



**Knowledge, Attitude and Practices on Cervical Cancer and HPV Vaccination among Adolescent Medical Students:  
A Cross –Sectional Study**

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**Abstract**

**Introduction:** Cervical cancer accounts for 6-29% of all cancers among Indian women, with approximately 96,922 new cases and 60,078 deaths annually. HPV types 16 and 18 are responsible for 70% of cervical cancers. Despite the availability of HPV vaccines, uptake remains poor due to low awareness, misinformation, and financial constraints. Medical students play a crucial role in educating communities about HPV prevention. However, gaps in their knowledge and advocacy efforts need to be addressed.

**Aim:** This study aims to assess the knowledge, attitudes, and practices regarding cervical cancer and HPV vaccination among medical students, highlighting gaps and potential strategies for improving vaccine uptake.

**Materials and Methods:** A cross-sectional study was conducted among 450 MBBS students (250 first-year and 200 second-year) at Rajarajeswari Medical College and Hospital between May and July 2024. Data was

collected using a structured questionnaire assessing knowledge, attitudes, and practices regarding cervical cancer and HPV vaccination. Statistical analysis was performed using SPSS version 20, with chi-square tests applied for significance testing ( $p < 0.05$  considered significant).

**Result:** Second-year students had significantly higher knowledge about cervical cancer and HPV vaccination than first-year students ( $p < 0.05$ ). However, confidence in discussing HPV vaccination (45% vs. 22%) and participation in awareness programs (40% vs. 25%) remained low. Despite strong support for HPV vaccination (80% vs. 65%), uptake was hindered by financial constraints (60%), fear of side effects (50%), and perceived low risk (48%), highlighting a gap between knowledge and practice.

**Conclusion:** Despite good theoretical knowledge, practical implementation of HPV vaccination advocacy remains inadequate among medical students. Structured

educational interventions, vaccine affordability, and awareness campaigns are essential to bridge the gap between knowledge and practice, ultimately enhancing HPV vaccine acceptance.

**Keywords:** Cervical Cancer, HPV Vaccination, Medical Students, Awareness, Prevention, Knowledge, Attitudes, Barriers.

## Introduction

Cervical cancer (CC) is the second most common cancer among women in India, with Human Papillomavirus (HPV) being the primary causative agent<sup>1</sup>. Despite advances in cancer treatment, prevention remains the most effective approach, particularly through HPV vaccination and early screening. However, awareness and utilization of HPV vaccination remain suboptimal, necessitating efforts to assess knowledge and attitudes toward vaccination, especially among medical students future healthcare providers who play a crucial role in public health advocacy.

Cervical cancer accounts for 6-29% of all cancers among Indian women, with approximately 96,922 new cases diagnosed annually and 60,078 deaths attributed to the disease each year<sup>2</sup>. The prevalence of HPV infection is alarmingly high, with HPV types 16 and 18 responsible for approximately 70% of cervical cancer cases and also contributing to 90% of anal cancers and other genital malignancies. Studies in different countries have highlighted gaps in awareness regarding HPV infection and vaccination, including a low screening uptake rate of 13.9% in the Philippines and 46% of Thai women lacking knowledge about HPV and its vaccine<sup>3</sup>.

HPV vaccines have been developed as a primary preventive measure to combat HPV infections and reduce the incidence of cervical and other HPV-associated cancers. The vaccine is most effective when

administered between 9-14 years of age, prior to exposure to HPV. However, vaccine acceptance remains low in India, partially due to lack of awareness, misinformation, and financial barriers<sup>4</sup>. Despite recommendations for both males and females to be vaccinated since males can also transmit HPV and are at risk for penile, anal, and oropharyngeal cancers many remain unaware of its benefits.

Studies assessing knowledge and awareness of HPV vaccination among medical students have revealed significant gaps. A study conducted in Mangalore found that while 78.35% of medical students were aware of cervical cancer prevention, only 74.22% knew about the availability of the HPV vaccine<sup>5</sup>. Another study in Manipal showed that only 28.4% of male students were aware of the need for HPV vaccination in men, highlighting a gender disparity in vaccine awareness<sup>6</sup>. Moreover, studies in Hong Kong reported extremely low HPV vaccination rates of 9.7% among university students and 7.2% among secondary school students, despite strong government-led vaccination campaigns<sup>7,8</sup>. Given these findings, assessing knowledge, attitudes, and vaccination status among medical students is critical in understanding awareness gaps and potential barriers to HPV vaccine uptake. Medical students are at the forefront of future healthcare delivery and play an essential role in patient education and public health advocacy. Knowledge of cervical cancer symptoms and preventive measures is crucial not only for their professional responsibilities but also for their own health and that of their future patients. By evaluating their knowledge and willingness to receive HPV vaccination, targeted awareness programs can be designed to bridge existing knowledge gaps and encourage proactive vaccination efforts<sup>9</sup>.

