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Knowledge, Attitude and Practice regarding Human Papilloma virus vaccine among Undergraduate Medical Students in Government Medical College Rajnandgaon, Chhattisgarh: A Cross-Sectional study.

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ABSTRACT

Background:

Cervical cancer (CC) caused by the human papillomavirus (HPV) can be prevented or managed with the help of healthcare professionals, particularly young medical students. However, it is frequently noted that medical students, who provide front-line patient care, have little knowledge about CC and HPV.

Aim & Objective:

The study aims to evaluate the knowledge, attitude, and practice regarding the Human Papillomavirus (HPV) vaccine among undergraduate medical students at Government Medical College, Rajnandgaon, Chhattisgarh, while also assessing their knowledge about cervical cancer to identify gaps.

Materials and Methods

This was a descriptive cross-sectional and institutional-based study conducted at BRLSABVMMC, Rajnandgaon (C.G.), from July to October 2025. Convenience sampling was used. The sample size was 341 students, from all Phase i.e. Phase I, II, III and IV. Data was collected using a validated semi-structured questionnaire distributed via Google Form. Data was analysed using MS-Excel 2007.

Results

The study was conducted among 341 students. Approximately 53.7% of participants were females and 46.3% were males. The majority of students (58%) belong to (21-25 years age group). About 33.7% belong to Phase III. About 92.1% were Hindu. More than 80% of students had sufficient knowledge about the HPV vaccine. In comparison, knowledge regarding cervical cancer and HPV vaccine was poorer in MBBS Phase-I & II students than Phase III & IV students. Only 5.7% student were vaccinated in Govt. Medical College, Rajnandgaon, Chhattisgarh.

Conclusion

Students reported a good knowledge about Cervical cancer as well as HPV Vaccine but the uptake was very poor i.e. only 5.7%. More work is required to raise medical undergraduates' knowledge of HPV and encourage them to be vaccinated. To have a significant beneficial impact on their acceptance of vaccination as well as their desire to advocate it in the future, targeted health education activities are necessary.

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INTRODUCTION

The fourth most common type of cancer in women globally is cervical cancer with around 660,000 new cases and around 350,000 deaths in 2022. [1]. In India cervical cancer is the most common type of cancer among women. The highest rates of cervical cancer incidence and mortality are in low and middle-income countries. [2]. This shows a big gap between uptake of HPV vaccination, screening and treatment services. Factors like social and economic determinants also play an important role in disease occurrence. Over 80% of cervical cancer cases in India are c aused by two high-
risk HPV strains, HPV 16 and HPV 18 [4].
Cervical cancer can be cured if diagnosed and treated at an early stage of disease[3]. As evidence, CC is a major public health issue in India, which creates the need to spread awareness among the female population regarding its risk factors and preventive measures.There is an urgent need to sensitise them to the disease through health education and screening programs. Though Pap smear is the conventional screening method, it is less known among the rural regions.Another barrier to the diagnosis of CC is the stigma faced by the women, especially in rural area, when discussing the problem and the screening procedure.[4] Medical students are future healthcare providers and can play a vital role in promoting cervical cancer screening and HPV vaccination. Importance of the right knowledge, positive attitude and high acceptance of these interventions among medical students can't be undermined.[5] Thus, the study aimed at assessing the knowledge attitude and practice regarding Human Papilloma Virus vaccine and cervical cancer among medical students[1]

