



The relationship between knowledge, attitude and acceptance of Human Papilloma Virus (HPV) vaccination for cervical cancer prevention among students at Bushehr University of Medical Sciences, Iran

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Abstract

Background: Human Papilloma Virus (HPV) is the causative agent of cervical cancer. Vaccination against HPV is an effective strategy against cervical cancer. This study aimed to assess the acceptance of HPV vaccination for cervical cancer prevention and its relationship with knowledge and attitude about HPV vaccination among students.

Methods: This cross-sectional study was carried out on 360 female students at Bushehr University of Medical Sciences in 2018. Students were recruited using proportional stratified random sampling method. Data was gathered using a questionnaire about knowledge, attitude and effective factors of HPV vaccine acceptance. Descriptive analysis, chi-square, independent sample t-test, and logistic regression were used to analyze the data in SPSS-16.0 (SPSS Inc., Chicago, IL, USA). The significance level was set at $P < 0.05$.

Results: 56.4% of students had poor knowledge while 54.1% were willing to accept HPV vaccination as well as 43% who had positive attitude towards HPV vaccination. Paramedical students were 96% more likely to accept the HPV vaccination compared to health sciences faculty students (OR= 1.96; 95% CI= 1.04-3.68; $p=0.036$). Also, for each unit increase in the HPV knowledge score, students were 15% more likely to accept the vaccine (OR= 1.15; 95% CI= 1.07-1.24; $p < 0.001$). Moreover, for each unit increase in attitude score, students were 16%

more likely willing to accept HPV vaccine (OR= 1.16; 95% CI=1.08 -1.28; p =0.002).

Conclusions: It is necessary to implement on HPV vaccination for students. Inclusion of HPV vaccine in the National Program on Immunization would also be an effective strategy for improving HPV vaccination.

Keywords: Knowledge, Attitude, Acceptance, Papillomaviridae, Vaccination, Students, Uterine Cervical Neoplasms

Introduction

Cervical cancer is the second most common cancer in women living in less developed regions with an estimated 445000 new cases in 2012 (84% of the new cases worldwide). According to World Health Organization report in 2012, approximately 270000 women died from cervical cancer; more than 85% of these deaths occurring in low- and middle-income countries (1).

Human papillomavirus (HPV) is a group of viruses that are extremely common worldwide (2). There are more than 100 types of HPV, of which at least 13 are cancer-causing and known as high risk type. Most infections are asymptomatic and usually clear up without any intervention within a few months, and about 90% clear within two years (1,2). There has been definitive evidence to show that 70-80% cases of cervical cancers are due to persistent infection by two high-risk types of the sexually transmitted Human Papilloma Virus types 16 and 18 (2-4).

HPV is mainly transmitted through sexual contact and most people are infected with HPV shortly after the onset of sexual activity. Cervical cancer is caused by sexually acquired infection with certain types of HPV. There is also evidence linking HPV with cancers of anus, vulva, vagina and penis. Clinical trial results show that HPV vaccines are safe and very effective in preventing infection with HPV 16 and 18. Vaccines against HPV 16 and 18 have been approved for use in many countries (1, 2).

Iran has a female population of 30.13 million aged 15 and older who are at risk of developing cervical cancer (5). In the recent years, the prevalence of high risk HPV infection among Iranian women has been increased (6, 7). HPV vaccines that prevent HPV 16 and 18 infections are now available in Iran and have the potential to reduce the incidence of cervical and other anogenital cancers (5). Factors which influence successful HPV vaccine immunization program, are lack of HPV awareness, lack of provided recommendation, HPV vaccination concerns, lack of access in low- and middle-income countries and practice-level barriers (8-12).

Students of medical sciences programs, as future health care professionals will play a pivotal role in creating public awareness about cervical cancer and HPV vaccination (13).

The success of prevention and taking control of cervical cancer greatly depends on the level of knowledge and awareness about different aspects of both the disease and the vaccine (14, 15). Several factors influencing on HPV vaccination include societal, religious, and socioeconomic status, prejudice ideas, and level of awareness, knowledge and attitude towards cervical cancer and HPV vaccine (14). Studies have shown that the level of awareness and knowledge about cervical cancer and HPV among young female students has been poor (16-18) which may be due to social stigma, ignorance and un exposure to audio-visual or print media (19,20). Hence, it is

important to assess students' knowledge in order to develop educational and awareness programs and to increase their knowledge and improve their attitude(14).

This study aimed to assess the acceptance of HPV vaccine for cervical cancer prevention and its relationship with knowledge and attitude among students at Bushehr University of Medical Sciences, southwest Iran. The study will help health policy makers in assessing the needs for awareness programs among young female students about this important public health issue.

