Knowledge, Attitude, and Practice Towards Vaccination for HPV Among Young Adults and Parents in South India: A Cross-Sectional Study

Amrutha JA[1], Sebin S Varghese[1], Drishya L[2] Shaiju S Dharan[3]
[1]*Pharm D Intern, Department of Pharmacy Practice, Ezhuthachan college of Pharmaceutical Sciences, Thiruvananthapuram, Kerala*
[2]*Assistant Professor, Department of Pharmacy Practice, Ezhuthachan college of Pharmaceutical Sciences, Thiruvananthapuram, Kerala*
[3]*Principal/HOD, Department of Pharmacy Practice, Ezhuthachan College of Pharmaceutical Sciences, Thiruvananthapuram. Kerala*

Abstract- Background: ***Cervical cancer remains a significant public health challenge globally, particularly in low- and middle-income countries (LMICs). Persistent infection with high-risk strains of Human Papillomavirus (HPV) is the primary cause, and preventive measures such as HPV vaccination and screening play a crucial role in reducing incidence. Despite global initiatives, low vaccine uptake and poor awareness continue to hinder prevention efforts.***

Objective: This study aimed to assess the knowledge, attitudes, and practices (KAP) of young adults and parents in Kerala regarding cervical cancer prevention and HPV vaccination.

Methods: A cross-sectional survey was conducted among 110 participants aged 20–35 years in Kerala, India, using a validated self-structured questionnaire. Data on demographic characteristics, knowledge, attitudes, and practices toward HPV vaccination were collected. Descriptive statistics, Chi-square tests, and Pearson correlation were employed to analyze associations between demographic factors and KAP.

Results: Among the participants, 49.1% demonstrated good knowledge, 29.1% had average knowledge, and 21.8% had poor knowledge. Attitudes toward HPV vaccination were predominantly positive, with 85.5% showing good attitudes, while only 3.6% exhibited poor attitudes. In contrast, vaccination practices were suboptimal—26.4% demonstrated good practice, 25.5% average practice, and 48.2% poor practice. Statistically significant associations were observed between age and attitude ($p = 0.001$) and between marital status and attitude ($p = 0.013$). Correlation analysis revealed significant positive associations between knowledge and attitude ($r = 0.224$, $p = 0.018$), knowledge and practice ($r = 0.221$, $p = 0.021$), and attitude and practice ($r = 0.393$, $p < 0.001$).

Conclusion: The findings highlight a substantial gap between positive attitudes toward HPV vaccination and actual preventive practices. While awareness levels were moderate and attitudes favorable, poor vaccination practices remain a concern. Targeted awareness campaigns, government-led vaccination programs, and community-based interventions are essential to bridge this gap and enhance HPV vaccine uptake, ultimately reducing the cervical cancer burden in India.

Keywords: HPV vaccine, human papilloma virus, cervical cancer

I.INTRODUCTION

Cervical cancer is a major public health concern worldwide, particularly in low- and middle-income countries (LMICs), where it ranks as one of the leading causes of cancer-related deaths among women. According to the World Health Organization (WHO), approximately 604,000 new cases of cervical cancer and 342,000 deaths were reported globally in 2020. The vast majority of these cases (about 85%) occur in LMICs, where access to screening, early detection, and preventive healthcare is limited (1).

Cervical cancer is primarily caused by persistent infection with high-risk types of the Human Papillomavirus (HPV) (2). HPV is a sexually transmitted virus, and nearly all sexually active individuals will be exposed to it at some point in their lives. While most HPV infections are transient and resolve spontaneously, persistent infections with high-risk strains, such as HPV-16 and HPV-18, can lead to the development of precancerous lesions and, eventually, invasive cervical cancer. The natural

history of cervical cancer development typically spans 10–20 years, providing a window of opportunity for prevention and early intervention (3).

The introduction of the HPV vaccine has transformed the landscape of cervical cancer prevention. Vaccination programs targeting adolescents, before their exposure to HPV, have demonstrated remarkable efficacy in reducing the prevalence of HPV infections, precancerous lesions, and ultimately cervical cancer (4). Furthermore, cervical cancer screening methods, such as Pap smears and HPV DNA testing, have proven to be effective in detecting early-stage abnormalities (5). Despite these advancements, cervical cancer remains highly prevalent in LMICs due to several challenges, including low vaccine uptake, inadequate screening coverage, limited public awareness, and socio-economic and cultural barriers (6).

