

Awareness and Knowledge on Human Papillomavirus Prevention and Vaccination for Cervical Cancer among College Students in Coimbatore

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Abstract

Human papillomavirus (HPV) infection is one of the most common sexually transmitted infections worldwide and a leading cause of cervical cancer, along with other anogenital and oropharyngeal cancers. Despite the availability of safe and effective vaccines, awareness, acceptance, and uptake remain suboptimal in many low- and middle income countries, including India. This survey was conducted among 1004 college students aged 18–23 years in Coimbatore. **Aim:** To assess awareness, knowledge, and attitudes toward HPV and HPV vaccination. Data were collected using structured questionnaires and analyzed using Microsoft Excel and GraphPad Prism. **Result:** Results revealed that only 44.5% of respondents had heard of cervical cancer, 56.5% were aware of HPV, and 47.6% had heard of the HPV vaccine. Correct knowledge linking HPV to cervical cancer was reported by just 31.3% of participants, and only 6.9% had received the vaccine. Major barriers to vaccination included lack of information (40.1%), fear of side effects (23.3%), and cost (16.7%). However, 71.7% expressed interest in attending awareness or vaccination camps, and 68.2% supported organizing such programs in colleges. **Conclusion:** The findings underscore a significant gap in knowledge and uptake of HPV vaccination, highlighting the need for targeted educational interventions, campus-based awareness programs, and policy measures to improve vaccine accessibility and coverage, thereby contributing to cervical cancer prevention in India.

Key words: Awareness, cancer prevention, cervical cancer, college students, human papillomavirus vaccination, human papillomavirus, India, vaccine acceptance

INTRODUCTION

Human papillomavirus (HPV) infection is a viral infection. There are more than 100 types of HPV. Some types of HPV infection cause skin growths called warts and some types of HPV infection can cause cancer.^[1] Most HPV infections do not lead to cancer. However, some types of genital HPV can cause cancer of the lower part of the uterus that connects to the vagina, called the cervix. Other types of cancers have been linked to HPV infection. These include cancers of the anus, penis, vagina, vulva, and back of the throat. Cancer at the back of the throat is called oropharyngeal cancer.

These infections are often passed through sex or through other skin-to-skin contact. Vaccines can help protect against the strains of HPV most likely to cause genital warts or cervical cancer.

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HPV is the most common viral sexually transmitted disease in the United States. Roughly, 14 million people get the infection each year. HPV is so common that most sexually active people who are not vaccinated against HPV will become infected at some point in their lives. Most never know that they have it. Nearly, all cervical cancer is due to HPV and two strains, HPV16 and HPV18, account for 70% of all cases.^[1]

At present, cervical cancer is the only HPV-caused cancer for which screening tests are available. Screening tests are used to check for disease when there are no symptoms. The goal of screening for cervical cancer is to find precancerous cell changes before they become cancer and when treatment can prevent cancer from developing. Screening for cervical cancer is an important part of routine health care for people who have a cervix. This includes women and transgender men who still have a cervix.^[2]

HPV subtypes show a predilection for body sites that they most commonly infect, and disease manifestations that result from infection may vary. Over 180 subtypes of HPV have been identified. Cutaneous warts of the hands and feet, such as verruca vulgaris or verruca plantaris, are most commonly caused by HPV subtypes 1, 2, 4, 27, or 57. Most anogenital warts, such as condyloma acuminatum, are caused by HPV subtypes 6 or 11 and termed low-risk HPV; these subtypes also are responsible for juvenile and adult recurrent respiratory papillomatosis. Pre-cancerous and cancerous lesions of the cervix, male and female anogenital areas, and oropharyngeal area are most commonly caused by HPV subtypes 16 and 18. However, subtypes 31, 33, 35, 45, 52, and 58 also fall in the high-risk HPV group as they are associated with cervical cancer development.^[3-4]

