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Original Research Article

WHY ARE FUTURE DOCTORS NOT GETTING VACCINATED? HUMAN PAPILLOMAVIRUS VACCINE AWARENESS AND BARRIERS TO UPTAKE AMONG MEDICAL STUDENTS OF CHENNAI

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ABSTRACT

Background: Human Papilloma Virus (HPV) is the most common viral infection of the reproductive tract in men and women that may progress to cancer. The HPV vaccine is highly effective, with the potential to prevent over 90% of HPV-related cancers. Despite over a decade of HPV vaccine use in India, awareness is still limited, even among the educated. **Objectives:** To assess the knowledge, attitude toward HPV vaccination and identify perceived barriers to vaccine uptake among medical students.
Materials and Methods: A cross-sectional study was conducted over 2 months among 484 MBBS students from a tertiary care hospital in Chennai, with 121 students randomly selected from each academic year.
Results: Good knowledge about HPV vaccine was found among 60.1% students. Only 8.5% of participants had received the HPV vaccine. Among non-vaccinated students, majority (88.9%) are willing to take the vaccine. Lack of awareness (55.8%) was cited as the major barrier. Factors such as gender, Native state, and parent's occupation were significantly associated with vaccine uptake.
Conclusion: Despite knowledge gaps, the study shows medical students' positive attitude and willingness towards HPV vaccine. With Cervavac's introduction and upcoming National rollout, enhancing awareness among future healthcare providers is essential.
Keywords: Awareness, Cervical cancer, Human Papilloma Virus, Health Professionals, Vaccine.

INTRODUCTION

Human Papilloma Virus (HPV) is the most common viral infection of the reproductive tract leading to many conditions including precancerous lesions that may progress to cancer in both men and women.[1] HPV is responsible for over 95% of cervical cancer cases.[2] globally, cervical cancer is the fourth most common cancer among women. In India, it is one of the leading causes of death due to cancer.[3]
Currently there are six licensed HPV vaccines: three bivalent, two quadrivalent, and one nonavalent vaccine, all protecting against HPV types 16 and 18, which are known to cause at least 70% of cervical cancers worldwide and responsible for 82% of all cervical cancers in India. The vaccines are also highly

efficacious in preventing precancerous cervical lesions caused by these virus types.[4] The HPV vaccines are typically recommended for administration at ages 11 or 12, but it can begin as early as 9 years old. The Food and Drug Administration (FDA) has approved its use up to the age of 45 years.[5] So far, 125 countries (64%) have introduced the HPV vaccine in their national immunization program for girls, and 47 countries (24%) for boys also.[1]

Serum Institute of India recently developed India's first indigenous HPV vaccine (CERVAVAC), making the vaccine very affordable for the vast majority of Indians.[6] While HPV vaccination does not replace routine screening methods like Pap tests, VIA, or HPV testing, it offers added protection and greatly lowers the risk of cervical cancer.[7] To make an effort towards making India cervical cancer free there is an immense need for Community education about vaccines and screening. Despite HPV vaccine being introduced in India more than ten years ago, the lack of awareness about HPV vaccines exists even among the educated population. Being in the medical field, medical students need to have complete and updated knowledge regarding the HPV vaccine for their own benefit and also to promote vaccination among the public. This study aimed to assess the knowledge, attitude, and perceived barriers to HPV vaccine uptake among both male and female medical students so that they can take an informed decision about getting vaccinated and also promote the vaccination among the public.

Objectives:

1. To assess the knowledge and attitude toward HPV vaccination among medical students
2. To identify the perceived barriers to the uptake of the vaccine among medical students
3. To identify the association between HPV vaccination status and sociodemographic factors.

MATERIALS AND METHODS

A Cross-Sectional Descriptive study was done among Undergraduate Medical (MBBS) students of Professional year I, II, III Part 1 & Part 2 studying in tertiary care hospital, Chennai for a duration of 2 months (October and November 2023). The sample size was calculated using awareness of the HPV vaccine among Biology major college students i.e. 46.58 %8. Based on this, the required sample size with 10% relative precision and a confidence level of 95% was 440.

Taking into consideration, a non-response rate of 10%, sample size was 484. The sample size was divided among four years equally (121 from each year). The required sample size of 121 from each batch were selected using simple random sampling.

