



**Assessment of Knowledge and Perception Regarding Human Papillomavirus Vaccine and Genital Warts among First Year Medical Undergraduates: A Questionnaire Based Study**

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**Abstract**

**Introduction:** Human papillomavirus (HPV) remains one of the most prevalent sexually transmitted infections globally and is responsible for a significant burden of diseases including cervical cancer and genital warts. Although prophylactic HPV vaccination has proven effective in reducing disease incidence, awareness and acceptance remain suboptimal, particularly in low- and middle-income countries. Medical students, as future

healthcare providers, play a critical role in influencing community health behavior; therefore, assessing their baseline understanding of HPV is essential.

**Aims and objectives:**

1. To assess the knowledge and perception regarding HUMAN PAPILLOMAVIRUS infection, HUMAN PAPILLOMAVIRUS vaccine, and genital warts among first-year medical undergraduates.

2. To evaluate awareness and understanding of HUMAN PAPILLOMAVIRUS infection and its association with genital warts.
3. To assess the knowledge of HUMAN PAPILLOMAVIRUS vaccination, its schedule, and preventive role in genital warts and cervical cancer.

**Materials & Methods:** Questionnaire-based study was conducted under the Department of Dermatology, Venereology and Leprosy among first-year undergraduate medical students of the A.J. Institute of Medical Sciences, Mangalore, between December 2025 and January 2026. Approval was obtained from the Institutional Ethics Committee prior to commencement of the study, and written informed consent was secured from all participants or their legal guardians.

**Results:** Of the participants, 72.2% had heard of HPV, yet only 58.9% recognized sexual transmission as the primary mode, and 52.3% identified HPV as a cause of cervical cancer. Awareness that HPV affects both sexes was reported by 46.4%, while only 31.1% linked genital warts to HPV. Knowledge of vaccination was also limited—61.6% had heard of the vaccine, but only 21.2% correctly identified the recommended vaccination age. Female students demonstrated significantly higher knowledge and greater willingness to receive the vaccine compared to males ( $p < 0.05$ ).

**Conclusion:** The present study demonstrates that although first-year medical undergraduates had moderate awareness of HPV, substantial gaps persist in understanding its transmission, clinical manifestations—particularly genital warts—and prevention through vaccination. Knowledge regarding male susceptibility and the recommended age for HPV vaccination was notably poor. Female students showed higher knowledge levels and greater willingness to accept vaccination,

reflecting gender-based differences in health awareness and preventive attitudes. As medical students are future healthcare providers, inadequate knowledge at this stage may limit effective patient counselling and public health advocacy. Strengthening undergraduate curricula through structured teaching modules, focused workshops, and early exposure to STI prevention is essential to bridge these gaps and support long-term HPV control and cervical cancer prevention efforts.

**Keywords:** Human papillomavirus, Medical undergraduates, Human papillomavirus vaccine, Genital warts, Perception, knowledge

### Introduction

Human papillomavirus (HPV) infection represents one of the most prevalent sexually transmitted infections globally and is a major public health concern due to its association with significant clinical morbidity, including genital warts and various malignancies. It is estimated that nearly 80% of sexually active individuals will acquire HPV at some point in their lives, highlighting its widespread nature and epidemiological importance<sup>1</sup>. More than 200 HPV genotypes have been identified, of which high-risk oncogenic subtypes such as HPV 16 and 18 are strongly associated with malignancies including cervical, anal, vulvar, penile, and oropharyngeal cancers, while low-risk types such as HPV 6 and 11 account for over 90% of genital warts<sup>2,3</sup>. The development of prophylactic HPV vaccines has demonstrated significant potential in reducing the burden of HPV-related diseases, offering an opportunity for primary prevention and long-term disease control.

Cervical cancer remains the fourth most common cancer among women worldwide, with 604,000 new cases and 342,000 deaths recorded in 2020<sup>4</sup>. India bears a disproportionate burden, contributing nearly one-fifth of

the global cervical cancer cases with an age-standardized incidence rate of 18 per 100,000 women <sup>5</sup>. Despite the introduction of safe and effective vaccines including bivalent, quadrivalent, and nonavalent formulations, vaccination uptake remains suboptimal in many low- and middle-income countries. Barriers to adequate vaccine adoption include lack of awareness, cost concerns, inadequate health education, cultural misconceptions, and stigma associated with sexually transmitted infections <sup>6,7</sup>.

