

Awareness Profile about Human Papillomavirus Vaccine Among Medical Undergraduates: A Cross-Sectional Study

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KEYWORDS

Human papillomavirus, HPV vaccine, medical undergraduates, awareness, cross-sectional study

ABSTRACT:

Introduction & Background:

Human papillomavirus (HPV) is a common sexually transmitted infection associated with cervical and other cancers. Vaccination is an effective preventive measure, but awareness among medical undergraduates, who are future healthcare providers, may vary. Assessing knowledge, attitudes, and practices regarding HPV vaccination is crucial for improving preventive strategies.

Methodology:

A cross-sectional study was conducted among 410 medical undergraduates at Belagavi Institute of Medical Sciences, Belagavi. Participants completed a structured, self-administered 30-item questionnaire assessing knowledge, attitude, and practices regarding HPV infection and vaccination. Data were analyzed using descriptive statistics, and results were presented as frequencies and percentages.

Results:

Among the participants, 89% had heard of the HPV vaccine, and 96.1% correctly identified the full form of HPV. Awareness regarding the recommended age, vaccine doses, and available vaccines in India was lower, ranging from 29.5% to 37.1%. The majority (94.1%) supported awareness programs, and 88% favored inclusion of the HPV vaccine in the National Immunisation Schedule. Overall, 49% of participants demonstrated good awareness (score 21–30), 42% moderate awareness, and 9% poor awareness. Cost, perceived lack of risk, and limited recommendations by healthcare providers were the main barriers to vaccination.

Conclusion:

While medical undergraduates showed moderate to good awareness of HPV and its vaccine, knowledge gaps exist regarding vaccination schedule, recommended age, and available vaccines. Strengthening educational interventions and awareness programs, along with improving accessibility and affordability of the vaccine, may enhance uptake and contribute to cervical cancer prevention.

INTRODUCTION:

Human papillomavirus (HPV) is a common viral infection known to cause various cancers, notably cervical cancer, which represents a significant public

health challenge globally. Vaccination against HPV is recognized as a groundbreaking preventive measure that offers protection against the majority of HPV-related cancers, making it a critical tool in cancer prevention



strategies^{1,2}. Despite the availability and proven efficacy of HPV vaccines, awareness and knowledge about the vaccine, especially among medical undergraduates who are future healthcare providers, remain variable and often inadequate^{3,4}. Medical undergraduates play a pivotal role in educating the public and promoting vaccine uptake; hence, understanding their awareness and attitudes toward the HPV vaccine is crucial to addressing gaps in vaccination coverage⁵.

Several cross-sectional studies conducted among medical students have underscored the mixed levels of understanding regarding the HPV vaccine, revealing that while a good proportion are aware of the vaccination, detailed knowledge about the vaccine dosage, efficacy, and protective benefits against cancers is often insufficient^{3,6}. Barriers such as lack of comprehensive knowledge, misconceptions related to vaccine safety, cost concerns, as well as limited emphasis in medical curricula, have been identified as factors contributing to low vaccine uptake among this group^{3,7}. Given the rising burden of HPV-related cancers and the vital role that healthcare professionals play in vaccine advocacy, it is essential to assess and enhance the awareness profile of HPV vaccination among medical undergraduates through targeted educational interventions⁸. This study aims to evaluate the awareness profile about the HPV vaccine among medical undergraduates.

Need for the Study:

Despite the availability of effective vaccines, awareness and uptake among young adults, including medical undergraduates, is often suboptimal. As future healthcare providers, medical students play a crucial role in educating the community and promoting vaccination. Assessing their knowledge, attitudes, and practices regarding HPV vaccination is essential to identify gaps, inform targeted educational interventions, and ultimately enhance vaccine coverage and cervical cancer prevention efforts.

OBJECTIVES: 1. To assess awareness status regarding Human Papillomavirus Vaccine among medical undergraduates. 2. To analyse the factors influencing the knowledge about Human Papillomavirus Vaccine among medical undergraduates.

