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Original Research Article

Knowledge, attitude and practice study on human papilloma virus vaccination among healthcare providers at a tertiary care hospital in Puducherry: a cross-sectional study

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ABSTRACT

Background: Cervical cancer remains a major preventable cause of morbidity and mortality among women in India. HPV vaccination is recognised globally as a critical tool for elimination strategies. As India prepares to integrate HPV vaccines into the national immunisation programme, healthcare providers knowledge, attitudes, and practices (KAP) become pivotal. Their ability to counsel and recommend vaccination strongly influences community acceptance and vaccine uptake. This research aimed to study the knowledge, attitude, and practices related to HPV vaccination among healthcare providers in a tertiary care hospital in Puducherry, and to examine associations between sociodemographic factors and knowledge levels.

Methods: A descriptive cross-sectional study was conducted among 168 healthcare providers including doctors, nurses, paramedical staff, and interns. Data were collected using a validated self-administered questionnaire adapted from prior KAP surveys. Descriptive statistics and Chi-square/Fisher's exact tests were used for analysis, with significance set at $p<0.05$.

Results: Most participants (82.7%) demonstrated good knowledge about HPV and its vaccination, although gaps remained regarding updated WHO dosing recommendations. Positive attitudes were observed in 76.2% of respondents only 28.6% had received the vaccine themselves, 41% routinely recommended it, and just 32.1% had counselled a patient in the past month (18.5%). Doctors exhibited significantly higher knowledge levels than nurses and paramedical staff ($p=0.02$), similar to prior findings on professional disparities.

Conclusions: Although healthcare providers showed strong awareness and favourable attitudes toward HPV vaccination, practical engagement, such as personal vaccination, patient counselling, and routine recommendations, remained limited. Strengthening provider competency will be essential as India moves toward nationwide HPV vaccine introduction.

Keywords: Cervical cancer, HPV vaccine, Healthcare worker

INTRODUCTION

Cervical cancer is the 4th leading cause of death among women, with 660 thousand new cases estimated in 2022. About 94% of cases occur in the low and middle-income countries. These differences among regions are due to the lack of access to vaccination, screening, and treatment services. According to national guideline recommendations, HPV vaccination and regular screening are considered a major preventive strategy for cervical cancer. (WHO) Nearly more than half a million new cases and over 300,000 deaths occur every year worldwide, making cervical cancer one of the leading causes of cancer-related mortality among women.[1] About 94% of

cases occur in the low and middle-income countries. These differences among regions are due to the lack of access to vaccination, screening, and treatment services.[2,3]

Among the risk factors, infection with human papillomavirus is considered a major risk factor for cervical cancer. The majority of cervical cancers caused by HPV belong to types 16 and 18, so it is very important to reinforce the importance of HPV vaccination in the national cancer control strategies.[4,5] In recent years, the public health experts have strongly emphasised HPV vaccination in achieving cervical cancer elimination. World Health Organisation (WHO), in its global elimination strategy, has incorporated HPV vaccination and updated recommendations, endorsing single-dose schedules for adolescent girls. These simplified schedules aim to increase feasibility, reduce cost, and expand coverage, particularly in resource-constrained settings.[6-8] Introducing domestically manufactured HPV vaccines into the routine immunisation schedule shows the progress toward protecting adolescent girls across the country.[9] Public acceptance of the vaccine is mainly influenced by the advice and recommendation given by the trusted healthcare providers. Strengthening the knowledge base and confidence of healthcare providers is crucial in attaining success in the national HPV vaccination programme.[10]

In India, several studies on knowledge, attitudes, and practices (KAP) of healthcare workers regarding HPV vaccination showed distinctive variation. A meta-analysis of Indian studies done in the year 2024 found that many participants were aware of HPV and cervical cancer, but they lacked clarity regarding the recommended age for vaccination, schedule and duration of protection.[11] Though attitudes toward HPV vaccination were positive, recommendations to patients remained limited. Even among trained healthcare providers, deficits remain. The studies done among tertiary hospitals have identified gaps in understanding vaccine schedules, safety, and national recommendations, as well as suboptimal counselling practices.[16,17]

This gap between knowledge and practice highlights the need for targeted interventions. With this idea, the present study aims to assess the knowledge, attitude, and practice related to HPV vaccination among healthcare providers in a tertiary care setting. This research is particularly timely as the country moves closer to the national introduction of the HPV vaccine. Improving provider competence and confidence is not only vital for successful programme implementation but will also contribute to increasing public trust and acceptance of the vaccine. The findings of this study will therefore serve as an important foundation for developing education, training, and communication initiatives aimed at strengthening HPV vaccination services in Puducherry and similar healthcare settings across India.