Methods

A cross-sectional study was carried out on 360 eligible female students recruit from five faculties at Bushehr University of Medical Sciences (BUMS) in 2018. The inclusion criteria was studying at BUMS and willingness to participate in the study. The exclusion criterion was non-completion of the questionnaires.

The sample size was calculated using a single proportion formula. Based on a previous study performed in the north of Iran, the proportion of proper knowledge and positive attitude towards HPV vaccination was 5% and 25%, respectively (21). Calculating the precision of 0.05 with 95% confidence interval, the sample size was calculated 73 and 288. Considering the non-response rate of 20%, the final sample size was 360.

$$n_o = \frac{Z^2 pq}{e^2}$$

There are five faculties in BUMS; medical, dentistry, nursing and midwifery, health and nutrition, and paramedical faculty in BUMS. A list of female students was obtained from the office of education of each faculty. Proportionate stratified random sampling was conducted considering the total female students at each faculty.

The data were collected using a validated, reliable and self-administered questionnaire which was consisted of five; socio-demographic data, knowledge about and attitude toward HPV infection and vaccination, willingness to accept HPV vaccine, and source of information about HPV vaccines. Socio-demographic data consisted of 8 questions regarding age, marital status, educational degree, number of semesters, and field of the study. The HPV knowledge scale was developed and modified based on Centers for Disease Control and Prevention (CDC) guideline and previous studies (21-23). Salehifar et al. (2015) confirmed that the Persian version of the scale has an acceptable level of validity and reliability. The content validity of the scale was approved by 12 experts, including specialist in reproductive health and gynecology, virologist, nursing, immunology and nutritionist. The reliability measure using Cronbach's Alph was 0.83 (21). The HPV knowledge was measured by a composite score of 14 items. The respondents were given one point for answering correctly and no points for answering wrong or when they did not know the answer. The respondents who answered ≤ 5 questions correctly were categorized as the group having low knowledge about HPV. The respondents who answered 6-10 of the questions correctly were categorized as the group having a moderate knowledge of HPV and those who answered >10 of the questions correctly were categorized as the group having a good knowledge of HPV. The total score for knowledge items ranged from (0 - 14)(21).

Attitudes and beliefs towards HPV vaccination were measured with a composite score of 5 items using a five-point Likert scale: one for strongly disagree to five for fully agree. Participants' attitudes towards HPV vaccine were measured by five items adopted by a previous study (24). The total score for attitude towards HPV ranged from 5 to 25. Respondents' attitude towards

HPV infection and vaccine were categorized as follows: negative if they obtained less than %50, neutral for %50–75, and positive for more than %75 of the total attitude score (21). The content validity of the attitude scale was approved by Salehifar et al. (2015) in Iran. The reliability measure using Cronbach's Alpha was 0.65 (21). The attitude towards HPV vaccine included: concern to encourage early or risky sexual behavior, concern about the safety of HPV vaccine, concern about the efficacy of HPV vaccine, moral and religious concerns regarding the HPV vaccine, and concern about the cost of the vaccine.

Acceptability of HPV vaccine consisted of one question with two options either "Yes" or "No". If the respondents answered "No", they would be asked an extra question regarding the most important obstacles to taking HPV vaccine. The last question was related to the sources of information that the students had obtained regarding HPV infection and vaccines.

The content validity of the questionnaire was established by a panel of women's health experts, including a community health expert and two midwives. Pretesting of the questionnaire was carried out among 30 students who did not participate in the study to ensure that the respondents have understood the items and also to measure the reliability (internal consistency) of the scales in the questionnaire. The internal consistency of the knowledge questions was a Cronbach's alpha=0.74 and for belief questions was a Cronbach's alpha=0.71.

Data was analyzed in SPSS version 16.0 (SPSS Inc., Chicago, IL, USA) using chi-square test to determine associations among categorical variables. Independent sample t-test was used to compare the means of the two groups of a quantitative variables. The variables that were significant in the bivariate analysis were re-examined in the multivariate analysis. Binary logistic regression was conducted to identify significant predictors after controlling other variables. The significance level was set at $P < 0.05$.

The Ethics Committee of BUMS approved the Study with the reference number of IR.BPUMS.REC.1395.172. Written Informed consent was obtained from all female students, who agreed to participate in the study, prior to their involvement in the research. The respondents had assured the confidentiality of their responses.

Results

The mean age of the respondents was 21.73 (SD=2.07) years. The majority of respondents were single (81.5%) and undergraduate (79.8%).

