

**Knowledge and Attitude towards Human Papilloma Virus (HPV), its relation to Cervical Cancer, Screening and Vaccination among young Population of Punjab**Hafsa<sup>a</sup>, Fiza Ibrar<sup>b</sup>, Muqaddas Saleem<sup>a</sup>, Mahnoor Jan<sup>a</sup>, Nazim Hussain<sup>a</sup><sup>a</sup> Center for Applied Molecular Biology, University of the Punjab, Lahore, Pakistan.<sup>b</sup> Department of Pharmacy Practice, Government College University, Faisalabad, Pakistan**Abstract**

*Human papillomavirus (HPV) is a prevalent sexually transmitted infection with well-established links to cervical and other cancers. Despite effective vaccines, public awareness and uptake remain low, often hindered by misinformation and cultural barriers. This study aimed to assess the awareness, knowledge, and attitudes toward HPV, its association with cancer, and its prevention through vaccination and screening among young adults in Punjab, Pakistan, with a focus on health science students. A cross-sectional survey was conducted with 189 participants from health science disciplines using a structured, self-administered questionnaire. Data were collected on demographics, HPV knowledge (transmission, symptoms, risks), and attitudes toward vaccination. Analysis included descriptive statistics. The results revealed a paradox: while general awareness was high—93.1% recognized HPV as a serious health concern and 83.1% identified sexual transmission—critical knowledge gaps were identified. Only 54.5% knew of asymptomatic infection, and merely 22.8% were fully aware of the spectrum of HPV-related cancers. Practical knowledge was severely lacking; 63% were unaware of Pap smear screening, and only 22.8% knew how to access the vaccine. Although 74.1% trusted the vaccine, only 39.2% were willing to be vaccinated immediately, with 50.8% needing more information. A significant financial barrier was also observed. This study highlights a concerning gap between theoretical knowledge and practical preparedness among future healthcare providers in Punjab where general sex education is limited. The findings underscore an urgent need for enhanced educational curricula that bridge this gap and comprehensive public health strategies that address informational and financial barriers to improve HPV prevention and vaccine uptake in Pakistan.*

**Keywords:** HPV awareness, HPV-related cancers, vaccine acceptance, questionnaire-based research

**Correspondence:** Hafsa

Center for Applied Molecular Biology, University of the Punjab, Lahore, Pakistan.

Email: [hafsarazaullah@gmail.com](mailto:hafsarazaullah@gmail.com)

Pages 11-15 /Received, August 17, 2025, Revision Received September, 28, 2025, Accepted 22 October, 2025

## 1. Introduction

Human papillomavirus (HPV) is a prevalent sexually transmitted infection and a primary causative agent for cervical cancer, which remains a leading cause of cancer-related mortality among women globally. The World Health Organization (WHO) reported approximately 604,000 new cases and 342,000 deaths in 2020, with a significantly higher burden in low- and middle-income countries like Pakistan. This disparity is largely attributed to limited access to preventive measures such as screening and vaccination (Singh et al., 2023). High-risk HPV genotypes, particularly 16 and 18, are implicated in the majority of cervical cancer cases, underscoring the critical need for effective prevention strategies (Kombe Kombe et al., 2020).

Prophylactic HPV vaccines have emerged as a powerful tool in preventing HPV-related cancers, demonstrating high efficacy when administered prior to sexual debut. Consequently, global health bodies recommend routine vaccination for adolescents. However, in many regions, including Pakistan, vaccine uptake remains suboptimal. This is frequently driven by multifaceted barriers encompassing limited accessibility, high cost, cultural hesitancy, and most critically, a pervasive lack of awareness and prevalent misinformation regarding the virus and the vaccine (Akhatova et al., 2022; Blasi et al., 2015).

Addressing this knowledge gap is particularly crucial among health science students, who represent future healthcare providers and public health advocates. Their level of awareness not only affects personal health behaviors but also influences future clinical decisions and patient counselling (Aga et al., 2022). As future physicians, nurses, and pharmacists, their attitudes toward the HPV vaccine can directly impact recommendation rates and overall vaccine coverage (Ergün, 2023). Paradoxically, prior research has highlighted persistent knowledge gaps and unfavorable perceptions even within medically inclined student populations, which could hinder their capacity to support HPV prevention efforts effectively (Şenocak Taşçi et al., 2024).

Therefore, this study aims to address this critical gap by assessing the awareness and attitudes regarding HPV among a health science-oriented cohort in Punjab, Pakistan. It seeks to evaluate participants' knowledge about HPV transmission, associated health consequences, and preventive measures, including vaccination. The study also investigates attitudes toward the HPV vaccine, including perceptions of its safety and necessity.