The U.S. Food and Drug Administration has approved three vaccines that prevent HPV infection. These vaccines cover 2, 4, or 9 HPV serotypes, respectively. Bivalent and quadrivalent vaccines are approved for women and men aged 9–26 years, and the 9-valent vaccine is approved for women and men aged 9–45 years. At present, the 9-valent vaccine is the only HPV vaccine available in the United States.^[5]

The Advisory Committee on Immunization Practices and American College of Obstetricians and Gynecologists recommend routine HPV vaccination for girls and boys at the target age of 11–12 years (but it may be given from the age of 9 years) as part of the adolescent immunization platform to reduce the incidence of anogenital cancer and genital warts associated with HPV infection.^[6]

MATERIALS AND METHODS

This is a prospective observational study. Survey was conducted over a period of 3 months, from March to June, among college students. A structured questionnaire was

developed and distributed through Google Forms to collect the data. The study included a sample size is 1,004 college students aged 18–23 years and above. All male and female students and who were willing to participate were included in the study. Participants who were not willing to take part, as well as those suffering from chronic illnesses or psychological conditions, were excluded. Data collected were compiled and analyzed using Microsoft Excel for descriptive statistics, and GraphPad Prism software was used for graphical representation and additional statistical analysis.

RESULTS

Age distribution

Based on the above table, the age distribution of the study participants is as follows: Out of a total of 1004 respondents, the largest proportion was within the 18–20 years age group, comprising 417 individuals (41.5%). This is closely followed by the 21–23 years group, with 409 participants (40.7%). A smaller proportion of respondents are above 23 years, accounting for 102 individuals (10.2%), while the below 18 years group forms the smallest segment, with 76 individuals (7.6%). This distribution shows that the majority of respondents (over 80%) are between 18 and 23 years, indicating a predominantly young adult population.

Gender distribution

Based on the above table, the gender distribution of the study participants is as follows: Out of a total of 1004 respondents, the majority are female, accounting for 565 individuals (56.2%). Male respondents make up 423 individuals (42.2%), while a small proportion, 16 participants (1.6%), identified as others.

Education response of distribution

Based on the above table, the year-of-study distribution of the respondents is as follows: Out of 1004 participants, the largest proportion are in their 2nd year, comprising 319 individuals (31.8%). This is followed by 3rd-year students, with 292 participants (29.1%), and 1st-year students, with 196 participants (19.5%). 4th-year students make up 156 individuals (15.5%), while those in internship represent the smallest group, with 41 participants (4.19%). This distribution shows that the study population is spread across all academic years, with the highest representation from students in their 2nd and 3rd years.

Awareness of cervical cancer

Based on the above table, the awareness of cervical cancer among the respondents is as follows Out of 1004 participants,

