Section: Community Medicine

Original Research Article

AWARENESS ABOUT HUMAN PAPILLOMA VIRUS, CERVICAL CANCER, AND ACCEPTABILITY OF HUMAN PAPILLOMA VIRUS VACCINATION AMONG MEDICAL STUDENTS

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Received *: 10/02/2026*
Received in revised form *: 04/03/2026*
Accepted *: 07/03/2026*

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DOI: 10.70034/ijmedph.2026.1.500

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (1); 2912-2917

ABSTRACT

Background: As preventing cancer with the help of a vaccine is a comparatively new concept, awareness and education about it will have important implication in the implementation of this strategy.
The HPV vaccine is used as one of the main prevention tools for HPV-related cancers globally, yet it is not part of the Indian National Immunization program. In light of the introduction of the indigenous vaccine, we examine, acceptance and awareness about HPV vaccination. **Objectives:** To assess awareness regarding Human Papilloma Virus and cervical cancer, also analyzing the factors influencing the acceptability of HPV vaccination among Medical students.
Materials and Methods: This cross-sectional study will be conducted among all medical students (MBBS Phase I, MBBS Phase II, and MBBS Phase III students) from a Rural Medical College during the period of 6 month from June-November 2024. Predesigned, pre-tested questionnaire will be used as study tool and information regarding sociodemographic profile of study participants, their awareness regarding Human papilloma virus and cervical cancer will be assessed. Knowledge regarding HPV vaccine and the acceptability of HPV vaccine among students will be also assessed.
Results: About 72% Medical students overall have good awareness regarding Human Papilloma Virus, and 81% Medical students overall have good awareness regarding Cervical Cancer. Binary logistic regression analysis showed that sex, year of course, encouragement from family/friends, and support for inclusion in NIP were statistically significant predictors of vaccine acceptability ($p < 0.05$).
Conclusion: The study highlights that medical students, predominantly young adults, demonstrated high levels of awareness regarding HPV and cervical cancer.
Logistic regression further revealed that sex, academic year, peer influence, and support for inclusion in the National Immunization Program significantly influenced HPV vaccine acceptability.
Keywords: HPV, Cervical Cancer, Acceptability of HPV Vacciness.

INTRODUCTION

Infection with the Human Papillomavirus (HPV) is the most common sexually transmitted infection (STI) of the reproductive tract, with the majority of the sexually active population estimated to acquire the virus at some point in their lifetime. The HPV family consists of more than 150 viral genotypes, 13

of which are identified as carcinogenic or high risk. Persistent infections along with lifestyle factors are associated with more than 90% of cervical cancers as well as a significant percentage of oropharyngeal, penile, vagina, and vulvar cancers.

Cervical cancer is the most common cancer among women aged 15 years or older in India, with a huge adverse social and economic impact on the families. Women in the reproductive age group (15-49 years) constituted 38% of these cases, indicating involvement of a relatively younger population. Cervical cancer is the fourth leading cancer worldwide among women, with an estimated 527,624 new cases and 265,672 deaths annually. In India, cervical cancer is the second most common cancer among women, accounting for approximately 122,844 new cases and 67,477 deaths annually.[1]

Cervical cancer is caused by the human papillomavirus (HPV); HPV-16 and HPV-18 are predominantly responsible for 70%–80% of the total cases. Based on Indian studies, about 82.7% of invasive Cervical cancer cases have shown the presence of HPVs 16 or 18.[2]

The discovery that human papillomavirus (HPV) is responsible for virtually all cervical cancers opens exciting new possibilities for controlling this disease. As preventing cancer with the help of a vaccine is a comparatively new concept, awareness and education will have important implications in the implementation of this strategy.[3]

Despite the recommendations by the World Health Organization (WHO) and the availability of highly effective and safe HPV vaccines in more than 100 countries, HPV vaccine is not currently included as part of the national immunization program (NIS) in India; however, the vaccine is available in the private sector since 2008, and in 2016, the State Government of Delhi and Punjab launched HPV vaccine implementation.[4]

