Asian Pacific Journal of Cancer Care
Vol 6 No 1 (2021), 41-46
Original Research

Knowledge, Awareness and Attitude of Medical Students Regarding HPV Infection and HPV Vaccination

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Background: Cervical cancer is the second commonest cancer among women in India and accounts for 6-29% of cancers among women in India. Human Papilloma Virus (HPV) is a causative agent of the disease. Recent advances in technology have led to introduction of vaccine to prevent HPV infection. The current study aims to assess the awareness among medical students about HPV infection as a causative factor for cervical cancer and their knowledge about HPV vaccination. Assessing the knowledge of vaccination among medical students helps us to understand the level of awareness regarding the same among future doctors.
Methods: A questionnaire based study was done on 150 MBBS students from 2nd and 3rd year of Vydehi Medical College, Bangalore,Karnataka, India. Questionnaire consisted of 16 questions of multiple choice type and results were analysed using percentages and chi square test. P value <0.05 was considered significant.
Results: Knowledge regarding HPV as a causative agent for cervical cancer was found in 67 (95.7%) of male students and 79 (98.8%) of female students with no statistically significant difference. Awareness about availability of HPV vaccine was seen in 66 (82.5%) females as compared to 50 (71.4%) males with a p value of 0.078, which was not statistically significant. Complete vaccination status was seen in 3 (4.3%) male students and 11 (13.8%) female students with a p value of 0.041 and this association was statistically significant. 1 (1.42%) male student and 1 (1.25%) female student received incomplete vaccination. 25 (35.7%) males and 74 (92.5%) females were willing to get vaccinated with HPV vaccine with p value 0.000, and the association was statistically significant.
Conclusion: There was good knowledge among medical students regarding cervical cancer and its prevention. But knowledge regarding HPV vaccine was poor among both males and females. Willingness to get vaccinated in male students was very less compared to female students.

Introduction

Cervical cancer is the second commonest cancer among women in India and Human Papilloma Virus (HPV) is an important causative agent of the disease [1]. Today we have vaccination available to prevent HPV infection. There is a need to study the awareness regarding HPV vaccination and take measures to improve the utilization of vaccination.

Cervical cancer accounts for 6-29% of cancers among women in India [2]. A total of 96,922 new cervical cancer cases are diagnosed annually in India [3]. There are 432.2 million women in India who are aged 15 years and above and are at a risk of developing cervical cancer [4].

Cervical cancer is responsible for 60,078 deaths annually in India [3]. It ranks as the 2nd leading cause of female cancer related deaths in India [1].

HPV viral infection spread by Human Papilloma Virus types 16 and 18 is implicated in 70% of cervical cancers, 90% of anal cancers and also in other genital cancers such as vulval cancer and

vaginal cancer. HPV is proven to cause head and neck cancers apart from cervical cancer [5].

In a study conducted among Iranian women in 2013-16, prevalence of HPV infection was found to be 29.3% [6]. In the same study, among the HPV positive subjects, high-risk and low-risk HPV subtypes were found 67.2% and 52.0%, respectively [6]. A study was conducted at rural Philippines in 2020 among the community which inferred that only 13.9% underwent cervical cancer screening [7]. In a study conducted among Thai women in 2020, 46% of the participants were found to have poor knowledge regarding HPV infection and HPV vaccination [8].

Recent advances in technology have led to introduction of HPV vaccine to prevent HPV infection, which will directly help in reducing the incidence of cervical, ano-genital cancers and genital warts.

Vaccination is also recommended for boys as it is also implicated in penile, ano-rectal and oral cancer. Males also have a role in transmission of HPV infection to females [9].

As the HPV vaccine is a recent introduction and is targeted towards 9-26 age group, the awareness about this vaccine in the general population appears to be less. 9-14 years is the ideal age for administering this vaccine because it provides maximum immunogenicity of the vaccine at that age [10].