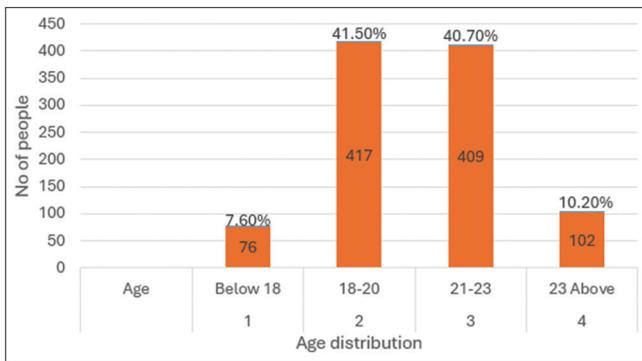


Figure 1: Age distribution

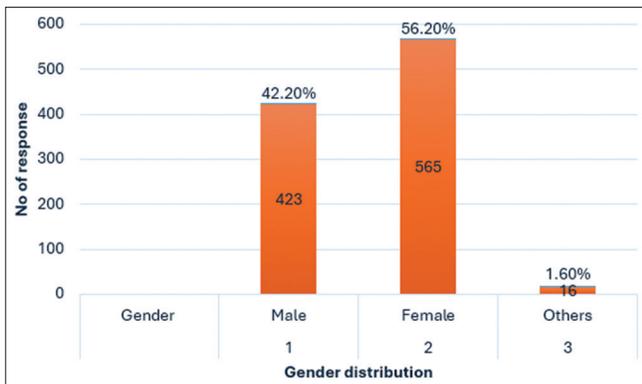


Figure 2: Gender distribution

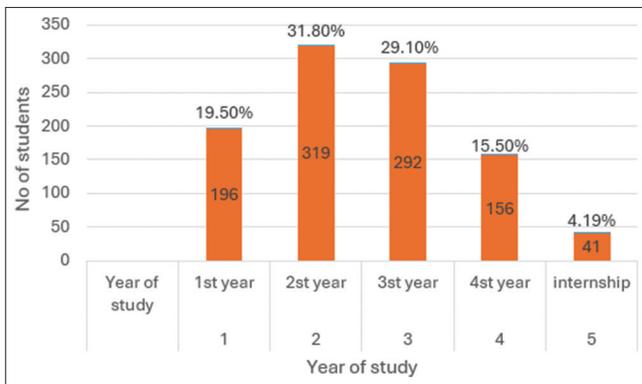


Figure 3: Education response of distribution

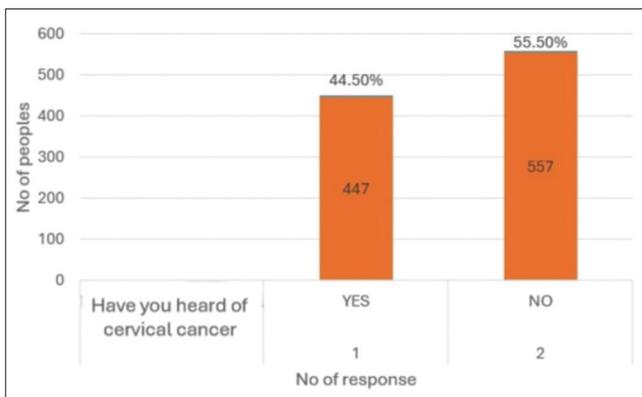


Figure 4: Awareness of cervical cancer

447 individuals (44.5%) reported that they have heard of cervical cancer, while a majority of 557 individuals (55.5%) indicated that they have not heard of it. This finding suggests that more than half of the respondents lack awareness about cervical cancer, highlighting a significant gap in knowledge that may require targeted health education initiatives.

Awareness of HPV disease and vaccine

Based on the above table, the awareness of HPV among the respondents is as follows: Out of 1004 participants, 567 individuals (56.5%) reported that they have heard of HPV, while 437 individuals (43.5%) stated that they have not heard of it. This indicates that slightly more than half of the respondents are aware of HPV and its vaccine, though a substantial proportion remain uninformed, suggesting the need for further awareness and educational programs.

Knowledge and awareness of HPV

Based on the above table, the knowledge and awareness of HPV among the respondents is as follows: Out of 1004 participants, 314 individuals (31.3%) correctly associated HPV with cervical cancer. Two hundred and thirty participants (22.9%) believed that HPV causes genital warts, while 225 participants (22.4%) thought that it causes skin rash. In addition, 234 respondents (23.3%) reported having no idea about what HPV causes. These findings indicate that less than one-third of the participants are aware of the correct link between HPV and cervical cancer, while the remaining respondents either hold misconceptions or lack knowledge entirely, highlighting a need for improved health education on HPV-related diseases.

Awareness of HPV

Based on the above table, the awareness of HPV transmission among respondents is as follows: Out of 1004 participants, 376 individuals (37.5%) correctly identified sexual contact as a mode of HPV transmission. Two hundred and forty-six participants (24.5%) believed HPV could be transmitted through sharing utensils, and 207 participants (20.6%) thought that it could spread through blood transfusion. In addition, 175 respondents (17.4%) reported that they do not know how HPV is transmitted. These results show that while sexual contact is the most recognized mode of transmission, a considerable number of respondents hold misconceptions or lack knowledge, indicating a need for targeted education to correct false beliefs about HPV transmission.

