

Knowledge and Attitude regarding Human Papilloma Virus vaccination among mothers of adolescent girls –A community based descriptive study

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Abstract—Introduction: Cervical cancer is a major health problem and a leading cause of death among women in world.

Objectives : Assess the Knowledge regarding Human Papilloma Virus vaccination among mothers of adolescent girls, assess the Attitude regarding Human Papilloma Virus (HPV) Vaccination among mothers of adolescent girls, determine the correlation between Knowledge and Attitude regarding Human Papilloma Virus vaccination(HPV) among mothers of adolescent girls and determine the association between Knowledge and Attitude regarding HPV Vaccination among mothers of adolescent girls with selected socio personal variables.

Method: The study adopted a quantitative approach with descriptive design and the sample comprised 160 mothers of adolescent girls based on convenience sampling, and inclusion criteria. Data were collected using an interview schedule and a five-point rating scale. The reliability of the interview schedule and five-point rating scale was found to be 0.73 and 0.7 respectively

Result: The study results show that among 160 mothers 83(51.9 %) of mothers have poor knowledge and 77(48.1%) have average Knowledge regarding Human Papilloma Virus vaccination. Median score of Knowledge regarding Human Papilloma Virus vaccination among mothers of adolescent girls is 7.0 with IQR of 3 which shows that the knowledge regarding Human Papilloma Virus Vaccination among mothers of adolescent girl is poor and all the mothers (100%) have favourable Attitude regarding Human Papilloma Virus vaccination. Median score of Attitude regarding Human Papilloma Virus vaccination among mothers of adolescent girls is 52.0 with IQR of 8 which shows that mothers of adolescent girls have favourable Attitude regarding HPV vaccination. There is no correlation between Knowledge and Attitude regarding Human Papilloma Virus Vaccination among mothers of adolescent girls. (ρ = - 0.028 ($P > 0.05$)) There is a no significant association between Knowledge regarding Human Papilloma Virus vaccination among mothers of

adolescent girls with selected socio personal variables. ($P > 0.05$). There is a no significant association between Attitude regarding Human papillomavirus vaccination among mothers of adolescent girls with selected socio personal variables ($P > 0.05$). **Conclusion:** The study highlights a significant gap in knowledge concerning HPV vaccination among mothers despite their positive attitude

Index Terms—Attitude; Human papilloma Virus vaccination; mothers of adolescent girls

I. INTRODUCTION

The human immune system has a remarkable ability to detect, recall, and fight off infections. Vaccines harness this capacity by triggering a targeted immune response when exposed to a harmless piece of a pathogen. This response equips the body with long-term defenses against specific diseases.

By leveraging this natural process, vaccine technology has achieved remarkable successes, including the global elimination of smallpox and near eradication of polio, as well as significant containment of highly infectious diseases. HPV types 16 and 18 are the primary cancer-causing strains, responsible for a significant majority of cervical cancers, including 60-78% of squamous cell carcinomas and 72-94% of adenocarcinomas. Fortunately, effective measures to prevent and combat cervical cancer include HPV vaccination and regular screening, which enable early detection and treatment, thereby reducing the incidence of this disease. By adopting these strategies, we can significantly lower the risk of cervical cancer. Getting vaccinated against HPV is a proactive way to guard against cervical cancer, while addressing precancerous abnormalities through timely treatment

offers a practical and cost-effective approach to preventing the disease from developing. By taking these steps, individuals can significantly reduce their risk of cervical cancer and stay ahead of potential health issues. The World Health Organization (WHO) strongly advocates for the HPV vaccine as the most effective way to prevent cervical cancer, advising that girls receive the vaccine between the ages of 9 and 14, prior to the onset of sexual activity, as a proactive measure to protect against this potentially life-threatening disease.

Objectives of the study

Primary objective:

- Assess the knowledge regarding Human Papilloma Virus Vaccination among mothers of adolescent girls.
- Assess the Attitude regarding Human Papilloma Virus (HPV) Vaccination among mothers of adolescent girls.

Secondary objective:

- Determine the correlation between Knowledge and Attitude regarding Human Papilloma Virus vaccination (HPV) among mothers of adolescent girls.
- Determine the association between Knowledge regarding HPV Vaccination among mothers of adolescent girls with selected socio personal variables
- Determine the association between Attitude regarding HPV Vaccination among mothers of adolescent girls with selected socio personal variables

II. MATERIALS AND METHODS RESEARCH APPROACH

In view of the nature of the problem and the objectives to be accomplished, a quantitative approach was considered appropriate for the study

Research design: For the present study, the researcher intends to assess the Knowledge and Attitude regarding Human Papilloma Virus (HPV) Vaccination among mothers of Adolescent Girls: Hence adopted a descriptive design for the study.

