

Awareness of HPV Infection and its Relationship to Cervical Cancer in Medical Students of Karachi, Pakistan--A Cross Sectional Study

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ABSTRACT

Objective: To assess the level of awareness among medical students about HPV, its vaccines and its relation to cervical cancer

Methodology: This is a cross-sectional, multicenter study conducted at Creek General Hospital, Karachi from March 2020 to November 2021 after IRB approval from United Medical and Dental College. Data was collected from undergraduate MBBS students via an online questionnaire.

Results: Total participants in the study were 219. Age range was between 18 and 26 years. A majority (82%) of medical students were aware of the causal relationship between HPV and cervical carcinoma. Only 53% of students had the knowledge for the need for regular pap smear. Students confessed about lack of knowledge regarding HPV and its preventive measures with 82% of students admitting to having gaps in their knowledge.

Conclusion: The study brings us to the conclusion that the current medical curriculum is not fortified and hence the medical students are unaware about the diagnostic and preventive strategies of cervical cancer which is a good gap in their clinical career.

Keywords: Attitude, cervical cancer, human papilloma virus, knowledge, medical student, vaccine.

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INTRODUCTION

Cervical cancer is one of the most serious HPV-related diseases¹. High-risk HPV subtypes are estimated to cause 90-98% of the global burden of cervical cancers. Similarly, these high-risk subtypes are found in 95-100% of women with known cervical carcinoma. Women with normal immune systems take 15-20 years for development of cervical cancer, while in women with weakened immune systems, like those with untreated HIV infection, cervical cancer can develop in 5-10 years¹.

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If cervical cancer is ranked worldwide, it is the seventh most common cancer among all the groups of cancers and the fourth most common cancer in women². Throughout the world, the incidence of human papilloma virus (HPV) 16 and HPV 18 with Low-grade Squamous Intraepithelial Lesions (LSIL) is 25.8%, High-grade Squamous Intraepithelial Lesions (HSIL) 51.9%, and cervical cancer is 69.4%, respectively³.

Human papillomavirus is a DNA virus from the papillomavirus family and causes a viral infection that is passed between people through skin-to-skin contact. Out of the 100 types of HPV present, more than 40 are passed sexually, affecting the genitals, mouth, or throat. HPV types can be found in 95–100% of women with cervical cancer⁴, and those types are estimated to cause 90–98% of cervical cancers worldwide.

The recent global awareness of the role of HPV in relation to primary prevention of cervical cancer and the screening based vaccination process, has decreased the HPV related mortality rate in the urban setup. Still, one of the biggest reasons for the poor acceptance of cervical screening is inadequacy of knowledge on the subject and negative thinking⁵.

Both males and females acquire this infection once they are sexually active and penetrative sex is not required for transmission. Skin-to-skin genital contact is a well-recognized mode of transmission⁶.

In Nepal, cervical cancer is the commonest cancer in women with 2% carrying HPV 16 and 18, and 10.16 million women of reproductive age are at the risk of developing it^{1,7}. Approximately, 2% are estimated to carry HPV 16 and 18. Whereas, 80.3% women are diagnosed with invasive cervical cancer³, 30.2% women with LSIL, and 63.4% with HSIL. HPV infection has a high prevalence in Nepal than in the general population of the world⁸.

Similar to Nepal, cervical cancer has been observed to be the second most common cancer affecting women of reproductive age in India and Bangladesh^{2,3,10}. Cervical HPV-16/18 infection is present in 5% of women in the general population, whereas, 83.2% of invasive cervical cancers are attributed to HPV 16 or 18². In Bangladesh, approximately, 4.4% women are estimated to carry cervical HPV 16/18 infection and 80.3% of advanced cervical cancers are due to HPV 16 or 18¹¹.

