International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Poonia H et al. Int J Reprod Contracept Obstet Gynecol. 2025 Nov;14(11):3788-3792
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20253519

Original Research Article

Knowledge, attitude and practice about human papilloma virus vaccination among medical students

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Received: 22 July 2025
Revised: 15 October 2025
Accepted: 16 October 2025

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ABSTRACT

Background: Human papilloma virus (HPV) is one of the most common sexually transmitted infections and a major etiological factor for cervical cancer, which remains a leading cause of morbidity and mortality among women worldwide. Although safe and effective vaccines are available, awareness and vaccination coverage remain suboptimal, especially among young adults. Medical students, as future healthcare providers, play a pivotal role in promoting HPV vaccination; therefore, understanding their knowledge, attitude, and practices (KAP) is essential.
Methods: A cross-sectional study was conducted among undergraduate medical students of JNU medical college, Jaipur. Data were collected using a structured, pretested questionnaire assessing participants' knowledge about HPV infection and vaccination, their attitudes toward immunization, and their personal vaccination practices. The responses were analysed using descriptive statistics to determine awareness levels and the relationship between knowledge and vaccination behaviour.
Results: The study revealed that while a majority of students had heard about HPV and its association with cervical cancer, only a smaller proportion demonstrated adequate knowledge about the recommended age, dosage schedule, and target groups for vaccination. Attitude toward HPV vaccination was generally positive, but the actual practice of vaccination among students was low. A clear gap was observed between awareness and vaccine uptake.
Conclusions: Although medical students showed moderate awareness and positive attitudes toward HPV vaccination, poor vaccination practice highlights the need for targeted educational programs and inclusion of HPV-related content in the medical curriculum.

Keywords: HPV, Cervical cancer, Vaccination, Medical students, Awareness, Preventive healthcare

INTRODUCTION

Human papilloma virus (HPV) is one of the most common asymptomatic sexually transmitted infections worldwide and represents a major etiological factor in the development of cervical cancer.[1] Cervical cancer ranks as the second most frequent cancer among women globally and continues to be a major public health concern in India, largely due to inadequate screening practices and limited immunization coverage.[2] The transmission of HPV occurs primarily through sexual contact, and persistent infection with high-risk oncogenic strains, particularly HPV types 16 and 18, is responsible for more than 70% of cervical cancer cases.[3] In addition to cervical malignancy, HPV infection has also been linked to other anogenital and oropharyngeal cancers, underscoring its widespread impact on global health.[4]

The introduction of prophylactic HPV vaccines marked a major advancement in the prevention of HPV-associated diseases. Two main types of vaccines are currently in use: the bivalent vaccine, which protects against HPV types 16 and 18, and the quadrivalent vaccine, which provides additional protection against types 6 and 11, known to cause genital warts.[5] More recently, a nonavalent vaccine has been developed to cover nine HPV strains, offering

broader immunological protection.[6] The world health organization (WHO) recommends routine HPV vaccination for both girls and boys aged 9-14 years, ideally before the onset of sexual activity, as part of comprehensive cervical cancer prevention programs.[7]

Despite strong evidence supporting the vaccine's safety and efficacy, vaccination coverage remains suboptimal, particularly in low- and middle-income countries like India.[8] Factors contributing to poor uptake include limited awareness, sociocultural stigma surrounding sexually transmitted infections, misconceptions regarding vaccine safety and necessity, and financial barriers.[9] Additionally, the lack of national-level HPV immunization programs and inconsistent health education further limit vaccine implementation.[10]

Medical students, as future healthcare professionals, play a pivotal role in health promotion, disease prevention, and patient education.[11] Their understanding and perception of HPV vaccination are crucial not only for their personal protection but also for influencing public attitudes toward immunization. Studies have shown that healthcare providers' recommendations significantly affect vaccination acceptance among patients and caregivers.[12] Therefore, ensuring that medical students possess adequate knowledge, positive attitudes, and correct practices (KAP) regarding HPV vaccination is essential for the success of future public health initiatives.[13]

Assessing the knowledge, attitude, and practice of medical students toward HPV vaccination provides valuable insight into potential gaps in awareness and barriers to vaccine acceptance. Identifying these gaps can help design targeted educational programs within medical curricula to enhance awareness, promote preventive practices, and reduce vaccine hesitancy.[14] Thus, the present study aims to evaluate the KAP regarding HPV vaccination among medical students, with the broader goal of contributing to improved vaccine advocacy and cervical cancer prevention strategies in India.

METHODS

A cross-sectional, questionnaire-based study was conducted AT January 2025 to march 2025 among 150 undergraduate medical students of JNU medical college, Jaipur, to evaluate their KAP regarding HPV vaccination. Prior approval from the institutional ethics committee was obtained before commencing the study, and written informed consent was taken from all participants.

Data were collected using a pre-validated, structured questionnaire specifically designed for this study. The questionnaire comprised both multiple-choice and open-ended questions that assessed various aspects of students' understanding of HPV infection and vaccination. It included sections on demographic details, awareness of HPV transmission and associated diseases, knowledge of vaccine availability and dosage, attitudes toward immunization, and personal vaccination practices.

