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Awareness about Cervical Cancer and Human Papillomavirus Vaccination among Undergraduate Students of G.R. Medical College, Gwalior, Madhya Pradesh: A Cross-Sectional Study

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Abstract

Background: Cervical cancer is the second leading cause of cancer-related deaths in Indian women and is considered a significant public health problem. Human papillomavirus (HPV) is the principal etiologic agent. Timely screening and vaccination are effective strategies to combat the prevalence of cervical cancer. The aim of the present study was to improve knowledge regarding cervical cancer, HPV, and HPV vaccines, which will help increase vaccine acceptance and prevention of cervical cancer. **Aim:** "To Assess Awareness about Cervical Cancer and HPV Vaccination among Undergraduate Students of G.R. Medical College, Gwalior, Madhya Pradesh." **Objectives:** (1) To assess knowledge regarding cervical cancer and HPV vaccination among the study participants. (2) To find out students' willingness to receive the HPV vaccine and recommend it to others. (3) To determine barriers to HPV vaccination uptake among medical students. **Materials and Methods**: The present cross-sectional study was conducted at G.R. Medical College, Gwalior, among 800 undergraduate MBBS students aged 18 years and above after obtaining informed consent. Data were collected using a pre-tested, semi-structured questionnaire. The collected data will be analyzed using SPSS software. Chi-square test and multiple logistic regression analysis will be applied to assess associations between variables of interest. **Results:** Of the total respondents, 55.6% were male, 60.8% were urban residents, and 56.1% were from middle-class backgrounds. Awareness was high: 90.5% had heard of HPV, 92.2% of cervical cancer, 70.3% of HPV vaccines in India, and 72.5% knew vaccination prevents cervical cancer. Only 19.0% were vaccinated, though 48.3% were willing to receive it, 83.1% would recommend it to peers, and 89.2% to future patients. Top barriers (multi-select) were fear of side effects (42.6%), lack of knowledge (41.8%), and cost (28.8%). Urban students showed higher awareness ($P < 0.05$, Chi-square), but there were no significant gender differences in willingness. **Conclusion:** Our findings showed that although medical undergraduates were generally aware of the importance of vaccines, many still lacked deeper knowledge and hesitated to get vaccinated often because of concerns about safety and cost. With more supportive, clear, and focused educational efforts, students could have been better equipped to feel confident and make informed choices, ultimately improving vaccination uptake.

Keywords: Cervical cancer, Human papillomavirus vaccine, Undergraduate students

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Introduction

Cervical cancer is predominantly caused by human papillomavirus (HPV).

In India, high-risk HPV types 16 and 18 account for approximately 80% of cervical cancers.[1] Cervical cancer is the 2nd leading cause of cancer-related deaths among Indian women. India contributes 19% of cases and 23% of deaths from cervical cancer globally.[2]

Cervical cancer is preventable, yet awareness of HPV vaccination is low even among medical students, and uptake is extremely low. This study identifies knowledge gaps to design targeted interventions and boost vaccine uptake.

Aim

- To assess awareness about cervical cancer and HPV vaccination among undergraduate students of G.R. Medical College, Gwalior, Madhya Pradesh.

Objectives

- To assess knowledge regarding cervical cancer and HPV vaccination among the study participants.
- To find out students' willingness to receive the HPV vaccine and recommend it to others.
- To determine barriers to HPV vaccination uptake among medical students.

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Materials and Methods

Study Design

A cross-sectional study.

Study Setting

G.R. Medical College, Gwalior, Madhya Pradesh.

Study Period

June 2025–August 2025.

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Study Subjects

MBBS Undergraduates (1st to final year).

Inclusion Criteria

MBBS students aged 18 years and above.

Exclusion Criteria

Participants who are not willing to participate.

