

Original Research Article

Knowledge, awareness on cervical cancer and attitude towards human papillomavirus vaccine among medical students in private medical institution: a cross-sectional study

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ABSTRACT

Background: Human papillomavirus (HPV) infection is the most common sexually transmitted infection worldwide and the leading cause of cervical cancer, which significantly affects women in their reproductive age group. Cervical cancer is the second most common cancer among women in India, with approximately 1,22,845 new cases and 67,480 deaths annually. However, HPV vaccines are still not included in the National Immunisation Program, even if they are very immunogenic, safe, well-tolerated, and very effective in preventing HPV infection.

Methods: A cross-sectional study was conducted among MBBS students from phase I to IV between March and May 2025 to assess knowledge, attitude, and practices regarding HPV and cervical cancer. Data were collected using a structured Google-based questionnaire.

Results: A total of 466 students participated, with a mean age of 18-24 years. About 57.6% were aware that cervical cancer can be detected early, and 66.9% identified Pap smear as the screening method. Overall, 76.8% demonstrated good knowledge of cervical cancer. However, gaps persisted: 70.1% knew cervical cancer is vaccine-preventable, and 66.9% were aware of vaccine availability in India, but 43.4% were unaware of the number of doses. Additional misconceptions included incorrect age of vaccination, need for prior screening, and limited awareness regarding vaccination in HPV-positive individuals. These findings were statistically significant ($p < 0.05$).

Conclusions: Despite moderate awareness, detailed understanding of HPV vaccination and screening remains inadequate among medical students, indicating a significant knowledge-practice gap. Key barriers to vaccination included lack of information, cost, fear of side effects, and concerns regarding efficacy.

Keywords: HPV, Cervical cancer, Knowledge

INTRODUCTION

The most common sexually transmitted illness on Earth is HPV infection, or HPV infection. The primary cause for a woman's cervical cancer- which most frequently affects women during their peak reproductive years, is the leading cause of death in the reproductive age group. The encouraging aspect is that one may avoid cervical cancer. More than most people realise, HPV infection spreads via anal, oral, and even skin-to-skin or hand-to-genital

contact with someone already infected with HPV, rather than only through vaginal sex. Having herpes, starting sex or marriage at an early age, several partners, several pregnancies, HIV, long-term birth control pill use, or any other sexually transmitted disease (STDs) all increase one's chance of getting the HPV infection.¹ Poor cleanliness and smoking or chewing tobacco are among some of these. Starting in the cells covering the cervix, cervical cancer develops. Early on, you will never know it's there; no warning indications are at all discernible. But as things get worse, you may experience pelvic pain,

weight reduction, bleeding between periods, odd foul-smelling vaginal discharge, or pain and bleeding following sex.²

According to Globocan 2020, cervical cancer accounts for a mortality rate of 9.1% and a prevalence rate of 18.3% (123,907 cases). Across all age groups, the prevalence rate was 42.82 per one lakh population over 5 years. Breast and cervical malignancies are the most frequent ones among women, as per the National Cancer Registry Program. Among women in India, cervical cancer makes up almost 29% of all malignancies. With an estimated 27.7%, Arunachal Pradesh, India's Papumpare district had the highest incidence of cervical cancer in Asia.¹⁴

The National Cancer Institute (NCI) says that cervical cancer is a cancer that begins in the cells of the cervix.³ Among women worldwide, cervical cancer ranks fourth most often; around 5,27,625 new cases and 2,65,675 fatalities yearly are expected. Cervical cancer is the second most frequent cancer among women in India; around 1,22,845 fresh cases and 67,480 deaths annually occur from it. Human Papilloma Virus (HPV) types 16 and 18 account for 80% of all cervical cancer worldwide. Condylomata acuminata, often known as anogenital warts, are brought on by HPV types 6 and 11. The virus infects epithelial cells of skin and mucosa and is linked to cancer of the oropharynx, vulva, vagina, anus, and penis.⁴ Sixteen to twenty-five years is the most susceptible age range. The maximum infection rate for men and women is around ten years after searched between 24 and 30 years. The common human disease HPV can lead to recurrent respiratory papillomatosis, cervical cancer, other anogenital cancers, and genital warts. Young people and sexually active people often get an HPV infection. About 75 to 80% of sexually active people will contract a disease at some point in their lives. Though only women are affected by anogenital cancers in the cervix, men's rates of prostate, anus and penis cases-4.73, 0.25, and 0.06, respectively, as well as those of anus, vulva, and vagina cases- 0.27, 0.73, and 0.39 in women are rising.⁹