Recognizing this, the World Health Organization recommends HPV vaccination for adolescents aged 9–14 years, ideally before the initiation of sexual activity, to maximize protective efficacy <sup>8</sup>. However, achieving optimal vaccination coverage requires strong advocacy and awareness among healthcare professionals, who play a critical role in influencing public perceptions and uptake of vaccination programs. Medical students, who represent the future healthcare workforce, must therefore possess adequate knowledge regarding HPV infection, its complications, prevention, and the significance of vaccination as a public health intervention.

Multiple international studies have documented suboptimal knowledge and perception related to HPV among medical and health-science students. In a study among Hungarian high school seniors, Balla et al. found that only 9–10% of participants were aware that HPV causes genital warts, and just over half recognized its role in cervical cancer <sup>9</sup>. Similarly, Rashwan et al. reported that among students in Malaysia, only 46% were aware of the association of HPV with cervical cancer, and knowledge of transmission and prevention remained limited <sup>10</sup>. Findings from Indian studies reflect comparable trends. Mehta et al. reported that although 68% of medical students had heard of HPV, only 35%

knew that it causes genital warts, while fewer than half understood its oncogenic association <sup>11</sup>. Another study by Pandey et al. found that less than 25% of medical students could correctly identify the recommended age group for vaccination <sup>12</sup>. These results highlight a gap in comprehensive understanding, even among populations expected to counsel patients in the future.

Awareness of HPV vaccine benefits does not always translate into positive perception or vaccine uptake. Studies conducted among medical students in India and other countries have shown that although many students acknowledge the potential benefits of vaccination, hesitancy persists due to perceived side effects, financial burden, and inadequate information <sup>13,14</sup>. This emphasizes the need for structured educational interventions to improve knowledge, dispel misconceptions, and promote positive health behaviors.

Considering the critical role of medical undergraduates in future vaccination advocacy, it is essential to evaluate their knowledge and attitudes early in their professional training. First-year medical students, having just begun formal medical education, provide valuable insight into baseline awareness before curriculum exposure. The findings can assist in identifying learning gaps and guiding the design of targeted educational modules that strengthen HPV-related literacy and public health preparedness.

The present study aims to assess the knowledge and perception regarding HPV infection, genital warts, and HPV vaccination among first-year medical undergraduates in a tertiary medical college. The results may contribute to curriculum strengthening and improved vaccination advocacy among future healthcare professionals.

### Aims and Objectives

1. To assess the knowledge and perception regarding HUMAN PAPILLOMAVIRUS infection, HUMAN PAPILLOMAVIRUS vaccine, and genital warts among first-year medical undergraduates.
2. To evaluate awareness and understanding of HUMAN PAPILLOMAVIRUS infection and its association with genital warts.
3. To assess the knowledge of HUMAN PAPILLOMAVIRUS vaccination, its schedule, and preventive role in genital warts and cervical cancer.

### Materials and Methods

A cross-sectional, questionnaire-based study was conducted among first-year medical undergraduates at A.J. Institute of Medical Sciences, Mangalore, from December 2025 to January 2026, after obtaining Institutional Ethics Committee approval and written informed consent. Newly admitted students were included to assess baseline awareness prior to formal curricular exposure; those refusing participation or submitting incomplete questionnaires were excluded. A sample size of 151 was calculated based on prior awareness estimates, and convenience sampling was used to recruit participants during academic sessions. Data were collected using a pre-tested, self-administered questionnaire assessing demographics, knowledge of HPV transmission, disease associations, vaccine awareness, and attitudes toward vaccination. Responses were analyzed using SPSS version 23.0 with descriptive statistics and chi-square tests, and a p-value <0.05 was considered statistically significant.

### Inclusion Criteria

1. First-year MBBS students of A.J. Institute of Medical Sciences.
2. Students aged 17-25 years.

3. Students who are willing to participate in the study.
4. Students who provide informed consent.

### Exclusion Criteria

1. Students not belonging to first year M.B.B.S.
2. Students who do not consent to participate.
3. Students who have previously participated in a similar study.
4. Incomplete questionnaire responses.