Two types of HPV vaccines are available in India – the quadrivalent vaccine (Gardasil TM, Merck, USA, HPV4 targeting HPV types 6,11,16and 18) and the bivalent vaccine (Cervarix TM, GSK Biologicals, Belgium, HPV2 targeting HPV types 16 and 18).[5] The Indian Academy of Paediatrics Advisory Committee on Vaccination and Immunization Practices recommends offering the HPV vaccine to all females aged 9–26 years who can afford the vaccine.[6]

In India, the HPV vaccine is recommended for girls and women, but the vaccine is not licensed for boys. The current HPV vaccine prevents six cancers (i.e., cervix, vaginal vulva, anus, penile, and oropharyngeal) and other HPV-associated diseases (e.g., genital warts).[7,8]

Strong HPV vaccine recommendation by health care providers (HCPs) remains a crucial strategy for successful vaccination implementation programme. Medical students, as future physicians and health care providers are the key stakeholders in improving awareness of HPV-related disease burden and advocate for HPV vaccination programs.[3,9] It is important to assess the knowledge of HPV and the acceptability of the vaccine among medical students in the health sector, especially given the controversy and debates related to the cultural aspects, disease prioritization, and parental attitudes.[10]

Need for the study

The awareness and attitudes about the HPV vaccine among undergraduate students have been reported, but data are limited regarding HPV vaccine acceptability and recommendations to others.

Thus, it is important to educate all HCPs about the need for this vaccine. Medical students are future healthcare providers and can play a vital role in promoting cervical cancer screening and HPV vaccination. The importance of the right knowledge, positive attitude, and high acceptance of these interventions among medical students can't be undermined.

Thus, the purpose of this exploratory study is to evaluate undergraduate students' understanding of barriers and facilitators of HPV vaccination and identify potential health education opportunities for HPV vaccination.

MATERIALS AND METHODS

Study design: Cross-sectional study.

Study setting: Rural Medical College

Study period: 6 Months (June-November 2024)

Study subjects: All MBBS students in the selected medical college

Sample size: All the available MBBS medical students at the time of data collection will be included in the study.

Study tools: A Pretested, pre-designed questionnaire, developed for the study, will be used. Pilot testing will be done to further validate the questionnaire and to assess the feasibility of administration of the questionnaire, and necessary changes will be made.

Inclusion Criteria: All students of both sexes studying MBBS in the rural medical college will be included in the study.

Exclusion Criteria

1. Students not willing to participate in the study
2. The student who will not give consent.

Data collection

Ethical approval of the Institutional Human Ethics Committee will be obtained. For all the eligible study subjects, informed written consent will be obtained after thoroughly explaining the purpose and nature of the study. This cross-sectional study will be conducted among all medical students (MBBS Phase I, MBBS Phase II, and MBBS Phase III students) from a Rural Medical College during the period of 6 months from June to November 2024. A predesigned, pre-tested questionnaire will be used as a study tool, and information regarding the sociodemographic profile of study participants, their awareness regarding Human papillomavirus and cervical cancer will be assessed. Knowledge

regarding the HPV vaccine and the acceptability of the HPV vaccine among students will also be assessed.

Statistical Test: Analysis of Descriptive data will be in percentages and proportions, whereas the analysis of associations will be by using chi-square or appropriate statistical tests.

Reference Citation: Vancouver[11] system of listing and citing of reference was used. The references were numbered according to their appearance in the text and listed accordingly.

RESULTS

Human papillomavirus infection (HPV infection) is caused by a DNA virus from the Papillomaviridae family. In some cases, an HPV infection persists and results in either warts or precancerous lesions. These lesions, depending on the site affected, increase the risk of cancer of the cervix, vulva, vagina, penis, anus, mouth, tonsils, or throat. Nearly all cervical cancer is due to HPV, and two strains – HPV16 and HPV18 – account for 70% of all cases.

Cervical cancer: Cervical cancer is a growth of cells that starts in the cervix, the lower part of the uterus. It's usually caused by HPV, a common infection that's passed through sexual contact.

