Knowledge, Attitudes, and Practices of Pharmacy Students Regarding Human Papillomavirus Vaccine and Obstacles to its Acceptance in Pakistan.

Gotam Kumar [1] , Hafsa Rasheed [2,*], Fatima Awan [3] , Hafsa Qazi [4], Anousha Humayoon [5]

ABSTRACT:
Objective: To assess awareness regarding HPV vaccination and identify the obstacles of its acceptance among pharmacy students.
Methodology: This cross-sectional descriptive study was conducted among pharmacy students of Peoples University of Medical and Health Sciences for Women, Shaheed Benazirabad during April 2025 to August 2025. Data from 200 students was collected through a pre-designed questionnaire administered through one-on-one interviews. Statistical investigation was done through using Statistical Software for Social Sciences version 26.0.
Results: Revealed that the Human Papillomavirus Vaccine was unknown to 59.0% of the participants. Just 34% knew that HPV is linked to cervical cancer. 74.0% said they would be open to getting immunized again. No pupils claimed to have received any vaccinations. With 92% of respondents never having attended an awareness workshop or had ever received a vaccination recommendation from their healthcare professionals, ignorance was the main obstacle identified. Concerns about the negative effects of vaccinations were cited by 26% of individuals who were unwilling to get vaccinated, followed by side effects.
Conclusion: The findings show that pharmacy students in Nawabshah have serious deficiencies in their understanding and application of HPV vaccination. This highlights the urgent need for focused national awareness efforts and government-backed programs to address these issues and knowledge gaps and boost public and future healthcare professionals' acceptability and uptake of the HPV vaccine. These initiatives are essential to enhancing preventative strategies and advancing the Who is objective of eliminating cervical cancer.

Key words: HPV vaccine, Human papillomavirus, Barriers, Pharmacy students.

Cite: Kumar G, Rasheed H, Awan F, Qazi H, Humayoon A. Knowledge, Attitudes, and Practices of Pharmacy Students Regarding Human Papillomavirus (HPV) Vaccine and Obstacles to its Acceptance in Pakistan. J Muhammad Med Coll. 2025; 16 (1) pp-95-100

Introduction:
As the fourth most frequent disease in women worldwide, cervical cancer is a severe health concern.[1] According to a study, there are 342,000 recorded deaths and over 600,000 new cases worldwide.[2] Because 90% of cases occur in low- and middle-income countries. In developing nations like Pakistan, where the situation is particularly terrible, cervical cancer is incredibly common. With over 60 million women at risk and a crude incidence rate of 5.97 per 100,000, Pakistan ranks seventh in the world for deaths from cervical cancer.[3] In 2020 approximately 10,000 new cases and 10,070 five year prevalence deaths were recorded,[4] making cervical cancer the third most common cancer in Pakistani women.[5] The most carcinogenic of the more than 100 human papillomavirus (HPV) subtypes that have been found are types 16 and 18, which are responsible for roughly 70% of cervical cancer cases worldwide.[7] According to a recent study, HPV infections are highly prevalent in Pakistan and can result in both malignant and precancerous cervical lesions. Additionally, research shows a link between characteristics like early marriage and multiparity and abnormal Pap smear results.[8] The current cervical screening techniques reduce the mortality rates from cervical neoplasia, but they do not prevent HPV infections or the development of potentially treatable precancerous lesions like high-grade cervical intraepithelial neoplasia. A vaccination that guards against HPV infections may reduce the number of illnesses, fatalities, and financial burden of HPV-related disorders.[9]
HPV vaccines were approved by the US FDA in 2006 and have proven successful in preventing HPV infections, cervical lesions, genital warts, and anal precancers.[10,11] These vaccinations come in bivalent (Cervarix), quadrivalent (Gardasil), and nonavalent formulations, with each targeting multiple high-risk HPV strains.[12] According to the EPI 2022 policy, the vaccination schedule for children aged 9 to 14 years is two doses given six months apart (0 and 6 months), and for children aged 15 to 45 years is three doses given at intervals of 0, 2, and 6 months (it is best for young girls and boys to receive the vaccine before they engage in sensual activity and are exposed to Human Papillomavirus).[13] Human Papillomavirus vaccination is now part of 107 nations' national immunization regimens.[14] Despite these advances, global HPV vaccine uptake remains low. By 2023, only 27% of girls globally had received their