One of the reasons that has contributed to this lack of awareness among the general population in Pakistan regarding the importance of HPV vaccination, is the paucity of research studies that actually try to investigate public knowledge and understanding of HPV. Moreover, no robust public health initiatives are undertaken to improve education among the young adults about HPV symptoms, causes and prevention. In the current era, Internet is one good source of information about knowledge on HPV infection¹².

Being a lower-middle-income country with a high burden of cervical cancer, Pakistan lacks an effective nationwide HPV screening and vaccination program. As a result, the Pakistani population may be unaware of there being such a vaccine. About 84.3% of all cervical cancers were reported from developing countries alone; out of cervical cancer patients in Pakistan, 88.3% of women had HPV type 16 or 18 or both. Today, more than 60 million females aged 15 or above are at risk of cervical cancer, with a crude incidence rate of 5.97 per 100,000^{13,14}. Medical students (age group: 17–25) have been selected for these awareness studies as these students will be the practicing clinicians, and will be sought by the population as the first line information resources and can play a pivotal role in spreading awareness among a wide range of population. Educational initiatives targeting health care professionals have a definitive role in fostering vaccine acceptance¹⁵. Due to the lack of research data on this subject in Pakistan, this research has been planned as an eye opener for the future.

In view of the above mentioned information, our objective is to evaluate the current knowledge and beliefs of young medical students regarding the use of the HPV vaccine and its relationship to cervical cancer.

METHODOLOGY

This cross sectional study was planned at the Creek General Hospital, United Medical and Dental College Karachi from the month of March 2020 till November 2021. The Institutional Review Board of United Medical and Dental College approved this study by certifying it with IRB certificate. (Ref.No:UMDC/Ethics/2021/01/03/290).

It was an online survey conducted among students of UMDC and students from other private and public sector medical colleges of Karachi. Adult undergraduate MBBS students from all years (1-5) from different medical colleges of Karachi including Jinnah Sindh Medical University, Jinnah Medical and Dental College, and Bahria University were included in this research. The sampling technique was non-probability convenience sampling. Students studying Dentistry, Physiotherapy and Pharm D were excluded from the study along with nurses, graduate medical doctors and any non-medical personnel.

A sample size of 219 undergraduate medical students was calculated using Raosoft online sample size calculator with the total students population of 650 students and a response distribution of 50%. The confidence interval was 95% with an error margin of 5%. Undergraduate medical students between the ages of 19 and 26 years who gave Informed Consent, were given the chance to fill a 37-item questionnaire administered electronically. In order to assess the adequacy of knowledge, the median of correct responses was calculated. The participants who had knowledge equal to or more than the median for correct responses were labeled to have adequate knowledge, while those with correct responses less than median were labeled to have inadequate knowledge. The results were then exported to SPSS version 22 for statistical analysis. Frequency and percentages of all variables were derived. Test applied was Chi-square and p-value was calculated. A p-value of <0.05 was considered statistically significant.

RESULTS

Active participation was observed mostly by female students (74%) out of 219 students. They were 21-22 years of age (55%). The characteristics of the population are listed in Table 1. The data regarding the questions asked is listed in Table 2.

Table 1: The Characteristics of the Population

Characteristics	n (%)
Gender	
Female	163 (74.4)
Male	56 (25.6)
Age	
19-22	142(64.8)
23-26	76(34.7)
>26	1(0.4)
Marital status	
Married, single partner	7 (3.2)
Unmarried	209 (95.4)
Married, multiple partners	2 (0.9)
History of genital infections	
Yes	25 (11.4)
No	154 (70.3)
Maybe	40 (18.3)male
HPV vaccination status	
Yes	21 (9.6)
No	164 (74.9)
Maybe	34 (15.5)
Family history of malignancy	
Yes	50 (22.8)
No	168 (76.6)
Maybe	1 (0.5)
Family history of genital malignancy	
Yes	17 (7.8)
No	202 (92.2)

The perception of knowledge of the students and the adequacy of knowledge was assessed by the number of their correct responses and analyzed with Chi-square test.

