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Original Research Article

Knowledge, Attitudes, and Uptake of HPV Vaccine among Young Females in a Peripheral Area

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Abstract

Introduction: Cervical cancer is a leading cause of morbidity and mortality among women, particularly in low- and middle-income countries. Human papillomavirus (HPV) infection is the primary etiological factor, and vaccination offers effective prevention. Despite this, HPV vaccine uptake remains low in peripheral areas due to limited awareness, misconceptions, and socioeconomic barriers. The objective of the study is to assess the knowledge, attitudes, and uptake of the HPV vaccine among young females in selected peripheral areas of Himachal Pradesh, India.

Materials and Methods: A cross-sectional study was conducted from May 2025 to September 2025 at Civil Hospital, Ghawandal, Bilaspur; Community Health Centre, Kotkhai, Shimla; and Zonal Hospital, Shimla. A total of 300 females aged 15–29 years were recruited using convenience sampling. Data were collected using a pretested structured questionnaire covering sociodemographic, HPV knowledge, attitudes, sources of information, and vaccine uptake. Vaccination status was categorized as vaccinated (≥1 dose) or not vaccinated. Data were analyzed using SPSS v25, with chi-square tests applied to assess associations. A p-value <0.05 was considered statistically significant.

Results: The mean age was 20.8 ± 2.3 years. Seventy percent had heard about HPV, and 55% were aware that the vaccine prevents cervical cancer. Attitudes were generally positive, with 65% perceiving the vaccine as safe and 60% acknowledging its necessity. Only 35% of participants had received at least one dose. Higher education and socioeconomic status were significantly associated with better knowledge and vaccine uptake ($p < 0.001$). Positive attitudes were strongly linked to vaccination ($p < 0.001$). Healthcare providers were the most common source of information (40%).

Conclusion: Awareness of HPV is moderate, but actual vaccine uptake is low. Targeted educational interventions, accessible vaccination programs, and reinforcement by healthcare providers are crucial to improve coverage and reduce cervical cancer burden in peripheral regions.

Keywords: HPV Vaccine, Knowledge, Vaccine Uptake.

Introduction

Cervical cancer remains a major public health concern worldwide, particularly in low- and middle-income countries, where it is one of the leading causes of cancer-related morbidity and mortality among women [1,2]. Human papillomavirus (HPV) infection is the primary etiological factor for cervical cancer, with high-risk HPV types responsible for the majority of cases [3,4]. Despite the availability of effective preventive strategies, including HPV vaccination and regular screening, cervical cancer continues to pose a significant health burden due to low awareness, inadequate screening, and suboptimal vaccine coverage [5]. The HPV vaccine has been demonstrated to be highly effective in preventing infections with high-risk HPV types and reducing the incidence of cervical precancerous lesions [6]. The World Health Organization recommends

vaccination of adolescent girls before the onset of sexual activity to achieve maximum preventive benefit [7]. However, uptake of the HPV vaccine remains low in many regions, including peripheral and rural areas, due to factors such as limited knowledge, misconceptions about vaccine safety, socioeconomic barriers, and insufficient healthcare outreach programs [8,9].

Knowledge, attitudes, and perceptions of the target population play a critical role in vaccine acceptance [10]. Studies have shown that individuals with higher education, positive health beliefs, and access to credible information sources are more likely to accept and complete the HPV vaccination schedule [11,12]. Understanding the determinants of HPV vaccine uptake is therefore essential to design effective interventions aimed at increasing coverage and ultimately reducing the burden of cervical cancer.

The aim of the study is to assess the knowledge, attitudes, and uptake of the HPV vaccine among young females in selected peripheral areas of Himachal Pradesh, India.

Materials and Methods

A cross-sectional study was conducted among young females residing in selected peripheral areas of Himachal Pradesh, India, to assess their knowledge, attitudes, and uptake of the HPV vaccine. The study was carried out at Civil Hospital, Ghawandal, Bilaspur; Community Health Centre, Kotkhai, Shimla; and Zonal Hospital, Shimla between May 2025 and September 2025. The study population included females aged 15–29 years who were either students or residents of the catchment areas of these health facilities. A total of 300 participants were recruited using convenience sampling. Individuals who were unwilling to participate or had contraindications to vaccination were excluded. Informed consent was obtained from all participants prior to data collection. Data were collected using a pretested, structured questionnaire that included sections on sociodemographic characteristics, knowledge of HPV infection and its vaccine, attitudes towards vaccination, and actual vaccine uptake. Knowledge questions assessed awareness of HPV, its association with cervical cancer, preventive benefits of vaccination, and recommended age for vaccination. Attitude items evaluated perceptions of vaccine safety, necessity, and willingness to recommend the vaccine to peers. Trained research assistants conducted face-to-face interviews to ensure accurate and complete data collection.

