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Hpv Vaccination Awareness Among Medical Students

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ABSTRACT

Background: Human papillomavirus (HPV) infection is one of the most common sexually transmitted infections, contributing significantly to the global burden of cervical and other anogenital cancers. Cervical cancer (CA cervix), in particular, is one of the leading causes of cancer-related mortality among women in developing countries, despite being largely preventable through timely vaccination and screening. Medical students, as future healthcare professionals, play a pivotal role in promoting HPV vaccination and cervical cancer prevention. Understanding their level of knowledge and attitudes toward HPV infection, vaccination, and cervical cancer can inform targeted educational interventions aimed at improving vaccine uptake and early prevention strategies.

Objective: To evaluate the awareness, knowledge, and attitudes regarding HPV and its vaccination among medical students at the Adichunchanagiri Institute of Medical Sciences, BG Nagara.

Methods: A cross-sectional observational study was conducted from January to May 2024 among 1000 randomly selected undergraduate medical students. Participants completed a structured, self-administered questionnaire assessing demographics, fundamental knowledge of HPV, awareness of HPV vaccination guidelines, and attitudes toward HPV-related diseases. Descriptive statistics (frequencies and percentages) were generated using SPSS version 24.0.

Results: Of the 1000 respondents, 58.0% were female, and 42.0% were male. Most participants were in their final years (80.0%), with the remainder in their second year. Over half (53.2%) incorrectly believed HPV to be relatively uncommon, and 100.0% erroneously thought sexually active individuals must be tested prior to vaccination. Although 96.4% recognized condom use as a preventive strategy, only 44.4% accurately identified the peak incidence of HPV infection. While 100.0% agreed vaccines are recommended for both males and females, 88.8% believed they are not licensed beyond age 26, reflecting outdated information. Overall, misconceptions persisted about HPV prevalence, testing requirements, vaccine licensing, and dose schedules.

Conclusion: Although medical students demonstrated moderate awareness of HPV vaccination, notable gaps in knowledge and attitudes were identified. Targeted educational interventions and curriculum enhancements are recommended to address these misconceptions, ensuring future physicians are better equipped to advocate for effective HPV prevention strategies.

Keywords: HPV, vaccination, medical students, cross-sectional study, knowledge

INTRODUCTION

Cervical cancer (CA cervix) remains one of the most preventable yet prevalent malignancies affecting women worldwide, particularly in low- and middle-income countries. It is primarily caused by persistent infection with high-risk human papillomavirus (HPV) types, making HPV the most significant etiological agent for cervical neoplasia and a major global public health concern [1-3]. In recognition of this, the World Health Organization (WHO) has launched a global strategy to eliminate cervical cancer as a public health problem, aiming to achieve 90% HPV vaccination coverage, 70% screening coverage, and 90% access to treatment by 2030 [1].

Human papillomavirus encompasses over 200 genetically related virus types, of which approximately 14 are classified as high-risk due to their association with cancers of the cervix, anus, penis, vulva, vagina, and oropharynx, as well as anogenital warts [1,2]. Among these, HPV types 16 and 18 are responsible for nearly 70% of cervical cancer cases globally [2]. Transmission primarily occurs through sexual contact—vaginal, anal, or oral—and the infection is often asymptomatic, allowing for silent transmission between partners [1].

Persistent infection with oncogenic HPV types leads to cervical intraepithelial neoplasia and, if untreated, invasive cervical cancer [3]. The introduction of prophylactic HPV vaccines has been a milestone in cancer prevention, with evidence demonstrating high efficacy in preventing HPV-related lesions and malignancies, particularly when administered before sexual debut [4]. The evolution from bivalent and quadrivalent to nonavalent vaccines further expands protection against additional high-risk HPV types.

Despite these advancements, global HPV vaccination uptake is uneven [5]. Countries such as Australia and the United Kingdom have implemented robust school-based vaccination programs, resulting in significant declines in HPV prevalence and associated precancerous conditions [6]. Conversely, many low- and middle-income countries struggle with program implementation due to cost, healthcare infrastructure deficits, and cultural barriers [7,8]. Additionally, widespread vaccine hesitancy—driven by misinformation, concerns over safety, and sociocultural beliefs—poses a serious obstacle in achieving WHO's targets.

