Physical Education, Health and Social Sciences
https://journal-of-social-education.org E-ISSN: 2958-5996
P-ISSN: 2958-5988

Knowledge and Attitudes and Practice Regarding the Human Papillomavirus (HPV) Vaccine Among Healthcare Setting Tertiary Hospital Punjab Pakistan

Munazza Rani[1], Shakeela Bibi[2], Rabia Maryam[3], Sobia Anwar[4], Hafiz Ab Wajid[5]

[1] Nursing Officer, Tehsil Head Quatr Hospital, Khairpur Tamewale, Bahawalpur, Punjab, Pakistan, Email: munazzarani02@gmail.com
[2] MSN Scholar, College Of Nursing, University of Child Health Science, Lahore, Pakistan, Email: km4850785@gmail.com
[3] Nursing Manager, BVH Hospital, Bahawalpur, Pakistan, Email: rabia03076805664@gmail.com
[4] Nursing Manager BVH Hospital, Bahawalpur, Pakistan, Email: sobiaanwar62@gmail.com
[5] Faculty of Nursing, University of Health Science, Lahore, Pakistan, Email: hafiz2k12@gmail.com

DOI: https://doi.org/10.63163/jpehss.v4i1.1100

Abstract

Human papillomavirus (HPV) infection is a major cause of cervical and other anogenital cancers. Despite the effectiveness and safety of HPV vaccination, its uptake remains suboptimal in several regions. Healthcare professionals (HCPs), particularly doctors and nurses, are key influencers of vaccine acceptance. This study assessed doctors' and nurses' knowledge and attitudes toward the HPV vaccine and identified barriers influencing their recommendation behaviors. A cross-sectional descriptive study was conducted among 200 healthcare professionals (100 doctors and 100 nurses) from a tertiary hospital. Data were collected using a validated, self-administered questionnaire covering demographics, knowledge, attitudes, and barriers to vaccine advocacy. Descriptive and inferential statistics, including *t*-tests, chi-square tests, and Pearson's correlation, were performed at a significance level of $p \leq 0.05$. Doctors demonstrated significantly higher mean knowledge scores (15.2 ± 3.8) than nurses (12.5 ± 4.2; $p = 0.03$). Most respondents expressed positive attitudes toward HPV vaccination, with 82.5% agreeing or strongly agreeing to recommend it to their patients. Common barriers included a lack of patient demand (47.5%), limited consultation time (37.5%), and cultural or religious concerns (27.5%). A significant positive correlation was found between knowledge and attitude toward recommending the vaccine ($r = 0.42$, $p < 0.01$). Conclusion: Knowledge positively influenced healthcare professionals' attitudes toward HPV vaccination. Addressing knowledge gaps through targeted education and institutional support can enhance healthcare providers' advocacy and potentially improve HPV vaccine uptake in clinical practices.

Keywords: Human Papillomavirus (HPV), HPV Vaccine, Healthcare Professionals, Doctors, Nurses, Knowledge, Attitudes, Vaccine Recommendation, Vaccine Hesitancy, Cross-sectional

Introduction

Healthcare professionals (HCPs), especially doctors and nurses, play a central role in recommending HPV vaccination and addressing patient/caregiver concerns. This cross-sectional study will assess the knowledge, attitudes, and practices (KAP) related to HPV infection and vaccination among doctors and nurses in [insert region/hospital network]. Using a validated questionnaire adapted from prior provider studies, we will recruit a representative sample of

doctors and nurses (target n ≈ 384; see the sample size section) and measure their knowledge scores, attitude scales, and reported recommendation behavior. We will evaluate the associations between demographic/professional factors and knowledge/attitude outcomes using chi-square tests and multivariable logistic regression analyses. The findings will identify knowledge gaps and attitudinal barriers amenable to targeted education and system interventions to improve future HPV vaccine uptake. The results will inform local continuing education programs and policy recommendations to strengthen provider-led vaccination efforts. (Smith, 2023). Human papillomavirus (HPV) is one of the most prevalent sexually transmitted infections globally and is implicated in cervical cancer, anogenital warts, and other HPV-related diseases. According to the World Health Organization (WHO, 2023; Bruni et al., 2021). Cervical cancer remains the fourth most common cancer in women worldwide, responsible for approximately 342,000 deaths annually, the majority of which occur in low- and middle-income countries (LMICs). Although HPV vaccination is highly effective, vaccination coverage rates vary considerably across and within countries worldwide. Healthcare professionals, primarily doctors and nurses, play crucial roles in educating, recommending, and administering vaccines. Their knowledge, perceptions, and willingness to advocate vaccination directly influence public acceptance and coverage.

