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ASSESSING THE IMPACT OF KNOWLEDGE, ATTITUDE AND RELEGIOUS CULTURE BELIEF IN HPV VACCINE HESITANCY AMONG PARENTS OF ADOLESCENT GIRLS IN LAHORE

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Abstract

Background: Human Papillomavirus (HPV) is the cause of cervical cancer and a significant health problem in the population. Although the HPV vaccine is safe and effective, low vaccination coverage is a significant barrier especially in resource poor countries such as Pakistan. In 2025, the HPV vaccine was implemented in the national immunization program of Pakistan in a young group of girls in Lahore.

Objectives: To assess the impact of parents' knowledge, attitudes, and religious-cultural beliefs on HPV vaccine hesitancy among parents of adolescent girls in Lahore

Methodology: We conducted a cross-sectional study of parents of adolescent girls (9-14 years) in Lahore. We recruited 252 parents from public and private schools and vaccination centres using a convenient sampling technique. Pre-tested questionnaire was used for collect the data which were comprise of questions related to knowledge, attitudes, religious-cultural practices and vaccine hesitancy.

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Inferential statistics were determining the relationships between independent variables and vaccine hesitancy with p-value below than 0.5 as statistically significant.
Results: Our research showed significant associations between parental knowledge, attitudes, cultural religious beliefs and HPV vaccine hesitancy. We anticipated that the more knowledgeable parents are the more favorable their attitudes towards the vaccine and the less impact of cultural-religious beliefs, the less likely they are to be hesitant. Similarly, positive attitudes and greater knowledge were predicted greater vaccine acceptance.
Conclusion: This study concluded that HPV vaccine hesitancy among parents of adolescent girls in Lahore was mainly influenced by inadequate knowledge, negative attitudes, and religious-cultural beliefs. Improving parental awareness through culturally sensitive education and strong healthcare provider recommendations can increase confidence in HPV vaccination. These strategies may enhance vaccine uptake and help reduce the burden of HPV-related diseases, including cervical cancer, in Pakistan.

INTRODUCTION

The most worldwide sexually transmitted virus is human papillomavirus (HPV), which is genetically and clinically classified into genital, non- genital and epidermodysplasia verruciform is types, and causes almost all the global cancers and almost all cervical cancers (the fourth most common cancer in women) (WHO\UNICEF, 2023). Human Papillomavirus Infection (HPV) is a nonenveloped, double stranded and circular DNA virus that mostly infects the skin and mucosal epithelium. It has a broad spectrum of clinical features such as benign tumors to cancer. In particular, most cervical cancers are caused by high risk types of HPV including HPV-16 and HPV-18 (1).

As the second-largest city, Lahore has a diversity of socioeconomic classes, a dual system of public and private health care; and a mix of religious cultural beliefs and modernization. Together with the previous distrust in the vaccination program, urbanization and education levels, influence the parental attitude and behavior (Public Health Implications Study Pakistan 2024). This is where knowledge, attitudes and cultural religious beliefs interplay is important in designing a communication and delivery plan for HPV vaccination (2).

Human papillomavirus (HPV)-caused cancer is one of the most significant problems in the global population health, as it is the cause of the fourth most prevalent cancer in women cervical cancer. The consequence of persistent HPV infection is cervical cancer and it causes vulvar, vaginal, anal, penile and oropharyngeal cancer. Cervical cancer can be prevented by HPV vaccination, screening and early detection but the vaccine is not common in most countries including Brazil. Low and falling coverage rates are worrying, even with safe and effective vaccines and recent changes to policy to supply a single dose. This is partly due to vaccine hesitancy, which is the refusal or delay in accepting a vaccine when it's available. Understanding the factors of hesitancy is important to increase vaccine coverage and prevent future human papillomavirus (HPV) cancers (3).

Despite the proven safety and effectiveness of the HPV vaccine, vaccination coverage among adolescent girls in Pakistan remains low. This study aims to assess how parents' knowledge, attitudes, and religious-cultural beliefs influence HPV vaccine hesitancy in Lahore. Understanding these factors will help identify barriers to vaccine acceptance

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and support the development of culturally appropriate educational interventions and public health policies. Ultimately, the findings will contribute to improving HPV vaccination uptake and reducing the burden of HPV-related diseases in Pakistan.

LITERATURE REVIEW

Aldawood et al. (2023) performed a cross-sectional research on Saudi Arabian health college students to establish their knowledge and vaccine hesitancy regarding HPV vaccine. The authors have indicated low level of vaccination (5.2) and high level of overall reluctance (59.1%). In particular, men are more reluctant (75.9) than women because they believe that they do not need to be vaccinated. This paper finds that the knowledge gap can be addressed through teaching the specifics of the HPV vaccine in the universities and training future health care professionals who was become the agents of community vaccinations (31).