Medical students occupy a crucial position in the future of HPV vaccine promotion and cervical cancer prevention. Their level of awareness, attitudes, and preparedness directly impact their likelihood of recommending the vaccine and addressing patient concerns effectively [9]. Research shows that while many medical students recognize HPV's role in cervical cancer, fewer are aware of its links to other cancers, the breadth of vaccination guidelines, or recent updates such as the nonavalent vaccine's introduction [9,10]. These knowledge deficits could hinder their ability to promote vaccination confidently and competently.

Moreover, personal beliefs, cultural background, and misinformation can influence medical students' perspectives on HPV vaccine efficacy and safety [7,8]. Common misconceptions—such as the false notion that vaccination promotes promiscuity—may persist even among future healthcare providers without structured, evidence-based training. Clinical exposure to HPV-related diseases during medical education can improve awareness, but also brings to light challenges such as vaccine cost, policy gaps, and healthcare inequities [9]. This underscores the urgent need for curricular reforms integrating biomedical science with public health, sociocultural understanding, and ethical reasoning.

Therefore, the objective of this study is to assess the knowledge, attitudes, and perceptions regarding HPV infection and HPV vaccination among medical students, with the aim of identifying gaps and informing targeted educational strategies to strengthen their role as future advocates for HPV prevention.

MATERIALS AND METHODS

This cross-sectional observational study was carried out to assess the awareness, knowledge, and attitudes related to human papillomavirus (HPV) vaccination among undergraduate medical students. The study was conducted at a single point of time, providing a snapshot of prevailing levels of HPV-related awareness in the medical student population. The research took place at the Adichunchanagiri Institute of Medical Sciences (AIMS), BG Nagara, a setting well-suited due to its diverse and accessible student population across different academic years. The infrastructure of the institution enabled efficient data collection through visits to lecture halls, common areas, and other academic spaces.

The data collection period extended from January to May 2024, spanning five months to allow for optimal recruitment and minimal disruption to students' academic activities. Undergraduate MBBS students enrolled at AIMS during this time were eligible for participation. Inclusion criteria required students to be currently registered in the MBBS program and willing to provide written informed consent. Students on long-term leave or those who declined or later withdrew consent were excluded from the study. The target sample size was determined to be 1000 students, based on feasibility and resource availability, and all participants who met the inclusion criteria and submitted complete responses were included in the final analysis.

A simple random sampling technique was used to ensure unbiased selection. A list of all eligible students was compiled, and each student was assigned a unique identifier. A computerized random number generator was employed to randomly select students, giving every student an equal chance of being chosen. All participants were treated as a single cohort for analysis, as the primary objective was to evaluate the overall awareness and attitudes toward HPV vaccination among the general medical student body. However, demographic data such as age, gender, and year of study were collected for descriptive purposes.

Data were collected using a structured, self-administered questionnaire that included closed-ended questions covering three domains: demographic details, knowledge about HPV and its associated diseases, and awareness and attitudes towards HPV vaccination. The questionnaire was distributed in paper format after participants were briefed about the study and gave informed consent. They completed the survey in their own time and submitted responses either in designated collection boxes or directly to the research assistants. To ensure data integrity, each completed questionnaire was reviewed for completeness and clarity. Incomplete or illegible responses were excluded from the final dataset.

All valid responses were compiled into a secure digital database using unique codes to ensure participant anonymity. Data were analyzed using SPSS version 24.0, with descriptive statistics (frequencies and percentages) used to summarize categorical variables related to knowledge and attitudes. Results were presented in tables and charts for ease of interpretation. Ethical approval for the study was obtained from the Institutional Ethics Committee (IEC) of AIMS. Participation was entirely voluntary, and students were assured of confidentiality. The study conformed to the ethical principles of the Declaration of Helsinki, and additional educational resources were made available to participants interested in learning more about HPV and its vaccination.

RESULTS

A total of 1000 medical students participated in the study, with a slightly higher proportion of females (58%) compared to males (42%). Most of the respondents were in their final years of study, with 40.8% in Final Year I and 39.2% in Final Year II, while 20% were from the second year, reflecting a broad representation across different academic stages (Table 1).