### Results

A total of 151 first-year medical undergraduates participated in the study, with a response rate of 100%.

#### The demographic characteristics of the participants

Of the respondents, 55.6% were females and 44.4% were males. The mean age of the participants was  $18.6 \pm 0.9$  years. Most students resided in urban areas (62.9%), followed by semi-urban (23.8%) and rural (13.2%) areas.

Table 1: Demographic characteristics of Participants

Variable	Category	Frequency	Percentage (%)
Age (years)		Mean $\pm$ SD: 18.6 $\pm$ 0.9	
Gender	Male	67	44.4
	Female	84	55.6
Residence	Urban	95	62.9
	Semi-urban	36	23.8
	Rural	20	13.2
Primary source of health information	Internet	70	46.3
	Media/TV	28	18.5
	Friends/Family	24	15.9
	Doctors/Teachers	29	19.2

#### Knowledge about HPV infection among respondents

Of the participants, 72.2% had heard of HPV prior to the study. However, only 58.9% identified sexual contact as the primary mode of transmission, and 46.4% recognized that HPV could affect both males and females. Knowledge regarding the disease spectrum was limited, with only 52.3% identifying cervical cancer as an HPV-related outcome and just 32.4% aware of its role in genital warts.

Table 2: Knowledge about HPV infection among respondents

Item assessed	Correct response (%)	Incorrect/Don't know (%)
Heard of HPV infection	72.2	27.8
Knew HPV is sexually transmitted	58.9	41.1
Aware that HPV can infect both sexes	46.4	53.6
Knew HPV causes cervical cancer	52.3	47.7
Knew HPV causes genital warts	32.4	67.6
Identified high-risk behaviors (multiple partners/unprotected sex)	40.9	59.1

**Awareness and understanding of HPV vaccination**

Only 61.6% had prior knowledge of the HPV vaccine. Among them, 49.0% knew that the vaccine prevents cervical cancer, while only 28.5% recognized its role in

preventing genital warts. Only 21.2% correctly identified the recommended vaccination age group (9–14 years). Awareness levels are detailed in Table 3.

Table 3: Awareness and understanding of HPV vaccination

Item assessed	Correct (%)	Incorrect/Don't know (%)
Heard of HPV vaccine	61.6	38.4
Vaccine prevents cervical cancer	49.0	51.0
Vaccine prevents genital warts	28.5	71.5
Correct vaccination age group (9–14 years)	21.2	78.8
Knew no. of doses required (2 or 3 as per age)	25.8	74.2

**Vaccination status and influencing factors**

Actual vaccine uptake was low, with only 6.6% reporting having received the vaccine. Despite this, 64.2% expressed willingness to receive it in the future.

Willingness to vaccinate was significantly higher among females ( $p = 0.012$ ).

Table 4: Vaccination status and influencing factors

Variable	Number (n)	Percentage (%)
Students already vaccinated	10	6.6
Willing to take vaccine in future	97	64.2
Perceived self-risk of HPV infection	56	37.1
<b>Barriers to vaccination</b>		
Lack of awareness	62	41.1
Cost	41	27.2
Concerns about side effects	35	23.2
Cultural/social concerns	13	8.6