MATERIAL AND METHODS: This cross-sectional study was conducted among medical undergraduates at

Belagavi Institute of Medical Sciences, Belagavi, after obtaining informed written consent from all participants. A total of 410 students were included in the study. The sample size was calculated using the formula $n = z^2pq/d^2$, considering a prevalence of knowledge from a reference study ($p = 44.9\%$, $q = 55.1\%$), with 95% confidence interval and 5% absolute error, which yielded a minimum required sample of 380. To enhance reliability, 410 students were enrolled.

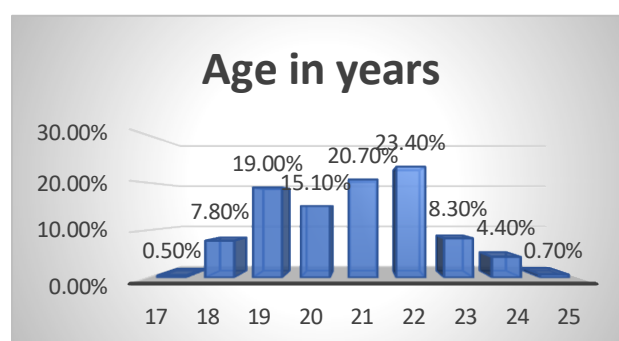
Data were collected using a pre-tested, structured, self-administered questionnaire developed for the purpose of this study. The questionnaire comprised 30 items designed to assess the knowledge, attitude, and practices related to human papillomavirus (HPV) infection and vaccination. To ensure confidentiality and minimize reporting bias, responses were recorded anonymously.

The inclusion criteria comprised medical undergraduates of Belagavi Institute of Medical Sciences who were willing to participate and provided informed consent. Students who declined participation were excluded.

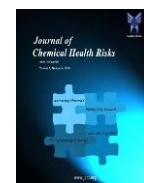
Collected data were compiled, summarized, and presented in the form of frequencies, percentages, proportions, and graphical representations wherever appropriate. Statistical tests for association were performed, but no significant associations were observed.

RESULTS & OBSERVATIONS

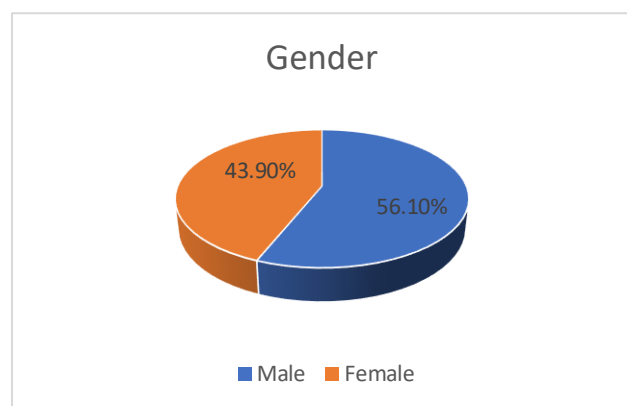
Graph 1: Distribution of Study Participants According to Age (N = 410)



The age of the study participants ranged from 17 to 25 years. The majority of respondents were 22 years old (23.4%), followed by 21 years (20.7%) and 19 years (19.0%). A smaller proportion belonged to the younger (17 years, 0.5%) and older (25 years, 0.7%) age groups.

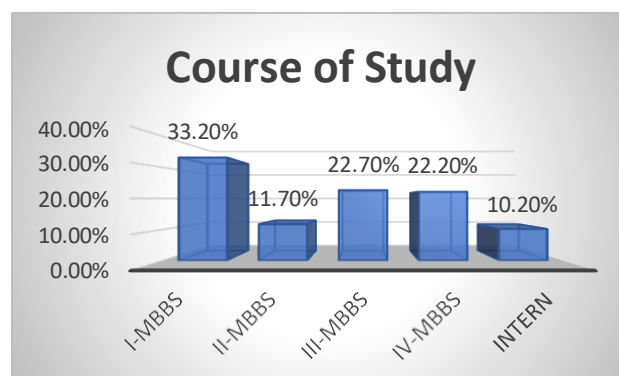


Graph 2: Distribution of Study Participants According to Gender (N = 410)



Out of 410 study participants, 230 (56.1%) were males and 180 (43.9%) were females.