Early detection of cervical cancer has a favourable outlook. For women younger than 26, the most efficient way to prevent HPV infection is the HPV vaccine; several measures help to reduce the risk of HPV infection. Vaccinations have signalled a turning point in preventing cervical cancer.⁷ Initially licensed in 2006, HPV vaccines were proven to be both safe and somewhat effective against HPV infections. The Indian Academy of Paediatrics Advisory Committee on Vaccination and Immunisation Practices (IAP COVI) advises giving the HPV vaccine to any girls aged 9-26 years who can pay for it. Girls 9-14 years old should get two intramuscular doses of either of the two HPV vaccines (HPV4 or HPV2) with six months between them. Girls 15 years of age and older, as well as immunocompromised girls and women, are advised to have three doses of the vaccine spread out across six months.⁴

Two vaccines, a quadrivalent vaccine (HPV 16,18,6 and 11) "Gardasil" and a bivalent vaccine (HPV 19 and 18) "Cervarix" are found as primary prevention for vaccination of young adolescent girls between ages 9-13 and /or 13-26 years old young adults. Approved by the US FDA (Food and Drug Administration), these two HPV vaccines are commercially sold in India. However, HPV vaccines are still not included in the National Immunisation Program, even if they are very immunogenic, safe, well-tolerated, and very effective in preventing HPV infection. PATH (Program for appropriate technology in health) and ICMR (Indian Council of Medical Research) conducted HPV vaccine immunogenicity studies in the states of Andhra Pradesh and Gujarat, where unrelated fatalities occurred; these vaccines were stopped. Therefore, India has no effective immunisation campaign. Non-administration of vaccine results from other factors, including increased vaccine cost, social, religious, and cultural concerns, as well as fear of side effects.⁸ Worldwide, HPV vaccines have a high chance of preventing HPV infections in men and women. It could help avoid the development of cervical malignancies. The world health organisation (WHO) advises that HPV vaccination should target the group. Everyone up to the age of 26 years is advised to get the HPV vaccination.⁹

To identify cervical cancer, a doctor should first enquire about a patient's personal and family history, then conduct a physical, pelvic, and rectovaginal examination.¹³ Above the age of 26 years, pap smear is thought of as a cervical cancer screening technique. Up to 80% drop in the incidence and the mortality of cervical cancer cases have results from Papanicolaou (Pap) smear testing and the HPV vaccine in wealthy nations. Early detection of cervical cancer is possible via a pap smear; correct treatment is then administered.⁷

One major impediment to cervical cancer prevention is a lack of awareness about cervical cancer among the public. Every Indian medical student should know the improvements and treatments available in low-resource contexts. Preventing cancer using a vaccine is a novel idea; hence, awareness and education would be quite crucial in the execution of this plan. Medical students are chosen basically because they will become future doctors, have close contact with the public, and be a key source of information for the public, as well as an important guide for the population. They also play a big role in raising awareness among the people.¹⁰ Medical students, as future health care providers, have a pivotal role in promoting HPV vaccination and cervical cancer prevention. Their knowledge, attitudes, and the perceptions directly influence public acceptance and vaccine uptake. However, gaps in understanding and concerns regarding vaccine safety and efficacy may limit their ability to effectively counsel patients. The goal of this research on women of reproductive age is to evaluate their knowledge, attitude, and practice about cervical cancer and its screening.

METHODS

The cross-sectional study was conducted among the medical students studying from the 1st year to 4th year in a Private Medical Institution. The study was conducted from March 2025 to May 2025. The study was conducted in the college premises; the setting was chosen based on the feasibility and availability of adequate samples. The 466 medical students from phase 1 to phase 4 were recruited for the study. The questionnaire was collected through Google Forms. The two exclusion criteria of unwillingness and absence of the student were considered. The students were asked about the written consent to participate before the collection of data individually. The structured questionnaire regarding the knowledge, risk factors, clinical features, and practice of cervical cancer and HPV vaccine. The Semi-structured questionnaire was taken from the UCL Health Behaviour Research cervical awareness measure. The students were asked to fill out the forms during the break time individually. The personal information and confidentiality were maintained throughout the study. The study was conducted according to the preferences of the individuals, especially in Tamil, Hindi and English.

Statistical analysis

The results were analysed by the statistical version of SPSS-24. This study was approved by the institutional ethical committee.