## 2. Method

A cross-sectional, descriptive study design was employed to assess knowledge and attitudes toward human papillomavirus (HPV) among a cohort of young adults in Punjab, Pakistan. The study focused on key areas including understanding of HPV transmission routes, associated health risks, preventive measures, and perceptions surrounding the HPV vaccine. The influence of demographic variables on awareness and attitudes was also explored. The study received ethical approval prior to the commencement of data collection, and all procedures adhered to strict ethical guidelines.

### 2.1 Study Design and Setting

This quantitative study utilized a structured, self-administered questionnaire for data collection. The survey was distributed to individuals affiliated with academic institutions specializing in health sciences in Punjab. Targeting this specific cohort was intentional, as understanding HPV awareness and vaccination attitudes among future healthcare professionals is crucial for strengthening preventive health efforts. Data collection was conducted over a six-week period.

### 2.2 Participants and Sampling

The study comprised a sample of 189 participants, selected through convenience sampling from undergraduate and postgraduate students enrolled in health-related programs. These included medicine, nursing, public health, pharmacy, and allied health sciences. The eligibility criteria required participants to be at least 18 years of age, actively enrolled in a health sciences program, and willing to provide informed consent. Individuals were excluded if they were not affiliated with a health sciences discipline, had previously participated in HPV-specific training programs, or submitted incomplete questionnaires.

The sample size was deemed adequate for a preliminary evaluation of awareness and attitudes, consistent with the descriptive and exploratory nature of the study. Efforts were made to include participants from various academic levels and health science disciplines to enhance the diversity and representativeness of the sample.

### 2.3 Questionnaire Designing

A structured questionnaire was developed following an extensive review of existing literature on HPV awareness, vaccination practices, and relevant health behavior models. Items were adapted from previously validated tools to align with the cultural and academic context of the study population (Forster et al., 2017; Zhang & Yuan, 2023). To ensure cultural adaptation and contextual appropriateness, the questionnaire was reviewed by experts including a psychologist and public health specialists familiar with the local culture and academic context.

The final instrument consisted of **four primary sections**:

**2.3.1 Demographic Information:** This section collected data on age, gender, academic program, year of study, and prior exposure to formal sexual health education. These variables were essential for subsequent subgroup analysis and for identifying demographic predictors of knowledge and attitudes.

**2.3.2 Knowledge of HPV and Transmission:** This section assessed general awareness of HPV, its types, and modes of transmission (e.g., vaginal, oral, anal sex, and skin-to-skin contact) through multiple-choice and true/false questions. It also evaluated knowledge of risk factors and the asymptomatic nature of the virus.

**2.3.3 Knowledge of Health Risks and Prevention:** This part examined participants' understanding of HPV-related diseases, particularly cervical and oropharyngeal cancers, as well as other conditions like genital warts. It also gauged awareness of preventive strategies, including condom use, routine screening (e.g., Pap smears), and vaccination.

**2.3.4 Attitudes Toward HPV Vaccination:** Participants' perceptions were measured using a 5-point Likert scale (ranging from "strongly disagree" to "strongly agree") in response to statements on the vaccine's efficacy, safety, necessity, and perceived barriers. This section also evaluated willingness to receive the vaccine, recommend it to peers, or support school-based vaccination programs.

### 2.4 Data Collection Procedure

Participants were recruited both in-person and via digital platforms associated with their academic institutions, such as learning management systems and departmental email groups. A participant information sheet detailed the study's purpose and scope, and electronic informed consent was obtained from all respondents. Participation was voluntary and anonymous, with an average completion time of 10–15 minutes. No personally identifiable information was collected to ensure participant confidentiality. All responses were recorded digitally and stored in a secure, password-protected database accessible only to the principal investigators. Participants were allowed to skip questions they were uncomfortable answering; however, questionnaires with more than 30%

missing data were excluded from the final analysis to maintain data integrity.

### 3. Results

#### Demographic Insights

The study population was predominantly female (83.6%), unmarried (89.9%), and enrolled in health sciences (94.2%), with a majority (52.9%) at the postgraduate level. Almost all participants (99%) identified as Muslim. This demographic profile is important for interpreting the results, as the high proportion of health science students suggests the findings may represent a "best-case scenario" for awareness, potentially overestimating knowledge in the general young population of Punjab. The complete demographic breakdown of participants is provided in Table 1.

