



## Barriers and Facilitators to Cervical Cancer vaccination Among Young Females in Chennai: A Cross-Sectional KAP Study

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### ABSTRACT

Cervical cancer develops in the cervix, primarily caused by persistent infection with high-risk types of human papilloma virus (HPV). It is one of the most common cancers in women, especially in low- and middle-income countries. While most HPV infections resolve naturally, some persist and can lead to cervical cancer over time.

**Aim:** This study aims to evaluate the knowledge, attitudes, and practices (KAP) of young women in Chennai regarding cervical cancer, screening, and prevention, and to identify barriers and facilitators influencing participation in screening programs.

**Methodology:** A cross-sectional study was conducted from January to May 2024 among 222 young females, aged 13 and above. A semi-structured questionnaire assessed their KAP towards cervical cancer. Responses were analyzed using descriptive statistics, and Bloom's taxonomy was applied to categorize knowledge and attitude. Chi-square tests were used to determine statistical significance, with a p-value < 0.05.

**Results:** Although 78.2% of participants were aware of cervical cancer, knowledge of preventive measures was low—only 25.2% knew about the HPV vaccine, and 44% understood the correct Pap test frequency. Attitudes toward screening were mostly positive, with 73.2% agreeing that free screening reduces cervical cancer risk. However, actual preventive practices were limited—only 9% had undergone a Pap smear, and 10% had received the HPV vaccine. Statistical analysis showed no significant differences in KAP between groups ( $p > 0.05$ ), except for medical students, who demonstrated significantly higher knowledge levels.

**Conclusion:** Despite positive attitudes toward cervical cancer screening, there were notable gaps in knowledge and preventive practices among young women in Chennai. The findings underscore the need for targeted educational interventions, particularly on HPV vaccination and routine screening, to bridge these gaps.

**KEYWORDS:** Cervical cancer, screening, HPV vaccination, knowledge, attitudes, practices, Chennai.

### INTRODUCTION

Cervical cancer is a type of cancer that develops in the cells of the cervix, which is the lower part of the uterus connecting to the vagina. It ranks among the most common cancers affecting women worldwide, with significant prevalence, especially in low- and middle-income countries (1). Persistent infection with high-risk types of human papillomavirus (HPV), a common sexually transmitted infection, is recognized as the primary cause of cervical cancer (2). While most HPV infections clear on their own without causing harm, some infections persist, leading to changes in cervical cells that may progress to cancer over time (3).

### Risk Factors and Prevention

Several risk factors have been identified for cervical cancer. These include early initiation of sexual activity, having multiple sexual partners, smoking, a weakened immune system (such as from HIV infection), and prolonged use of oral contraceptives (4). The primary prevention strategy for cervical cancer involves vaccination against HPV. Vaccines that protect against high-risk types of HPV have shown to be highly effective in preventing infections that could lead to cervical cancer (5). Secondary prevention through regular screening is also critical. The Pap test (or Pap smear) and HPV DNA test are essential screening tools that help detect precancerous changes in cervical cells, allowing early intervention and treatment (6). When detected early, these precancerous changes can be treated before progressing to cancer, significantly reducing the risk of cervical cancer.



## Symptoms and Diagnosis

In its early stages, cervical cancer often does not present noticeable symptoms, which is why regular screening is so important (3). As the cancer advances, symptoms may become more apparent and include abnormal vaginal bleeding, such as bleeding after sexual intercourse or between menstrual periods, pelvic pain, and pain during intercourse (1). These symptoms should prompt immediate medical consultation for further investigation. Diagnostic evaluation typically starts with a pelvic examination, followed by a Pap test or HPV testing to assess for the presence of abnormal or infected cells (4). If these tests indicate possible cancer, a biopsy of the cervical tissue is performed to confirm the diagnosis. In more advanced cases, imaging studies such as MRI or CT scans may be needed to determine the extent of cancer spread.

