

Comparison of awareness, uptake and barriers of Human Papilloma Virus vaccine among students of private medical college in Karachi – A cross sectional study.

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Abstract:

Received:

Cervical cancer is the condition which has a long latency period from premalignant to malignant stage. Human papilloma virus (HPV) is the most common cause of cervical cancer in sexually active woman. The objective of our study was to assess and compare the awareness of HPV and its vaccine, uptake and the associated barriers among medical, dental and nursing students of Jinnah medical and dental college of Karachi.

Accepted:

Material and Methods: This cross-sectional study was conducted from August - November, 2016. Data was collected after taking informed and written consent in a structured questionnaire through interview. Total 455 students were selected via convenient sampling. Data analysis was performed on SPSS version 25.0.

Results: In general, male students showed better understanding of HPV infection and vaccine than female students. Most of the participants (79.4% male and 51.7% female) were well aware about the virus. But only 38.2% male and 22.3% female students knew about the availability of HPV Vaccine. The level of Vaccine uptake among the students was even lower and only 13 out of 455 respondents had actually taken up the HPV Vaccine however, majority of the students (64% males and 60% females) showed willingness to get vaccinated if they get a chance. Moreover, unawareness about the disease and vaccine were identified as the chief barrier and most students agreed upon the need of conducting awareness programs on HPV infection and vaccine.

Conclusion: This study reveals insufficiency in awareness regarding HPV and its vaccinations which is recognized as a profound barrier in our community. Fortunately, ca cervix is preventable by vaccine but in order to get maximum benefit knowledge of health professionals about the disease and its prevention should be amplified through medical education programs, conference and media.

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Introduction:

Human papillomavirus (HPV) is the most common viral infection of reproductive tract. Most sexually active women and men are infected at some point in their reproductive lives and reinfection is also common. In 90% cases, HPV infections usually clear up from the body within 2 years. A Small proportion of certain types of HPV (type 16 & 18) can persist and progress to cervical cancer.¹ Cervical cancer is the most common HPV related disease and nearly all cas-

es of cervical cancer can be attributable to HPV infection.² Cervical cancer is the fourth leading cancer among women worldwide with estimated number of 570,000 new cases in 2018, representing 7.5% of all female cancer related deaths. In developed countries female are routinely screened for sexually transmitted infection and vaccinated against HPV infection. Screening helps in detecting early pre-cancerous lesions and for starting early treatment which has resulted in 80% reduction of cervical cancer in

Table-1: Socio-Demographic Characteristics of the Students (n=455)

Participants Characteristics	Overall n=455 n (%)	Male (n=136) n (%)	Female (n=319) n (%)
Age (in years)			
Mean (\pm S. D) *	21.30 (\pm 1.845) *	21.45 (\pm 1.595) *	21.23 (\pm 1.940) *
17-20	173 (38.02)	042(30.9)	0131(41.1)
21-24	266 (58.46)	93(70.3)	0173(54.1)
25-27	016 (03.51)	001(00.7)	015(04.7)
Education stream			
MBBS	175(38.5)	80 (58.8)	95(29.8)
BDS	140(30.8)	56 (41.2)	84(26.3)
BScN	140(30.8)	00(00.0)	140(43.9)
Marital Status			
Single	435 (95.6)	131(96.3)	304(95.3)
Married	020 (4.4)	005(03.7)	0015(04.7)
Year of Study			
1st Year	105 (23.1)	034(25.0)	073(22.9)
2nd Year	105 (23.1)	032(23.5)	073(22.9)
3rd Year	105 (23.1)	023(16.9)	082(25.7)
4th Year	105 (23.1)	033(24.3)	070(21.9)
5th Year	035 (07.7)	014(10.3)	0021(06.6)

*Numerical variable

western countries.³ Incidence of cancer is higher in developed countries as compared to developing countries like Pakistan. However, mortality rates are higher in developing countries due lack of awareness regarding available screening and primary preventive treatment options.⁴ Vaccination against HPV can prevent nearly 70% of all cervical cancers.⁵ However, vaccine uptake is limited due to lack of awareness, social acceptability, financial burden and lack of concerted public health efforts to create awareness on this common issue of reproductive health. With this preamble in perspective, we conducted this research aiming to assess the awareness of HPV related cancer and to investigate the uptake of HPV vaccine among the students of Jinnah Medical and Dental College

Material and Methods:

Study Design: This cross sectional study was carried out in the medical, dental and nursing students of Jinnah Medical and Dental College in Karachi.