**Table 1**  
*Descriptive Statistics*

Characteristics	N(%)
Gender	
Male	31 (16.4)
Female	158 (83.6)
Marital Status	
Married	19 (10.1)
Unmarried	170 (89.9)
Education	
Intermediate	5 (2.6)
Bachelor	62 (32.8)
Master	100 (52.9)
Doctorate	22 (11.6)
Religion	
Muslim	187 (99)
Christian	2 (1)
Field of Study	
Health Sciences	178 (94.2)
Non-Health Sciences	11 (5.8)

**Table 1:** Socio-demographic characteristics of the study participants (N=189)

The knowledge gaps identified in this educated cohort, who presumably have better access to health information, suggest that awareness in the general population of Punjab might be even lower. However, further research with more representative samples is needed to confirm this.

#### Knowledge and Awareness of HPV

The assessment of general knowledge revealed a moderate to high level of awareness among participants concerning HPV's biological nature and its public health significance. A notable 74.6% of participants were aware that certain viral infections can cause cancer, reflecting a solid understanding of viral oncogenesis, particularly relevant for HPV. However, 25.4% of respondents did not identify this connection, indicating a knowledge gap even among health science students. Encouragingly, an overwhelming majority (93.1%) recognized HPV as a serious health concern. Detailed findings on HPV awareness are presented in Table 2.

#### Transmission

A high proportion of respondents (83.1%) correctly identified sexual contact as the primary mode of HPV transmission. This indicates successful foundational education on sexually transmitted infections among this cohort. However, the study did not specifically quantify awareness of non-penetrative skin-to-skin contact or asymptomatic transmission, suggesting these remain potential areas where knowledge is less comprehensive.

#### Symptoms and Risks

Understanding of HPV's clinical presentation showed considerable variability. Just over half of the respondents (54.5%) recognized that HPV

infection can be asymptomatic, a critical factor in its transmission. When asked about the potential consequences of HPV, only 22.8% were fully aware that it can cause genital warts, lesions, and cancers, while a majority (59.3%) reported being only "little aware". This indicates a significant gap in detailed knowledge about the spectrum of HPV-related diseases beyond its link to cervical cancer.

**Table 2**  
*Key knowledge and awareness about HPV(N=189)*

Questions	Awareness about HPV Responses	N (%)
Do you think Viruses can cause cancers?	Yes	141 (74.6)
	No	13 (6.9)
	Maybe	35 (18.5)
Do you know HPV infection is serious health concern?	Yes	176 (93.1)
	No	13 (6.9)
Who is affected by HPV?	Males	2 (1)
	Females	37 (20)
	Both	150 (79)
Do you know the cervical cancer rate caused by HPV is highest among women in their 20s and 30s?	Yes	98 (51.9)
	No	91 (48.1)
How is HPV transmitted?	Contaminated food	5 (2.7)
	Sneezing & coughing	3 (1.5)
	Physical contact	24 (12.7)
	Sexual contact	157 (83.1)
Are you familiar with the signs and symptoms of an HPV infection?	Yes	71 (37.6)
	No	118 (62.4)
Do you know that an HPV infection can be asymptomatic sometimes?	Yes	103 (54.5)
	No	86 (45.5)
Do you know HPV can cause genital warts, lesions, and cancers e.g. cervical, and penile?	Fully Aware	43 (22.8)
	No	34 (18)
	Little aware	112 (59.3)
Are you aware of the symptoms of cervical cancer?	Fully Aware	30 (15.9)
	No	69 (36.5)
	Little Aware	90 (47.6)
Have you ever had an HPV test?	Yes, but report was - ve	5 (2.6)
	Yes, report was + ve	0 (0)
	Not even once	183 (96.8)
	Yes, but report was not collected	1 (.5)
Have you heard about the Pap(Papanicolaou) smear testing for HPV detection?	Yes	33 (17.5)
	No	119 (63)
	Somewhat Know	37 (19.5)
Do you know early detection of cervical cancer is helpful for treatment?	Yes	162 (85.7)
	No	27 (14.3)
HPV can be prevented by?	Vaccination	17 (9)
	Safe sex	14 (7.4)
	Healthy life style	8 (4.2)
	By all	150 (79.4)
Do you know by whom, when & where can you get the HPV vaccination?	Yes	43 (22.8)
	No	146 (77.2)
Have you had the HPV vaccine?	Yes	12 (6.3)
	No	177 (93.7)
Are you aware that the HPV vaccine can help prevent cervical cancer?	Yes	83 (44)
	No	32 (17)
	Don't Know about the Presence of HPV vaccine	74 (39)

**Prevention**

While 79.4% of participants broadly knew that HPV could be prevented by a combination of vaccination, safe sex, and a healthy lifestyle, a stark disparity emerged in practical knowledge. Only 22.8% knew where, when, and from whom they could obtain the HPV vaccine. This highlights a crucial barrier between theoretical awareness and actionable prevention strategies

**Screening**

Knowledge of screening methods was identified as a major deficit. A concerning 63% of respondents had never heard of the Pap smear test for HPV detection. Furthermore, 96.8% reported they had never undergone an HPV test themselves. This may indicate a significant disconnect between academic knowledge and personal engagement with preventive healthcare practices, even in a health-literate sample.