Demographic information such as age, gender, and MBBS batch year was collected to establish background characteristics. The inclusion criteria included all undergraduate students of JNU Medical College who voluntarily provided consent to participate in the study. Students younger than 18 years of age or those unwilling to participate were excluded.

Knowledge about HPV infection and vaccination was assessed through six key questions exploring students' understanding of whether HPV causes cancer, its role in cervical and penile cancers, vaccine availability in India, recommended number of doses, and whether vaccinated individuals could still develop HPV-related cancers. Attitude toward HPV vaccination was evaluated by asking participants about their perceptions of vaccine safety, effectiveness in cancer prevention, and its role in protecting sexual partners.

Practice related to HPV vaccination was assessed by determining the students' vaccination status, categorized as: (1) fully vaccinated or currently undergoing vaccination, (2) never vaccinated, or (3) unaware of their vaccination status. Additionally, the reasons for vaccine hesitancy or non-vaccination were explored to identify barriers to vaccine uptake.

All responses were coded and entered into a database for analysis. Data were analyzed using descriptive statistical methods to determine the level of knowledge, attitude, and vaccination practices among the participants.

RESULTS

A total of 150 medical students participated in this study to assess their knowledge, attitude, and practice regarding HPV vaccination.

A total of 70% of students were aware of HPV infection and its link to cervical cancer. Although 90.7% of them were aware of HPV being sexually transmitted, very few (55.3%) knew about HPV being a causative agent infecting both men and women. Regarding vaccination timing, 60% knew the ideal age for vaccination; however, 40% were unaware or unsure about the correct vaccination schedule (Table 1).

Overall, 80% exhibited a positive attitude towards the efficacy of the vaccine. However, only 40% of students were confident about the safety of vaccination, indicating a large gap between awareness and confidence. Despite this, 75.3% expressed willingness to pay for the vaccination, and 85.3% believed it should be included in the national immunization program (Table 2).

About 54.7% of students were not sure about their vaccination status, and among the unvaccinated group

(n=120), 35% reported that lack of adequate information and another 35% cited uncertainty about vaccine efficacy as factors influencing their decision not to get vaccinated. However, 80% indicated they would recommend HPV vaccination to their future patients, showing a positive intention despite personal hesitation (Table 3 and 4).

Table 1: Knowledge about HPV vaccination among medical students.

Knowledge parameters	Correct response	Incorrect response	Did not know
Aware of the HPV vaccine	105 (70.0%)	38 (25.3%)	7 (4.7%)
HPV is primarily associated with cervical cancer and genital warts	100 (66.7%)	23 (15.3%)	27 (18.0%)
HPV is sexually transmitted	136 (90.7%)	6 (4.0%)	8 (5.3%)
Both males and females can be infected with HPV	83 (55.3%)	30 (20.0%)	37 (24.7%)
Ideal age of HPV vaccination is before sexual debut (9-14 years)	90 (60.0%)	30 (20.0%)	30 (20.0%)
HPV vaccination can prevent cervical cancer	113 (75.3%)	23 (15.3%)	14 (9.3%)
Overall knowledge score	108 (72.0%)	25 (16.7%)	17 (11.3%)

Table 2: Attitude about HPV vaccination among medical students.

Attitude parameters	Agree	Disagree	Don't know/not sure
HPV virus is causative agent for cervical cancer	135 (90.0%)	0 (0.0%)	15 (10.0%)
Efficacy of HPV vaccination	120 (80.0%)	15 (10.0%)	15 (10.0%)
Safety of HPV vaccination for sexual health	60 (40.0%)	53 (35.3%)	37 (24.7%)
Willingness to pay for vaccination	113 (75.3%)	30 (20.0%)	7 (4.7%)
HPV vaccination should be included in national immunization program	128 (85.3%)	8 (5.3%)	14 (9.3%)
Would recommend HPV vaccination to family and friends	105 (70.0%)	20 (13.3%)	25 (16.7%)
Overall positive attitude score	110 (73.3%)	21 (14.0%)	19 (12.7%)

Table 3: Practice regarding HPV vaccination among medical students.

Practice parameters	Yes	No	Not sure
Have you received HPV vaccination?	30 (20.0%)	38 (25.3%)	82 (54.7%)
Would you get vaccinated if offered?	98 (65.3%)	22 (14.7%)	30 (20.0%)
Have you ever recommended HPV vaccination to others?	45 (30.0%)	75 (50.0%)	30 (20.0%)
Do you discuss HPV vaccination with patients during clinical postings?	38 (25.3%)	90 (60.0%)	22 (14.7%)
Would you recommend HPV vaccination to your future patients?	120 (80.0%)	8 (5.3%)	22 (14.7%)

Table 4: Reasons for not being vaccinated (among unvaccinated, n=120).