HPV vaccine: A vaccine that helps protect the body against infection with certain types of human papillomavirus (HPV). HPV infection can cause abnormal tissue growth, such as warts, and other changes to cells. Infection for a long time with certain types of HPV can cause cancers of the cervix, vagina, vulva, anus, penis, and oropharynx. HPV vaccines are being used to prevent some of these cancers and to prevent genital warts, abnormal lesions that may lead to some of these cancers.

Table 1: Distribution of participants according to socio-demographic characteristics. (Total N=502)

Variables		Frequency (N)	Percentage (%)
Age (Years)	15-20 Years	131	26.1
	21-25 Years	360	71.7
	26-30Years	11	2.2
Gender	Male	271	54.0
	Female	231	46.0
Academic year	1st Year	101	20.1
	2nd Year	87	17.3
	3rd Year	149	29.7
	Final Year	65	12.9
	Intern	100	19.9
Religion	Agnostic	1	0.2
	Buddhism	18	3.6
	Christian	4	0.8
	Hindu	434	86.5
	Jain	6	1.2
	Muslim	39	7.8
Type of family	Joint	95	18.9
	Nuclear	391	77.9
	Third generation	16	3.2
Place of residence	Rural	231	46.0
	Urban	271	54.0

Table 1: presents the socio-demographic characteristics of the 502 participants. Most students were aged 21–25 years (71.7%), followed by 15–20 years (26.1%) and 26–30 years (2.2%), reflecting a predominantly young adult population. Males constituted 54% and females 46% of the sample. The largest group was 3rd-year students (29.7%), followed by 1st-year (20.1%), interns (19.9%), 2nd-year (17.3%), and final-year students (12.9%). The majority were Hindu (86.5%), with smaller proportions of Muslim (7.8%), Buddhist (3.6%), Jain (1.2%), Christian (0.8%), and Agnostic (0.2%). Most participants belonged to nuclear families (77.9%), and residence was nearly evenly divided between urban (54%) and rural (46%) areas.

Table 2: Association between sex and Awareness regarding Human Papillomavirus

Variable		Human Papillomavirus			Chi-square Value	p-value
		Good N (%)	Poor N (%)	Total N (%)		
Sex	Male	189 (52.1%)	82 (59%)	271 (54%)	**1.941**	**0.164**
	Female	174 (47.9%)	57 (41%)	231 (46%)		
	Total	**363 (100%)**	**139 (100%)**	**502 (100%)**		
Academic year	1st Year	40 (11%)	61 (43.9%)	101 (20.1%)	**71.280**	**0.0001**
	2nd Year	65 (17.9%)	22 (15.8%)	87 (17.3%)		
	3rd Year	118 (32.5%)	31 (22.3%)	149 (29.7%)		
	Final Year	53 (14.6%)	12 (8.6%)	65 (12.9%)		
	Intern	87 (24%)	13 (9.4%)	100 (19.9%)		
	Total	**363 (100%)**	**139 (100%)**	**502 (100%)**		

Table 2: Shows that HPV awareness did not differ significantly by sex (p = 0.164), though males had slightly higher poor awareness (59%). Academic year, however, was strongly associated with awareness (p = 0.0001). Higher-year students, especially interns (24%) and 3rd years (32.5%), showed better awareness, while 1st-year students had the highest poor awareness (43.9%), indicating knowledge improves with academic progression.

Table 3: Association between sex and Awareness regarding cervical cancer

Variable		cervical cancer			Chi-square Value	p-value
		Good N (%)	Poor N (%)	Total N (%)		
Sex	Male	213 (52%)	58 (63%)	271 (54%)	3.722	0.05
	Female	197 (48%)	34 (37%)	231 (46%)		
	Total	**410 (100%)**	**92 (100%)**	**502 (100%)**		
Academic year	1st Year	49 (12%)	52 (56.5%)	101 (20.1%)	101.082	0.0001
	2nd Year	71 (17.3%)	16 (17.4%)	87 (17.3%)		
	3rd Year	132 (32.3%)	17 (18.5%)	149 (29.7%)		
	Final Year	61 (14.9%)	04 (4.3%)	65 (12.9%)		
	Intern	97 (23.7%)	03 (3.3%)	100 (19.9%)		
	Total	**410 (100%)**	**92 (100%)**	**502 (100%)**		