RESULTS

Among the 466 students included in the study, 37% are males and 63% are females. The mean age of the study population ranged from 18 to 24 years. The 357 participants (76.8%) were aware that uterine cervical cancer is a type of cancer. The 327 participants (70.3%) were aware of risk factors for cervical cancer. Out of the total participants, 268 (57.6%) were aware that cervical cancer can be identified in early stages. Among the study respondents, 311 (66.9%) were aware that the screening technique for cervical cancer is the Pap smear. About 241 (51.8%) knew that vaginal bleeding between periods is a sign of cervical cancer, and 209 (44.9%) knew that persistent lower back pain is a sign of cervical cancer. Vaginal bleeding after menopause is a sign of cervical cancer were aware among 298 (64.1%). Persistent pelvic pain is one of the signs of cervical cancer; about 266 (57.2%) were aware of it. Out of the total participants, 164 (35.3%) were aware that blood in stool or urine can be a sign of cervical cancer, while an equal number, 164 (35.3%), were unaware of this symptom. The unexplained weight loss is also one of the major marking symptoms of cervical cancer which 296 (63.7%) were aware about it (Table 1).

Among 466 students, 326 (70.1%) were aware that cervical cancer is vaccine-preventable. The 311 (66.9%) students were aware that the vaccine is available in India.

The 202 (43.4%) don't know the number of doses of the vaccine. The 234 (50.3%) stated that the vaccine is given in 10-30 years. The 204 (43.9%) stated that girls are vaccinated. The 171 (36.8%) answered that screening is required before vaccination. 172 (37%) don't know that the vaccine can prevent STD. 216 (46.5%) were not aware that the vaccine can be given to already HPV positive women. The 203 (43.7%) don't know that vaccinated women will not become HPV positive (Table 2).

Among 466 students, 328 (70.5%) students gave consent for vaccination against HPV. The 43 (9.2%) students were not willing to get vaccinated. The 393 (84.5%) were willing to recommend this vaccine to others. Lack of awareness (63.2%), high cost (56%), fear of side effects (17.8%), and Doubt on efficacy (6.9%) were the reasons reported for non-administration of vaccines (Table 3).

Among 466 students, only 83 (17.8%) were vaccinated with the HPV vaccine. The 382 (82.2%) were not vaccinated with the HPV vaccine. The 423 (91%) have not screened for HPV infection or cervical cancer in the past. Only 42 (9%) have screened for HPV infection or cervical cancer in the past. The 238 (48.8%) students have a regular habit of seeking professional help if they have any symptoms (Table 4).

Figures 1 and 2 shows that age and gender distribution among the participants. Most of the study population was under 23 years of age.

Table 1 presents information regarding the knowledge of cervical cancer and its screening. The statistically significance value ($p=0.001$) ($p<0.05$) found to be observed in 76.8% of the study population knew about cervical cancer, 44.9% of the participants knew signs of cervical cancer like persistent pelvic pain, 35.3% of individuals were aware, and equal number of participants did not know that blood in the stool or urine is a sign of cervical cancer and 41.3% of the study population do not know that persistent diarrhoea is a sign of cervical cancer. The 70.3% of the study population were aware of the risk factors for cervical cancer, which did not exhibit any statistically significant value ($p=0.194$).

Another statistically significant value ($p=0.000$) ($p<0.05$) was observed in the following findings: 57.6% of the individuals were aware that cervical cancer can be detected in early stages; 66.9% of the respondents knew that Pap smear is the screening technique for cervical cancer; 34.4% of participants were unaware of the recommended screening interval; 51.8% of the participants recognized that vaginal bleeding between periods as a sign of cervical cancer; 62.6% of the individuals identified abnormal vaginal discharge with an unpleasant odour is a symptom of cervical cancer, Vaginal bleeding after menopause was recognized as a symptom by 64.1% of the participants; Persistent pelvic pain a sign of cervical cancer was known by 57.2% and 63.7% were

aware that unexplained weight loss is also a major symptom of cervical cancer.

Table 2 illustrates the awareness of HPV vaccination and its secondary prevention. 43.4% of participants were unaware of the vaccine's number of doses, with a statistically significant association ($p=0.042$) ($p<0.05$). The 46.5% of participants were unaware that the HPV vaccine can be administered to HPV-positive women, indicating a statistical correlation of ($p=0.022$) ($p<0.05$). A statistically significant value ($p=0.000$) ($p<0.05$) was observed in 70.1% of the participants knew that cervical cancer can be prevented through vaccine, 66.6% were aware that vaccine is available in India, 29.5% of individuals did not know at what age is the vaccine given, 43.7% of the respondents do not know that vaccinated women can become HPV-positive.