Perception of knowledge was assessed by asking the participants about their cognizance regarding gaps in their knowledge about HPV and their confidence in dealing with patients' queries related to HPV (Table 3). Both these parameters were significantly related to the adequacy of knowledge (Table 4).

Upon looking at the demographic characteristics of the population, it was found that about 209 (95%) medical students were unmarried while 154 (70.3%) had no history of genital tract infections (Table 1). It was found that 17 (7.8%) participants reported a family history of genital tract malignancy and 164 (74.9%) participants stated that they had not been vaccinated against HPV. The majority of the participants had no family history of malignancy.

A significant number of students (82%) were aware of a link between HPV and its role in causing cervical cancer and genital warts, while only some (36.5%) knew that HPV could be transmitted through skin (Table 2). Only 53% of students were aware of the need for regular Pap smear despite the female being

Table 2: Knowledge About HPV and HPV Vaccine

Knowledge About HPV and HPV Vaccine	Correct response	Incorrect response	Unsure response
	Number (%)	Number (%)	Number (%)
Do you know what vaccines are?	209 (95.4)	7 (3.2)	3 (1.4)
What is HPV short for?	209 (95.4)	10 (4.6)	0
What type of organism is HPV?	209 (95.4)	10 (4.6)	0
HPV infection has visible signs always.	88 (40.2)	59 (26.9)	71 (32.5)
HPV can cause cervical cancer and genital warts.	180 (82.2)	1 (.5)	38 (17.4)
Which types of HPV are responsible for genital warts?	98 (44.7)	117 (53.4)	4 (1.8)
Which types of HPV are responsible for cervical cancer?	147 (67.1)	71 (32.4)	1 (.5)
HPV can cause AIDS.	54 (24.7)	107 (48.9)	58 (26.5)
Men cannot get HPV.	11 (.5)	156 (71.2)	52 (23.7)
A person can have HPV infection for years without knowing it	139 (63.5)	17 (7.9)	63 (23.8)
Women positive for HPV will definitely get cervical cancer	80 (36.5)	80 (36.5)	59 (27)
If a woman does not have HPV she has a low risk of cervical cancer	126 (57.5)	37 (16.9)	56 (25.6)
Recommended number of HPV vaccination	69 (31.5)	22 (10)	128 (58.5)
HPV vaccination offers protection against genital warts	144 (65.8)	16 (7.3)	59 (26.9)
HPV can be transmitted through skin.	80 (36.5)	72 (32.9)	67 (30.6)
HPV can be transmitted through sexual intercourse.	192 (87.7)	2 (.9)	25 (11.5)
HPV heals on its own.	21 (9.6)	145 (66.2)	53 (24.2)
HPV vaccination protects against all STI	35 (16)	147 (67.1)	37 (16.9)
HPV test can tell how long the infection has been present?	52 (23.7)	62 (28.3)	105 (47.9)
HPV test can be done at the same time as smear	102 (46.6)	19 (8.7)	98 (44.8)
Women who have had HPV vaccination do not need pap smear.	28 (12.8)	116 (53)	75 (34.3)
Do you favor pediatric vaccination?	202 (92.2)	6 (2.7)	11 (5)
Do you favor adult vaccination?	200 (91.3)	6 (2.7)	13 (5.9)

Table 3: Relationship of Adequacy of Knowledge with Characteristics of Population

Variable (Total number=209)		Adequate Knowledge (113-51.6%)	Inadequate Knowledge (106-48.4%)	p-Value
Gender	Female	86	77	0.64
	Male	27	29	
Age	19-22	66	76	0.3
	23-26	46	30	
	>26	1	0	
Marital status	Unmarried	105	104	0.18
	Married, single partner	6	1	
	Married multiple partners	1	1	
History of genital infections	Yes	10	15	0.2
	No	85	68	
	Maybe	18	22	
HPV vaccination status	Yes	8	13	0.004
	No	95	69	
	Maybe	10	24	
Family history of malignancy	Yes	27	23	0.6
	No	85	83	