Materials and Method

Study Design, Setting, and Duration-This research adopted a Descriptive Cross-sectional study design. It was an Institutional based study conducted in the Department of Community Medicine at BRLSABVMMC, Rajnandgaon (C.G.). The study was carried out over a duration from July 2025 to October 2025.
Study Population and Sampling-The target study population consisted of Medical Undergraduates. The inclusion criteria were students of Phase I, II, III and IV who provided consent. The study utilized a convenience sampling technique. Prior announcements were made to each batch, and a day was fixed for filling the proforma. Students available on that day were considered participants. Pre-designed, pre-tested questionnaires were used as study tools and information regarding sociodemographic profile of study participants, their knowledge regarding cervical cancer—risk factors, screening, and prevention were assessed. Knowledge regarding HPV vaccine and the acceptability of HPV vaccine among girls was also assessed.
Study Tool and Data Analysis-The study tool was a semi-structured questionnaire prepared with the help of available research evidence and validated by a pilot study. In the pilot study the same questionnaire was used among 20 participants to check whether they were understanding the question or not. These participants are not included in this study. The actual data collection was performed using a Google Form. Data was entered and analyzed with MS Excel, focusing on frequency, percentage, and related statistical tests. The assessment of the knowledge was performed using a score-based method. Data was analyzed using Excel. The study population was characterized by using descriptive statistics and expressed as percentages. Chi-square test was applied to test the association between the baseline characteristics and the score obtained.
Ethical considerations: Ethical approval of the Institutional Ethical committee was obtained. For all the eligible
study subjects, informed written consent was obtained after thoroughly explaining the purpose and nature of study.Anonymity was maintained as in place of name numbering was done.
Those who refused to give consent were excluded.Statistical analysis: The current status

of knowledge, vaccination status and willingness to vaccinate were the primary outcome measures. Various socio demographic variables, course and year of study were the explanatory variables. Descriptive analysis of all the explanatory and outcome variables was done by using mean and standard deviation for quantitative variables, frequency and percentages for categorical variables. The association between the explanatory variables and knowledge was assessed. P value less than 0.05 was considered as statistically significant. Microsoft Excel was used for analysis.

Results:

Table 1: Sociodemographic distribution of the study participants.(N=341)

Variables	Responses	Frequency	Percentage %
Age (years)	18-21	123	36%
	>21-25	199	58%
	>25-29	16	5%
	>30	3	1%
Sex	Female	183	53.70%
	Male	158	46.30%
Phase	I	78	22.90%
	II	86	25.20%
	III	115	33.7%
	IV	62	18.2%
Religion	Christian	14	4.10%
	Hindu	314	92.10%
	Muslim	12	3.50%
	Others	1	0.3%

Table 1 shows the sociodemographic profile of the study participants. The majority belonged to the 21–25 years age group (58%), followed by 18–21 years (36%). Females slightly outnumbered males (53.7% vs 46.3%). Most participants were from Phase III (33.7%), while Phase I, II and IV contributed 22.9%, 25.2% and 18.2% respectively. Religion-wise, the sample was predominantly Hindu (92.1%), with small proportions of Christians (4.1%), Muslims (3.5%) and others (0.3%).

Table.2 Knowledge of students regarding HPV vaccine.

Variables	Frequency	Percentage
1.Are vaccines available in India?		
Yes	299	87.9%
No	23	6.8%
Don't know	19	5.6%

2.What are the no. of doses required for age greater than 16 years?		
1 dose	17	5%
2 dose	193	56.6%
3 dose	120	35.2%
Don't know	11	3.2%
3.At what age vaccine is recommended? (in years)		
0-9	30	8.8%
10-30	202	59.2%
31-50	70	20.5%
>50	4	1.2%
Don't know	35	10.3%
4.Who can be vaccinated?		
Boys	3	0.9%
Girls	110	32.2%
Both	219	64.2%
Don't know	9	2.7%
5.Can the vaccine be given to sexually active girl?		
Yes	242	71%
No	16	4.7%
Don't know	83	24.3%
6.Can vaccine be administered to those infected with HPV		
Yes	266	78.0%
No	63	18.5%
Don't know	12	3.5%
Post vaccination can one have multiple sexual partners?		
Yes	161	47.2%
No	57	16.7%
Don't know	123	36.1%
Will you recommend it to others?		
Yes	323	94.3%
No	18	5.7%

Table 2 Indicates generally high levels of awareness regarding HPV vaccination among students. Most participants (87.9%) knew that the vaccine is available in India and 64.2% correctly identified that both boys and girls can be vaccinated. Over half (56.6%) reported the correct dose schedule for individuals above 16 years, and 59.2% identified the recommended

age range as 10–30 years. A majority were aware that the vaccine can be administered to sexually active girls (71%) and HPV-infected individuals (78%). However, misconceptions persisted, particularly regarding post-vaccination sexual behavior, with 47.2% believing that multiple sexual partners are safe after vaccination. Despite knowledge gaps, 94.3% were willing to recommend the HPV vaccine to others, reflecting a favorable orientation toward vaccine advocacy.