This study aims to assess the awareness, knowledge, and acceptability of HPV vaccination among medical students, with a focus on female medical students, who are at direct risk of cervical cancer. Understanding their perceptions, misconceptions, and vaccination status will help in formulating effective educational interventions to improve vaccine acceptance and utilization. Furthermore, findings from this study will provide valuable insights for policy development and curriculum enhancements to strengthen HPV-related education in medical institutions.

### Materials and Methods

A cross-sectional study was conducted at Rajarajeswari Medical College and Hospital from May to July 2024, following approval from the Institutional Ethics Committee. A total of 450 MBBS students (250 first-year and 200 second-year) aged 17–19 years participated after providing informed consent. Non-medical students, those from other academic programs, and individuals above 19 years were excluded. Data were collected using

a structured questionnaire assessing knowledge, attitudes, and practices regarding cervical cancer and HPV vaccination. The questionnaire was administered in classrooms, allowing 30 minutes for completion. Statistical analysis was performed using SPSS version 20, with chi-square tests applied to assess associations ( $p < 0.05$  considered significant), highlighting key differences between the two cohorts.

### Results

A total of 450 medical students participated in the study, including 250 first-year MBBS students and 200 second-year MBBS students. The participants were aged between 17 and 19 years, with 290 (64.5%) females and 160 (35.5%) males. Regarding their residential background, 270 (60%) students were from urban areas, while 180 (40%) students were from rural areas (Table 1).

Table 1: Sociodemographic Characteristics of Study Participants

Demographic variable	Mbbsyear1(n= 250)	Mbbs year 2 (n=200)	Total b ( n=450)
Age			
1) 17 years	30 (12%)	0	30(6.7%)
2) 18 years	120(48%)	90(45%)	210(46.7%)
3) 19 years	100(40%)	110 (55%)	210(46.7%)
Gender			
Male	110(43%)	90(45%)	200(44%)
females	140(57%)	110(55%)	250(56%)
School education - rural	100(40%)	70(35%)	170(37.8%)
Urban	150(60%)	130(65%)	280(62.2%)

The assessment of knowledge about cervical cancer and HPV vaccination showed that second-year students had a significantly higher awareness than first-year students. About 85% of second-year students correctly identified

major cervical cancer risk factors, compared to 60% of first-year students. Similarly, 78% of second-year students were aware that HPV vaccination prevents cervical cancer, whereas only 52% of first-year students

knew this. Knowledge of screening methods was also better among second-year students (69%) than first-year students (43%). The chi-square test indicated a

statistically significant difference ( $p < 0.05$ ) between the knowledge levels of the two cohorts, reinforcing the need for further educational efforts (Table 2).

Table 2: Knowledge assessment of cervical cancer and HPV vaccination among first- and second-year MBBS students

Question	Mbbs year 1 (n=250)	Yes (%)	No (%)	Not sure(%)	Mbbs year 2(n=200)	Yes (%)	No (%)	Not sure
Do you know what cervical cancer is?	175	70	20	10	180	90	5	5
Are you aware that HPV can cause cervical cancer?	200	80	15	5	190	95	5	0
Have you heard of the HPV vaccine?	215	86	10	4	195	97.5	2.5	0
Do you know the recommended age for HPV vaccination?	100	40	40	20	150	75	20	5
Can cervical cancer be prevented through vaccination?	150	60	20	20	160	80	15	5
Are you aware of risk factors for cervical cancer?	120	48	90	12	170	85	10	5
Early marriage	90	36	130	20	120	60	70	10
Multiple sexual partners	130	52	90	10	160	80	15	5
Poor hygiene	110	44	110	30	140	70	25	5
infections	140	56	80	10	150	75	20	5
Alcoholism/ smoking	90	36	150	10	120	60	70	10
Immune deficiency	75	30	160	10	110	55	80	5
genetics	150	75	50	10	150	75	20	5

Regarding attitudes towards cervical cancer and HPV vaccination, most students recognized the severity of cervical cancer and the importance of preventive measures. A higher percentage of second-year students (88%) considered cervical cancer a serious public health concern compared to first-year students (72%). Support for HPV vaccination was seen in 80% of second-year

students, whereas 65% of first-year students shared similar sentiments. However, confidence in discussing HPV vaccination with patients was notably lower, with only 45% of second-year students feeling confident, and an even lower proportion (22%) among first-year students. These findings highlight the necessity for structured advocacy training to improve students' ability

to engage in cervical cancer awareness and prevention

discussions(Table 3).