1. Associate Professor, Department of Community Medicine. People's University of Medical & Health Sciences for Women (PUMHSW). Benazirabad.
2. Final Year MBBS students, Batch 2020-2021 (PUMHSW) Benazirabad.
3. Final Year MBBS students, Batch 2020-2021 (PUMHSW) Benazirabad.
4. Final Year MBBS students, Batch 2020-2021 (PUMHSW) Benazirabad.
5. Final Year MBBS students, Batch 2020-2021 (PUMHSW) Benazirabad.

**=corresponding author* :
Email: hafsaqazi018@gmail.com

Received: 13.09.2025 . Revised: 30.09.2025
Accepted: 21.09. 2025 Published online 22.10.2025

first dose of the vaccination, with low-income nations experiencing notably poor coverage.[15] Although the HPV vaccine was first made available in Pakistan three or four years ago, there is little information concerning its coverage or the reasons for its withdrawal. Unfortunately, the majority of Pakistan does not currently provide an HPV vaccination program or an HPV vaccine.[16] According to a prediction model research, achieving 90% yearly HPV vaccine coverage among girls may prevent up to 133,000 cases of cervical cancer over the next ten years.[17]

The barriers to its uptake could be the high cost of vaccines (Rs. 4,700 for Cervarix and Rs. 199,000 for Gardasil),[18] limited public awareness,[19] inadequate healthcare infrastructure, societal stigma surrounding sexually transmitted infections, and cultural taboos associated with discussing sexual health.[20] The absence of research studies that genuinely attempt to examine public knowledge and understanding of HPV is one of the factors that has contributed to the general population's ignorance of the significance of HPV vaccination in Pakistan. Furthermore, no significant public health efforts are made to enhance young adults' knowledge of HPV symptoms, causes, and prevention. One excellent resource for information regarding HPV infection in the modern day is the Internet.[21] Frequently stated barriers to vaccination included concerns about vaccine safety, efficacy, hesitancy, insurance problems, price of vaccine, lack of guidelines, and Health Care Worker recommendations.[22] Lower education levels of women are directly connected to lower levels of immunization for their children. In some societies, boys are given more value than girls, with their health needs.[22] These challenges are further exacerbated by insufficient knowledge even among populations affiliated with healthcare professions. We chose students of pharmacy as our target population because they are dignified to be future healthcare professionals, hold an essential role in public education, and encourage vaccination.[23] However, research has shown critical gaps in their understanding of HPV and the vaccine, raising concerns about their capacity to effectively contribute to vaccination awareness and public health interventions.[24] Enhancing awareness in this group is essential, as it could directly impact vaccine acceptance rates and lead to better public health outcomes.[25] This review mandate to know about the Knowledge level, attitude, and practice of pharmacy students and their effect on future HPV coverage. Additionally, pharmacy students also prepared their behavioral change communication strategies for college students and girls.

Objective:

To assess awareness regarding HPV vaccination and identify the obstacles of its acceptance among pharmacy students.

Methodology:

The first, second, third, fourth, and final year pharmacy students of Peoples Medical and Health Sciences University for Women (PUMHSW) Benazirabad, (n=200) participated in this descriptive cross-sectional study. The Ethical Review Committee of PUMHSW examined and approved the study's methodology vide letter no. PUMHSW/SBA/PVC/ERC/107/2025). After obtaining gate keeper permission from the Director Department of pharmacy; during April 2025 to August 2025, we conducted interviews with each student using a standardized questionnaire for their convenience. Through one-on-one interviews, study, participants were invited to pre-test and test the questionnaire. Throughout the interview, questions were combined, open-ended, and closed-ended so that we could challenge participants' responses and obtain the appropriate answer. Collected data was analyzed using SPSS, and presented as mean ±SD, frequency/percentage; chi square test used where applicable.