Awareness of HPV and cervical cancer

Based on the above table, the awareness of HPV and cervical cancer prevention through vaccination among respondents

is as follows: Out of 1004 participants, 571 individuals (59.9%) believed that HPV infection is preventable through vaccination, while 433 individuals (43%) thought that it is not preventable by vaccination. This indicates that although a majority are aware of the preventive potential of HPV vaccines, a substantial proportion still lack accurate knowledge, underscoring the importance of educational campaigns to promote correct understanding of HPV prevention.

Knowledge and awareness of HPV vaccine

Based on the above table, the awareness of the HPV vaccine among respondents is as follows: Out of 1004 participants, 477 individuals (47.6%) reported that they have heard of the HPV vaccine, while 527 individuals (52.4%) stated that they have not heard of it. This shows that more than half of the respondents are unaware of the HPV vaccine, highlighting a significant gap in public knowledge and the need for increased awareness efforts regarding HPV vaccination.

Awareness and knowledge of HPV

Based on the above table, the awareness of the recommended age for receiving the HPV vaccine among respondents is as follows: Out of 1004 participants, 283 individuals (28.2%) correctly stated that the HPV vaccine should be taken before becoming sexually active. Four hundred and twenty-eight participants (42.6%) believed that it can be given at any age, while 294 participants (29.3%) reported that they do not know the recommended age. These findings indicate that less than one-third of respondents are aware of the correct recommended age for HPV vaccination, while the majority either hold misconceptions or lack knowledge, emphasizing the need for targeted education on vaccination guidelines.

Awareness of HPV vaccine

Based on the above table, the awareness and uptake of the HPV vaccine among respondents is as follows: Out of 1004 participants, only 70 individuals (6.9%) reported that they have received the HPV vaccine. The majority, 644 participants (64.15%), stated that they have not received it, while 290 participants (29%) were not sure if they had been vaccinated. These results reveal a very low HPV vaccination rate among respondents, with a substantial proportion either unvaccinated or uncertain about their vaccination status, indicating the need for improved vaccination coverage and awareness initiatives.

Knowledge and HPV

Based on the above table, the reasons for unwillingness to receive the HPV vaccine among respondents are as follows:

Out of 1004 participants, the most common reason cited was lack of information, reported by 403 individuals (40.1%). This was followed by fear of side effects (234 participants, 23.3%), cost concerns (168 participants, 16.7%), and not being sexually active (105 participants, 10.4%). Cultural or religious reasons were mentioned by 94 participants (9.1%). These findings indicate that inadequate knowledge is the primary barrier to HPV vaccination, alongside concerns about safety, affordability, and personal or cultural beliefs, highlighting the need for targeted awareness and education campaigns.

Awareness of HPV

Based on the above table, the opinion of respondents on organizing HPV and cervical cancer awareness programs in college is as follows: Out of 1004 participants, a majority of 685 individuals (68.2%) agreed that the college should organize awareness programs on HPV and cervical cancer. In contrast, 320 participants (31.8%) felt that such programs are not necessary. This shows a strong interest among students in receiving educational initiatives on HPV and cervical cancer, indicating that awareness programs could be well-received and impactful.

Knowledge and awareness of HPV

Based on the above table, the sources of information about HPV among respondents are as follows: Out of 1004 participants, the most common source was school/college, reported by 293 individuals (29.2%). This was followed closely by internet/social media (257 participants, 25.6%) and family/friends (244 participants, 24.3%). Fewer respondents cited doctors or health professionals (78 participants, 7.8%), while 133 participants (13.2%) reported that they had never heard of HPV before. These findings suggest that educational institutions and online platforms play a major role in disseminating information about HPV, whereas healthcare professionals are a less frequent source, highlighting the potential to strengthen medical-based counseling and awareness efforts.

