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HPV AWARENESS AND VACCINATION - ARE MEN AND WOMEN EQUALLY AWARE? -A SURVEY AMONG COLLEGE STUDENTS OF JAMSHEDPUR

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Abstract

Background

Human papillomavirus (HPV) is a widespread sexually transmitted infection associated with several cancers. Despite its prevalence, awareness of HPV and its related health implications remains insufficient, particularly among men and younger adults. This study aims to investigate HPV awareness and vaccination coverage among college students in Jamshedpur, with a specific focus on gender disparities.

Methods

Data were collected from 339 college students using a validated questionnaire that assessed knowledge of HPV, vaccination status, and related attitudes. The study analyzed participants' awareness of HPV and its link to cancer, as well as their vaccination history. Statistical analyses were performed to identify significant differences in awareness and vaccination rates between genders and academic streams.

Results

The findings revealed moderate awareness of HPV among participants, with 62.8% having heard of the virus and 56.0% recognizing its association with cancer. Women showed significantly higher awareness than men (64.0% vs. 46.0%, $p = 0.003$) and the availability of the HPV vaccine (63.0% vs. 48.7%, $p = 0.024$). Vaccination rates were low overall, with only 12.4% of participants reporting vaccination. A notable gender gap in vaccination rates was observed (16.9% of women vs. 6.7% of men, $p = 0.008$).

Conclusion

Despite moderate levels of awareness regarding HPV, significant gaps remain, particularly in vaccine uptake and the inclusion of HPV vaccination in national immunization programs. The findings of this study highlight the urgent need for targeted educational initiatives and vaccination campaigns aimed at bridging these knowledge gaps and improving health outcomes related to HPV.

Recommendation

Future research should explore the underlying barriers to vaccination and further investigate the impact of educational interventions on different demographic groups. By translating awareness into action and ensuring equitable access to immunization, we can make substantial strides in preventing HPV-related diseases and fostering a healthier, more informed population.

***Keywords*:** *Human papillomavirus vaccination, Cervical cancer awareness, Cancer risk awareness, Gender gap in health education.*
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Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) globally, affecting approximately 630 million people [1]. Despite its high prevalence and the serious health risks associated with it, including cancers of the throat, vulva, vagina, cervix, anus, and penis, awareness and understanding of HPV remain alarmingly low in many communities. This lack of awareness is particularly concerning among young adults, who are at the highest risk of acquiring HPV. In India, where cervical cancer—largely caused by HPV—accounts for a significant proportion of cancer-related

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deaths among women, the importance of understanding and preventing HPV cannot be overstated [2]. Yet, the focus on female health has often overshadowed the risks and necessary preventive measures for men, leading to potential gender disparities in HPV awareness and vaccination rates. Recent research published in *The Lancet Global Health* reveals that nearly 1 in 3 men over the age of 15 are infected with at least one type of genital HPV, and 1 in 5 are infected with high-risk, oncogenic HPV types [3]. This highlights the critical need to include men in HPV prevention efforts to reduce the overall incidence of HPV-related diseases across all genders.

While the significance of HPV as a public health issue is widely acknowledged, there is a noticeable gap in the knowledge and awareness of HPV among different demographic groups. Studies indicate that awareness campaigns and vaccination drives are often more targeted toward women, particularly in preventing cervical cancer, which could result in men being less informed about their risks and the availability of the HPV vaccine [4, 5]. This disparity not only hinders the effectiveness of public health initiatives but also perpetuates the gender biases that have historically influenced healthcare practices. Understanding the extent of this knowledge gap, especially among young adults in academic settings, is crucial for developing more inclusive and effective public health strategies [6-8].

This study aims to explore the level of HPV awareness and vaccination coverage among college students in Jamshedpur, with a focus on assessing whether men and women are equally informed about the virus and its prevention. By identifying gaps in knowledge and understanding, this research seeks to provide insights that could inform more balanced and comprehensive public health interventions, ultimately aiming to improve HPV-related outcomes across all genders. We hypothesize that there is a significant disparity in HPV awareness and vaccination rates between male and female students, with men being less informed and less likely to be vaccinated.

