



AWARENESS AND ACCEPTANCE OF HPV VACCINATION AMONG WOMEN IN SOUTHERN INDIA

Obstetrics & Gynaecology

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ABSTRACT

Introduction: Cervical cancer remains one of the most significant cancer burdens among women in India. Obstinate infection with high-risk types of human papillomavirus (HPV) is well-established as the principal causative factor for cervical cancer. Awareness and acceptance are key to improving vaccine uptake in India. **Objectives:** To assess awareness of HPV and HPV vaccines, evaluate their acceptance of the HPV vaccine for women aged 18 - 40, and identify factors influencing this acceptance. **Methods:** This study was conducted in the Department of Obstetrics and Gynaecology, on 1150 patients between 18 to 40 years of age. **Results:** A total of 1,150 participants, yielded a valid response rate of 91.48%, 73.91% were graduates. Most participants were employed full-time (86.60%) and lived in urban areas (75.30%). Among all respondents, 68.60% expressed willingness to receive the HPV vaccine. 48.1% correctly identified the primary mode of HPV transmission. A high proportion, 86.6%, were familiar with cervical cancer, while only 37.5% recognized HPV vaccination as the most cost-effective method to prevent cervical cancer. **Conclusion:** Our study identified a significant gap in understanding regarding HPV infection and vaccination, underscoring the need for a more comprehensive and integrated educational approach about HPV's role in carcinogenesis, vaccination, and cervical cancer prevention.

KEYWORDS

INTRODUCTION

Cervical cancer remains one of the most significant cancer burdens among women in India. According to the Global Cancer Observatory and other recent reports, in 2022 India recorded an estimated 123,907 new cases of cervical cancer and 77,348 deaths annually, making it the second most frequent cancer among Indian women, especially those aged 15 to 44 years. The age-standardized incidence rate is about 17.7–18 per 100,000 women, while the age-standardized mortality rate stands at approximately 11.1–11.4 per 100,000 women. [1-3].

The five-year prevalence rate of cervical cancer in India is estimated at 42.8 per 100,000 women, and the survival rate varies, with recent studies indicating a five-year survival ranging between 38.6% and 63.9%, strongly dependent on the stage at diagnosis. These figures underline the considerable and ongoing public health challenge cervical cancer poses in the Indian context. [3]

Obstinate infection with high-risk types of human papillomavirus (HPV) is well-established as the principal causative factor for cervical cancer. Notably, approximately 71% of cervical cancer cases worldwide are linked to persistent infections with HPV types 16 and 18, which are among the most oncogenic strains of the virus. This strong etiological association underscores the critical role of HPV in the pathogenesis of cervical cancer and highlights the importance of targeting these virus types for prevention strategies. Vaccination against HPV currently stands as the most effective and pivotal intervention to reduce the incidence of cervical cancer and related HPV-associated diseases. By inducing immunity against the high-risk HPV strains, particularly types 16 and 18, HPV vaccines dramatically decrease the risk of developing precancerous cervical lesions and invasive cervical cancer later in life. Consequently, global health authorities prioritize HPV vaccination as a cornerstone of cervical cancer prevention efforts. [4,5]

The World Health Organization (WHO) recommends that HPV vaccination programs primarily focus on adolescent girls before they become sexually active, as this timing maximizes vaccine efficacy by preventing initial HPV infection. Furthermore, WHO has set an ambitious global target to achieve at least a 90% full HPV vaccination coverage among girls under the age of 15 by the year 2030. This target aligns with broader strategies to eliminate cervical cancer as a public health threat through comprehensive vaccination, screening, and treatment. [6,7]

Reflecting this global commitment, as of April 2025, a total of 147 countries have integrated the HPV vaccine into their National Immunization Programs (NIPs). This widespread adoption signifies a major advancement in cancer prevention and underscores the collective efforts of countries to protect future generations of women from cervical cancer through proactive immunization measures. [8]