Zakhour et al. (2023) find out the factors that contribute to the unwillingness of parents to have their children vaccinated against HPV in Lebanon, Zakhour conducted a cross-sectional study in the Middle East. It was discovered that the majority of the parents (60%), who knew about the vaccine were not or would not have their children vaccinated, although they had positive attitudes towards vaccines. The chief causes of reluctance were that the pediatrician did not recommend the vaccine and the parent felt that there was inadequate information about the vaccine. To my surprise, the influence of culture/religion and cost were not regarded as significant. The authors suggest the primary intervention activities to be the process of informing parents of the advantages and dangers of the vaccine, and the process of making sure that Lebanese doctors can deliver the parents with the information that is both reliable and free of gender and bias (32).

Ou et al. (2023) studied the effectiveness of the mobile health (mHealth) interventions in adolescent and parental promotion of HPV vaccination was also explored. They examined 17 studies and discovered that among all the mHealth interventions, involving text messaging, mobile phone applications and video, 88% of the interventions positively influenced knowledge of HPV, intention to vaccinate or vaccine initiation. The most effective were interventions that actively employed the behavioral change theories to the interventions and had a culture-based approach that allowed the personalization of the information. The authors state that mHealth has proven to be a practical approach that can be utilized in order to close the gap in the HPV vaccination but further studies are required to implement theories and overcome the issue of cultural irrelevance among the various communities (33).

Hittson et al. (2023) conducted a study on how college students perceive the Human Papillomavirus (HPV) vaccine and religion. It is both a complicated problem and a question of morality, religion and health. Apparently, highly religious college students are more apt to be vaccine-resistant primarily due to the assumptions about the connection between HPV vaccination and sex (as well as the moral meaning of sex). The absence of information and reasons based on faith also contributed to the lack of information about vaccination. On the other hand, the students who indicated that they believed vaccination is a preventive measure of health despite sexual contact were more accepted. The authors infer that culturally and faithbased amicable health communication is necessary to avert the misconception and encourage human papillomavirus [HPV] vaccination among faith-based students (34).

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Winarto et al. (2022) investigated the human papillomavirus (HPV) vaccination, cervical cancer (CC) and its knowledge, attitudes and practices (KAP) of human papillomavirus infection among urban residents in Jakarta, Indonesia. The findings were that the knowledge and positive attitude of the respondents were good, but their preventive practices were poor. The key determinants of the higher knowledge and the positive attitudes of the respondents were the female sex, education and mother education. Moreover, the enhanced knowledge and attitudes were also strongly associated with the enhanced prevention practices and immunizations. The paper has addressed the role of education and socio-demographic attributes in enhancing knowledge and practice as far as HPV and the necessity of incorporating some of the public health strategies in order to maximize the rate of vaccination and cervical cancer prevention (35).

Btoush et al. (2022) studied in the state of New Jersey was a cross-sectional study in order to identify the factors that might have contributed to the decision to recommend HPV vaccination of adolescents by health-care providers (HCPs). The sample size of 390 HCP (health care providers) included doctors and nurse practitioners in the field of pediatrics, family medicine and women health. The researchers discovered that the older adolescents (73 per cent) were rated higher than younger adolescents (56 per cent). The variables that were linked with a higher recommendation were that the pediatrician was more knowledgeable about the provider, had less concerns regarding the safety of the vaccine and a larger proportion of minority patients and patients with private health insurance were represented in their practice. The findings of the study show that provider education, myths surrounding the vaccine and provider environment that favor beneficial practice are all issues that should be dealt with to improve the rate of HPV vaccine (36).

Smolarczyk et al. (2022) researched in Poland to learn more about parental knowledge and attitude towards HPV infection and vaccination. Knowledge of HPV and general was very low with 62.5% of 288 parents aware of HPV and an average of 49.4 percent of parents answering the questions correctly. Increased education and knowledge levels but not age, sex and location were important correlates of positive attitude towards vaccination. The paper has shown that there are numerous misconceptions about HPV transmission and prevention and no money and information resources support vaccination. It should be mentioned that 55% of parents would vaccinate their children in case it was free. The research indicates that there is a necessity to implement educational initiatives that were facilitate the acceptance and awareness of Polish parents about the importance of the HPV vaccination (37).

MATERIAL AND METHODS

This study employed a cross-sectional analytical study design to assess HPV vaccine hesitancy among parents of adolescent girls. A cross-sectional design was considered appropriate because it enabled the collection of data from a large population within a relatively short period, making it both time-efficient and cost-effective. The study included 252 participants. It also facilitated the examination of the relationship between the independent variables parents' knowledge, attitudes, and religious-cultural beliefs and the dependent variable, HPV vaccine hesitancy.

The study was conducted in Lahore, Punjab, Pakistan, at selected public and private secondary schools and community immunization centers participating in the national

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HPV vaccination program. Recruiting participants from multiple settings ensured representation of parents from diverse socioeconomic and cultural backgrounds, providing a comprehensive understanding of the factors influencing HPV vaccine hesitancy. The study was completed within 4 months following approval from the Institutional Review Board (IRB).

