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Knowledge, attitude and practices regarding HPV vaccination among medical and paramedical students in North India

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ABSTRACT

Aims: To assess the knowledge, attitude and practices regarding HPV vaccination among medical and para medical students in North India.

Results: A total of 391 respondents were enrolled in the study with mean age of 24.39 ± 4.27 years. The overall knowledge level of respondents in the study was satisfactory around 69%. Majority of respondents favours need for more awareness programmes regarding HPV vaccination, implementation of education on HPV infection at schools and colleges, inclusion of HPV vaccination in National Immunisation Schedule and provision to provide vaccination at schools and colleges. In regard to practice, 78.5% respondents either underwent or were willing to undergo vaccination. Reason for non-vaccination were mainly fear of side effect (23.2%), cost (18.8%), doubts about efficacy (10.4%) and others.

Methods: This study is Cross sectional study conducted among 391 medical and nursing students after obtaining ethical approval from the Institute's Ethics committee. Data was analyzed using Statistical Package for Social Sciences 21.0. Independent samples t-test and ANOVA were used to compare the data. Correlation between knowledge, attitude and practice scores was assessed using Pearson correlation coefficient.

Conclusions: The study concludes, not only the students but a health care professional lacks appropriate knowledge regarding HPV and cervical cancer.

Keywords: cervical cancer, human papilloma virus, vaccination

INTRODUCTION

Cancer cervix has emerged as a huge epidemic over past two decades. There is a declining trend in the incidence of cervical cancer in the western world, on the contrary, in India we have observed that this disease is still a great menace to a women's health and is showing rising trend. It is estimated that cervical cancer will

occur in approximately 1 in 53 Indian women during their lifetime compared with 1 in 100 women in more developed regions of the world.¹

According to Global cancer statistics 2018; China and India together contributed more than one third of the global cervical burden, with 97000 cases in India, and 60000 deaths in India in year of 2018.² Carcinoma cervix is the second most common gynecological malignancy amongst Indian women aged 25-44 years with an incidence of 3.5% after carcinoma breast (28.6%).^{3,4}

Human papillomavirus (HPV) infection is now a well-established cause of cervical cancer and there is growing evidence of HPV being a relevant factor in other anogenital cancers (anus, vulva, vagina and penis) as well as head and neck cancers. There are more than 120 types of HPV identified, with 30 types of these HPV primarily infecting the squamous epithelium of the lower anogenital tract of men and women.

Among all subtypes prevalence of HPV 16 and 18 infections among high grade lesions (HSIL) are 62.8 % and among cervical cancer is about 83.2 %.⁵

Because HPV infection plays an important role in pathogenesis of cervical cancer, primary prevention was the development of HPV vaccine. Three vaccines that prevent infection with disease causing HPV types are licensed for use. They are bivalent vaccine Cervarix containing VLP for HPV 16, 18 approved by FDA in 2009, quadrivalent vaccine Gardasil containing VLP for HPV 6, 11, 16, 18 approved in 2006 while Gardasil 9 is a nonavalent vaccine against HPV subtypes 6,11,16,18,31,33,45,52,58. Current evidence suggests that from the public health perspective the bivalent, quadrivalent and nonavalent vaccines offer comparable immunogenicity, efficacy and effectiveness

for the prevention of cervical cancer, which is mainly caused by HPV types 16 and 18. All three HPV vaccines have an excellent safety profiles.⁴

Efficacy of both the vaccine against persistent infection of HPV subtypes 6, 11, 16, and 18 in women who received 3 doses of vaccine is over 90%. According to CDC apart for cervical cancer HPV vaccine can protect against five more cancers like Oropharyngeal, Anal Cancer, Vulvar, Vaginal Cancer and Penile Cancer.⁶

Recognizing the importance of cervical cancer and other HPV-related diseases as global health problems, WHO recommends that routine HPV vaccination should be included in national immunization programme.

By 31 March 2017, globally 71 countries (37%) had introduced HPV vaccine in their national immunization programme for girls, and 11 countries (6%) also for boys.⁷ Additionally, the models predicted that cervical cancer incidence will be halved in LMICs by 2061 (2060–63) with HPV vaccination alone, by 2055 (2055–56) when adding once-lifetime screening, and by 2048 (2047–49) when adding twice-lifetime screening.^{8,9}

In spite of fully understood role of HPV in pathogenesis of cervical cancer and satisfactory efficacy of HPV vaccine as a primary preventive strategy, still coverage of vaccine in developing country is very minimal. Lack of proper knowledge and pessimistic behavior regarding HPV vaccination among general population is the principal cause for poor acceptance of HPV vaccine in developing country like India.