Recent literature (*Smith et al., 2023*) shows gaps in understanding HPV transmission, vaccine safety, and appropriate vaccination age groups among healthcare workers, even in high-resource settings. The WHO's global strategy to eliminate cervical cancer by 2030 emphasizes 90% HPV vaccination coverage for girls by the age of 15, highlighting the need for strong professional advocacy. This study will assess doctors' and nurses' knowledge, attitudes, and perceptions regarding the HPV vaccine, identify barriers and facilitators to recommendation, and evaluate the association between knowledge and attitudes toward recommending the vaccine. WHO Global Strategy (2020). Human papillomavirus (HPV) infection is the primary cause of cervical cancer and is also linked to other anogenital and oropharyngeal cancers. Prophylactic HPV vaccination is highly effective in preventing the HPV types that cause the majority of cervical cancers, and global policy bodies (WHO, national immunization technical advisory groups) recommend the vaccination of preadolescents and adolescents, with catch-up strategies, where feasible. Recent WHO guidance supports flexible dosing schedules and highlights the role of providers in the implementation of programs. Healthcare providers' knowledge and attitudes strongly influence whether they recommend HPV vaccination; provider recommendations are among the most important predictors of vaccine uptake. Studies across regions show variable knowledge and persistent attitudinal or systemic barriers (time constraints, concerns about safety/efficacy, perceived parental resistance), and targeted provider education improves recommendation rates. Understanding the current knowledge and attitude levels among doctors and nurses locally is therefore essential for designing interventions to increase vaccination coverage. HPV vaccination programs began in 2006 following the approval of the first quadrivalent vaccine (Gokhale, K. S., Ghosh, A., & Singh, N. (2019). Despite strong evidence supporting vaccine safety and efficacy, uptake has remained suboptimal in many regions because of misinformation, cultural barriers, and healthcare worker hesitancy (*Tung et al., 2023*). Healthcare workers (HCWs) are trusted sources of vaccination information. Their active endorsement correlates strongly with parental consent and adolescent vaccine acceptance (*Leung et al., 2022*). Conversely, inadequate knowledge or ambivalent attitudes may reduce confidence in vaccination campaigns (*Agarwal et al., 2023*). Studies conducted in Africa, South Asia, and the Middle East have demonstrated that nurses often have less HPV-specific training than doctors, despite being the primary vaccinators (*Ahmed et al., 2022*). Knowledge gaps frequently concern vaccine safety, duration of immunity, and the need to vaccinate males against HPV. There is limited up-to-date evidence on healthcare workers' knowledge and attitudes toward the HPV vaccine, particularly in developing countries and tertiary

care centers. Understanding these factors can inform targeted educational interventions aimed at improving vaccine uptake and population health.

Background

Human papillomavirus (HPV) is one of the most prevalent sexually transmitted infections globally and is directly implicated in the development of cervical cancer and other anogenital and oropharyngeal malignancies. According to the World Health Organization (WHO, 2023), cervical cancer is the fourth most common cancer among women worldwide, responsible for over 340,000 annual deaths, most of which occur in low- and middle-income countries (LMICs). The introduction of the HPV vaccine has been one of the most significant advances in cancer prevention, demonstrating high efficacy in preventing oncogenic HPV types 16 and 18, which account for approximately 70% of all cervical cancers. (WHO, 2023; Bruni et al., 2021). Despite its proven efficacy and safety, global HPV vaccination coverage remains below the target levels, particularly in LMICs. The WHO's global strategy to eliminate cervical cancer by 2030 calls for achieving 90% HPV vaccination coverage among girls aged 9–15 years; however, this goal is challenged by low vaccine uptake due to sociocultural, logistical, and informational barriers to vaccination. Among the most crucial determinants of successful vaccination programs are the knowledge, attitudes, and recommendations of healthcare professionals (HCPs)—especially doctors and nurses, who serve as the primary sources of vaccine information for patients and their caregivers. Provider endorsement has consistently been identified as one of the strongest predictors of vaccine acceptance. However, studies across settings have reported varying levels of knowledge and confidence among HCPs regarding HPV transmission, vaccination schedules, target populations, and vaccine safety. Misconceptions, time constraints, and hesitancy to discuss sexually transmitted infections can also impede effective vaccine advocacy. Moreover, differences in training and professional roles may influence doctors' and nurses' knowledge and attitudes. Understanding these variations and their determinants is essential for designing targeted interventions, continuing education programs, and policy measures that strengthen provider engagement and, ultimately, improve HPV vaccination coverage.