The study population consisted of parents of adolescent girls aged 9–14 years who were residents of Lahore. Parents of girls younger than 9 years or older than 14 years were excluded, as these age groups fell outside the recommended target population for HPV vaccination. Participants were selected using a convenience sampling technique, a non-probability sampling method in which eligible participants were recruited based on their accessibility and willingness to participate. This approach was considered practical and feasible within the available time and resources for the study.

RESULTS

Age, gender, marriage status, education and occupation of the respondents (n=252) were explored using descriptive statistics. While data for the age and gender variables was obtained for all 252 respondents, the data for the marital status and occupation variables was obtained for 252 and 252 respondents respectively. The respondents' mean and median age were 1.69 and 2.00 respectively while the mean and mode for gender were 1.68 and 2 respectively, showing the gender that was most common. Marital status was slightly biased towards a certain group, with a mean of 1.06 and a mode of 1. The socioeconomic characteristics of the respondents show that they were quite educated (Mean=4.68, Median=5.00). The variable of occupation was more evenly distributed with a mean of 2.85 and mode of 3.

Statistics for the variables Age of Respondent, Gender of Respondent, Marital Status of Respondent, Education Level of Respondent, Occupation of Respondent

		Age of Respondent	Gender of Respondent	Marital Status of Respondent	Education Level of Respondent	Occupation of Respondent
N	Valid	252	252	252	252	252
	Missing	0	0	0	0	0
Mean		1.69	1.68	1.06	4.68	2.85
Median		2.00	2.00	1.00	5.00	3.00
Mode		2	2	1	5	3
Std. Deviation		.657	.468	.328	1.134	.981
Variance		.431	.219	.108	1.285	.962
Sum		425	423	268	1180	719

A range of descriptive statistics were used to assess the socioeconomic background and level of knowledge of the respondents, revealing a strong level of basic awareness of HPV. A total of 252 respondents reported their monthly household income with a mean of 2.71 and a median of 3.00, implying a middle-income earned by the sample.

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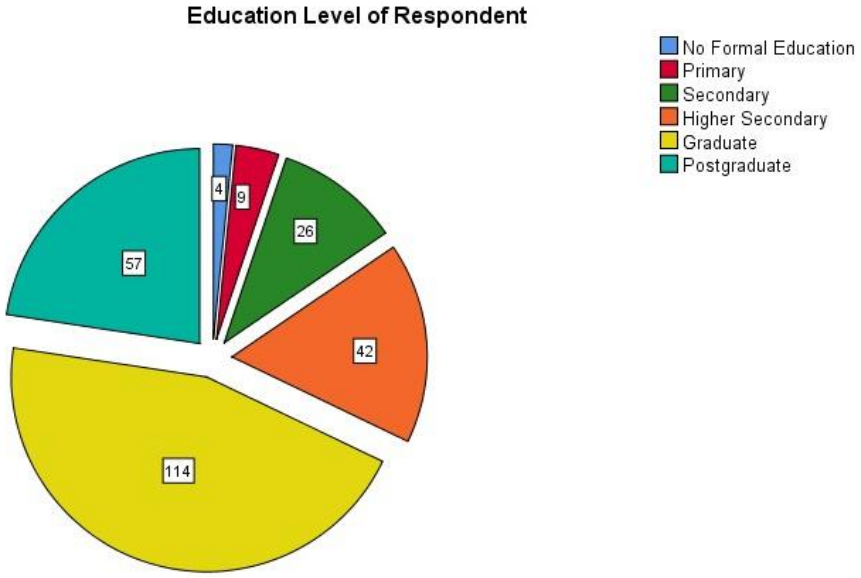
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Knowledge of the HPV vaccine was almost universal with a mode of 1 and a low standard deviation of .451, suggesting a high degree of agreement. And the respondents were well-informed about the relation between the virus and health effects, as both the awareness that HPV causes cervical cancer and belief in the vaccine's efficacy as a preventative measure yielded the same mean of 1.40 and median of 1.00. Although awareness about the vaccine's inclusion in the national immunization program in Pakistan was less unanimous (as shown by the higher mean of 1.60 and standard deviation of .830), a majority of respondents were still positive with a mode of 1.