Vaccination status was recorded as either vaccinated (≥1 dose of HPV vaccine) or not vaccinated, and participants were asked about their sources of information, including healthcare providers, internet/social media, family/friends, and school/college programs. Socioeconomic status was classified into upper middle, lower middle, upper lower, and lower class based on household income and occupation. Education level, age, and marital status were also documented to assess their relationship with knowledge and vaccine uptake.

Data were entered into Microsoft Excel and analyzed using SPSS version 25.0. Descriptive statistics were used to summarize demographic characteristics, knowledge, attitudes, sources of information, and vaccination status. Categorical variables were presented as frequencies and percentages. Associations between education, age, attitude, and socioeconomic status with knowledge and vaccine uptake were assessed using the chi-square test. A p-value <0.05 was considered statistically significant for all analyses.

Results

The study included 300 young females with a mean age of 20.8 ± 2.3 years. The majority of participants were aged 20–24 years (55%), followed by 15–19 years (30%) and 25–29 years (15%). Half of the participants had completed graduate-level education, 30% had higher secondary education, and 20% had secondary education or below. Most participants were single (90%), while 10% were married. Regarding socioeconomic status, 20% belonged to the upper middle class, 35% to lower middle, 30% to upper lower, and 15% to lower class (Table 1).

Table 1: Demographic Characteristics of Participants

Characteristic	Category	n (%)
Age (years)	**15–19**	90 (30%)
	20–24	165 (55%)
	25–29	45 (15%)
Education Level	**Secondary or below**	60 (20%)
	Higher Secondary	90 (30%)
	Graduate or above	150 (50%)
Marital Status	**Single**	270 (90%)
	Married	30 (10%)
Socioeconomic Status	**Upper middle**	60 (20%)
	Lower middle	105 (35%)
	Upper lower	90 (30%)
	Lower class	45 (15%)

Knowledge regarding HPV and its vaccine was moderate among participants. While 70% had heard about HPV, 60% correctly identified it as a cause of cervical cancer, and 55% were aware that the HPV vaccine prevents cancer. Only 30% knew the recommended age for vaccination, indicating a gap in detailed knowledge despite general awareness (Table 2).

Table 2: Knowledge about HPV and HPV Vaccine

Knowledge Parameter	Correct Response n (%)
Heard about HPV	210 (70%)
Know HPV causes cervical cancer	180 (60%)
Know HPV vaccine prevents cancer	165 (55%)
Know recommended age for vaccination	90 (30%)

Attitudes towards HPV vaccination were generally positive. Most participants (65%) agreed that the vaccine is safe, and 60% considered it necessary. Additionally, 55% expressed willingness to recommend the vaccine to peers. However, a notable proportion of participants were neutral or disagreed, highlighting some hesitancy (Table 3).

Table 3: Attitudes towards HPV Vaccination

Attitude Statement	Agree n (%)	Neutral n (%)	Disagree n (%)
HPV vaccine is safe	195 (65%)	60 (20%)	45 (15%)
HPV vaccination is necessary	180 (60%)	75 (25%)	45 (15%)
Willing to recommend vaccine to peers	165 (55%)	90 (30%)	45 (15%)

Vaccine uptake was low, with only 35% of participants having received at least one dose of the HPV vaccine, while 65% had not been vaccinated. This demonstrates a significant gap between awareness and actual vaccination coverage (Table 4).

Table 4: HPV Vaccine Uptake

Vaccine Status	n (%)
Vaccinated	105 (35%)
Not vaccinated	195 (65%)

Healthcare providers were the most common source of information about HPV vaccination (40%), followed by the internet or social media (30%), family and friends (20%), and school or college programs (10%), suggesting that formal health channels play a critical role in dissemination of information (Table 5).

Table 5: Sources of Information

Source	n (%)
Healthcare providers	120 (40%)
Internet/social media	90 (30%)
Family/Friends	60 (20%)
School/College programs	30 (10%)

Analysis of knowledge by education level showed that participants with higher education were more likely to have adequate knowledge about HPV. Adequate knowledge was reported in 68% of graduates, 50% of higher secondary participants, and 30% of those with secondary education or below. The association between education and knowledge was statistically significant ($p < 0.001$), indicating that education strongly influences awareness (Table 6).