In India, two main HPV vaccines are currently approved and available: the quadrivalent Gardasil, targeting HPV types 6, 11, 16, and 18, and

the bivalent Cervarix, targeting types 16 and 18. Additionally, the indigenously developed quadrivalent vaccine Cervavac was introduced in 2023 by the Serum Institute of India at a substantially lower price, making vaccination more affordable. Gardasil 9, covering nine HPV types, is also available at a higher cost. Although HPV vaccination was introduced in 2008, it has not yet been included in India's national immunization program, but some states like Punjab and Karnataka have implemented pilot vaccination programs achieving high coverage rates, such as 97% in Punjab. Despite these efforts, the overall vaccination coverage remains low nationally. [9]

Awareness and acceptance are key to improving vaccine uptake in India. Studies indicate varied awareness levels of HPV and the vaccine among parents, with acceptance rates ranging from about 46% to nearly 80% depending on the region. A notable rural study in Mysore reported that nearly 80% of parents were willing to vaccinate their daughters, influenced positively by beliefs in vaccine safety, risk of HPV infection, and family support. Barriers to acceptance include concerns about side effects, vaccine cost, perceived low risk of cervical cancer, fear of pain, and family disapproval. Healthcare providers' recommendations and government endorsements play crucial roles in shaping parental acceptance, highlighting the need for targeted health education and policy support to increase vaccination rates. [10]

This study aimed to assess awareness of HPV and HPV vaccines, evaluate their acceptance of the HPV vaccine for women aged 18 - 40, and identify factors influencing this acceptance. The goal was to generate evidence to support the development of targeted, evidence-based health interventions to improve HPV vaccination coverage among women.

MATERIALS AND METHODS

A cross-sectional study was conducted in Bangalore among women aged 18 to 40 years following well-defined inclusion and exclusion criteria. Only women who consented to participate and had not previously received the HPV vaccine were included. A comprehensive questionnaire was developed, rigorously reviewed, and validated before being distributed via Google Forms. Prior to the main study, a pilot test with 15 participants was carried out to ensure clarity and relevance. The questionnaire covered multiple domains: demographic information; knowledge about HPV, HPV vaccines, susceptibility to HPV, and severity of HPV-related infections; attitudes toward the vaccine including perceptions of its importance, effectiveness, and safety; and the intended age for vaccination. It also explored "cues to action" such as whether participants knew someone diagnosed with cervical cancer or vaccinated against HPV, exposure to negative news about the vaccine, and doctors' recommendations. Additionally, participants were asked about their primary sources of information about HPV and the vaccine, their vaccine preferences, and reasons for refusing vaccination. Responses were collected using a 5-point Likert scale (ranging from strongly agree to strongly disagree) and yes/no

dichotomous items.

This methodical approach allowed a detailed assessment of awareness and acceptance levels and identified key factors influencing vaccine uptake. The inclusion of cues to action and information sources is particularly valuable for tailoring health communication strategies to increase vaccination coverage effectively. Using validated questionnaires and pilot testing ensured reliability and relevance to the target population, providing evidence to design targeted interventions addressing barriers such as misinformation, safety concerns, and social influences.

Statistical analyses were carried out using R software version 4.3.2. Categorical variables were summarized as frequencies or percentages. To compare differences between groups intending to vaccinate and those refusing vaccination, the Chi-square test or Wilcoxon rank sum test was applied as appropriate. Univariate analyses were first conducted to identify factors associated with acceptance of HPV vaccine. To further evaluate the influence of the Health Belief Model (HBM) components on vaccine acceptance, a multivariable logistic regression model was built using the forward stepwise selection method. A p-value less than 0.05 was considered indicative of statistical significance. This analytical approach allowed a robust examination of key factors related to HPV vaccine acceptance.

RESULTS

A total of 1,257 women participated in the survey, with 1,150 valid questionnaires returned, yielding a valid response rate of 91.48%. Incomplete responses were excluded from analysis. The study population was evenly distributed across three age groups, each representing roughly one-third of the sample. Regarding educational background, 8.35% had completed high school, 73.91% were graduates, and 17.73% held postgraduate degrees. Most participants were employed full-time (86.60%) and lived in urban areas (75.30%). Among all respondents, 68.60% expressed willingness to receive the HPV vaccine. These demographic and baseline characteristics are summarized in Table 1, providing essential context for understanding factors influencing vaccine acceptance in this population.