The mean knowledge score was 4.82 (SD=3.44). More than half (56.4%) of the subjects had poor knowledge, 37.8% had moderate knowledge and only 5.8% had a good knowledge of HPV infection and vaccination. (Table 1)

Table1. HPV knowledge, attitude, and acceptance of vaccination among students (n=360)

Variable	N (%)	Mean±SD
HPV knowledge		4.82±3.44
Poor	203 (56.4)	
Moderate	136 (37.7)	
Good	21 (6)	
Attitude about the HPV vaccine		15.67±3.90
Positive	155 (43)	
Neutral	92 (26)	
Negative	113 (31)	
Acceptance of HPV vaccine		
Yes	195 (54.1)	
No / Not Sure	165 (45.9)	

Regarding specific knowledge of HPV, 64% of respondents were aware of the viral etiology of cervical cancer. Fifty-eight percent of participants were not aware that the HPV vaccine does not protect women against all types of Sexually Transmitted Diseases (STD). Twenty-one percent of them were aware of the target population for HPV vaccination while the majority did not know. Further, 18.2% of respondents knew that the HPV vaccine does not treat existing HPV infection. The mean attitude score was 15.67 (SD=3.90). About (43%) of the participants had positive, 26% had neutral, and about one third (31%) had a negative attitude towards HPV vaccination (Table 1). About half of the respondents (50.2%) disagreed with HPV vaccination, because of moral or religious reasons. Seventy-three percent of participants had a neutral and negative attitude towards the safety of the HPV vaccine. Moreover, 74% of participants had a neutral and negative attitude towards the efficacy of HPV vaccine. Also, a majority of the participants (81.5%) were concerned about the cost of the HPV vaccine. Further, the majority disagreed with HPV vaccination, because of moral or religious reasons.

Of all the subjects, 54.1% were willing to accept HPV vaccination. The others were either unsure or unwilling (Table 1). The most important obstacle that deterred the subjects from receiving HPV vaccination was lack of enough knowledge (60.7%), followed by fear of complications (26.2%) and lack of awareness of vaccine availability (11.5%). The most frequent source of knowledge regarding HPV was medical courses and internet followed by health care staff.

Table 2 shows a clear association between the acceptability of the HPV vaccine and other background variables. There was significant difference between acceptance of HPV vaccine and age (P=0.047), term (P=0.019), degree (P=0.007), type of faculty (P=0.01) as well as knowledge (P=.001) and attitude (P<0.001) towards HPV vaccine. These observed associations in bivariate analysis were reassessed by multiple logistic regressions to identifying association with the probability of the acceptance of the HPV vaccine.

Table 2. Relationship between socio- demographic characteristic, knowledge, attitude and acceptability of HPV vaccine (n=360)

Variable	Acceptability of HPV vaccine			P value
	Yes	No/ Not sure	Total	
	N (%)	N (%)	N (%)	
Age	195 (54.1)	165 (45.9)	360 (100)	0.04
M ± SD	21.95±2.16	21.50±1.94		
Term of study	195 (54.1)	165 (45.9)	360 (100)	0.01
M ± SD	5.22±2.19	4.46 ± 2.22		
Marital Status				
Single	158 (53.9)	136 (46.1)	294 (81.5)	0.99
Married	36 (54)	30 (46)	66 (18.5)	
Degree				
Undergraduate	142 (50)	142 (50)	284 (79.8)	0.007
Postgraduate	49 (68.1)	23 (31.9)	76 (20.2)	
Faculty				
Medical	21 (77.3)	6 (22.7)	27 (7.5)	0.01
Dentistry	32(64.6)	18(35.4)	50(14)	
Health & Nutrition	40(41.5)	56(58.7)	96(26.7)	
Nursing & Midwifery	53(56.8)	41(43.2)	94(26)	
Paramedical	49(53.2)	44(46.8)	93(25.8)	
Knowledge about HPV vaccine				
Poor	92(45.4)	111(54.6)	203(56.4)	0.001
Moderate	90(66.2)	46(33.8)	136(37.7)	
Good	13(60)	8(40)	21(6)	
Attitude toward HPV vaccine				
Positive	107(68.9)	48(31.1)	155(43)	<0.001
Neutral	29(31.8)	63(68.2)	92 (26)	
Negative	59(51.9)	54(48.1)	113 (31)	

The full model containing all predictors was statistically significant, $\chi^2 (1, N=360) = 58.40$, $P < 0.001$, indicating that the model was able to distinguish between respondents who reported and did not report acceptance of HPV vaccine. The model as a whole explained the 35.6% (Nagelkerke R squared) of the variance in acceptance of HPV vaccine, and correctly classified 69.8% of cases. As can be seen from the table 3, variables such as type of faculty (OR=1.96; 95% CI=1.04-3.68; P=0.036), HPV knowledge (OR=1.15; 95% CI=1.07-1.24; P<0.001) and attitude vaccine (OR=1.16; 95% CI=1.08 -1.28; P=0.002) are significant predictors of accepting of HPV vaccine. Respondents who were from paramedical faculty were 96% more likely to report a willingness to get the HPV vaccine as compared to health sciences faculty. Also, for each unit increase in the HPV knowledge score, students were 15% more likely accepting the HPV vaccine. Moreover, for each unit increase in attitude score, students were 16% more likely accepting the HPV vaccine. (Table 3)