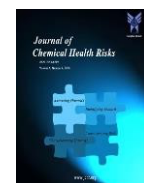
Graph 3: Distribution of Study Participants According to Course of Study (N = 410)



Among the 410 medical undergraduates surveyed, the largest proportion were first-year MBBS students (33.2%), followed by third-year (22.7%) and fourth-year (22.2%) students. Interns accounted for 10.2% of the participants, while the smallest group was second-year MBBS students (11.7%).

Table 1: Awareness and Knowledge Regarding Human Papillomavirus (HPV) Vaccine Among Medical Undergraduates (N = 410)

Questions	No		Yes		
	n	%	n	%	
Q1	Have you heard of HPV vaccine before?	45	11.0	365	89.0
Q2	What does HPV stand for ?	16	3.9	394	96.1
Q3	What does HPV Infection cause ?	72	17.6	338	82.4
Q4	Name the strain of HPV which is responsible for cervical cancer .	174	42.9	234	57.1
Q5	Is HPV infection sexually transmitted ?	40	9.8	370	90.2
Q6	HPV vaccination provides protection against which cancer ?	34	8.3	376	91.7
Q7	Are you aware of the recommended age for HPV vaccination?	265	64.6	145	35.4
Q8	What age does HPV vaccine start ?	289	70.5	121	29.5
Q9	How many doses of HPV vaccine should be given ?	181	44.1	229	55.9
Q10	Do you believe the HPV vaccine is important for : Females, Males	154	37.6	256	62.4
Q11	Does HPV vaccine cause any potential side effect ?	245	59.8	165	40.2
Q12	Is pregnancy a contraindication for HPV vaccination ?	201	49.0	209	51.0
Q13	What is the route of administration of HPV Vaccine ?	172	42.0	238	58.0
Q14	Name the HPV vaccines which are available in INDIA .	258	62.9	152	37.1



Q15	s HPV vaccination an alternative to cervical cancer screening ?	208	50.7	202	49.3
Q16	s cervical cancer preventable ?	52	15.1	348	34.9
Q17	Do you feel there is need for more awareness programmes related to HPV vaccine ?	24	5.9	386	94.1
Q18	Do you feel there is need for education on HPV vaccination in schools and colleges ?	26	5.3	384	93.7
Q19	Do you feel that HPV vaccination should be implemented in National immunisation schedule?	49	12.0	361	88.0
Q20	Do you feel that HPV vaccination should be made cost effective ?	31	7.6	379	92.4
Q21	Are you personally considering getting the HPV vaccine or have you received it already?	168	41.0	242	59.0
Q22	f yes, at what age did you receive your first dose of the HPV vaccine?	392	95.6	18	4.4
Q23	f yes, how many doses have you completed?	401	97.8	9	2.2
Q24	f not considering, what are the reasons?				
Q25	Would you recommend the HPV vaccine to family / friends / others ?	51	12.4	359	87.6
Q26	What factors would influence your decision to get vaccinated against HPV?	225	54.9	185	45.1
Q27	Where do you get information about vaccines in general?				
Q28	Have you received information about the HPV vaccine from your healthcare provider?	175	42.7	235	57.3
Q29	How would you rate your knowledge about HPV and the HPV vaccine?	125	30.5	285	59.5
Q30	What sources of information do you trust regarding vaccines and HPV?				

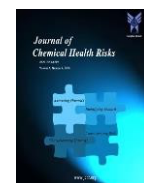
The majority of respondents (89.0%) had heard of the HPV vaccine, and 96.1% correctly identified the full form of HPV. Most participants (82.4%) knew that HPV infection can cause disease, and 57.1% identified the specific strain associated with cervical cancer. Awareness of HPV as a sexually transmitted infection was high (90.2%), and 79.5% recognized its role in preventing HPV-related cancers.