Results:

Among 250 students of pharmacy, data complete in every aspect was received from 200 students with a positive response of 80%. Demographic shown in table 1. The majority of participants (57.5%) were between the ages of 21 and 24, with 42% aged 17 to 20. 72.0% of the population lived in cities, while 28.0% lived in rural areas. The distribution of academic year indicated that 21% were in the first year, 22% in the second year, 19% in the third year, 18% in the fourth year, and 20% in the final year. The socioeconomic status of students, was assessed using the Pakistan Bureau of Statistics Department's classification, showed that 46.5 percent belong to the middle class and 4% to the upper class.

Table No 1: Sociodemographic features of Studied Participants

Variables	Category	n (%)
Age in years	17-20	84 (42.0)
	21-24	115 (57.5)
	25 and ≥	1 (0.5)
Residency	Urban	114 (72.0)
	Rural	56 (28.0)
Class (year)	First	42 (21.0)
	Second	44 (22.0)
	Third	38 (19.0)
	Fourth	36 (18.0)
	Fifth	40 (20.0)
Socioeconomic status	Lower class	15(7.5)
	Lower middle class	41(20.5)
	Middle class	93(46.5)
	Upper middle	43(21.5)
	Upper class	8(4.0)
Marital Status	Married	6 (3.0)
	Single	194 (97.0)

Although majority of the students (n=153,76.5%) were knowing about HPV, surprisingly only 82 (41%) were familiar that a vaccine is available for prophylaxis of HPV related diseases. Among those knowing about HPV vaccines (n=82), the source of knowledge was online (53.65%) while academic lectures reported as source of knowledge by 31.70%. When asked about the association between HPV and cervical cancer most of the students (n=153, 76.5%) were knowing the fact; in contrast to 47 (23.5%) students who were unaware of the fact. As far as the knowledge regarding the availability of HPV vaccine in Sindh is concerned majority of the students (n=118, 59%) were unaware table 2.

Attitude of the students towards HPV vaccine found mainly positive as 56% believed in, in contrast to 41% who did not believe in HPV vaccine. When asked would you like to get vaccinated for HPV, 74% students were willing to get vaccinated, and 26% showed unwillingness.

This unwillingness was due to lack of knowledge about vaccine (n=17, 32.69%), 20 (38.46%) showed concern about side effects; fear of vaccine, needle phobia, not sat-

isfied and unsure about the safety were other reasons of refusal for HPV vaccine.

Table No 2: Knowledge regarding HPV vaccine

Question:	Response	n (%)
Have you heard of Human Papillomavirus (HPV)?	Yes	153 (76.5)
	No	47 (23.5)
Have you heard about any vaccine available to prevent HPV-related disease?	Yes	82 (41.0)
	No	118 (59.0)
What is the source of your knowledge regarding HPV vaccination?	Online	44 (53.65%)
	academic lectures	26 (31.70)
	healthcare providers	10 (12.19)
	family/friends	1 (1.2)
	Others	1/ (1.2)

Table No 3: Attitude towards HPV Vaccination

Do you believe in HPV vaccine?	Yes	112 (56%)
	No	82 (41%)
	Don't Know	6 (3%)
Would you like to get vaccinated?	Yes	148 (74.0)
	No	52 (26.0)
If no (n=52) what are your concerns about vaccination?	Lack of awareness and knowledge	17(32.69%)
	concerned about side effects	20 (38.46)
	fear of the vaccine	4 (7.69)
	needle fear	1 (1.92)
	not willing	1 (1.92)
	unsure about the vaccine	9(17.30)
Belief in HPV Vaccine regarding safety	Yes	112(56.0)
	No	7(3.5)
	don't know	81(40.5)
Do cultural beliefs play a role in HPV vaccine acceptance?	Yes	101(50.5)
	No	99(49.5)
Do you think there are any religious restrictions on the acceptance of HPV Immunization?	Yes	56(28.0)
	No	144(72.0)