Education Level of Respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Formal Education	4	1.6	1.6	1.6
	Primary	9	3.6	3.6	5.2
	Secondary	26	10.3	10.3	15.5
	Higher Secondary	42	16.7	16.7	32.1
	Graduate	114	45.2	45.2	77.4
	Postgraduate	57	22.6	22.6	100.0
	Total	252	100.0	100.0	



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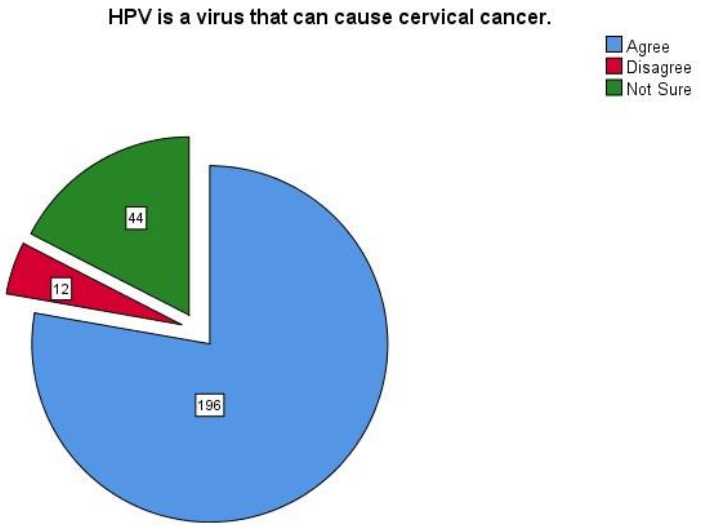
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Pie Chart for the variable Education level of respondent

The pie chart displays the distribution of participants' of Education Status of the respondents with the largest part of the chart is taken up by Graduates (yellow) with a number of 114, Postgraduates (zinc) with 57 participants, Higher secondary (orange) with 42 participants, Secondary (green) with 26 participants, Primary (red) with 9 participants and No formal education (blue) with 4 participants.

HPV is a virus that can cause cervical cancer

	Frequency		Percent	Valid Percent	Cumulative Percent
Valid	Agree	196	77.8	77.8	77.8
	Disagree	12	4.8	4.8	82.5
	Not Sure	44	17.5	17.5	100.0
	Total	252	100.0	100.0	



Frequency Analysis for the variable HPV is a virus that can cause cervical cancer.

The pie chart below shows the distribution of the three categories of respondent with Agree (blue) as the highest with 196 respondents, Not sure (green) of 44 respondents and disagree (red) of 12 respondents.

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The analysis assesses the link between public awareness of the HPV vaccine's inclusion in Pakistan's national vaccination program and opinions about its safety and effectiveness. 134 out of 158 people who were aware of the national program also agreed that the vaccine is safe and effective, according to the contingency cross-tabulation, which shows a substantial alignment in responses. Perceptions of the vaccine's safety and efficacy and knowledge of its national program status are statistically significantly correlated ($x^2(4) = 68.433$, $p < .001$), according to a Pearson Chi-Square test. This suggests that positive safety perceptions are closely associated with knowledge of official program integration.

DISCUSSION

Our study found that parental knowledge and attitudes were significantly associated with HPV vaccine hesitancy among parents of adolescent girls in Lahore. Parents with inadequate knowledge and negative attitudes were more likely to hesitate or refuse HPV vaccination. These findings are consistent with previous research, which reported that concerns regarding vaccine safety, effectiveness, and necessity strongly influence parental vaccination decisions and reduce vaccine uptake (62).

Our findings also demonstrated that parents' religious and cultural beliefs contributed to HPV vaccine hesitancy. Similar findings were reported by previous studies, which showed that misconceptions, cultural norms, and lack of trust in vaccination programs negatively affect HPV vaccine acceptance. These studies emphasized that culturally appropriate education and effective communication can improve parental confidence and vaccination rates (64).

The present study supports earlier evidence that healthcare providers have an important role in reducing HPV vaccine hesitancy. Previous research found that providers with greater confidence and better communication skills were more likely to recommend HPV vaccination successfully, whereas limited communication and perceived parental resistance reduced vaccine recommendations. These findings highlight the need for healthcare provider training to improve vaccine acceptance (66).

Our study further highlights the public health importance of addressing HPV vaccine hesitancy to improve vaccination coverage. This finding agrees with previous evidence showing that low HPV vaccine uptake increases the future burden of cervical cancer and other HPV-related diseases. Earlier studies concluded that strengthening public awareness, healthcare provider recommendations, and evidence-based vaccination policies is essential for improving HPV vaccine coverage and reducing HPV-related morbidity and mortality (67).

Our study found that inadequate knowledge and negative perceptions were important contributors to HPV vaccine hesitancy among parents. Similar findings were reported in a 2023 survey conducted in France, which showed that fear of side effects, limited knowledge about HPV, and low perceived risk reduced vaccine acceptance. The study also emphasized that parental attitudes and trust in healthcare providers significantly influenced vaccination decisions, highlighting the need for targeted educational interventions and effective communication to improve HPV vaccine uptake (68).