From the Table 3, which shows the attitude towards vaccination and justifications for non-administration of vaccines, with a statistically significant association ($p=0.000$) ($p<0.05$), indicating that 70.5% of respondents are willing to give consent for HPV vaccination. The 63.2% of individuals cited a lack of awareness as their primary reason for not getting vaccinated; however, there was no statistical association was found ($p=0.085$).

Table 4 explains the practices associated with HPV infection and HPV vaccination. Only 83 (17.8%) participants received the HPV vaccine, which had no statistical significance ($p=0.903$), and 423 (91%) individuals had not previously been screened for HPV infection or cervical cancer in the past; this finding had no statistical correlation ($p=0.537$).

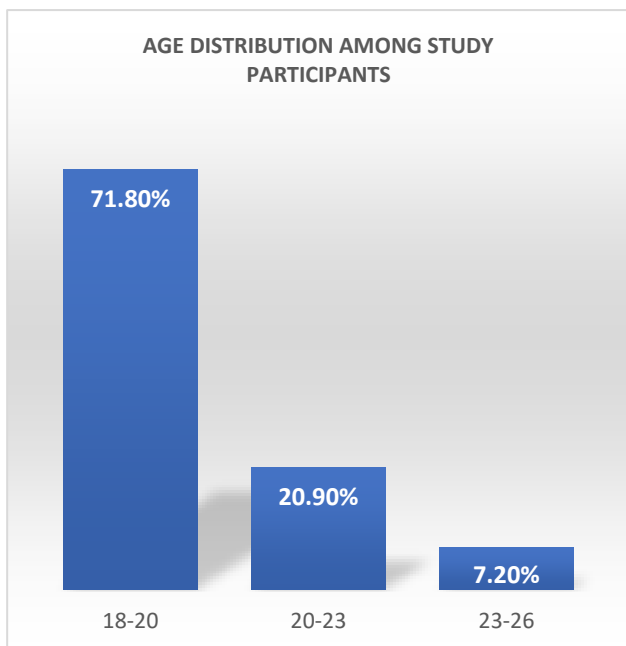


Figure 1: Age distribution among study participants.

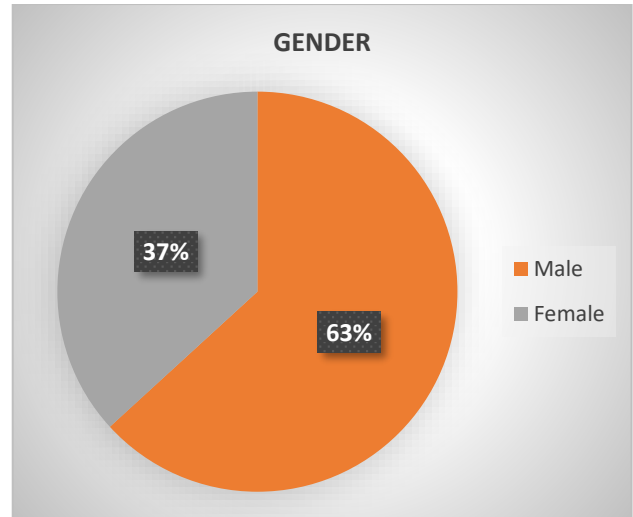


Figure 2: Gender.

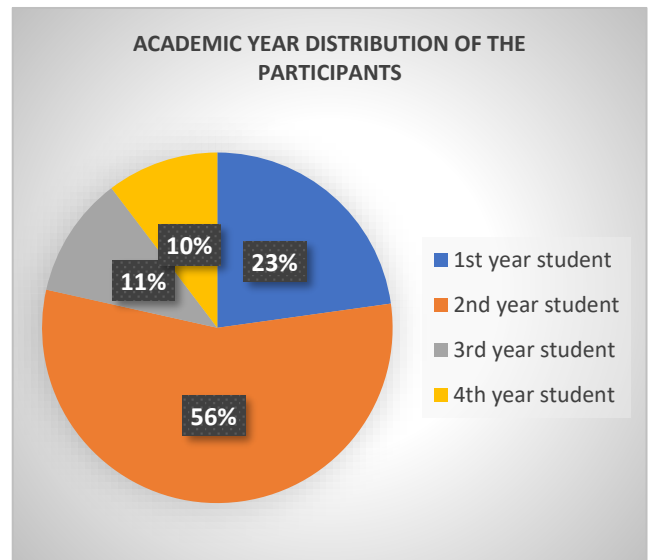


Figure 3: Academic year distribution of the participants.