Regarding acceptance of vaccine in the society with respect to culture and religious belief, 50.0 % students think that cultural beliefs play a role in HPV; while 28% students think that there are religious restrictions towards vaccine acceptance; however, 72% denied any such restriction table 3. Regarding practice for HPV vaccination, 71.5% think that lack of awareness is major obstacle in acceptance of the vaccine. Other obstacles reported by participants were Fear of the vaccine Inadequate healthcare infrastructure, cost and social stigma in that order as shown in table 4.

When asked how we may increase the coverage of HPV vaccination, 49% students were of opinion that by simply making easy availability of vaccine we may increase coverage, 34% students supported that by reducing cost of vaccine at private sector facility coverage may be increased. While 4.5% students favored safe rapid transportation may enhance coverage of the HPV vaccination

Table No 4: Level of Practice for HPV vaccination.

According to you, what could be the barrier to vaccine uptake?	Lack of awareness	143 (71.5)
	Fear of the vaccine	28(14.0)
	Inadequate healthcare infrastructure	16(8.0)
	Cost of vaccine	6(3.0)
	Social and cultural stigma	3(1.5)
	Other	4(2.0)
How do you think vaccine coverage of HPV could be improved in your community?	increasing availability	98(49.0)
	reducing cost (in case of An individual can buy from a private)	68(34.0)
	improving the vaccine transportation	9(4.5)
	others	25(12.5)
Will you get the HPV vaccination if the Government of Pakistan Provides it free of cost to you?	Yes	133 (66.5)
	No	67(33.5)
Are you vaccinated against HPV?	Yes	0
	No	200 (100%)
Are willing to get vaccination if HPV vaccine provided from Govt free of Cost	Yes	66.5%
	No	33.5

Discussion:

The goal of current study was to document knowledge, attitudes, and practices of the pharmacy students at PUMHSW, Benazirabad Sindh. Pakistan's knowledge, attitudes, and practices about HPV vaccination and related hurdles. To our knowledge it is first ever study of pharmacy students at PUMHSW. 200 willing students who were present at the time of data collection participated in one-on-one interviews using printed forms. A substantial portion of participants (88%) in research done at King Saud University in

