

Original Article

Knowledge, Attitude, and Practice of HPV (Human Papilloma Virus) Vaccine among Health Care Professionals of RMU and Allied Hospitals: A Cross-Sectional Study

Muhammad Sharjeel Ashraf¹, Fatima Rasheed¹, Qandeel Khurshid¹, Zohaib Hassan¹, Maimoona Saleem¹, Sana Bilal²

¹ Final Year MBBS Students, Rawalpindi Medical University

² Associate Professor, Department of Community Medicine, Rawalpindi Medical University

Author's Contribution

¹ Conception of study

¹ Experimentation/Study Conduction

¹ Analysis/Interpretation/Discussion

¹ Manuscript Writing

² Critical Review and Facilitation

Corresponding Author

Mr. Muhammad Sharjeel Ashraf,

Final Year M.B.B.S Student,

Rawalpindi Medical University,

Rawalpindi

Email: shurgiel@gmail.com

Article Processing

Received: 05/01/2024

Accepted: 05/15/2024

Cite this Article: Ashraf, M. S., Rasheed, F., Khurshid, Q., Hassan, Z., Saleem, M., & Bilal, S. (2024). Knowledge, Attitude, and Practice of HPV (Human Papilloma Virus) Vaccine among Health Care Professionals of RMU and Allied Hospitals: A Cross-Sectional Study. *SJPMC*, 28(1).

Conflict of Interest: Nil
Funding Source: Nil



Abstract

Introduction: Cervical cancer, usually caused by HPV, is becoming a serious health risk and an emerging cause of death among women worldwide. More than 60 million females are at risk in Pakistan alone. Vaccination against HPV is one of the most effective methods to combat the issue but might yet be largely unknown in developing nations owing to its newness, and a thorough understanding of medical professionals' awareness of it is lacking.

Objectives: The objectives of this study are to assess the health professionals' knowledge of HPV, their awareness of the HPV vaccine, and their attitudes and practices associated with it.

Materials and Methods: A cross-sectional survey involving 278 medical practitioners from Allied hospitals. Participants were recruited using convenience sampling and their responses were gathered via a self-administered standardized questionnaire. The analysis was done using SPSS v27 to provide descriptive details, determine associations using chi-square tests and correlation analysis, and ascertain differences among categories using ANOVA.

Results: Many gaps and misconceptions were found about knowledge of the HPV vaccine. Only 47.5% were aware of the existence of the HPV vaccine in Pakistan, with numerous misconceptions about the target group. Despite these knowledge gaps, and though, only 6.5% of the professionals were vaccinated, 64.8% expressed confidence in the vaccine's effectiveness, and 76.3% were willing to vaccinate their children.

Conclusion: The study revealed a satisfactory level of knowledge regarding HPV among doctors, but it was somewhat lacking in the case of nurses and paramedics. Significant gaps in awareness about HPV vaccination and its practices were identified. Tailored interventions, increased affordability, and comprehensive education campaigns are pivotal to bridging these gaps and informed vaccination practices should be advocated.

Keywords: Human Papillomavirus (HPV) vaccine, Healthcare professionals, Cervical Cancer

Introduction

Cervical cancer, the fourth most common type of cancer, has become a major health issue and an emerging cause of death among women.^{1,2} Among various risk factors, the human papillomavirus (HPV) infection is the actual causative agent.³ Different genotypes of HPV identified are classified as low or high-risk depending on their oncogenic potential on the infected cells.⁴ Among the four main disease-causing subtypes of HPV: types 16 and 18 account for 70% of cervical cancers whereas types 6 and 11 cause genital warts only.^{3,5} According to GLOBOCAN 2020, approximately 604,000 new cases of cervical cancer were diagnosed worldwide, and 342,000 deaths were reported.⁶ The highest number of instances of HPV cervical cancer are found in Asia.⁷ In Pakistan, the crude incidence rate of cervical cancer is 5.9, and more than 60 million females 15 years of age or older are at risk.⁸ Various screening studies have reported that high-risk strains i.e., HPV 16 and 18 have been isolated from the samples collected from Punjab province.⁹ Cervical cancer control includes primary prevention (vaccination against HPV), secondary prevention (screening and treatment of pre-cancerous lesions), tertiary prevention (diagnosis and treatment of invasive cervical cancer), and palliative care¹⁰.