Fig.1 Attitude towards HPV Vaccination among medical undergraduates.

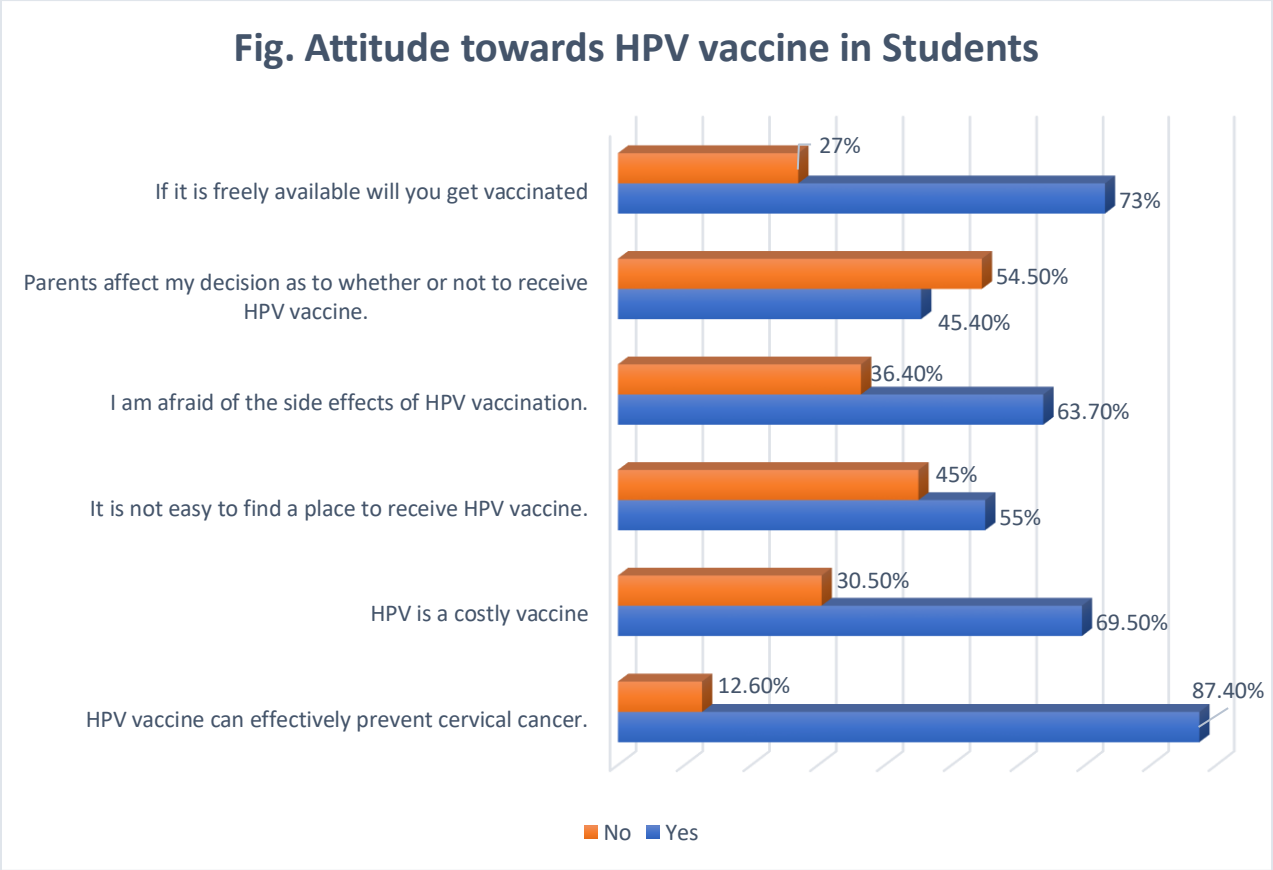

Figure 1 Shows that although medical undergraduates demonstrated a positive attitude towards HPV vaccination, multiple barriers influenced vaccine acceptance. A majority 73% were willing to get vaccinated if the vaccine was provided free of cost, and 69.5% perceived it as expensive. Parental influence affected vaccination decisions in 54.5% of students. Concerns regarding safety were prominent, with 63.7% expressing fear of side effects, while 55% reported difficulty in accessing vaccination services. Despite these barriers, 87.4% believed that the HPV vaccine effectively prevents cervical cancer, indicating strong confidence in its protective role.