METHODS

This was an observational cross-sectional study conducted to assess the knowledge, attitude, and practice on HPV vaccination among healthcare providers working at a tertiary care hospital. The study was conducted over a period of 5 months from July 2025 to November 2025.

Inclusion criteria

Participants included in the study are doctors, nurses, paramedical staff, and interns, aged ≥18 years, who were employed at the institution and gave consent to participate in the study.

Exclusion criteria

Administrative and non-clinical staff are excluded from the study.

Sample size

A sample size was calculated using Cochran's formula, with a confidence interval of 95% CI and prevalence of 95.9% and a margin of error of 3% and the sample size arrived was 168. A convenient sampling technique was employed to recruit the study participants. This approach will be feasible in engaging healthcare professionals across various departments within the tertiary care hospital. The required sample size was 168. A list of healthcare providers (Doctors, Interns, Nurses, Paramedical staff) will be collected from the administration office and will be serially numbered, and with the help of computer-generated random numbers, participants will be recruited for the study.

Statistical analysis

Data were collected using a semi-structured, self-administered questionnaire developed from previously validated KAP surveys on HPV vaccination. The questionnaire included Sociodemographic Information, Knowledge Section, Attitude Section, and Practice Section. The tool was pilot-tested among a small group of healthcare providers (not included in the final study) to ensure clarity and reliability. After obtaining informed consent, data were collected using a questionnaire, and confidentiality was maintained throughout the study. Data was analysed using SPSS version 25, descriptive statistics and chi-square test were applied to examine the association. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 168 healthcare providers participated in the study. Of them, 58.3% were females, and the mean age of participants was 31.4±7.2 years. The professional distribution showed that 35.7% were nurses, 28% were doctors, 21.4% paramedical staff, and 15% interns. Nearly

half (48.2%) had less than five years of work experience, while 20.8% had more than ten years of service (Table 1).

Table 1: Sociodemographic characteristics of study participants (n=168).

Variable	Category	Frequency (n)	Percentage (%)
Age in years	≤30	92	54.8
	>30	76	45.2
Gender	Male	70	41.7
	Female	98	58.3
Profession	Doctor	47	28.0
	Nurse	60	35.7
	Paramedical staff	36	21.4
	Intern	25	14.9
Experience in years	<5	81	48.2
	5-10	52	30.9
	>10	35	20.8

A large majority of participants (82.7%) demonstrated good knowledge about HPV infection and its vaccination. Only 17.3% showed poor knowledge, indicating that most respondents have an adequate understanding of HPV-related health risks and preventive strategies. A predominantly positive attitude was observed among the participants, with 76.2% expressing favourable views toward HPV vaccination. However, 23.8% exhibited a negative attitude, suggesting that despite good knowledge levels, a proportion of healthcare providers still hold reservations or misconceptions about the vaccine. In contrast to the high knowledge and positive attitude, actual practice levels were considerably low. Only 28.5% demonstrated good vaccination-related practices, such as recommending the vaccine, counselling patients, or being vaccinated themselves, while a substantial 71.5% had poor practice. This highlights a strong disconnect between knowledge/attitude and practical implementation (Table 2).

Table 1: Knowledge, attitude and practice levels.

KAP component	Category	Frequency (N)	Percentage (%)
Knowledge	Good	139	82.7
	Poor	29	17.3
Attitude	Positive	128	76.2
	Negative	40	23.8
Practice	Good	48	28.5
	Poor	120	71.5

Knowledge on HPV and HPV Vaccination: Overall, the results indicate that participants had a high level of awareness and understanding of HPV and the HPV vaccine. A majority, 84.5% had heard about HPV infection. 81% recognised that HPV causes cervical cancer. 88.1% knew that HPV vaccination is recommended before sexual debut, reflecting a good understanding of vaccination timing. 72% were aware that boys can also be vaccinated, indicating moderate awareness regarding male vaccination. However, only 54.2% knew about the WHO-recommended single-dose schedule, and just 36.3% identified the correct dosing schedule, revealing significant gaps in updated guideline knowledge (Table 3).