However, gaps were noted in specific knowledge: only 35.4% were aware of the recommended age for vaccination, and less than one-third (29.5%) knew the correct starting age. Just over half (55.9%) knew the required number of doses, and 58.0% were aware of the

correct route of administration. Awareness of available HPV vaccines in India was limited to 37.1%.

Encouragingly, most participants supported broader preventive strategies: 94.1% emphasized the need for awareness programmes, 93.7% advocated education in schools and colleges, and 88.0% recommended inclusion of the HPV vaccine in the National Immunisation Schedule. A large majority (92.4%) felt the vaccine should be made more affordable.

Personal acceptance was moderate, with 59.0% considering or already receiving the vaccine, though only 4.4% had actually taken the first dose, and just 2.2% had completed the full schedule. Furthermore, 87.6%



expressed willingness to recommend HPV vaccination to others, showing positive intent despite knowledge gaps.

Table 2: Reasons for Not Considering HPV Vaccination Among Study Participants (N = 195)

24. If not considering, what are the reasons?		
	Frequency	Percent
Lack of awareness	26	13.3%
Cost	59	30.3%
Not at risk	60	30.8%
Concerns about side effects	18	9.2%
Not recommended by healthcare provider	15	7.7%
Others	17	8.7%
Total	195	100%

Among the 195 participants who were not considering HPV vaccination, the most common reasons cited were the perception of not being at risk (30.8%) and the high cost of the vaccine (30.3%). Lack of awareness accounted for 13.3%, while 9.2% expressed concerns about potential side effects. Additionally, 7.7% reported that the vaccine had not been recommended by a healthcare provider, and 8.7% mentioned other reasons.

Table 3: Sources of Information About Vaccines in General Among Study Participants (N = 410)

27. Where do you get information about vaccines in general?	
	Frequency
Healthcare providers	146
Internet	164
Friends/ family	55
Others	37
Total	410

The most common source of vaccine-related information reported by the participants was the internet (40.0%),

followed by healthcare providers (35.6%). Friends and family contributed to 15.4% of information sharing, while 9.0% cited other sources.

Table 4: Trusted Sources of Information Regarding Vaccines and HPV Among Study Participants (N = 410)

30. What sources of information do you trust regarding vaccines and HPV?		
	Frequency	Percent
Healthcare providers	179	43.7%
Internet	98	23.8%
Friends/ family	93	22.7%
Government health agencies	40	9.8%
Total	410	100%

When asked about trusted sources of information on vaccines and HPV, nearly half of the participants (43.7%) relied on healthcare providers, making them the most trusted source. The internet was trusted by 23.8% of respondents, followed closely by friends and family (22.7%). Government health agencies were the least trusted, with only 9.8% of participants depending on them for credible information.

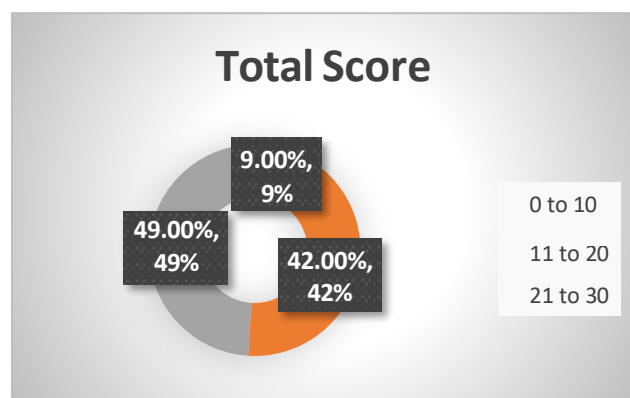
Table 5: Distribution of Participants According to Total Awareness Score Categories on HPV Vaccine (N = 410)

	Frequency	Percent
Total Score 0 to 10	37	9.0%
11 to 20	172	42.0%
21 to 30	201	49.0%
Total	410	100.0%

Based on the total awareness score, nearly half of the participants (49.0%) fell into the highest score category (21–30), indicating good knowledge regarding HPV and its vaccine. About 42.0% were in the moderate score category (11–20), while only 9.0% scored in the lowest



range (0–10), reflecting poor awareness. Overall, this distribution suggests that although a majority of medical undergraduates demonstrated moderate to good awareness, a small but notable proportion still had inadequate knowledge.