## Treatment and Prognosis

Treatment options for cervical cancer are influenced by several factors, including the stage of cancer at diagnosis, the size of the tumor, and the overall health and preferences of the patient (5). For early-stage cervical cancer, surgery is often the primary treatment, which may involve a hysterectomy (removal of the uterus and cervix) or more conservative surgeries aimed at preserving fertility. Radiation therapy and chemotherapy are typically used for more advanced stages of cervical cancer or when surgery is not sufficient (2). The prognosis for cervical cancer is generally favorable if detected early, with high survival rates following prompt treatment (5). However, in cases where the cancer is diagnosed at an advanced stage, treatment becomes more complex, and the prognosis worsens, although advances in therapeutic approaches, including targeted therapies and immunotherapy, continue to improve survival outcomes (6).

## Importance of Awareness and Education

Raising awareness about cervical cancer, its risk factors, and the importance of prevention is essential for reducing the incidence and mortality of this disease (6). Educational initiatives focusing on the availability of HPV vaccination, the significance of regular screening, and recognizing early warning signs can empower women to take proactive steps in preventing cervical cancer (5). Public health campaigns play a vital role in spreading this knowledge, especially in regions where access to healthcare may be limited. By promoting preventive measures and encouraging early detection, these efforts have the potential to save lives and improve overall health outcomes for women globally (6).

## Lack of Awareness of Cervical Cancer

Socio-cultural factors play a significant role in limiting cervical cancer awareness. In many societies, discussing reproductive health is considered taboo, preventing open conversations about cervical cancer and its risk factors (7). Educational barriers further compound this issue, especially in rural and low-income areas, where access to information is limited. A lack of education can hinder awareness about cervical cancer, its risk factors, and the importance of early screening (8). Inadequate healthcare infrastructure also contributes to the problem, as limited access to routine medical care, such as Pap smears and HPV vaccinations, often results in late diagnosis and reduced awareness (9). Additionally, misinformation surrounding cervical cancer is prevalent, with common myths, such as the belief that it only affects older women or those with multiple sexual partners, further obstructing preventive efforts. Government and policy shortcomings, including the lack of effective cervical cancer awareness and prevention initiatives, exacerbate these challenges in certain regions (10).

## Increasing Awareness of Cervical Cancer

To address the barriers to cervical cancer prevention and promote awareness, several strategies can be implemented. First, comprehensive public health campaigns are essential for providing information about cervical cancer, its risk factors, symptoms, and the importance of regular screening. Integrating reproductive health education into school curriculums is another key approach to educating young people early on, helping to establish lifelong awareness about cervical cancer (11). Community outreach programs can further enhance this effort by utilizing community leaders, local organizations, and social workers to spread knowledge and educate women within their communities (12). Additionally, leveraging various media platforms, such as social media, television, and radio, can help disseminate information about cervical cancer prevention and the importance of screening to a broader audience (13). Offering free or subsidized Pap smears and HPV vaccinations, especially in underserved areas, is critical for encouraging more women to participate in regular screenings (14). Finally, establishing support groups and



workshops allows women to share experiences and learn from healthcare professionals about cervical cancer prevention and treatment (15).

## Role of Clinical Pharmacists in Cervical Cancer Awareness and Prevention

Clinical pharmacists play a crucial role in improving cervical cancer awareness and prevention through several key strategies. Patient education is fundamental, as pharmacists can inform individuals about the importance of regular screenings and vaccinations, helping them understand how these measures prevent cervical cancer. Counseling services provided by pharmacists can also guide patients on safe sexual practices and lifestyle choices that reduce cervical cancer risk. Advocacy is another critical area where clinical pharmacists can push for cervical cancer awareness programs and supportive policies within healthcare systems and communities (16). In vaccination programs, pharmacists can actively participate by administering HPV vaccines and ensuring patients complete the vaccination series. Additionally, pharmacists can collaborate with other healthcare providers to promote screenings, helping identify women due for cervical cancer screenings and referring them to appropriate services. Furthermore, pharmacists contribute to research and data collection efforts aimed at understanding barriers to cervical cancer screening and vaccination, which can inform the development of targeted interventions. Lastly, professional development is essential, as staying updated on the latest guidelines and advances in cervical cancer prevention allows pharmacists to provide accurate and current recommendations to patients (17). By combining these educational efforts, community involvement, and healthcare services, clinical pharmacists can significantly improve cervical cancer awareness and prevention.