Variables:

A. Research variable: Knowledge and Attitude regarding Human Papilloma Virus (HPV) Vaccination among mothers of adolescent girls.

B. Extraneous variables:

Socio-personal variables include - Sample characteristics such as age, education occupation, monthly income, religion and information regarding Human Papilloma Virus vaccination among mothers of adolescent girls.

The setting of the study: The study was conducted in the selected wards of Kadannappalli Panappuzha Grama Panchayath of Kannur district. Kadannappalli Panapuzha Grama Panchayath formed in 1963 with area covering of 53.75 sq -km and it is under Taliparamba block. The total number of wards in Kadannappalli Grama Panchayath -15

Population: Refers to the mothers of adolescent girls who are studying in 7th, 8th and 9th standard during the study period.

Sample:

The sample consisted of 160 mothers of adolescent girls aged between 9 to 15 years who are studying in 7th, 8th and 9th standard and fulfilling the sampling criteria.

Sample size calculation: Sample size was calculated separately for the variables Knowledge and Attitude with reference to a cross-sectional study to assess the Knowledge and Attitude regarding the Human Papilloma Virus (HPV) Vaccine and associated factors among mothers of daughters aged between 9-15 years in Central Ethiopia.^[94]

Sample size is computed for each of the variables from the above-mentioned study and the one with larger sample size taken as the study size.

Sample size calculated based on the percentage of Knowledge score from the above-mentioned study. The sample size was calculated using the formula Z^2Pq/d^2 .

Sampling technique Convenience sampling criteria Inclusion criteria Mothers of adolescent girls who are studying in 7th, 8th and 9th standard.

- who can read and understand Malayalam
- who have at least one adolescent girl studying in 7th, 8th, 9th standard

Exclusion criteria

Mothers who are mentally challenged

III. TOOLS AND TECHNIQUES OF DATA COLLECTION

Tool-1

Interview schedule to assess the Knowledge regarding Human Papilloma Virus (HPV) vaccination among mothers of adolescent girls.

Section A: Socio-personal variables of mothers of adolescent girls

Section B: Assessment of Knowledge regarding Human Papilloma Virus (HPV) Vaccination among mothers of adolescent girls

Tool- 2

Five-point Likert scale to assess the Attitude regarding HPV Vaccination among mothers of adolescent girls Technique; Interview and Self-report technique.

Development of the tool

- Reviewed research and non-research literature related to Cervical cancer, Human Papilloma Virus infection and HPV Vaccination.
- Review the Guidelines, Policies and Standards given by WHO (World Health Organization), CDC (Center for Disease control and Prevention) and JHPIEGO (Johns Hopkins Program for International Education in Gynecology and Obstetrics) and GAVI (Global Alliance for Vaccines and Immunization) related to HPV Vaccination and Cervical cancer.
- Attended classes and webinars related to Cervical cancer, HPV infection and HPV vaccination
- Consultation and discussion with Obstetrician, Nursing experts from Obstetrics and Gynaecology and Statistician
- Prepared the final tool with the guidance and suggestions of the guide.

Description of the tool

The following tool was used for the present study

Tool 1 – Interview schedule to assess the Knowledge regarding Human Papilloma Virus (HPV) Vaccination among mothers of adolescent girls.

Section A: Socio-personal variables of mothers of adolescent girls– It comprises of nine items - age, religion, educational status, occupation, monthly income, number of daughters between the age group

of 9-15 years, type of family, information and source of information regarding HPV Vaccination and vaccination status of the adolescent girls.

Section B: Assessment of Knowledge regarding Human Papilloma Virus (HPV) Vaccination among mothers of adolescent girls. -It consists of 17 items on Cervical cancer-causes, signs and symptoms, prevention of cervical cancer, HPV infection, risk factors of HPV infection, mode of transmission, clinical features, Human Papilloma Virus (HPV) vaccination, dose schedules, recommendation of HPV Vaccination and contraindications.

Each correct response carries one mark. The total score is 21.