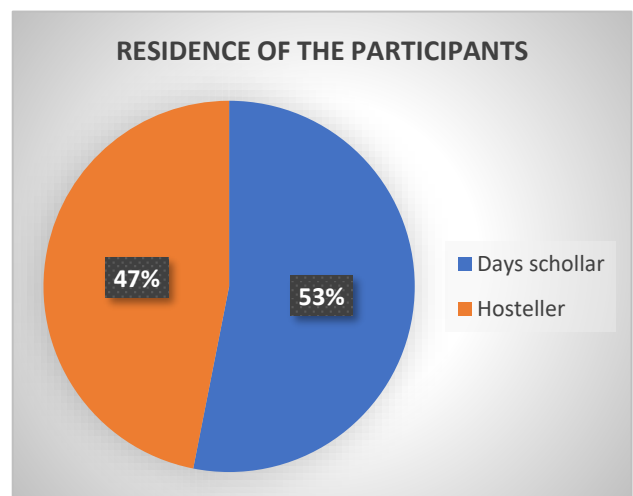


Figure 4: Residence of the participants.

Table 1: Knowledge regarding risk factors and clinical features of cervical cancer.

Variables	Options	N	Percentage	P value
Do you know what is uterine cervical cancer?	Yes	357	76.8%	0.001
	No	49	10.5%	
	Don't know	59	12.7%	
Can cervical cancer be identified in early stages?	Yes	268	57.6%	0.000
	No	63	13.5%	
	Don't know	134	28.8%	
What are the screening techniques for cervical cancer?	Pap smear	311	66.9%	0.000
	Blood culture	25	5.4%	
	PCR	23	4.9%	
	Don't know	106	22.8%	
What is the screening interval?	Once in a year	138	29.7%	0.000
	Once in two years	62	13.3%	
	Once in three years	105	22.6%	
	Don't know	160	34.4%	
Do you think vaginal bleeding between periods could be a sign of cervical cancer?	Yes	241	51.8%	0.000
	No	90	19.4%	
	Don't know	134	28.8%	
Do you think persistent lower back pain could be a sign of cervical cancer?	Yes	209	44.9%	0.001
	No	89	19.1%	
	Don't know	167	35.9%	
Do you think persistent diarrhoea could be a sign of cervical cancer?	Yes	89	19.1%	0.001
	No	184	39.6%	
	Don't know	192	41.3%	
Do you think vaginal bleeding after menopause could be a sign of cervical cancer?	Yes	298	64.1%	0.000
	No	50	10.8%	
	Don't know	117	25.2%	
Do you think persistent pelvic pain could be a sign of cervical cancer?	Yes	266	57.2%	0.000
	No	65	14%	
	Don't know	134	28.8%	
Do you think blood in the stool or urine could be a sign of cervical cancer?	Yes	164	35.3%	0.001
	No	137	29.5%	
	Don't know	164	35.3%	
Do you think unexplained weight loss could be a sign of cervical cancer?	Yes	296	63.7%	0.000
	No	42	9%	
	Don't know	127	27.3%	

Table 2: Knowledge about HPV vaccine and about secondary prevention.

Variables	Options	N	Percentage	P value
Can cervical cancer be prevented by a vaccine?	Yes	326	70.1%	0.000
	No	33	7.1%	
	Don't know	106	22.8%	
Is the vaccine available in India?	Yes	311	66.9%	0.000
	No	36	7.7%	
	Don't know	118	25.4%	
What is the number of doses required for an age greater than 16 years?	1	43	9.2%	0.042
	2	116	24.9%	
	3	104	22.4%	
	Don't know	202	43.4%	
At what age can the vaccine be given (in years)?	0-9	30	6.5%	0.000
	10-30	234	50.3%	
	31-50	54	11.6%	
	>51	10	2.2%	
	Don't know	137	29.5%	
Who can be vaccinated?	Boys	6	1.3%	0.000
	Girls	204	43.9%	
	Both	179	38.5%	
	Don't know	76	16.3%	

Continued.

