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Women's knowledge, perception, and intention concerning human papillomavirus vaccination: a survey in a public hospital in Hong Kong

Pui Woo Angela YAM, MBBS, MRCOG
Wan Yee HO, MBBS
Wai Hon LI, FHKAM(O&G), FHKCOG
Department of Obstetrics and Gynaecology, Queen Elizabeth Hospital, Hong Kong SAR, China

Objectives: This study aimed to explore the knowledge, perception, and intention concerning human papillomavirus (HPV) vaccination among women attending our hospital, and to identify factors influencing the decision to receive HPV vaccination.
Methods: This was a cross-sectional observational study. Women aged 16 to 45 years who attended gynaecology outpatient clinics at Queen Elizabeth Hospital between May and July 2024 were invited to participate. Participants were asked to complete a questionnaire about knowledge, perception, and intention concerning HPV vaccination.
Results: In total, 286 women (mean age, 35.9 years) were included in the analysis. Regarding knowledge on HPV infection, transmission, and vaccination, >80% of participants correctly answered at least 10 out of 12 questions. Regarding perceptions of HPV vaccine, participants, on average, agreed that "the HPV vaccine is safe" and that "the current HPV vaccine is capable of preventing the occurrence of cervical cancer". Regarding intention to receive HPV vaccination, 82 (28.7%) participants received vaccination, 24 (8.4%) were in the process of completing vaccination, and 180 (62.9%) did not receive vaccination. Of the latter, 105 (58.3%) had no intention to receive it mainly owing to worries about the vaccine's adverse effects and safety issues (54.3%) and insufficient knowledge about the vaccine (43.8%). Additionally, 86 (81.9%) would consider receiving vaccination if their gynaecologists recommended it. Of 39 participants with children, 30 (76.9%) would recommend their children to receive HPV vaccination. In multivariate analysis, independent factors associated with higher vaccination rate were higher education levels (odds ratio [OR]=2.007, p=0.025), higher household income (OR=1.451, p=0.021), better knowledge on HPV-related questions (OR=1.541, p<0.001), and the perception that the vaccines are safe (OR=2.168, p<0.001).
Conclusion: Despite adequate knowledge and favourable perception towards HPV vaccination, our participants have suboptimal vaccination uptake. Gynaecologists should be more proactive to educate women on vaccination.

Keywords: Human papillomavirus vaccine; Uterine cervical neoplasms

Introduction

In Hong Kong, cervical cancer is the seventh most common cancer among women[1], mostly caused by persistent human papillomavirus (HPV) infection. HPV vaccination can prevent cervical cancer by protecting against oncogenic-type HPV infections[2]. The efficacy and safety of the HPV vaccine have been well demonstrated[3,4]. Although the vaccine is most beneficial when administered at a younger age and before the start of sexual activity[5], it can still offer protective immunity across older age groups[6]. Women who have been infected with HPV but have cleared the infection can still achieve protection against the HPV types included in the vaccines[7].

Physicians play a significant role in one's vaccination decision[8,9]. This study aimed to explore the knowledge, perception, and intention concerning HPV vaccination among women attending our hospital, and to identify factors influencing the decision to receive HPV vaccination.

Methods

This was a cross-sectional observational study. Women aged 16 to 45 years who attended gynaecology outpatient clinics at Queen Elizabeth Hospital between May and July 2024 were invited to participate. Those who were mentally incapacitated or illiterate or had a history of abnormal cervical smears were excluded.

Participants were asked to complete a questionnaire about knowledge, perception, and intention concerning HPV vaccination. The knowledge section comprised

Correspondence to: Dr Pui Woo Angela YAM
Email: ayam@connect.hku.hk

12 statements; answers were either true or false. The perception section comprised two statements; responses were measured in a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The intention section comprised five questions; percentages of participants received, in the process of completing, or did not receive vaccination were recorded, as were reasons for not receiving vaccination. Other data collected included age, marital status, income, education level, number of sexual partners, and ethnicity.

Based on the total number of women aged 16 to 45 years attending our clinics in 3 months, which amounts to about 1000, a minimum sample size of 278 is needed to achieve a 95% confidence interval at a 5% margin of error. Comparisons of categorical or continuous variables were made using the Chi-squared test or Student's *t* test, respectively. Variables with a p value of <0.1 in the univariate analysis were entered in the multivariate analysis to identify independent factors influencing HPV vaccination. A p value of <0.05 was considered statistically significant. Statistical analyses were performed using SPSS (Windows version 26.0; IBM Corp, Armonk [NY], United States).

Results

In total, 286 women were included in the analysis (Table 1). There were no missing data because completeness of questionnaire responses was checked by staff before submission. The mean age of participants was 35.9±7.5 years; 56.3% were aged 36 to 45 years; 42.2% had at least one child; 72.4% reported being sexually active; and 43.5% of the latter never had cervical smear screening.

Regarding knowledge on HPV infection, transmission, and vaccination, >80% of participants correctly answered at least 10 out of 12 questions (Table 2).