Methods

Study Design

This was a prospective observational study.

Study Location

This study was conducted at Manipal Tata Medical College, Jamshedpur, India.

Study Participants

This survey included college students from professional institutions in Jamshedpur because they belong to the most sexually active age group. The choice of Jamshedpur was motivated by the lack of existing studies in the area, making the findings valuable for the city and state in understanding the awareness levels in this region. To eliminate bias, students from diverse fields of study were included.

Data Collection

Participants were given a questionnaire that included dichotomous, scaling, and multiple-choice questions. The questionnaire was available in both English and Hindi to cater to the local population. The questions primarily addressed general knowledge about HPV, associated risks, vaccination awareness, and vaccine acceptability. A pilot survey was conducted beforehand to evaluate the questionnaire's effectiveness.

Instrument Validity

The questionnaire's construction and content validity were confirmed by having it reviewed by two independent clinicians. Their expertise ensured that the wording was appropriate and easily understandable for the respondents.

Data Analysis

The collected data was entered into MS Excel and analyzed using Jamovi software. Qualitative variables were presented as frequencies and percentages, while quantitative variables were expressed as mean and standard deviation. A Chi-square test was performed to identify statistical associations, with a significance level set at $P < 0.05$. Responses were analyzed separately based on gender, educational status, and other socio-demographic factors to reduce bias. Male awareness and acceptance were also compared to those of females, given the perception of cervical cancer as primarily a female health concern. Additionally, responses from participants over 25 years old pursuing their postgraduate or master's, who were still in the college-going peer group, were also considered.

Statistical Analysis

Statistical analysis was conducted using MS Excel (Microsoft 365) and RStudio (Version: 2024.04.2+764). Since the data was categorical, values were summarised using frequency and percentages, except age, which is summarised using mean and standard deviation. Association between awareness regarding HPV infection and vaccination with gender were compared using Chi-square test or Fisher's Exact test as appropriate. For all the tests, a p-value of <0.05 (two-tailed) was considered statistically significant.

Ethical clearance

Ethical clearance for the study was obtained from the Institutional Review Board of Manipal Tata Medical College, with the approval number (MTMC/IEC/2023/46). This approval ensured that all research procedures complied with ethical standards for studies involving human participants. Informed consent was obtained from all participants before their involvement, ensuring their voluntary participation and the confidentiality of their responses.

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Results

The demographic details of the study participants (N = 339) indicated an average age of 21.8 years (± 2.3). The sample comprised 55.8% females (n = 189) and 44.2% males (n = 150). In terms of educational attainment, the majority were undergraduates (57.2%, n = 194), followed by those with a 12th-grade education (23.0%, n = 78) and graduates (8.0%, n = 27). The educational streams were predominantly in science (67.8%, n = 230), with fewer participants from commerce (20.6%, n = 70) and arts (11.5%, n = 39). Employment status revealed that most participants were students (87.6%, n = 297), while a small proportion were employed (10.0%, n = 34), unemployed (1.5%, n = 5), freelancers (0.6%, n = 2), or housewives (0.3%, n = 1) (Table 1).

Table 1: Demographic details of all the study participants

Demographic details (N = 339)	**Descriptive statistics**
Age (in years)	21.8 ± 2.3
Gender	
Female	189 (55.8%)
Male	150 (44.2%)
Highest education status	
10th	23 (6.8%)
12th	78 (23.0%)
Undergraduate	194 (57.2%)
Graduate	27 (8.0%)
Post-Graduate	17 (5.0%)
Educational Stream	
Arts	39 (11.5%)
Commerce	70 (20.6%)
Science	230 (67.8%)
Employment Status	
Student	297 (87.6%)
Unemployed	5 (1.5%)
Employed	34 (10.0%)
Freelancer	2 (0.6%)
Housewife	1 (0.3%)

The study revealed a moderate level of awareness regarding HPV infection among college students, with 62.8% having heard of HPV. While 62.8% correctly identified HPV as a sexually transmitted disease (STD), 28.6% were unaware of its nature, and some mistakenly associated it with foodborne or respiratory infections. Among participants, 67.2% of women recognized HPV as an STD, compared to 57.3% of men, though this difference was not statistically significant (p = 0.108). A notable gender disparity was observed in awareness of HPV's association with cancer, with 64.0% of women aware of this link compared to 46.0% of men (p = 0.003), highlighting a critical gap in understanding among male participants (Table 2).

