



Original Research Article

KNOWLEDGE, ATTITUDE, AND REASONS` FOR HESITANCY OF HPV VACCINE AMONG MEDICAL, AND DENTAL STUDENTS IN A TERTIARY CARE CENTRE, RAICHUR, INDIA: A CROSS SECTIONAL STUDY

Radha¹, Pratibha Reddy¹, Roopakala N², Vaishnavi A V³

¹Assistant Professor, Department Community Medicine, Navodaya Medical College Hospital and Research Centre, India.

²Associate Professor, Department Community Medicine, Navodaya Medical College Hospital and Research Centre, India.

³Final MBBS Student, Navodaya Medical College Hospital and Research Centre, India.

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Corresponding Author:

Dr. Radha,

Assistant Professor, Department
Community Medicine, Navodaya
Medical College Hospital and Research
Centre, India.

Email: pujariradha6@gmail.com

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ABSTRACT

Background: Cervical cancer is the second most common cancer among women in India, contributing to approximately 6–29% of all cancers in Indian women. The primary causative agent is the Human Papillomavirus (HPV). The Human Papillomavirus (HPV) vaccine is a key tool in preventing cervical cancer. It protects against the most common HPV types that cause the majority of cervical cancer cases. However, several studies have highlighted gaps in knowledge and hesitancy even among medical and Dental students, raising concerns about their preparedness to advocate for HPV vaccination. The objective is to assess the knowledge, attitude and practice regarding the HPV vaccine among undergraduate medical and dental students and to assess the determinants of hesitancy of HPV vaccination among medical and dental students.

Materials and Methods: A descriptive cross-sectional study was conducted tertiary care hospital Raichur, India from February to April 2025. Data were collected from --- Medical and Dental students using a validated questionnaire covering socio-demographic information, knowledge, attitudes, and reasons for non-uptake of HPV vaccination. Statistical analysis was performed using MS Excel and SPSS version 26.0. Descriptive statistics summarized the data, while binary and multivariable logistic regression analyses identified factors associated with knowledge, attitude, and willingness for HPV vaccination.

Results: A total of 164 medical and dental students participated in the study. Most students showed good awareness regarding HPV vaccination, with 98.9% of MBBS and 80.0% of dental students recognizing its role in preventing cervical cancer. Positive attitudes toward vaccination were observed, and most participants supported inclusion of the HPV vaccine in the National Immunization Schedule. However, misconceptions regarding protection against all STIs and the need for Pap smear screening after vaccination were identified. Major reasons for vaccine hesitancy included fear of side effects, lack of adequate information, uncertainty about vaccine safety, and high vaccine cost.

Conclusion: Medical and dental students demonstrated favorable knowledge and attitudes regarding HPV vaccination, though important knowledge gaps and hesitancy factors persist. Safety concerns, insufficient information, and financial barriers were the major determinants of hesitancy. Strengthening educational interventions, awareness programs, and improving vaccine accessibility may enhance vaccine acceptance and promote cervical cancer prevention among future healthcare professionals.

Keywords: knowledge, Attitude, Practice, Cervical Cancer, HPV vaccine, Medical and Dental Students.

INTRODUCTION

Cervical cancer remains a leading cause of cancer morbidity and mortality among women, with strong evidence linking persistent high-risk HPV infection to most cases and vaccination offering highly effective primary prevention.

In India, cervical cancer accounts for between 6–29% of all cancers in women, making it the second most frequent cancer among them.^[1] The main cause is the Human Papillomavirus (HPV), a common viral infection that is primarily disseminated through intercourse. Chronic exposure to high-risk HPV strains, especially 16 and 18, has been closely associated with the development of cervical cancer.^[2] Recent developments in medical research have produced safe and efficient vaccines that provide defense against HPV infection and the issues that come with it.^[3] Even though these vaccinations are available, India's uptake of them is still below ideal. Misinformation, societal stigma, lack of knowledge, and worries about the safety and adverse consequences of vaccines are some of the main causes of this.^[4]