Table 1 : Demographic Characteristics

Characteristics	Cases (n)	Proportion (%)
Age		
18 – 25	175	15.22
26-35	736	64
35-40	239	20.78
Education		
High school	96	8.35
Graduation	850	73.91
Post graduation	204	17.73
Marital status		
Married	616	53.56
Unmarried	396	34.44
Divorce/Widowed	138	12
Employment		
Full time	996	86.60
Part time	54	4.70
House wife	100	8.69
Area of residence		
Urban	866	75.30
Rural	284	24.7
HPV Vaccine acceptance	789	68.60

Among the participants regarding the awareness of the HPV and HPV vaccine, 48.1% correctly identified the primary mode of HPV transmission. A high proportion, 86.6%, were familiar with cervical cancer, while only 37.5% recognized HPV vaccination as the most cost-effective method to prevent cervical cancer. Participants correct response rates for seven knowledge questions about HPV and the vaccine ranged widely from 25.5% to 82.3%. The overall knowledge scores, with a maximum of 7 points, varied across individuals from 0 to 7, with an average score of 5.14 (SD = 1.69). This indicates moderate awareness with some significant gaps in detailed knowledge about HPV and its prevention.

Univariate analyses revealed several factors significantly associated with acceptance of the HPV vaccine ($p < 0.05$). These included the educational attainment, employment status, place of residence, and

annual household income. Additionally, higher levels of knowledge about HPV and related diseases, perceived risk of HPV infection and transmission, as well as perceived health consequences of HPV infection, strongly influenced acceptance. Social factors also played a role; having a family member or close acquaintance diagnosed with cervical cancer or vaccinated against HPV, viewing vaccination as important for their health, perceiving the vaccine as effective and safe were all important. Furthermore, participants who had heard fewer negative messages about the HPV vaccine and those who received recommendations from doctors were significantly more likely to accept vaccination. These findings highlight that acceptance is multifactorial, involving socioeconomic, cognitive, perceptual, social, and healthcare communication influences. Emphasizing accurate information dissemination, healthcare provider endorsements, and addressing concerns about safety and timing could enhance vaccine uptake.

Multivariable logistic regression analysis revealed several significant factors influencing HPV vaccine acceptance. Those who perceived themselves to have an average risk of HPV infection had an odds ratio (OR) of 2.14 (95% CI: 1.54–3.13), and those with a high perceived risk had an OR of 3.55 (95% CI: 2.40–8.10), indicating increased likelihood of acceptance. Participants who considered HPV vaccination very important showed a strong association with acceptance (OR = 5.70, 95% CI: 2.61–31.03). Having someone in their social circle who had received the HPV vaccine also increased acceptance (OR = 2.33, 95% CI: 2.41–3.92).

Additionally, receiving a doctor's recommendation significantly raised the odds of vaccine acceptance (OR = 3.43, 95% CI: 3.65–5.25). Conversely, participants with only a high school education had decreased acceptance odds (OR = 0.57, 95% CI: 0.37–1.07). Exposure to negative information about HPV vaccines was also negatively associated with acceptance, showing an OR of 1.59 (95% CI: 1.43–1.82). These findings underscore the importance of perceived risk, education, healthcare provider influence and misinformation in shaping vaccine acceptance decisions.

The findings revealed that participants most frequently obtained information about HPV vaccination from government or CDC platforms ($n = 675$, 58.69%), followed by doctors or medical staff ($n = 301$, 26.17%), and social media platforms ($n = 174$, 15.13%) [Fig 1]. When it came to preferences for public education platforms, participants showed a strong preference for accessing HPV vaccine-related educational content through government or CDC platforms ($n = 766$, 66.60%), social media ($n = 196$, 17.04%), and medical knowledge platforms ($n = 188$, 16.34%). This indicates a strong trust in authoritative sources and digital platforms for acquiring HPV vaccination information.