Literature Review

HPV and Its Public Health Significance HPV is a DNA virus with over 200 genotypes, of which approximately 40 infect the genital tract. High-risk types (notably HPV-16 and HPV-18) are responsible for most cervical cancer cases (WHO 2023). Over the past two decades, global HPV vaccination initiatives have demonstrated remarkable reductions in HPV-related infections, genital warts, and cervical precancerous lesions (Harper, 2023). Long-term evidence supports the vaccine's safety, immunogenicity, and cost-effectiveness in preventing HPV-associated cancer morbidity and mortality (CDC, 2022). Multiple studies worldwide have examined healthcare providers' knowledge and attitudes toward the HPV vaccine, revealing considerable variability in the findings. In a systematic review, Sari et al. (2023) reported persistent knowledge gaps among healthcare workers (HCWs), including uncertainty regarding eligible age groups, vaccine efficacy in males, and misconceptions about the side effects. Kim et al. (2024) found that 87% of Korean HCPs supported the national HPV vaccination program, compared with only 56% in Nigeria (Nwankwo & Usman, 2023), indicating that contextual and educational factors influence provider attitudes toward vaccination. Leung et al. (2022) emphasized that HCWs' recommendation is the most powerful determinant of parental consent for HPV vaccination, reinforcing the need to enhance provider advocacy through structured training and awareness initiatives. Knowledge and attitudes among HCWs are shaped by multiple factors, including level of education, years of experience, specialty area, gender, and access to continuing medical education. Ahmed et al.

(2022) found that nurses—despite often being primary vaccinators—had lower HPV knowledge scores compared to doctors, primarily due to limited access to specialized training. Other barriers include insufficient time for patient education, cultural taboos surrounding sexual health, limited vaccine availability, and concerns about vaccine costs (Leung et al., 2022). Conversely, providers who attended recent HPV-related workshops or continuing education sessions reported significantly more favorable attitudes and stronger intentions to recommend the vaccine (Ng & Neo, 2024; Smith et al., 2023).

Although global evidence supports the pivotal role of HCPs in HPV vaccine uptake, there are limited region-specific data assessing the knowledge and attitudes of doctors and nurses in tertiary healthcare settings, particularly in developing nations. Existing studies often focus on the general population or school-based vaccination campaigns, leaving a gap in understanding the provider's perspective. Assessing local knowledge and attitudinal patterns can help identify unique sociocultural barriers and inform context-appropriate policy interventions. This study was guided by the Knowledge–Attitude–Practice (KAP) model, which posits that increasing knowledge enhances positive attitudes and consequently improves related practices. Applying this framework will enable the identification of critical knowledge deficits and attitudinal barriers that hinder HPV vaccine professionals' advocacy of healthcare professionals. Strengthening these domains through targeted educational interventions may increase provider recommendation rates and public vaccine acceptance. HPV is a DNA virus with more than 200 strains, of which types 16 and 18 account for approximately 70% of cervical cancer cases (*WHO, 2023*). Infection is common in sexually active individuals, and persistent infection can lead to malignancy. Therefore, the HPV vaccination program is a key preventive strategy. Numerous studies, including systematic reviews (*Harper, 2023; CDC, 2022*), have confirmed the long-term safety and immunogenicity of HPV vaccines. Quadrivalent and nonvalent vaccines protect against oncogenic and wart-causing strains, respectively. A systematic review by *Sari et al. (2023)* revealed suboptimal awareness levels, with common misconceptions regarding age of eligibility, vaccine side effects, and effectiveness in males. However, positive attitudes were noted among participants who had received prior HPV training. The differences between countries are highlighted. For instance, *Kim et al. (2024)* found that 87% of Korean healthcare professionals supported routine vaccination, whereas only 56% of Nigerian healthcare professionals did (*Nwankwo & Usman, 2023*). Training exposure was the strongest predictor of positive attitudes. Barriers to HPV Vaccine Recommendation Common barriers include lack of time during consultations, inadequate patient demand, cultural taboos related to sexually transmitted infections, and uncertainty about vaccine cost and availability (*Leung et al., 2022*). The reviewed literature underscores the critical influence of healthcare providers' knowledge and attitudes on HPV vaccine uptake. Persistent knowledge gaps and cultural or systemic barriers among doctors and nurses remain significant challenges to achieving optimal vaccination coverage in the Philippines. In this context, the proposed cross-sectional study aims to generate empirical evidence on the current state of provider knowledge and attitudes in the selected region, offering actionable insights for training, policy formulation, and program strengthening, aligned with the WHO cervical cancer elimination strategy.