Saudi Arabia said they had never heard of the HPV vaccine.[26] However, our study found that 59.0% of students knew nothing about the HPV vaccine, indicating that students are not aware of the HPV vaccine. According to our study, 41.0% of pharmacy students knew about the HPV vaccine, and of those, 22% cited online resources as their primary source of information, while 13% learned about it from academic lectures. This suggests that raising awareness of the HPV vaccine through online platforms would be very beneficial. Only 34% of pharmacy students in our study are aware of the HPV relation to cervical cancer, demonstrating a low degree of knowledge on the virus's function in cancer, compared to 90% of MBBS students in a prior study at PUMHSW Benazirabad.[27] Our study revealed that no student is vaccinated against HPV, whereas according to a study conducted in JSMU Karachi, 9.6% MBBS students were vaccinated, which shows a major gap in practice among pharmacy students.[28] While analyzing results of our study, 31.5% participants were not aware of the target age group for HPV vaccination and 10.5% think (9-14) and 25.0% think (15-45) and 33% think (both) should get vaccinated. This shows the importance of initiating nationwide awareness programs in order to clear any sort of doubt. Studies conducted in Turkey and China highlighted the high cost of the HPV vaccine as a barrier to vaccine acceptance. [29,30] Also, in a review article published in India, high cost was found to be the major barrier.[31] However, in our study, lack of awareness (71.5%) was a major barrier to vaccine acceptance. Similar results were shown in another study conducted among women in the Arab community [32] In our study, 92% of participants had never gone to an HPV vaccine awareness event. In order to close the significant information gap regarding the HPV vaccine, it is advised that a nationwide HPV awareness campaign be launched in Pakistan. According to our survey, 26% of students were unwilling to get vaccinated, and the majority of them (10%) were worried about the adverse effects. In a similar vein, adverse effects were the most worrisome aspect of vaccine adoption in a Bahraini study.[33] According to our survey, 74.0% of students said they would be open to receiving an HPV vaccination in the future. In a similar vein, research from Finland, Malaysia, and Italy revealed that 81.7%, 86%, and 53.3% of respondents, respectively, were open to receiving an HPV vaccination in the future.[34-36] This demonstrated a favorable outlook on vaccination acceptance. Although a sizable portion of participants in our study (57.5%) were in the 21-24 age range, there was no discernible relationship between knowledge level, academic year, age group, or residency. unlike the UAE study, which found a substantial correlation between age group and knowledge level.[37] We believe the outcomes of this study will be helpful for the government to initiate their campaign for HPV vaccine, as in our study, 66.5% students were willing to get vaccinated if the government provide it free of cost. The remaining 33.5% unwilling students want to seek more information about the vaccine (11%), 8% were unsure about the vaccine 8.5% worry about side effects and vaccine safety. These doubts of students could be cleared if, along with the vaccine campaign government also conducts awareness sessions. We chose to assess knowledge, attitude, and practice among pharmacy students as they are the future clinicians who will act as key information providers to the public by enhancing vaccine availability in pharmacies, educating patients, and conducting sessions

Limitation of the study:
Participants were from a single center and sampling technique used was non-probability.

Conclusion:
The findings reveal considerable gaps in HPV vaccination awareness and practice among pharmacy students in Nawabshah. This highlights the urgent need for targeted national awareness campaigns and government-supported measures to address information gaps and concerns, as well as enhance HPV vaccine acceptance and uptake among future healthcare professionals and the general public. Such activities are critical for enhancing preventative measures and advancing the Who is aim of eradicating cervical cancer.

Financial Support and Sponsorship: None

Conflicts of Interest: Authors declare no any conflict of interest.

References:

1. Kumari K, Iari A, Shahid A, Farooqui A, Abbas K, Bashir F. Awareness of HPV Infection and its Relationship to Cervical Cancer in Medical Students of Karachi, Pakistan. Annals of Jinnah Sindh Medical University. 2023; 8(2), 74-79. doi:10.46663/ajsmu.v8i2.74-79
2. Shahnaz S, Fricovsky E, Anwar R, Arain MI. Cervical Cancer Awareness and Attitude Towards Cervical Cancer Screening and Human Papillomavirus Vaccines Among Urban Women of Karachi, Pakistan. Cureus. 2023 Aug 4;15(8):e42970. doi: 10.7759/cureus.42970. PMID: 37671214; PMCID: PMC10475580.
3. 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 Nov 12;11(11):e6134. doi: 10.7759/cureus.6134. PMID: 31886070; PMCID: PMC6903894
4. Chughtai N, Perveen K, Gillani SR, Abbas A, Chunara R, Manji AA, Karani S, Noorali AA, Zakaria M, Shamsi U, Chishti U, Khan AA, Soofi S, Pervez S, Samad Z. National cervical cancer burden estimation through systematic review and analysis of publicly available data in Pakistan. BMC Public Health. 2023 May 5;23 (1):834. doi: 10.1186/s12889-023-15531-z. PMID: 37147640; PMCID: PMC10163779.
5. Shamaun S, Jaleel R, Gull Y, Shahid A, Iqbal M, Qazi TN. Knowledge and Attitude of Cervical Cancer Screening and Vaccination in Patients Attending Gynecology Outpatient Clinic at a Tertiary Care Hospital in Pakistan. South Asian J Cancer. 2022 Aug 22;12(1):17 -22. doi: 10.1055/s-0042-1751093. PMID: 36851927; PMCID: PMC9966166.
6. Khan A, Jamil M, Naz R, Humayun A, Ullah S, Jelani G. Investigation of treatment regimen of the genital warts using various chemotherapeutic agents. Biomedical Sciences. 2020;6(1):1-4. doi: 10.11648/j.bs.20200601.11
7. Jafri AA, Shah AY, Shamim Z, Bajwa AA. Awareness and knowledge regarding cervical cancer screening and its association with demographic characteristics. Ann Pak Inst Med Sci. 2018;14(4): 285-290. doi:10.48036/apims.v14i4.138
8. Shahid M, Kazmi SU, Rehman A, Ainuddin J, Furqan S, Nazeer S. Cervical cancer screening and HPV gen-