The WHO launched the Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem, with the goal of reducing incidence to less than 4 cases per 100,000 women annually (7). This strategy emphasizes three key pillars: vaccination, screening, and treatment (8). By achieving 90% HPV vaccination coverage for girls, 70% screening coverage for women, and 90% access to treatment for precancerous lesions and invasive cancers, cervical cancer elimination is achievable within the next century (9).

However, these targets require robust public health systems, adequate resource allocation, and community engagement to overcome barriers to prevention and treatment. The success of these efforts hinges on addressing gaps in knowledge, attitudes, and practices related to cervical cancer and HPV prevention, particularly in resource-limited settings where the burden is highest (10).

This study aims to contribute to these efforts by assessing the knowledge, attitudes, and practices (KAP) of the target population regarding cervical cancer, its risk factors, and the preventive role of HPV vaccination (11). By identifying gaps and misconceptions, this research seeks to inform public health initiatives and policy development to reduce the global burden of cervical cancer and move closer to achieving its elimination as a public health problem (12).

II. MATERIALS AND METHODS

A random sampling method was used in the study. The state Kerala was the only focus for the data collection. Based on previous studies, the final sample size was 160. Survey were conducted among age group of 20 to 50 years in February to march 2025. The researcher obtained signed informed consent and explained the background of the study, the purpose, the principle of privacy and confidentiality and the precautions before conducting the survey. Inclusion criteria included 1.General population between the ages of 18-35. 2. Individuals willing to participate. The exclusion criteria were 1.Participants were failure to complete the questionnaire.2.Individuals not from Kerala.

The questionnaires (see Appendix) used for survey were self-structured and validated through expert panel. 10, questions each were included in the part of knowledge, attitude and practice respectively regarding the vaccination for HPV among young adults and parents. All the data were entered in Microsoft spreadsheet and proper analysis were carried out using Pearson correlation. The study was conducted after protocol approval by Institutional Research committee of Ezhuthachan College of Pharmaceutical Sciences.

III.RESULT

III a: Demographic Characteristics:

A total of 110 participants from Kerala were included in the study. The majority of participants belonged to the age group of 20–24 years (51.8%), followed by those aged 25–29 years (36.4%). Fewer respondents were below 20 years (4.5%), and the age groups 30–34 years and 35–39 years each constituted 3.6% of the participants. Females comprised 71.8% of the sample, while males accounted for 28.2% as shown in Figure 1 and 2.

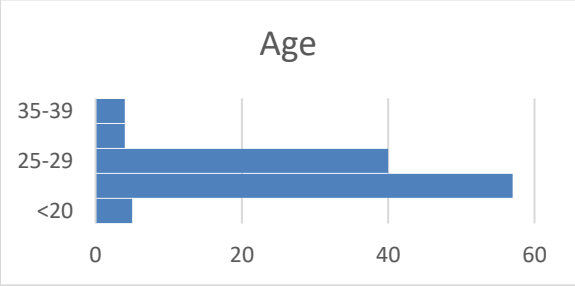

Figure. 1. Age distribution

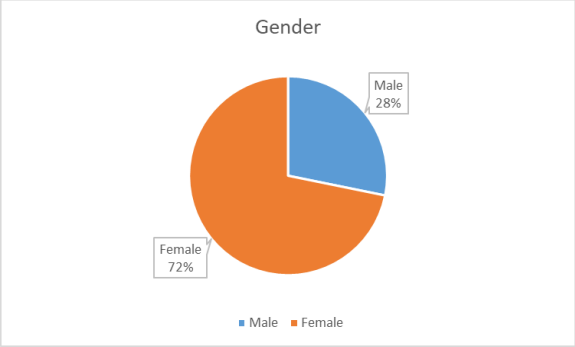

Figure. 2. Gender distribution

Among the 110 participants, a majority were single (74.5%), whereas married respondents accounted for 25.5%. the majority (80.0%) reported having no children, while 20.0% indicated having children.

III b: Knowledge

The knowledge section comprised 10 statements assessing participants' awareness of the use, risks, and benefits of HPV vaccine. Responses were graded as yes or no. The assessment of participants' knowledge regarding the use, risks, and benefits of HPV vaccine was quantified and categorized into three distinct levels: good, average, and poor. Out of the 110 participants surveyed, 54 (49.1%) were classified as having good knowledge, 32 (29.1%) demonstrated an average level of knowledge, while 24 (21.8%), were found to have poor knowledge on the subject.