Sample Size

Calculated using the single population proportion formula

$$n = Z^2 \times p \times (1-p)/d^2$$

Table 1: Sociodemographic characteristics of study participants (*n*=424)

Variable	*Category*	*n*	*%*
Age	≤20 years	182	42.9
	>20 years	242	57.1
Gender	Male	227	53.5
	Female	197	46.5
Year of study	1st year	106	25
	2nd year	106	25
	Pre-final year	106	25
	Final year	106	24
Residence	Rural	176	41.5
	Urban	248	58.5
Religion	Hindu	391	92.2
	Muslim	10	2.4
	Others	23	5.4
Socioeconomic Status	Upper Class	10	2.4
	Upper middle	61	14.4
	Middle Class	235	55.4
	Lower Middle	84	84
	Lower Class	34	8.0

Table 2: Knowledge regarding HPV and cervical cancer (*n*=424)

Questions	*Yes, n (%)*
Heard of HPV	389 (91.7)
HPV is primarily transmitted through sexual contact	335 (79)
HPV can infect males	302 (72.6)
The main cause of cervical cancer is HPV infection	372 (87.7)
HPV types most commonly causing cervical cancer (16 & 18)	319 (75.2)
Heard of cervical cancer	394 (92.9)
Most common symptom of cervical cancer: abnormal vaginal bleeding	172 (40.6)
Oral contraceptive pills are responsible for cervical cancer	275 (66.1)
STDs are a risk factor for cervical cancer	349 (83.9)
Hereditary factors are not responsible for the occurrence of cervical cancer	107 (25.6)
Hormonal factors are not responsible for the occurrence of cervical cancer	67 (16.0)
Aware of HPV vaccine availability in India	297 (71.2)
Name of indigenously manufactured HPV vaccine in India (Cervavac)	142 (38.6)
Both genders should ideally receive the HPV vaccine	235 (55.4)
9–14 years is the recommended age for HPV vaccination	137 (32.3)
The vaccination schedule for the 9–14-year-old age group is a two-dose schedule	106 (27.6)

HPV: Human papillomavirus

Where Z = 1.96 (95% confidence interval), p = 44.9% (awareness from Swarnapriya *et al.*[3]), d = 5% marginal error, n = 380; after adding a 10% non-response rate, final sample size = 424.

Data collection is done by a pre-designed, pre-tested, self-administered semi-structured questionnaire (Google Forms and paper) containing sections on sociodemographics, knowledge, willingness, and barriers.

Statistical Analysis

Descriptive statistics (frequencies, percentages) were calculated using Jamovi v2.3.28. Chi-square tests were used for associations.

Results

Table 1 shows the sociodemographic characteristics of study participants:

- This table summarizes the sociodemographic profile of the 424 study participants. More than half of them were above 20 years of age (57.1%), and males constituted 53.5% of the sample. Participants were almost equally distributed across all years of study.
- A majority (58.5%) resided in urban areas. Most respondents were Hindu (92.2%). In terms of socioeconomic status, over half belonged to the middle class (55.4%), followed by the lower middle class (19.8%), whereas only a small proportion were from the upper class (2.4%).

Table 2 shows the knowledge regarding HPV and cervical cancer:

- Participants showed good general awareness of HPV and cervical cancer, correctly identifying HPV infection and high-risk types as major causes. However, knowledge of key symptoms was limited. Awareness of HPV vaccination was moderate; although many knew of its availability and purpose, fewer recognized the indigenous vaccine, recommended

Table 3: Practice and attitude toward HPV vaccination (*n*=424)

Statement	*Yes, n (%)*	*No, n (%)*	*Don't know/ undecided, n (%)*
You are vaccinated against HPV	79 (18.6)	345 (81.4)	
Willing to receive the HPV vaccine	211 (49.8)	89 (21.0)	124 (29.2)
Recommend the HPV vaccine to others	381 (89.9)	43 (10.1)	
Do you think HPV vaccination should be mandatory for school children?	253 (59.7)	52 (12.3)	119 (28.1)

HPV: Human papillomavirus

Table 4: Barriers to HPV vaccination uptake (multiple response analysis, *n*=424)

Barriers	*n*	*%*
Cost of vaccine	249	58.7
Fear of side effects	208	49.1
Belief that it is unnecessary	138	32.6
Consider the vaccine to not be safe	121	28.5
Accessibility issues	112	26.4
Not at risk of HPV infection	98	23.1
Social stigma	89	21.0
Religious or cultural concerns	56	13.2