Graph 4: Distribution of Participants According to Total Awareness Score Categories on HPV Vaccine (N = 410)

DISCUSSION: This study assessed the awareness, attitudes, and practices regarding HPV vaccination among medical undergraduates. Our findings indicate that while general awareness of HPV and its vaccine was high, knowledge gaps persist in specific areas such as recommended age, dosing schedule, and available vaccines in India.

Demographic Profile:

In this study, a total of 410 medical undergraduates participated. The majority of students were aged between 19 and 22 years, with the highest proportion being 22 years old (23.4%), followed by 21 years (20.7%) and 19 years (19.0%). Males accounted for 56.1% of the participants, while females constituted 43.9%. Regarding the course of study, the largest group was first-year MBBS students (33.2%), followed by third-year (22.7%) and fourth-year students (22.2%), with interns representing 10.2% and second-year students 11.7%. Gupta et al.⁹ conducted a cross-sectional study among 391 medical and nursing students in North India, with respondents' ages ranging from 18 to 35 years (mean 24.39 ± 4.27 years). Most were between 21–25 years (57%), followed by 26–30 years (27.1%). Females comprised 61.6% of the sample, with a sex ratio of 0.62. Among participants, 60.4% were MBBS students and 39.6% were nursing students. Swarnapriya et al.¹⁰ conducted a cross-sectional study among 957

undergraduate students (MBBS, BDS, and nursing) in a tertiary care hospital in South India. The mean age was 19.25 ± 1.64 years, and females formed the majority (71.6%). Academic distribution included MBBS (49.7%), BDS (30.3%), and nursing (20%). Family history of malignancy was reported by 7.8%. Mothers' education was relatively high, with 32.1% graduates and 19.4% postgraduates. Singh and Baliga¹¹ conducted a cross-sectional study among 297 medical students in Belagavi, India, including 152 second-year and 145 third-year MBBS students. The mean age was 20.45 ± 1.23 years (range 18–25), with females comprising 58.2% of the sample. Almost all students (99.3%) reported no family history of cervical cancer. Ori et al.¹² conducted a cross-sectional study among 250 MBBS students at Gulbarga Institute of Medical Sciences, Kalaburagi. The mean age was 21.4 years (range 18–26), with equal male and female representation (125 each). Most students (53.6%) were in the 21–23 years age group, 80.4% were Hindus, and 49.2% belonged to the upper socioeconomic class. About 13.2% reported having a family member working in the health sector. Thakkar and Agarwal¹⁴ conducted a cross-sectional study among 868 medical students from multiple colleges in Gujarat, India, using an online questionnaire in July–August 2022. Most participants (96%) were below 25 years of age, and females made up 54.4% of the sample. Students were distributed across MBBS years: first year (16%), second year (17.2%), third year (18.8%), fourth year (23.4%), interns (18.8%), and residents (5.9%).

Awareness of HPV and Vaccine:

This study revealed high general awareness regarding HPV and its vaccine. A majority of participants (89%) had heard of the HPV vaccine, and 96.1% correctly identified the full form of HPV. Knowledge regarding the consequences of HPV infection was high, with 82.4% correctly identifying disease associations, and 90.2% were aware that HPV is sexually transmitted. Awareness regarding specific strains responsible for cervical cancer was moderate (57.1%). However, knowledge gaps were noted in vaccination specifics; only 35.4% knew the recommended age, 29.5% knew the starting age, 55.9% knew the correct number of doses, and 37.1% were aware of vaccines available in India. Gupta et al.⁹ reported an overall satisfactory knowledge level of 69%. About 92.1% knew HPV is the principal cause of cervical cancer, 90.5% recognized HPV as causing genital warts,