Our findings also support previous evidence that HPV vaccine hesitancy is often driven by uncertainty rather than complete refusal. Beavis et al. reported that parents commonly delayed vaccination because of concerns about vaccine safety, insufficient information, and the belief that their children were not at immediate risk of HPV infection. The authors concluded that strong healthcare provider recommendations,

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respectful communication, and evidence-based counseling were effective in improving parental confidence and increasing HPV vaccination acceptance among adolescents (69).

CONCLUSION

This study concluded that HPV vaccine hesitancy among parents of adolescent girls in Lahore is influenced by multiple factors, including inadequate knowledge, negative attitudes, and religious-cultural beliefs. Limited awareness, misconceptions, and concerns about vaccine safety and effectiveness were major barriers to vaccine acceptance. Cultural norms, religious perceptions, and trust in healthcare providers also played a significant role in parental decision-making. The findings emphasize the need for culturally sensitive health education, evidence-based communication, and stronger healthcare provider recommendations to improve vaccine confidence. Strengthening public awareness and addressing misinformation can enhance parental acceptance of HPV vaccination. These interventions may increase HPV vaccine coverage and contribute to reducing the burden of HPV-related diseases, including cervical cancer, in Pakistan.

RECOMMENDATIONS

Based on the study findings, it is recommended that culturally sensitive educational programs and community awareness campaigns be implemented to improve parental knowledge and address misconceptions regarding HPV vaccination. Healthcare professionals should be trained to provide clear, evidence-based vaccine recommendations and counseling to parents. The government should strengthen HPV vaccination policies by integrating the vaccine into routine immunization programs and ensuring affordable or free access. Future studies should employ probability sampling techniques, include rural populations, and incorporate qualitative methods to gain a more comprehensive understanding of the factors influencing HPV vaccine hesitancy.

LIMITATIONS OF THE STUDY

This study had several limitations. The use of convenience sampling and recruitment from urban Lahore may have limited the generalizability of the findings to the wider Pakistani population. Data were collected through self-administered questionnaires, which are subject to recall and social desirability bias, and incomplete responses reduced the final sample size. In addition, the cross-sectional design and relatively short study duration did not allow assessment of changes in parental attitudes over time. Finally, the absence of qualitative interviews limited an in-depth exploration of cultural and religious beliefs influencing HPV vaccine hesitancy.

REFERENCES

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;19:1891.

Soares LMC, de Medonca AEO, de Souza DLB, Carvalho AV, Flores MG, Neto AM, et al. Factors associated with HPV vaccine hesitancy: A nationally representative crosssectional study. Vaccine. 2025;59:127278.

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about
Baig et al, 2026
DOI: https://doi.org/10.5281/zenodo.21257555

Online ISSN	Print ISSN
3007-2387	3007-2379

Ji M, Huang Z, Yan H, Ren J, Wagner AL, Sun X, et al. HPV vaccination coverage, hesitancy, and barriers: Insights from a serial cross-sectional study in Shanghai, China (2019– 2024). Human Vaccines & Immunotherapeutics. 2025;21(1):2513707.

Kyei GK, Kyei EF, Ansong R. HPV vaccine hesitancy and uptake: a conceptual analysis using Rodgers' evolutionary approach. Journal of Advanced Nursing. 2025;81(5):2368-81.

Takahashi T, Ichimiya M, Tomono M, Minoura R, Kinoshita T, Imanishi Y, et al. Overcoming HPV vaccine hesitancy in Japan: a narrative review of safety evidence, risk communication, and policy approaches. Vaccines. 2025;13(6):590.

Brewer SK, Stefanos R, Murthy NC, Asif AF, Stokley S, Markowitz LE. Human papillomavirus vaccination at age 9 or 10 years to increase coverage–a narrative review of the literature, United States 2014–2024. Human Vaccines & Immunotherapeutics. 2025;21(1):2480870.

Sabeena S, Beynon C. The Impact of the COVID-19 Pandemic on HPV Vaccination Coverage Among Adolescents From High-Income Countries and Challenges: A Scoping Review. Reviews in Medical Virology. 2026;36(1):e70102.

Ntonifor MM-N, Tazinkeng NN, Kemah B-L, Claudia NE, Sonia YK, Nchinjoh SC, et al. Factors associated with parental hesitancy towards the human papillomavirus vaccine: a cross-sectional study. Scientific Reports. 2025;15(1):18284.

Fu Y, He Y, Wang Z, Sun J. Strategies, barriers, and facilitators for healthcare professionals to recommend HPV vaccination: a systematic review. Vaccines. 2025;13(4):402.

Ma J, Lu W, Sun S, Zhan Y, Zhang J, Zhang H. The influencing factors in intention making-decision of Human papillomavirus vaccine in Chinese college students: A qualitative study. Patient Education and Counseling. 2025;131:108594.

Tobaiqy M, MacLure K. A systematic review of human papillomavirus vaccination challenges and strategies to enhance uptake. Vaccines. 2024;12(7):746.