III c: Attitude

The attitude section consisted of 10 statements exploring the frequency of positive behaviors related to HPV vaccine. The attitudes of participants toward the HPV vaccine were systematically evaluated and classified into three categories: good, average, and poor. Among the 110 respondents, 94 individuals (85.5%) exhibited a good attitude, showing the need of giving HPV vaccine available to all individuals in this country. The average attitude group comprised 12 participants (10.9%), reflecting moderate thoughts and doubts regarding the use of HPV vaccine. The poor attitude category included 4 individuals (3.6%), displaying a small population.

III d: Practice

The practice section included 10 statements evaluated on a scale of strongly agree to strongly disagree, capturing real-life actions and beliefs. The practical behaviours of participants concerning the HPV vaccine were categorized into three levels—good, average, and poor—based on their responses to key practice-related statements. Among the 110 participants, 29 individuals (26.4%) demonstrated good practice, showed that they have undertaken the actions and steps for HPV vaccination.

A further 28 participants (25.5%) exhibited average practice. This group reflected moderate adherence to recommended behaviours, but with occasional lapses. Individuals in this category may be possible to take HPV vaccine if they were provided by the government sources.

Notably almost half of the individuals, 53 participants (48.2%) were classified as having poor practice. This segment shows the need, that the normal population of India doesn't have a reach to these vaccines, which is very helpful for the future.

The distribution demonstrates that, almost half of the population have poor practice regarding the HPV vaccine. The presence of nearly half in the poor practice category is particularly concerning, as these shows the development of our healthcare sector.

ASSOCIATION OF KNOWLEDGE, ATTITUDE AND PRACTICE TO DEMOGRAPHIC VARIABLES

Age: Good knowledge was most common among participants aged 20–24 years (57.9%) and 25–29 years (50.0%), whereas the youngest (<20 years) and oldest (≥30 years) groups exhibited lower proportions of good knowledge (0% and 12.5%, respectively). However, this difference was not statistically significant (χ^2=11.6, df=6, p=0.702).

There was a significant association between age and attitudes toward HPV vaccination (χ^2=28.6, df=6, p=0.001). Participants aged 20–24 years exhibited the highest proportion of good attitude (93.0%), followed by those aged 25–29 years (85.0%). The lowest proportion of good attitudes was observed among participants under 20 years *Table.1. Association of knowledge, attitude,practice towards demographic variables*

Variable	Categories	Knowledge						Total		χ2	df	p
		Good		Average		Poor						
		No	%	No	%	No	%	No	%			
Age	<20	0	0.0	3	60.0	2	40.0	5	100.0			
	20-24	33	57.9	15	26.3	9	15.8	57	100.0			
	25-29	20	50.0	10	25.0	10	25.0	40	100.0			
	≥30	1	12.5	4	50.0	3	37.5	8	100.0	11.6	6	0.702
GENDER	Male	14	45.2	6	19.4	11	35.5	31	100.0			
	Female	40	50.6	26	32.9	13	16.5	79	100.0	5.2	2	0.073
MARITAL STATUS	Single	43	52.4	21	25.6	18	22.0	82	100.0			
	Married	11	39.3	11	39.3	6	21.4	28	100.0	2.1	2	0.353
HAVE CHILDREN	Yes	10	45.5	9	40.9	3	13.6	22	100.0			
	No	44	50.0	23	26.1	21	23.9	88	100.0			
	Total	54	49.1	32	29.1	24	21.8	110	100.0	2.2	2	0.327

	Categories	Attitude						Total		χ2	df	p
		Good		Average		Poor						
		No	%	No	%	No	%	No	%			
Age	<20	2	40.0	1	20.0	2	40.0	5	100.0			
	20-24	53	93.0	3	5.3	1	1.8	57	100.0	28.6	6	0.001
	25-29	34	85.0	5	12.5	1	2.5	40	100.0			
	≥30	5	62.5	3	37.5	0	0.0	8	100.0			
GENDER	Male	27	87.1	2	6.5	2	6.5	31	100.0	1.7	2	0.419
	Female	67	84.8	10	12.7	2	2.5	79	100.0			
MARITAL STATUS	Single	73	89.0	5	6.1	4	4.9	82	100.0	8.7	2	0.013
	Married	21	75.0	7	25.0	0	0.0	28	100.0			
HAVE CHILDREN	Yes	17	77.3	5	22.7	0	0.0	22	100.0	4.7	2	0.094
	No	77	87.5	7	8.0	4	4.5	88	100.0			
	Total	94	85.5	12	10.9	4	3.6	110	100.0			