**Awareness related to genital warts**

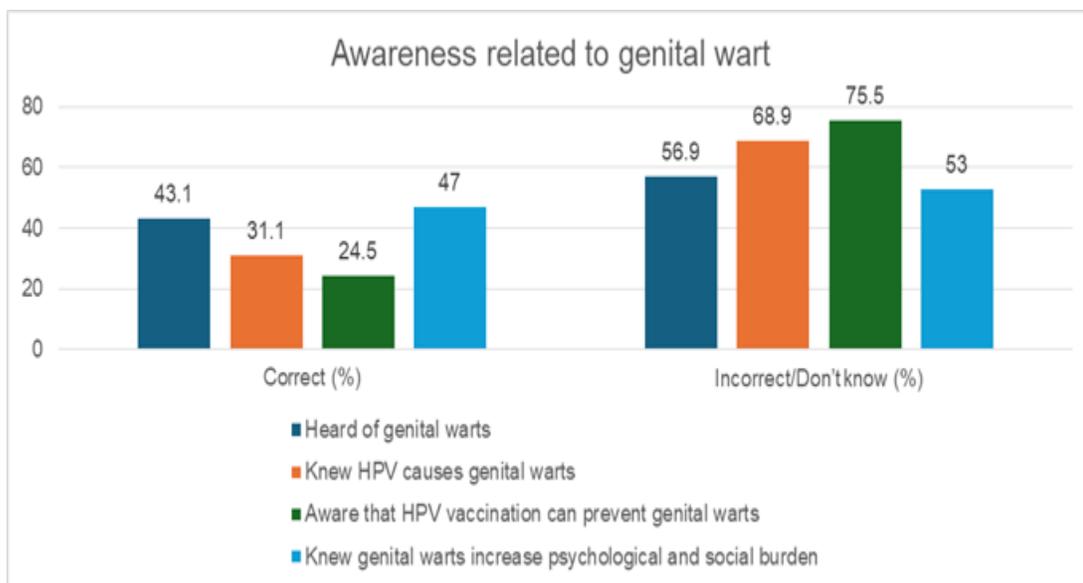
Limited awareness among medical students regarding genital warts and their association with HPV. Although 43.1% had heard of genital warts, only 31.1% correctly identified HPV as the causative agent, reflecting inadequate understanding of the disease etiology. Awareness of the preventive role of HPV vaccination was even lower, with only 24.5% recognizing that

vaccination can reduce the risk of genital warts. However, nearly half (47%) acknowledged the psychological and social burden associated with the condition. The findings indicate the need for greater educational emphasis on HPV-related genital conditions and the broader benefits of vaccination beyond cervical cancer prevention.

Table 5: Awareness related to genital warts

Item assessed	Correct (%)	Incorrect/Don't know (%)
Heard of genital warts	43.1	56.9
Knew HPV causes genital warts	31.1	68.9
Aware that HPV vaccination can prevent genital warts	24.5	75.5
Knew genital warts increase psychological and social burden	47.0	53.0

Figure 1: Awareness related to genital wart



**Association between Gender and Knowledge Levels**

A significant association between gender and knowledge levels regarding HPV and its prevention. Female students showed higher adequate knowledge (66.7%) compared to males (47.8%), with statistically significant differences also noted in awareness about HPV causing cervical cancer and affecting both sexes. Although knowledge about the HPV vaccine was higher among

females, the difference did not reach statistical significance. Willingness to receive vaccination was notably greater among females (72.6%), reflecting higher acceptance of preventive strategies. These findings suggest that female students possess better understanding and health orientation regarding HPV, highlighting the need for targeted awareness initiatives for male students.

Table 6: Association between Gender and Knowledge Levels

Variable	Male (n = 67)	Female (n = 84)	Total (n = 151)	Chi-square value	p-value
Adequate knowledge ( $\geq 50\%$ correct)	32 (47.8%)	56 (66.7%)	88 (58.3%)	5.32	0.021*
Awareness that HPV causes cervical cancer	31 (46.3%)	48 (57.1%)	79 (52.3%)	4.12	0.043*
Awareness that HPV can affect both sexes	25 (37.3%)	45 (53.6%)	70 (46.4%)	4.01	0.045*
Correct knowledge of HPV vaccine	36 (53.7%)	57 (67.9%)	93 (61.6%)	3.52	0.060
Willingness to receive HPV vaccine	36 (53.7%)	61 (72.6%)	97 (64.2%)	6.31	0.012*

**Gender-wise Comparison of Knowledge Levels**

The comparison of mean HPV knowledge scores between male and female students. Female participants demonstrated a higher mean score ( $9.4 \pm 2.0$ ) compared to males ( $8.2 \pm 2.1$ ), and this difference was statistically

significant ( $t = 2.33, p = 0.021$ ). This indicates that female students had better baseline understanding of HPV, its transmission, complications, and vaccination.