Table 6: Knowledge by Education Level

Education Level	Adequate Knowledge n (%)	Inadequate Knowledge n (%)	Total	p-value
Secondary or below	18 (30%)	42 (70%)	60	<0.001
Higher Secondary	45 (50%)	45 (50%)	90	
Graduate or above	102 (68%)	48 (32%)	150	
Total	165 (55%)	135 (45%)	300	

Vaccine uptake differed across age groups. Participants aged 20–24 years had the highest vaccination rate, with 70 of 165 individuals (42%) vaccinated, compared to 22% (20/90) in the 15–19-year age group and 33% (15/45) in the 25–29-year group. The association between age and vaccination status was statistically significant (p =

0.03), indicating that young adults in the 20–24-year range were more likely to receive the HPV vaccine than their younger or older counterparts (Table 7).

Table 7: Vaccine Uptake by Age Group

Age Group (years)	Vaccinated n (%)	Not Vaccinated n (%)	Total	p-value
15–19	20 (22%)	70 (78%)	90	0.03
20–24	70 (42%)	95 (58%)	165	
25–29	15 (33%)	30 (67%)	45	
Total	105 (35%)	195 (65%)	300	

Vaccination status was also strongly associated with participants' attitudes towards the HPV vaccine. Among those with a positive attitude, 46% (90/195) were vaccinated, whereas only 13% (15/105) of participants who were neutral or disagreed with vaccination received it. This association was highly significant ($p < 0.001$), demonstrating that favourable perceptions towards the vaccine are strongly linked to actual vaccine uptake (Table 8).

Table 8: Vaccine Uptake by Attitude towards Vaccine

Attitude (Agree)	Vaccinated n (%)	Not Vaccinated n (%)	Total	p-value
Positive (Agree)	90 (46%)	105 (54%)	195	<0.001
Neutral/Disagree	15 (13%)	90 (87%)	105	
Total	105 (35%)	195 (65%)	300	

Discussion

The present study evaluated knowledge, attitudes, and uptake of the HPV vaccine among 300 young females in peripheral areas of Himachal Pradesh. The majority of participants were aged 20–24 years and had completed graduate-level education, reflecting a relatively educated cohort. Socioeconomic status varied, with most participants belonging to the lower middle and upper lower classes. These demographic characteristics are consistent with previous community-based studies, which reported higher female participation among educated and middle-income groups [13].

Knowledge regarding HPV and its vaccine was moderate, with 70% of participants having heard about HPV and 55% aware of the vaccine's preventive benefits. However, only 30% knew the recommended age for vaccination, indicating significant gaps in detailed knowledge. Similar trends have been observed in other Indian studies, where general awareness was higher than specific knowledge about vaccine schedules and cervical cancer prevention [14,15]. Our findings highlight the need for targeted educational interventions, especially regarding the timing and benefits of vaccination.

Attitudes towards vaccination were generally positive, with 65% considering the vaccine safe and 60% acknowledging its necessity. Despite favourable attitudes, actual vaccine uptake was low, with only 35% having received at least one dose. This gap between awareness and practice aligns with previous reports from India and other low- and middle-income countries, where vaccine hesitancy, limited access, and inadequate health promotion contributed to suboptimal coverage [16]. Our study further demonstrated that vaccination was significantly associated with age and attitude; participants aged 20–24 years and those with positive perceptions were more likely to be vaccinated. These findings are consistent with prior research emphasizing that favorable attitudes and older adolescent age increase likelihood of vaccine uptake [17,18].

Higher education was strongly associated with adequate knowledge, and healthcare providers were the most common source of information, reinforcing the critical role of formal health channels in promoting vaccine awareness.

Socioeconomic status also influenced uptake, with participants from higher SES categories being more likely to be vaccinated. These associations highlight the multifactorial nature of vaccine acceptance, influenced by education, economic status, and trusted information sources.

Limitations**:** The study employed a cross-sectional design and convenience sampling, which may limit generalizability. Self-reported vaccination status may be subject to recall bias, and causal relationships cannot be established. Additionally, the study was confined to selected health facilities in Himachal Pradesh, which may not reflect patterns in other regions. Despite these limitations, the study provides valuable insights into knowledge gaps, attitudes, and determinants of HPV vaccine uptake among young females in peripheral areas of India.

Conclusion

This study highlights that while general awareness of HPV and its vaccine is moderate among young

females in peripheral areas of Himachal Pradesh, detailed knowledge and actual vaccine uptake remain suboptimal. Positive attitudes, higher education, and higher socioeconomic status were significantly associated with better knowledge and higher likelihood of vaccination, underscoring the importance of targeted educational interventions and accessible vaccination programs. Strengthening the role of healthcare providers and community-based awareness campaigns could bridge the gap between awareness and practice, ultimately improving HPV vaccine coverage and contributing to cervical cancer prevention in this population.

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