Two strategies are currently being adopted to combat this issue: Pap smear test and vaccination against human papillomavirus.¹¹ Pap smear testing is done among healthy, asymptomatic women. There is a high potential for cure with early detection and prompt treatment.¹⁰

Vaccination, screening, and treatment of pre-cancerous lesions are proven to be a cost-effective way to prevent cervical cancer. Three vaccines were approved by the FDA in 2006, 2009 and 2014. These are certified by WHO⁹ and include Gardasil, Cervarix, and Gardasil-9.¹² They have high efficacy against targeted type HPV infection.^{13,14} and work best if administered before exposure to HPV. Therefore, to prevent cervical cancer, WHO recommends vaccinating masses before they become sexually active.¹⁰ Moreover, A study has shown that vaccinated females of age 12-13 are less likely to develop grade 3 cervical intraepithelial neoplasia (CIN).¹⁵ Though the vaccines were formulated at least two decades ago, they still appear to be missing in the Pakistani healthcare system – something that may be due to a lack of knowledge thereof, and hence, this knowledge needs to be assessed. The global strategy by WHO to eliminate cervical cancer is 90-70-90 targets to be reached by 2030 which includes: 90% of girls fully vaccinated with the HPV vaccine by age 15, 70% of women screened with a high- performance test by 35, and again by 45 years of age, 90% of women identified with the cervical disease receive treatment.¹⁵ This ambitious goal can only be achieved if medical professionals, the prime authority on drugs and medicines, have the requisite knowledge and understanding of the vaccines. Thus, the knowledge, attitude, and practices of medical professionals need to be assessed.

Our study was focused on the knowledge and attitude of healthcare professionals in allied hospitals of Rawalpindi Medical University (RMU) with a specific emphasis on whether they advise or administer the HPV vaccine in their offices. Since physician's recommendations strongly influence HPV vaccination this research also focuses on identifying the factors associated with physicians' recommendations. Identifying these factors and other perceived obstacles could provide insights for healthcare policymakers on how to enhance the adoption of the HPV vaccine among target groups. The objective of this study is to assess the health professionals' knowledge of HPV, their awareness of the HPV vaccine, and their attitudes and practices.

Methods

A cross-sectional study was conducted from April to August 2023, spanning 5 months, to assess the knowledge of healthcare professionals regarding HPV (Human Papillomavirus) and its vaccination. The study focused on healthcare professionals affiliated with the Allied hospitals and encompassed nurses, house officers, post-graduate trainees, and consultants. Respondents submitted their answers both physically and electronically, with transparency maintained through the collection of PMDC registration numbers.

A total of 278 responses were obtained, with 20 collected in person and 258 via Google Forms. The sample size of 278 was determined using the WHO sample size calculator, with a 95% confidence interval, an expected frequency of 50%, and a 5% margin of error. Convenience sampling was employed due to time constraints.

Healthcare professionals from RMU and Allied hospitals were included. Paramedics and health professionals involved in emergencies (ER, ICU) were not.

The objective of the study was to evaluate the knowledge, attitude, and practices of working healthcare professionals regarding HPV and its vaccination. Consequently, medical students and retired healthcare professionals were excluded from the study. House officers with less than six months of service were also excluded to ensure an adequate understanding of HPV-related matters based on substantial exposure to the working environment.

The survey questionnaire covered demographic details such as age, gender, marital status, and level of practice. Additionally, it delved into respondents' knowledge about HPV, its risk factors, cervical cancer, the importance of pap smears, and the HPV vaccine. Knowledge, attitudes, and practices toward HPV vaccination were assessed and analyzed via questions related to the respondent's vaccination history, pap smears, recommendations to children and patients, and any apprehension about refusing the HPV vaccine. The questionnaire was systematically categorized into three distinct scales: HPV awareness, and vaccine awareness, and the third scale was of attitude and practices associated with the vaccine.

For scoring, every question was designed to have a maximum possible score of one point. In instances where a question comprised multiple correct options, this total point value (i.e., one point) was proportionally

distributed among the correct options. For illustration, a question with four correct options would give 0.25 points to each correct response. The questionnaire also incorporated a negative marking system to encourage careful consideration of responses. If an answer was incorrect, points would be deducted to emphasize the importance of accuracy. To support respondents, an "I don't know" option was included for each question to allow for honest self-assessment. This option would result in a score of zero for the particular question, promoting thoughtful engagement with the material.