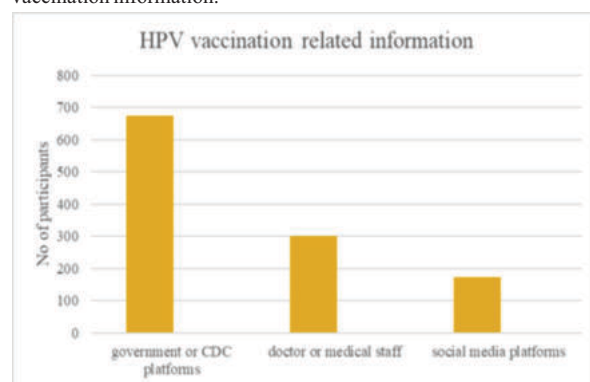


Fig 1 : Participants Response for HPV Vaccine Related Source of Information

Among participants, the majority (68.62%) expressed willingness to receive both domestic and imported HPV vaccines, indicating that both options were acceptable. However, among those reluctant to vaccinate ($n = 361$, 31.40%), the primary reasons cited for refusal included concerns about vaccine safety ($n = 152$, 42.10%), that they were too young for immediate vaccination ($n = 85$, 23.54%), and the high cost of HPV vaccines ($n = 124$, 34.34%). These findings reflect common barriers to vaccine uptake and highlight the need for addressing safety perceptions, age-related concerns, and affordability to improve HPV vaccination rates.

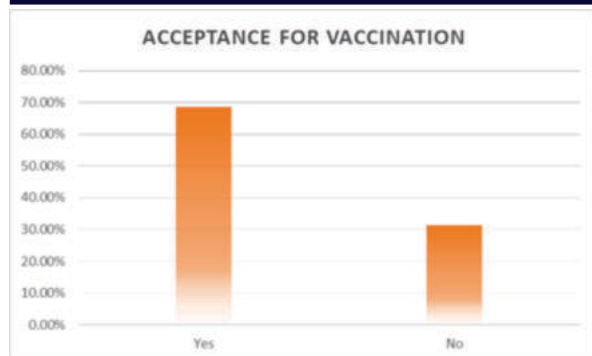


Fig 2 : Acceptance of Participants for Vaccination

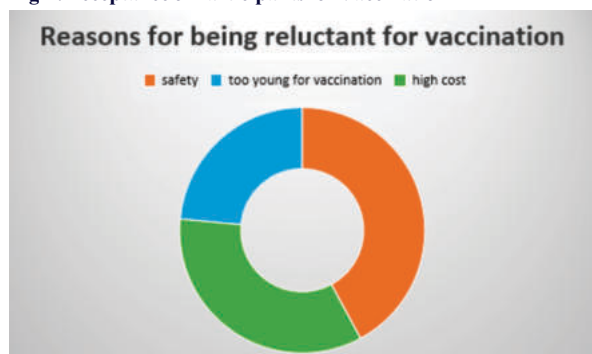


Fig 3 : Reasons for Being Reluctant for Vaccination

DISCUSSION

Cancer remains a formidable health challenge, with cervical cancer being the most common gynaecological malignancy affecting women aged 15 to 44 years. Research has demonstrated that HPV vaccines play a critical role in preventing certain cancers, including cervical cancer. However, knowledge about HPV, its link to cervical cancer, and preventive measures remains low. [11]

Despite the proven effectiveness and significant potential community impact of HPV vaccination, its uptake remains very low in many developing countries, including India. Key reasons for this low uptake include a low perceived risk of cervical cancer among the population, limited availability of the vaccine, and its high cost, which can be prohibitive for many. Additionally, cultural barriers, misinformation regarding vaccine safety and effectiveness, and limited inclusion in national immunization programs contribute to the slow adoption of HPV vaccination. Addressing these challenges through enhanced awareness programs, affordable vaccine options, and integration into national health policies is critical for improving vaccine coverage and reducing cervical cancer burden in India. [12]