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Table 2: Comparison of awareness regarding HPV infection among study participants between male and female

Awareness of HPV infection among study participants	Female 189 (55.3%)	Male 150 (44.2%)	Total (339)	p-value
Have you ever heard of HPV (Human Papillomavirus)				
Maybe / Not sure	16 (8.5%)	20 (13.3%)	36 (10.6%)	0.061
No	44 (23.3%)	46 (30.7%)	90 (26.5%)	
Yes	129 (68.3%)	84 (56.0%)	213 (62.8%)	
What type of disease is it?				
Don't know	45 (23.8%)	52 (34.7%)	97 (28.6%)	0.108
Foodborne	0 (0.0%)	2 (1.3%)	2 (0.6%)	
Respiratory/Airborne	1 (0.5%)	2 (1.3%)	3 (0.9%)	
Sexually Transmitted Disease	127 (67.2%)	86 (57.3%)	213 (62.8%)	
STD	14 (7.4%)	7 (4.7%)	21 (6.2%)	
Waterborne	2 (1.1%)	1 (0.7%)	3 (0.9%)	
Which age group is at the maximum risk of contracting HPV?				
0-14	1 (0.5%)	5 (3.3%)	6 (1.8%)	0.018*
15-25	81 (42.9%)	64 (42.7%)	145 (42.8%)	
26-35	48 (25.4%)	22 (14.7%)	70 (20.6%)	
36-45	8 (4.2%)	2 (1.3%)	10 (2.9%)	
46-65	1 (0.5%)	2 (1.3%)	3 (0.9%)	
Don't know	50 (26.5%)	55 (36.7%)	105 (31.0%)	
Is it related to cancer?				
Don't know	43 (22.8%)	55 (36.7%)	98 (28.9%)	0.003*
No	25 (13.2%)	26 (17.3%)	51 (15.0%)	
Yes	121 (64.0%)	69 (46.0%)	190 (56.0%)	
The most prevalent cancer in Indian females is?				
Breast cancer	126 (66.7%)	92 (61.3%)	218 (64.3%)	0.145
Cervical cancer	7 (3.7%)	3 (2.0%)	10 (2.9%)	
Don't know	28 (14.8%)	33 (22.0%)	61 (18.0%)	
Lung cancer	1 (0.5%)	5 (3.3%)	6 (1.8%)	
Ovarian cancer	12 (6.3%)	6 (4.0%)	18 (5.3%)	
Uterine cancer	15 (7.9%)	11 (7.3%)	26 (7.7%)	
Can/Do males get it, females get it, or both?				
Don't know	51 (27.0%)	49 (32.7%)	100 (29.5%)	0.2
Everyone	119 (63.0%)	80 (53.3%)	199 (58.7%)	
Only females	18 (9.5%)	19 (12.7%)	37 (10.9%)	
Only Males	0 (0.0%)	2 (1.3%)	2 (0.6%)	
Transgender's	1 (0.5%)	0 (0.0%)	1 (0.3%)	
Is it safe to have sex if one has an active HPV infection?				
Don't know	38 (20.1%)	43 (28.7%)	81 (23.9%)	0.009*
No	145 (76.7%)	94 (62.7%)	239 (70.5%)	
Yes	6 (3.2%)	13 (8.7%)	19 (5.6%)	

*Values represented are frequency (%). The test used: Chi-square test; *p-value of <0.05, statistically significant.*

The study indicated that awareness of risk factors related to HPV among participants was moderate, with 42.8% recognizing the 15-25 age group as being at maximum risk of infection. However, a significant number of participants (28.9%) were unaware that HPV is related to cancer, with only 56.0% acknowledging this association (**Figure 1**). Additionally, awareness regarding the safety of sexual activity during an active HPV infection was limited, with 23.9% unsure about its implications (**Figure 2**). The awareness of complications caused by HPV in men was notably low, with many participants unable to identify the potential risks, including the development of genital warts and certain cancers (**Figure 3**).