Results

The sample included 278 medical practitioners, aged 24-67 ($M = 32.04$, $SD = 8.98$), with a mesokurtic distribution (kurtosis = 2.65) and positive skewness (1.702). A summary of sample characteristics is presented in **Table I**. 46% of the participants were unmarried while the married group had been wed an average of 9.31 years ($SD = 8.18$). Almost a third of participants from each professional category had practiced for more than 5 years. Doctors who participated were most frequently House Officers (23.0%) followed closely by PGs (20.5%), GPs (14.7%), and Consultants (11.5%) as determined by valid responses from 194 doctors.

Table-I Sample Characteristics

	Group	Validated Percentage
Age	21-30	61.2
	31-40	21.2
	41-50	13.7
	51 and above	4.0
Gender	Female	60.1
	Male	36.3
	Rather not tell	3.6
Profession	Doctors	71.2
	Nurses	22.8
Years of practice	1-5 years	64.3
	6-10 years	17.7
	11-15 years	6.4
	16-20 years	5.3
	21-25 years	3.4
	More than 26 years	3

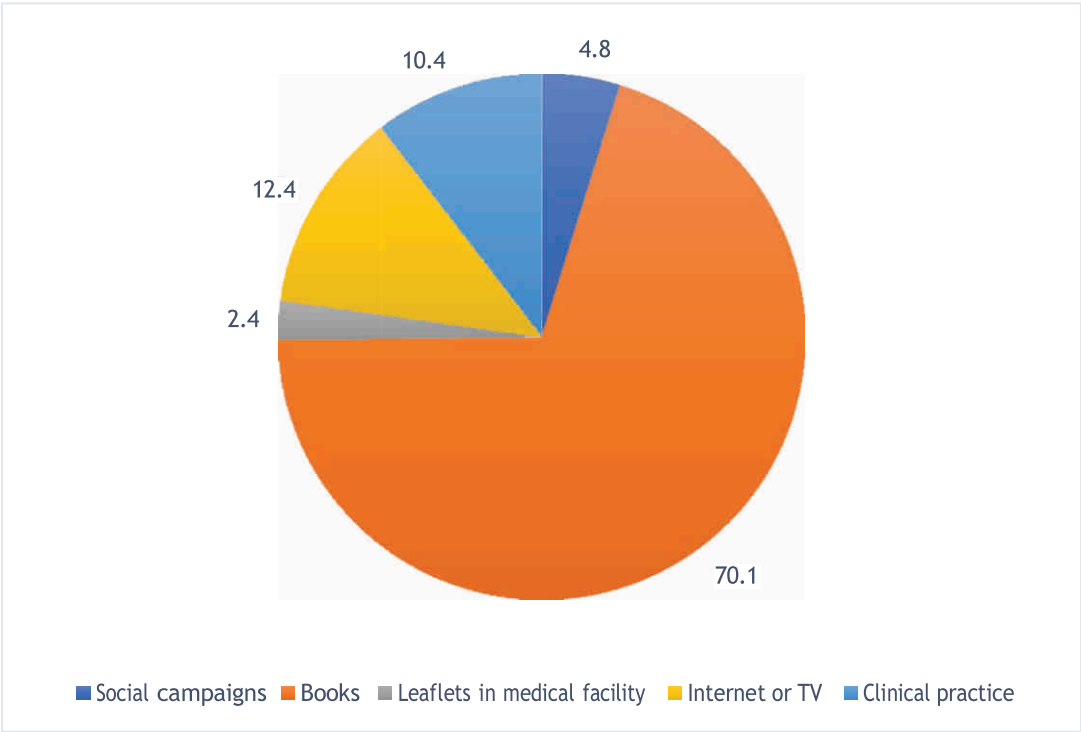


Figure 1: Percentage of population that received HPV awareness from a particular source (N = 251)

While there was substantial awareness in certain areas, the responses to questions about HPV risk factors, modes of transmission, prevention, and conditions associated with HPV infection revealed

some glaring gaps in knowledge and perception in other areas, as depicted in Table I.