Institutional Ethics Committee clearance was obtained before the start of the study. After obtaining the written informed consent, a semi-structured proforma with information regarding socio-demographic data and questions/statements about knowledge, attitude toward the HPV vaccine, and perceived barriers to vaccine uptake were collected from the study participants, ensuring complete confidentiality. After data collection, participants were educated about the HPV vaccine. Medical students were encouraged to get the HPV vaccine and also promote the vaccination among family members, friends, patients and the community. Descriptive statistical measures like percentages were used for categorical data. A Chi-square test was used for finding an association between HPV vaccination status and related factors. Data represented in tables and graphs as relevant. The alpha value was kept at 5% for measuring statistical significance.

RESULTS

Table 1: Sociodemographic Characteristics of Study Participants (N = 484)

Variable	Category	Frequency (%)
Age in years	17-18	78 (16.1)
	19-20	154 (31.8)
	21-22	174 (36.0)
	≥ 23	78 (16.1)
MBBS Year of study	First	121 (25)
	Second	121(25)
	Third - Part 1	121(25)
	Third -Part2	121(25)
Gender	Male	212 (43.8)
	Female	272 (56.2)
Native place	Tamil Nadu	414 (85.5)
	Other states	70 (14.5)
Mother's Education	Master Degree	117 (24.2)
	Bachelor Degree	192 (39.7)
	High and Higher secondary	110 (22.7)
	Primary and Middle	7 (1.4)
	Non-literate	58 (12.0)
Father's Education	Master Degree	94 (19.4)
	Bachelor Degree	312 (64.5)
	High and Higher secondary	66 (13.6)
	Primary	5 (1.0)

	Non-literate	7 (1.4)
Mother's Occupation	Doctors	19 (3.9)
	Paramedical	24 (5.0)
	Others	383 (79.1)
	Homemakers	58 (12.0)
Father's Occupation	Doctors	29 (6.0)
	Paramedical	7 (1.4)
	Others	448 (92.6)
Family history of cervical cancer		5 (1.03)
Family History of other cancers		72 (14.9)

Among 484 students participated in the study, the Mean age of study participants was 20.56 + 1.7 years. Females represent 56.2% of the study population. Majority (85.5%) of the study participants belong to Tamil Nadu. Among 70 students belonging to other states, majority are from Maharashtra (19), followed by Andhra Pradesh (14) and Kerala (6). About 4% and 6% of students had mothers and fathers who are doctors, respectively.

Table 2: Knowledge about HPV Vaccine among Participants (N=484)

Knowledge Related to HPV vaccine	Frequency (%)
HPV vaccine prevents cervical cancer	428 (88.4)
HPV vaccine can be given to boys	191 (39.5)
Aware of Availability of HPV vaccine in India	350 (72.3)
Aware of types of HPV vaccine available in India	219 (45.2)
Aware of Indigenously developed HPV vaccine in India	137 (28.3)
HPV can be given to sexually active persons	275 (56.8)
HPV vaccine can be given to already HPV infected people	167 (34.5)
HPV vaccine not recommended for Pregnant women	217 (44.8)
No. of doses required when vaccine administered before 14 years	130 (26.9)
No. of doses required when vaccine administered after 14 years	73 (15.1)
Correct site for administration of HPV vaccine	152 (31.4)
Correct dose of HPV vaccine	190 (39.3)
Correct route of HPV vaccine	258 (53.5)
Age for administration of HPV vaccine for highest efficacy	165 (34.1)
HPV vaccinated women also require regular screening for cervical cancer	281 (58.1)
Good knowledge about HPV vaccine (Answered 7 or more questions correctly)	291 (60.1)

Although Majority of the participants (88.4%) were aware that cervical cancer can prevented by HPV vaccine, only 39.5% are aware that boys can also receive HPV vaccine for preventing Carcinoma Anus/Penis, genital warts etc. Even though 72.3% were aware about HPV vaccine availability, only 45.2% were aware about the vaccine types available in India and only 28.3% were aware of Quadrivalent HPV vaccine (Cervavac) developed by Serum Institute of India. Correct knowledge about vaccine administration site, dose and route varied from range of 31.4 to 53.55%. Approximately one-third (34.1%) of students are aware of the age for administration of HPV vaccine for its highest efficacy. Among 484 students, 291 (60.1 %) have overall good knowledge about HPV vaccine (Table 2).

It was noted that 89 (18.4%) of participants were asked about the information on HPV vaccine by Friends/relatives. The major source of information about HPV vaccination was social media (52.3%) like WhatsApp, Instagram, and Facebook, followed by teachers (35.1%), friends (7%) and family (5.6%).

Attitude towards HPV vaccination: Majority i.e. 405 (83.7%) of the students were willing to know more about HPV vaccination. Among 443 students who didn't receive vaccination, Majority (88.9%) are willing to take HPV vaccine.