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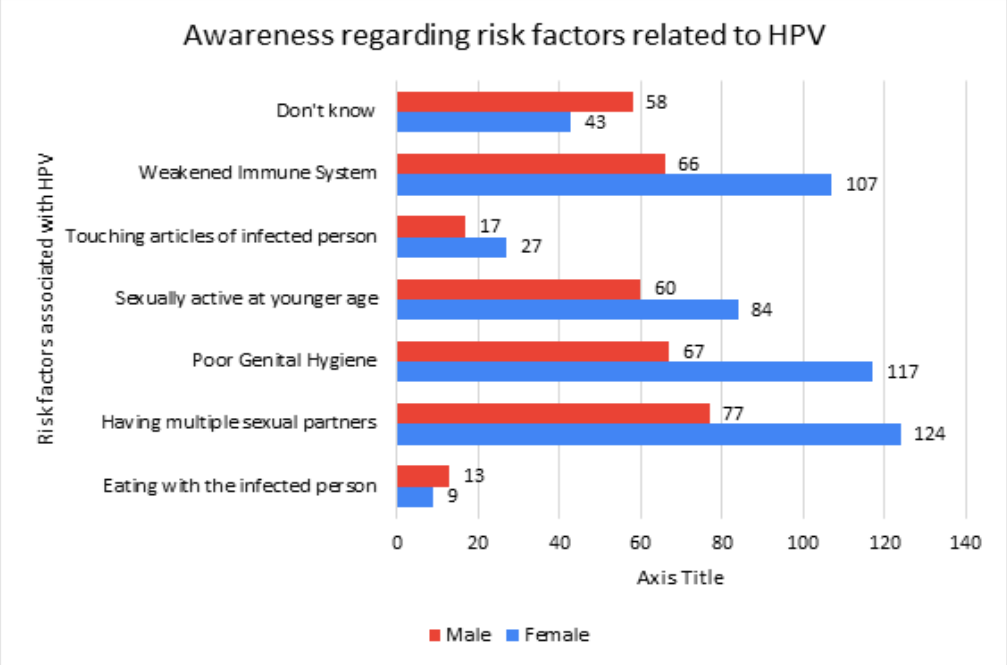

Figure 1: Patient awareness regarding risk factors related to HPV.