The score is categorized as follows:

Range of score	Level of knowledge
0-8	Poor
9-15	Average
16-21	Good

Tool 2- A Five-point rating scale to assess the attitude regarding HPV Vaccination among mothers of adolescent girls

- The scale consists of 15 statements of both negative and positive statements

Ethical clearance

- The Institutional Human Ethics Committee of Govt. Nursing College, Kannur approved the study, as per number; IHEC NO. B1/1412/290/GNCK /2023/ dated on 13/06/2023.
- Permission was also obtained from the President of Kunjimangalam Grama panchayath and Kadannapalli Panapuzha Grama Panchayath President.
- Detailed information about the study was given in writing to all participants to enable them to make informed decisions about participating or declining participation (Participant Information Sheet).
- Obtained informed consent from the mothers of adolescent girls before data collection and ensured anonymity and confidentiality of data.

Pretesting of the tool

The pretesting of the tool was done among four mothers of adolescent girls in Kunjimangalam Panchayath, to determine the clarity of the item, feasibility, ambiguity and time required to complete the items.

Content validity of the Tool

The Interview schedule and five-point rating scale were given to six experts from Obstetrics and Gynaecological Nursing and Obstetrician to ensure Content Validity. The total number of items to assess the knowledge and attitude regarding HPV Vaccination among mothers of adolescent girls are 17 and 15 items respectively. The experts were requested to rate the items in terms of clarity and its relevance on a four-point ordinal scale: 1(not relevant), 2(somewhat relevant), 3(quite relevant), and 4(highly relevant). As per the suggestion from validators, grammatic mistakes were corrected and also corrected the dosage schedule of vaccination. After content validity, the interview schedule and five-point rating scale retained 17 and 15 items respectively.

Translation of the tool and Information Booklet

Tool and Information book prepared in English were translated to Malayalam with experts in both languages and retranslated back into English. Found the tool and information booklet to be equally semantic.

Reliability of the tool

To establish reliability, tool 1 interview schedule to assess the Knowledge and tool 2 five-point rating scale to assess the Attitude regarding HPV vaccination were administered among 30 mothers of adolescent girls. The reliability of the Interview schedule was calculated by Test-retest method using Intra class Correlation coefficient and that of five-point rating scale was computed using Cronbach Alpha. The reliability was found to be 0.73 and 0.7 respectively.

Pilot study

After obtaining permission from the concerned authorities and approval from Institutional Human Ethics Committee, collected data from 16 mothers of adolescent girls in the wards Ward- 1 Kunninukizhakku, ward-4Parambath, ward-6 Malliyoteward-10 Thalayi of kunjimangalam Grama Panchayath from 27. 01. 2023 to 9. 02. 2024 using a convenience sampling. The socio-personal variables and assessment of knowledge were done using an interview schedule and the attitude regarding Human Papilloma Virus vaccination among mothers of adolescent girls were assessed using a five-point rating scale. The collected data were amenable to statistical analysis and found the study to be feasible.

No modifications and corrections made in the tool after pilot study. Information booklet distributed among ASHA workers and mothers to provide information regarding HPV vaccination in the community.

Data collection process

After getting approval from the Scientific Review Committee, Institutional Human Ethics Committee, Government Nursing College Kannur, approval from KUHS, and permission from the President of Kadannapalli Panapuzha Grama Panchayath, mothers were selected as per the sample criteria and by Convenience sampling.

Duration of data collection was from 11-03-24 to 5-04 -24. The total number of wards in kadannapalli Panappuzha Grama Panchayath=15

The investigator selected 11 wards (as mentioned in the setting) for data collection. The investigator selected the wards as per the availability of the mothers and also the convenience of ASHA workers. The investigator met the ASHA worker at the Anganwadi of the concerned ward.

The list of mothers who have eligible daughters between 9-15 years were taken from the anganwadi of the selected wards with the help of ASHA workers. Then home to home visit was done to get mothers who fulfilled inclusion criteria. The researcher introduced herself to the participants and established rapport. Detailed information about the study was given to all the participants in writing to enable them to make informed decisions about participating or declining the study (participant information sheet). The confidentiality of the collected data was assured, and obtained informed consent. Interview schedules were used to assess the socio personal variables and Knowledge and a Five-point rating scale was used to assess the attitude regarding Human Papilloma Virus Vaccination among mothers of adolescent girls. The numbers of mothers with eligible daughters in the selected wards are approximately 15-20. The investigator has selected 3-6 mothers daily from each ward for data collection.

The average time taken for data collection was approximately 15-20 minutes. The investigator provided information booklet and also health education regarding Human Papilloma Virus (HPV) Vaccination among mothers in the Anganwadi of selected wards.