In order to eliminate cervical cancer as public health problem WHO has set the targets of 90–70–90 targets that need to be met by

2030.¹⁰ It includes: 90% of girls fully vaccinated with the HPV vaccine by age 15; 70% of women are screened with a high-performance test by 35, and again by-45 years of age; and 90% of women identified with cervical disease receive treatment (90% of women with pre-cancer treated; 90% of women with invasive cancer managed).

As medical and paramedical students are frontline and future health care providers, they play indispensable role in promoting health educations among patients and general public.

Considering the gravity of present scenario of cervical cancer cases in our country and low coverage of HPV vaccine the present study has been conducted with following objective of assessing the knowledge regarding HPV vaccine among medical and paramedical students, attitude of the respondents towards HPV vaccine and their current practices and perception towards HPV vaccine.

METHODS

This study was Cross sectional study conducted among the medical and nursing students after obtaining ethical approval. Based on previous studies where the prevalence of knowledge of the obstetricians was 45% with a confidence interval of 95% and 5% margin of error, the minimum sample size required was 391. A self-administered semi-structured pre tested 20-item questionnaire in different domains with Likert scale was used. The scoring grades attributed to each domain and overall, were adopted from the Original Bloom's cut off points, score of 80-100% correct response as good, 60-79% as satisfactory and score<60% as poor knowledge. Data were analyzed using Statistical Package for Social Sciences 21.0. Total domain scores as well as total scale score were semi-quantitative in nature; hence a parametric

evaluation plan was evaluated. Independent samples test and ANOVA were used to compare the data. Correlation between knowledge, attitude and practice scores was assessed using Pearson correlation coefficient.

For the purpose of study, a 20-item questionnaire was prepared. The questionnaire had a total of 13 questions related with knowledge. For each correct response, score of 1 was awarded. Question No.14 to17 were related with attitude and were scored on Likert scale, the responses ranged from strongly disagree (score 0) to strongly agree (score 4) with higher scores for more positive scores. Question Nos. 18 and 19 were related with practice domain and had only one correct response indicative of correct practice. Apart from this demographic information related with age, gender, academic stream, marital status and family history was also collected to act as determinants of knowledge, attitude and practice and total scores. Total scores were taken as sum total of knowledge, attitude and practice domains, totaling to a maximum possible score of 38.

RESULT

A total of 391 respondents were enrolled in the study. Age of respondents ranged from 18 to 35 years with a mean age of 24.39 ± 4.27 years. Majority of respondents were aged between 21 and 25 years (57%) followed by 26-30 years (27.1%), <20 years (12%) and >30 years (3.8%) respectively. Majority were females (61.6%). Sex-ratio of the study population was 0.62. A total of 236 (60.4%) were MBBS students while 155 (39.6%) were nursing students. There were 45 (11.5%) married respondents, remaining 346 (88.5%) were unmarried. Family history of cervical cancer was reported by 56 (14.3%) respondents.

The level of knowledge of respondents along with its scoring is summarized [Table-1].

Number of knowledge sources reported by respondents ranged 1-4 with a mean of 1.37 ± 0.75 delineated by pie chart [Figure-1].

Table-1: Item wise correct responses on different questions related with knowledge

Item No.	Details	No. of correct responses	%
1.	Rank of cervical cancer among gynecological cancers in India	317	81.1
2.	HPV being the principal cause of cervical cancer	360	92.1
3.	HPV also causes genital warts	354	90.5
4.	Strain of HPV responsible for cervical cancer	296	75.7
5.	Availability of vaccine against HPV	369	94.4
6.	Knowledge of names of HPV vaccines		
	a) Only one correct	71	18.2
	b) Two correct	74	18.9
	c) All three correct	22	5.6
7.	Availability of HPV vaccines for men and women	197	50.4
8.	Age group for which HPV vaccines are available	176	45.0
9.	Route of administration of HPV vaccine	329	84.1
10.	% Efficacy of HPV vaccine in uninfected women	325	83.1
11.	Feasibility of vaccination in HPV infected women	248	63.4
12.	HPV vaccination is not an alternative to screening	249	63.7
	Mean Total Knowledge Scores \pm SD (Range)	8.96 \pm 2.23 (1-13)	