Study period: Four months from August 2016 to November 2016.

Inclusion criteria: Undergraduate students en-

rolled in the Jinnah Medical, Dental & Nursing programs were eligible to participate in this study.

Exclusion criteria: Teaching faculty & medical staff were not included in this study.

Sample size & sampling method: We have collected data from 455 undergraduate students (175 medical students (35 students respectively from year 1-5), 140 dentistry students, 140 school of nursing students) using convenience sampling.

Data collection: 20 items-based questionnaire was used to collect information on demographic profile, knowledge and awareness of HPV infection, HPV vaccine, vaccine uptake, willingness and barriers in getting vaccination, willingness of students to participate in conduction of awareness programs regarding the virus and vaccine in the health-care setting.

The questionnaire was pretested on 40 students which are not included in actual study.

Data analysis: Data entry and analysis were done using SPSS software version 25.0.

Ethical consideration: Study was approved from the ethical review committee of Jinnah Medical and Dental College. Informed consent was necessary for research participants.

Results:

455 students were included in the study from which 175(38.5%) belong to MBBS and 140(30.8%) each to BDS and BScN study streams of a private medical college of Karachi.

Mean age of our respondents was 21.30(\pm 1.845) years and majority of the students were in 21-24 years age group. Among 455 students, 136(30%) were male and only 20(4.4%) were married. Details of demographic characteristics of participants is summarized in Table 1.

Awareness of Human papilloma virus: Table 2

Table-2: Comparison of Awareness among Male and female students (n=455)

Variables	Male (n=136)	Female (n=319)	p-value ^a
Heard about HPV			<0.001*
Yes	108(79.4)	165(51.7)	
No	028(20.6)	154(48.3)	
Perceived risk of infection by HPV			0.006*
Yes	030(22.1)	0062(19.4)	
No	057(41.9)	0092(28.8)	
Don't know	049(36.9)	0165(51.7)	
Infection is life threatening			<0.001*
Yes	098(72.1)	0153(48.0)	
No	015(11.7)	0050(15.7)	
Don't know	023(16.9)	0116(36.4)	
Problem is emerging in Pakistan			0.007*
Yes	056(41.2)	0036(13.8)	
No	007(05.1)	0096(30.1)	
Don't know	073(53.7)	0179(56.1)	
Have cervical or anal cancer in family			0.318
Yes	02(01.5)	009(02.8)	
No	120(88.2)	264(82.8)	
Don't know	014(10.3)	046(14.4)	

ap-value obtained from chi square; * p-value significant

Table-3: Comparison of Knowledge among gender (n=455)

Variables	Male (n=175)	Female (n=140)	p-value ^a
Disease caused by HPV			
Ca Cervix			<0.001*
Yes	76(55.9)	113(35.4)	
No	060(44.1)	206(64.6)	
Herpes			0.0640
Yes	022(16.2)	032(10.0)	
No	114(83.8)	287(90.0)	
Genital warts			0.007*
Yes	051(37.5)	080(25.1)	
No	085(62.5)	0239(74.9)	
Anal cancer			<0.037*
Yes	017(12.5)	021(06.6)	
No	119(87.5)	298(93.4)	
Prostate cancer			0.724
Yes	007(05.1)	014(04.4)	
No	129(94.7)	305(95.6)	
Sex effected by HPV infection			<0.001*
Male	026(19.1)	031(09.7)	
Female	050(36.8)	083(26.30)	
both	060(44.1)	0205(49.3)	
Vaccine available for HPV			0.001*
Yes	052(38.2)	071(22.3)	
No	023(16.9)	082(25.7)	
Don't know	061(44.9)	0166(52.0)	
Who needs vaccine?			<0.001*
Male	006(04.4)	003(00.9)	
Female	016(11.8)	031(9.7)	
both	97(71.3)	0192(60.2)	
don't know	017(12.5)	093(29.2)	
Dose you need for complete vaccination			0.576
One	003(02.2)	010(03.1)	
Two	005(03.7)	012(03.8)	
Three	019(14.0)	031(09.7)	
Don't know	109(80.1)	266(83.4)	