Table 3: Perceived Barriers for HPV Vaccine Uptake (N=484)

Perceived barriers	Frequency (%)
Lack of awareness	270 (55.8)
Fear of side effects	78 (16.1)
Cost of the vaccine	75 (15.5)
Doubt about efficacy	35 (7.2)
Ignorance	26 (5.4)

Lack of awareness (55.8) was the major perceived barrier for HPV uptake among participants followed by fear of side effects, cost of vaccine, doubts about efficacy and ignorance (Table 3).

Table 4: HPV Vaccination Details Among Vaccinated Participants (N= 41)

Variable	Category	Frequency (%)
Age at First dose of vaccine	9-15 years	10 (24.4)

	>15 years	31 (75.6)
Type of HPV vaccine	Cervarix	3 (7.3)
	Gardasil 9	5 (12.2)
	Don't know	33 (80.5)
No. of Doses received	1	21 (51.2)
	2	6 (14.6)
	3	2 (4.9)
	Don't know	12 (29.3)

Among 484 students, 41 (8.5%) received HPV vaccine. Three fourth of the participants received HPV vaccination after 15 years. Among those received vaccine, many (80.5%) don't know the type of HPV vaccine they received. (Table 4). Out of 484, 57 (11.8%) participant's family members were vaccinated with HPV vaccine. Majority of the family members who are vaccinated were sisters (64.9%), followed by Mothers (31.6%) and brothers (3.5%).

Table 5: Association between Sociodemographic Factors and the Uptake of HPV Vaccination (N=484)

Variable	Category	HPV Vaccine Received	HPV vaccine Not Received	Chi-square value, df	p-value
Age in years	17-18	9 (11.5)	69 (88.5)	1.674,3	0.643
	19-20	14 (9.1)	140 (90.9)		
	21-22	13 (7.5)	161 (92.5)		
	≥ 23	5 (6.4)	73 (93.6)		
Gender	Male	11 (5.2)	201 (94.8)	5.242,1	0.022
	Female	30 (11.0)	242 (89.0)		
MBBS Year of study	First	10 (8.3)	111 (91.7)	1.785,3	0.618
	Second	12 (9.9)	109 (90.1)		
	Third - Part 1	12 (9.9)	109 (90.1)		
	Third -Part2	7 (5.8)	114 (94.2)		
Native place	Tamil Nadu	30 (7.2)	384 (92.8)	5.537,1	0.019
	Other states	11 (15.7)	59 (84.3)		
Mother's education	Non-literate	3 (5.2)	55 (94.8)	9.192,4	0.088¶
	Primary, Middle school	0 (0.0)	7 (100)		
	High & higher secondary	5 (4.5)	105 (95.5)		
	Bachelor Degree	16 (8.3)	176 (91.7)		
	Master Degree	17 (14.5)	100 (85.5)		
Father's Education	Non-literate	0 (0.0)	7 (100)	9.703,4	0.088¶
	Primary	0 (0.0)	5 (100)		
	High & higher secondary	3 (4.5)	63 (95.5)		
	Bachelor Degree	23 (7.4)	289 (92.6)		
	Master's Degree	15 (16.0)	79 (84.0)		
Mother's Occupation	Homemakers	3 (5.2)	55 (94.8)	39.791,3	0.000¶
	Doctors	9 (47.4)	10 (52.6)		
	Paramedical	3 (12.5)	21 (87.5)		
	Others	26 (6.8)	357 (93.2)		
Father's Occupation	Doctors	12 (41.4)	17 (58.6)	43.661,2	0.000¶
	Paramedical staff	1 (14.3)	6 (85.7)		
	Others	28 (6.3)	420 (93.8)		
History of cervical cancer	Yes	1 (20)	4 (80)	0.866,1	0.359¶
	No	40 (8.4)	439 (91.6)		
	No	20 (8)	229 (92)		

Note: Numbers within brackets indicate row percentages for individual observations. Fisher's exact test.