Knowledge and awareness of HPV

Based on the above table, the interest in attending an HPV awareness or vaccination camp on campus among respondents is as follows: Out of 1004 participants, a majority of 721 individuals (71.7%) expressed interest in attending such a camp, while 284 participants (28.3%) indicated no interest. This shows a strong willingness among students to participate in awareness or vaccination initiatives, suggesting that organizing such programs on campus could have a high level of engagement and potential impact.

S. No.	Questions	Score	Total	P-value
1	Age distribution			
	Below 18	76	1004	-
	18–20 years	417		
	21–23 years	409		
	23 above	102		
2	Gender distribution			
	Male	423	1004	-
	Female	565		
	Others	16		
3	Have you heard of cervical cancer before			
	Yes	557	1004	0.00052
	No	447		
4	Have you heard of human papillomavirus (HPV)			
	Yes	567	1004	0.00004
	No	437		
5	What do you think HPV causes			
	Cervical cancer	314	1004	0.00009
	Genital warts	230		
	Skin rash	225		
	No idea	234		
6	How is HPV transmitted			
	Sexual contact	376	1004	<0.00001
	Sharing utensils	246		
	Blood transfusion	207		
	Do not know	175		
5	Do you know that HPV infection is preventable through vaccination			
	Yes	571	1004	0.00001
	No	433		
7	Have you heard of the HPV vaccine			
	Yes	477	1004	0.11
	No	527		
8	At what age is it recommended to get the HPV vaccine			
	Before becoming sexually active	283	1004	<0.00001
	Any age	420		
	Do not know	294		
9	Have you received the HPV vaccine			
	Yes	70	1004	<0.00001
	No	644		
	Not sure	290		
10	Do you think colleges should organize awareness programs on HPV and cervical cancer			
	Yes	684	1004	<0.00001
	No	320		
11	Would you be interested in attending an HPV awareness or vaccination camp on campus			
	Yes	721	1004	<0.00001
	No	284		