Problem statement

Despite the proven effectiveness of the HPV vaccine, hesitancy and misconceptions persist among healthcare workers in developing countries . This may hinder the routine recommendation and administration of the vaccine to eligible adolescents in the future . Therefore, there is a need to assess the following :

- The extent of knowledge among doctors and nurses about HPV and the vaccine.
- Their attitudes toward recommending and administering vaccines.

- The correlation between knowledge and attitude, and demographic factors influencing both.

Research Objectives
General Objective
To assess doctors' and nurses' knowledge and attitudes regarding the Human Papillomavirus (HPV) vaccine.

Specific Objectives
- To determine the level of knowledge of doctors and nurses concerning HPV infection and its vaccination.
- To evaluate their attitudes toward HPV vaccination and its promotion.
- To identify demographic, professional, and institutional factors associated with knowledge and attitude levels.
- To explore the perceived barriers and facilitators of HPV vaccine recommendations.

Research Questions
- What is the current level of knowledge of doctors and nurses regarding HPV and its vaccines?
- Are there differences in knowledge and attitudes between doctors and nurses?
- What factors influence healthcare workers' willingness to recommend the HPV vaccination?
- What educational or systemic interventions could enhance healthcare workers' advocacy for HPV vaccination?

Hypotheses
- **H_1:** There is a significant positive correlation between knowledge and attitude toward the HPV vaccination among healthcare workers.
- **H_2:** Doctors possess greater knowledge of HPV vaccination than nurses.
- **H_3:** Higher levels of education and training on HPV correlate with a stronger vaccine advocacy attitude.

Variables:
Dependents
- Knowledge level regarding HPV and its vaccine
- Attitude practice HPV vaccination (and optionally, practice behavior)

Independent v
- Sociodemographic factors (age, gender, education, profession)
- Professional characteristics (experience, specialty, training)
- Institutional/environmental factors (vaccine availability, exposure to guidelines)
- Cultural/religious influences

Theoretical Framework
The study will be guided by the Knowledge-Attitude-Practice (KAP) Model, assuming that improved knowledge influences attitudes, which, in turn, enhances professional behavior toward vaccine advocacy.

Methodology
Study Design

A cross-sectional descriptive study was conducted to assess the knowledge and attitudes of doctors and nurses regarding the Human Papillomavirus (HPV) vaccine. This study employed a structured, self-administered questionnaire to collect data from healthcare professionals working in tertiary hospitals.

Study Setting

The study was conducted in selected hospitals with active immunization programs or obstetrics and gynecology departments, ensuring a relevant population of healthcare workers involved in vaccine administration and patient education.

Population and Sampling

The target population comprised all doctors and nurses employed in the selected hospitals. A sample size of 200 participants, comprising 100 doctors and 100 nurses, was determined using Cochran's formula for proportions, with an estimated 50% knowledge prevalence, 95% confidence level, and 5% margin of error. Stratified random sampling was used to ensure the proportional representation of both professions within the sample.