Table-II Percentage responses depicting knowledge and link between HPV and cervical cancer.

Item	n (%)
Who is at risk of HPV infection?	
Only women	38.5%
Only men	12.6%
Children	8.3%
Multiple sex partners	75.5%
Immunocompromised	41.4%
I do not know	5.8%
How can you get infected with HPV?	
By kissing	24.2%
By touch	16.8%

Through sexual intercourse	89.7%
During natural childbirth	27.1%
By contact of infected blood with the blood of an uninfected person e.g., using the same needle or blood transfusion	24.2%
I do not know	4.8%
Do you know what the purpose of the Pap smear test is?	
No	11.9%
Yes	80.6%
I do not know	7.6%
What are the outcomes of HPV infection?	
Cancer of the genitourinary organs (vagina, penis, anus, and vulva)	57.90%
Cervical cancer	73.70%
Papillary lesions of the genital area	67.60%
Respiratory papillomatosis	16.90%
I do not know	5.80%
What factors increase the risk of developing cervical cancer?	
Smoking cigarettes	23.1%
A family history of cervical cancer	58.5%
HPV infection	72.6%
A large number of sexual partners	71.5%
Lack of physical activity	2.2%
I do not know	5.4%
How can HPV infection be prevented, or the risk of HPV infection be reduced?	
Vaccination before sexual initiation	58.8%
By using condoms	76.2%
By limiting the number of sexual partners and by avoiding risky sexual behavior	42.6%
It is not possible to prevent HPV infection	1.8%
I do not know	9.0%

Less than half of the participants (47.5%; N = 278) were aware of the existence of HPV vaccines in Pakistan. Awareness about the existence of the vaccine and the knowledge of its target group was found to be associated ($p < 0.001$) but even among those who knew about the existence of the vaccine in the country, at least 9.8% acknowledged their

lack of knowledge about its target group. Neither of the actual target groups was selected by more than half of the participants as shown in Table III. While 54.3% of medical practitioners believed that vaccines reduce cervical cancer risk (though not by 100%), 12.6% believed they eliminated it, and 19.4% declared a lack of knowledge on the subject.

Table-III Percentage of participants who knew of vaccine existence and selected a particular potential target group for the vaccine (n = 132).

Target Group	Percentage of those who claimed to know about the existence of the vaccine
Young women/girls around 12 years old	48.5
Young men/boys around 12 years old	23.5
Young women before sexual initiation	40.2
Young men before sexual initiation	15.9
Young women not infected with HPV	17.4
Young men not infected with HPV	11.4
All women, regardless of age	28
All men, regardless of age	9.1
I do not know	9.8

While 22.1% of the medical practitioners had had their pap smear done (considering females only), only 6.5% of the participants (N = 278) were found to have received an HPV vaccine and even among them, 11.1 % never received all doses of the vaccine.

While few had received the HPV vaccine themselves, 76.3% supported vaccinating their children. Additionally, 64.8% believed in the vaccine's efficacy against HPV-related cancers, and 61.2% advocated its inclusion in Pakistan's immunization schedules. Consequently, the mean scores evaluating vaccine effectiveness and its incorporation into vaccination programs were 3.58 (SD = 1.14; skewness = -0.77) and 3.56 (SD = 1.21; skewness = -0.62) respectively, indicating a

pronounced confidence in and desire for the vaccine among medical professionals.

While the means for each of the three scales: awareness of HPV and cervical cancer, awareness of HPV vaccine in Pakistan, and attitude and practices associated with HPV vaccine were found to be quite low, an analysis of variance revealed that the scores had some association with the profession of the participant, with doctors performing better overall than the other two subgroups. The correlations between scales are shown in Table IV. A correlation of age, years of practice, or years of marriage with any of the three scales could not be described due to a failure to reject the null hypothesis ($p > 0.05$).

Table-IV Correlations between knowledge and attitude scales.

	HPV awareness	Vaccine knowledge	Attitude towards vaccine
HPV awareness	1		
Vaccine Awareness	0.416	1	
Attitudes and practices associated with the HPV vaccine	0.205	0.207	1

Participants indicated varied reasons for vaccine hesitancy: 34.50% cited cost, 50.20% saw it as unnecessary and 24.70% doubted its effectiveness. Other reasons, including

potential health risks, the reluctance to aware children of sexuality, and fear of unusual post-vaccination behaviors also resonated strongly, are detailed in Figure 2.