In a study conducted in Mangalore among medical students, 78.35% students were aware about cervical cancer prevention; 82.47% were aware that cervical cancer is caused by virus; 74.22% were aware about the availability of the vaccine [11]. In a study conducted in Manipal among medical students, only 28.4% of male students were aware that there is a need for vaccination in men [12]. The HPV vaccine is a newer addition in the universal immunization schedule. Hence its awareness is less compared to other vaccines.

Assessing the knowledge of vaccination among medical students helps us to understand the level of awareness regarding the same among future doctors.

Knowledge about cervical cancer symptoms can help in early detection and treatment of cervical cancer. After finding out the vaccination status, it will guide us to conduct appropriate awareness programs and motivate the students to get vaccinated.

The present study was done with the following objectives:

1. To assess the awareness about HPV virus infection as causative factor for cervical cancer.

2. To assess the knowledge about availability of HPV vaccination.

3. To assess the attitude towards getting vaccinated.

4. To assess the vaccination status among the medical students surveyed.

Materials and Methods

A cross sectional study was conducted on students in second and third year MBBS in 2019-2020 at Vydehi Institute of Medical Sciences and Research Centre, Bangalore, Karnataka, India.

Inclusion criteria was students willing to participate in study, studying in 2^{nd} and 3^{rd} MBBS and aged between 18-25 years. Exclusion criteria was those who were not willing to participate in study.

A sample of 150 students (students of 2nd and 3rd MBBS) was chosen with a margin of error of 5%. Permission was obtained from the Institutional Ethical Committee to conduct the study. The subjects were explained about the nature of the study. After obtaining written informed consent, questionnaire was administered to 2nd and 3rd year MBBS students. Informed consent and questionnaire were administered separately to maintain anonymity. For collection of data, questionnaire was devised from cervical cancer awareness measure tool kit version 2.0 and was modified [13]. Questionnaire consisted of 16 questions out of which, 12 questions assessed knowledge, 2 questions assessed attitude and 2 questions assessed practice regarding HPV infection and HPV vaccinations. Questions were of multiple choice type of which, the participants were asked to choose single or multiple responses wherever applicable. Questions on attitude and practice were of yes or no type.

Knowledge was assessed using questions on risk factors, causative agent, screening methods of cervical cancer. In the question on risk factors, 4 correct risk factors were given and inference was made on the each risk factor chosen in percentage. Similarly, the question: common cancers among women in India; was assessed with 2 out of 4 correct answers in the options.

Questions on awareness of availability of vaccine, whether vaccine is given to boys; were used to assess knowledge regarding HPV vaccine with a yes or no type of answering. Question on right age group for vaccination had 1 out of 4 correct answers in the options.

Attitude was assessed based on willingness to get vaccinated and to recommend the vaccine to a female relative with a yes or no type of answering.

A correct response to each of the questions and each right answer in a multiple answer type was given 1 point. A wrong answer in each question was given 0 points.

Percentages based on right answers were calculated and compared for each question separately for both male and female students and also compared between 2nd and 3rd year students.

The response was noted and statistical analysis was done.

Statistical analysis

Data was entered on excel sheet and was analysed using Statistical Package for Social Sciences (SPSS) ver.21 software.

Data was analysed using percentages and chi-square tests and results were obtained. In chi square tests, p value< 0.05 was considered significant.

Results

A total of 150 medical students participated in the study. Among them, 70 (46.7%) were males and 80 (53.3%) were females. 68 (45.3%) students were studying in 2nd year whereas 82 (54.7%) were studying in 3rd year. The ages ranged from 19-23 years and most of them were 20 (38.7%) and 21 (36.7%) years old as shown in Table 1.

Demographic details		n (%)
Age (years)	19	18 (12%)
	20	58 (38.7%)
	21	55 (36.7%)
	22	16 (10.7%)

	23	3 (2%)
Sex	Male	70 (46.7%)
	Female	80 (53.3%)
Year of study	2nd year	68 (45.3%)
	3rd year	82 (54.7%)

Table 1: Demographic Details of the Participants.