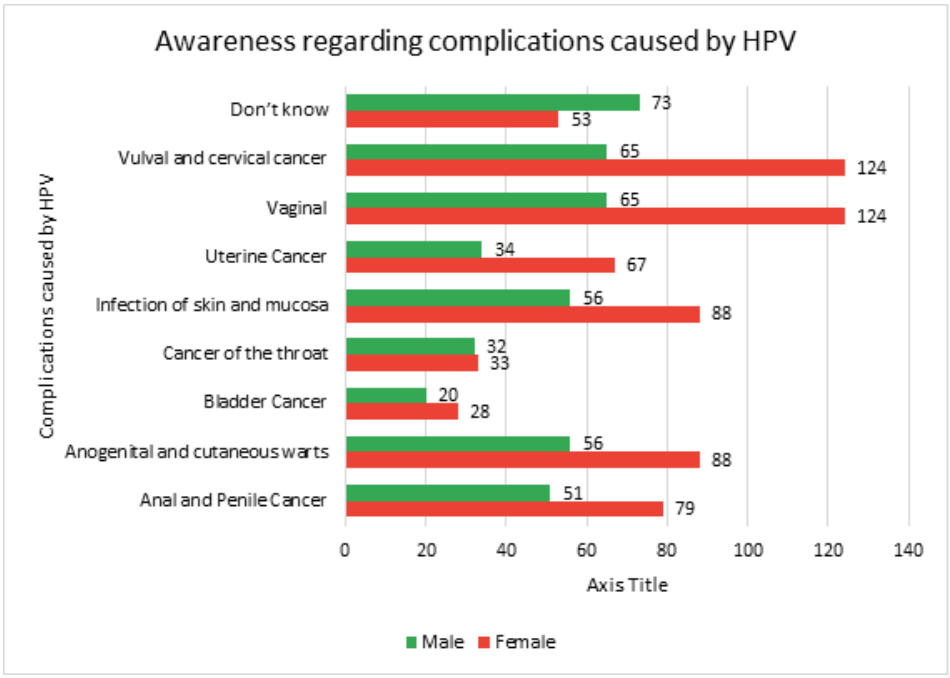

Figure 2: Patient awareness regarding complications caused by HPV

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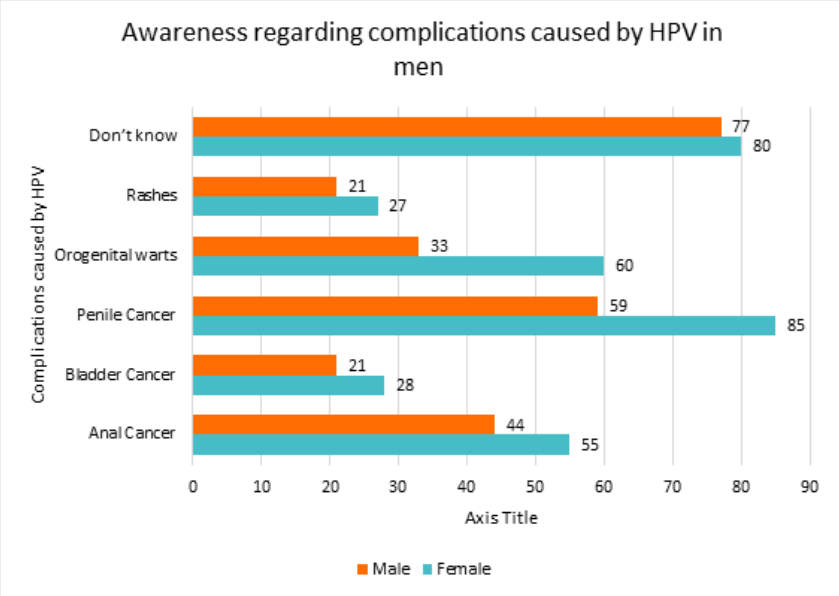

Figure 3: Patient awareness regarding complications caused by HPV in men

The results indicated significant gender differences in awareness of HPV vaccination among participants, with 63.0% of females and 48.7% of males acknowledging the existence of a vaccine (p = 0.024). Although a majority of both genders recognized the vaccine's preventability (56.0%), 36.0% were unsure. When asked about vaccination status, only 12.4% reported having received the vaccine, with a higher percentage of females (16.9%) than males (6.7%) (p = 0.008). Additionally, 51.3% of females believed everyone should receive the vaccine, compared to 37.3% of males (p = 0.001), while awareness regarding the vaccine's inclusion in the National Immunization Schedule was low, with 44.8% expressing uncertainty (Table 3).

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Table 3: Comparison of awareness regarding HPV vaccination among study participants between male and female