Lu Y, Zhao W, Xu S, Tang C, Hussain I, Kadirhaz M, et al. Effectiveness of information interventions in reducing HPV vaccine hesitancy: a randomized survey experiment in China. Vaccine. 2026;74:128205.

Iwami M, Bouaddi O, Razai MS, Mansour R, Morais B, Ali NM, et al. 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.

Kujawa A, Krzeszowska P, Zajączkowska A, Zajączkowski J, Stępniak K, Krochmal K, et al. The impact of government policy on female HPV vaccination rates: A global perspective. Quality in Sport. 2025;42:61037-.

Hohman ME. Improving HPV Vaccination Decision-Making for Adolescents and Their Caregiver: University of Missouri-Saint Louis; 2025.

Aydın ES, Coskun BN. What Do Medical Faculty Students Think About HPV Vaccination? Journal of Uludağ University Medical Faculty. 2026;52:1774871.

Shi B, Chen R, Yuan X, Wu J. Evolving Public Attitudes Towards the HPV Vaccine in China: A Fine-Grained Emotion Analysis of Sina Weibo (2016 vs. 2024). Entropy.2025;27(9):887.

DOI: https://doi.org/10.5281/zenodo.21257555

Online ISSN 3007-2387

Print ISSN 3007-2379

Cherif A, Palmer C, Senese F, Bechini A, Salvati C, Bonanni P, et al. A costeffectiveness analysis of adult human papillomavirus vaccination strategies in Italy. Human Vaccines & Immunotherapeutics. 2025;21(1):2474891.

Bourissi H, Zinab A. HPV Vaccination in Morocco: Quiet Progress or Public Health Failure? Journal of Cancer Education. 2025:1-3.

Cooper SC, Williams IV, Porter A, Presti C, Mikhaylov A, King A, et al. 'They're not going to tell you everything': A qualitative study with HPV vaccine hesitant parents and caregivers in the northeast and southeast US. Vaccine. 2025;68:127948.

Hieu LTH, Giang NLH, Trinh TL. CURRENT SITUATION AND BARRIERS TO HPV VACCINATION AMONG FEMALE NURSING STUDENTS AT TRA VINH UNIVERSITY, VIETNAM, 2024. Tạp chí Sức khỏe và Lão hóa. 2025;1(5):112-6.

Zhao Y, Sun Y, Li Z, Ma J, Wang F, Jia B. HPV vaccination willingness among 3,081 secondary school parents in China's capital. Human Vaccines & Immunotherapeutics. 2025;21(1):2477383.

Dang JH, Gori A, Rios L, Rolon AM, Zhang J, Chen Jr MS. "You Don't Know If It's the Truth or a Lie": Exploring human papillomavirus (HPV) vaccine hesitancy among communities with low HPV vaccine uptake in Northern California. Vaccines. 2024;12(4):372.

Liu J, Niu Q, Nagai-Tanima M, Aoyama T. Understanding human papillomavirus vaccination hesitancy in Japan using social media: content analysis. Journal of Medical Internet Research. 2025;27:e68881.

Gańczak M, Król M, Lulkiewicz M, Pęgowska Z, Wowk A, Żuchowska M. Factors influencing an intent to vaccinate a child for HPV among parents of primary school students. European Journal of Public Health. 2025;35(Supplement_4):ckaf161. 922.

Atif N, Hashmi FK, Malik UR, Ghauri MA, Gillani AH, Kadirhaz M, et al. From awareness to acceptance: understanding HPV and vaccine knowledge, attitudes and beliefs among university students in Punjab, Pakistan. Journal of Pharmaceutical Policy and Practice. 2025;18(1):2473023.

Lurgain JG. An ecological exploration of the barriers and facilitators to cervical cancer screening and HPV self-sampling acceptability amongst Moroccan and Pakistani women in Spain: London School of Hygiene & Tropical Medicine; 2025.

Ayo-Farai O, Adaramola B, Ernest-Okonofua EO, Alfakeer H, Alnemr L, Ali A, et al. Assessing the role of parental knowledge, attitudes, and practices in childhood immunization: a global review of determinants and health outcomes. Discover Public Health. 2025;22(1):533.

Yagi A, Ueda Y, Kimura T. HPV Vaccine Issues in Japan: A review of our attempts to promote the HPV vaccine and to provide effective evaluation of the problem through socialmedical and behavioral-economic perspectives. Vaccine. 2024;42(22):125859.

Branda F, Pavia G, Ciccozzi A, Quirino A, Marascio N, Gigliotti S, et al. Human papillomavirus (HPV) vaccination: progress, challenges, and future directions in global immunization strategies. Vaccines. 2024;12(11):1293.

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about
Baig et al, 2026
DOI: https://doi.org/10.5281/zenodo.21257555

Online ISSN	Print ISSN
3007-2387	3007-2379

Aldawood E, Alzamil L, Faqih L, Dabbagh D, Alharbi S, Hafiz TA, et al., editors. Awareness of human papillomavirus among male and female university students in Saudi Arabia. Healthcare; 2023: MDPI.