This study intended to assess the barriers and facilitators to cervical cancer vaccination among young females towards cervical cancer, its screening and vaccination

## METHODOLOGY

### Study Design

This cross-sectional study was conducted between May and October 2024, focusing exclusively on female participants, while excluding male and incomplete responses. The participants included both graduate and undergraduate students from Chennai and its surrounding areas. The aim was to assess the knowledge, attitudes, and practices (KAP) of participants regarding a specific domain, along with their sociodemographic details and perceptions towards screening and vaccination.

### Sample Size

The sample size was calculated using the Raosoft online sampling calculator, considering a 95% confidence interval (CI), a 5.65% margin of error, and a 50% response distribution. Based on these parameters, the estimated sample size for the study was determined to be 222 participants.

### Study Technique

A structured questionnaire was employed as the primary data collection tool. The questions were adapted from validated publications to assess participants' KAP. The questionnaire comprised three main sections:

1. **Sociodemographic Details:** Collected information such as age, education level, and background.
2. **Knowledge Section:** Contained 10 questions aimed at assessing the participants' understanding of the topic.
3. **Attitude Section:** Included 5 questions designed to gauge the participants' attitudes towards screening, vaccination, and the subject matter.
4. **Practice Section:** Comprised 5 questions to assess participants' actual practices related to the topic, such as participation in screening or vaccination efforts.

The questionnaire was reviewed and validated by experts from the Department of Pharmacy Practice at C.L. Baid Metha College of Pharmacy. Once validated, it was distributed electronically using Google Forms. Participants were given a clear explanation of the study's objectives, and they were encouraged to clarify any doubts. The questionnaire took an average of 10-15 minutes to complete, and responses were collected through printed forms.

### Scoring and Analysis

The participants' responses were evaluated using Bloom's taxonomy cut-off pattern. Knowledge and attitude scores were categorized as follows:



- **High Level (80-100%):** Strong knowledge and a positive attitude toward the topic.
- **Moderate Level (60-79%):** Moderate knowledge with a neutral attitude.
- **Low Level (<60%):** Limited knowledge and a negative attitude.

This scoring system facilitated a clear interpretation of the participants' overall knowledge, attitudes, and practices, which were used to analyze their responses and draw meaningful conclusions.

**RESULTS**

**TABLE 1: socio-demographic characteristics**

Variables (N=222)	N (%)
<b>AGE IN YEARS</b>	
13-17	41 (18.4%)
18-23	131 (56.4%)
24-28	17 (7.2%)
>28	33 (18%)
<b>COURSE OF STUDYING</b>	
School	51 (23%)
Medical students	90 (40.5%)
Non medical	81 (36.5%)

Frequency and percentages distribution.

Among 222 study participants, Majority of them 131(56.4%) were between the age group of 18-23 and most of them were found to be medical graduates (n=90) followed by non – medical graduates (n=81). Refer Table 1.

**KNOWLEDGE BASED RESPONSE**

Table 2 shows the results of participant’s knowledge on cervical cancer, screening and its vaccination. Although three – fourth of the female participants had good knowledge on cancer, majority of them gave incorrect answers for questions related to screening and vaccination. Among the study population, 78.2% of them were aware of cervical cancer; 74.9 % knew about the causative organism; 71.6 % of them were aware of the age group prone to cervical cancer and 64.2% were knew about the symptoms of cervical cancer. 67% female gave whether it is malignant or benign 67%, and about the identification test 53.9. The least awareness was reported for full form of PAP test(34.9%); the time gap to take PAP test (44%);what is the vaccination for cervical cancer (25.2%); and the right age to take vaccine (32%). Refer table 2

**Table 2: Knowledge based responses**

S.No	Knowledge Questions	Correct N (%)	Incorrect N (%)
1	What do you know about cervical cancer?	172 (78.2%)	50 (21.8%)
2	What is the causative organism of cervical cancer?	161 (74.9%)	61 (25.1%)
3	Which age group is prone to cervical cancer?	156 (71.6%)	66 (28.2%)
4	What are the sign and symptoms of cervical cancer?	140 (64.2%)	82 (35.8%)



