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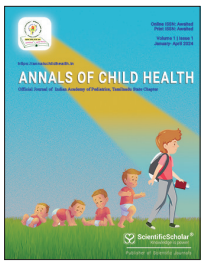


*Original Article*

# Knowledge, Attitude, and Practices of Human Papillomavirus Vaccination among Parents

Mounika B[1], Janani Sankar[1]

[1]Department of Pediatrics, Kanchi Kamakoti CHILDS Trust Hospital, Chennai, Tamil Nadu, India.

***Corresponding author:**
Mounika B,
Department of Pediatrics,
Kanchi Kamakoti CHILDS
Trust Hospital, Chennai,
Tamil Nadu, India.

drmounikabalu2006@gmail.com

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## ABSTRACT

**Objectives:** Human papillomavirus (HPV) infection is a major cause of cervical cancer, contributing significantly to the global disease burden, particularly in countries like India. Despite the availability of vaccines targeting oncogenic strains, awareness and uptake remain varied, influenced by education and socio-economic factors. This study aimed to assess parental knowledge, attitudes, and practices regarding HPV vaccination among children aged 0–18 years in a paediatric outpatient setting in a tertiary care hospital.

**Material and Methods:** A prospective cross-sectional survey was conducted among 160 parents using a semi-structured questionnaire. Convenience sampling was employed, and data were collected through face-to-face interviews in Tamil. The survey assessed parental awareness of cervical cancer, HPV transmission, and vaccine acceptability. Participants were queried on their knowledge of HPV, belief in vaccine preventability, attitudes toward vaccinating boys and girls, and willingness to pay for or receive free HPV vaccination. Statistical analysis was performed using SPSS software version 29.0, employing descriptive statistics and chi-square tests to evaluate associations between categorical variables, with significance set at $P < 0.001$.

**Results:** Among the participants, 56.9% had heard of cervical cancer, and 50.6% believed in vaccine preventability. Awareness regarding HPV's impact on boys was low (20%), with only 22.5% supporting HPV vaccination for boys compared to 49.4% for girls. Despite this, vaccine acceptability was high, with 87% of parents expressing willingness to pay for it. Though vaccination uptake was significantly higher in females (51.7%) compared to males (4.7%), greater awareness to reach 100% vaccination is needed.

**Conclusion:** The study highlights significant gaps in parental awareness regarding HPV infection and vaccination, particularly concerning its impact on boys. While vaccine acceptance was high among the educated population surveyed, targeted educational interventions are necessary to improve understanding and equitable uptake. Strengthening awareness and incorporating HPV vaccination into national immunization programs can help reduce cervical cancer incidence and mortality effectively.

**Keywords:** Attitude, Awareness, Human papillomavirus vaccination, Knowledge

## INTRODUCTION

Human papillomavirus (HPV), a small, non-enveloped deoxyribonucleic acid (DNA) virus, is highly transmissible and is primarily transmitted by sexual contact. Among the 200 serotypes discovered, 15–20 are oncogenic. About 99.7% of all cervical cancer cases demonstrate oncogenic HPV DNA with a lag period of 15–20 years from infection to invasive cancer disease.[1] In India, the most common prevalent genotypes as a cause of cervical cancer in women are 16 and 18. Non-oncogenic HPV serotypes 6 and 11 contribute

to over 90% of benign genital infections such as genital warts.

According to Catalan Institute of Oncology (ICO) and the International Agency for Research on Cancer (IARC) HPV Information Center recent data,[2] cancer of the cervix uteri is the 4th most common cancer among women worldwide, with an estimated 604,127 new cases and 341,831 deaths in 2020. Worldwide, mortality rates of cervical cancer are substantially lower than incidence, with a ratio of mortality to incidence of 57%. About 123,907 new cervical cancer cases are diagnosed annually in India, and it ranks as the 2nd leading cause of female cancer in women aged 15–44 years in India.

Cervical cancer is essentially a preventable disease when detected in the precancerous stage. With the evolution and practice of screening tests, early detection is possible and there is a considerable reduction in mortality. To further prevent mortality and morbidity, vaccines will be of great help.

