have the HPV vaccine.

Family physicians can use the findings of this study in their efforts to increase the acceptance of the HPV vaccine in their practice. For example, the uptake of the HPV vaccine can be improved by improving awareness of the vaccine.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other

clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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