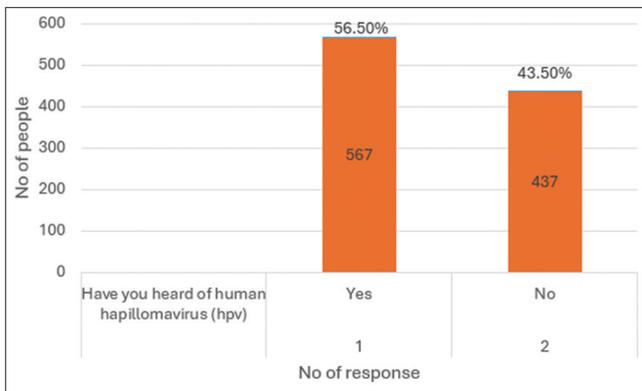


Figure 5: Awareness of human papillomavirus disease and vaccine

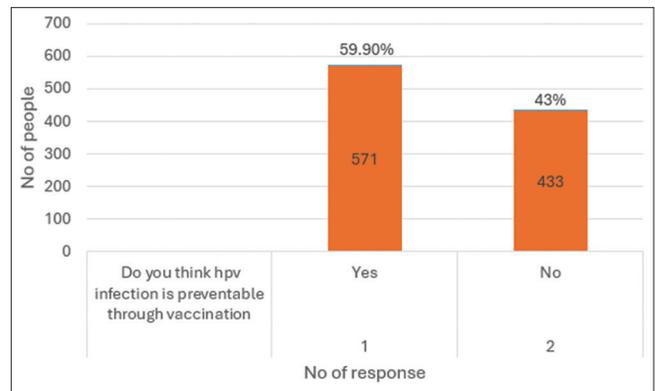


Figure 8: Awareness of human papillomavirus and cervical cancer

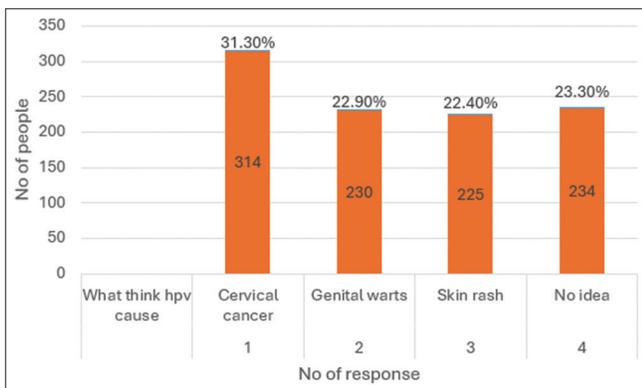


Figure 6: Knowledge and awareness of human papillomavirus

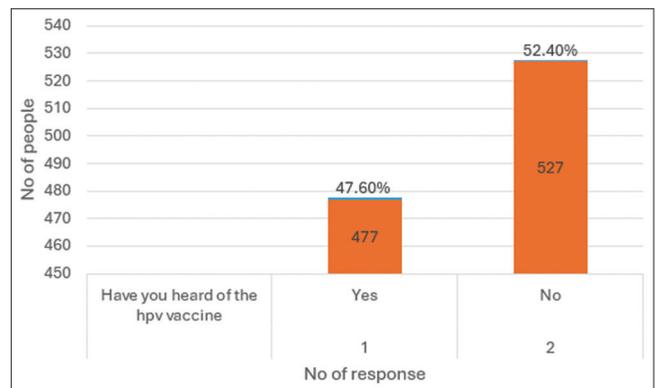


Figure 9: Knowledge and awareness of human papillomavirus vaccine

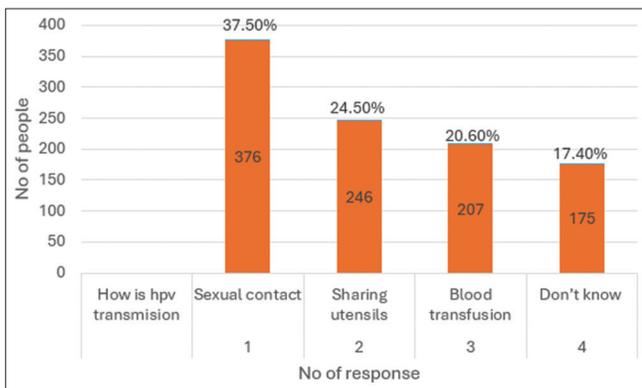


Figure 7: Awareness of human papillomavirus

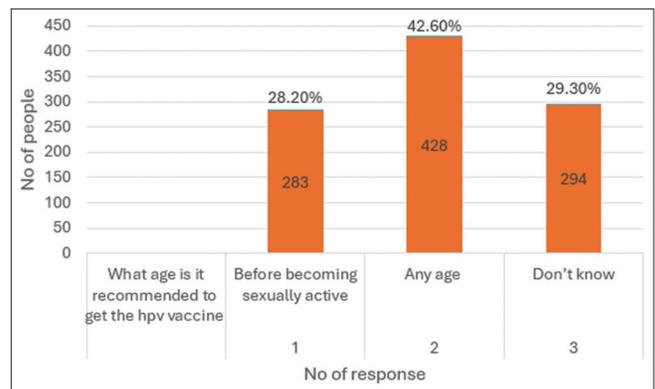


Figure 10: Awareness and knowledge of human papillomavirus

DISCUSSION

In our cross-sectional survey of 1004 college students in Coimbatore, awareness of cervical cancer (55.5%) and HPV (56.5%) was moderate, while knowledge that HPV causes cervical cancer stood at 31.3%, and awareness of preventive vaccination reached 56.9%. However, actual vaccine uptake was very low (6.9%). These findings align closely with the national pooled estimates: A meta-analysis by Chauhan *S et al.* (“Knowledge, attitude, and reasons for non-uptake of human papilloma virus vaccination among nursing students”

BMC Med. 2025) found knowledge prevalence around 22% and vaccine coverage about 4% in India.^[7]

All the figures regarding the knowledge and awareness was represented in the figures 1-15.