HPV vaccination is a revolutionary approach to the primary prevention of cervical cancer. Quadrivalent and nonavalent vaccines against oncogenic and non-oncogenic strains of HPV are available in the market. In India, Quadrivalent vaccines are available for females aged 9–45 years, and nonavalent vaccines are available for boys aged 9–14 years and girls aged 9–26 years.

The HPV vaccines are of public health importance. The World Health Organization states that the HPV vaccine should be included in national immunization programs.[3] This is especially so in countries like India having considerable disease burden but without a screening program. All three licensed HPV vaccines (bivalent, quadrivalent, and nonavalent) have excellent safety, efficacy, and effectiveness profiles.[4]

## MATERIAL AND METHODS

A prospective cross-sectional questionnaire survey was conducted among parents of children aged 0–18 years of age attending the pediatric outpatient department in the month of May to June 2024.

### Sample size

In this study, the sample size was determined using a standard formula:

$$n = \frac{Z^2 P(1-P)}{d^2},$$

where n represents the sample size, p is the expected proportion of desired events (set at 0.22), q = 1-p, Z is the critical value of the standard normal distribution (at 95 % level of significance, Z = 1.96), d = 0.05 denotes acceptance level of errors (5 %). It was adopted from a nation-wide study conducted by Eva *et al*.[5] in Bangladesh, where the awareness of HPV vaccination was 22%. Based on this calculation, the sample size was determined to be 160.

### Sampling method

The study adopted convenience sampling and the parents who consented to participate in the study were included in the study. A semi-structured questionnaire was used for face-to-face interview with the parents. The initial questions selected were validated by a team of gynecologist, pediatrician, and psychologist, and the first pilot was tested in English. Adjustments were made to the questionnaire and then translated into the local language, Tamil. It included items surveying the knowledge, attitude, and practices of HPV vaccination. All the participants were provided with an information sheet explaining the study, and a signed informed consent was taken from them.

### Statistical analysis

The filled 21 item questionnaire, including demographic details, was collected from the participants, and the details were entered in the Microsoft Excel in a prescribed format, and the statistical tests were performed using the Statistical Package for the Social Sciences software version 29. Descriptive data were presented as frequency or percentage, and Chi-square test was used; $p < 0.001$ was considered statistically significant.

## RESULTS

Out of the 160 parents participated in the study, 68% were mothers, and the rest were fathers. About 67.5% of the population lived in the city, while the remaining lived in areas outside the city. About 72% of the population were well educated who at least had a bachelor's degree or higher, and 10% of the population had attended only primary school. Half of the study participants were parents of female children; one-fourth had male children, and the remaining had both male and female children.

More than half (53%) of the study participants were parents of eligible kids, defined as children more than 9 years who are eligible to get vaccinated, as shown in Figure 1.A majority (56.9%) acknowledged having heard of cervical cancer, while 25% were unaware of it and 18.1% were unsure. Knowledge about cervical cancer transmission through sexual contact was limited, with only 22.5% correctly identifying this mode of transmission, while 40% believed otherwise and 37.5% were unsure. Awareness of the relationship between cervical cancer and HPV stood at 37.5%, indicating a significant portion (62.5%) either did not know this connection or were uncertain. Despite this, a notable 50.6% believed that

cervical cancer is preventable by vaccine, yet 33.1% were unsure. Awareness of HPV vaccines was moderate, with 54.4% aware of their existence. Opinions on the necessity of HPV vaccination for children were split, with 49.4% in favor, 15.6% against, and 35% unsure. Knowledge of HPV affecting boys was limited, with only 20% aware, while 49.4% were unsure. Similarly, opinions on boys needing the HPV vaccine were divided, with 22.5% supporting the idea, 40% opposing it, and 37.5% uncertain [Table 1].