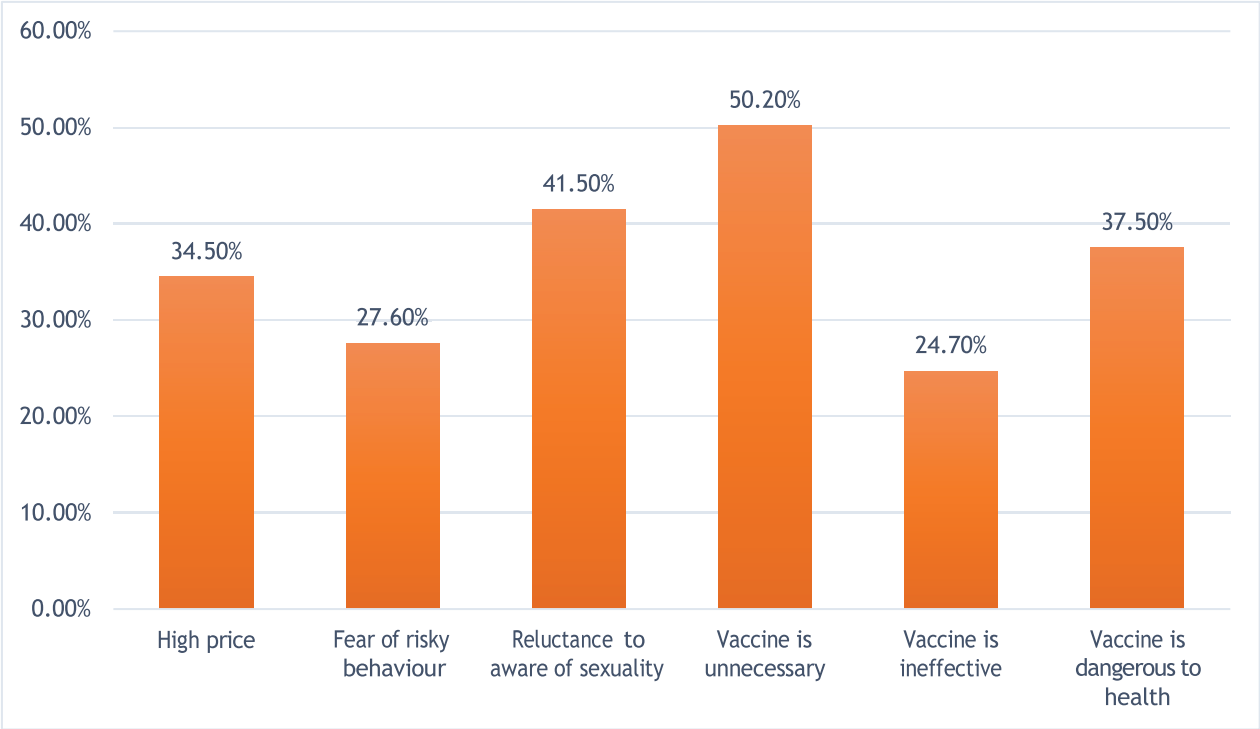


Figure 2: Percentage of patients that hesitate from HPV vaccine due to a specific reason.

Discussion

Of the 278 medical practitioners surveyed, the majority were doctors (71.2%), while the rest comprised of nurses (22.8%). Both genders were included with females outnumbering males. The same result was

found in a study conducted at Wah

Medical College in 2018.²⁵

Upon evaluating the knowledge of the human papillomavirus, the majority of our participants had heard of the term HPV. However, a minority, 10.1%, admitted a lack of memory or knowledge. When considering the category, the doctors

showed the highest acknowledgment of HPV at 98.5% among all the health professionals. However, 75.8% of our nurses were aware of HPV which is much higher than a study conducted in Ghana in 2021 where only 41% of nurses knew HPV. There are huge differences in geographical location, religious and cultural values of both countries.²⁹

academic research material medical literature came out to be the predominant source of this HPV knowledge (70.1%) which highlighted heavy reliance on these traditional learning mediums. Moreover, it's concerning that only 4.8% attributed their awareness to social campaigns. Given the efficacy of social campaigns in informing the public and less-informed healthcare subgroups, like nurses and paramedics (responsible for HPV knowledge in 20.0% and 11.8% respectively), the potential of these campaigns remains underutilized.