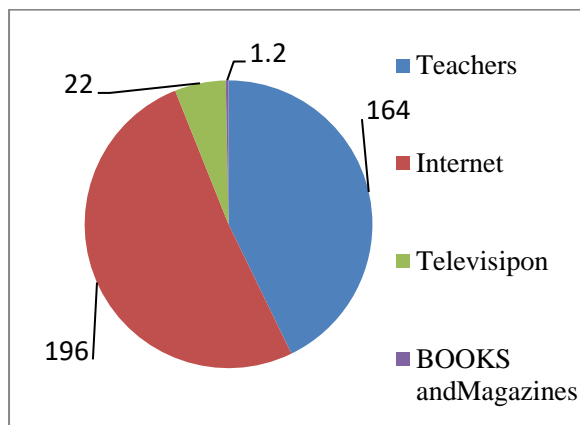


Figure-1: Sources of Knowledge as reported by Respondents

By Attitudes Score towards HPV vaccine, 65.2% of respondents strongly agree that there is need for more awareness programs on HPV vaccination. 93.6% respondents favors the implementation of education on HPV infection at schools and colleges. 91.8% of respondents approve for inclusion of HPV vaccination in National Immunization Schedule and almost similar number states that HPV vaccination should

be given in schools and colleges. [Table-2. Figure-2]

By correct number of responses obtained for practice related items including various reasons for non-vaccination, out of 391 respondents, 307(78.5%) showed positive attitude towards vaccination. Among these 307(78.5%) respondents, 83(27%) were vaccinated and 224(72.9%) were willing to get vaccinated. 90.5% recommend vaccination to others. Out of 308, who were not vaccinated, the reasons for non vaccination were mainly fear of side effects (23.1%), costs (18.8%), doubts about efficacy (10.4%) and others. [Table 3 and 4]

All the bivariate correlations of knowledge, attitude and practice were significant statistically [Table-5].

Table-2: Item wise Attitude scores f respondents (n=391)

Item No.	Details	Score 0	Score 1	Score 2	Score 3	Score 4	Mean ± SD (Range)
1.	Need for more awareness programmes	5 (1.3%)	14 (3.6%)	13 (3.3%)	104 (26.6%)	255 (65.2%)	3.51±0.83 (0-4)
2.	Need for education on HPV vaccination in schools and colleges	11 (2.8%)	5 (1.3%)	9 (2.3%)	128 (32.7%)	238 (60.9%)	3.48±0.84 (0-4)
3.	HPV vaccination in national immunization schedule	2 (0.5%)	8 (2.0%)	22 (5.6%)	178 (45.5%)	181 (46.3%)	3.35±0.73 (0-4)
4.	HPV vaccination to be given in schools/colleges	1 (0.3%)	7 (1.8%)	27 (6.9%)	180 (46.0%)	176 (45.0%)	3.34±0.71 (0-4)
Mean Attitude Scores ± SD (Range)				13.67±2.42 (2-16)			

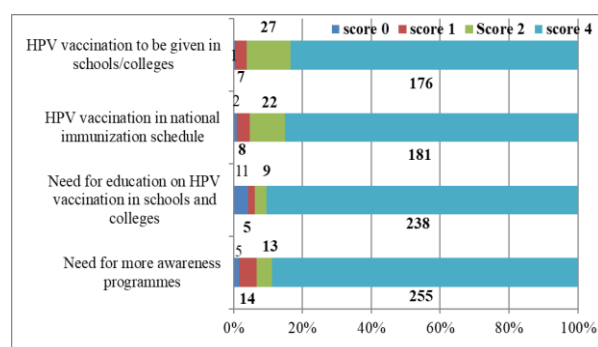


Figure-2: Item-wise attitude score

Table-3: Item-wise Correct responses for Practice domain (n=391)

Characteristic	No.	%
1. Underwent or willing to undergo vaccination*	307	78.5
2. Recommend vaccination to others	354	90.5
Mean practice scores ± SD (Range)	6.76±2.31 (0-8)	

*Includes 83 vaccinated and 224 willing to be vaccinated respondents

Table-4: Reason for non-vaccination (n=308)*

SN	Reason	N	%
1.	Cost	58	18.8
2.	Doubts regarding efficacy	32	10.4
3.	Fear of side effects	71	23.1
4.	Multiple reasons	4	1.3
5.	Did not respond	143	46.4

*Responses of only those respondents who did not underwent vaccination were recorded.