Zakhour R, Tamim H, Faytrouni F, Makki M, Hojeij R, Charafeddine L. Determinants of human papillomavirus vaccine hesitancy among Lebanese parents. PLoS One. 2023;18(12):e0295644.

Ou L, Chen AC-C, Amresh A. The effectiveness of mHealth interventions targeting parents and youth in human papillomavirus vaccination: systematic review. JMIR Pediatrics and Parenting. 2023;6(1):e47334.

Hittson H, McAleer L, Saucedo L, Mahler L, Andino G, Zorba A, et al. Association between religious beliefs and HPV vaccination attitudes among college students. Vaccines. 2023;11(10):1623.

Winarto H, Habiburrahman M, Dorothea M, Wijaya A, Nuryanto KH, Kusuma F, et al. Knowledge, attitudes, and practices among Indonesian urban communities regarding HPV infection, cervical cancer, and HPV vaccination. PloS one. 2022;17(5):e0266139.

Btoush R, Kohler RK, Carmody DP, Hudson SV, Tsui J. Factors that influence healthcare provider recommendation of HPV vaccination. American Journal of Health Promotion. 2022;36(7):1152-61.

Smolarczyk K, Duszewska A, Drozd S, Majewski S. Parents' Knowledge and Attitude towards HPV and HPV Vaccination in Poland. Vaccines. 2022. 10 (228). s Note: MDPI stays neutral with regard to jurisdictional claims in published …; 2022.

Fallucca A, Immordino P, Riggio L, Casuccio A, Vitale F, Restivo V. Acceptability of HPV vaccination in young students by exploring health belief model and health literacy. Vaccines. 2022;10(7):998.

Cordoba-Sanchez V, Lemos M, Tamayo-Lopera DA, Sheinfeld Gorin S. HPV-vaccine hesitancy in Colombia: a mixed-methods study. Vaccines. 2022;10(8):1187.

Tung W-C, Jones D, Lu M. Sources of information and communication about HPV among Chinese students attending US colleges: implications for culturally appropriate strategies. Journal of Transcultural Nursing. 2022;33(3):437-45.

Saran AB, Gada MB. Barriers and facilitators of human papillomavirus vaccination uptake in India: A systematic review. Indian Journal of Medical Sciences. 2025;77(1):34-9.

Berza N, Stars I, Zodzika J, Kivite-Urtane A, Pärna K, Uuskula A, et al. Understanding hesitancy: barriers to HR-HPV self-sampling among women at high risk for cervical cancer in Latvia. BMC Women's Health. 2025.

Takahashi T, Kinoshita T, Shigemi D, Imanishi Y, Sakamoto M, Ichimiya M, et al. Effect of information awareness on attitudes toward human papillomavirus vaccination intentions in Japan. Vaccine: X. 2025;22:100599.

Mantina NM, Smith J, Miiro FN, Magrath PA, McClelland DJ, Barraza L, et al. Perspectives of HPV vaccine decision-making among young adults: A qualitative systematic review and evidence synthesis. PLoS One. 2025;20(5):e0321448.

He J, Tian T, Tuo X, Yu W, Asilibieke S, Zhang Z, et al. Determinants of Changes in HPV Vaccination Willingness Among Men Who Have Sex With Men: An Observational Cohort Study. Journal of Medical Virology. 2025;97(10):e70611.

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about
Baig et al, 2026
DOI: https://doi.org/10.5281/zenodo.21257555

Online ISSN	Print ISSN
3007-2387	3007-2379

Singh S, Singh SR, Pathak R, Patil AD. Exploring the Scope of Homeopathy in Addressing Vaccine Hesitancy in HPV and Cervical Cancer Prevention. 2025.

Garcia VG, Mpanumpanu R, Sneed AC, Romero N, Duthely LM. Adolescent HPV Vaccination: A US and Global Perspective on Overcoming Barriers. Wellbeing Futures: Innovation, Policy and Research. 2025;1:125-9.

Liang J, Yang Y, Li X. Awareness and determinants of HPV vaccination intentions among female university students in Guangzhou, China: a cross-sectional study. Journal of Global Health Economics and Policy. 2025;5:e2025018.

Zhu Y, Wang H, Zhang B, Ding H, Qiao Y. Promoting HPV vaccination among adolescent girls in low-resource areas of China: A multi-centered qualitative study. Human vaccines & immunotherapeutics. 2025;21(1):2521940.

Li Y, Kawasaki H, Cui Z, Nakaoka S, Cui Y, Rahman MM. Exploring the willingness to pay for HPV vaccines and price sensitivity among Chinese college students: the impact of health literacy and vaccine hesitancy. Frontiers in Public Health. 2025;13:1621416.