However, while many correctly recognized sexual intercourses (89.7%) as a mode of transmission of HPV infection, which is higher than just 68% of healthcare professionals who were able to identify HPV as a sexually transmitted disease in a study

conducted in Tanzania in 2019³⁰. A significant percentage was unaware of perinatal transmission (72.9% unaware). Similarly, the majority appreciated its link with cervical cancers and related diseases, respiratory papillomatosis came out to be the least predisposition (83.1% unaware). The majority of participants (80.6%) mentioned that they knew the importance of Pap smear test which is in stark contrast to only 37% in a previously conducted study in Karachi.⁵

Regarding the risk factors for cervical cancer, although a majority correctly identified HPV infection and multiple sexual partners, a significant percentage overlooked tobacco smoking which emphasizes the need for awareness in this regard for proper patient counseling. A study conducted at the University of Kentucky America in 2019 cites smoking as one of the major risk factors for CA cervix.²⁷ The knowledge about HPV vaccination was suboptimal. Only 47.5% were aware of the existence of the HPV vaccine in Pakistan. A study conducted in India in 2016 among healthcare professionals showed that 87% of the respondents knew of the existence of vaccines.²⁶

Furthermore, among those aware, misconceptions about the target group persisted. For instance, less than half (48.5%) knew that young women/girls around 12 years old were target recipients. Meanwhile, in contrast to our research, only 40.9% of respondents in a study conducted in Iran supported vaccination of preadolescent girls.⁶

Despite the gaps in awareness about the presence of the HPV vaccine in Pakistan, a majority expressed confidence in its effectiveness (64.8%) and advocated its inclusion in national vaccination programs (61.2%). These favorable attitudes, alongside the 76.3% willing to vaccinate their children, reflect the trust in vaccines' preventive potential. However, with only 6.5% themselves being vaccinated, there's a discernible gap between knowledge, attitude, and practice.

The percentage of medical professionals vaccinated against HPV in Rawalpindi is almost the same as in a cross-sectional study conducted in Istanbul (5.6% female and 4% male participants vaccinated against HPV).⁷ The study addressed several vaccine reluctance factors, including cost, informational gaps, and safety worries. Due to possible adverse effects, a significant 37.5% of people declined the vaccine. 8% of people were put off by the vaccine's high price, which reflects hurdles to accessibility and affordability. In Pakistan, Cervarix costs 10,000 PKR, making it expensive for the majority of people.⁸ With the use of evidence-based knowledge and prospective policy changes, such insights can direct efforts and increase immunization rates.

The findings underscore the critical need for targeted public health policies to improve HPV vaccination rates. Public health authorities in Pakistan should prioritize the inclusion of HPV vaccination in national immunization schedules and develop cost-reduction strategies to enhance vaccine accessibility. Additionally, educational initiatives should be expanded to correct misconceptions and emphasize the importance of HPV vaccination among healthcare professionals, as their advocacy is pivotal for wider public acceptance.

Customized Continuing Medical Education (CME) can help people comprehend HPV and cervical cancer. Effective social efforts among healthcare professionals can impact the public view of the HPV vaccination. Healthcare workers have a critical role in determining vaccination acceptability. Many responders favor its inclusion in national programs, citing Australia's National Immunization Programme⁹ as an example. Implementing similar comprehensive vaccination programs

in Pakistan could significantly reduce the incidence of HPV-related diseases and improve overall public health outcomes. Gender-neutral vaccination education is critical for herd immunity. Gender bias in perception must be addressed.

The study not only encompassed healthcare professionals with different demographic backgrounds, such as age, marital status, and years of experience and level of practice but also provided a comprehensive insight into how well-informed our medical community is and highlighted areas needing intervention for enhanced public health outreach. Future research should focus on evaluating the effectiveness of newly implemented public health policies and continuing education programs in improving HPV knowledge and vaccination rates among healthcare providers in Pakistan. Moreover, research should also track changing attitudes and investigate the causes of vaccination hesitation among skeptics.