Regarding perceptions of HPV vaccine, the mean score was 3.86 (95% confidence interval, 3.77-3.95) for the statement "the HPV vaccine is safe" and 3.76 (95% confidence interval, 3.68-3.84) for the statement "the current HPV vaccine is capable of preventing the occurrence of cervical cancer" (Table 2).

Regarding intention to receive HPV vaccination, 82 (28.7%) participants received vaccination, 24 (8.4%) were in the process of completing vaccination, and 180 (62.9%) did not receive vaccination (Table 2). Of the latter, 105 (58.3%) had no intention to receive it. Specifically, younger age groups (16-25 and 26-35 years) had higher intention to receive vaccination than the older age group (36-45 years) [44.8% vs 47.9% vs 29.2%, p=0.035]. Among the 105 participants with no intention to receive vaccination, 57 (54.3%) worried about the vaccine's adverse effects and safety issues; 46 (43.8%) reported having insufficient knowledge about the HPV vaccine; 30 (28.6%) considered the vaccine too expensive; and 86 (81.9%) would consider receiving vaccination if their gynaecologists recommended

Table 1. Characteristics of participants

Characteristics	No. (%) of participants (n=286)
Age group, y	
16-25	29 (10.1)
26-35	96 (33.6)
36-45	161 (56.3)
Education level	
Primary	5 (1.7)
Secondary	111 (38.8)
Tertiary	170 (59.4)
Household income, HK$	
<10 000	25 (8.7)
10 001-29 999	98 (34.3)
30 000-49 999	82 (28.7)
50 000	81 (28.3)
Ethnicity	
Chinese	263 (92.0)
Non-Chinese	23 (8.0)
Smoking	
Yes	9 (3.1)
No	277 (96.9)
Cervical smear screening	
Yes	117 (40.9)
No	90 (31.5)
Not applicable	79 (27.6)
No. of sexual partners	
0	79 (27.6)
1	116 (40.6)
2-4	70 (24.5)
5-10	20 (7.0)
>10	1 (0.3)
Children	
Yes	121 (42.3)
No	165 (57.7)

Table 2. Knowledge, perception, and intention concerning human papillomavirus (HPV) vaccination

Statement	No. (%) of participants with correct response (n=286)
Knowledge	
Women no longer need to undergo cervical cancer screening after receiving HPV vaccine (false)	268 (93.7)
Only women who have had more than one sexual partner need to receive HPV vaccine (false)	271 (94.8)
Cervical cancer may be caused by HPV infection (true)	252 (88.1)
Genital warts may be caused by HPV infection (true)	238 (83.2)
HPV vaccine can only be received after sexual contact (false)	264 (92.3)
Using condoms can eliminate the risk of HPV infection (false)	258 (90.2)
People must find a gynaecologist to receive the vaccine (false)	207 (72.4)
HPV vaccine is only suitable for women (false)	245 (85.7)
HPV vaccine requires two to three injections (true)	258 (90.2)
There is only one type of HPV vaccine available on the market (false)	245 (85.7)
People who are already infected with HPV can completely clear the virus by receiving the HPV vaccine (false)	263 (92.0)
The government currently provides two free doses of 9-valent HPV vaccine to all eligible girls from primary 5 to primary 6 through the Hong Kong Childhood Immunisation Programme (true)	212 (74.1)
Perception (measured using a five-point Likert scale from 1 [strongly disagree] to 5 [strongly agree])	**Mean±standard deviation (95% confidence interval)**
The HPV vaccine is safe	3.86±0.74 (3.77-3.95)
The current HPV vaccine is capable of preventing the occurrence of cervical cancer	3.76±0.67 (3.68-3.84)
Intention	**No. (%) of participants**
Have you received HPV vaccination?	82 (28.7)
If you have not yet received vaccination, will you consider receiving vaccination?	24 (8.4)
If the answer is no, what are the reasons for not taking the vaccination? (multiple answers allowed)	n=105
I am worried of adverse effects / safety profile	57 (54.3)
I am not sure about the effectiveness of HPV vaccines in prevention of cervical cancer	32 (30.5)
I do not have enough information about HPV vaccine	46 (43.8)
I think it is too expensive	30 (28.6)
I am not sure where to receive HPV vaccine	12 (11.4)
My partner/family members do not allow me to take it	1 (1.0)
Will you consider taking the vaccination if it is recommended by your gynaecologist?	86 (81.9)
Will you recommend the vaccines to your children? (if applicable)	39 (37.1)

it. Of 39 participants with children, 30 (76.9%) would recommend their children to receive HPV vaccination.

In multivariate analysis, independent factors associated with higher vaccination rate were higher education levels (odds ratio [OR]=2.007, p=0.025), higher household income (OR=1.451, p=0.021), better knowledge on HPV-related questions (OR=1.541, p<0.001), and the perception that the vaccines are safe (OR=2.168, p<0.001) [Table 3].

