

A Cross-sectional Study on Knowledge, Attitude and Practice of Female Undergraduate Medical Students about HPV Vaccination in Sri Aurobindo Medical College & PG Institute, Indore (M.P.)

Dr. Shivam Astonkar^{1*}, Dr. R.R. Wavare², Dr. Sanjay Dixit³, Dr Apurv Thakur⁴, Dr Nitish Adwadkar⁵

¹Junior Resident, Department of Community Medicine, Sri Aurobindo Medical College & PG Institute, Sri Aurobindo University Indore, Madhya Pradesh, India. Email: astonkar16@gmail.com, Phone: 8965963280.

²Professor and Dean Department of Community Medicine, Sri Aurobindo Medical College & PG Institute, Sri Aurobindo University Indore, Madhya Pradesh, India

³Professor and Directorate of Medical Education Department of Community Medicine,

Sri Aurobindo Medical College & PG Institute, Sri Aurobindo University Indore, Madhya Pradesh, India.

⁴ Professor, Department of Community Medicine, Sri Aurobindo Medical College & PG Institute, Sri Aurobindo University Indore, Madhya Pradesh, India.

⁵ Assistant Professor, Department of Community Medicine, Sri Aurobindo Medical College & PG Institute, Sri Aurobindo University Indore, Madhya Pradesh, India

Abstract

Background: Cervical cancer remains one of the leading causes of cancer-related morbidity and mortality among women worldwide and continues to be a major public health concern in India. Persistent infection with high-risk Human Papillomavirus (HPV), particularly genotypes 16 and 18, is responsible for the majority of cervical cancer cases. HPV vaccination is a highly effective primary preventive strategy capable of substantially reducing the incidence of cervical cancer. Despite the introduction of the National HPV Vaccination Programme in India in 2024, vaccine uptake remains inadequate due to poor awareness, financial constraints, misconceptions, and sociocultural barriers. As future healthcare providers, medical students play a vital role in promoting HPV vaccination and educating the community.

Objectives: To assess the knowledge, attitude and practice regarding HPV vaccination among female undergraduate MBBS students of Sri Aurobindo Medical College & PG Institute, Indore.

Materials and Methods: A cross-sectional descriptive study was conducted among 200 female undergraduate MBBS students from first to final year. Participants were selected through convenience sampling. Data were collected using a pre-validated semi-structured questionnaire administered through Google Forms after obtaining informed consent. The questionnaire assessed knowledge, attitude and practice regarding HPV vaccination. Data were analysed using SPSS version 25. Descriptive statistics, Chi-square test, Kruskal-Wallis test and Spearman's correlation were used.

Results: Among the 200 participants, 61.5% demonstrated good knowledge regarding HPV vaccination, while 33.5% had average knowledge and 5% had poor knowledge. Neutral attitude towards HPV vaccination was observed among 53.5% of students, whereas 23% had a positive attitude and 23.5% demonstrated a negative attitude. Only 12.1% of the participants had received HPV vaccination. Among the unvaccinated students, lack of awareness regarding vaccination centres (38%), high cost (26%), low perceived susceptibility (21%), fear of side effects (9%), and lack of priority (6%) were the major barriers. Nearly three-fourths (74%) of the unvaccinated students expressed willingness to receive HPV vaccination if it was provided free of cost or at subsidized rates.

Conclusion: Although knowledge regarding HPV vaccination was satisfactory among female medical students, vaccination uptake remained remarkably low. Institutional awareness programmes, subsidized vaccination services and incorporation of HPV education into the undergraduate medical curriculum may substantially improve vaccine acceptance and contribute towards the national goal of cervical cancer elimination.

Keywords: Human Papillomavirus, HPV vaccination, Cervical cancer, Knowledge, Attitude, Practice, Medical students.

INTRODUCTION

Cervical cancer, despite being one of the most preventable cancers, remains prevalent among women globally and poses a significant public health challenge, particularly in low- and middle-income countries. India notably contributes to this global burden, with thousands of new cases and fatalities annually.²⁻³ The primary etiological factor for cervical cancer is persistent infection with high-risk Human Papillomavirus (HPV).¹⁻⁴⁻⁵ Of the over 200 identified HPV genotypes, types 16 and 18 are responsible for approximately 70–80% of cervical cancer cases worldwide and about 83% of invasive cervical cancers in India.²⁻⁵ Although the majority of HPV infections resolve spontaneously, persistent infections with high-risk types can progress to cervical precancerous lesions and invasive cancer.⁴ Prophylactic HPV vaccines have demonstrated high efficacy in preventing infections with oncogenic HPV types and in reducing cervical precancerous lesions.¹⁻⁷ The World Health Organization advocates for routine HPV vaccination of adolescent girls prior to sexual debut, and India implemented the National HPV Vaccination