Table 1: Demographic Profile of Respondents

Characteristic	Category	Number	Percentage (%)
Gender	Male	420	42.0
	Female	580	58.0
Year of Study	Second Year	200	20.0
	Final Year I	408	40.8
	Final Year II	392	39.2

Knowledge regarding HPV and its transmission revealed both strengths and gaps. While 96.4% of respondents knew that condom use could help prevent HPV transmission and 80.4% correctly identified HPV as the primary cause of cervical cancer, only 44.4% were aware that HPV incidence peaks in women in their thirties. A concerning 53.2% believed that HPV is a relatively uncommon STI, and nearly half (49.6%) incorrectly thought that most genital HPV cases are symptomatic. Furthermore, 90% assumed the same HPV types cause both genital warts and cervical cancer, indicating persistent misconceptions (Table 2).

Table 2: Knowledge About HPV and Its Transmission

Statement	Number	Percentage (%)
HPV is relatively uncommon sexually transmitted infection	532	53.2
Condom use can prevent HPV transmission	964	96.4
Almost all cervical cancers are caused by HPV	804	80.4
HPV incidence is highest in women in their thirties	444	44.4
Most people with genital HPV are symptomatic	496	49.6
Genital warts are caused by the same HPV types as cervical cancer	900	90.0

Awareness about HPV vaccination showed encouraging trends with universal acknowledgment (100%) that vaccines are available for both males and females. However, 88.8% of respondents incorrectly believed that HPV vaccines are not licensed for women above 26 years of age. Additionally, 96.4% wrongly thought that HPV-positive individuals should not be vaccinated, though all participants correctly believed that sexually inactive individuals should still receive the vaccine (Table 3).

Table 3: Knowledge and Beliefs About HPV Vaccination

Statement	Number	Percentage (%)
HPV vaccines are not licensed for females over 26 years	888	88.8
HPV vaccines are available for both males and females	1000	100.0
Individuals with HPV-positive status should not receive HPV vaccine	964	96.4
HPV vaccine is needed for sexually inactive individuals	1000	100.0

Attitudinal responses toward HPV and its consequences highlighted both accurate perceptions and areas of uncertainty. A vast majority strongly agreed that females are at higher risk (90%) and that HPV is common in females (96%). While 62.4% agreed that genital warts could cause significant physical, emotional, and financial strain, only 42.4% strongly agreed that nearly all sexually active women are infected with HPV by age 26. Encouragingly, 94% strongly agreed that HPV contributes to various cancers beyond cervical cancer, including anal, vulval, vaginal, and rectal malignancies (Table 4).

Table 4: Attitudes Toward HPV and Its Consequences

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
Females are at higher risk of HPV infection	900	40	20	12	28	1000
HPV infection is common in females	960	8	12	16	4	1000
Genital warts cause serious physical, emotional, and financial issues	624	296	16	44	20	1000
Nearly all sexually active females are infected with HPV by age 26	424	220	16	208	132	1000
HPV infections may contribute to multiple cancers (anal, vulval, vaginal, cervical, rectal)	940	44	8	4	4	1000

Perceptions about the ideal timing and dosage of the HPV vaccine varied among respondents. More than half (53.2%) felt the vaccine should be taken up to 26 years of age, while 22.4% believed it could be taken whenever desired. A small group (3.2%) admitted they didn't know the ideal time. Regarding the number of doses, 50.4% preferred a single dose, followed by 35.2% who opted for two doses, and 14.4% who supported two doses plus a booster schedule (Table 5).

Table 5: Perceptions About Ideal Timing and Doses of HPV Vaccine

Parameter	Category	Percentage (%)
Ideal Time for Vaccination	Don't know	3.2
	0–9 years	11.2
	9–15 years	10.0
	Up to 26 years	53.2
	Whenever we want	22.4
Number of Doses	Single	50.4
	Two	35.2
	Two doses + booster	14.4

Awareness of specific HPV vaccine brands was inconsistent. Only 41.6% of respondents were aware of all available vaccine brands. Gardasil was the most recognized brand (26%), followed by Gardasil 9 (14%). Awareness of Cervivac was relatively low (8.8%), and just 9.6% could name both of the main vaccine brands together, suggesting the need for improved education about available vaccine options (Table 6).