- A similar pattern was observed in Purba Bardhaman, West Bengal, where Datta *et al.* (“Awareness about Cervical Cancer and HPV Vaccine among Undergraduate College Students...;” Asian Pac J Cancer Prev. 2025) reported that only one-third of students had heard about cervical

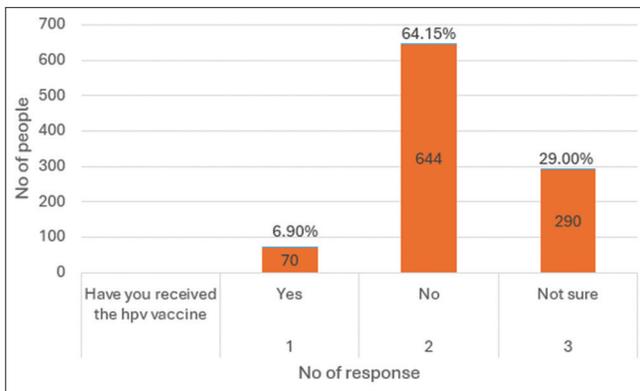


Figure 11: Awareness of human papillomavirus vaccine

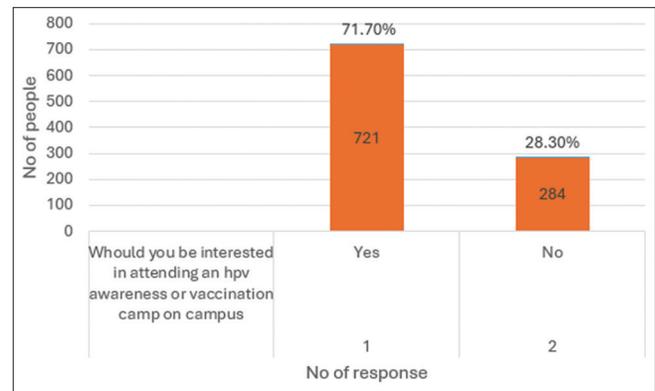


Figure 15: Knowledge and awareness of human papillomavirus

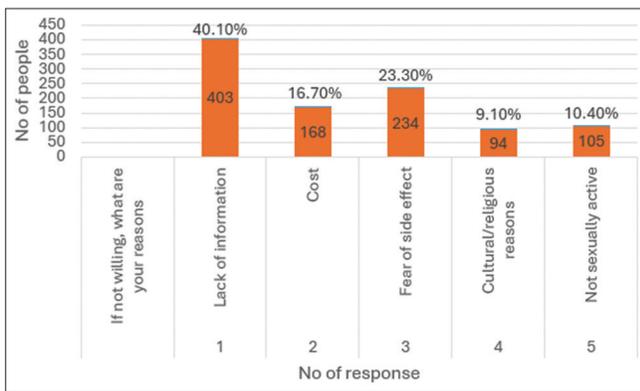


Figure 12: Knowledge and human papillomavirus

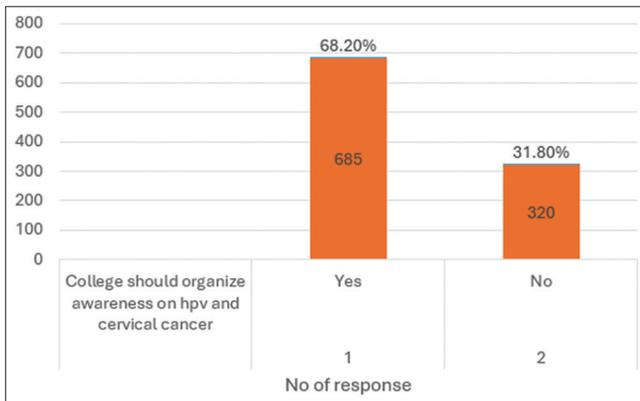


Figure 13: Awareness of human papillomavirus

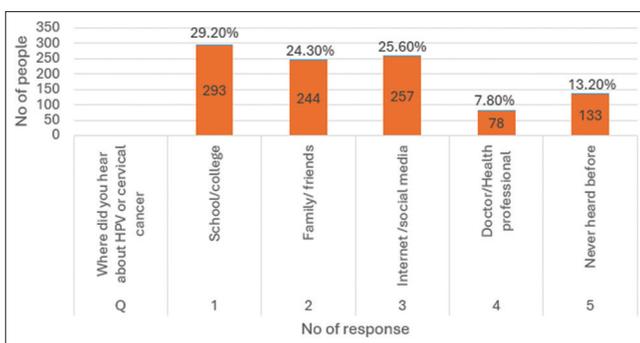


Figure 14: Knowledge and awareness of human papillomavirus

cancer or the HPV vaccine, paralleling our awareness levels.^[7]

- By contrast, a study among students in Kollam, Kerala (medRxiv preprint, 2025) indicated substantially higher awareness – 85.6% knew HPV causes cervical cancer – but did not report vaccination uptake, suggesting awareness alone does not guarantee vaccine coverage.^[7]
- A meta-analysis by Chauhan S *et al.* (“Knowledge, attitude, and reasons for non-uptake of human papilloma virus vaccination among nursing students” BMC Med. 2025) found knowledge prevalence around 22% and vaccine coverage about 4% in India.^[7]
- Taken together, these comparisons underscore a consistent pattern in Indian college populations: Moderate awareness, substantially lower knowledge of HPV-cervical cancer link, and minimal vaccine uptake. Barriers such as cost, lack of information, and safety fears – though not quantified here – are well-recognized in both our study and prior literature.^[8]
- There is a clear need for structured, campus-based education programs that not only increase knowledge but also address logistical and financial barriers. Our finding that two-thirds of students are open to participating in awareness or vaccination events provides a practical avenue for intervention.^[8]