Awareness of HPV vaccination among study participants	Female 189 (55.3%)	Male 150 (44.2%)	Total (339)	p-value
Do we have a vaccine for HPV?				
Don't know	52 (27.5%)	53 (35.3%)	105 (31.0%)	0.024*
No	18 (9.5%)	24 (16.0%)	42 (12.4%)	
Yes	119 (63.0%)	73 (48.7%)	192 (56.6%)	
Is the HPV vaccine preventable?				
Don't know	61 (32.3%)	61 (40.7%)	122 (36.0%)	0.074
No	12 (6.3%)	15 (10.0%)	27 (8.0%)	
Yes	116 (61.4%)	74 (49.3%)	190 (56.0%)	
Is the vaccine for males or females?				
Both	145 (76.7%)	123 (82.0%)	268 (79.1%)	0.14
Only Females	44 (23.3%)	25 (16.7%)	69 (20.4%)	
Only Males	0 (0.0%)	2 (1.3%)	2 (0.6%)	
Which age group should the vaccine be given in?				
0-14	29 (15.3%)	19 (12.7%)	48 (14.2%)	0.188
15-30	104 (55.0%)	67 (44.7%)	171 (50.4%)	
31-45	6 (3.2%)	6 (4.0%)	12 (3.5%)	
46-65	1 (0.5%)	1 (0.7%)	2 (0.6%)	
Don't know	48 (25.4%)	57 (38.0%)	105 (31.0%)	
Have you received the vaccine?				
Don't remember	48 (25.4%)	52 (34.7%)	100 (29.5%)	0.008*
No	109 (57.7%)	88 (58.7%)	197 (58.1%)	
Yes	32 (16.9%)	10 (6.7%)	42 (12.4%)	
Is the vaccine included in the National Immunization schedule?				
Don't know	75 (39.7%)	77 (51.3%)	152 (44.8%)	0.096
No	62 (32.8%)	38 (25.3%)	100 (29.5%)	
Yes	52 (27.5%)	35 (23.3%)	87 (25.7%)	
Would you like to receive the vaccine now in the catch-up program?				
No	70 (37.0%)	61 (40.7%)	131 (38.6%)	0.503
Yes	119 (63.0%)	89 (59.3%)	208 (61.4%)	
Who do you think needs a vaccine for HPV?				
Everyone, irrespective of whether he/she is sexually active or not	97 (51.3%)	56 (37.3%)	153 (45.1%)	0.001*
People having multiple sex partners	5 (2.6%)	11 (7.3%)	16 (4.7%)	
People practicing risky/unprotected sex	12 (6.3%)	11 (7.3%)	23 (6.8%)	
Sexually active individuals	27 (14.3%)	10 (6.7%)	37 (10.9%)	
Don't know	48 (25.4%)	62 (41.3%)	110 (32.4%)	
Do you know at what age the HPV vaccine is given as per the National Immunization Schedule?				
No	120 (63.5%)	101 (67.3%)	221 (65.2%)	0.492
Yes	69 (36.5%)	49 (32.7%)	118 (34.8%)	

*Values represented are frequency (%). The test used: Chi-square test or Fisher's exact test; *p-value of <0.05, statistically significant.*

DISCUSSION

The study found that overall awareness of HPV among college students in Jamshedpur is moderate, with 62.8% reporting prior knowledge of the infection and 56.0% acknowledging its association with cancer. Notably, women exhibited higher awareness levels than men, particularly regarding HPV's link to cancer (64.0% vs. 46.0%). Vaccine awareness was similarly higher among women, with 63.0% recognizing the existence of the HPV vaccine compared to 48.7% of men. This aligns with the results of earlier studies, which reveal that females generally demonstrated a higher level of knowledge than males about HPV and its associated diseases, including the benefits of the HPV vaccination [9]. Additionally, the awareness rates of HPV and the HPV vaccine were

consistently lower among male students, particularly regarding the fact that HPV can infect men, highlighting a significant knowledge gap that necessitates targeted educational interventions aimed at male populations [10]. This observation is consistent with broader trends noted in other research, which suggests that men often have less awareness of HPV-related health issues compared to women [11]. However, significant gaps persist in both genders' understanding of the vaccine and its inclusion in national immunization schedules, emphasizing the need for targeted educational initiatives.