Conclusion

This study highlights adequate knowledge among health professionals about HPV, but gaps in awareness about vaccines and vaccination practices remain. While most recognize HPV, misconceptions about its transmission, risk factors, and prevention are evident in the study. Addressing these through clear information dissemination, affordability strategies, and broader education campaigns is crucial. The findings emphasize the need for tailored interventions and consistent medical education to bridge knowledge gaps and promote informed HPV vaccination practices.

References

1. Szymonowicz KA, Chen J. Biological and clinical aspects of HPV-related cancers. *Cancer Biol Med.* 2020 Dec 15;17(4):864-878. Doi: 10.20892/j.issn.2095-3941.2020.0370. PMID: 33354269; PMCID: PMC7754057. <https://doi.org/10.20892/j.issn.2095-3941.2020.0370>
2. Muñoz N, Bosch FX, De Sanjosé S, Herrero R, Castellsagué X, Shah KV, Snijders PJ, Meijer CJ. Epidemiologic classification of human papillomavirus types associated with cervical cancer. *N Engl J Med.* 2003 Feb 6;348(6):518-27. Doi: 10.1056/NEJMoa021641. PMID: 12571259.
3. Batool SA, Sajjad S, Malik H. Cervical cancer in Pakistan: A review. *J Pak Med Assoc.* 2017 Jul;67(7):1074-1077. PMID: 28770839.
4. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA Cancer J Clin.* 2021 Mar;71(3):209-249. Doi: 10.3322/caac.21660. Epub 2021 Feb 4. PMID: 33538338. <https://doi.org/10.3322/caac.21660>
5. Centre IHI. Human papillomavirus and related diseases in Pakistan. Summary Report 2016-02-26. 2016 [cited 2016 Jun 13]. Available from: <http://www.hpvcentre.net/statistics/reports/P AK.pdf>
6. Gul S, Murad S, Javed A. Prevalence of high risk human papillomavirus in cervical dysplasia and cancer samples from twin cities in Pakistan. *Int J Infect Dis.* 2015 Sep;34:14-19. Doi: 10.1016/j.ijid.2015.03.011. Epub 2015 Apr 11. PMID: 25868449.
7. Hirani S, Khan S, Akram S, Virji SN, Shaikh PA, Naeem E, Chaudhry RA, Khalid AB, Khan JUD, Qasim MS, Jehan I. Knowledge, awareness, and practices of cervical cancer, its risk factors, screening, and prevention among women in Karachi, Pakistan. *Eur J Cancer Prev.* 2021 Jan 1;30(1):97-102. Doi: 10.1097/CEJ.0000000000000590. PMID: 31904720.
8. Kombe Kombe AJ, Li B, Zahid A, Mengist HM, Bounda GA, Zhou Y, Jin T. Epidemiology and Burden of Human Papillomavirus and Related Diseases, Molecular Pathogenesis, and Vaccine Evaluation. *Front Public Health.* 2021 Jan 29;8:552028. Doi: 10.3389/fpubh.2020.552028. PMID: 33644064; PMCID: PMC7906051. <https://doi.org/10.3389/fpubh.2020.552028>
9. Jumaan AO, Ghanem S, Taher J, Braikat M, Al Awaidey S, Dbaibo GS. Prospects and challenges in the introduction of human papillomavirus vaccines in the extended Middle East and North Africa region. *Vaccine.* 2013 May 24;31 Suppl 6:G58-G64. Doi: 10.1016/j.vaccine.2012.06.097. PMID: 23683962. <https://doi.org/10.1016/j.vaccine.2012.06.097>
10. World Health Organization. Human papillomavirus vaccines: WHO position paper, May 2017. *Weekly Epidemiological Record= Relevé épidémiologique hebdomadaire.* 2017 May 12;92(19):241-68.
11. Schiller JT, Lowy DR. Understanding and learning from the success of prophylactic human papillomavirus vaccines. *Nat Rev Microbiol.* 2012 Oct;10(10):681-92. Doi: 10.1038/nrmicro2872. PMID: 22961341
12. Lei J, Ploner A, Elfström KM, Wang J, Roth A, Fang F, Sundström K, Dillner J, Sparén P. HPV Vaccination and the Risk of Invasive Cervical Cancer. *N Engl J Med.* 2020 Oct 1;383(14):1340-1348. Doi: 10.1056/NEJMoa1917338
13. Falcão M, Castañón A, Ndlela B, Checchi M, Soldan K, Lopez-Bernal J, Elliss-Brookes L, Sasieni P. The effects of the national HPV vaccination programme in England, UK, on cervical cancer and grade 3 cervical intraepithelial neoplasia incidence: a register-based observational study. *Lancet.* 2021 Dec 11;398(10316):2084-2092. Doi: 10.1016/S0140-6736(21)02178-4. <https://www.who.int/news-room/fact-sheets/detail/cervical-cancer#:~:text=Nearly%20all%20cases%20of%20cervical,progress%20to%20invasive%20cervical%20cancer>
14. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9063649/#S1title>
15. Hafeez R, Perveen F, Zafar SN, Hafeez A. Educational effect on knowledge, attitude and practice among registered nurses regarding cervical cancer, its prevention and screening in Karachi, Pakistan. *J Pak Med Assoc.* 2020 Apr;70(4):674-678.
16. Shafiq MH, Mansoor M, Arshad A, Mansoor S, Iftikhar S. Frequency of human papilloma virus (HPV) vaccination among female health care providers and reasons for non-immunization at a public sector hospital. *J Pak Med Assoc.* 2023 May;73(5):1159-1163.
17. Makwe CC, Anorlu RI. Knowledge of and attitude toward human papillomavirus infection and vaccines among female nurses at a tertiary hospital in Nigeria. *Int J Womens Health.* 2011;3:313-7.
18. Wamai RG, Ayissi CA, Oduwo GO, Perlman S, Welty E, Welty T, Manga S, Onyango MA, Ogembo JG. Awareness, knowledge and beliefs about HPV, cervical cancer and HPV vaccines among nurses in Cameroon: an exploratory study. *Int J Nurs Stud.* 2013 Oct;50(10):1399-406
19. Ali SF, Ayub S, Manzoor NF, Azim S, Afif M, Akhtar N, Jafery WA, Tahir I, Farid-Ul-Hasnain S, Uddin N. Knowledge and awareness about cervical cancer and its prevention amongst interns and nursing staff in Tertiary Care Hospitals in Karachi, Pakistan. *PLoS One.* 2010 Jun 10;5(6):e11059
20. Mojahed S, Karimi Zarchi M, Bokaie M, Salimi