Reasons	N (%)
Lack of adequate information	42 (35.0%)
Uncertainty about vaccine efficacy	42 (35.0%)
Cost concerns	18 (15.0%)
Not considered necessary	12 (10.0%)
Fear of side effects	6 (5.0%)

DISCUSSION

The present study evaluated the knowledge, attitude, and practice regarding HPV vaccination among 150 medical students and revealed important findings with significant implications for medical education and public health. While 70% of students demonstrated awareness about HPV and its association with cervical cancer, and 90.7% correctly identified it as a sexually transmitted infection, critical knowledge gaps identified in several areas. Notably, only 55.3% of participants recognized that HPV can infect both males and females, and merely 60% knew ideal age for vaccination (9-14 years, before sexual debut). These findings are concerning, as medical students represent future healthcare providers who will play pivotal role in patient counseling and vaccination advocacy.

The attitude assessment revealed that 80% of students exhibited confidence in vaccine efficacy, and 90% acknowledged HPV as the causative agent for cervical cancer. However, a significant concern emerged regarding vaccine safety, with only 40% expressing confidence while 35.3% either disagreed or remained uncertain. This safety concern is particularly troubling among medical students who should be well-informed about evidence-based vaccine safety profiles. Despite these concerns, 75.3% expressed willingness to pay for vaccination, and 85.3% believed it should be included in the national immunization program, indicating overall positive attitudes that could be leveraged through targeted educational interventions.[13,14]

The most striking finding was the substantial knowledge-practice gap observed in this study. Despite 72% demonstrating adequate knowledge and 73.3% showing positive attitudes, only 20% confirmed receiving HPV vaccination, while 54.7% remained uncertain about their vaccination status. Among unvaccinated students, the primary barriers identified were lack of adequate information (35%) and uncertainty about vaccine efficacy (35%), followed by cost concerns (15%).[15,16] This paradox-where medical students possess theoretical knowledge but fail to translate it into personal health behavior-highlights systemic issues in medical education and healthcare delivery that need urgent attention.

These findings align with previous studies demonstrating that knowledge alone is insufficient to drive behavioral change.[17,18] Medical students are in a strategic position to influence public opinion and educate patients, making it crucial that their own knowledge is both accurate and comprehensive. The fact that 80% expressed willingness to recommend HPV vaccination to future patients, while only 25.3% currently discuss it during clinical postings, suggests that barriers such as misinformation, cost, limited access to vaccines, and lack of institutional support significantly impede practice.[19,20]

Several factors may contribute to the observed knowledge-practice gap. First, HPV vaccination may not be adequately emphasized in the medical curriculum, leading to insufficient practical understanding of vaccine administration, dosage schedules, and patient counseling strategies. Second, the lack of accessible, affordable vaccination programs within medical institutions may prevent students from getting vaccinated despite positive intentions. Third, persistent misconceptions about vaccine safety, possibly fueled by misinformation on social media and lack of evidence-based education, create hesitancy even among educated healthcare professionals-in-training.[21]

To address these gaps, targeted educational interventions integrated into the medical curriculum are essential. These should include comprehensive modules on HPV pathophysiology, vaccination guidelines, safety profiles, and effective patient communication strategies. Additionally, institutional policies providing subsidized or free HPV vaccination to medical students could bridge the knowledge-practice gap while setting an example for future clinical practice. Peer education programs, wherein vaccinated students share their experiences, may also help address safety concerns and normalize vaccination uptake.[22]

Further research should explore knowledge differences between pre-clinical and clinical students, assess curriculum integration effectiveness, examine regional disparities, and conduct longitudinal studies to evaluate retention of knowledge and actual long-term vaccination uptake beyond self-reports.

Limitations

This study was conducted in a single medical institution, which limits the generalizability of its findings to other medical colleges across India. The cross-sectional design prevents assessment of causal relationships between knowledge and vaccination behavior. As the study relied on self-reported responses, recall and reporting biases may have influenced the results. Despite these limitations, the study provides valuable insights into the existing knowledge and practice gaps and highlights the importance of strengthening HPV education within medical curricula.

CONCLUSION

Despite high awareness and a generally positive attitude towards HPV vaccination among medical students, the actual rate of vaccine uptake remains alarmingly low. This study highlights the need for improved educational strategies that not only provide factual knowledge but also promote behavioral change through motivation and accessibility.

Incorporating HPV education into medical training can lead to better-informed future healthcare providers who will be better equipped to recommend and administer the vaccine to the public.

In the present study among medical students we found that majority of the students knew that HPV may cause cancer in humans (90%), leading to cervical cancer in females (86%). In our study, 72.5% students knew that HPV can even lead to cancer in males.

Through our study we gathered the information that (91%) medical students strongly believe in efficacy of HPV vaccination but when asked whether students are willing to pay for vaccination, 75 % agreed to pay for vaccination and 25% did not agree or were not sure to pay for vaccination and were also insecure regarding the safety but later on they were guided & motivated by senior healthcare professionals for getting vaccinated and change in attitude was observed.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Poonia H, Masand DL. Knowledge, attitude and practice about human papilloma virus vaccination among medical students. Int J Reprod Contracept Obstet Gynecol 2025;14:3788-92.