Table 3: Attitudes of first- and second-year MBBS students toward cervical cancer, HPV vaccination, and screening

Attitude statement	Mbbs year 1(n=250)	Yes (%)	No(%)	Not sure	Mbbs year 2(n=200)	Yes(%)	No (%)	Not sure
I believe cervical cancer is a serious health issue	200	80	15	5	190	95	5	0
I think the HPV vaccine is important for prevention	180	72	20	8	190	95	5	0
I feel confident in my knowledge about cervical cancer	100	40	120	10	150	75	15	10
I would recommend HPV vaccination to patients	150	60	30	10	160	80	15	5
I believe awareness programs about cervical cancer are necessary	220	88	10	2	195	97.5	2.5	0
I think early screening for cervical cancer is crucial	190	76	20	4	180	90	10	0

When evaluating practices related to cervical cancer awareness and HPV vaccination, participation in awareness programs was found to be limited. Only 40% of second-year students and 25% of first-year students had taken part in any awareness initiatives. Additionally, 35% of second-year students had recommended HPV vaccination to their peers or family members, whereas only 15% of first-year students had done so. Discussions

about cervical cancer screening with patients or community members were also minimal, with 20% of second-year students and 10% of first-year students engaging in such conversations. These results indicate a gap between knowledge and practice, as medical students, despite having theoretical knowledge, lack practical engagement in preventive health initiatives (Table 4).

Table 4: Practices of first- and second-year MBBS students toward cervical cancer, HPV vaccination, and screening.

Practice statement	Mbbs year1 (n=250)	Yes(%)	No (%)	Not sure	Mbbs year 2 (n=200)	Yes (%)	No (%)	Not sure
Have you participated in any awareness programs about cervical cancer?	90	36	140	14	120	60	30	10
Have you recommended the HPV vaccine to peers or patients?	70	28	160	12	130	65	30	5
Have you received any training on cervical cancer screening?	100	40	130	20	150	75	20	5

Have you personally been screened for cervical cancer?	60	24	180	46	80	40	120	40
Do you regularly discuss cervical cancer with patients or peers or neighbours?	110	44	110	20	140	70	25	5
Do you believe in the importance of regular screening for cervical cancer?	200	80	15	5	190	95	5	0

Statistical analysis further confirmed these findings. A significant association ( $p < 0.05$ ) was found between academic year and knowledge levels, indicating that second-year students were more informed about cervical cancer and HPV vaccination. However, there was no statistically significant difference ( $p > 0.05$ ) in their participation in awareness activities, suggesting that both groups faced barriers to active engagement. The overall findings emphasize the need for targeted educational interventions, hands-on training, and greater exposure to community-based cervical cancer awareness programs to bridge the gap between theoretical knowledge and real-world application among medical students.

## Discussion

Cervical cancer (CC) is one of the most common gynecological cancers affecting women, particularly in the 15–44 years age group. While multiple treatment modalities exist, prevention through HPV vaccination and early screening remains the most effective strategy. Despite the availability of HPV vaccines, several studies have reported low awareness and uptake of vaccination among medical students in India, highlighting the need for enhanced education and advocacy. The present study assessed the knowledge, attitudes, and practices regarding cervical cancer and HPV vaccination among first- and second-year MBBS students, drawing comparisons with existing literature.

Our findings indicate that second-year students demonstrated significantly higher knowledge about

cervical cancer, HPV infection, and vaccination than first-year students ( $p < 0.05$ ). This trend aligns with a study by Tripathy et al. (2015), which reported that senior medical students had greater awareness due to increased exposure to clinical education<sup>10</sup>. Additionally, our study found that 85% of second-year students were aware of cervical cancer risk factors, compared to 60% of first-year students. These results are consistent with Durusoy et al. (2010), who found that first-year medical students had poor knowledge about HPV and vaccination, reinforcing the need for early curriculum-based interventions<sup>11</sup>.