Variables	Options	N	Percentage	P value
Is screening required before vaccination?	Yes	171	36.8%	0.000
	No	146	31.4%	
	Don't know	148	31.8%	
Does the vaccine prevent STDs?	Yes	131	28.2%	0.000
	No	162	34.8%	
	Don't know	172	37%	
Can the vaccine be given to already HPV positive women?	Yes	122	26.2%	0.022
	No	127	27.3%	
	Don't know	216	46.5%	
Do vaccinated women become HPV positive?	Yes	117	25.2%	0.000
	No	145	31.2%	
	Don't know	203	43.7%	

Table 3: Attitude towards vaccination and reasons for non-administration of vaccines.

Variables	Options	N	Percentage	P value
Will you give consent for vaccination against HPV?	Yes	328	70.5%	0.000
	No	43	9.2%	
	Don't know	94	20.2%	
Will you recommend this vaccine to others?	Yes	393	84.5%	0.000
	No	72	15.5%	

Table 4: practice related to HPV infection and HPV vaccination.

Variables	Options	N	Percentage	P value
Have you been vaccinated with the HPV vaccine?	Yes	83	17.8%	0.903
	No	382	82.2%	
Have you previously been screened for HPV infection or cervical cancer in the past?	Yes	42	9%	0.537
	No	423	91%	
Do you have regular habit of seeking professional help if you have any symptoms?	Yes	238	51.2%	0.456
	No	227	48.8%	

DISCUSSION

Cervical cancer is more common in low-income regions because many women do not have regular access to screening or proper treatment. Programs that use HPV vaccination, either by itself or along with screening, have shown strong success in lowering new cases and deaths from cervical cancer in different populations.¹⁰ The study comprised approximately 466 participants, who were examined using quantitative study tool with questionnaire approach to determine their knowledge, awareness and practice about cervical cancer. The variables analysed are:

Knowledge

Understanding of cervical cancer, risk factors, screening methodologies and interval as well as symptoms and signs of cervical cancer. Concerning vaccine and secondary prevention.

Attitude

Regarding cervical cancer vaccination and reasons why it is not offered.

Practice

Related to HPV infection and vaccination.

Knowledge regarding risk factors and clinical features of cervical cancer

In the present study, 357 (76.8%) out of 466 students were aware of cervical cancer, which is similar to the study reported by Jenitha et al in which 74% were aware of cervical cancer.¹⁰ In contrast to the study by Shetty et al which found higher awareness, with 95% and 89.3% for cervical cancer and HPV, respectively, whereas in the study by Bansal et al they reported very low awareness levels.^{2,4}

In the current study, 268 (57.6%) students knew that cervical cancer can be identified at an early stage, and this finding showed a significant statistical association ($p=0.000$) ($p<0.05$). Our study showed students had more awareness than compared to the study by Jenitha et al where 240 (80%) participants didn't know about early detection.¹⁰ However, higher awareness was reported in the study by Singh et al with 228 (76.77%) students

recognising early detection, and in another study by Singh et al showing 163 (82.33%) students had this knowledge.^{15,16}

In our present study, 311 participants (66.9%) had a good knowledge that Pap smear is the screening tool used for cervical cancer, and this finding showed a significant statistical association ($p=0.000$) ($p<0.05$). Jenitha et al discovered that 282 participants (94%) were more aware that the most common screening method in India is the Pap smear.¹⁰ On the other hand, Patel et al found that 253 students (63.1%) were unaware that Pap smear is used in screening for cervical cancer.¹⁷

In our study, 160 participants (34.4%) did not know the screening interval, which shows a clear lack of knowledge, and this finding showed a significant statistical association ($p=0.000$) ($p<0.05$). Singh et al reported relatively better awareness levels, where 41.41% of participants correctly identified the screening interval.¹⁵ Similarly, in another study conducted by Singh et al 135 students (45.45%) were aware that cervical cancer screening should be performed annually.¹⁶

From our current study, 209 participants (44.9%) knew that long-lasting lower back pain can be a symptom of cervical cancer, and this finding showed a significant statistical association ($p=0.001$) ($p<0.05$). In the study by Verma et al., they reported lower awareness, with only 104 participants (21%) knowing that persistent lower back pain could be a sign of cervical cancer.⁶ Similarly, in the study by Mekonnen et al found that 180 participants (30%) did not know that persistent lower back pain could indicate cervical cancer.⁹

In the present study, 241 participants (51.8%) recognised bleeding between menstrual cycles as a possible sign of cervical cancer, and this finding showed a significant statistical association ($p=0.000$) ($p<0.05$). Higher awareness was reported in the study by Jenitha et al where 210 participants (70%) identified intermenstrual bleeding as a warning sign of cervical cancer.¹⁰ In contrast to the study by Bansal et al which found much lower awareness, with only 117 (29.2%) participants knowing this.²