Variable	Categories	Practice						Total		χ2	df	p
		Good		Average		Poor						
		No	%	No	%	No	%	No	%			
Age	<20	2	40.0	1	20.0	2	40.0	5	100.0			
	20-24	14	24.6	14	24.6	29	50.9	57	100.0	2.1	6	0.909
	25-29	12	30.0	11	27.5	17	42.5	40	100.0			
	≥30	1	12.5	2	25.0	5	62.5	8	100.0			
GENDER	Male	10	32.3	4	12.9	17	54.8	31	100.0	3.6	2	0.162
	Female	19	24.1	24	30.4	36	45.6	79	100.0			
MARITAL STATUS	Single	22	26.8	22	26.8	38	46.3	82	100.0	0.492	2	0.782
	Married	7	25.0	6	21.4	15	53.6	28	100.0			
HAVE CHILDREN	Yes	6	27.3	7	31.8	9	40.9	22	100.0	0.748	2	0.688
	No	23	26.1	21	23.9	44	50.0	88	100.0			
	Total	29	26.4	28	25.5	53	48.2	110	100.0			

(40.0%) and those aged 30 years or older (62.5%).

Good practice regarding HPV vaccination was highest among participants aged below 20 years (40.0%) and lowest among those aged 30 years or older (12.5%). However, these variations were not statistically significant (χ^2=2.1, df=6, p=0.909).

Gender: A higher proportion of females had good knowledge (50.6%) compared to males Male participants had slightly better practice (32.3%) compared to female participants (24.1%), though this difference was not statistically significant (χ^2=3.6, df=2, p=0.162).

Marital status: Good knowledge was slightly higher among single participants (52.4%) than married participants (39.3%). However, this association was not statistically significant (χ^2=2.1, df=2, p=0.353).

Single participants showed significantly better attitudes (89.0%) compared to married participants (75.0%) (χ^2=8.7, df=2, p=0.013).

(45.2%). The difference was not statistically significant (χ^2=5.2, df=2, p=0.073).

Good attitudes toward HPV vaccination were slightly higher among males (87.1%) compared to females (84.8%), although this difference was not statistically significant (χ^2=1.7, df=2, p=0.419).

The proportions of good practice were similar among single (26.8%) and married participants (25.0%), and the association was not statistically significant (χ^2=0.492, df=2, p=0.782).

Having children: Participants without children had slightly higher levels of good knowledge (50.0%) compared to those with children (45.5%), though this difference was not statistically significant (χ^2=2.2, df=2, p=0.327).

Participants without children had better attitudes (87.5%) compared to those with children (77.3%), although this difference was not statistically significant (χ^2=4.7, df=2, p=0.094).

Participants with children (27.3%) and without children (26.1%) showed similar levels of good practice, and the difference was not statistically significant (χ^2=0.748, df=2, p=0.688).

ASSOCIATION BETWEEN KNOWLEDGE, ATTITUDE AND PRACTICE

Knowledge and attitude: There was a statistically significant positive correlation between knowledge and attitude scores (r = 0.224, p = 0.018). This indicates that participants with better knowledge tended to have more positive attitudes towards HPV vaccination.

Knowledge and practice: Knowledge scores also showed a statistically significant positive correlation with practice scores (r = 0.221, p = 0.021), suggesting that better knowledge was associated with improved practices related to HPV vaccination.

Attitude and practice: The strongest correlation was observed between attitude and practice scores (r = 0.393, p < 0.001), indicating that participants with positive attitudes towards HPV vaccination were more likely to have good vaccination practices.

Table.2. Association between knowledge attitude and practice

		Knowledge Score	Attitude Score	Practice Score
Knowledge Score	Pearson Correlation	1	.224*	.221*
	Sig. (2-tailed)		.018	.021
	N	110	110	110
Attitude score	Pearson Correlation	.224*	1	.393**
	Sig. (2-tailed)	.018		.000
	N	110	110	110
Practice Score	Pearson Correlation	.221*	.393**	1
	Sig. (2-tailed)	.021	.000	
	N	110	110	110
*. Correlation is significant at the 0.05 level (2-tailed).				
**. Correlation is significant at the 0.01 level (2-tailed).				