**Attitudes toward the HPV Vaccine**

Analysis of attitudes revealed a complex landscape of trust, hesitancy, and sociocultural perception. While 74.1% expressed trust in the HPV vaccine, only 39.2% were willing to get vaccinated immediately, with 50.8% stating they needed more information before deciding. A strong majority (76.7%) felt no embarrassment about the vaccine's association with an STI, and 76.2% correctly rejected the misconception that the vaccine is only for sexually active people. Financial barriers were evident, as only 58% were willing to pay for the vaccine, though 82.5% supported government-sponsored initiatives to make it affordable. A comprehensive summary of attitude-related results is shown in Table 3.

**Table 3**

*Attitudes towards the HPV vaccination (N=189)*

Questions	Attitude about HPV	
	Responses	N (%)
Do you have trust in the HPV vaccine?	Yes	140 (74.1)
	No	49 (25.9)
As HPV infection is regarded as a sexually transmitted disease (STD). Will getting the HPV vaccine make you feel embarrassed?	Yes	44 (23.3)
	No	145 (76.7)
Would you be willing to get vaccinated against HPV?	Yes	74 (23.3)
	No	19 (10.1)
	Need to know more about vaccine before getting one	96 (50.8)
Do you consider vaccinating your family & friends?	Yes	92 (48.7)
	No	8 (4.2)
	Need to know more about vaccine before getting one	89 (47.1)
Do you think the HPV vaccine is only for people who are sexually active?	Yes	45 (23.8)
	No	144 (76.2)
Do you know even once vaccinated, women can still have cervical cancer?	Yes	94 (49.7)
	No	95 (50.3)
Are you willing to pay for vaccination?	Yes	108 (58)
	No	79 (42)
Do you agree with the idea of offering low cost HPV vaccine to all individuals by government?	Yes	156 (82.5)
	No	4 (2.1)
	Need to know more before getting one	29 (15.3)

Willingness to vaccinate showed notable hesitation, with half the cohort (50.8%) requiring additional information before decision making. A similar trend emerged regarding vaccinating family and friends, with 48.7% willing, 47.1% requiring more information, and 4.2% unwilling.

A substantial portion of respondents (76.2%) disagreed with the idea that the HPV vaccine is only for people who are sexually active, though 23.8% believed it to be the case. Awareness of the vaccine's limitations was fairly split, with 49.7% acknowledging that vaccinated women can still develop cervical cancer, and 50.3% unaware of this fact.

Financial considerations also played a role in respondents' attitudes. More than half (58%) expressed a willingness to pay for the HPV vaccine, while 42% were unwilling. A significant majority (82.5%) supported the idea of the government offering the vaccine at a low cost, although 15.3% desired more information before endorsing such a plan, and 2.1% opposed it.

**2 Discussion**

This study provides important insights into the knowledge and attitudes toward HPV among health science students in Punjab, Pakistan. The findings demonstrate adequate foundational awareness but reveal significant gaps in critical knowledge areas and practical prevention strategies. The high recognition of HPV as a serious health concern (93.1%) and knowledge of sexual transmission (83.1%) indicate successful knowledge transfer in basic virology and epidemiology. However, the limited understanding of asymptomatic infection (54.5%) and the full spectrum of HPV-related diseases (22.8% fully aware) suggests deficiencies in clinical and preventive medicine education.

The observed knowledge pattern aligns with studies from similar settings where health profession students often possess fragmented understanding of HPV, predominantly focusing on cervical cancer while overlooking other HPV-associated malignancies and the significance of asymptomatic transmission (Aga et al., 2022; Şenocak Taşçı et al., 2024).

This gap is clinically relevant as misunderstanding asymptomatic transmission can lead to inadequate risk perception and poor adoption of preventive measures.

The most concerning finding is the disconnect between theoretical knowledge and practical prevention. While 79.4% of participants knew HPV was preventable, only 22.8% possessed practical knowledge of vaccine access, and 63% were unaware of Pap smear screening. This theory-practice divide among future healthcare providers is particularly problematic, as they may struggle to effectively counsel patients about prevention strategies they themselves do not fully understand or utilize.