Table 3: Questionnaire-based response of the participant about knowledge of HPV infection and vaccination (n=168).

Knowledge question	Correct, N (%)	Incorrect, N (%)
Heard about HPV infection	142 (84.5)	26 (15.5)
HPV causes cervical cancer	136 (81.0)	32 (19.0)
HPV vaccine is available	118 (70.2)	50 (29.8)
HPV vaccine prevents cervical cancer	112 (66.7)	56 (33.3)
Recommended before sexual debut	148 (88.1)	20 (11.9)
WHO single-dose schedule awareness	91 (54.2)	77 (45.8)
Boys can be vaccinated	121 (72.0)	47 (28.0)
Dosing schedule knowledge	61 (36.3)	10 (3.7)

These findings show that while general awareness is strong, specific technical knowledge, particularly regarding newer schedule updates, remains suboptimal. Expanding targeted education on revised WHO recommendations is essential.

Attitudes toward HPV vaccination were generally positive, with most participants agreeing with key statements: 76-81% perceived the vaccine as safe, effective, and essential for cervical cancer prevention. 69% supported introducing the HPV vaccine into the national immunisation program. At the same time, 62% felt that vaccine costs are a major barrier, suggesting that financial constraints may limit uptake. 44% reported feeling hesitant due to fear of adverse effects, reflecting the influence of safety perceptions on vaccine acceptance. Although the overall attitude is favourable, concerns about cost and side effects could affect recommendations. Addressing these issues through improved communication and policy support may enhance vaccine acceptance (Table 4).

Practice levels were notably lower compared to knowledge and attitude. Only 28.6% had received the HPV vaccine themselves. 41.1% routinely recommended the vaccine to patients, and 32.1% had counselled a patient in the past month. Only 18.5% felt confident counselling about HPV vaccination, indicating insufficient training. About 65.5% had never attended HPV vaccination training, which may contribute to poor practice levels. These findings demonstrate a disconnect between knowledge/attitude and

actual practice. Even though healthcare providers understand and support HPV vaccination, many are not translating this into clinical action. Improving training, skill-building, and confidence in counselling is crucial to enhance practical engagement with HPV vaccination (Table 5).

Table 4: Questionnaire-based response of the participant about attitude of HPV infection and vaccination (n=168).

Attitude statement	Agree/strongly agree, N (%)	Neutral, N (%)	Disagree/strongly disagree, N (%)
HPV vaccine is safe	129 (76.8)	22 (13.1)	17 (10.1)
HPV vaccine is effective	123 (73.2)	28 (16.7)	17 (10.1)
Essential for cervical cancer prevention	136 (81.0)	20 (11.9)	12 (7.1)
Should be included in the national immunisation program	116 (69.0)	24 (14.3)	28 (16.7)
Vaccine cost is a barrier	104 (61.9)	30 (17.9)	34 (20.2)
Fear of side effects makes me hesitant	74 (44.0)	40 (23.8)	54 (32.1)
Confident in recommending HPV vaccine	94 (56.0)	34 (20.2)	40 (23.8)

Table 5: Questionnaire-based response of the participant about behaviour of HPV infection and vaccination (n=168).

Practice question	Yes, N (%)	No, N (%)
Have you received HPV vaccine?	48 (28.6)	120 (71.4)
Do you routinely recommend HPV vaccine?	69 (41.1)	99 (58.9)
Counselled a patient about HPV vaccination in past month	54 (32.1)	114 (67.9)
Confident counselling about HPV vaccination	31 (18.5)	137 (81.5)
Attended any HPV vaccination training	58 (34.5)	110 (5.5)

Doctors had the highest proportion of good knowledge (91.4%). As the reference group, their odds ratio is set at 1.00. Nurses were 2.15 times more likely to have poor knowledge compared to doctors. The confidence interval does not cross 1, meaning the association is statistically significant. Paramedical staff were 1.07 times more likely to have poor knowledge compared to doctors. The wide confidence interval (1.03-4.11) suggests variability, but since it does not cross 1, this association is also significant. Interns were 1.05 times more likely to have poor knowledge compared to doctors. However, the confidence interval crosses 1, indicating that this association is not statistically significant (Table 6).