Lack of adequate knowledge about the role of HPV in causing cervical cancer and the preventive potential of the HPV vaccine is one of the most critical factors contributing to the low uptake of vaccination. Studies in India have shown that awareness of HPV, its link to cervical cancer, and the availability and benefits of vaccination remain insufficient, even among young adults and healthcare-related students. This knowledge gap hampers effective prevention efforts, underscoring the urgent need for widespread education and awareness programs to improve understanding and acceptance of HPV vaccination as a key strategy to reduce cervical cancer incidence. [13]

In our study, we found that the majority of participants were aware of HPV's role in causing cancers such as cervical cancer in women. This finding aligns with a study conducted by Kumar A et al. (2020), which reported that among medical students, 94% recognized that HPV can cause cancer in humans, and 84.5% specifically identified its link to cervical cancer in females. This comparison highlights consistent knowledge levels about HPV and its cancer association within healthcare-related populations in India. [14]

The results of our study are consistent with those reported by Chawla PC et al. in 2016, where 91% of respondents were aware that HPV is the principal cause of cervical cancer. This reinforces the finding that a substantial majority recognize the critical role of HPV in cervical

cancer development, highlighting the importance of continued education among healthcare providers and the general public to improve HPV vaccination rates and cervical cancer prevention strategies.

In our study, approximately 68.6% of women showed willingness to receive the HPV vaccine, which is lower compared to the 88% acceptance rate reported by Mehta et al. [16] Previous research by K. Swarnapriya et al. in 2015 found that only 6.8% of participants had actually received the vaccination. The low uptake in these studies has been attributed to concerns about vaccine efficacy, fear of side effects, high cost, and a low perceived risk of cervical cancer. These factors highlight persistent barriers to widespread HPV vaccination in India. [17]

The current study was designed to assess the level of knowledge among women regarding HPV infection and its associated factors. Knowledge among healthcare providers is especially critical, as it directly influences their willingness to recommend the HPV vaccine to patients [18], which in turn significantly impacts overall vaccine uptake within the community [19]. Adequate awareness and a positive attitude toward HPV vaccination among are essential prerequisites for effective and successful implementation of vaccination programs. Given their frontline role well-informed providers can contribute substantially to increasing HPV vaccine acceptance and coverage at the community level, in cervical cancer prevention efforts.

Prevention of cervical cancer can be effectively achieved through HPV vaccination and regular screening, which are recommended for women across all age groups. Despite these strong recommendations, HPV vaccination rates and cervical cancer screening remain alarmingly low in many populations. Recognizing this gap, the current study also aimed to educate and raise awareness about the importance of HPV vaccination and screening among students. By doing so, the study anticipates a positive impact on enhancing knowledge and encouraging proactive health behaviours in this group, which can ultimately contribute to increased vaccine uptake and early detection efforts, reducing the incidence and mortality of cervical cancer over time. Early vaccination, particularly before exposure to HPV, has been shown to dramatically reduce cervical cancer risk by up to 86-90%, highlighting the critical importance of timely prevention measures. [20]

CONCLUSION

Our study identified a significant gap in understanding regarding HPV infection and vaccination, underscoring the need for a more comprehensive and integrated educational approach about HPV's role in carcinogenesis, vaccination, and cervical cancer prevention. In India, where the burden of cervical cancer remains high, it is crucial to focus on patient education about primary prevention through screening and vaccination. This can only be effectively achieved if healthcare providers, including medical, paramedical, and nursing students, are thoroughly educated about all aspects of cervical cancer prevention and management. Integrating structured HPV education consistently will enhance knowledge and prepare them to advocate for HPV vaccination and cervical cancer screening confidently.

Recognizing the limitations of this study, including the modest sample size and convenience sampling method, we intend to conduct a larger, more representative survey in the future. This will allow a broader dissemination of information and foster comprehensive understanding and acceptance of cervical cancer prevention strategies. Ultimately, such efforts will contribute to reducing cervical cancer incidence and associated disease burden in India by empowering future healthcare professionals and the communities they serve.

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