Table 7: Gender-wise Comparison of Knowledge Levels

Variable	Male	Female	Test value	p-value
Mean knowledge score (Mean $\pm$ SD)	$8.2 \pm 2.1$	$9.4 \pm 2.0$	$t = 2.33$	0.021*

**Discussion**

The present study evaluated the baseline knowledge, awareness, and perceptions regarding HPV infection, genital warts, and HPV vaccination among first-year medical undergraduates. The results demonstrate that while general awareness of HPV was moderate (72.2%), comprehensive understanding of its transmission, disease spectrum, and prevention through vaccination remained limited. Such findings reflect trends observed across diverse educational settings, indicating that even among future healthcare providers, knowledge gaps are substantial and require targeted curricular reinforcement. In the current study, 58.9% of students recognized HPV as a sexually transmitted infection, and only 52.3% were aware of its association with cervical cancer. Similar findings have been reported in earlier studies. Mehta et al. observed that while 68% of medical students had heard of HPV, fewer than half understood its oncogenic potential in cervical carcinogenesis<sup>11</sup>. Rashwan et al.

also reported that only 46% of Malaysian students recognized the connection between HPV and cervical cancer, suggesting limited conceptual clarity among young learners<sup>10</sup>. Balla et al. further demonstrated that only about half of Hungarian high school seniors could correctly identify cervical cancer as an HPV-related outcome, despite relatively high exposure to health education interventions<sup>9</sup>. These consistencies across international studies suggest that early medical education does not always guarantee sufficient disease-specific literacy, especially regarding sexually transmitted infections associated with malignancies.

Only 46.4% of students in the present study were aware that HPV affects both males and females. This misconception has also been observed in prior literature, where students commonly perceive HPV as a disease exclusive to women due to its strong association with cervical cancer<sup>10,11</sup>. However, several high-risk HPV strains are linked to malignancies in males, including

anal, penile, and oropharyngeal cancers <sup>2</sup>. Lack of awareness of male vulnerability may contribute to lower male vaccination rates and decreased emphasis on male-targeted prevention programs within communities. These findings reinforce the need to highlight HPV as a gender-neutral public health concern in undergraduate teaching.

Knowledge of genital warts was notably low in our study, with only 43.1% having heard of the condition and just 31.1% correctly identifying HPV as the causative agent. This echoes the findings of Balla et al., who noted that only 9–10% of students were aware of HPV's role in genital warts <sup>9</sup>. Although cervical cancer dominates public and clinical discourse on HPV, genital warts account for a significant proportion of HPV-related morbidity, affecting psychological well-being, sexual relationships, and social acceptance. In our sample, nearly half of the respondents (47%) recognized the broader psychological consequences of genital warts, indicating that even when biomedical knowledge is limited, students demonstrate intuitive appreciation of the emotional burden associated with sexually transmitted diseases.

Awareness of HPV vaccination was also limited, with only 61.6% of respondents having heard of the vaccine and just 21.2% correctly identifying the recommended vaccination age (9–14 years). This trend aligns with findings from Pandey et al., where fewer than 25% demonstrated accurate knowledge of vaccination schedules <sup>12</sup>. Rajiah et al. similarly observed that despite high awareness of the vaccine among Malaysian health-science students, understanding of dosage and age recommendations remained inadequate <sup>14</sup>. These findings suggest that while exposure to the concept of HPV vaccination may be increasing, detailed knowledge

of implementation protocols is lacking even among medical trainees, which could translate into ineffective patient counselling in future practice.

Gender differences were also evident in our study. Female students demonstrated significantly higher knowledge scores and greater willingness to receive the vaccine, a finding consistent with previous research. Tripathy et al. reported that female medical students demonstrated greater awareness and more positive attitudes toward vaccination compared to their male counterparts <sup>13</sup>. Increased visibility of cervical cancer prevention campaigns targeting women may partly explain this difference. However, given the rising incidence of HPV-associated malignancies in males, educational interventions must equally target both genders to improve long-term vaccination coverage and disease prevention strategies.

This study has certain limitations. Being a single-centre survey among first-year medical students, the findings may not be generalizable to students from other institutions or different academic years. The use of a self-administered questionnaire may introduce recall and social desirability bias, potentially affecting accuracy of responses. Additionally, the cross-sectional design assesses knowledge at only one point in time, preventing evaluation of knowledge improvement following curriculum exposure or educational interventions. A larger multi-center longitudinal study would strengthen generalizability.