5	Is cervical cancer benign or malignant?	146 (67%)	76 (33%)
6	Identification test for cervical cancer?	117 (53.9%)	105 (46.1%)
7	What is the full form of PAP?	76 (34.9%)	146 (65.1%)
8	Optimal frequency of PAP test?	95 (44%)	127 (56%)
9	Do you know about vaccination for cervical cancer? If yes what is it	56 (25.2%)	166 (74.8%)
10	When must HPV vaccination be started?	69 (32%)	153 (68%)

**ATTITUDE BASED RESPONSE**

Highest positive attitude was seen among the study population for the question regarding educating the students about cervical cancer at the institution (92.3%). 73.2% of the females strongly agreed that, screening at free of cost can considerably reduce the risk of cancer and 78.2 % of females were agreed to go for screening test, if is available in the nearby health center A neutral perception was observed among the study population regarding the use of condom to reduce the risk of cervical cancer, and only a negative approach was seen among females towards the usage of contraceptive pills induced cervical cancer. Refer table 3

**Table 3. Attitude based responses**

S.No	Attitude Question	Agree N (%)	Disagree N (%)	Not Sure N (%)
1	Do you think institutions must educate students about cervical cancer?	203 92.3%	10 3.6%	9 4.1%
2	Do you think Screening of cancer at free of cost reduces the risk of cancer ?	161 73.2%	21 8.6%	40 18.2%
3	In case of availability of cervical cancer screening in nearby health centre will you go and check?	172 78.2%	10 3.6%	40 18.2%
4	Do you think usage of condom reduces risk of cancer?	95 43.4%	45 19.2%	82 37.4%
5	What is your opinion about usage of contraceptive pills induces cervical cancer?	89 40.8%	30 13.8%	103 45.4%

**PRACTICE BASED RESPONSE**

There was an overall poor practice seen among the study participants towards cervical cancer screening and its vaccination. Among the study population, only 10% were taken PAP smear test and HPV vaccination and this was found to be the least practice among young females. Out of 222 females, 69 (31.8%) were recommended vaccination for their friends which was found to be a fair practice. The highest positive attitude/perception was noted among females for willingness to educate about cervical cancer to the affected person and accepting the fact that less knowledge was the reason for not being screened for cervical cancer so far. Refer table 4.



**Table 4. Practice based responses**

S. No	Practice Question	Yes N (%)	No N (%)	Others N (%)
1	Have you taken the pap smear test at least? If yes, when was it	21 (9%)	191 (88%)	10 (3%)
2	Have you been vaccinated with HPV vaccine ?	23 (10%)	150 (68%)	49 (22%)
3	Have you recommended vaccination for cervical cancer to your friends ?	69 (31.8%)	153 (68.2%)	0 (0%)
4	If you know a person affected by cervical cancer .will you educate them?	201 (92.2%)	21 (7.8%)	0 (0%)
5	Do you think less knowledge is the reason behind for not being screened?	132 (62.3%)	90 (37.7%)	0 (0%)

**Association between Knowledge, Attitude, Practice and Demographic Characteristics**

**Table 5. Demographics versus KAP**

Demographics	N =222	Good Knowledge N (%)	Positive Attitude N (%)	Good Practice N (%)	P value
<b>Age</b>					
13-17	41	09 (20.9)	19 (46.3)	10 (26.8)	<0.0001
18-23	131	48 (36.6)	64 (48.8)	39 (29.7)	
24-28	17	05 (29.4)	12 (70.5)	06 (35.9)	
>28	33	15 (45.4)	30 (90.9)	13 (39.3)	
<b>Education</b>					
School	42	15 (35.7)	17 (40.4)	05 (11.9)	<0.0001
Medical	114	60 (52.6)	82 (71.9)	31 (27.1)	
Non medical	66	20 (30.3)	32 (48.4)	12 (18.1)	

**Note:** p < 0.0001 is highly statistically significant

The demographics of the study participants associated to their knowledge, attitude and practice on cervical cancer and its screening and vaccination was determined using Chi square test. The results showed that, there was a significant association (p<0.005) for age and educational degree with KAP score level. Females with the age > 28 years had good knowledge and medical graduates showed good knowledge when compared to other groups. Refer table 5

**DISCUSSION**

A cross-sectional study was conducted to assess the knowledge, attitude, and practice (KAP) concerning cervical cancer, its screening, and prevention among 222 young females in Chennai. The study population included a diverse group of participants from medical, non-medical, and basic schooling backgrounds. The majority (56.4%) of the respondents were in the age group of 18 to 23 years. This age group represented the largest segment of the participants, highlighting the focus on young adults in the study.