Uptake of HPV vaccination is suboptimal globally and particularly low in India, where awareness gaps persist even among future healthcare providers. As aspiring healthcare professionals, medical students are expected to be essential in advancing vaccination and other preventative health measures. Their views and expertise regarding the HPV vaccine can have a big impact on how they behave clinically and counsel patients in the future.^[5] Concerns have been raised regarding medical and dentistry students' readiness to promote HPV vaccination, nevertheless, as a number of recent studies have revealed knowledge gaps and reluctance.^[6,7]

This study aims to quantify the awareness levels of medical and dentistry students in order to pinpoint knowledge gaps and emphasize the necessity of focused educational interventions in the medical curriculum. In order to improve vaccination advocacy and, eventually, lessen the incidence of cervical cancer in India, it is imperative to raise awareness among aspiring physicians.

Objectives

1. To assess the knowledge, attitude and practice regarding the HPV vaccine among undergraduate medical and dental students
2. To assess the determinants of hesitancy of HPV vaccination among medical and dental students.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted in a tertiary care hospital Raichur, India from February to April 2025. Data were collected from Undergraduate medical and Dental students from first to final year, as well as from interns.

Inclusion Criteria:

1. Students who provided consent, were included in the study

Exclusion Criteria:

1. Students who were not given consent.
2. Students who were confirmed with diagnosis of cervical cancer .
3. Students who were chronic absentees (>1 month).

Data Collection Tool and Procedure: Ethical clearance was obtained from our Institutional Ethical Committee. After obtaining informed consent via Google Sheets, data were collected using a pre-validated semi-structured questionnaire designed with reference to various prior studies. The questionnaire consisted of three sections:

1. Socio-Demographic Information: This section included gender, age, locality, year of study, socioeconomic status (classified based on modified B.G. Prasad classification), parental education, parental occupation (divided based on the National Classification of Occupations) , marital status and personal habits.
2. Knowledge Assessment: This section assessed knowledge about HPV vaccine.
3. Attitude Assessment: The third section included participants' attitudes towards HPV vaccine.

The questionnaire had 30 questions on knowledge, attitude, practice and reasons for HPV vaccine hesitancy, with response options of True/False/I don't know.

Statistical Analysis: The collected data were entered into Microsoft Excel and subsequently analyzed using SPSS statistical software. Categorical variables were described using frequencies and percentages, while continuous variables were summarized as mean \pm standard deviation (SD).

RESULTS

The study enrolled 164 participants from medical (MBBS) and dental courses at a tertiary care centre, providing a sociodemographic foundation for evaluating knowledge, attitude, practice (KAP), and reasons for hesitancy toward the HPV vaccine.

Table 1: Sociodemographic profile of Study Participants

Variables	MBBS	Dental	p Value
Marital status			
Married	01(33.3)	02(66.7)	0.576
Unmarried	93(57.8)	68(42.2)	
Year of course			
1st	18(78.3)	05(21.7)	
2nd	18(56.3)	14(43.8)	
3rd	22(34.4)	42(65.6)	0.000
Final	06(75.0)	02(25.0)	

Internship	06(16.2)	31(83.8)	
Fathers education			
College	68(58.6)	48(41.4)	
Diploma	14(43.8)	18(56.3)	
Higher secondary	11(73.3)	04(26.7)	0.154
Illiterate	01(1.1)	0(0.0)	
Fathers Occupation			
Professional	24(30.8)	54(69.2)	
Semiskilled	20(57.1)	15(42.9)	0.011
Skilled	26(51.0)	25(49.0)	
Mothers education			
College	30(36.6)	52(63.4)	
Diploma	10(35.7)	18(64.3)	0.039
Higher secondary	30(57.7)	22(42.3)	
Illiterate	00(0.0)	02(100.0)	
Mothers Occupation			
Professional	15(16.0)	10(14.3)	
Semiskilled	72(76.6)	50(71.4)	
Skilled	07(7.4)	10(14.3)	
Location			
Rural	13(37.1)	22(62.9)	
Urban	48(37.2)	81(62.8)	0.012