Table-5: Correlation between Knowledge, Attitude and Practice Scores (Pearson’s correlation coefficient)

SN	Correlation ‘r’	‘p’	Interpretation
1.	Knowledge vs Attitude	0.247 <0.001	Weak +ve & significant
2.	Knowledge vs Practice	0.376 <0.001	Mild +ve & significant
3.	Attitude vs Practice	0.249 <0.001	Weak +ve & significant

Total scores of respondents ranged from 9 to 37. The 25th percentile, 50th percentile (median) and 75th percentile total scores of respondents were 27, 30 and 33 respectively. Mean total scores were 29.40±5.04. Thus, those having scores >33 could be termed to have excellent KAP scores with respect to HPV vaccination. [Table-6, Figure-3]

Table-6: Quartile wise distribution of total scores

Quartile	Score
25 th Percentile	27
50 th Percentile	30
75 th Percentile	33
Mean Total Scores (Range)	29.40 ± 5.04 (9-37)



Figure-3: Box plot showing dispersion of Total Scores

Age did not show a significant association with either of three domain or total scores. Females tended to have significantly higher mean scores for all the three domains as well as total scores. Mean scores for all the three domains as well as total scores were significantly higher in medical students as compared to nursing stream respondents ($p < 0.001$). Mean knowledge and attitude scores and total scores of unmarried respondents were significantly higher as compared to those of married respondents ($p \leq 0.001$), however, practice scores seemed to be unaffected by marital status ($p = 0.799$). Those having a positive family history had significantly lower mean attitude scores as compared to those not having a family history ($p = 0.038$). However, no significant difference between those having a positive family history and those not having a positive family history was observed for knowledge, practice and total scores ($p > 0.05$). [Table-7, Figure-3]

DISCUSSION

More than half of students (57%) were between 21 to 25 year of age with mean age of 24.3. Although age did not show a significant association with either of three domains or total scores in my study while

females tended to have significantly higher mean scores for all the three domains as well as total scores.

The overall knowledge level of respondents in my study was satisfactory around 69% which is almost similar to the study conducted by Gaurav et al among medical and paramedical students in AIIMS Rishikesh.¹¹ While study conducted among medical and para medical students of south India by K Swarnapriya et al also displayed good knowledge about HPV (44%).¹²

Specific knowledge regarding trade name of vaccine, appropriate age of vaccination, feasibility of vaccination in already infected HPV women is missing among students enormously in this study. This was also highlighted by other studies such as Swarnapriya et al in which approx 50% students correctly knew dose, site and age of administration of vaccine while only 17% of them correctly responds regarding efficacy of vaccine.¹² In my study more than half students didn't know the role of HPV vaccine in penile cancer in males similar to the study conducted by Nivedeta das et where only 31% of respondents knew that HPV vaccine also prevent penile cancer in males.¹³

About 63.7% are aware of the fact that vaccination would not be an alternative to screening procedures. In a KAP study conducted by PC Chawla et al among different 590 health care professionals of Delhi NCR observed that among all practitioners only gynecologists showed highest awareness about HPV and its vaccine.¹⁴

This concludes not only the students but a health care professional lacks appropriate knowledge regarding HPV and cervical cancer. This warrant for a need of proper periodic medical education for all the health

Table-7: Association of Knowledge, Attitude and Practice Scores with different demographic variables