Mothers and other women reported that education session was highly informative, motivational and easy to understand. They expressed the need for additional sessions to be held in other wards. The investigator also conducted health education regarding Human Papilloma Virus Vaccination among mothers in the Pediatric and Gynaec Out Patients Department (OPD) of Government Medical College Hospital, Kannur and also distributed information booklet.

Plan for data analysis

- All the categorical variables will be summarized by Frequency and Percentage.
- Quantitative variables will be summarized using Median and IQR or Mean and Standard Deviation based on the normality of data. In this study, quantitative variables are summarized using the Median and Interquartile Range (Q1, Q3) since data violate normality.
- Correlation between Knowledge and Attitude regarding Human Papilloma Virus Vaccination among mothers of adolescent girls is determined using Karl Pearson or Spearman's Rank correlation based on the normality of data. In this study, Spearman rank correlation coefficient is used as data violate normality.
- Association between Knowledge regarding HPV vaccination among mothers of adolescent girls with selected socio personal variables - Chi-square test.
- Association between Attitude regarding HPV vaccination among mothers of adolescent girls with selected socio personal variables - Chi-square test.
- $p < 0.05$ is considered statistically significant. Performed the complete analysis using the SPSS 22 software.

IV. RESULT

1: Socio-personal variables of mothers of adolescent girls

- Among 160 mothers of adolescent girls, 108 (67.5%) of mothers belong to the age group of 36 - 40 years.
- Most of the mothers of adolescent girls, 128(80.0%) belong to Hindu religion.
- Of the mothers, 73 (45.6%) had completed higher secondary education.

- Most of the mothers 110 (68.7%) are home makers
- Among the mothers, 78 (49%), belong to the income category of Rs. 10001-20000.
- Of 160 mothers of adolescent girls, 78 (48.8%) belong to joint family
- Majority of the mothers 127(79.4%) have no information regarding Human Papilloma Virus vaccination. Among the mothers 33 (20.6%) who have information regarding HPV vaccination, magazine being the main source of information 25 (15.6%).
- All the adolescent girls are not vaccinated against Human Papilloma Virus vaccination.

2: knowledge regarding Human Papilloma Virus (HPV) Vaccination among mothers of adolescent girls

- Among 160 mothers 83 (51.9%) of mothers have poor knowledge and 77 (48.1%) have average knowledge regarding Human Papilloma Virus vaccination.
- Median score of knowledge regarding human papilloma virus vaccination among mothers of adolescent girls is 7.0 with IQR of 3 which shows that the knowledge regarding Human Papilloma Virus Vaccination among mothers of adolescent girl is poor.

3: Attitude regarding Human Papilloma Virus (HPV) vaccination among mothers of adolescent girls.

- All the mothers (100%) have favourable attitude regarding Human papilloma virus vaccination.
- Median score of Knowledge regarding human papilloma virus vaccination among mothers of adolescent girls is 52.0 with IQR of 8 which shows that mothers of adolescent girls have favourable Attitude regarding HPV vaccination.

4: Correlation between Knowledge and Attitude regarding HPV Vaccination among mothers of adolescent girls with selected socio personal variables

- There is no correlation between Knowledge and Attitude regarding Human Papilloma Virus Vaccination among mothers of adolescent girls. ($\rho = -0.028$ ($P > 0.05$))

5: Significance of association between Knowledge regarding HPV vaccination among mothers of adolescent girls with selected socio personal variables

- There is a no significant association between Knowledge regarding Human papilloma Virus vaccination among mothers of adolescent girls with selected socio personal variables. ($P > 0.05$)

6: Significance of association between Attitude regarding Human Papilloma Virus vaccination among mothers of adolescent girls with selected socio personal variables

There is a no significant association between Attitude regarding Human papilloma Virus vaccination among mothers of adolescent girls with selected socio personal variables ($P > 0.05$).

Table 2 Distribution of mothers of adolescent girls based on based on age, religion and occupation

n=160

Socio personal variables	Frequency	Percentage
Age in years		
<35	21	13.1
36-40	108	67.5
41-45	26	16.3
>45	05	3.1
Religion		
Hindu	128	80.0
Muslim	18	11.3
Christian	14	8.7
Occupation		
Homemaker	110	68.7
Manual Labour	31	19.4
Government employee	16	10.0
Private sector	3	1.9

Table 2 shows that among 160 mothers of adolescent girls, 108 (67.5%) of mothers belong to the age group of 36-40 years, 128(80.0%) of the mothers belong to Hindu religion and most of the mothers 110 (68.7%) are home makers.