Sociodemographic Overview: A total of 164 students participated in the present study. The overwhelming majority were unmarried (98.2%), aligning with the student life stage where personal health choices, including vaccination, are shaped by education and family influences. This near-universal single status mirrors patterns observed in undergraduate healthcare education, where students are typically in late adolescence or early adulthood—a developmental window when HPV vaccination decisions intersect with emerging sexual health awareness, peer influences, and curriculum exposure. The age breakdown further reinforces this: 64% (approximately 105 participants) were aged 21–23 years, 25.6% (approximately 42 participants) were 18–20 years, leaving an estimated 17 participants (10.4%) in other brackets, potentially including mature interns or younger entrants. This concentration in the early-to-mid twenties aligns with critical periods for catch-up vaccination recommendations and underscores the relevance of targeting educational interventions during professional training.

Course distribution showed 94 (57.3%) pursuing MBBS and 70 (42.7%) in dental programs, reflecting a balanced representation of core medical and allied health streams relevant to HPV prevention discussions. [Table 1]

Age and Academic Year Distribution: Approximately 64% of participants fell in the 21–23 years range, followed by 25.6% in the 18–20 years group (remaining ~10.4% likely older or younger outliers) (Graph No.1). Academic progression peaked in the 3rd year (39.0%), with interns comprising 22.6%, suggesting many were

approaching clinical exposure where HPV-related knowledge becomes practically relevant. [Table 1]

Parental Background Characteristics: Fathers predominantly held college education (70.7%) and professional occupations (47.6%), while mothers showed college education in 50.0% and semiskilled occupations in 74.4%. These factors are often linked in literature to varying levels of health literacy that could moderate vaccine hesitancy. [Table 1]



Figure 1: Distribution of study participants based on age

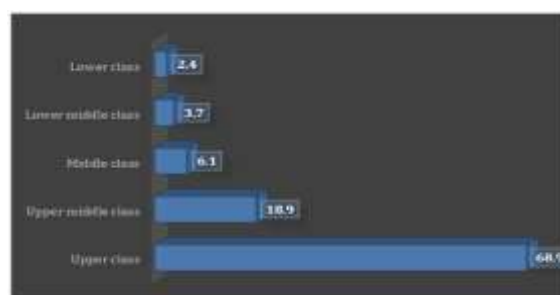


Figure 2: Distribution of study participants based on socioeconomic status.

Table 2: Knowledge regarding HPV infection n=(164)

Respondents that responded affirmatively correct.		
Questions	MBBS(%)	Dental(%)
HPV vaccine is safe & effective in preventing cervical cancer:	93(98.9)	56(80.0)
Being vaccinated for HPV can reduce the risk of having an HPV infection	90(95.7)	60(85.7)
HPV vaccine requires 3 doses:	84(89.4)	64(91.4)
A person who has received the HPV vaccine` might not develop cervical cancer:	54(57.4)	30(42.9)

HPV vaccine offers protection against all STIs:	70(74.5)	26(37.1)
One of the HPV vaccines offers protection against genital warts:	19(20.2)	12(17.1)
Girls who had the HPV vaccine do not need to get regular Pap smears:	69(73.4)	32(45.7)
Those who have multiple sexual partners would benefit from the HPV vaccine:	73(77.7)	50(71.4)

Knowledge Regarding HPV Vaccination Overall, both medical (MBBS) and dental students demonstrated a high level of general knowledge about the HPV vaccine, though specific gaps were identified.

- **Efficacy and Risk Reduction:** A vast majority of students correctly understood that the HPV vaccine is safe and effective in preventing cervical cancer, with 98.9% (93 students) of MBBS students and 80.0% (56 students) of Dental students answering affirmatively. Similarly, 95.7% of MBBS students and 85.7% of Dental students knew that the vaccine reduces the risk of an HPV infection.
- **Dosage:** Knowledge regarding the dosage was strong across both groups, with 89.4% of MBBS students and 91.4% of Dental students correctly identifying that the vaccine requires three doses.