* p-value is significant at <0.05

Table 4: Perception of Adequacy of Knowledge About HPV

Variable	Yes	No	Maybe
Do you feel there are gaps in your knowledge regarding HPV?	128 (58.4)	40 (18.3)	51 (23.3)
Do you think you know enough about the HPV and its vaccine to confidently answer any questions that a patient might have?	23 (10.5)	78 (53.7)	118 (54.8)

vaccinated against HPV. The majority of the students were in favour of paediatric vaccinations (92.2%) and 91.3% were in favour of adult vaccinations. Only a small proportion of students (10.5%) were confident in the information they had regarding HPV while the majority (82%) admitted to having some or significant gaps in knowledge.

According to this criterion, 113 (51.6%) participants had adequate, while 106 (48.4%) had inadequate knowledge. The adequacy of knowledge was not related significantly to age, gender, year of study, history of genital infection and history of malignancy in family (Table 3). The p value was found to be 0.64.

DISCUSSION

In our study, we found that students had inadequate attitude, practice, and knowledge on the subject of cervical cancer. Only 53% of the students in our study had adequate knowledge regarding regular Pap smear. As many as 82% of students admitted to have gaps in their knowledge along with a certain lack of confidence in their knowledge about HPV as well as its preventive measures. Chanprasertpinyo et al did a study in Thailand

and found a direct link between the intention to vaccinate against HPV and the knowledge the students had regarding HPV and its vaccine, with students having a better understanding being more willing to get vaccinated¹⁶. In this study, the percentage of students with adequate knowledge was found to be 51.6%. It was seen that 58.4% of students felt that the knowledge they had regarding HPV was incomplete or inadequate. And only 10.5% students felt that they had enough knowledge to adequately counsel patients regarding HPV and its vaccine. Similarly, Costa, in their study, found a direct correlation between the year of medical study and the knowledge gap present, with greater knowledge gaps in the initial years of study compared with final year medical students¹⁷. Our study, however, found no significant correlation between the year of medical study and the adequacy of knowledge regarding HPV and its vaccines.

In this study, 31.5% and 65.8% of the students had correct knowledge about the vaccine against HPV including the number of vaccine doses and whether the vaccine offers protection from genital warts, respectively. Poor knowledge regarding the vaccine was also seen in other studies such as Pandey conducted

a study in India, which demonstrated that 38.8% of males and 41.4% of females were aware of the correct number of doses for HPV vaccination, with 44% students being aware of the correct schedule for vaccination¹⁸. Another study by Borlu demonstrated that 56.3% of students had no knowledge that HPV vaccination offers protection from cancer of cervix¹⁹. Our study revealed that 65.8% of students had knowledge that HPV vaccination can provide protection against genital warts and cervical cancer. Our study revealed that 9.6% of the medical students had been vaccinated against HPV. This is relatively higher than the 0.3% of students of university who were HPV vaccinated to prevent cancer¹⁹.

There is a very significant knowledge gap when it comes to awareness regarding the risk HPV poses to men. Our study shows that only 5% of students were aware that HPV could also infect men. While the remaining 95% were either wrong or not sure regarding this fact. Pandey et al. also found 31.4% of the medical students were unable to answer questions regarding the need to vaccinate men against HPV correctly¹⁸. A study on 3000 Lebanese medical students via a self-administered questionnaire-based survey revealed a significant lack of knowledge and awareness on HPV among medical students in Lebanon, with a strikingly low vaccination rate (16.4%) due to many barriers²⁰. This can create a significant impact and help to increase the low levels of HPV vaccinated individuals and further help decrease the cervical cancer incidence.