Programme in 2024 to bolster cervical cancer prevention and elimination efforts.^{1 6 7} Despite the availability of effective vaccines, HPV vaccination coverage in India remains suboptimal due to inadequate awareness, misconceptions regarding vaccine safety, limited accessibility, financial constraints, and insufficient recommendations from healthcare providers. Medical students, as prospective physicians, are pivotal in promoting HPV vaccination. Their knowledge, attitudes, and personal vaccination practices can significantly influence future patient counseling and vaccine acceptance.^{8 9 10 12} There is a paucity of data on the knowledge, attitude, and practice (KAP) regarding HPV vaccination among female medical students in Central India. Consequently, this study was conducted to evaluate the KAP concerning HPV vaccination among female MBBS students at Sri Aurobindo Medical College and PG Institute, Indore, Madhya Pradesh. The findings aim to inform targeted educational interventions and enhance institutional vaccination strategies.

MATERIALS AND METHODS

Study Design

A cross-sectional descriptive study was conducted to assess the knowledge, attitude, and practice regarding Human Papillomavirus (HPV) vaccination among female undergraduate medical students.

Study Setting

The study was conducted at Sri Aurobindo Medical College & Post Graduate Institute (SAMC & PGI), Indore, Madhya Pradesh, a tertiary care teaching institution affiliated with Sri Aurobindo University.

Study Population

The study population comprised female undergraduate MBBS students enrolled in the first, second, third, and final years of the MBBS course during the study period.

Study Duration

The study was conducted over a period of three months (2025) after obtaining approval from the Institutional Ethics Committee.

Inclusion Criteria

Female undergraduate MBBS students.
Students willing to participate in the study.
Students providing informed electronic consent.

Exclusion Criteria

Male MBBS students.
Students absent during data collection.
Students unwilling to participate or submitting incomplete responses.

Sample Size

The sample size was calculated using the formula:

$$n = Z^2 P(1 - P)/d^2$$

Where:

Z = 1.96 at 95% confidence interval

P = Expected prevalence

d = Absolute precision

The calculated sample size was 200 participants.

Sampling Technique

A convenience sampling technique was adopted due to easy accessibility of participants from different MBBS batches.

Study Tool

Data were collected using a pre-validated semi-structured questionnaire prepared after reviewing relevant literature. The questionnaire consisted of four sections:

Section I

Sociodemographic details

Section II

Knowledge regarding HPV infection and vaccination

Section III

Attitude towards HPV vaccination

Section IV

Practice regarding HPV vaccination

Data Collection Procedure

After describing the study's purpose, participants gave their consent electronically.

The questionnaire was shared via Google Forms, maintaining anonymity and confidentiality. Each participant could submit only one response.

Variables Studied

The variables examined were:

Independent Variables

- Year of MBBS
- Age

Dependent Variables

- Knowledge score
- Attitude score
- HPV vaccination status
- Intention for vaccination
- Barriers to vaccination

Statistical Analysis

Data collected were entered into Microsoft Excel and analyzed using SPSS Version 25.

The statistical methods used included:

- Frequency
- Percentage
- Mean
- Standard deviation
- Chi-square test
- Kruskal-Wallis test
- Spearman's rank correlation coefficient

A p-value <0.05 was considered statistically significant.

Ethical Considerations

Prior to the initiation of the study, ethical approval was secured from the Institutional Ethics Committee of Sri Aurobindo Medical College & PG Institute, Indore. Participation in the study was entirely voluntary. Informed consent was electronically obtained from all participants. Throughout the study, the confidentiality and anonymity of participants were rigorously upheld. No personal identifiers were collected, and the data were exclusively utilized for academic and research purposes.

RESULTS

Variable	Category	Frequency (n)	Percentage (%)
MBBS Year	First Year	41	20.5
	Second Year	41	20.5
	Third Year	85	42.5
	Final Year	33	16.5
Knowledge Level	Good	123	61.5
	Average	67	33.5
	Poor	10	5.0
Attitude	Positive	46	23.0
	Neutral	107	53.5
	Negative	47	23.5
HPV Vaccination Status	Vaccinated	24	12.1
	Not Vaccinated	176	87.9
Reasons for Non vaccination	Lack of awareness regarding vaccination centre	—	38
	High cost	—	26
	Did not perceive themselves at risk	—	21
	Fear of side effects	—	9
	Did not prioritize vaccination	—	6
Willingness to Receive HPV Vaccine	Willing if vaccine available free/subsidized	—	74
	Not willing	—	26