- **Specific Protections and Limitations:** There were notable knowledge gaps regarding what the vaccine protects against. Only 20.2% of MBBS students and 17.1% of Dental students knew that the vaccine offers protection against genital warts. Additionally, a significant portion of students mistakenly believed the vaccine offers protection against all sexually transmitted infections (STIs), a misconception held by 74.5% of MBBS students and 37.1% of Dental students.
- **Screening and Demographics:** Regarding post-vaccination screening, 73.4% of MBBS students and 45.7% of Dental students incorrectly believed that vaccinated girls do not need regular Pap smears. However, most correctly identified that individuals with multiple sexual partners would benefit from the vaccine (77.7% of MBBS and 71.4% of Dental students).

Table 3: Attitude regarding HPV Vaccination

Questions	MBBS		Dental	
	Agree (%)	Disagree (%)	Agree (%)	Disagree (%)
I think taking the vaccine will keep me safe & effective	90(95.7)	04(4.3)	68(97.1)	02(2.9)
I feel it is better to be vaccinated before becoming sexually active	89(94.7)	05(5.3)	62(88.6)	08(11.4)
HPV vaccine may have short-term or long-term side effects on me	48(51.1)	46(48.9)	28(40.0)	42(60.0)
HPV should be included in the National Immunization Schedule	88(93.6)	06(6.4)	70(100.0)	00(0.0)
If I am vaccinated, I can protect other people by preventing the spread of disease	66(70.2)	28(29.8)	60(85.7)	10(14.3)

Attitudes Regarding HPV Vaccination The participants displayed overwhelmingly positive attitudes toward the necessity and implementation of the HPV vaccine.

- **Safety and Timing:** Almost all participants felt that taking the vaccine would keep them safe, with 95.7% of MBBS and 97.1% of Dental students agreeing. A high proportion also agreed that it is better to be vaccinated before becoming sexually active (94.7% of MBBS and 88.6% of Dental students).
- **Public Health and Immunization:** There was near-universal support for public health

integration; 93.6% of MBBS students and 100% of Dental students agreed that the HPV vaccine should be included in the National Immunization Schedule. Furthermore, many recognized the communal benefits, with 70.2% of MBBS and 85.7% of Dental students agreeing that their vaccination could protect others by preventing the spread of the disease.

- **Side Effect Concerns:** Despite positive attitudes, concerns about short-term or long-term side effects lingered, with 51.1% of MBBS students and 40.0% of Dental students agreeing that the vaccine might cause them side effects.

Table 4: Reasons for hesitancy to take HPV vaccine

Reasons	MBBS (%)	Dental(%)
Afraid of sideeffects associated with HPV vaccine	23(24.5)	20(28.6)
Doctor did not recommend it	01(1.0)	02(2.9)
Need more information about the vaccine	26(27.6)	16(22.8)
Not sure about the safety of the vaccine	08(8.5)	32(45.7)
Vaccine is too expensive	25(26.5)	4(5.7)

Reasons for Hesitancy The reasons for hesitancy varied significantly between the two academic disciplines.

- **Information and Cost:** For MBBS students, the primary barriers were a lack of sufficient information and financial constraints. Specifically, 27.6% (26 students) cited needing

more information about the vaccine, and 26.5% (25 students) felt the vaccine was too expensive. In contrast, only 5.7% of Dental students cited expense as a reason.

- **Safety and Side Effects:** For Dental students, the most prominent reason for hesitancy was uncertainty about the vaccine's safety, reported by

a striking 45.7% (32 students), compared to only 8.5% of MBBS students. Fear of side effects was a shared concern, reported by 28.6% of Dental students and 24.5% of MBBS students.

- **Medical Recommendations:** A lack of doctor recommendation was the least common factor for hesitancy, cited by only 1.0% of MBBS and 2.9% of Dental students.