Knowledge regarding cervical cancer

In a question about the most common cancers among women in India, 44 (29.3%) participants chose breast cancer, 68 (45.3%) participants chose cervical cancer and 32 (21.3%) chose both breast and cervical cancer as shown in Table 2.

Knowledge regarding cervical cancer and HPV vaccine	Male	Female	p value	2nd year	3rd year	p value
	n (%)	n (%)		n (%)	n (%)	
Most common cancers among women in India				-	-	-
Cervical cancer	29 (41.4%)	39 (48.8%)				
Both	10 (14.3%)	22 (27.5%)				
HPV as a causative agent*	67 (95.7%)	79 (98.8%)	0.261	66 (97.1%)	80 (97.6%)	0.616
Pap smear as a screening method*	63 (90%)	75 (93.8%)	0.293	58 (85.3%)	80 (97.6%)	0.006
Can be treated if detected early*	65 (92.9%)	73 (91.2%)	0.478	61 (89.7%)	77 (93.9%)	0.26
Availability of HPV vaccine**	50 (71.4%)	66 (82.5%)	0.078	42 (61.8%)	74 (90.2%)	0.000
Right age group**	50 (71.4%)	73 (91.2%)	0.002	54 (79.4%)	69 (84.1%)	0.295
Recommended to boys**	43 (61.4%)	54 (67.5%)	0.272	39 (57.4%)	58 (70.7%)	0.062
Screening required after vaccination**	62 (88.6%)	72 (90%)	0.491	59 (86.8%)	75 (91.5%)	0.253

Table 2: Knowledge Regarding Cervical Cancer and HPV Vaccine.

*knowledge regarding cervical cancer; **knowledge regarding HPV vaccine

More number of female students as compared to male students had knowledge about this and this association was statistically significant.

Knowledge regarding HPV virus as a causative agent for cervical cancer was found in 67 (95.7%) males and 79 (98.8%) females. Where as 66 (97.1%) from 2nd year and 80 (97.6%) from 3rd year knew that cervical cancer is caused by HPV virus as shown in Table 2.

Among male students, 17 (24.3%), 13 (18.6%), 53 (74.3%) and 41 (58.6%) of the students correctly identified risk factors for cervical cancer to be early marriage, early child birth, multiple sexual partners and infections respectively. Among female students, 20 (25%), 20 (25%), 59 (73.8%), 41 (51.3%) of students could correctly identify early marriage, early child birth, multiple sexual partners and infections respectively as the risk factors of cervical cancer.

A question was asked regarding the screening method for cervical cancer where 63 (90%) of males and 75 (93.8%) of the females chose Pap smear as the right screening method. With respect to the year of study, 79 (96.3%) from 3rd year as compared to 57 (83.8%) from 2nd year were aware of the right screening method and this association was statistically significant as shown in Table 2.

When asked whether cervical cancer can be treated if detected early,65 (92.9%) males and 73 (91.2%) females answered positively. 61(89.7%) from 2nd year and 77 (93.9%) from 3rd year answered positively as shown in Table 2.

Knowledge regarding HPV vaccine

66 (82.5%) females as compared to 50 (71.4%) males were aware about the availability of HPV vaccine for cervical cancer. 74 (90.2%) students from 3rd year as compared to 42 (61.8%) students from 2nd year knew about the availability of HPV vaccine and this association was statistically significant as shown in Table 2.

When asked about the right age group for vaccination, and 73 (91.2%) females as compared to 50 (71.4%) males gave the correct response and this association was statistically significant. The correct response regarding right age group for vaccination was chosen by 42 (61.8%) students from 2nd year 74 (90.2%) students from 3rd year as shown in Table 2.

Only 43 (61.4%) males knew that HPV vaccine can be given to boys whereas, 54 (67.5%) females were aware of this fact as shown in Table 2.