a p-value obtained from chi square; * p-value significant -correct answers are shown in bold characters

showed the comparison of awareness of HPV infection among study participants. It was observed that greater number of male students 79.4%(108) have heard about Human Papilloma Virus whereas, only 51.7% (165) female students have knowledge of it. This difference was found to be statistically significant ($p<0.001$) among two groups.

Also, perception of getting disease was low in female students (19.4%, 62) as compared to male (22.1%, 30) shown by a significant p-value of 0.006. Surprisingly, larger proportion of male (72.1%, 98) students considered HPV infection as serious and life threatening, as compared to 48%(153) of female students, and among gender this difference was also statistically significant ($p<0.001$). Likewise, recognition of HPV as emerging problem was more among males (41.2%, 56) than female (13.8%, 36) students with statistically significant difference ($p=0.007$).

It was also discovered that in the study that 1.5%(2) males and 2.8%(9) female students have cervical/anal cancer cases in their family, while most of the students deny the presence of such cases, yet few are not aware that these cases exist in their family with statistically non-significant difference ($p=0.318$)

Knowledge regarding HPV infection and Vaccine: Table 3 summarizes the comparison of knowledge among male and female students. It is a known fact that HPV is oncogenic and causes cervical cancer, anal cancer and genital warts. While testing students' knowledge, it was found that male (56.0%, 76) have better understanding of etiology of cervical cancer as compared to female (35.4%, 113) which is statistically significant ($p<0.001$). On the other hand, lack of knowledge became evident when 93.4% (298) female and 87.5% (114) male students rejected that HPV causes anal cancer ($p=0.037$). Following the same pathway, more female (75%, 239) than male (62.5%, 85) students were unable to identify HPV as causative agent of genital warts with statistically significant difference

Table-4: Comparison of Uptake and willingness of getting HPV Vaccine among Gender

Assessment of Uptake	Male n (%)	Female n (%)	Overall n (%)	p-value ^a
Uptake of HPV Vaccine				0.271
Yes	4 (02.9)	09 (02.8)	13 (02.9)	
No	70 (51.5)	190 (59.6)	260 (59.1)	
Don't Remember	62 (45.6)	120 (37.6)	182 (40.0)	
Any one in family is vaccinated				0.033*
Yes	15(11.0)	25(7.8)	40 (08.8)	
No	32(23.5)	114(35.7)	146 (32.1)	
Don't know	89 (65.4)	180(56.4)	269 (59.1)	
Thought about getting Vaccinated;				0.186
Yes	22(16.2)	61(19.1)	83(18.2)	
No	72(52.9)	139(43.6)	211(46.4)	
Don't know	42(30.9)	119(37.3)	158(23.9)	
Willingness to be Vaccinated if get a Chance				0.682
Yes	87(64.0)	191(59.9)	270(61.1)	
No	20(14.7)	49(15.4)	69(15.2)	
Don't Know	29(21.2)	79(24.8)	108(23.7)	
Ask family member to get vaccinated				<0.062
Yes	97(71.3)	191(59.9)	288(63.3)	
No	16(11.8)	58(18.2)	74(16.3)	
Don't know	23(16.9)	70(21.9)	93(20.4)	
Need of awareness program				0.009*
Awareness only	10(07.4)	55(17.2)	65(14.3)	
Uptake only	3(02.2)	3(00.9)	6(01.3)	
Both	117(86.0)	235(73.7)	352(77.4)	
None	6(04.4)	26(08.2)	32(07.0)	