In addition to gender disparities, awareness of HPV varies significantly across educational streams and age groups. Students from science backgrounds demonstrated the highest levels of awareness, especially concerning HPV as a sexually transmitted disease and its connection to cancer, whereas those in commerce and arts streams exhibited considerably lower knowledge levels. Age also influenced awareness, with younger participants (15-25 years) showing a greater understanding of HPV risks and vaccination compared to older groups. A similar observation was observed in earlier studies, which demonstrated that younger individuals exhibited higher levels of knowledge regarding HPV and its associated risks [12, 13]. This trend underscores the importance of targeting educational initiatives towards older age groups to improve their understanding and awareness of HPV [9]. A notable portion of participants across all demographics remained uncertain about critical aspects of HPV, such as its association with cancer and the recommended age for vaccination, indicating a widespread educational gap that needs to be addressed through comprehensive awareness programs tailored to different educational backgrounds and age groups.

When compared to previous research, this study reveals a mix of similarities and differences regarding HPV awareness among college students. The overall awareness of 62.8% reflects a higher level than often seen in lower-resource settings but is consistent with global trends. The pronounced gender differences in awareness, with women being more informed than men, align with findings from other regions, though the gap in Jamshedpur appears more significant [14-17]. The study also notes that 56.6% of participants were aware of the HPV vaccine, consistent with awareness levels in Western countries, yet the low vaccination rate mirrors trends in other developing regions. Furthermore, science students displayed significantly higher awareness compared to their peers in commerce and arts, highlighting a more substantial educational disparity than observed in some prior studies. Interestingly, younger students showed greater awareness of HPV than older individuals, contrasting with other research that found older populations to be more informed.

The findings of this study have several important implications for public health and education. The notable level of HPV awareness among college students suggests that health education efforts have been effective, yet there is a pressing need to enhance these initiatives, particularly for students in non-science disciplines and older age groups. Bridging the significant knowledge gaps across educational streams could involve integrating comprehensive HPV education into curricula across all fields. Despite high awareness levels, the low HPV vaccination rates reveal a disconnect between knowledge and action, indicating the need for improved strategies to promote vaccination, such as better outreach programs and increased accessibility to vaccines.

Addressing gender disparities in awareness is also crucial; targeted educational campaigns can help raise HPV knowledge among men, who currently lag behind women. Promoting HPV vaccination for males is essential to achieve broader public health benefits, as it can prevent the spread of the virus and reduce the incidence of related cancers. Public health initiatives should focus on dispelling myths surrounding the vaccine, emphasizing its importance for both genders and ensuring that vaccination programs are readily available and accessible. Policymakers and educators should consider these findings to develop inclusive and effective health education and vaccination strategies that cater to the specific needs of various demographic groups.

CONCLUSION

This study highlights both progress and challenges in HPV awareness among college students in Jamshedpur. While awareness levels are relatively high, particularly among science students and younger individuals, significant gaps remain in vaccination rates and knowledge disparities between genders and educational streams. Addressing these issues requires a multifaceted approach: enhancing educational efforts across all disciplines, targeting gender-specific campaigns to improve male awareness, and developing robust strategies to increase vaccine uptake.

Limitations

The study faced several limitations that should be acknowledged. It relied on self-reported data, which can introduce response biases or inaccuracies. The sample was limited to college students in Jamshedpur, restricting the generalizability of findings to other age groups or regions. While the study highlighted a high awareness of HPV, it did not explore the factors contributing to low vaccination rates. Although the significant knowledge gap between different educational streams was noted, it was not thoroughly investigated. Lastly, external factors influencing HPV awareness, such as socioeconomic status, were not addressed.

Recommendation

Future research should explore the underlying barriers to vaccination and further investigate the impact of educational interventions on different demographic groups. By translating awareness into action and ensuring equitable access to immunization, we can make

substantial strides in preventing HPV-related diseases and fostering a healthier, more informed population.

Acknowledgment
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Data Availability
Data is available upon request.

Author contributions
All authors contributed to the design of the research. OC and SM collected and analyzed the data. AK and CD wrote the manuscript. SM and OC edited the paper. All authors read and approved the paper.

List of Abbreviations
HPV- Human papillomavirus
STI- sexually transmitted infection
STD- sexually transmitted disease

Source of funding
No funding was received.

Conflict of interest
The authors have no conflicting interests to declare.

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