Interpretation

Among the 200 female undergraduate medical students, the majority (42.5%) belonged to the third MBBS year. Overall, 61.5% of participants had good knowledge regarding HPV vaccination, whereas 33.5% had average knowledge and 5% had poor knowledge. More than half (53.5%) demonstrated a neutral attitude towards HPV vaccination. Despite satisfactory knowledge, only 12.1% of participants had received the HPV vaccine. The most frequently reported barriers to vaccination were lack of awareness regarding vaccination centres (38%) and high cost (26%). Encouragingly, 74% of unvaccinated students expressed willingness to receive the vaccine if it were made available free of cost or at subsidized rates through institutional health services.

DISCUSSION

The current cross-sectional study evaluated the knowledge, attitudes, and practices concerning HPV vaccination among 200 female undergraduate MBBS students at Sri Aurobindo Medical College & PG Institute, Indore. As future healthcare providers, medical students are crucial in promoting preventive health measures, including HPV vaccination. Thus, assessing their awareness and vaccination practices is vital for identifying educational deficiencies and enhancing future public health strategies. In this study, 61.5% of participants exhibited good knowledge of HPV vaccination, 33.5% demonstrated average knowledge, and only 5% showed poor knowledge. These results indicate that the majority of female medical students have a satisfactory understanding of HPV infection, cervical cancer, and

the preventive role of HPV vaccination. This relatively high level of knowledge is anticipated among medical students due to their academic curriculum and regular exposure to healthcare information. However, approximately two-fifths of participants still lacked comprehensive knowledge, highlighting the necessity for ongoing educational reinforcement. Similar findings were reported by Sharma et al., who noted satisfactory knowledge among undergraduate medical students.⁸ The study further revealed that 53.5% of students maintained a neutral attitude toward HPV vaccination, while 23.0% had a positive attitude and 23.5% had a negative attitude. Despite satisfactory awareness regarding HPV, many students remained hesitant or undecided about vaccination. This suggests that knowledge alone may not suffice to foster favorable health behavior. Personal beliefs, cultural perceptions, concerns about vaccine safety, and limited institutional promotion may contribute to this neutral attitude. Comparable observations were reported by Shetty et al., where many students expressed positive awareness but hesitancy towards vaccination.⁹ A significant finding of this study was the pronounced disparity between knowledge and actual vaccination practices. Although over sixty percent of participants possessed good knowledge, only 12.1% had received the HPV vaccination, leaving 87.9% unvaccinated. This discrepancy underscores that sufficient knowledge does not necessarily translate into vaccine acceptance. Padmanabha et al. also reported low vaccination coverage among medical students. Similar observations have been documented in studies involving healthcare students, where awareness levels were relatively high, yet vaccination coverage remained low. Among unvaccinated participants, the most prevalent barrier was a lack of awareness regarding vaccination centres (38%), followed by high vaccine cost (26%), low perceived personal risk (21%), fear of side effects (9%), and failure to prioritize vaccination (6%). These findings suggest that structural and financial barriers are more influential than a mere lack of awareness. Enhancing access to vaccination services and alleviating financial constraints could significantly increase vaccine uptake among medical students. An encouraging finding was that 74% of unvaccinated students expressed willingness to receive the HPV vaccination if it were offered free of charge or at subsidized rates through institutional health services. This observation indicates that vaccine hesitancy within the study population is not absolute, and targeted interventions could markedly improve vaccination coverage. Organizing on-campus vaccination drives, integrating HPV vaccination into student health programs, and providing subsidized vaccination through medical colleges could effectively bridge the existing gap between awareness and practice. These findings align with the WHO strategy to enhance HPV vaccination coverage and accelerate cervical cancer elimination. The distribution of participants according to MBBS year revealed that students from all academic years participated in the study, with the highest proportion from the third MBBS year (42.5%). Year-wise analysis also showed variation in vaccination coverage, with second-year students exhibiting relatively higher vaccine uptake than those from other years. This may reflect differences in curriculum exposure, peer influence, or recent academic instruction related to cervical cancer prevention. The findings of the present study have important public health implications. Since medical students will become future physicians, improving their own vaccination status and confidence regarding HPV vaccination may positively influence their future clinical recommendations. Evidence suggests that healthcare provider recommendation is one of the strongest determinants of HPV vaccine acceptance among adolescents and young adults. The present study has several strengths. It included participants from all undergraduate MBBS years, used a pre-validated questionnaire, and assessed knowledge, attitude, and practice simultaneously, providing a comprehensive understanding of HPV vaccination among female medical students. However, certain limitations should be acknowledged. The study was conducted in a single medical college using convenience sampling, which may limit the generalizability of the findings. Information was collected through self-administered questionnaires and may therefore be subject to recall bias and social desirability bias. Furthermore, the cross-sectional nature of the study does not allow assessment of causal relationships. Despite these limitations, the findings provide valuable baseline evidence regarding HPV vaccination among female undergraduate medical students in Central India. The study emphasizes the urgent need for strengthening institutional awareness programmes, incorporating structured HPV education into undergraduate medical training, improving vaccine accessibility, and conducting regular on-campus vaccination campaigns. Such interventions would not only improve vaccination coverage among future healthcare professionals but also contribute to India's efforts toward achieving the World Health Organization's cervical cancer elimination targets. The present study demonstrated that although the majority of female undergraduate medical students possessed satisfactory knowledge regarding Human Papillomavirus (HPV) infection and its vaccination, actual vaccine uptake remained considerably low. More than three-fifths (61.5%) of the