### **Conclusion**

The present study highlights that although general awareness of HPV among first-year medical undergraduates was moderate, significant gaps remain in understanding its transmission, clinical manifestations, and prevention through vaccination. Knowledge

regarding genital warts, male susceptibility, and recommended vaccination age was particularly limited, underscoring the need for comprehensive educational reinforcement. Female students demonstrated higher knowledge levels and greater willingness to accept vaccination, emphasizing gender-based differences in health awareness and preventive orientation. Since medical students represent future healthcare providers, their competency in HPV-related counselling and advocacy is crucial for improving community vaccination uptake and reducing the long-term burden of HPV-associated diseases. Strengthening undergraduate curricula through structured modules, focused workshops, and early exposure to STI prevention concepts may help address these gaps. Continuous evaluation and reinforcement of HPV-related education will support development of informed healthcare professionals capable of contributing to national and global efforts toward HPV control and cervical cancer prevention.

## References

1. Koutsky L. Epidemiology of genital human papillomavirus infection. *The American journal of medicine*. 1997 May 5;102(5):3-8.
2. Muñoz N, Castellsagué X, de González AB, Gissmann L. HPV in the etiology of human cancer. *Vaccine*. 2006 Aug 21;24:S1-0.
3. World Health Organization. Human papillomavirus (HPV) vaccine coverage monitoring manual. World Health Organization; 2020 May 18.
4. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*. 2021 May;71(3):209-49.
5. Bruni LB, Barrionuevo-Rosas L, Albero G, Serrano B, Mena M, Gómez D, Muñoz J, Bosch FX, De Sanjosé S. Human papillomavirus and related diseases report. ICO/IARC information centre on HPV and Cancer (HPV Information Centre). 2019 Jun;7:26-42.
6. Bruni L, Saura-Lázaro A, Montoliu A, Brotons M, Alemany L, Diallo MS, Afsar OZ, LaMontagne DS, Mosina L, Contreras M, Velandia-González M. HPV vaccination introduction worldwide and WHO and UNICEF estimates of national HPV immunization coverage 2010–2019. *Preventive medicine*. 2021 Mar 1;144:106399.
7. Tran VD, Nguyen TC, Pham MN, Dorofeeva VV, Pak TV, Huynh PN, Le MH. Knowledge, attitudes, and practices of HPV vaccination among pharmacy students and other health science students. *Journal of the American College of Clinical Pharmacy*. 2023 Nov;6(11):1225-36.
8. HPV Vaccination Recommendations | CDC [Internet]. 2025 [cited 2025 Nov 20]. Available from:<https://www.cdc.gov/vaccines/vpd/hpv/hcp/recommendations.html>
9. Balla BC, Terebessy A, Tóth E, Balázs P. Young hungarian students' knowledge about HPV and their attitude toward HPV vaccination. *Vaccines*. 2016 Dec 29;5(1):1.
10. Rashwan H, Ishak I, Sawalludin N. Knowledge and views of secondary school students in Kuala Lumpur on cervical cancer and its prevention. *Asian Pacific Journal of Cancer Prevention*. 2013;14(4):2545-9.
11. Mehta S, Rajaram S, Goel G, Goel N. Awareness about human papilloma virus and its vaccine among

- medical students. *Indian Journal of Community Medicine*. 2013 Apr 1;38(2):92-4.
12. Pandey D, Vanya V, Bhagat S, Vs B, Shetty J. Awareness and attitude towards human papillomavirus (HPV) vaccine among medical students in a premier medical school in India.
13. Tripathy S, Mohapatra S, Muthulakshmi M, Rani R. Knowledge, attitude towards human papillomavirus and HPV vaccine among medical students of a tertiary care teaching hospital in India. *Int J Reprod Contracept Obstet Gynecol*. 2015 Dec;4(6):1771-4.
14. Rajiah K, Maharajan MK, Chin NS, Num KS. Awareness and acceptance of human papillomavirus vaccination among health sciences students in Malaysia. *Virusdisease*. 2015 Dec;26(4):297-303.