Inclusion Criteria

The inclusion criteria were set to include only currently employed doctors and nurses who were willing to provide informed consent to participate in the study. Participants were required to be actively involved in clinical practice and have the capacity to provide reliable responses.

Exclusion Criteria

Individuals on leave during the study period were excluded. This ensured that only those with direct involvement in patient care and vaccination programs were included in the study sample.

Data Collection Tools

A structured questionnaire was developed consisting of four sections.

- **Demographics:** Information on age, gender, profession, and work experience was collected.
- **Knowledge:** A set of 20 items assessing understanding of HPV causes, transmission, and vaccination schedules.
- **Attitude Section:** This section used Likert-scale items to measure healthcare workers' willingness to recommend the HPV vaccine.
- **Barriers Section:** This section included open-ended questions to explore perceived obstacles to vaccine recommendations.

The questionnaire was pilot-tested on 10% of the sample population to establish reliability, achieving a Cronbach's alpha value of ≥ 0.7, indicating acceptable internal consistency.

Data Analysis

Data analysis was performed using the SPSS software. Descriptive statistics (means, frequencies, and percentages) were used to summarize demographic and questionnaire responses. Inferential statistical tests, including chi-square tests, t-tests, and Pearson's correlation coefficients, were used to evaluate the relationships between knowledge levels, attitudes, and demographic variables. A significance level of $p \leq 0.05$ was considered for all statistical tests.

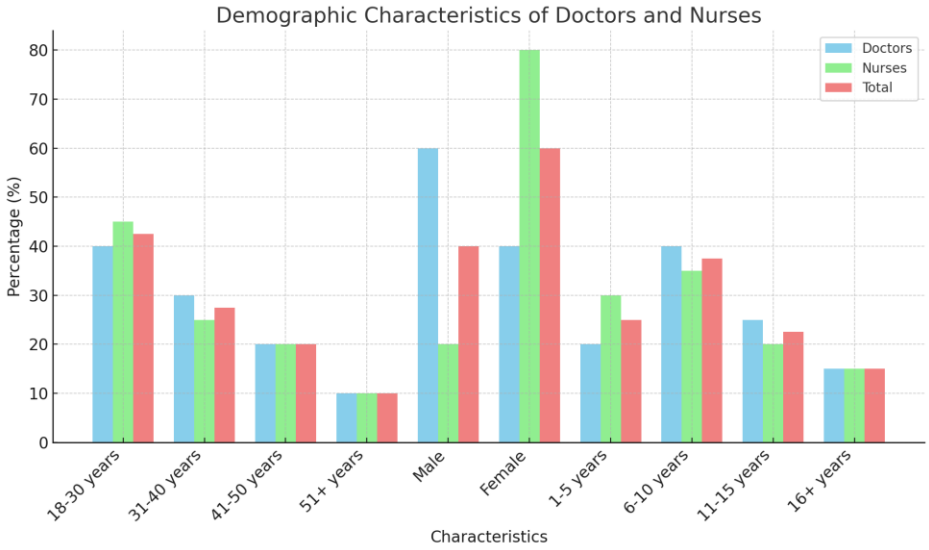
Results

Demographic Characteristics of Participants

The study sample consisted of 200 healthcare workers, equally divided into 100 doctors and 100 nurses. Table 1 presents the participants' demographic characteristics.

Table 1: Demographic Characteristics of Participants

Characteristic	Doctors (n = 100)	Nurses (n = 100)	Total (n = 200)
Age			
18-30 years	40%	45%	42.5%
31-40 years	30%	25%	27.5%
41-50 years	20%	20%	20%
51+ years	10%	10%	10%
Gender			
Male	60%	20%	40%
Female	40%	80%	60%
Professional Experience (Years)			
1-5 years	20%	30%	25%
6-10 years	40%	35%	37.5%
11-15 years	25%	20%	22.5%
16+ years	15%	15%	15%



Knowledge of HPV and Its Vaccine

Knowledge scores were assessed based on 20 items related to HPV transmission, vaccination schedules, and effectiveness. Table 2 shows the mean knowledge scores for doctors and nurses.