Among various sociodemographic factors tested for association with HPV vaccine uptake, a significant association was found with gender, native place, mothers' occupation and fathers' occupation. (Table 5). HPV vaccination uptake was found to be more among females, students hailing from other states, and students with their parents in medical profession. It was clearly evident that HPV vaccine uptake was higher among students whose parents are in medical and paramedical profession compared to other professions

DISCUSSION

Human Papillomavirus (HPV) is a common sexually transmitted infection, and persistent infection with high-risk types can cause cancers of the cervix, vagina, vulva, penis, anus, and oropharynx. Most infections caused by HPV go unnoticed and resolve on their own, but it is not possible to predict which infection will develop in to cancer. So, the need for vaccination against HPV is eminent. This remains the best way in combination with screening to reduce the burden of HPV-related cancers, especially cervical cancer, which is one of the leading causes of cancer deaths in India. Overall knowledge about HPV vaccine among medical studies in the present study was found to be 60.1%. Multiple studies done across India demonstrate a varied level of knowledge ranging from 20.63% to 73.1% regarding the HPV vaccine among different groups, including medical students, healthcare professionals, and the general population. While participants exhibited adequate

awareness of HPV-related diseases and prevention measures, significant knowledge gaps persist, particularly concerning vaccine administration, Vaccine inclusivity for males, efficacy, and indications, contraindications etc.[9-14] Despite the gaps in existing knowledge about vaccine among medical students, the present study found that majority (83.7%) are willing to update their existing knowledge about the vaccine. Among 443 students who are not vaccinated in the present study, Majority (88.9%) are willing to take HPV vaccine. Similar findings were found in studies with positive attitudes varying from 27.72% to 77% in India.[9,11,13,15,16] Attitudes toward HPV vaccination are influenced by various factors, including gender, educational background of parents, and cultural beliefs. Studies found that Medical students displayed more positive attitudes the HPV vaccine compared to dental and nursing students.[9,14,17] A study done in South India,[14] found that majority of participants expressed willingness to create awareness and promote vaccine uptake within their communities, highlighting a positive shift in attitudes toward public health initiatives. Providing accurate and comprehensive information about HPV vaccines to medical students holds significant promise for fostering greater vaccine uptake among them and also can serve as a powerful catalyst for promoting its acceptance and utilization among the broader public. Educational efforts aimed at healthcare practitioners, coupled with cost reduction initiatives and educational intervention programmes are vital to achieving optimal immunization rates within communities. Findings from a study in western India.[13] found that educational interventions play a crucial role in enhancing awareness and knowledge about HPV and its vaccine. Post-education, there was a notable improvement in participants' understanding of HPV-related topics such as aetiology, symptoms, precautions, and vaccination strategies for cervical cancer prevention. Following an HPV vaccine information session among medical students in Mangalore, 59% of previously unvaccinated individuals expressed intent to receive the vaccine, with an additional 34% considering vaccination.[10]

In this study, social media is found to be the major source of information about HPV vaccination for more than half of the participants (52.3%) followed by information from teachers (35.1%). other studies done in India found common sources of information to be Undergraduate teaching, internet, friends and Health care providers.[15,17] The prevalence of HPV vaccination varied across the studies done in India, with vaccination rates ranging from as low as 5.5% to as high as 26.73%, with most of the studies with less than ten percent.[9,12,15,17] In the present study Inadequate/Lack of information about the vaccine was a primary reason for not receiving HPV Vaccine, followed by fear of side effects, cost of vaccine, doubts about efficacy and ignorance. Several barriers to HPV vaccine uptake were identified across various studies, reflecting multifaceted challenges in promoting vaccination initiatives. Factors contributing to low vaccination rates included lack of awareness, perceived low risk due to sexual inactivity, high vaccine costs, and doubts regarding vaccine safety and efficacy, religious beliefs.[9,10,13,15,20] Among various sociodemographic factors tested for association with HPV vaccine uptake, factors such as gender, native place, and parents' occupation were significantly associated with vaccine uptake, with higher uptake among females, students from states other than Tamilnadu, and those with parents in medical professions. A study in western India found that females have more knowledge on HPV vaccination compared to males.[13] In this study, no statistically significant difference was found between age, year of study, family history of cervical cancer, parents' education and the HPV Vaccine uptake. Similar findings were found in a study done at Chennai.[9] where age, cancer history in the family and mother's education had no association with HPV vaccination.

Strengths and Limitations: This study included both male and female medical students, addressing a gap in existing literature that often focuses solely on females. As the study was conducted in a single institution, findings might not represent the general population.

CONCLUSION

The knowledge of HPV vaccination among medical students demonstrates obvious gaps and fallacies. With Cervavac being offered at a cheaper cost and the long-term plan of inclusion in the National Immunization Schedule, it is crucial to implement robust educational initiatives targeting healthcare practitioners. By raising awareness about the HPV vaccine and its availability at a reduced cost among medical students who will be future first-contact physicians, there can be a significant positive impact on the acceptance of vaccination.

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