and 94.4% were aware of vaccine availability. However, only 45% knew the correct age group for vaccination, and 50.4% were aware vaccines are for both men and women. Knowledge gaps included trade names of vaccines and feasibility of vaccination in infected women. Swarnapriya et al.¹⁰ found that 86.4% of participants had heard of HPV vaccines, but only 70.6% could expand the acronym correctly. About 60.1% knew HPV vaccination prevents cervical cancer, while knowledge of other HPV-related conditions was much lower (genital warts 15.9%, carcinoma penis 8.8%). Awareness of correct dosage, route, and age of administration ranged from 41.2% to 57.7%. Only 17.9% believed efficacy exceeded 90%. Overall, just 44.9% displayed good knowledge. Singh and Baliga¹¹ found that 79.8% of students knew vaccines are available in India, but only 6.7% could name a single vaccine correctly, and 66.3% did not know the types available. About 52% identified the correct vaccination age range (10–30 years), while 77.4% believed only girls could be vaccinated, and just 12.1% recognized both boys and girls. Although 92.6% recognized vaccination as a preventive method, knowledge gaps remained in dosing schedules, vaccination eligibility for HPV-infected individuals, and post-vaccination protection. Ori et al.¹² reported that 92.4% knew HPV causes cervical cancer, 93.6% recognized it as a sexually transmitted disease, and 68.4% were aware it also causes penile cancer. Regarding vaccines, 88.4% knew HPV vaccines prevent cervical cancer, 76% knew about genital wart prevention, and 61.2% were aware vaccines can be given to boys. However, only 39.2% correctly identified 9–14 years as the target vaccination group, and 35.6% knew the vaccine is not included in the National Immunization Schedule. Singh et al.¹³ found significant knowledge gaps. Only 23.2% of students correctly identified HPV as the main cause of cervical cancer, and 31.8% recognized HPV types 16 and 18 as most associated with the disease. Awareness of transmission was poor, with just 23.6% identifying sexual contact as the primary route, while many incorrectly cited airborne or blood-borne spread. Only 32.6% knew HPV can be asymptomatic. Awareness of vaccination was mixed: 52.4% identified two doses as sufficient, but misconceptions persisted about timing and efficacy. Thakkar and Agarwal¹⁴ reported that 92.6% of students had heard about HPV vaccines. However, knowledge was limited: only 60.6% identified HPV as the most important and preventable cause of cervical cancer, and just 35.3% were aware of available HPV vaccines in

India. Knowledge about ideal age of vaccination (23.7%), schedule (43.1%), duration of effect (6.9%), and eligibility of both sexes (52.6%) was notably low. Only 6.3% had heard about serious side effects.

Attitudes and Perceptions:

In this study, Most participants demonstrated positive attitudes toward HPV vaccination. A majority (62.4%) believed that the vaccine is important for both males and females. Nearly all participants supported awareness initiatives, with 94.1% advocating for more awareness programs and 93.7% recommending education about HPV vaccination in schools and colleges. Furthermore, 88% favored inclusion of the HPV vaccine in the National Immunisation Schedule, and 92.4% felt that the vaccine should be made more cost-effective. According to Gupta et al.,⁹ 65.2% strongly agreed on the need for more awareness programs, while 93.6% supported HPV education in schools and colleges. Nearly 92% favored including HPV vaccination in the National Immunization Schedule, and 91.8% believed it should be given at schools/colleges. Overall, students displayed a positive attitude toward HPV vaccination. In Swarnapriya et al.¹⁰ Although nearly half of unvaccinated participants were unwilling to receive the vaccine (48.54%), those unwilling cited doubts about efficacy (30.5%), fear of side effects (26.1%), and high cost (21.7%). A subset (14.6%) believed cervical cancer posed minimal risk. These findings indicate a mix of hesitancy and misconceptions affecting attitudes. Singh and Baliga¹¹ reported that 80.5% of students said they would recommend HPV vaccination to others. A majority (71.7%) believed the vaccine could be administered to sexually active girls, and 66.7% correctly stated that cervical screening is still required after vaccination. Female students showed significantly higher knowledge scores and were more willing to accept vaccination compared to males. Ori et al.¹² found that 56.4% strongly agreed to get vaccinated if free, and 54.8% agreed they would pay for it. More than half (51.6%) strongly agreed they would recommend vaccination to friends, and 54.8% would recommend it to future clients. However, 22.8% believed only sexually active women should take the vaccine, and 22.4% felt their parents would not allow them to get vaccinated. A large majority (96.4%) wanted more information on HPV and vaccines. According to Singh et al.,¹³ only 30.8% believed HPV vaccines are effective, while 35.6% were unsure. Just 26.6%