62 (88.6%) male students and 72 (90%) female students agreed that women who are already vaccinated need cervical cancer screening. 59 (86.8%) students from 2nd year and 75 (91.5%) students from 3rd year agreed to the same as shown in Table 2.

Among the participants, sources of knowledge and information on HPV vaccine was found in 122 (81.3%), 41 (27.3%), 17 (11.3%), 45 (30%), 64 (42.7%), 6 (4%) as medical school teachings, friends, newspaper, books, internet and television, respectively.

Practice regarding HPV vaccination

3 (4.3%) of the male students were fully vaccinated whereas, 11 (13.8%) females were fully vaccinated and this association was statistically significant. Apart from this, 1 (1.42%) male student and 1 (1.25%) female student was found to have taken partial course of vaccination as shown in Table 3.

Practice regarding HPV vaccination	Male n (%)	Female n (%)	p value	2nd year n (%)	3rd year n (%)	p value
Initiated vaccination	4 (5.7)	12 (15)	0.056	9 (13.2)	7 (8.5)	0.253
Completed vaccination	3 (4.3)	11 (13.8)	0.041	8 (11.8)	6 (7.3)	0.257

Table 3: Practice Regarding HPV Vaccination.

Attitude regarding HPV vaccination:

Among the participants, 74 (92.5%) female students as compared to 25 (35.7%) male students were willing to get vaccinated and this association was statistically significant. 47 (69.1%) students and 52 (63.4%) students from 2nd and 3rd year respectively were willing to get vaccinated as shown in Table 4.

Attitude regarding HPV vaccination	Male n (%)	Female n (%)	p value	2nd year n (%)	3rd year n (%)	p value
Willing to get vaccinated	25 (35.7)	74 (92.5)	0.000	47 (69.1)	52 (63.4)	0.288
Recommend vaccination to a female relative	64 (91.4)	73 (91.2)	0.601	65 (95.6)	72 (87.8)	0.079

Table 4: Attitude Regarding HPV Vaccination.

Among the participants, 64 (91.4%) males and 73 (91.2%) females were ready to recommend the vaccine to a female relative. With respect to the year of study, 65 (95.6%) students from 2nd year and 72 (87.8%) students from 3rd year would recommend the vaccine to a female relative as shown in Table 4.

Discussion

The aim of our study was to assess the awareness and acceptability of HPV vaccine among medical students. In this study which was conducted among 150 medical students, 70 were males and 80 were females.

According to our study, 67 (95.7%) males and 79 (98.8%) females were aware that HPV virus causes cervical cancer. To compare, in a study by Al-Darwish et al. [14] in Saudi Arabia among medical students, 45% of males and 53.2% females were able to identify HPV infection as the cause for cervical cancer. This shows that there is a huge difference in the knowledge regarding causative agent between the two studies with more students being aware in the present study.

In the current study, 66 (82.5%) females and 50 (71.4%) males were aware that HPV vaccine is available. A study conducted by Pandey et al. [12] at Manipal among medical students showed that 65.7% males and 83.1% females knew about the availability of HPV vaccine. An increased percentage of male students were aware in the current study when compared. In a study conducted by Borlu et al. [15] in Turkey among undergraduate university students, 160 (62.5%) of medical students were aware about the availability of HPV vaccine compared to 116 (66.5%) medical students in our study.

In the current study, awareness regarding vaccination advised to men was found to be in 43 (61.4%) males and 54 (67.5%) females. In a study conducted by Yam et al.

[16] in Hong Kong on 420 medical and non medical students, 84% of medical students agreed that vaccination was recommended to men when compared to 97 (64.7%) medical students in our study.

The current study shows that 25 (35.7%) males and 74 (92.5%) females were willing to get vaccinated. Also, 64 (91.4%) males and 73 (91.2%) females were willing to recommend the vaccine to a female relative. This indicates that there is lack of awareness among males regarding vaccination advised for men. This is also reflected in the fact that only 35.7% males were willing for vaccination for themselves compared to 91.4% males willing to advise vaccination to a female

relative. In a study conducted by Fu et al. [17] among medical students in Chong-qing, China, 57.2% males and 78.5% females were willing to receive or advise HPV vaccination.