otype distribution among asymptomatic patients of Karachi Pakistan. Pak J Med Sci. 2015;31(3):493-8. doi: 10.12669/pjms.313.8004. PMID: 26150831; PMCID: PMC4485258.
9. Azam F, Shams-ul-Islam M. Prevention of human papilloma virus infection with vaccines. J Pak Med Assoc. 2010 Aug;60(8):676-81. PMID: 20726203.
10. Palmieri B, Poddighe D, Vadalà M, Laurino C, Carnovale C, Clementi E. Severe somatoform and dysautonomic syndromes after HPV vaccination: case series and review of literature. Immunol Res. 2017 Feb;65 (1):106-116. doi: 10.1007/s12026-016-8820-z. Erratum in: Immunol Res. 2017 Feb;65(1):117-119. doi: 10.1007/s12026-016-8865-z. PMID: 27503625; PMCID: PMC5406435.
11. Joura EA, Pils S. Vaccines against human papillomavirus infections: protection against cancer, genital warts or both? Clin Microbiol Infect. 2016 Dec 1;22 Suppl 5:S125-S127. doi: 10.1016/j.cmi.2016.12.017. PMID: 28034371.
12. Topçu EG, Ubom AE, Roy P, Ruiloba F. A global study on knowledge and perception of HPV and HPV vaccination among young obstetricians and gynecologists. Turk J Obstet Gynecol. 2024 Mar 4;21(1):51-56. doi: 10.4274/tjod.galenos.2024.31369. PMID: 38440968; PMCID: PMC10920966.
13. Expanded Program on Immunization Sindh: Building Immunity, Building Futures [Internet]. Epi.gos.pk. 2025 [cited 2025 May 12]. Available from: https://epi.gos.pk/index.php.
14. Bruni L, Saura-Lázaro A, Montoliu A, Brotons M, Alemany L et al. HPV vaccination introduction worldwide and WHO and UNICEF estimates of national HPV immunization coverage 2010-2019. Prev Med. 2021 Mar;144:106399. doi: 10.1016/j.ypmed.2020.106399.PMID: 33388322.
15. Iwami M, Bouaddi O, Razai MS, Mansour R, Morais B, Ali NM, Crawshaw AF, Bojang S, Seedat F, Deal A, Webb S. Defining drivers of human papillomavirus (HPV) vaccine uptake in migrant populations globally and strategies and interventions to improve coverage: a systematic review. medRxiv. 2025:2025-01.available at https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(25)00148-3/fulltext.
16. 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 Oct;32(10):1377-1378. doi: 10.29271/jcpsp.2022.10.1377. PMID: 36205296.
17. Portnoy A, Abbas K, Sweet S, Kim JJ, Jit M. Projections of human papillomavirus (HPV) vaccination impact in Ethiopia, India, Nigeria and Pakistan: a comparative modelling study. BMJ Glob Health. 2021 Nov;6 (11):e006940. doi: 10.1136/bmjgh-2021-006940. PMID: 34725040; PMCID: PMC8562528.
18. Ghayas, S., Anjum, F., Husain, T., Bashir, L., Naz, S., & Masood, M. A. (2018). Human papillomavirus and its vaccine: awareness and attitudes of young female Pakistani students. Khyber Medical University Journal, 10 (4), 200-205. doi:10.35845/kmuj.2018.18405
19. Graham, J.E., Mishra, A. Global challenges of implementing human papillomavirus vaccines. Int J Equity Health.2011; 10, 27. doi:10.1186/1475-9276-10-27