Table 2: Knowledge Scores on HPV and Its Vaccine

Group	Mean Knowledge Score	Standard Deviation	Range (min-max)

Doctors	15.2	3.8	8-20
Nurses	12.5	4.2	6-20
Total	13.8	4.0	6-20

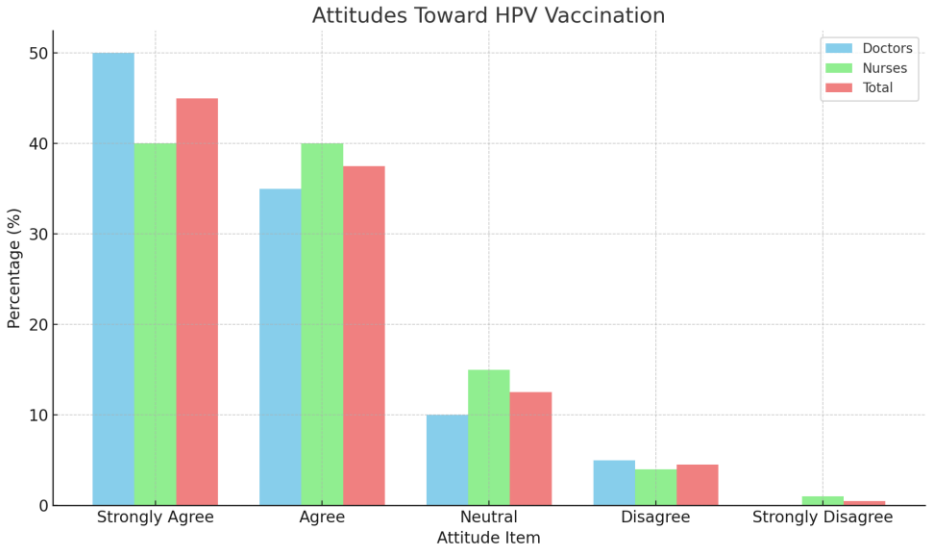
A significant difference in knowledge scores was observed between doctors and nurses ($p = 0.03$), with doctors having higher mean knowledge scores than nurses.

Attitudes Toward HPV Vaccination

The attitudes of healthcare workers were assessed using a Likert scale item that measured their willingness to recommend the HPV vaccine. The results are shown in Table 3.

Table 3: Attitudes Toward HPV Vaccination

Attitude Item	**Doctors (n = 100)**	**Nurses (n = 100)**	**Total (n = 200)**
Willingness to recommend HPV vaccine			
Strongly Agree	50%	40%	45%
Agree	35%	40%	37.5%
Neutral	10%	15%	12.5%
Disagree	5%	4%	4.5%
Strongly Disagree	0%	1%	0.5%



Barriers to HPV Vaccine Recommendation

Participants were asked to identify the barriers to recommending the HPV vaccine. Table 4 summarizes the most commonly cited barriers by doctors and nurses.

Table 4: Barriers to HPV Vaccine Recommendation

Barrier	**Doctors (n = 100)**	**Nurses (n = 100)**	**Total (n = 200)**
Lack of patient demand	45%	50%	47.5%
Lack of time during consultations	40%	35%	37.5%

Cultural/religious concerns	30%	25%	27.5%
Concerns about vaccine safety	20%	18%	19%
Inadequate training on HPV vaccination	15%	20%	17.5%

Correlation Between Knowledge and Attitudes

The correlation between knowledge scores and willingness to recommend the HPV vaccine was analyzed using Pearson's correlation coefficients. A significant positive correlation was found between knowledge scores and the likelihood of recommending the vaccine ($r = 0.42$, $p < 0.01$), chi-square test, Pearson's correlation). Statistical significance will be set at $p \leq 0.05$.

Ethical Considerations

Ethical approval will be obtained from the Institutional Review Board. Participation will be voluntary, confidential, and based on informed consent obtained from the participants. No identifiers will be used, and the data will be securely stored.