In our present study, 192 participants (41.3%) were unaware that long-term diarrhoea can be an indication of cervical cancer, and this finding showed a significant statistical association ($p=0.001$) ($p<0.05$). Mekonnen et al reported similar results, with 180 participants (30%) being unaware that long-term diarrhoea can be a sign of cervical cancer, whereas Verma et al. found that 104 participants (21%) correctly identified persistent diarrhoea as a possible symptom of cervical cancer.^{6,9}

In our study, 298 participants (64.1%) identified postmenopausal vaginal bleeding as a possible symptom of cervical cancer, with a statistically significant correlation ($p=0.000$) ($p<0.05$). In comparison, only 19

participants (4.7%) identified postmenopausal vaginal bleeding as a possible sign of cervical cancer in the study by Bansal et al 104 participants (21%) recognized postmenopausal vaginal bleeding as a possible sign of cervical cancer in the study by Verma et al while in the study by Mekonnen et al 180 participants (30%) did not know about this symptom.^{2,6,9}

In the current study, 296 participants (63.7%) were aware that unexplained weight loss can indicate cervical cancer, with a substantial statistical association ($p=0.000$) ($p<0.05$). In comparison to the study by Mekonnen et al 180 participants (30%) were not aware that unexplained weight loss could be an indication of cervical cancer, but only 104 participants (21%) correctly identified this symptom in the study by Verma et al.^{6,9}

Knowledge about HPV vaccine and about secondary prevention

Our study found that 70.1% were aware that vaccination can prevent cervical cancer, with a significant statistical connection ($p=0.000$) ($p<0.05$). In the study by Kavitha et al 296 participants (73%) were aware that cervical cancer can be prevented through vaccination, while in the study by Ramya et al 74% of the participants were aware that cervical cancer can be prevented through vaccination.^{7,18} In contrast, Shetty et al discovered a lower level of awareness, with only 523 participants (52.9%) knowing that cervical cancer can be prevented through vaccination.⁴

In the current study, 202 individuals (43.4%) did not know the right number of HPV vaccine doses, with a significant statistical correlation ($p=0.042$) ($p<0.05$). Similar gaps were found in the study by Shetty et al where 519 participants (52.5%) did not know the proper number of HPV vaccine doses.⁴ Even in Patel et al investigation, 345 participants (86.0%) lacked this knowledge.¹⁷ For instance, Verma et al showed that just 42 participants (9%) knew the exact dosing schedule.⁶

In the current study, 234 participants (50.3%) reported that the HPV vaccine is recommended between 10 and 30 years of age, indicating a strong statistical correlation ($p=0.000$) ($p<0.05$). A similar survey conducted by Shetty et al. found that 378 participants (38.3%) said the HPV vaccine is recommended for people aged 9 to 26. In contrast to the study by Patel et al 345 participants (86%) knew at what age the vaccine was administered.¹⁷ In the study conducted by Bansal et al only 4 (1%) participants were aware of the age at which the vaccine is administered.²

In our study, 204 individuals (43.9%) believed HPV vaccination was just for girls, resulting in a strong statistical correlation ($p=0.000$) ($p<0.05$). In a comparable survey conducted by Kavitha et al 272 participants (67.1%) answered that immunisation is only for girls.¹⁸ In a similar study conducted by Patel et al 327 participants

(81.5%) answered that vaccination is only for girls.¹⁷ Similarly, in the study by Rashid et al 634 (72.2%) participants claimed that vaccination is only for girls.⁸

Our study found that 171 individuals (36.8%) believed screening was necessary before receiving the HPV vaccine, with a strong statistical association ($p=0.000$) ($p<0.05$). Jenitha et al observed higher awareness, with 178 participants (59.3%) stating that screening is necessary.¹⁰ In contrast to the findings of Patel et al 221 participants (55.1%) were unsure regarding screening before vaccination.¹⁷ In the study by Shetty et al 451 (45.6%) participants answered that screening occurs before vaccination.⁴

In this study, 172 participants (37%) were unaware that the HPV vaccine helps prevent sexually transmitted infections, which indicated a strong statistical association ($p=0.000$) ($p<0.05$). In comparison to Jenitha et al study, 242 participants (80.67%) were aware that the HPV vaccine helps to prevent the sexually transmitted infections.¹⁰