Distribution of mothers of adolescent girls based on education is given in Fig :4

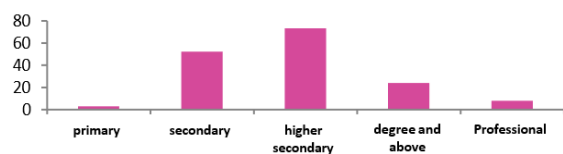


Fig4: Distribution mothers of adolescent girls based on education

Figure 3 depicts that 73 (45.6%) of the mothers of adolescent girls had completed higher secondary education.

Distribution of mothers of adolescent girls based on monthly family income given in fig:5

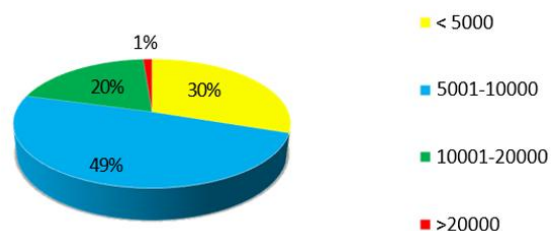


Fig 5: Distribution mothers of a dole's cent girls based on monthly family income

Figure 4 shows that most of the of the mothers 78 (49%), belong to the income category of Rs. 10001-20000.

Table :3 Distribution of mothers based on type of family, information and source of information regarding HPV vaccination and vaccination status of adolescent girls.

n = 160

Characteristics	Frequency	Percentage
Type of family		
Nuclear family	71	44.3
Joint Family	78	48.8
Extended family	11	6.9
Information regarding HPV Vaccine		
Yes	33	20.6
No	127	79.4
Source of information		
Media	1	0.62
Magazines	25	15.6
Health Professionals	5	3.1
Relatives/Friends	2	1.3
Vaccination status		
Vaccinated	0	0.0
Not vaccinated	160	100.0

Table 3 shows that of 160 mothers of adolescent girls, 78 (48.8%) belong to joint family Majority of the mothers 127 (79.4%) have no information regarding Human Papilloma Virus vaccination and 33 (20.6%) them have information through magazines 25 (15.6%), Health professionals 5 (3.1%) and relatives 2 (1.3%) and medias (0.62%). Data showed that not all adolescent girls are vaccinated against Human Papilloma Virus.

Section 2- Knowledge regarding Human Papilloma Virus Vaccination among mothers of adolescent girls. The section deals with the distribution of mothers

based on their knowledge regarding Human Papilloma Virus vaccination. The Kolmogorov Smirnov test is done to test the normality of data which showed that Knowledge regarding HPV Vaccination is not

normally distributed. Hence Median and Inter Quartile Range (Q1, Q3) are reported to summarize the knowledge regarding HPV vaccination among adolescent girls as data violate normality assumptions.

Table 4: Distribution of mothers based on Knowledge score regarding Human Papilloma Virus Vaccination.

n=160

Knowledge Regarding HPV Vaccination	Score	Frequency	Percentage
Good	15–21	0	0.0
Average	8–14	77	48.1
Poor	0–7	83	51.9

The data presented in Table 4 indicates that among 160 mothers 83(51.9 %) of mothers have poor knowledge and 77(48.1%) have average Knowledge regarding Human Papilloma Virus vaccination.

Table 5: Range, Median and Inter quartile range (IQR) of Knowledge score regarding Human Papilloma virus vaccination among mothers of adolescent girls.

n=160

Variable	Minimum	Maximum	Median	Q1	Q3	IQR
Knowledge	2	14	7.0	6.0	9.0	3

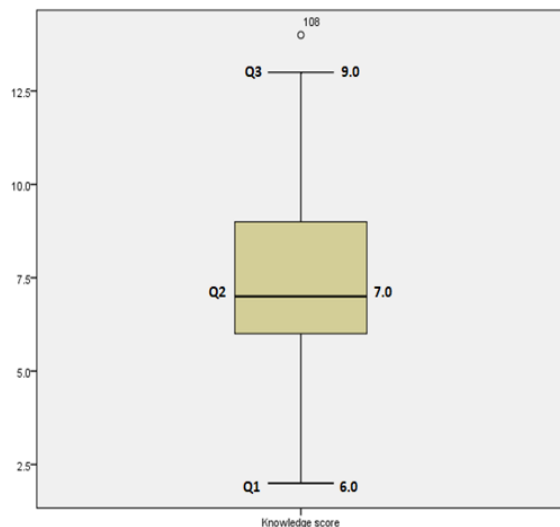


Figure 6: Box and Whiskers plot of Knowledge scores regarding HPV Vaccination among mothers of adolescent girls

Table 5 and figure 6 (Box and Whiskers plot) indicates that the median score of Knowledge regarding Human Papilloma Virus vaccination among mothers of adolescent girls is 7.0 with IQR of 3 which shows that the Knowledge regarding Human Papilloma Virus Vaccination among mothers of adolescent girls is poor.