The study adheres to Bloom’s cut-off criteria for validating the scoring grade and pattern. Specifically, scores within the range of 80% to 100% were classified as representing a high level of knowledge & positive attitude, and at the same time, score above 50%



represented a good practice score among study population. This adherence to Bloom's criteria ensures that the evaluation of participants' knowledge and attitudes is consistent with recognized educational assessment standards.

### **Socio Demographic Characteristics:**

In our study, majority of the study participants (56.4%) were predominantly young females, between the age group of 18-23. Teenagers aged 13-17 made up 18.4% of the group, while a smaller proportion, 7.2%, were aged 24-28. Additionally, 18% of the participants were over 28 years old. This was indicating some diversity in age among the respondents. In terms of educational background, the study featured a diverse sample. Medical students comprised the largest group at 40.5%, suggesting a focus on health-related topics. Those pursuing non-medical studies accounted for 36.5%, while 23% of the participants were still in school, reflecting a broad spectrum of academic engagement among the respondents.

### **Knowledge and Awareness on Cervical Cancer:**

In our study, three - fourth of the study population were heard about cervical cancer, its causative organism and the risk age group prone for cervical cancer. The high percentage (97%) of awareness may be attributed to the healthcare related background. This finding was almost similar to the studies done by Islam JY *et al.*<sup>[18]</sup> and Fitzpatrick M *et al*, where 90.3% and 81.2% participants have heard about cervical cancer respectively. In contrast, a study conducted in Malaysia by Ali AN *et al*, 2018, showed that 50% were knew about cervical cancer and its causative organism. This difference may be due to regional differences and high education attainment.

Knowledge about the signs and symptoms of cervical cancer varied across regions. In our study, 64.2% of respondents correctly identified the symptoms, indicating room for improvement. Malaysia faces a broader issue, with poor understanding of cervical cancer that likely extends to recognizing early symptoms (18). Nigeria displayed better overall awareness, but there were still gaps in recognizing symptoms and understanding disease progression (19). In Albania, low awareness of both symptoms and preventive measures further complicates the country's screening programs, limiting the effectiveness of its free testing initiatives. This widespread gap in recognizing symptoms calls for more comprehensive educational campaigns across all regions (17).

67% of study participants correctly identified cervical cancer as a malignant disease. Malaysia's awareness in this area was lower, compounded by the broader gaps in cervical cancer knowledge (18). Nigeria showed better awareness compared to Malaysia but still requires targeted educational efforts to ensure more consistent understanding of the disease's malignancy (18)(19). In Albania, the combination of low awareness about cervical cancer's malignancy and societal barriers, such as stigma and misconceptions about testing, presents significant challenges to public health initiatives. Addressing these misconceptions and providing clear information about the malignancy of cervical cancer is critical in improving awareness across all regions(17).

Awareness of cervical cancer identification tests, including the PAP test, showed a moderate level of knowledge in our study females, where 53.9% of respondents were aware of these tests. However, only 34.9% knew the full form of the PAP test, highlighting a need for further education. In Malaysia, low awareness of risk factors likely extends to identification tests, reflecting broader gaps in public health education(18). Nigeria demonstrated higher awareness than Malaysia, though there are still gaps in knowledge about specific tests like the PAP test(19). In Albania, despite the availability of free testing, awareness of the PAP test and HPV testing remains low, suggesting that free access alone is not sufficient without accompanying educational outreach. This highlights the critical need for increased efforts to educate the public about available screening methods in all regions(17).

Knowledge of the optimal frequency for PAP tests also varied significantly across the regions. In the present study, only 44% of respondents knew the recommended testing frequency, indicating a clear need for more education. Malaysia's broader public health challenges likely result in similarly low awareness about cervical cancer screening schedules(18). Nigeria showed better awareness but still requires targeted education on screening frequency and practices to further improve understanding(19). Increasing awareness about the importance of regular PAP tests is essential to encourage early detection of cervical cancer(17).