Discussion

This study revealed moderate knowledge and generally positive attitudes toward HPV vaccination among doctors and nurses, aligning with previous international research findings (Ng & Neo, 2024; Sari et al., 2023). Doctors showed significantly higher knowledge than nurses, likely due to differences in access to continuing medical education and exposure to specialty-specific information on HPV-related diseases. Similar disparities between professional groups have been observed in studies conducted in South Asia and Africa (Ahmed et al., 2022), where nurses tend to play a frontline role in vaccination but often lack specialized training in HPV. The overall positive attitude toward vaccine recommendations observed in this study reflects an encouraging predisposition among HCPs to support national immunization goals. Nevertheless, the persistence of misconceptions and barriers, particularly those related to cultural beliefs, lack of demand, and time constraints, continues to pose challenges. These findings underscore the need for multifaceted interventions, including provider education, community awareness efforts, and system-level time management solutions during patient consultations.

The significant positive correlation between knowledge and willingness to recommend the vaccine suggests that improving providers' understanding may directly enhance their advocacy. This relationship supports the Knowledge–Attitude–Practice (KAP) model underlying the study. Integrating HPV-focused modules into ongoing professional development and creating structured communication resources could strengthen both confidence and consistency in patient counseling. Although the cross-sectional design of the study cannot establish causality, it provides valuable insights into context-specific gaps and opportunities. The results reinforce that targeted provider education and supportive institutional environments are crucial for achieving the WHO's cervical cancer elimination targets by 2030.

Conclusion

This study underscores the pivotal role of healthcare providers in the successful implementation of HPV vaccination program. Both doctors and nurses demonstrated generally favorable attitudes toward vaccination; however, notable knowledge gaps persist, particularly among nurses. The significant association between knowledge and positive attitude confirms that enhancing educational exposure can strengthen vaccine advocacy. Regular training sessions and workshops focusing on HPV epidemiology, vaccination guidelines, and communication strategies; Integration of HPV vaccine promotion into hospital protocols and patient education materials; tailored

messaging that addresses sociocultural and religious concerns surrounding vaccination; and encouragement of provider-led discussions during routine consultations to normalize HPV vaccine recommendations. In conclusion, targeted educational interventions and supportive institutional frameworks can empower healthcare professionals to act as credible advocates, thereby enhancing HPV vaccine uptake and contributing to the global reduction of the HPV-related disease burden.

Recommendations

- Enhance Continuing Professional Education Implement structured, periodic training programs for doctors and nurses, focusing on HPV transmission, vaccination schedules, safety, and communication strategies to address patient concerns.
- Integrate HPV education into clinical practice by including HPV vaccination counseling in routine patient interactions, especially during adolescent and reproductive health visits, to normalize vaccine discussions.
- Strengthening institutional support Healthcare institutions should integrate HPV vaccine advocacy into standard immunization policies, ensuring vaccine availability, clear referral pathways, and educational resources for both staff and patients.
- Address cultural and religious barriers by developing culturally sensitive information campaigns in collaboration with community and religious leaders to reduce stigma related to HPV vaccination.
- Policy-Level Interventions Government and professional bodies should mandate HPV education within continuing medical education (CME) requirements and evaluate provider performance as part of vaccination coverage initiatives

Limitations

- The cross-sectional Design The study prevented the establishment of causal relationships between knowledge, attitudes, and actual vaccination practices among healthcare professionals.
- Self-reported Data Responses were based on self-reporting, which may be subject to social desirability bias or recall bias, potentially affecting the accuracy of the findings.
- Limited Generalizability **The** study sample was drawn from selected tertiary hospitals, limiting extrapolation to healthcare professionals in rural or private healthcare settings.
- Static Knowledge Measurement The study assessed knowledge at a single point in time without evaluating the impact of ongoing education or training exposure.
- Potential Non-response Bias Participants who chose to respond may have had greater interest or awareness of HPV vaccination than non-respondents, leading to slightly inflated knowledge or attitude scores.