It is important to recognize that this gap in knowledge is even greater when it comes to students that do not have medical education^{21,22}. Shafei discovered that students with a background in health sciences scored more as compared to students with no background in health sciences²¹. This is thought to be due to the notably greater exposure of medical students towards health related subjects. Hirth discussed that medical students that had been vaccinated against HPV themselves, were more likely to be informed of its importance and advantages and were thus much more likely to recommend them to their patients²³. Furthermore, Berensone highlighted the importance of education regarding HPV, its association to cervical cancer, and noted a positive change in the students' behavior and confidence when counselling patients regarding the vaccine²⁴.

There were several limitations in our study. Firstly, a relatively small sample size was collected. A larger sample size would have facilitated a more in depth study of the adequacy of knowledge among medical students. Similarly, the sample obtained was from five medical colleges. Involvement of students from other

medical colleges in Karachi would have helped to diversify and give a more accurate over all picture of the adequacy of knowledge and thus help to assess the need for future educational interventions regarding the subject.

Instead of an electronic survey, an interview based study could have proved to be more interactive and helped to determine the factors that limit the presence of adequate knowledge among medical students. An intervention based study could have helped to determine the effectiveness of any education provided on the subject. Pre and post tests could be used to assess any improvement in the adequacy of knowledge and thus can be used as a guideline for further education pertaining to the subject.

CONCLUSION

The study concludes that our medical students were inadequately aware about HPV and its vaccine which is thought provoking and worrisome. In future, when they will start their clinical career, they will not be able to guide women about the importance of pap smear and different modalities of prevention from cervical cancer. It is absolutely vital that medical students be provided with adequate knowledge about HPV, its role in causing cervical cancer and vaccination for its prevention. This should be an important part of the medical training because of the future role they are to assume as medical professionals and health care providers.

Conflict of Interest: The authors declare that they have no conflict of interest.

Authors' Contribution: KK worked on paper writing and theme of the paper, AL, AS, and AF worked on data collection, KA, and FB reviewed the article and performed data analysis. All authors have proofread and approved the manuscript.

REFERENCES

1. Human papillomavirus (HPV) and cervical cancer. Who Int. 2021 Available from: [https://www.who.int/news-room/fact-sheets/detail/human-papillomavirus-\(hpv\)-and-cervical-cancer](https://www.who.int/news-room/fact-sheets/detail/human-papillomavirus-(hpv)-and-cervical-cancer)
2. Global Cancer Observatory. GlobocanIarc fr 2021 [cited 29 April 2021]. Available from: <http://globocan.iarc.fr/old/FactSheets/cancers/cervix-new.asp>
3. [Internet]. Hpvcentre.net. 2021 [cited 29 April 2021]. Available from: <https://hpvcentre.net/statistics/reports/XWX.pdf>
4. Boda D, Docea AO, Calina D, Ilie MA, Caruntu C, Zurac S, et.al. Human papilloma virus: Apprehending the link with carcinogenesis and unveiling new research avenues. *Int J Oncol.*2018; 52(3):637-655.