acknowledged the vaccine's contribution to herd immunity, and 33.2% supported mandatory vaccination. Misconceptions about the appropriate age for vaccination were common, with only 21.6% identifying 9–14 years correctly. Attitudes toward vaccine necessity and effectiveness were therefore inconsistent and uncertain. Thakkar and Agarwal¹⁴ revealed mixed perceptions. While 93.7% knew HPV vaccination prevents cervical cancer, misconceptions persisted regarding duration and optimal age. Around 70% knew HPV vaccines can also prevent other cancers. A majority (72.7%) said they would recommend the vaccine to friends/relatives, though many were uncertain about personal uptake

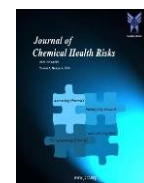
Acceptance and Barriers:

In this study, Regarding personal uptake, 59% of participants reported that they were considering or had already received the HPV vaccine. However, actual vaccination rates were low, with only 4.4% having received the first dose and 2.2% completing the full schedule. Among those not considering vaccination ($n = 195$), the main barriers were perceived low risk (30.8%) and high cost (30.3%), followed by lack of awareness (13.3%), concerns about side effects (9.2%), and absence of healthcare provider recommendation (7.7%). Gupta et al.⁹ noted that 78.5% of respondents either had been vaccinated (21%) or were willing to undergo vaccination. Additionally, 90.5% recommended vaccination to others. Reported barriers to vaccination included fear of side effects (23.1%), cost (18.8%), doubts about efficacy (10.4%), and insufficient information (46% of non-vaccinated respondents). Despite positive attitudes, actual uptake remained low. Swarnapriya et al.¹⁰ reported very low vaccine uptake, with only 6.8% already vaccinated. Among the unvaccinated, 51.5% expressed willingness to get vaccinated, but a substantial 48.5% were not willing. Main barriers included efficacy concerns (30.5%), fear of side effects (26.1%), cost (21.7%), and low perceived risk of cervical cancer (14.6%). In Singh and Baliga,¹¹ 36 students had already received vaccination. Additionally, 85.6% indicated willingness to be vaccinated in the future. The main barriers for some students were doubts about vaccine efficacy and misconceptions such as whether multiple sexual partners are permissible post-vaccination. Regression analysis indicated that knowledge and acceptance improved with advancing education and was significantly higher among females.

Ori et al.¹² reported very low uptake: only 7 students (2.8%, all female) had received at least one vaccine dose. Willingness was higher, with 56.4% ready to take it if free and 88% overall expressing acceptance in line with previous Indian studies. The most common barriers to vaccination were lack of awareness about vaccine availability (61.2%), non-availability locally (26.4%), high cost (4%), fear of needles (2%), and parental disapproval (0.8%). Singh et al.¹³ reported that 49% of students had received HPV vaccination, while 35% planned to take it. Barriers included cost (19.6%), lack of HPV-related education in the curriculum (52.4%), fear of side effects (33%), and limited public awareness (35%). These barriers highlight systemic and informational challenges despite moderate willingness. Thakkar and Agarwal¹⁴ reported that 13.4% of students were vaccinated. Among the unvaccinated, 48.2% planned to get vaccinated, 19.7% refused, and 32.1% were unsure. Barriers included lack of knowledge (37.9%), difficult access (18.2%), high cost (7.7%), side effect concerns (7.9%), and doubts about efficacy (9.8%). Only a small minority (0.6%) opposed all vaccines.