Fig.2 Practices about HPV vaccine in students

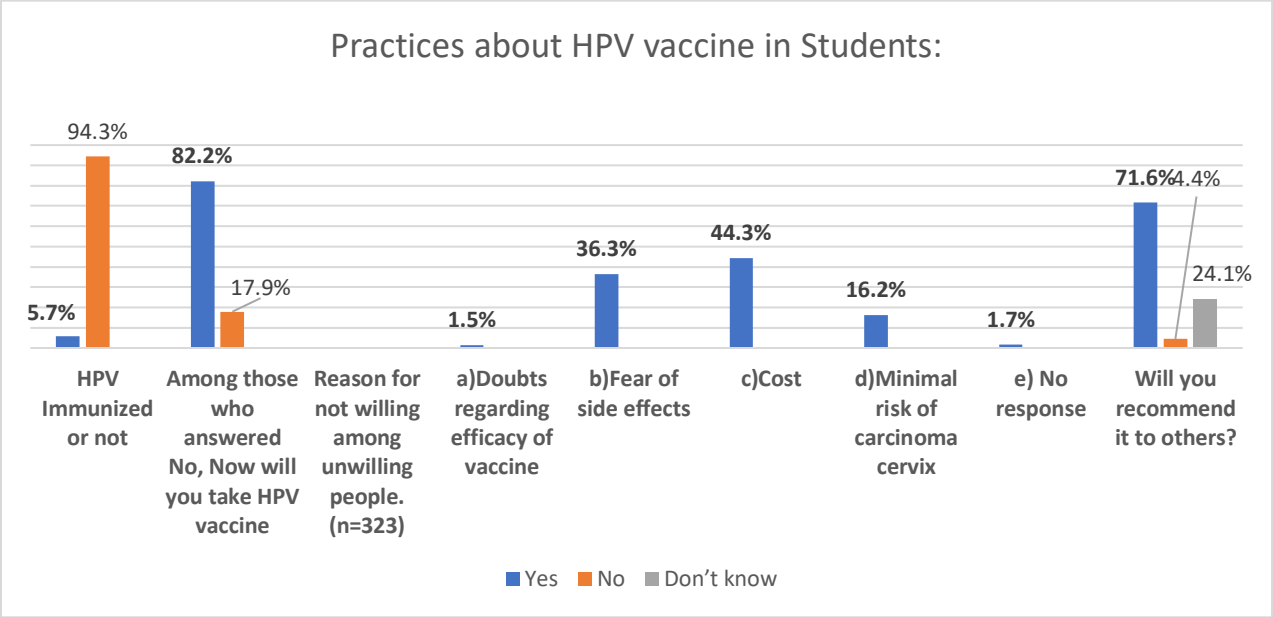

Figure 2 Reveals very low HPV vaccination coverage among students, with 94.3% reporting that they were not immunized. However, vaccine hesitancy appeared modifiable, as 82.2% of previously unwilling students expressed readiness to accept vaccination upon reconsideration. The major barriers reported were high cost (44.3%) and fear of side effects (36.3%), while fewer students perceived themselves at minimal risk (16.2%) or doubted vaccine efficacy (1.5%). Despite poor vaccination uptake, 71.6% were willing to recommend the vaccine to others, highlighting a gap between favorable attitudes and actual preventive practices.

Table 3. Knowledge of students regarding screening and preventive measures of cervical cancer.