Discussion

Despite satisfactory knowledge on HPV vaccination and favourable perception towards receiving it, only 106 (37.1%) of our participants received or were in the process of completing HPV vaccination. Among the 180 unvaccinated

Table 3. Independent factors associated with human papillomavirus (HPV) vaccination

Variable	Univariate analysis		Multivariate analysis	
	Odds ratio (95% confidence interval)	p Value	Odds ratio (95% confidence interval)	p Value
Age group	0.613 (0.429-0.876)	0.007	0.780 (0.522-1.166)	0.226
Education level	2.680 (1.618-4.439)	<0.001	2.007 (1.090-3.693)	0.025
Household income	1.823 (1.390-2.391)	<0.001	1.451 (1.058-1.989)	0.021
Smoking status	0.845 (0.207-3.450)	0.814	-	-
Cervical smear screening	0.799 (0.491-1.299)	0.366	-	-
Chinese ethnicity	0.146 (0.033-0.634)	0.010	2.239 (0.441-11.365)	0.331
No. of lifetime sexual partners	1.089 (0.964-1.231)	0.172	-	-
Having children	1.120 (0.688-1.823)	0.647	-	-
Knowledge score	1.719 (1.397-2.117)	<0.001	1.541 (1.226-1.937)	<0.001
Perception				
The HPV vaccine is safe	1.858 (1.296-2.663)	<0.001	2.168 (1.436-3.274)	<0.001
The current HPV vaccine is capable of preventing the occurrence of cervical cancer	1.324 (0.916-1.914)	0.135	-	-

participants, 105 (58.3%) had no intention to receive vaccination mainly owing to worries about the vaccine's adverse effects and safety issues (54.3%) and insufficient knowledge about the vaccine (43.8%). Participants with positive perception towards the vaccine's adverse effects and safety were more likely to have been vaccinated.

Our participants showed satisfactory knowledge about HPV vaccination. In a 2008 study in Hong Kong, adolescents had limited knowledge of cervical cancer, and most never heard of HPV[10]. Similarly, in a 2008 study in Canada, women had a moderate understanding of HPV-related issues[11]. Better knowledge and awareness of HPV and cervical cancer is associated with higher vaccination uptake[11,12]. Common barriers to HPV vaccination include parents' lack of understanding, concerns about vaccine safety or efficacy, and vaccine costs[13]. The safety profile of HPV vaccine has been validated through extensive clinical trials, even among those with gynaecological disease or a history of sexual exposure[14]. Nonetheless, apprehension regarding severe adverse effects remains a concern[15-17]. Our participants had similar barriers to vaccination, except for vaccine costs. This suggests that factors beyond affordability play a significant role in vaccine hesitancy, although costs are a key factor influencing vaccine acceptance[18,19]. Vaccine hesitancy may stem from many aspects including, but not limited to, religious beliefs, societal norms, and psychological constructs[20]. To gain an insight into these concerns, focus group interviews could yield a more thorough understanding of the cultural and psychological factors[21,22]. Findings may help healthcare practitioners to understand specific misconceptions for targeted counselling.

More than 25% of participants wrongly believed that only gynaecologists could give HPV vaccination. This lack of knowledge about vaccine access and availability may deter vaccination uptake[11,23]. Therefore, public health campaigns and education should emphasise the availability of HPV vaccination in the primary care settings.

Physicians have a significant role in influencing one's vaccine acceptance and uptake[8,9]. Gynaecologists should consider providing education on HPV vaccines to all women during consultation. Although this may be difficult, it may be appropriate for women with an abnormal cervical smear. Additionally, gynaecologists should promote cervical screening, which is essential in cervical cancer prevention and early detection. Of sexually active participants, 43.5% did not have regular cervical screening. Therefore, education about cervical screening should be provided. The HPV vaccine is safe and effective, even for women with abnormal cervical screening and other gynaecological conditions[24]. Practitioners must be knowledgeable and positive towards the HPV vaccine. Healthcare providers are often inconsistent in recommending HPV vaccination[25]. In Hong Kong, many healthcare workers including doctors and nurses did not view the HPV vaccine favourably[26].

There are limitations to the present study. It was conducted in a single public hospital using convenience sampling, which may introduce selection bias and limit the generalisability of the findings to private hospital settings that have different sociodemographic backgrounds or to the entire Hong Kong population, although the public healthcare system caters for 90% of the population. Women with abnormal cervical screening results were excluded. Cervical cancer prevention should not be limited to HPV vaccination. The rate of cervical cancer screening of our participants was lower than that recommended by the World Health Organization for cervical cancer elimination. Education on cervical cancer prevention is more appropriately provided at the community level rather than in gynaecology clinics during consultations. HPV vaccination is not contraindicated for women with gynaecological illnesses or abnormal cervical cancer screening.

Conclusion

Despite adequate knowledge and favourable perception towards HPV vaccination, our participants have suboptimal vaccination uptake. Gynaecologists should be more proactive to educate women on vaccination.

Contributors

PWAY designed the study and analysed the data. PWAY and WYH acquired the data. PWAY and WYH drafted the manuscript. All authors critically revised the manuscript for important intellectual content. All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

All authors have disclosed no conflicts of interest.

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Data availability

All data generated or analysed during the present study are available from the corresponding author upon reasonable request.

Ethics approval

This study was approved by the Central Institutional Review Board, Hospital Authority (reference: PAED-2024-026). The patients were treated in accordance with the tenets of the Declaration of Helsinki. The patients provided written informed consent for all treatments and procedures and for publication.

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