SN	Determinant	No. of respondents	Knowledge scores (Mean±SD)	Attitude scores (Mean±SD)	Practice scores (Mean±SD)	Total Scores (Mean±SD)
1. Age	<20 Years	47	8.55±2.28	13.66±3.24	6.81±2.49	29.02±5.67
	21-25 Years	223	9.08±2.07	13.62±2.39	6.69±2.36	29.39±4.93
	26-30 Years	106	8.92±2.53	13.83±2.08	6.91±2.18	29.65±5.15
	>30 Years	15	8.93±2.25	13.33±2.16	6.67±1.95	28.93±4.20
	Statistical significance (ANOVA)		F=0.736; p=0.531	F=0.279; p=0.841	F=0.222; p=0.881	F=0.217; p=0.884
2. Sex	Male	150	8.61±2.30	13.30±2.46	6.16±2.61	28.07±5.43
	Female	241	9.19±2.16	13.90±2.36	7.14±2.01	30.23±4.61
	Statistical significance (Independent samples 't'-test)		't'=2.517; p=0.012	't'=2.420; p=0.016	't'=4.159; p<0.001	't'=4.207; p<0.001
3. Academic stream	Medicine	236	9.63±2.05	14.14±2.10	7.15±1.87	30.92±4.13
	Nursing	155	7.95±2.12	12.96±2.70	6.17±2.74	27.08±5.43
	Statistical significance (Independent samples 't'-test)		't'=7.841; p<0.001	't'=4.851; p<0.001	't'=4.220; p<0.001	't'=7.939; p<0.001
4. Marital status	Unmarried	346	9.10±2.20	13.90±2.26	6.75±2.32	29.75±4.89
	Married	45	7.91±2.24	11.96±2.91	6.84±2.20	26.71±5.49
	Statistical significance (Independent samples 't'-test)		't'=3.411; p=0.001	't'=5.235; p<0.001	't'=0.254; p=0.799	't'=3.867; p<0.001
5. Family history	Yes	56	8.57±2.27	13.05±3.06	7.29±1.89	28.91±4.79
	No	335	9.03±2.22	13.78±2.28	6.67±2.36	29.48±5.09
	Statistical significance (Independent samples 't'-test)		't'=1.425; p=0.155	't'=2.080; p=0.038	't'=1.842; p=0.066	't'=0.782; p=0.435

care workers including medical and paramedical workers emphasizing more on students. Like most other studies such as Joshi AD et al commonest reported source of knowledge was internet (50%) followed by teachers (41.9%) and books (39.6%).¹⁵

Despite having satisfactory knowledge and positive attitude of students, vaccine uptake is very poor. In the present study only 83 students out of 391 (21%) are vaccinated while 224 were willing to get vaccinated. This vaccination data collaborates with the study by HoblidarS et al¹⁶ recently in 2019 where about 26.73% students were vaccinated. But this vaccination data is higher when compared to previous study by

Swarnapriya et al and Sunite GA et al where vaccination coverage was 6.8% and 5.5% respectively.^{12,17}

This is alarming because even after almost a decade of introduction of HPV vaccines, which are available in India since 2008, vaccination programme hasn't travelled half way. While the studies done in countries such as Malaysia where national HPV vaccination programme has been initiated at secondary school level the vaccine uptake among female medical and paramedical students is quite high (79%) and majority (65%) had good awareness towards cervical cancer vaccination.¹⁸

The four most common barriers for non-vaccination with HPV vaccine as reported by the students were as follows: insufficient information about the vaccine, safety concerns, expensive cost, and doubts regarding efficacy. Most of the students (46%) admit that lack of proper knowledge at correct time is the main cause for their non vaccination while rest 23.1% and 18.8% of subjects affirm the safety concerns and cost issues respectively. Only 10% students doubts regarding the efficacy of vaccine while 4 students had multiple reasons for non vaccination. This is contrary to other study like Swarnapriya et al in which majority students had doubts regarding efficacy and safety of vaccine while in the study by Nivedita et al high cost of the vaccines was the foremost reason for non vaccination.^{12,13} Despite achieving good scores in knowledge and having positive attitude regarding vaccine this had not converted into favorable practice which signifies there is lack of applied practical knowledge and motivation among health care students.

These facts closely correlate with the study conducted by Gaurav et al¹¹ in AIIMS Rishikesh among same study population in which 64% MBBS and 61% nursing displayed good knowledge yet majority of them states paucity of knowledge and motivation being the prime cause for non vaccination.

Regardless of knowledge and practice of respondents 85% of students shows positive attitude towards vaccination. Amongst 391 students, 255 students strongly agree that more awareness programs should be initiated at community level as well as school level. More than 90% students agreed that HPV vaccine should be included in National immunization schedule and to be given at

school and college level for its optimum coverage.

Mean scores for all the three domains as well as total scores were significantly higher in medical stream as compared to nursing stream of respondents ($p < 0.001$). This study elucidates the need for community participation in strengthening cervical screening practices and vaccination of young girls to ultimately achieve the aim of elimination of cervical cancer.

CONCLUSIONS

All health care professionals including students lack appropriate knowledge on human papilloma virus and cervical cancer. Thus, the information should be disseminated effectively in order to achieve cervical cancer elimination target.

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