The survey results indicate varying attitudes toward HPV vaccination across different scenarios, as depicted in Table 2. A significant majority, comprising 87% of respondents, expressed willingness to pay for and receive the HPV vaccine, reflecting a positive inclination toward vaccination. Similarly, 85.5% indicated that they would vaccinate if it were free, reinforcing a strong overall positive sentiment toward vaccination efforts. The positive response rate for vaccinating a girl child stood at 61.9%, which is higher when compared to the 40% positive response rate for vaccinating boys. Notably, 73.3 % disagreed with the notion that only sexually active women should be vaccinated, emphasizing broader supports for universal vaccination strategies. Interestingly, 82.5% expressed a willingness to learn more about HPV and vaccination, indicating a potential for increased awareness and education efforts to further promote vaccination uptake.

Surprisingly, nearly half of the eligible children (51.7%) were vaccinated, out of which 8.3% of males and 91.7% of females were vaccinated, as shown in Figure 2. Parents were more likely to vaccinate their daughters against HPV than their sons ($P < 0.001$). This version clarifies the percentages and the significance of the gender difference in vaccination rates.

## DISCUSSION

The survey on awareness and knowledge regarding cervical cancer and HPV vaccination revealed mixed levels of understanding among respondents. Our study showed that 56.9% have heard of cervical cancer, and 50.6% believed that vaccines could prevent it. This is almost similar to the findings conducted in Puducherry by Siddharthar *et al.*[6], where 44.5 % of the women were aware of cervical cancer, whereas in a study conducted in the rural population of Kerala, almost three-fourths of the study population was aware of cervical cancer and its screening.[7] In contrast, studies conducted in certain parts of India conclude that the awareness regarding cervical cancer and its vaccine is far behind.[6-9]

A study conducted by Kumari *et al.*[10] in UP has showed a very low level of awareness, with only 8.07% of participants having

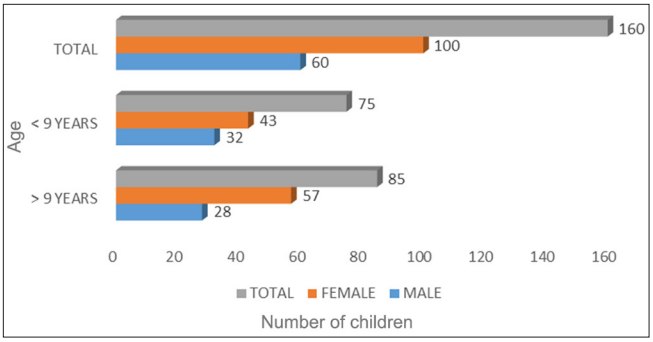


**Figure 1:** Sex distribution of eligible kids.

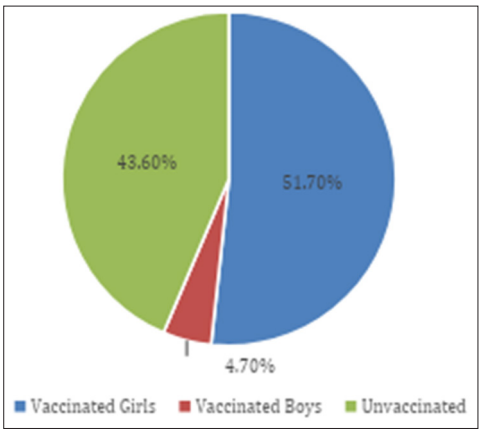


**Figure 2:** Vaccination among eligible kids.

**Table 1:** Knowledge based on response to questions.

| Questions | Response | | |
|---|---|---|---|
| | Yes (%) | No (%) | Don't know (%) |
| Have you heard of cervical cancer? | 91 (56.9) | 40 (25) | 29 (18.1) |
| Do you know it spreads by sexual contact? | 36 (22.5) | 64 (40) | 60 (37.5) |
| Have you heard of the relationship between cervical cancer and HPV? | 60 (37.5) | 46 (28.7) | 54 (33.8) |
| Is cervical cancer preventable by vaccine? | 81 (50.6) | 26 (16.3) | 53 (33.1) |
| Have you heard of vaccines to prevent HPV? | 87 (54.4) | 27 (16.9) | 46 (28.7) |
| Do children need the HPV vaccine? | 79 (49.4) | 25 (15.6) | 56 (35) |
| Does HPV affect boys? | 32 (20) | 49 (30.6) | 79 (49.4) |
| Do boys need the HPV vaccine? | 39 (22.5) | 51 (40) | 70 (37.5) |