The box ranges from Q1 (the first quartile) to Q3 (the third quartile) of the distribution and the range represents the IQR. The median Q2 is indicated by the line across the box.

Table 6: Range, Median and Inter quartile range (IQR) of Attitude score regarding Human Papilloma virus vaccination mothers of adolescent girls.

n = 160

Variable	Minimum	Maximum	Median	Q1	Q3	IQR
Attitude	29	65	52.0	48	56	8

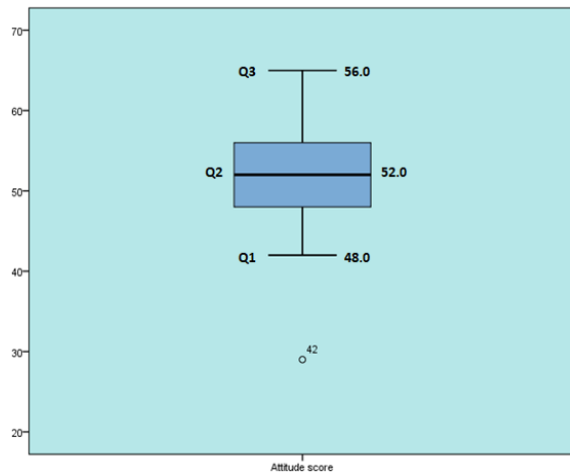


Figure 7: Box and Whiskers plot of Attitude scores regarding HPV Vaccination among mothers of adolescent girls

Table 6 and figure 7 (Box and Whiskers plot) indicates that the median score of Knowledge regarding Human

Papilloma Virus Vaccination among mothers of adolescent girls is 52. 0 with IQR of 8 which shows that mothers of adolescent girls have favourable Attitude towards HPV vaccination.

Section 4- Correlation between Knowledge and Attitude regarding Human Papilloma Virus Vaccination among mothers of adolescent girls.

To determin the correlation between Knowledge and Attitude regarding Human Papilloma Virus Vaccination mothers of adolescent girls.

The following hypothesis are formulated and tested at 0. 05 level of significance using Spearman rank correlation coefficient p (rho) as data violate normality. H0- There is no significant correlation between knowledge and attitude regarding HPV Vaccination among mothers of adolescent girls.

H1 - There is a significant correlation between knowledge and attitude regarding HPV Vaccination among mothers of adolescent girls.

Table 7 Correlation between Knowledge and Attitude regarding Human Papilloma Virus vaccination among mother of adolescent girls

n =160					
Variables	Median	Q1	Q3	Spearman Rank coefficient Correlation p(rho)	p Value
Knowledge score	7. 0	6. 0	9. 0	-0. 028	0. 721 (NS)
Attitude score	52. 0	48	56		

Table 7 indicate that spearman Rank Correlation Coefficient of Knowledge and attitude regarding Human Papilloma Virus Vaccination among mothers of adolescent girls is p (rho) is --0. 028 at $p > 0. 05$ level of significance. Hence null hypothesis is accepted and research hypothesis rejected.

Hence It is interpreted that there is no correlation between knowledge and attitude regarding Human Papilloma Virus Vaccination among mothers of adolescent girls.

Table 8: Significance of Association between Knowledge score regarding Human Papilloma Virus Vaccination among mothers of adolescent girls with selected socio personal variables.

n =160							
Sl. No.	Socio personal Variables	Median	Poor (≤ 7)	>Median Average (> 7)	Chi-square Test (χ^2)	df	p Value
1	Age in years						
	≤ 35	13	8		2. 806	3	0. 422
	36–40	53	55				
	41–45	13	13				
	> 45	4	61				
2	Religion						
	Hindu	66	62		3. 994	2	0. 262
	Muslim	12	6				
	Christian	5	9				
3	Educational Status						