Table 3: Shows a significant association between sex and cervical cancer awareness (p = 0.05), with males having higher poor awareness (63%) than females (37%). Academic year was also highly significant (p = 0.0001), as interns (23.7%) and 3rd-year students (32.3%) had the best awareness, while 1st-year students showed the highest poor awareness (56.5%), indicating knowledge improves with academic progression.

Table 4: Logistic Regression Analysis of Factors Influencing HPV Vaccine Acceptability Among Medical Students

Variable	Regression Coefficient	p-value	Odds Ratio Value
Sex	-1.981	.000	0.138
Year of Course	-0.207	.007	0.813
Encouraged Family/Friends	1.084	.000	2.958
Support Inclusion in NIP	1.202	.012	3.327
Father's education	-0.143	0.079	0.867
Mother's education	0.103	0.154	1.108
Camp encouragement	0.102	0.666	1.107
Family member vaccinated	0.071	0.807	1.073
Belief that government sponsorship would increase acceptability	0.564	0.274	1.758

Table 4: Shows that HPV vaccine acceptability was significantly influenced by sex and academic year, with males (OR = 0.138, p < .001) and students in earlier years (OR = 0.813, p = .007) being less likely to accept the vaccine. Social and policy support were strong predictors, as students who encouraged family/friends (OR = 2.958, p < .001) and those supporting inclusion in the NIP (OR = 3.327, p = .012) had much higher odds of acceptance. Other factors, including parental education, camp encouragement, family vaccination history, and belief in government sponsorship, were not significant.

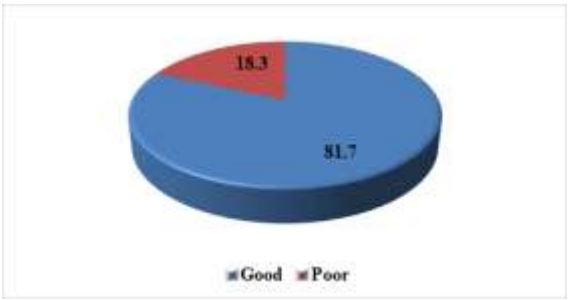

Figure 1: Overall Awareness regarding cervical cancer among medical students

Figure 1 illustrates the overall awareness regarding cervical cancer among medical students, with a significant majority (81.7%) demonstrating good awareness and only 18.3% falling into the poor awareness category.

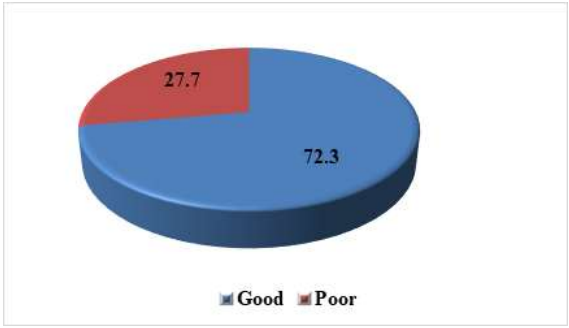

Figure 2: Overall Awareness regarding Human Papillomavirus among medical students

Figure 2 depicts the overall awareness regarding Human Papillomavirus (HPV) among medical students. The majority of participants (72.3%)

demonstrated good awareness, while 27.7% were categorized as having poor awareness.

DISCUSSION

The present study assessed awareness regarding Human Papillomavirus (HPV), cervical cancer, and the acceptability of HPV vaccination among medical students in a rural medical college. Medical students are future healthcare providers and play a crucial role in educating the community and influencing vaccine uptake; therefore, their level of knowledge and attitude towards HPV vaccination is of public health importance.