Sources of Information:

In this study, Participants obtained information about vaccines predominantly from the internet (40.0%) and healthcare providers (35.6%), while friends and family (15.4%) and other sources (9.0%) were less common. When considering trusted sources specifically for HPV-related information, 43.7% relied on healthcare providers, followed by 23.8% on the internet, 22.7% on friends and family, and 9.8% on government health agencies. Gupta et al.⁹ found that the most common sources of HPV knowledge among students were the internet (50%), followed by teachers (41.9%) and books/magazines (39.6%). Television played a lesser role as a source of information. Swarnapriya et al.¹⁰ showed teachers were the dominant source of knowledge (68.1%), followed by internet (12.4%), television (9.4%), and magazines (4.6%). This contrasts with other studies where the internet was more common. Singh and Baliga¹¹ noted that the most common sources of information were textbooks (65.3%), internet forums (43.8%), and radio broadcasts (2%). According to Thakkar and Agarwal,¹⁴ the major sources of information were medical books (68.6%), doctors (28.9%), friends/family (23.7%), media (16.7%), and pharmaceutical companies (2%).



Overall Awareness Score:

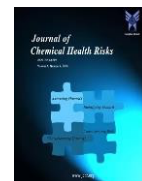
In this study, total awareness scores indicated that nearly half of the participants (49%) had good awareness (score 21–30), 42% had moderate awareness (score 11–20), and 9% had poor awareness (score 0–10). Gupta et al.⁹ reported mean knowledge scores of 8.96 ± 2.23 out of 13, attitude scores of 13.67 ± 2.42 out of 16, and practice scores of 6.76 ± 2.31 out of 8. The overall mean total score was 29.40 ± 5.04 (range 9–37). Higher scores were significantly associated with females, MBBS students, and unmarried respondents. In Swarnapriya et al.¹⁰ Only 44.9% of participants had “good” knowledge (≥ 6 correct responses). Knowledge levels improved significantly with advancing study year: final-year students were over 3.6 times more likely to have good knowledge compared to first-years. In Singh and Baliga et al.,¹¹ Knowledge levels were significantly higher among third-year students compared to second-years (2.38 times more likely to have good knowledge, $p < 0.0001$). While awareness of HPV vaccination and cervical cancer prevention was relatively high, there were substantial knowledge gaps in vaccine types, dosage, and male eligibility. Female students consistently scored better than males, and willingness to vaccinate was strongly associated with higher knowledge. Ori et al.¹² used a scoring system (20 questions). Overall, 50.4% had “good” knowledge, 23.2% had “very good” knowledge, 20% “poor,” and 7% “very poor.” Knowledge increased significantly with advancing year of study and age ($p < 0.05$). The mean score was 12.2, categorizing most students into the “good” group. Despite knowledge, actual vaccination rates remained very low. Singh et al.¹³ highlighted widespread misconceptions. Only about one-third of students demonstrated accurate knowledge on key parameters like cause, types, and transmission of HPV. Even though vaccination uptake (49%) was higher than in most other Indian studies, the awareness scores were low, reflecting a mismatch between practice and understanding. The lack of curriculum integration was cited as a key reason for poor awareness.

CONCLUSION: The study revealed that while overall awareness about HPV and its vaccine among medical undergraduates was moderate to good, significant gaps persist in knowledge regarding the recommended age, dosage schedule, and available vaccines in India. Although the majority recognized the importance of vaccination and supported its inclusion in the National

Immunisation Schedule, barriers such as cost, perceived lack of risk, and limited healthcare provider recommendations hindered acceptance. Strengthening awareness programmes, integrating HPV education into the medical curriculum, and making the vaccine more accessible and affordable could enhance uptake and contribute to effective cervical cancer prevention.

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