	Primary	0	3	7.178	4	0.125	NS
	Secondary	33	19				
	Higher Secondary	35	38				
	Degree and above	12	12				
	Professional/Technical	3	5				
4	Occupation						
	Home Maker	59	51	0.974	3	0.808	NS
	Manual Labour	15	16				
	Government Employee	7	9				
	Private Sector	2	1				
5	Monthly Income (₹)						
	≤5000	22	26	1.455	3	0.693	NS
	5001–10000	41	37				
	10001–20000	18	13				
	≥20000	2	1				
6	Information regarding HPV Vaccination						
	Yes	18	15	0.119	1	0.730	NS
	No	65	62				

Table value $\chi^2_{0.05(2)} = 5.99$, $\chi^2_{0.05(1)} = 3.80$, $\chi^2_{0.05(3)} = 7.82$, $\chi^2_{0.05(4)} = 9.49$

NS- Not Significant

Table 8 shows that the calculated chi-square value on Knowledge regarding Human Papilloma Virus vaccination among mothers of adolescent girls with socio personal variables like religion, age, religion, occupation, educational status, monthly income and information regarding HPV vaccination are less than the critical value at $p > 0.05$ level of significance. Hence the test is not found to be statistically significant. So null hypothesis is accepted and research hypothesis is rejected. Hence it is interpreted as there is a no significant association between Knowledge regarding Human Papilloma Virus vaccination among mothers of adolescent girls with selected socio personal variables.

Table 9: Significant of association between Attitude regarding Human Papilloma Virus (HPV) Vaccination among mothers of adolescent girls with their selected socio personal variables.

n=160

Sl. No.	Socio personal Variables	Median Poor (>52)	>Median Average (<52)	Chi-square Test (χ^2)	df	p Value	Inference
1	Age in years						
	≤35	9	9	1.223	3	0.748	NS
	36–41	60	60				
	41–46	14	14				
	>4	3	3				
2	Religion						
	Hindu	65	63	4.035	2	0.258	NS
	Muslim	13	5				
	Christian	8	6				
3	Educational Status						
	Primary	2	1				NS
	Secondary	21	31				
	Higher Secondary	43	30				
	Degree and above	16	8				
	Professional/Technical	4	4				
4	Occupation						
	Home Maker	59	51	0.974	3	0.808	NS

	Manual Labour	15	16				
	Government Employee	7	9				
	Private Sector	2	1				
5	Monthly Income (₹)						
	≤5000	24	24	0. 705	3	0. 872	NS
	5001–10000	42	13				
	10001–20000	18	13				
	≥20000	2	1				
6	Information regarding HPV Vaccination						
	Yes	13	20	3. 447	1	0. 63	NS
	No	73	4				

Table value χ^2 0. 05(2) = 5. 99, χ^2 0. 05(1) = 3. 80, χ^2 0. 05(3) = 7. 82, χ^2 0. 05(4) = 9. 49

NS- Not Significant

Table 9 shows that the calculated chi-square value on Attitude regarding Human Papilloma Virus vaccination among mothers of adolescent girls with socio personal variable like age, religion, occupation, educational status, monthly income, information regarding HPV Vaccination are less than the critical value at $p > 0. 05$ level of significance. Hence the test is not found to be statistically significant. So null hypothesis is accepted and research hypothesis is rejected.

Hence it is interpreted as there is a no significant association between Attitude regarding Human papilloma Virus vaccination among mothers of adolescent girls with selected socio personal variables.

V. DISCUSSION

The study findings are discussed below, with the results of the other studies the investigator reviewed.

The primary objective of the study

- Knowledge regarding Human Papilloma Virus Vaccination among mothers of adolescent girls.
- Attitude regarding Human Papilloma Virus Vaccination among mothers of adolescent girls.

In the present study, the result shows that the most of the mothers 83(51. 9 %) of mothers have poor knowledge and 77(48. 1%) have average knowledge regarding Human Papilloma Virus vaccination. Median score of knowledge regarding human papilloma virus vaccination among mothers of adolescent girls is 7. 0 with IQR of 3 which shows that the knowledge regarding Human Papilloma Virus Vaccination among mothers of adolescent girl is poor.

But all the mothers (100%) have favourable Attitude regarding Human Papilloma Virus vaccination. Median score of Knowledge regarding Human Papilloma Virus vaccination among mothers of adolescent girls is 52. 0 with IQR of 8 which shows that mothers of adolescent girls have favourable Attitude regarding HPV vaccination.