Attitudinal findings reveal a complex scenario. The high trust in vaccine efficacy (74.1%) and low embarrassment about STI association (76.7%) are positive indicators for vaccination promotion. However, the substantial proportion requiring more information before vaccination (50.8%) suggests persistent "information hesitancy" even in this educated cohort. This indicates that current educational approaches may not adequately address specific concerns about vaccine safety, efficacy, or administration protocols. The financial barrier remains significant, with only 58% willing to pay for vaccination despite strong support (82.5%) for government subsidies, highlighting the need for affordable vaccination programs.

These findings underscore an urgent need for educational and policy reforms. The identified knowledge-practice gap among future healthcare providers calls for curriculum enhancements that bridge theoretical knowledge with practical prevention strategies. Concurrently, the strong support for subsidized vaccination presents a clear opportunity for policymakers to implement affordable HPV immunization programs. Addressing these gaps is crucial for strengthening Pakistan's capacity to combat HPV-related cancers through better-prepared healthcare professionals and improved vaccine accessibility.

## Conclusion

Based on our findings, we suggest several considerations for future action. Educational curricula for health science students could benefit from incorporating more practical components on HPV prevention and vaccine access. Additionally, broader health education initiatives may help address knowledge gaps in the general population. The strong support for affordable vaccination observed in our study indicates that government-subsidized programs could potentially improve vaccine uptake. Further research with larger, more diverse samples is needed to better inform comprehensive public health strategies for HPV prevention in Pakistan.

## Statements and Declaration

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## References

- Aga, S. S., Yasmeen, N., Khan, M. A., Hakami, A. Y., Awadh, A., & Malli, I. A. (2022). Knowledge, attitudes, and perception toward human papillomavirus among health profession students: A cross-sectional study in King Saud Bin Abdulaziz University for Health Sciences. *J Educ Health Promot*, 11, 141. [https://doi.org/10.4103/jehp.jehp\\_640\\_21](https://doi.org/10.4103/jehp.jehp_640_21)
- Akhatova, A., Azizan, A., Atageldiyeva, K., Ashimkhanova, A., Marat, A., Iztleuov, Y.,...Aimagambetova, G. (2022). Prophylactic Human Papillomavirus Vaccination: From the Origin to the Current State. *Vaccines (Basel)*, 10(11). <https://doi.org/10.3390/vaccines10111912>
- Blasi, P. R., King, D., & Henrikson, N. B. (2015). HPV Vaccine Public Awareness Campaigns: An Environmental Scan. *Health Promot Pract*, 16(6), 897-905. <https://doi.org/10.1177/1524839915596133>
- Ergün, S. (2023). The Effect of University Students' Levels of Knowledge about HPV Infection and the HPV Vaccine on Their Health Beliefs: Health Sciences Students. *Vaccines (Basel)*, 11(6). <https://doi.org/10.3390/vaccines11061126>
- Forster, A. S., McBride, K. A., Davies, C., Stoney, T., Marshall, H., McGeechan, K.,...Skinner, S. R. (2017). Development and validation of measures to evaluate adolescents' knowledge about human papillomavirus (HPV), involvement in HPV vaccine decision-making, self-efficacy to receive the vaccine and fear and anxiety. *Public Health*, 147, 77-83. <https://doi.org/10.1016/j.puhe.2017.02.006>
- Kombe Kombe, A. J., Li, B., Zahid, A., Mengist, H. M., Bounda, G. A., Zhou, Y., & Jin, T. (2020). Epidemiology and Burden of Human Papillomavirus and Related Diseases, Molecular Pathogenesis, and Vaccine Evaluation. *Front Public Health*, 8, 552028. <https://doi.org/10.3389/fpubh.2020.552028>
- Şenocak Taşçı, E., Baş, D., Kayak, S., Anik, S., Erözcan, A., & Sönmez, Ö. (2024). Assessment of health literacy and HPV knowledge among university students: An observational study. *Medicine (Baltimore)*, 103(35), e39495. <https://doi.org/10.1097/md.00000000000039495>
- Singh, D., Vignat, J., Lorenzoni, V., Eslahi, M., Ginsburg, O., Lauby-Secretan, B.,...Vaccarella, S. (2023). Global estimates of incidence and mortality of cervical cancer in 2020: a baseline analysis of the WHO Global Cervical Cancer Elimination Initiative. *Lancet Glob Health*, 11(2), e197-e206. [https://doi.org/10.1016/s2214-109x\(22\)00501-0](https://doi.org/10.1016/s2214-109x(22)00501-0)
- Zhang, W., & Yuan, Y. (2023). Knowledge, attitudes, and practices of parents toward sexuality education for primary school children in China [Original Research]. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1096516>