Socio-demographic profile

The study population predominantly consisted of young adults aged 21–25 years, similar to findings reported in other studies among medical students in India. The near-equal gender distribution ensured adequate representation of both sexes, allowing meaningful comparison of awareness levels. Representation from all academic years, including interns, provided insight into the progression of knowledge with advancing medical education.

Awareness regarding Human Papillomavirus

The present study found a high level of awareness about HPV, with 93.6% of participants having heard of the virus and 88% knowing its association with cancer. These findings are consistent with studies by Pandey et al. and Shetty et al., which reported good baseline awareness among medical students. This high awareness can be attributed to inclusion of sexually transmitted infections, cervical cancer, and HPV in the undergraduate medical curriculum.

However, despite good overall awareness, important gaps were observed in vaccine-related knowledge. Less than half of the participants knew that HPV vaccination can be given to boys, and only around half were aware that screening is not mandatory before vaccination or that vaccination can be given to women already infected with HPV. Similar misconceptions have been reported in other Indian studies, indicating persistent confusion regarding HPV vaccine eligibility and administration. These gaps may negatively influence future counseling practices and vaccine recommendations by medical professionals.

Awareness regarding cervical cancer

Awareness regarding cervical cancer was found to be high in the present study, with 96% of participants having heard about cervical cancer and more than 85% knowing its etiology, mode of transmission, and preventability. This aligns with previous studies conducted among medical and paramedical students, which also reported high awareness levels.

However, awareness regarding screening after vaccination was suboptimal, with only 64.9% recognizing that vaccinated women still require cervical cancer screening. This highlights a critical knowledge gap, as continued screening remains essential even after vaccination. Addressing this misconception is important to prevent a false sense of security among both healthcare providers and the general population.

Association of awareness with sex and academic year

The study showed no statistically significant association between sex and HPV awareness, indicating comparable knowledge levels among male and female students. In contrast, awareness regarding cervical cancer was significantly higher among females, possibly due to greater personal relevance and exposure to reproductive health topics.

A strong association was observed between academic year and awareness of both HPV and cervical cancer. Interns and senior students demonstrated significantly better awareness compared to first-year students. This finding supports the role of progressive medical education and clinical exposure in improving knowledge. Similar trends have been reported in earlier studies, emphasizing the need for early integration of HPV-related education in the undergraduate curriculum.

Factors influencing HPV vaccine acceptability

Logistic regression analysis revealed that sex and year of study significantly influenced HPV vaccine acceptability. Male students and those in earlier academic years were less likely to accept HPV vaccination. This may reflect the misconception that HPV vaccination is relevant only for females and limited exposure to preventive medicine concepts in early years.

Social influence emerged as a strong determinant of vaccine acceptability. Students who encouraged family and friends to take the vaccine were significantly more likely to accept it themselves. Additionally, support for inclusion of the HPV vaccine in the National Immunization Program (NIP) was associated with higher acceptability, highlighting the importance of policy-level endorsement.

Other factors such as parental education, vaccination camps, and family vaccination history did not show significant associations, suggesting that personal beliefs and professional attitudes may play a more important role than background characteristics.

Limitations

As a cross-sectional study, causal relationships cannot be established. Self-reported responses may be subject to social desirability bias. Additionally, being conducted in a single rural medical college, the findings may not be generalizable to all medical students in India.

CONCLUSION

The study highlights that medical students, predominantly young adults, demonstrated high levels of awareness regarding HPV and cervical cancer. Most participants recognized HPV and its

link to cancer, as well as the preventability and early detection of cervical cancer. However, notable gaps existed in vaccine-related knowledge, particularly regarding eligibility, screening, and administration. Academic progression was strongly associated with better awareness, with interns and senior students showing higher knowledge compared to first-year students. Gender differences were evident in cervical cancer awareness, with females performing better than males. Logistic regression further revealed that sex, academic year, peer influence, and support for inclusion in the National Immunization Program significantly influenced HPV vaccine acceptability. Overall, while awareness levels were encouraging, targeted educational interventions are needed to address specific gaps and strengthen vaccine acceptance.

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