Table 6: Awareness of HPV Vaccine Brands

Vaccine Brand Awareness	Percentage (%)
ALL	41.6
BOTH 1, 2	9.6
CERVIVAC	8.8
GARDASIL 9	14.0
GARDASIL	26.0

DISCUSSION

The present study, conducted among 1000 respondents, revealed notable patterns in the knowledge and beliefs about HPV and its vaccination. A modest female majority (58%) may have influenced responses, particularly as HPV is more commonly associated with cervical cancer—a condition primarily affecting women. While a significant portion of participants (80%) were in their final year of medical studies and could be expected to possess advanced knowledge, persistent misconceptions were observed. Over half (53.2%) incorrectly believed that HPV is a relatively uncommon STI, which contradicts global data highlighting HPV as the most prevalent STI, with nearly all sexually active individuals acquiring it at some point. [11] Moreover, 19.6% failed to recognize HPV's central role in cervical cancer, which is alarming given the critical importance of this link in public health education.

Knowledge about the symptomatology and types of HPV was also inconsistent. Almost half (49.6%) believed that most individuals with genital HPV are symptomatic, despite evidence that most infections are asymptomatic and self-limiting. [12] This could result in underestimating the need for regular screening and vaccination. Additionally, while 90% of respondents thought that genital warts and cervical cancer are caused by the same HPV types, this reflects a common confusion—HPV types 6 and 11 cause warts, while types 16 and 18 are responsible for most cancers. [13] Most concerningly, all participants believed that sexually active individuals must be tested for HPV before receiving the vaccine, contrary to CDC and WHO guidelines that do not recommend routine HPV testing prior to vaccination. [1]

Regarding HPV vaccination awareness, participants showed partial alignment with current recommendations. While 100% acknowledged the vaccine's availability for both genders—suggesting effective messaging around gender inclusivity—96.4% incorrectly believed that HPV-positive individuals should not be vaccinated. In reality, such individuals may still benefit from protection against other HPV strains included in the vaccine. [14] Encouragingly, all respondents supported vaccination for sexually inactive individuals, aligning with recommendations to vaccinate prior to sexual debut for maximum efficacy. However, the belief held by 88.8% that vaccines are not licensed for women above 26 likely reflects outdated guidelines, as newer recommendations extend eligibility up to age 45 in some contexts.

When assessing perceptions around the ideal timing and dosage of vaccination, responses were scattered. Only a small proportion (10%) identified the widely recommended age group of 9–15 years as the ideal window for vaccination, whereas 22.4% believed it could be administered "whenever we want," indicating a lack of clarity about optimal timing. Likewise, beliefs about the required number of doses varied widely, with 50.4% opting for a single dose, even though guidelines generally recommend two or three doses depending on age and risk factors. [12] These variations suggest the need for targeted education to clarify schedules, especially as recent WHO recommendations also support single-dose schedules in some settings.

In terms of vaccine brand awareness, while 41.6% mentioned all available brands, there was confusion about specific vaccines such as Gardasil, Gardasil 9, and Cervarix. Despite high general awareness, brand-specific understanding and coverage differences (such as strain coverage) remain limited. Overall, this study highlights both the strengths and deficiencies in HPV-related knowledge among future healthcare providers. Similar findings were observed in previous studies by Malavika JC et al. [12] and Mehta et al. [11], which noted that even medical students have incomplete or conflicting knowledge about HPV's role in various cancers and the preventive scope of vaccination. These insights underscore the urgent need to enhance medical curricula and awareness campaigns to bridge these knowledge gaps and promote effective HPV prevention strategies.

CONCLUSION

In conclusion, the study highlights both commendable awareness of HPV's link to cervical cancer and substantial misconceptions about its prevalence, symptomatology, and vaccine guidelines among respondents. While most participants understand the need to vaccinate before sexual debut and recognize that HPV infects both genders, key gaps persist, notably regarding the possibility of vaccinating HPV-positive individuals and updated licensure age limits. These findings underscore the value of targeted educational interventions to ensure accurate, evidence-based knowledge. Addressing these misconceptions among upcoming healthcare professionals could significantly advance HPV prevention and thereby prevention of cervical cancer and other morbidities.

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