Table 3. Factors associated with acceptability of HPV vaccine among Female students

Variable	P value	OR	95% C.I. for OR	
			Lower	Upper
Age(continuous)	0.07	1.02	0.88	1.17
Term of study	0.53	1.04	0.91	1.19
Faculty				
Health & Nutrition		Ref		
Nursing & Midwifery	0.09	1.74	0.91	3.32
Paramedical	0.03*	1.96	1.04	3.68
Dentistry	0.48	1.59	0.43	5.94
Medical	0.34	2.14	0.44	10.36
Degree				
Undergraduate	0.35	1.77	0.52	5.90
Postgraduate		Ref		
Attitude (continuous)	0.01*	1.16	1.08	1.28
Knowledge (continuous)	<0.001*	1.15	1.07	1.24
Constant	0.95	1.08		

* Significant level at P< 0.05, Ref= reference, OR= odds ratio, CI= confidence interval

Discussion

In this study, the overall knowledge of students regarding HPV vaccine and infection was poor. This finding is consistent with previous studies among medical students in South Africa (25) and a study among female students of another medical university in north of Iran (21) , however their knowledge was lower than that observed in a recent study among medical students in Malaysia (26) and Nigeria (27). In the specific area of the knowledge, 63.6% of respondents were aware of the viral etiology of cervical cancer. This is less than the knowledge observed in previous studies among medical students in India (22, 28). In addition, more than half of the participants were not aware that the HPV vaccine does not protect women against all types of STD. Awareness regarding target population for HPV vaccination was very low. Only 21.4% of participants knew this, which was lower than Pandey's study among medical students in India (22). Further, a small proportion of students (18.2%) were aware that the HPV vaccine does not treat existing HPV infection. The inadequate knowledge among the students reflects a lack of relevant education about sexual issues which can compromise their awareness of personal risk of cervical cancer and HPV infection.

The current study showed that 54.1% of the participants accepted to receive HPV vaccines, which was lower than Kamini's study among male and female medical students in India (64%) (13), and a study of British young women whereas 91% of the subjects were willing to receive the vaccines (28). However, Gu reported that only 44% of the female undergraduate students in China were willing to be vaccinated in the future (29). The differences in the acceptability of HPV vaccines may be explained by subject variation, cultural differences and health beliefs.

In the present study, more than half of the participants had a neutral or negative attitude towards safety, efficacy, and cost of HPV vaccine. Also the majority disagrees with HPV vaccination, because of moral or religious reasons. Having a negative belief towards HPV vaccination may reflect lack of accurate knowledge regarding HPV infection and vaccination.

The most common reasons that deterred subjects from receiving HPV vaccination were lack of knowledge and health concern. While in Wang's study among undergraduate students in China, the major obstacle was concern about the safety of HPV vaccine (30). Moreover, in a study in southwest Nigeria, medical students reported inadequate information and high costs were the main obstacles to receiving vaccine and recommending it to others (27).

The most commonly cited source of information was a medical course which was consistent with Gu's study among female undergraduate students in china (29) and Adejuyigbe's study among medical students in southwest Nigeria (27). This shows that school teaching and medical education curriculum can play a significant role in spreading awareness. In contrast, in a study in Malaysia the main sources of information among medical students were TV and newspapers (26).

In this study, the influence of internet in students' daily life reflected in the results as the majority of the respondents considered that the internet is the second source of seeking information about HPV vaccines followed by health care staff. Hence, the role of the health care providers in health education and sharing information on vaccination is vital in promoting the HPV vaccination. A recent study by Jamadar (2018), among 2453 healthy and sexually active women who were referred for routine cervical cancer screening, showed that about 5% of the study population had an abnormal cervical cytology, of whom 34% were infected by high risk HPV (6). Although in recent years, the HPV vaccine has been introduced in Iran, it has not been included in the national immunization program and the cost of the vaccine is not covered by the insurance companies either (6 ,5).

Conclusion

Overall, knowledge level regarding HPV vaccination among the medical sciences students in southwest of Iran was low. Less than half of the respondents had positive attitude towards HPV vaccination. However, more than half of them were willing to get HPV vaccine.

As future health professionals, medical sciences students play a pivotal role in spreading awareness among a wide range of population. Considering that all participants were studied at medical sciences university and most of them have obtained information about HPV vaccine and cervical screening from medical courses at the university, it is predictable that the awareness level of HPV vaccination will be even lower in the general population. It is necessary to implement sexual health education programs on cervical cancer, HPV infection and HPV vaccination for both the public and the students. Inclusion of HPV vaccine in the National Program on Immunization would also be an effective strategy for improving HPV vaccination and access.

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