Zhu J, Gao J, Lu R, Yang R, Ma X, Yang Y. The Impact of HR-HPV Infection on Women's Cognition, Psychology, and Behavior: A Qualitative Study. 2025.

Li W, Jin Y, Li X, Jin M. Human papillomavirus and vaccine knowledge, willingness, and uptake among university students: a systematic review and meta-analysis. BMC Public Health. 2025;25(1):4268.

Patel Y, Spees L, Wheeler S, Ozawa S. HSD47 Increase in Healthcare Professionals' Willingness to Counsel HPV Vaccine Hesitant Parents Post-Pandemic: Results from a National Survey. Value in Health. 2025;28(6):S233.

Ishtiaq A, Saleem S. Between Hype and Health: Ethical Reflection on the HPV Campaign in Pakistan. Annals of King Edward Medical University. 2025;31(3):249-52.

Díaz-Cortés H, Hedges MS, Pacheco-Spann LM, Findley V, Leyva SC, Moran KM, et al. A feasibility study assessing knowledge, vaccine hesitancy, and completion rates of free HPV vaccination in low-income uninsured adults. Preventive oncology & epidemiology. 2024;2(1):2332260.

Huang Y, Chen C, Wang L, Wu H, Chen T, Zhang L. HPV vaccine hesitancy and influencing factors among university students in China: a cross-sectional survey based on the 3Cs model. International Journal of Environmental Research and Public Health. 2022;19(21):14025.

Di Lorenzo A, Berardi P, Martinelli A, Bianchi FP, Migliore G, Tafuri S, et al. Knowledge, Awareness and Vaccination Attitude Towards HPV in Sex and Gender Minorities: A Cross-Sectional Study. Vaccines. 2025;13(5):508.

Amer A, Altabbaa H, Sh. Ramadan M, Abdul-Hafez HA, Said HS, Khan M, et al. A multinational cross-sectional study on human papillomavirus and cervical cancer knowledge, vaccination attitudes, and risk factors in the Middle East. Scientific Reports. 2025.

Hawlader MDH, Eva FN, Khan MAS, Islam T, Monisha UK, Chowdhury I, et al. Acceptance of human papillomavirus (HPV) vaccine among the parents of eligible daughters (9–15 years) in Bangladesh: a nationwide study using health belief model. Plos one. 2024;19(11):e0310779.

Noreen K, Khalid SN, Javaid M, Khan SA. Public Health Implications of Introducing Human Papillomavirus (HPV) Vaccination in Pakistan: A protocol for a mixed-

DOI: https://doi.org/10.5281/zenodo.21257555

Online ISSN 3007-2387

Print ISSN 3007-2379

method study to explore community perceptions and health system preparedness. Plos One. 2025;20(5):e0323826.

Riaz L, Manazir S, Jawed F, Ali SA, Riaz R. Knowledge, perception, and prevention practices related to human papillomavirus-based cervical cancer and its socioeconomic correlates among women in Karachi, Pakistan. Cureus. 2020;12(3).

Szilagyi PG, Albertin CS, Gurfinkel D, Saville AW, Vangala S, Rice JD, et al. Prevalence and characteristics of HPV vaccine hesitancy among parents of adolescents across the US. Vaccine. 2020;38(38):6027-37.

Della Polla G, Pelullo CP, Napolitano F, Angelillo IF. HPV vaccine hesitancy among parents in Italy: a cross-sectional study. Human vaccines & immunotherapeutics. 2020;16(11):2744-51.

Nguyen KH, Santibanez TA, Stokley S, Lindley MC, Fisher A, Kim D, et al. Parental vaccine hesitancy and its association with adolescent HPV vaccination. Vaccine. 2021;39(17):2416-23.

Cunningham-Erves J, Koyama T, Huang Y, Jones J, Wilkins CH, Harnack L, et al. Providers' perceptions of parental human papillomavirus vaccine hesitancy: cross-sectional study. JMIR cancer. 2019;5(2):e13832.

McRee A-L, Gilkey MB, Dempsey AF. HPV vaccine hesitancy: findings from a statewide survey of health care providers. Journal of Pediatric Health Care. 2014;28(6):541-9.

Simms KT, Hanley SJ, Smith MA, Keane A, Canfell K. Impact of HPV vaccine hesitancy on cervical cancer in Japan: a modelling study. The Lancet Public Health. 2020;5(4):e223-e34.

Gauna F, Verger P, Fressard L, Jardin M, Ward JK, Peretti-Watel P. Vaccine hesitancy about the HPV vaccine among French young women and their parents: a telephone survey. BMC Public Health. 2023;23(1):628.

Beavis AL, Meek K, Moran MB, Fleszar L, Adler S, Rositch AF. Exploring HPV vaccine hesitant parents' perspectives on decision-making and motivators for vaccination. Vaccine: X. 2022;12:100231.