CONCLUSION

- Based on the presented data, the study reveals significant gaps in awareness, knowledge, and uptake of HPV vaccination among the surveyed population, despite a generally positive attitude toward awareness initiatives.
- A majority of participants had heard of cervical cancer (55.5%) and HPV (56.5%), with a notable proportion correctly identifying HPV as a cause of cervical cancer (31.3%). However, misconceptions remain prevalent – many associated HPV with unrelated causes such as skin rash or genital warts, and 23.3% had no idea about its consequences.
- Transmission knowledge was partial; while 37.5% recognized sexual contact as the primary mode, others

incorrectly attributed it to sharing utensils or blood transfusion. Awareness of HPV prevention through vaccination was moderate (56.9%), but familiarity with the HPV vaccine itself was lower (47.5%). Alarming, actual vaccine uptake was extremely low (7%), with the majority never vaccinated or unsure of their status.

- Most respondents supported preventive initiatives – 68.1% agreed colleges should organize awareness programs, and 71.8% expressed interest in attending HPV awareness or vaccination camps.
- Overall, these findings highlight the need for targeted educational interventions to correct misconceptions, improve knowledge of HPV transmission and vaccine recommendations, and promote vaccination uptake, leveraging the high willingness of students to participate in campus-based programs.
- Countries like the U.S., the gap is substantial. There is a critical need for structured public health interventions, school-based vaccine drives, and national policy support to improve uptake and protect future generations from HPV-related diseases, especially cervical cancer.

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