participants had good knowledge, indicating that medical education has been effective in creating awareness regarding HPV and cervical cancer prevention. However, despite this satisfactory knowledge, only 12.1% of the participants had received HPV vaccination, highlighting a substantial gap between knowledge and preventive practice.

More than half of the participants exhibited a neutral attitude toward HPV vaccination, suggesting that awareness alone is insufficient to ensure vaccine acceptance. The major barriers identified in this study included lack of awareness regarding vaccination centres, high vaccine cost, low perceived susceptibility to HPV infection, concerns regarding adverse effects, and failure to prioritize vaccination. Importantly, nearly three-fourths of the unvaccinated participants expressed willingness to receive HPV vaccination if it were made available free of cost or at subsidized rates.

The findings indicate that improving accessibility and affordability of HPV vaccination, along with targeted educational interventions, could significantly enhance vaccination coverage among future healthcare professionals. Medical colleges should actively promote HPV vaccination through awareness campaigns, counselling sessions, and institutional vaccination drives to improve preventive healthcare practices among students. Overall, the study highlights the need to bridge the gap between knowledge and practice and emphasizes the crucial role of medical institutions in achieving the national goal of cervical cancer prevention.

ACKNOWLEDGEMENT

The authors sincerely thank the Department of Community Medicine, Sri Aurobindo Medical College & PG Institute, Indore, for their guidance and support throughout the study. The authors also express their gratitude to all the undergraduate medical students who voluntarily participated in the study.

ETHICAL APPROVAL

The study was conducted after obtaining approval from the Institutional Ethics Committee of Sri Aurobindo Medical College & PG Institute, Indore. Written informed consent was obtained from all participants prior to data collection.

FUNDING

No external funding was received for this study.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

REFERENCES

1. World Health Organization. Human papillomavirus (HPV) and cancer. Geneva: World Health Organization; 2024. Available from: <https://www.who.int/news-room/fact-sheets/detail/human-papilloma-virus-and-cancer> World Health Organization
2. Bruni L, Albero G, Serrano B, Mena M, Gómez D, Muñoz J, et al. Human Papillomavirus and Related Diseases Report. Barcelona: ICO/IARC HPV Information Centre.
3. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global Cancer Statistics 2024. CA Cancer J Clin. 2024. World Health Organization
4. Schiffman M, Castle PE, Jeronimo J, Rodriguez AC, Wacholder S. Human papillomavirus and cervical cancer. Lancet. 2007;370(9590):890-907. doi:10.1016/S0140-6736(07)61416-0. PubMed
5. Bosch FX, de Sanjosé S. The epidemiology of human papillomavirus infection and cervical cancer. Dis Markers. 2007;23(4):213-227. doi:10.1155/2007/914823. PubMed
6. Ministry of Health and Family Welfare, Government of India. Operational Guidelines for Introduction of HPV Vaccine in the Universal Immunization Programme.
7. World Health Organization. Global strategy to accelerate the elimination of cervical cancer as a public health problem. Geneva: World Health Organization.

8. Sharma C, Singh P, Arora IK, et al. Assessment of understanding about human papilloma virus vaccination among undergraduate medical students in a developing country: Perspective from India. J Fam Med Prim Care. 2020;9(8):4311-4316.
9. Pandey D, Vanya V, Bhagat S, Binu VS, Shetty J, et al. Awareness and attitude towards human papillomavirus (HPV) vaccine among medical students in a premier medical school in India. PLoS One. 2012;7(7): e40619.
10. Padmanabha N, Kini JR, Alwani AA, Sardesai A. Acceptability of human papillomavirus vaccination among medical students in Mangalore, India. Vaccine. 2019.