DISCUSSION

The present study conducted in Raichur, India, highlights a high level of general awareness regarding the Human Papillomavirus (HPV) vaccine among medical and dental students, yet reveals significant gaps in specific knowledge and distinct barriers to take vaccination. As future healthcare providers, the knowledge and attitudes of these students are critical, as they will play a major role in patient counseling and vaccine advocacy.

Knowledge and Awareness: In the present study, 98.9% of MBBS and 80.0% of dental students recognized the vaccine as safe and effective for preventing cervical cancer. A similar study done by Kumari et al, also reported high levels of awareness and positive attitudes toward HPV vaccination among medical students in a tertiary care teaching institution.^[8]

Present study identified specific misconceptions like, 74.5% of MBBS students incorrectly believed the vaccine protects against all STIs. A similar study done by Saha et al, reinforced this trend, noting that while general awareness is high, detailed knowledge regarding HPV related infections and the spectrum of vaccine protection remains suboptimal among medical and dental cohorts.^[9]

Furthermore, the present study found that 73.4% of MBBS students mistakenly thought that vaccinated individuals do not require regular Pap smears. This critical gap is seen in a similar study done by Patel et al, which emphasized that even in Western India, healthcare students often lack a comprehensive understanding of the synergy between vaccination and continued screening.^[10]

Attitudes and Support for Immunization: The present study observed an overwhelmingly positive attitude toward public health integration, with 93.6% of MBBS and 100% of dental students advocating for the vaccine's inclusion in the National Immunization Schedule. A similar study done by Kataria et al, also showed that female medical undergraduates possess a strong willingness to receive and recommend the vaccine.^[11] Despite this, 51.1% of MBBS students in our study expressed concerns regarding potential side effects. This matches findings from a similar study done by Swarnapriya et al, which noted that despite favourable attitudes, concerns about vaccine safety and long-term effects remain a persistent psychological barrier.^[12]

Determinants of Vaccine Hesitancy: The present study identifies cost and a need for more information

as primary barriers for MBBS students, whereas dental students are primarily discouraged by safety concerns (45.7%). A similar study done by Kaundal et al, identified vaccine hesitancy and financial constraints as major roadblocks to achieving 100% vaccine coverage in the Indian context.^[13] Additionally, the lack of professional recommendation was a minor factor in our study, which contrasts with a similar study done by Navarathna Kumari et al, which suggested that academic year and professional guidance are significant predictors of actual vaccine uptake.^[14] These findings suggest that while curriculum exposure in medical and dental schools provides a foundation of knowledge, it is currently insufficient to address deep-seated safety concerns or the practicalities of post vaccination screening. Focused educational interventions are necessary to transform these students into confident advocates for cervical cancer prevention.

CONCLUSION

The present study highlights that undergraduate medical and dental students generally possess good awareness and positive attitudes regarding HPV vaccination, reflecting the growing recognition of its importance in cervical cancer prevention. Most participants acknowledged that the vaccine is safe, effective, and beneficial when administered before sexual exposure, and a large proportion supported its inclusion in the National Immunization Schedule. However, the study also identified important deficiencies in detailed knowledge, particularly regarding the vaccine's limitations, continued need for Pap smear screening, and misconceptions related to protection against all sexually transmitted infections. Vaccine hesitancy among participants was primarily driven by fear of side effects, uncertainty regarding vaccine safety, inadequate information, and financial concerns. Dental students showed comparatively greater concerns regarding vaccine safety, whereas MBBS students reported lack of information and high cost as major barriers. These findings emphasize the need for focused educational strategies within undergraduate healthcare curricula to improve understanding and confidence regarding HPV vaccination. Conducting regular awareness programs, strengthening evidence-based teaching, and ensuring affordable access to vaccines can help reduce hesitancy and improve acceptance. Empowering future healthcare professionals with accurate knowledge is essential for enhancing vaccine advocacy and reducing the burden of cervical cancer in India.

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