In the current study, 216 participants (46.5%) were unaware that the HPV vaccine can still be provided to HPV-positive women. This data demonstrated a significant statistical association ($p=0.022$) ($p<0.05$). Similarly, in the study by Jenitha et al 262 participants (87.3%) were not aware that HPV vaccination can still be given to women who are already HPV-positive.¹⁰ In a comparable study by Patel et al 309 participants (77.1%) were unaware that the HPV vaccine can still be administered to a woman who is already HPV-positive.¹⁷

Attitude towards vaccination and reasons for non-administration of vaccines

In the present study, 328 students (70.5%) were willing to obtain the HPV vaccine, which demonstrated a strong statistical association ($p=0.000$) ($p<0.05$). Similarly, Verma et al found that 446 participants (91%) were willing to get HPV vaccine.⁶ In contrast, Shetty et al study found that just 374 individuals (37.9%) were eager to receive the HPV vaccine.⁴

In this study, 393 participants (84.5%) reported that they would suggest the HPV vaccine to others, indicating a strong statistical connection ($p=0.000$) ($p<0.05$). In contrast, Shetty et al observed significantly reduced willingness, with just 375 participants (38%) saying that they would recommend the vaccine.⁴

In this study, 294 participants (63.2%) answered that lack of awareness is the primary reason for not getting the HPV vaccine. Jenitha et al found similar results, with 144 (53.4%) citing a lack of awareness as the primary reason for not receiving the HPV vaccine.¹⁰ According to Patel et al the primary reason for not receiving the HPV vaccine is a lack of awareness.¹⁷

Practice related to HPV infection and HPV vaccination

In our study, 382 participants (82.2%) had not received the HPV vaccine. Jenitha et al observed a similar conclusion, with 270 (80%) unvaccinated subjects.¹⁰ In contrast, Rashid et al found that just 43 participants (4.89%) had received the vaccine.⁸

In the current study, 423 participants (91%) had never undergone HPV testing or cervical cancer screening. Similar findings were reported in the study by Kavitha et al where none of the participants 0 (0%) had been screened for cervical cancer.¹⁸ Similarly, Patel et al discovered that 334 (83.3%) participants had not undergone any cervical cancer screening.¹⁷

In the present study, 238 participants (48.8%) stated that they will seek professional medical care when they have symptoms. In the study by Kavitha et al 281 (69.3%) participants showed improved health-seeking behaviour, whereas Mekonnen et al found inadequate practice with 471 (78.5%) participants not going to a healthcare professional regularly.^{9,18}

Strengths and limitations

From this study, the level knowledge and attitude about HPV vaccination and cervical cancer have been intervened. Strengthening educational interventions within the medical curriculum is critical for improving understanding of cervical cancer prevention, HPV vaccine regimens, and screening recommendations. Regular awareness programs, workshops, and seminars can assist students in correcting misconceptions and maintaining preventive health behaviours. Furthermore, institutional measures such as on-campus HPV vaccination drives, screening awareness campaigns, and counselling sessions may increase the vaccine acceptability and promote early preventive practices. Addressing challenges such as cost, safety concerns, and misinformation may help to enhance the vaccine uptake. Strengthening these strategies among the medical students can help to considerably improve cervical cancer prevention and control in the community.

CONCLUSION

This cross-sectional study evaluated medical students' knowledge, awareness, attitude, and practices about cervical cancer and HPV vaccination at a private medical university. The data show that most students were generally aware of cervical cancer, its symptoms, screening procedures, and the availability of HPV vaccination. Many people identified that Pap smear as an important screening tool and understood how cervical cancer might be diagnosed early. A positive attitude towards HPV vaccination was also seen, with a substantial majority of students wanting to obtain the vaccine and suggesting it to their peers. However, significant gaps in knowledge were discovered about the

suggested screening interval, optimal vaccination schedule, and HPV vaccination eligibility criteria.

Despite this level of awareness about HPV and cervical cancer, individual students' actual understanding of the HPV vaccine and cervical cancer screening practices was relatively low, suggesting a substantial knowledge-to-prevention gap. The main impediments to immunization were found as a lack of information, the expensive expense of the vaccine, fear of the side effects, and the questions about its efficacy. They did not know about to exact timing and period of taking the vaccination. Medical students are future healthcare providers who will play an important role in educating the population and encouraging preventive health measures, so these knowledge and practice gaps must be addressed immediately by educational institutions from conducting CME's or workshops.

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