What are the screening techniques for cervical cancer	**Pap smear** (82.6%)	**Blood Culture** (1.9%)	**PCR** (3.5%)	**Don't know** (12%)
What is the screening interval	**Once in a year** (68.10%)	**Once in two years** (11.7%)	**Once in 3 years** (19.60%)	**Don't know** (20.5%)
What are the preventive methods against CC	**Yes**	**No**	**Don't know**	

Sexual relationship with a single partner	55.22%	18.18%	24.91%	
Personal hygiene	87.54%	2.35%	7.70%	
Vaccination	92.60%	0.67%	6.06%	
Regular scanning for CC	86.53%	2.30%	8.70%	
Barrier methods for contraception	71.04%	7.70%	19.52%	
Good nutrition	79.79%	4.70%	14.48%	

Table 3 Highlights students' knowledge regarding cervical cancer screening techniques, screening intervals, and preventive measures. The majority (82.6%) correctly identified Pap smear as the primary screening method, while very few selected blood culture (1.9%) or PCR (3.5%), and 12% were unaware. Regarding screening interval, most participants (68.1%) reported annual screening, whereas 19.6% indicated screening once every three years and 11.7% once every two years; 20.5% lacked knowledge. Knowledge regarding preventive measures was good. Most students recognized vaccination (92.6%), personal hygiene (87.5%), and regular screening (86.5%) as effective preventive strategies. Awareness was also substantial for good nutrition (79.8%) and barrier contraceptive methods (71.0%). However, comparatively lower awareness was observed regarding maintaining sexual relationships with a single partner (55.2%), with a notable proportion expressing uncertainty across preventive components. Overall, the findings indicate good awareness of major preventive and screening measures, though gaps persist in understanding appropriate screening intervals and certain behavioral risk-reduction strategies.

Table 4. Association between various determinants and vaccination status of students.

Determinants		Vaccination status		Chi square value	P-value	Interpretation
		Vaccination done(n=28)	Vaccination Not done(n=313)			
Family History of malignancy	+ve	18	72	22.54	<0.000	Significan
	-ve	10	241			

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Sex	Female	27	156	22.43	<0.0000 1	Significant
	Male	1	157			
Religion	Hindu	22	264	0.633	0.42	Not significant
	Others	6	49			
Phase	I & II	5	159	11.17	0.00083	Significant
	III & IV	23	154			
Knowledge	Good	11	250	2.227	0.1355	Not significant
	Poor	9	63			

Table 4. Vaccination status of students showed a statistically significant association with **family history of malignancy**, **sex**, and **phase of study** ($p < 0.05$). Students having a positive family history of malignancy, females, and those belonging to Phase III and IV were more likely to be vaccinated. However, **religion** and **knowledge level** did not show any statistically significant association with vaccination status ($p > 0.05$).Those who have a positive family background of about any type of cancer have good vaccination rate (p value <0.00001), so it was statistically significant.The correct answer was scored "2", near correct "1" and incorrect or don't know was scored as "0".Those who scored 0 belong to 'poor' knowledge category and those who scored 2 and 1 belongs to 'good' knowledge category.

DISCUSSION

More than half of the participants (56.6%) correctly identified the dosage schedule for individuals above 16 years, which is comparable to findings by Uzunlar et al.(2013)[12], who reported that although medical students had basic awareness, detailed knowledge about dosage and eligibility remained inadequate. In this study, 87.9% of students were aware that the HPV vaccine is available in India.Similar findings were reported by Makwe et al. (2012)[9] among Nigerian university students and by Deodhar et al. (2012)[3] among Indian medical students, where awareness regarding vaccine availability was high but incomplete technical knowledge persisted.

More than half of the participants (56.6%) correctly identified the dosage schedule for individuals above 16 years, which is comparable to findings by Uzunlar et al. (2013)[12], who reported that although medical students had basic awareness, detailed knowledge about dosage and eligibility remained inadequate. Regarding eligibility, 64.2% correctly reported that both boys and girls can be vaccinated. However, one-third still believed vaccination is only for females. This aligns with studies by Wong and Sam (2010) and Barnack et al. (2010)[10,11], where lack of clarity regarding vaccination in males was a major gap even among healthcare trainees. Importantly, 64.2%

recognized that both boys and girls can be vaccinated, yet one-third still believed vaccination is only for females. This misconception reflects India's female-centric messaging around cervical cancer prevention, suggesting that **gender-neutral communication strategies** are urgently needed to normalize vaccination for both sexes.