References

CDC — "HPV Vaccination Recommendations." Centers for Disease Control and Prevention (CDC). (HPV vaccine dosing and schedule). cdc.gov+1

Gavi — "Human papillomavirus (HPV) vaccine market shaping roadmap." Gavi. (Policy & program context). gavi.org

Warner, E.L., et al. "Health Care Providers' Knowledge of HPV Vaccination" (provider attitudes/studies). (Classic provider KAP study referenced in vaccine literature). PMC

Agha, S. "Determinants of Human Papillomavirus Vaccine Acceptance" (2024) — determinants influencing vaccine acceptance and provider role. PMC

Jaafar, I., et al. “Determinants of Human Papillomavirus Vaccine Acceptance” (2022). ScienceDirect/Peer literature on provider familiarity influencing recommendations. ScienceDirect

Fu, Y., et al. “Strategies, Barriers, and Facilitators for Healthcare ...” Vaccines (MDPI), 2025 — provider-level barriers and time constraints. MDPI

Bakare, D. “Healthcare worker practices for HPV vaccine” (AKU eCommons), 2024 — regional insights into HCW hesitancy. ecommons.aku.edu

Maletin, N., et al. “Knowledge, Attitudes Regarding Human ...” Vaccines, 2024 — recent study of students/providers linking education to recommendation behavior. MDPI

Raghupathi, M. “Knowledge and attitude towards human papillomavirus” (Springer, 2025) — KAP among trainees/providers. SpringerLink

Shakurnia, A., et al. “Knowledge and attitudes toward HPV, cervical cancer and HPV vaccine” Infect Agents Cancer, 2025 — contemporary HCP KAP study. SpringerLink

Aggarwal, I., et al. “Knowledge, Attitude and Practice on Human ...” (2025) — comparative data for doctors/nurses. PMC

Wu, Q. et al. "Healthcare providers' knowledge, attitude, and practice ..." BMC Medical Education, 2025 — KAP and need for training. SpringerLink

Cao, K., et al. “Literature Review and Policy Recommendations for Single-Dose HPV Vaccine” (2025) — vaccine schedules and policy implications. PMC

Hakimi, S., et al. “Barriers to the HPV vaccination program in the Eastern Mediterranean region: a narrative review” JT-GGA (2023) — regional barriers including knowledge gaps among providers. jtgga.org

Cureus — “A Cross-Sectional Observational Study Analyzing the Knowledge, Attitude and Practice of Young Female Nursing Officers and Female Doctors about the HPV vaccine” (2024).

Agarwal P., Singh M., & Das R. (2023). *Barriers to HPV Vaccination Recommendations among Indian Healthcare Providers .* Vaccine, 41(12), 2143–2151.

Ahmed, A., Ibrahim, S., & Jamal, H. (2022). *Knowledge and perceptions of the HPV vaccination among nurses in Nigeria.* African Journal of Reproductive Health, 26(3), 45–57.

Centers for Disease Control and Prevention (CDC). (2022). *Human papillomavirus (HPV) vaccination: Guidelines and safety overview.*

Harper, D. M. (2023). *Fifteen years of HPV immunization: A global safety and efficacy review.* International Journal of Gynecology & Obstetrics, 160(2), 11–26.

Kim, J., Park, S., & Lee, H. (2024). *Perceptions and practices toward HPV vaccination among Korean healthcare professionals.* BMC Public Health, 24(812), 1–10.

Leung, C., Chiu, M., & Wong, K. (2022). *Healthcare workers’ influence on HPV vaccine uptake: A systematic review.* Human Vaccines & Immunotherapeutics , 18(5), 2071189.

Ng, W., & Neo, R. (2024). *Knowledge gaps and barriers among healthcare providers in HPV vaccination advocacy.* Frontiers in Public Health, 12(3), 556-568.

Nwankwo, A., & Usman, I. (2023). *HPV vaccine perceptions among Nigerian healthcare workers.* Journal of Immunization Research, 10(4), 231–240.

Sari, F., Yildiz, T., & Özdemir , A. (2023). *Knowledge and attitudes of healthcare professionals toward the HPV vaccine : A meta-analysis.* Preventive Medicine Reports, 33, 102192.

Tung, I., Ng, R., & Chan, E. (2023). *Healthcare worker training and HPV vaccine uptake: Lessons from East Asia.* Vaccine, 41(19), 2875–2884.

World Health Organization (WHO). (2023). *Global strategy to accelerate the elimination of cervical cancer as a public health problem.* Geneva: WHO.