- T. Attitude and knowledge of Iranian female nurses about human papillomavirus infection and cervical cancer: a cross-sectional survey. *J Prev Med Hyg.* 2013 Sep;54(3):187-90.
22. Karasu AFG, Adanir I, Aydin S, Ilhan GK, Ofli T. Nurses' Knowledge and Opinions on HPV Vaccination: a Cross-Sectional Study from Istanbul. *J Cancer Educ.* 2019 Feb;34(1):98-104.
23. Burney A, Zafar R. HPV Vaccination as a Mode of Cervical Cancer Prevention in Pakistan. *South Asian J Cancer.* 2023 Feb 25;12(1):51-52.
24. Shamsi U, Anwar A, Samad Z. Time for reintroducing HPV vaccine in Pakistan for primary prevention of cervical cancer. *J Coll Physicians Surg Pak.* 2022;32(10):1377-1378.
25. Sohail R, Habib M, Khurshid N. Awareness and Knowledge of Human Papillomavirus and its Vaccine Amongst Doctors of Tertiary Care Hospital. *J. Soc. Obstet. Gynaecol. Pak.* 2018; Vol 8(2):110-114
26. Chambuso RS, Shadrack S, Lidenge SJ, Mwakibete N, Medeiros RM. Influence of HIV/AIDS on Cervical Cancer: A Retrospective Study From Tanzania. *J Glob Oncol.* 2016 Jun 1;3(1):72-78. doi: 10.1200/JGO.2015.002964. PMID: 28717744; PMCID: PMC5493231.
27. Chawla PC, Chawla A, Chaudhary S. Knowledge, attitude & practice on human papillomavirus vaccination: A cross-sectional study among healthcare providers. *Indian J Med Res.* 2016 Nov;144(5):741-749. doi: 10.4103/ijmr.IJMR_1106_14. PMID: 28361828; PMCID: PMC5393086.