^a p-value obtained by using chi square test; *p-value is significant

Table-5: Comparison of Barriers in uptake of HPV vaccine among Gender

Barriers	Malen (%)	Female n (%)	p-value a
Unawareness of disease	120(88.2)	285(89.3)	0.730
Unawareness of vaccine	112(82.4)	270(84.6)	0.543
High cost	82(60.3)	143(44.8)	0.003*
Physician non-recommendation	067(49.3)	116(36.4)	0.010*
Non-availability of vaccine	45(33.1)	93(29.2)	0.403
Lack of time to complete schedule	47(34.6)	99(31.0)	0.461
Perception of low risk	29(21.3)	65(20.4)	0.819
Parent permission	18(13.2)	33(10.3)	0.371
Vaccine is not safe	14(10.3)	24(07.5)	0.328
Vaccine is not effective	12(08.8)	18(05.6)	0.211

^a p-value obtained by using chi square test; *p-value is significant

(p=0.007).

Conversely, female students (49.3%, 205) showed better knowledge on genders affected by HPV infection than male students (44%, 60). This difference of knowledge between two groups was also statistically significant with p-value <0.001.

Considering knowledge about HPV vaccine, male students (38.2%, 52) were better aware of the availability of HPV vaccine than female (22.3%, 71) students, but without any hesitation most students (45% male, 52% female) accepted that they were unaware of the existence of the vaccine against HPV infection. Statistically this difference is also significant with p-value <0.001. Similar trend was observed in realization of recipient of vaccine, where 71.3%(97) male and 60.2%(192) female acknowledged that both male and female need the vaccine (p<0.001). However, majority of the students (83.4% female & 80% male) did not know about the dose of HPV vaccine.

Uptake and willingness of getting HPV vaccine: Table 4 presents uptake, and willingness of HPV vaccine statistics. In the study surprisingly very low uptake of HPV vaccine in both groups was noticed. Out of 455 students, only 2.9%(4) male and 2.8%(9) female students were actually vaccinated and the difference was statistically non-significant (p-value=0.271). However it was encouraging to observe that majority of male (64%, 87) as compared to female (60%, 191) were willing to get themselves vaccinated whenever they get a chance however many remain undecided. Also, large number of students (71% male and 60% female) agreed to recommend vaccination for their family members.

Unexpectedly this study found that family members of 11%(15) male and 7.8%(25) female students were found to be vaccinated though majority don't know about the vaccination status of their family members.

In order to improve the uptake and awareness of HPV infection and vaccine majority of students (86% and 73.7% male and female respectively) have ratified upon need of awareness programs on both, HPV infection and uptake of vaccine

Barriers in uptake of Vaccine: Table 5 summarized barriers in uptake of vaccine. Both male and female have similar opinion in recognizing barriers in HPV uptake. Three most important bar-

riers unanimously identified by the respondents were: unawareness about the disease (female 89.3% and male 88.2%), unawareness about the vaccine (female 84.6% and male 82.4%) and high cost (male 60.3% and female 44.8%). Only high cost and physician recommendation were the barriers on which both groups have conflicting views shown by significant p-value (0.003 and 0.010 respectively). It was noticed that parent permission (p=0.851) was not identified as significant barrier by the students in uptake of vaccine.

Discussion:

Cervical cancer is an issue that has been neglected and not as enlightened as other diseases such as tuberculosis, breast cancer, hepatitis etc. This could be one of the leading factors affecting the awareness regarding HPV and could also account for an increase in the prevalence of cervical cancer.

The main objective of this research was to assess the awareness regarding HPV and its vaccine, so we explored the issue in its various dimensions i.e. its knowledge, acceptability, uptake and barriers among the undergraduate students. These students were believed to possess proficient knowledge as they were supposed to spread this knowledge in the community as a future health care provider.

This study included 70.1% females and 29.9% males, similar demographic proportions were reported in studies in Lahore⁶ and India⁷ whereas, different studies conducted worldwide encompassing China, UAE and USA, the population enrolled were only females⁸⁻¹⁰ as they were believed to be commonly affected by this virus except study in Canada which enrolled only male students.¹¹

In general, the statistics demonstrated that the rate of awareness among the students under consideration was average to low. About 80% male and 51% female students in the study have heard about HPV which is higher than studies conducted among university students in Paki-

stan^{6,12} and Turkey¹³ (57%, 23.2% and 24% respectively) but similar results were observed in a study conducted in India on pharmacy students.¹⁴ Reason behind that may be because these students have a non-medical background.