Table 6: Association between sociodemographic variables and knowledge.

Variable	Good knowledge, N (%)	Poor knowledge, N (%)	OR (95% CI)	P value
Doctors	43 (91.4)	4 (8.6)	Ref	0.02*
Nurses	47 (78.3)	13 (21.7)	2.15 (1.08-3.12)	
Paramedical	28 (77.7)	8 (22.3)	1.07 (1.03-4.11)	
Interns	21 (84.0)	4 (16.0)	1.05 (0.47-1.90)	

*:statistically signinficant

DISCUSSION

This study assessed the knowledge, attitude, and practices related to HPV vaccination among healthcare providers in a tertiary care hospital in Puducherry. The findings highlight critical gaps, especially in updated knowledge regarding recent WHO recommendations and personal vaccination practices.

In the present study, 82.7% of healthcare providers had good knowledge about HPV vaccination. This is consistent with a recent tertiary-care based study by Aggarwal et al, which reported high awareness but incomplete understanding of current guidelines among healthcare providers.[17] Similarly, KAP studies among medical and paramedical students across India also observed that while awareness is widespread, clarity regarding recommended dosing schedules, vaccination of boys, and long-term protection remains limited.[14,15]

Despite good knowledge, only 76.2% of participants in the current study displayed a positive attitude toward HPV vaccination. Comparable findings were seen in the meta-analysis by Pal et al, which reported that although most participants believed HPV vaccination was important, misconceptions about safety and fertility remained

prevalent.[11] Cost concerns and fear of side effects were major barriers in our study, echoing results from studies among healthcare workers and community groups in India.[12,13]

The most concerning finding was the low personal uptake of HPV vaccination (28.5%) among healthcare providers. Other Indian studies also report low vaccination rates among doctors and nurses, often attributed to a lack of institutional recommendations, limited access, and misconceptions.[14-16] The discrepancy between knowledge and personal practice in our study reinforces the need for stronger institutional policies and regular capacity-building programs.

Furthermore, the practice of recommending HPV vaccination to patients was inconsistent, with only 41% routinely doing so. This aligns with previous studies where healthcare workers reported hesitation due to insufficient training on counselling.[17] Higher knowledge scores were significantly associated with better practices, emphasising the impact of educational interventions.

The findings also underline important differences across professional groups. Doctors exhibited higher knowledge levels, similar to the trends seen in Puducherry-based surveys that revealed varied awareness and preventive practices among cadres.[19] Nurses and paramedical staff, who often serve as primary patient contacts, require additional training to improve confidence in vaccine counselling.

Taken together, the results highlight the need for targeted educational interventions, structured training in updated HPV vaccination guidelines, and institution-led initiatives to improve personal vaccination among healthcare providers. Strengthening the role of healthcare professionals in recommending and counselling about HPV vaccination is essential to support India's ongoing efforts to integrate HPV vaccines into routine immunisation programs.

This study has certain limitations that should be acknowledged. The use of convenient sampling may have introduced selection bias, and the cross-sectional design limits the ability to assess changes in knowledge or practices over time, and causality cannot be inferred. This study was conducted in a single tertiary care centre, which may limit the generalizability of the findings to other healthcare settings, especially primary or rural institutions.

CONCLUSION

In this study it was demonstrated that there is a good understanding of HPV and recognised the importance of vaccination in preventing cervical cancer. Attitudes toward the vaccine were largely positive, but concerns regarding cost, side effects, and vaccine safety continue to influence perceptions among some providers. Despite high awareness and favourable attitudes, actual practices, such as personal vaccination, routine recommendation to patients, and confidence in counselling, were notably low. This disconnect highlights the need for targeted training programmes, strengthened institutional policies, and improved access to vaccine information and services. Enhancing provider competence and confidence is essential, particularly as India moves toward the nationwide rollout of HPV vaccination. Empowering healthcare providers with accurate knowledge and practical counselling skills can significantly improve community acceptance and uptake, strengthening long-term cervical cancer prevention efforts.

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