IV. DISCUSSION

The present study provides important insights into the knowledge, attitudes, and practices regarding HPV vaccination among young adults and parents in Kerala. The results reveal a mixed scenario: while nearly half of the participants demonstrated good knowledge and the majority showed positive attitudes, actual preventive practices were alarmingly poor. This gap highlights the challenges in translating awareness and favorable perceptions into real-world action.

The proportion of participants with good knowledge (49.1%) is comparable to findings from other Indian studies, which reported moderate awareness of HPV vaccination but with regional variation depending on education level and healthcare access. The

predominance of good attitudes (85.5%) suggests that participants generally support HPV vaccination as an important preventive measure, indicating receptiveness to public health initiatives. However, the fact that almost half (48.2%) demonstrated poor practices underscores barriers such as lack of access, affordability concerns, and limited availability of vaccination programs in the community.

Demographic associations revealed that age significantly influenced attitudes, with younger participants (20–24 years) displaying the most positive outlook. This may reflect greater health awareness among younger, educated groups exposed to health information through digital media. Marital status also influenced attitudes, as single participants were more likely to show favorable perceptions compared to married participants. These findings suggest that targeted interventions tailored to demographic subgroups could improve vaccine uptake.

Correlation analysis further confirmed the interrelationship between knowledge, attitude, and practice. Knowledge was positively correlated with both attitude and practice, consistent with the KAP model, where increased awareness contributes to favorable perceptions and healthier behaviors. Notably, the strongest correlation was between attitude and practice ($r = 0.393$), reinforcing that fostering positive perceptions is key to improving vaccination uptake.

The poor practice levels despite favourable attitudes point to systemic and structural barriers rather than individual reluctance. Cost, accessibility, and lack of inclusion in national immunization schedules are likely contributing factors in India. Similar challenges have been reported across LMICs, highlighting the need for strong government-led policies. Integration of HPV vaccination into public immunization programs, subsidies to reduce cost, and school-based vaccination campaigns have proven effective in other settings and should be prioritized in Kerala and across India.

V. CONCLUSION

This cross-sectional study examined the knowledge, attitudes, and practices (KAP) regarding HPV vaccination among 110 young adults and parents in South India. The results revealed moderate levels of knowledge, with approximately half (49.1%) demonstrating good knowledge about HPV and vaccination. Attitudes were predominantly positive, with a substantial majority (85.5%) exhibiting favourable attitudes toward vaccination. However, actual vaccination practices were relatively poor, as nearly half (48.2%) of the participants reported inadequate vaccination practices.

The analysis further identified statistically significant associations between certain socio-demographic factors and attitudes. Younger participants (20–29 years) and single individuals showed significantly more positive attitudes compared to older and married respondents. Despite these variations, socio-demographic factors did not significantly influence knowledge or practices regarding HPV vaccination. Correlation analysis demonstrated positive interrelationships among knowledge, attitudes, and practices, with attitudes showing the strongest correlation with vaccination practices, highlighting the need for targeted educational Interventions to improve knowledge and foster positive attitudes to ultimately enhance vaccination uptake.

VI. RECOMMENDATIONS

Enhanced Community Education: Conduct targeted awareness campaigns through schools, colleges, and community centres. These initiatives should clearly communicate HPV risks, vaccination benefits, and dispel myths to improve knowledge and attitudes.

Healthcare Provider Engagement: Train healthcare professionals, particularly nurses and community health workers, to proactively counsel adolescents, young adults, and parents regarding the HPV vaccine, emphasizing safety, effectiveness, and preventive importance.

Integration with Routine Immunization: Promote HPV vaccination by integrating it into existing routine immunization programs or health check-ups. This strategy could help normalize the vaccine, improving acceptability and uptake.

Addressing Socio-cultural Barriers: Implement community dialogues involving religious and cultural leaders to address misconceptions and concerns regarding HPV vaccination, thereby reducing stigma and resistance rooted in cultural beliefs.

Improving Vaccine Accessibility and Affordability: Advocate for government-supported vaccination programs providing free or subsidized HPV vaccines

to reduce financial barriers and increase coverage among economically disadvantaged groups.

Strengthening School-based Programs: Expand school-based vaccination initiatives combined with educational programs. This will ensure better reach to young individuals and normalize discussions around HPV and sexual health from a preventive health perspective.

Monitoring and Evaluation: Establish ongoing monitoring systems to evaluate knowledge, attitudes, practices, and vaccination coverage at regular intervals. This data can guide continuous improvements in public health interventions related to HPV vaccination.

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