20. Gamaoun R. Knowledge, awareness and acceptability of anti-HPV vaccine in the Arab states of the Middle East and North Africa Region: a systematic review. East Mediterr Health J. 2018 Jul 29;24(6):538-548. doi: 10.26719/2018.24.6.538. PMID: 30079949.
21. Luwen G, Hameed H, Aslam B, Liyan Z, Jabbar A, Syyam A. Understanding of cervical cancer, human papillomavirus (HPV) and HPV vaccine among women from Pakistan and Afghanistan. Ecancermedicalscience. 2025 Apr 15;19:1891. doi: 10.3332/ecancer.2025.1891. PMID: 40496309; PMCID: PMC12149242.
22. Dela Cruz MRI, Tsark JAU, Chen JJ, Albright CL, Braun KL. Human Papillomavirus (HPV) Vaccination Motivators, Barriers, and Brochure Preferences Among Parents in Multicultural Hawai'i: a Qualitative Study. J Cancer Educ. 2017 Sep;32(3):613-621. doi: 10.1007/s13187-016-1009-2. PMID: 26951482; PMCID: PMC5014724.
23. 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. Epub 2012 Jul 31. PMID: 22859950; PMCID: PMC3409219.
24. Berenson AB, Hirth JM, Chang M, Kuo YF, Richard P, Jones DL. A brief educational intervention can improve nursing students' knowledge of the human papillomavirus vaccine and readiness to counsel. Hum Vaccin Immunother. 2021 Jul 3;17(7):1952-1960. doi: 10.1080/21645515.2020.1852871. Epub 2021 Jan 30. PMID: 33517843; PMCID: PMC8189062.
25. Baloch A, Rind S, Ghumro R, Ramzan S, Lashari S, Ali K. Assessment of Knowledge Regarding HPV Vaccination among Medical Students. IJBR. 2025 3 (1):515-9. doi:10.70749/ijbr.v3i1.523
26. Sabr Y, Abdulfattah DW, Alboqami OA, Alogaily NS, Omar TA, Beyari NB, Alotaibi RS. A cognitive behavioral perspective on attitude, perception, and acceptability of vaccination against human papillomavirus. Medical Science. 2021;25(107):213-23. available at https://discoveryjournals.org/medicalscience/current_issue/v25/n107/A27.htm.
27. Korkmaz, D., Turunç, H. N., Özarslan, Y. A., Yıldırım, Ümmühan İrem et al. (2023). Assessment of HPV Vaccine Knowledge Levels Among Medical Faculty Students: A Comprehensive Examination in the Turkish Context: HPV Vaccine Knowledge among Turkish Medical Students. Medical Science and Discovery. 2023; 10(9), 655-661.doi:10.36472/msd.v10i9.1033
28. 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.
29. Kwan TT, Chan KK, Yip AM, Tam KF, Cheung AN, Young PM, Lee PW, Ngan HY. Barriers and facilitators to human papillomavirus vaccination among Chinese adolescent girls in Hong Kong: a qualitative-quantitative study. Sex Transm Infect. 2008 Jun;84 (3):227-32. doi: 10.1136/sti.2007.029363. Epub 2008 Feb 6. PMID: 18256106.
30. Bharadwaj M, Hussain S, Nasare V, Das BC. HPV & HPV vaccination: issues in developing countries. Indian J Med Res. 2009 Sep;130(3):327-33. PMID: 19901442.
31. Ali SF, Ayub S, Manzoor NF, Azim S, Afif M, Akhtar N, Jafery WA, Tahir I, Farid-Ul-Hasnian S, Uddin N. Knowledge and awareness about cervical cancer and its prevention amongst interns and nursing staff in Ter-