It was also observed that most of the students (male 56% and female 35.4%) students knew that cervical cancer is caused by HPV, analogous results were reported in Lahore,⁶ Iran¹⁵ and Malaysia,¹⁶ however, it was found to be lower than reported in Indian^{7,14} and higher than in studies conducted in Peshawar.¹²

Role of vaccine in prevention of HPV infection is pivotal. This vaccine was available in Pakistan for more than five years¹⁷ but this fact was known to only 38.2% male and 22.3% female students, showing inadequacy in knowledge of future health professionals about HPV prevention though proportionately similar results were reported in other Asian studies.^{17,18} Knowledge level much lower than this were reported in other Pakistani studies,^{12,17} whereas higher awareness rates were reported in Brazil¹⁹ and India.^{7,14} Similarly, better statistics on dose of vaccine were presented by many global studies.^{7,18}

Lack of awareness was substantiated by low uptake of HPV vaccine in this study, only 13 out of 455 (2.9%) found to be vaccinated which is comparable to 5.5% of study conducted in India²¹ and 8.5% by Ghana,²² however, in developed regions like Europe⁵ about 80% target population have been vaccinated. Despite of the fact that vaccination rate was disappointing in developing countries,²³ willingness is increasing. In this study the willingness of participants to get vaccinated themselves and their family members was found to be 64% in males and 60% in female, but much higher (80% & 95.5%) readiness were reported by the studies conducted in UAE⁹ & Pakistan.¹² we observed that over all acceptability in Pakistan is better than in other Muslim countries where acceptability ranges between 11.3%¹⁵ and 44%²⁰ for the implementation of health programs regarding HPV and its vaccination.

Various factors of life promote the perception of low risk in the individuals which have a profound effect on their acceptance and dismissal, out of that importance of religion appears to come from a strong belief in sexual abstinence until marriage, and this is a barrier that will be a challenge to overcome.²⁰

Certain barriers and drivers should be kept in mind and need to be tackled for the goal of preventing and lowering the rate of cervical cancers to be achieved. In spite of the proven efficacy of HPV vaccine, the uptake of HPV vaccination is very low in many developing countries including India where lower perceived risk of cervical cancer, non-availability of vaccine and high cost were the common reasons but lack of complete knowledge about causative role of HPV in carcinoma cervix is one of the most important determining factors for poor uptake of vaccination.^{24,25} Similar barriers were identified in this study as well. On the other hand, non-recommendation by health care provider and side effect of vaccine were found to be the additional barriers in developed countries.^{11,26} However Studies have demonstrated that the proportion of subjects with intention to vaccinate themselves or their children range from about 70% to 100% once they were educated about the vaccine.^{27,28}

Limitations: In this study students from one medical university by convenient sampling method were included, for more accurate findings all the government and private sector medical universities should have been included. Our study was also confined to the health-related students and the results cannot be implied to the general population. Furthermore, this study only included individuals from the urban population; hence, its results will not be valid for rural population.

Conclusion:

This study was conducted in students who are pursuing health-related field, in spite of that, we conclude that the awareness was insufficient which is recognized as a profound barrier in our community. Fortunately, ca cervix is prevent-

able by vaccine but in order to get maximum benefit knowledge of health professionals about the HPV, cervical cancer, screening programs and avoidance of risk factors, including safe sex by using condoms, and availability of vaccines should be amplified through medical education programs, conference and media. Special attention should be given to community awareness and initiation of vaccination programs. NGO's along with health professionals should create advocacy in concerned Governmental authorities to arrange funding and incorporation of this vaccine in the EPI schedule as cervical cancer has become leading cause of cancer among women.

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Role and contribution of authors:

Dr Farzana Aamir, did the work in writing Introduction and discussion

Dr Shagufta Naqvi, did the data analysis and results writing.

Dr Arshi Farooquee, helped in methodology writing and did the final review of article.

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