HPV: Human papillomavirus

**Table 2:** Attitude based on response to questions.

| Questions | Response | | | |
|---|---|---|---|---|
| | More positive (%) | Positive (%) | Negative (%) | More Negative (%) |
| Will pay and get vaccinated | 38 (23.8) | 102 (63.7) | 18 (11.3) | 2 (1.3) |
| Will vaccinate if it was free | 37 (23.1) | 84 (52.5) | 26 (16.3) | 13 (8.1 |
| Vaccination of girl child | 32 (20) | 67 (41.9) | 49 (30.6) | 12 (7.5) |
| Vaccination of boy child | 15 (9.4) | 49 (30.6) | 74 (46.3) | 22 (13.8) |
| Only sexually active women should be vaccinated | 12 (7.5) | 34 (21.3) | 83 (51.9 | 31 (19.4 |
| Willingness to know about HPV and vaccination | 51 (31.9) | 81 (50.6) | 25 (15.6) | 3 (1.9) |

HPV: Human papillomavirus

heard of HPV infection and 2.08% of participants having HPV vaccine knowledge; it could possibly be attributed to the lower level of educated population in that part of our country, whereas our study population is highly educated.

Only 20% of the parents were aware of the fact that HPV can infect boys and vaccines are available to prevent it, which is in concordance with the study conducted by Hong Xie *et al*.[11]

In our study, we found a remarkably high level of willingness to vaccinate, exceeding 80%, which is far better than the pooled prevalence of 0.45 noted in the meta-analysis of HPV vaccination awareness in India conducted by Pal *et al*.[9] More than 80% of the parents were willing to vaccinate the child even if they must pay for the vaccine or if it is free. This contrasts with studies done in various parts of India, where the majority of the population were willing to vaccinate only if it was free of cost.[8,11] This high acceptance rate among the surveyed population may be due to the higher educational standards, socio-economic standards, and the awareness among them. In a study, Charakorn *et al*. found that despite poor knowledge, the acceptability of the HPV vaccine was high among the participants.[12]

Although people are aware of HPV infection and cervical cancer risk among females, they are unaware of the fact that boys can also be affected, and they must be vaccinated, showing a lower level of willingness to vaccinate boys compared to girls. Similar to our study, Xie *et al*.'s study conducted in China has shown that parents were more likely to vaccinate their daughters against HPV than their sons[11] ($P < 0.001$).

This is probably due to the lack of awareness and reduced availability of vaccines for boys.

It is notable that 82.5% showed openness to gaining further knowledge about HPV and its vaccination, highlighting the potential for heightened awareness campaigns to increase vaccination rates. It was reported that, counseling and information by health care providers increased the acceptance of HPV vaccine in a study done by Basu and Mittal in Kolkata.[13]

In a systematic review and meta-analysis done by Pal *et al*.[9] the overall pooled proportion of HPV vaccine uptake was only 4% with a 95% CI of 2–7%. Our study had an excellent uptake rate of 56% which reflects the educational status and awareness among the studied population. The low uptake rate among boys (8%) emphasizes on our responsibility to create awareness regarding vaccination in males.

## CONCLUSION

These findings underscore the need for enhanced education and awareness campaigns to address gaps in understanding about cervical cancer, HPV transmission, and vaccination benefits among the public.

The need for vaccination in male children and its availability should be taken to the public.

It's essential to advocate for the inclusion of HPV vaccination in national immunization programs. This step can effectively reduce cervical cancer rates and mortality rates..

**Author contributions:** MB: Concepts, design, definition of intellectual content, literature search, data acquisition, data analysis,statistical analysis, manuscript preparation, manuscript editing. JS: Concepts, manuscript editing,manuscript review, manuscript proofreading.

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