Despite 87.4% believing that the HPV vaccine prevents cervical cancer, only 5.7% of students were vaccinated. Similar low uptake was reported in Indian studies by Das et al. (2008)[4] and Basu et al. (2013)[5], where high awareness did not translate into vaccine acceptance due to cost and safety concerns. Fear of side effects (63.7%) and high perceived cost (69.5%) were the major barriers in the present study. These findings are consistent with Armstrong (2010) and Wamai et al. (2013)[6], underscoring the need for targeted interventions that address professional hesitancy. Cost was also cited as a barrier (69.5%), historically valid when imported vaccines like Gardasil were priced at ₹3,000–₹4,000 per dose. However, with the introduction of **Cervavac, India's indigenous quadrivalent HPV vaccine**, affordability is less of a barrier, as it is priced significantly lower and slated for inclusion in the national immunization programme but it is for 14 years old girl not completing their 15th birthday, and my study participants didn't belong to this age group so they have to pay and take vaccine. The challenge again persists about **cost, awareness and acceptance**. Importantly, 82.2% of previously unwilling students expressed readiness to accept vaccination on reconsideration. Similar improvement in acceptance after awareness was documented by Francis et al. (2010) and Poole et al. (2013)[7,8], demonstrating that education plays a crucial role in modifying vaccine hesitancy.

Knowledge regarding Pap smear as a screening tool was high (82.6%), comparable to findings from Indian medical student studies by Deodhar et al. (2012)[3]. However, incorrect understanding of screening intervals observed in this study has also been reported by Makwe et al. (2012)[9].

Overall, the study supports previous evidence that although medical students have relatively better awareness compared to the general population, gaps in detailed knowledge and practical barriers continue to limit HPV vaccine uptake. Since medical undergraduates are future health educators, strengthening their knowledge and addressing misconceptions is essential for improving community-level vaccination coverage.

In this study, 87.9% students were aware about the availability of HPV vaccine in India. Similar findings were reported in Indian studies among medical and health science students, where general awareness was high but detailed technical knowledge remained inadequate (Basu et al., 2013; Deodhar et al., 2012)[3,4].

More than half of the participants (56.6%) correctly identified the recommended dose schedule for individuals above 16 years. Comparable results were observed in Indian cross-sectional studies among medical students where partial knowledge regarding dosage and age eligibility was documented (Bhatla et al., 2008; Deodhar et al., 2012[1,5]. And partial knowledge is dangerous as it can misguide the vaccine acceptors. Encouragingly, 82.2% of initially unwilling students expressed readiness to accept vaccination upon reconsideration, demonstrating that education can modify hesitancy. Similar improvements have been documented internationally (Francis et al., 2010; Poole et al., 2013).

Knowledge regarding Pap smear as a screening tool was satisfactory (82.6%), which is comparable to Indian studies among medical students reporting good awareness of cervical cancer screening but inadequate practical understanding (Bhatla et al., 2008)[1].

Overall, the findings align with Indian evidence showing that although awareness about HPV and cervical cancer is relatively better among medical students, gaps in detailed knowledge and multiple barriers continue to limit vaccination uptake. Strengthening structured educational interventions like educational programs at multi level intervention -parent education, school-based, gender-neutral

vaccination programs. and CMEs at the undergraduate level are essential to improve vaccine acceptance and promote future advocacy among healthcare providers.

Limitations

1) Convenience sampling may not be representative of all students in the institution or India as people with a higher interest in the topic will have shown/participated in study.
2) A single institution study might not be representative of Indian medical undergraduates, affecting generalisability of results.
3) Since self reported data is used, students might over-report 'correct' attitudes or knowledge.

Conclusion

The present study revealed that undergraduate medical students had overall good awareness regarding HPV vaccination and cervical cancer prevention; however, the actual uptake of HPV vaccine was extremely low (5.7%). Despite recognizing the effectiveness of vaccination and preventive measures, misconceptions regarding eligibility, dosage, and post-vaccination behavior persisted. Fear of side effects, high vaccine cost, and accessibility barriers were the major factors contributing to poor vaccination practices. These findings highlight a significant gap between knowledge and real-life preventive behavior even among future healthcare providers. Targeted educational interventions and institutional vaccination strategies for the general public, physicians, and government officials in conjunction with lowering vaccine cost, improving vaccine access, and encouraging strong physician recommendations are urgently required to improve acceptance and promote future advocacy of HPV vaccination among medical students also.

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