In the present study, only 1 (1.42%) male student had received partial course of vaccination with 3 (4.3%) of the males having received complete vaccination. 11 (13.8%) females had received complete vaccination with 1 (1.25%) having received partial course of vaccination. In a study conducted by Berenson et al. [18] in U.S. among 231 medical students, 81 (66.4%) female students and 16 (14.7%) male students reported initiating the vaccine. Among all the participants in our study only 14 (9.3%) of the participants had received complete vaccination in comparison to 75 (35.2%) students with complete vaccination status according to a study conducted by Afonso et al. [19] in the U.S. among 213 medical students. In the same study, partially vaccinated students were 19 (8.9%) as compared to 2 (1.33%) in this study.

Regarding risk factors for cervical cancer, 37 (52.9%) male students and 43 (53.8%) female students could identify only one risk factor correctly. Only 7 (10%) male students and 8 (10%) female students could correctly identify early marriage, early child birth, multiple sexual partners and infections as risk factors for cervical cancer. 52 (74.3%) male and 59 (73.8%) female students identified multiple sexual partners as a risk factors for cervical cancer. 41 (58.6%) male and 41 (51.3%) female students identified infections as a risk factor for cervical cancer.

Pap smear as screening method for cervical cancer was known by 90.1% participants in a study conducted by Maharajan et al. [20] in Malaysia among 305 medical students. In our study, 138 (92%) of the participants have shown this knowledge. This knowledge seems to comparable in both the studies.

In a question regarding need for cervical cancer screening after vaccination, 59 (86.8%) from 2nd year and 75 (91.5%) from 3rd year answered positively in the present study. In a study conducted by Yam et al. [16] in Hong Kong among 420 medical and non medical students,88 (86.3%) medical students below 3rd year and 141 (99.3%) medical students from and above 3rd year have this knowledge. This data appears to be similar to our study. Further studies can be conducted to find out the root cause for the poor vaccination status and through those studies, measures can be taken to address the issue.

In conclusion, awareness about HPV vaccination as causative factor for cervical cancer was found in 67 (95.7%) males and 79 (98.8%) females. 66 (82.5%) females compared to 50 (71.4%) males were aware about the availability of HPV vaccine. Only one male student was found to have taken an incomplete course of vaccination. In comparison, 12 (15%) female students were found to have completed full course of vaccination and 1 female student having taken incomplete course of vaccination. This study found that 64 (91.4%) males and 73 (91.2%) females were willing to recommend the vaccine to a female relative.

The conclusion from the current study is that there is good knowledge among medical students regarding cervical cancer and its prevention. But knowledge regarding HPV vaccine i.e., availability of the vaccine, right age group for vaccination and vaccination recommended for males needs to improve. Vaccination status is poor among both males and females. Willingness to get vaccinated in male students was very less compared to female students. Hence, there seems to be a need to motivate male students towards vaccination.

Therefore, more awareness has to be created about HPV vaccine among medical students through emphasis in the curriculum.

Acknowledgements

“This work was supported and funded by Indian Council of Medical Research under its ICMR

STS-2019 programme”

Statement conflict of interest

This research project has been funded and approved by Indian Council of Medical Research under the ICMR STS-2019 program. With reference to the cervical CAM toolkit used to devise the questionnaire for this study: ‘This survey instrument (the Cervical CAM) was developed by the UCL Health Behaviour Research Centre, in collaboration with the Department of Health Cancer Team and The Eve Appeal, with funding from The Eve Appeal. It forms part of the Cervical Cancer Awareness and Symptoms Initiative (CCASI). It is based on a generic CAM developed by Cancer Research UK, University College London, King’s College London and Oxford University in 2007-08.’

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