5. Raychaudhuri S, Mandal S. Socio-demographic and behavioral risk factors for cervical cancer and knowledge, attitude and practice in rural and urban areas of North Bengal, India. *Asian Pac J Cancer Prev.* 2012;13(4):1093-1096.
6. Pinkbook | HPV | Epidemiology of Vaccine Preventable Diseases | CDC [Internet]. Cdc.gov. 2021 Available from: <https://www.cdc.gov/vaccines/pubs/pinkbook/hpv.html>
7. [Internet]. Hpvcentre.net. 2021 [cited 29 April 2021]. Available from: <https://hpvcentre.net/statistics/reports/NPL.pdf>
8. Thapa N, Maharja M, Shrestha G, Maharjan N, Petrini MA, Zuo N, et al. Prevalence and type-specific distribution of human papillomavirus infection among women in mid-western rural, Nepal-A population-based study. *BMC Infect Diseases*, 2018;18(1):1-8.
9. Chatterjee S, Chattopadhyay A, Samanta L. HPV and cervical cancer epidemiology-current status of HPV vaccination in India. *Asian Pacific J Cancer Preve.* 2018;17(8):3663-3673.
10. Jabeen S, Islam MJ, Talukder MH, Nurunnabi ASM, Haque M. Pathoepidemiology of Cervical Cancer in National Institute of Cancer Research and Hospital Of Bangladesh. *J Dhaka Med Col.* 2014; 23(2): 203-210.
11. Hoque MR, Haque E, Karim MR. Cervical cancer in low-income countries: A Bangladeshi perspective. *Int J Gynecol Obs.* 2021;152(1):19-25.
12. Khan TM, Buksh MA, Rehman IU, Saleem A. Papillomavirus. Knowledge, attitudes, and perception towards human papillomavirus among university students in Pakistan. *Papillomavirus Res.* 2016 ;2:122-127.
13. Shaikh MY, Hussaini MF, Narmeen M, Effendi R, Paryani NS, Ahmed A, Khan M, Obaid H. Knowledge, Attitude, and Barriers Towards Human Papillomavirus (HPV) Vaccination Among Youths of Karachi, Pakistan. *Cureus.* 2019; 11(11):e6134.
14. Zaheer R, Alam N, Hussain KCF, Herekar AA, Nasir H, Bhutta SZ. Awareness about human papillomavirus as a cause of cervical cancer and its prevention in the undergraduate female students of Karachi. *J Pak Med Assoc.* 2017; 67(1); 27-32.
15. Pandey D, Vanya V, Bhagat S, Vs B, Shetty J. Awareness and attitude towards human papillomavirus (HPV) vaccine among medical students in a premier medical school in India. *PLoS One.* 2012;7(7):e40619. doi: 10.1371/journal.pone.0040619.
16. Chanprasertpinyo W, Rerkswattavorn C. Human papillomavirus (HPV) vaccine status and knowledge of students at a university in rural Thailand. *Heliyo.* 2020;6(8): e04625.
17. Costa ADS, Gomes JM, Germani ACCG, da Silva MR, Santos EFD, et al. Knowledge gaps and acquisition about HPV and its vaccine among Brazilian medical students. *PloS one.* 2020;15(3): e0230058.
18. Pandey D, Vanya V, Bhagat S, Vs B, Shetty J. Awareness and attitude towards human papillomavirus (HPV) vaccine among medical students in a premier medical school in India. *PLoS One.* 2012;7(7):e40619. doi: 10.1371/journal.pone.0040619.
19. Borlu A, Gunay O, Balci E, Sagiroglu M. (2016). Knowledge and attitudes of medical and non-medical Turkish university students about cervical cancer and HPV vaccination. *Asian Pac J Cancer Prev.* 2016; 17(1):299-303.
20. Haddad SF, Kerbage A, Eid R, Kourie HR. Awareness about the human papillomavirus (HPV) and HPV vaccine among medical students in Lebanon. *J Med Virol.* 2022; 94(6):2796-2801. doi: 10.1002/jmv.27509
21. Shafei MN, Zainon N, Zulkifli NF, Ibrahim MI. Knowledge and perception on human papilloma virus infection and vaccination among medical students of a university in Malaysia. *Procedia-Social Behav Sci.* 2014;116:2707-2710.
22. Rajiah K, Maharajan MK, Chin NS, Num KSF. Awareness and acceptance of human papillomavirus vaccination among health sciences students in Malaysia. *Virusdisease*, 2015;26(4):297-303.
23. Hirth JM, Batuuka DN, Gross TT, Cofie L, Berenson AB. Human papillomavirus vaccine motivators and barriers among community college students: Considerations for development of a successful vaccination program. *Vaccine.* 2018;36(8):1032-1037.
24. Berenson AB, Hirth JM, Fuchs EL, Chang M, Rupp RE. An educational intervention to improve attitudes regarding HPV vaccination and comfort with counseling among US medical students. *Hum Vaccin Immunother.* 2020;16(5);1139-1144. doi: 10.1080/21645515.2019.1692558.