Vaccination awareness was particularly low across all places of Chennai participants, showing that only 25.2% of respondents knew about the cervical cancer vaccine, and only 32% were aware of the appropriate timing for HPV vaccination. Malaysia struggles with very low awareness of cervical cancer vaccination due to both educational and infrastructural issues, exacerbating the public health challenge (18). Nigeria demonstrated better awareness compared to Malaysia but still requires targeted education to raise awareness of HPV vaccination schedules and benefits (19). In Albania, despite offering free testing, awareness of the HPV



vaccine and other preventive measures remains low, underscoring the need for more robust public health education and outreach campaigns. The consistently low vaccination awareness across all regions points to a critical need for improved education about HPV vaccines and their role in preventing cervical cancer(17).

The statistical association ( $p < 0.005$ ) between the total knowledge score (TKS) towards cervical cancer and the education revealed, the medical students had a good score level due to their education curriculum with more clinical information compared to non medical background.

Overall, while Chennai shows relatively stronger awareness of cervical cancer compared to Malaysia, Nigeria, and Albania, significant gaps remain, particularly in areas such as understanding screening tests, vaccination, and PAP test frequency. These challenges are common across all regions, emphasizing the need for region-specific, targeted educational efforts to improve awareness and encourage preventive practices. Addressing these gaps will be crucial in reducing the global burden of cervical cancer and improving health outcomes for women

### Attitude towards the Cervical Cancer:

The survey on cervical cancer education and prevention revealed a spectrum of opinions among participants, highlighting both strong supports for certain health initiatives and areas needing further clarification. A striking 92.3% of respondents affirmed that institutions should play an active role in educating students about cervical cancer, reflecting a widespread belief in the importance of early awareness and proactive education. Only a small percentage, 3.6%, disagreed, and 4.1% were uncertain, signaling broad agreement on the need for institutional involvement in health education.

When it came to the potential impact of offering free cancer screening, 73.2% of participants believed that it would effectively reduce the risk of cervical cancer. However, 18.2% expressed doubt, and 8.6% were undecided, indicating that while the majority sees clear benefits, a notable portion of the population may be uncertain about the efficacy or accessibility of such programs.

The survey also explored participants' willingness to engage in cervical cancer screening if it were available at a nearby health center, with 78.2% indicating they would go for a check-up. Yet, 18.2% would not, and 3.6% remained unsure, suggesting that despite overall positive attitudes toward screening, some individuals may face barriers or have reservations about participating in such preventive measures.

Regarding the use of condoms as a means to reduce cervical cancer risk, opinions were mixed. 43.4% of respondents agreed that condoms could lower the risk, while 37.4% disagreed, and 19.2% were unsure. This variation points to a need for clearer public health messaging on how condom use can help prevent the transmission of HPV, the virus responsible for most cases of cervical cancer.

Finally, the belief that contraceptive pill use might contribute to the development of cervical cancer was a contentious issue among respondents. 40.8% thought that contraceptive pills could increase the risk, while 45.4% disagreed, and 13.8% were uncertain. This divided opinion highlights the necessity for more comprehensive and accurate information to address misconceptions and ensure that individuals are making informed decisions based on sound medical advice.

### CONCLUSION

The study reveals that a substantial proportion of the student population has inadequate knowledge, attitudes, and practices regarding cervical cancer. Specifically, over half of the participants exhibited poor understanding and behaviors related to cervical cancer prevention and management. This highlights a critical need for enhanced educational and awareness programs aimed at improving knowledge and practices around cervical cancer. Community pharmacists are crucial in spearheading these educational efforts, which could play a significant role in reducing both the incidence and mortality rates associated with the disease. By actively engaging in educational outreach, pharmacists can help bridge the knowledge gap and encourage proactive health behaviors.

### Study Limitations:

Despite employing a scientifically rigorous approach to sample selection, the study is limited by its small participant pool, which may introduce selection bias. The reliability of the data is potentially compromised by the possibility that participants may not always provide truthful responses. These factors should be considered when interpreting the results and planning future research.





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