tiary Care Hospitals in Karachi, Pakistan. PLoS One. 2010 Jun 10;5(6):e11059. doi: 10.1371/journal.pone.0011059. PMID: 20548787; PMCID: PMC2883573.
32. Alsous MM, Ali AA, Al-Azzam SI, Abdel Jalil MH, Al-Obaidi HJ, Al-Abbadi EI, Hussain ZK, Jirjees FJ. Knowledge and awareness about human papillomavirus infection and its vaccination among women in Arab communities. Sci Rep. 2021 Jan 12;11(1):786. doi: 10.1038/s41598-020-80834-9. PMID: 33436959; PMCID: PMC7804285.
33. Husain Y, Alalwan A, Al-Musawi Z, Abdulla G, Hasan K, Jassim G. Knowledge towards human papilloma virus (HPV) infection and attitude towards its vaccine in the Kingdom of Bahrain: cross-sectional study. BMJ Open. 2019 Sep 27;9(9):e031017. doi: 10.1136/bmjopen-2019-031017. PMID: 31562156; PMCID: PMC6773289.
34. Di Giuseppe, G., Abbate, R., Liguori, G. et al. Human papillomavirus and vaccination: knowledge, attitudes, and behavioural intention in adolescents and young women in Italy. Br J Cancer. 2008; 99, 225-229. doi: 10.1038/sj.bjc.6604454
35. Woodhall SC, Lehtinen M, Verho T, Huhtala H, Hokkanen M, Kosunen E. Anticipated acceptance of HPV vaccination at the baseline of implementation: a survey of parental and adolescent knowledge and attitudes in Finland. J Adolesc Health. 2007 May;40(5):466-9. doi: 10.1016/j.jadohealth.2007.01.005. Epub 2007 Mar 26. PMID: 17448408.
36. Al-Naggar RA, Al-Jashamy K, Chen R. Perceptions and opinions regarding human papilloma virus vaccination among young women in Malaysia. Asian Pac J Cancer Prev. 2010;11(6):1515-21. PMID: 21338190. (LATEST) ///////Chew KT, Kampan N, Shafiee MNPerception and knowledge of human papillomavirus (HPV) vaccine for cervical cancer prevention among fully vaccinated female university students in the era of HPV vaccination: a cross-sectional studyBMJ Open 2021;11:e047479. doi: 10.1136/bmjopen-2020-047479
37. Grandahl M, Paek SC, Grisurapong S, Sherer P, Tydén T, Lundberg P. Parents' knowledge, beliefs, and acceptance of the HPV vaccination in relation to their socio-demographics and religious beliefs: A cross-sectional study in Thailand. PLoS One. 2018 Feb 15;13(2):e0193054. doi: 10.1371/journal.pone.0193054. Erratum in: PLoS One. 2018 Apr 19;13(4):e0196437. doi: 10.1371/journal.pone.0196437. PMID: 29447271; PMCID: PMC5814087.
38. Kurt, A., Ekrem, E. C., & Dinç, F. (2024). Knowledge, Attitudes, and Beliefs of Parents Toward the Human Papilloma Virus Vaccine. Mediterranean Nursing and Midwifery. 2024; 4(3), 151-158. doi:10.4274/MNM.2024.23200

Author's contribution	
Gotam Kumar	Conceived idea, literature Review.
Hafsa Rasheed	Developed Proforma
Fatima Awan	Write introduction
Hafsa Qazi	Data Collection
Anousha Humayoon	Manuscript draft writing