HPV: Human papillomavirus

Table 5: Association of willingness to get the HPV vaccine with participants' gender

Gender	*Willing to get vaccinated, n=211 (%)*	*Undecided, n=124 (%)*	*Not willing, n=89 (%)*	*Total*	χ^2	*P-value*
Male	122	44	31	208	21.8	**0.001***
Female	89	80	58	216		

HPV: Human papillomavirus. *P<0.05 = Statistically Significant

Table 6: Association of willingness to get HPV vaccine with year of study

Year of study	*Willing to get vaccinated, n=205*	*Undecided, n=143*	*Not willing, n=76*	*Total*	χ^2	*P-value*
1st	44	45	17	106	18.0	**0.006***
2nd	50	25	31	106		
Pre-final	58	24	24	106		
Final	59	30	17	106		

HPV: Human papillomavirus. *P<0.05 = Statistically Significant

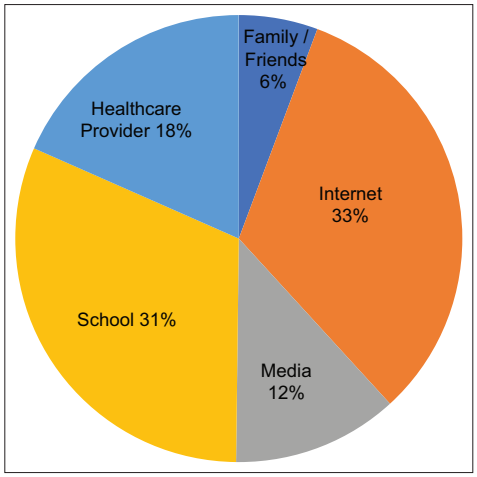


Figure 1: Source of information regarding the human papillomavirus vaccine among study participants, *n*=424

age group, or 2-dose schedule, indicating notable gaps in vaccination-related knowledge.

Table 3 shows that only 18.6% of participants were vaccinated against HPV, but attitudes were positive: 49.8% were willing to get vaccinated, 89.9% would recommend it to others, and ~60% supported mandatory school-based vaccination. Despite low uptake, acceptance remains high. Table 4 shows the most common barrier to HPV vaccination was the cost of the vaccine (58.7%), followed by fear of side effects (49.1%). Other barriers included perceived lack of necessity (32.6%), safety concerns (28.5%), accessibility issues (26.4%), low perceived infection risk (23.1%), social stigma (21.0%), and religious or cultural concerns (13.2%).

The internet was the primary source of HPV vaccination information (33%), followed by schools (31%) and healthcare providers (18%). Media contributed 12%, while family and friends accounted for 6% (Figure 1).

Tables 5 and 6 show the association of willingness to get the HPV vaccine with gender and year of study:

- A significant association was found between gender and willingness to receive the HPV vaccine (P = 0.001). Male students were more willing to get vaccinated compared to female students, who showed higher levels of hesitancy and unwillingness.
- Similarly, willingness to get vaccinated varied significantly across years of study (P = 0.006). Students in the pre-final and final years demonstrated greater willingness than those in the 1st and 2nd years, indicating increasing acceptance of HPV vaccination with academic progression.

Discussion

- This study found very high awareness of HPV (97.6%) and cervical cancer (98.8%), far exceeding previous Indian studies (55–85%), likely due to recent campaigns and the Cervavac launch in 2022–2023
- However, actual vaccination remains extremely low (11.3%), consistent with studies from Gujrat (7.72%),[4] Chennai (7%)[5] and Jodhpur (10%).[6]
- Cost (58.7%) and safety concerns are the biggest barriers, findings similar to systematic reviews across India
- Willingness is encouragingly high (82.3%), with females and senior students significantly more willing (P < 0.05).

Conclusion

Undergraduate medical students at G.R. Medical College, Gwalior, possess a high level of knowledge and positive attitudes toward HPV vaccination. However, actual uptake remains extremely low, primarily due to high cost and safety concerns.

Declarations

Ethical Approval

Institutional Ethics Committee, Gajra Raja Medical College, Gwalior.

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