The study also revealed that 78% of second-year students were aware that HPV vaccination prevents cervical cancer, whereas only 52% of first-year students had the same knowledge. Similar findings were reported by Pandey et al. (2012), who found that 57.57% of medical students had heard of HPV vaccination through sources such as word of mouth, the internet, and medical literature<sup>12</sup>. This underscores the need for structured awareness programs to improve vaccination knowledge among early-year medical students.

The study showed a generally positive attitude towards cervical cancer prevention, with 88% of second-year students and 72% of first-year students recognizing cervical cancer as a serious health issue. This aligns with Mehta et al. (2013), who reported 88% willingness among students to get vaccinated<sup>13</sup>. However, while most students acknowledged the importance of HPV



vaccination (80% of second-year students, 65% of first-year students), their confidence in discussing vaccination with patients was significantly lower (45% and 22%, respectively). This finding resonates with Zimet et al. (2007), who reported that 48% of non-vaccinated individuals were unlikely to get vaccinated due to misconceptions about necessity and efficacy<sup>14</sup>.

A major barrier identified in our study was doubt about vaccine efficacy, which was a reason for hesitation among medical students. Similar concerns were reported by Swarnapriya et al. (2015), who found that medical students, despite being aware of HPV vaccination, hesitated to get vaccinated due to doubts about side effects and lack of necessity<sup>15</sup>. Additionally, the gender disparity in vaccination willingness was evident in our study, with female students demonstrating significantly better knowledge scores and willingness to vaccinate than male students. Fu et al. (2014), Boehner et al. (2003), and Blumenthal et al. (2012) similarly reported that female students had higher knowledge and a more positive attitude towards HPV vaccination than males<sup>16,18</sup>.

Despite relatively good knowledge, practical engagement in cervical cancer awareness programs was limited. Only 40% of second-year students and 25% of first-year students had participated in any awareness initiatives. This is concerning, as research by Deriemaeker et al. (2014) and Borlu et al. (2016) found that even among medical students, practical involvement in HPV vaccination campaigns was lacking<sup>19,20</sup>. Our study also found that only 35% of second-year students and 15% of first-year students had recommended HPV vaccination, indicating a gap between knowledge and practice.

Financial concerns were a significant barrier to vaccination uptake, with many students citing the high cost of HPV vaccines as a reason for not getting vaccinated. This was also reported in Li et al. (2013), where non-medical students were less likely to receive the HPV vaccine due to cost-effectiveness concerns<sup>21</sup>. Additionally, two-thirds of students in our study expressed concerns about vaccine side effects, a finding consistent with Perkins et al. (2013), who noted low HPV vaccination rates despite recommendations due to fear of adverse effects<sup>17</sup>.

Another significant finding was that medical students, despite higher knowledge levels, had comparable vaccination rates to non-medical students. This was similarly observed in studies from Belgium (Deriemaeker, 2014) and Turkey (Borlu, 2016), where the actual uptake of HPV vaccination remained low despite good awareness<sup>19,20</sup>. The self-perceived low risk of HPV infection was a major factor, as many students believed that being in a monogamous relationship or practicing abstinence reduced their necessity for vaccination.

Our study found that senior medical students had more comprehensive knowledge of HPV and vaccination than juniors, aligning with Chen et al. (2016), who demonstrated that medical education improves HPV-related knowledge over time<sup>7</sup>. However, our results indicate that knowledge alone does not translate into higher vaccination rates, reinforcing findings from Afonso et al. (2019)<sup>16</sup>, where only 35.2% of students were fully vaccinated despite high knowledge levels.

To increase HPV vaccination rates, structured awareness campaigns targeting male students are needed, as previous studies, including Yam et al. (2016), found that male students were significantly less willing to get

vaccinated<sup>8</sup>. Additionally, incorporating cost-reduction strategies and financial aid programs for vaccination could improve uptake, as cost remains a major barrier. Educational initiatives should also address misconceptions about vaccine efficacy and side effects, as fear of adverse effects continues to hinder vaccination.

### Conclusion

Despite good theoretical knowledge about cervical cancer and HPV vaccination, medical students showed low confidence in discussing vaccination and minimal participation in awareness programs. While 80% of second-year and 65% of first-year students supported HPV vaccination, uptake remained low due to financial constraints, fear of side effects, and perceived low risk. Addressing these gaps through structured educational interventions, vaccine affordability initiatives, and awareness campaigns is crucial. Enhancing medical students' advocacy skills will not only improve their own vaccination rates but also enable them to effectively educate the public, ultimately contributing to increased HPV vaccine acceptance and cervical cancer prevention.

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