The present study is backed by a study conducted on knowledge and attitudes toward HPV vaccination among parents of adolescent girls in Mysore which shows that parents have limited knowledge about HPV or cervical cancer, most are still highly accepting an HPV vaccine. (79. 9%).^[90]

The present study is in harmony with a cross-sectional study on knowledge and Attitudes Regarding HPV and Vaccination Among Chinese Women Aged 20 to 35 Years in Fujian Province which shows that knowledge regarding HPV vaccine was low 44. 9%.^[87]

The present study is incongruent with a cross-sectional descriptive study conducted to assess the Knowledge, Attitudes and perceptions towards Human Papilloma Virus (HPV) vaccines among 186 parents which demonstrated good knowledge and negative attitudes towards HPV vaccination.^[89]

The present study consistent with a systematic review and meta-analysis were conducted to assess the evidence of Knowledge, attitude, and practice regarding Human Papilloma Virus (HPV) vaccination at the community level in India. The pooled proportions of Knowledge regarding HPV vaccination coverage were low among the general population and but in harmony with the present study in which all mothers have favourable Attitude toward HPV vaccination.^[68]

The present study congruent with a cross-sectional study to assess perception Attitude and knowledge towards HPV vaccination among 424 parents in Saudi which showed that poor knowledge regarding HPV vaccination but the same study is incongruent with the present study in which most of the parents have favourable attitude towards HPV vaccination. [82]

The present study contradiction with a community based cross sectional study to assess the knowledge and attitude toward HPV virus vaccination among 601 mothers which demonstrated good knowledge but the same study findings is supported by the present study in which mothers have favourable attitude toward HPV vaccination. [84]

The present study is incongruent with a study to assess the attitudes regarding HPV Vaccinations of Children among mothers with adolescent daughters in Korea. which shows that, mothers have negative attitudes towards vaccination due to side effect. [82]

The present study is in concordance with acceptance and attitudes towards Human Papilloma Virus vaccination in Japanese mothers of adolescent girls which shows that most mothers have positive attitude towards HPV vaccination (96. 6%). [83]

The present study is incongruent with a cross-sectional study conducted to assess knowledge, attitude, practice towards HPV vaccination and cervical cancer among mothers of adolescent girls which shows that mothers have poor Knowledge but positive Attitude towards HPV vaccination. [64]

The present study is inconsistent with a descriptive study to assess the attitude towards HPV vaccination among 368 parents which shows negative attitude towards HPV vaccination. The present study is backed by the same study which shows poor knowledge among mothers. [86]

The present study is supported with a cross-sectional descriptive study to assess the Parent's attitude and knowledge on HPV vaccination which shows that the majority of the parents with daughters (76. 7%) and 74. 6% of with sons have positive attitude towards HPV vaccination. [87]

The present study congruent with cross-sectional study conducted to assess the knowledge and attitudes toward Human Papilloma Virus vaccination among 191 mothers in Kazakhstan which shows that mothers have positive attitude towards HPV vaccination. [45]

The present study contradiction with a cross-sectional study conducted to evaluate the knowledge, attitude,

and perception of HPV vaccination among 288 parents of young girls (aged 8-12) in Mbarara City The result indicated that significant portion of the community (62. 1%) held negative attitudes towards the vaccine, which adversely influenced their perceptions. These negative attitudes and perceptions contributed to low vaccine acceptability in the area. [87]

The present study concordance with a study to assess the Knowledge, attitudes and perceptions towards Human Papilloma Virus (HPV) vaccines among 186 parents in Ibadan South-West local government area of Oyo state which shows that knowledge regarding HPV low and the present study is contradiction with the same study in which participants demonstrated poor attitude. [89]

The third objective of the study was determining the correlation between Knowledge and Attitude regarding Human Papilloma Virus vaccination (HPV) among mothers of adolescent girls.

The present study shows that there is no correlation between Knowledge and Attitude regarding Human Papilloma Virus Vaccination among mothers of adolescent girls. ($p(\rho) = -0.028$ $P > 0.05$).

The present study is incongruent with a community-based cross-sectional study was conducted to assess Knowledge and Attitude towards Human Papillomavirus Vaccine and Associated Factors Among 601 Mothers who Have Eligible Daughters in Debre Markos Town, Northwest Ethiopia which showed that there is correlation between knowledge and attitude ($p=0.0001$). [85]

The present study is in harmony with cross-sectional study was conducted to assess Knowledge, Attitude, and Practice on Human Papilloma Virus (HPV) Vaccination and Pap Smear Screening is Low among 225 Young Adult Women aged 19 to 25 in Muar, Malaysia in which there is no association between knowledge and attitudes. [90]

The present study is inconsistent with a study conducted to assess the knowledge and attitudes Regarding HPV Vaccinations of Children among Mothers with Adolescent Daughters in Korea which shows there is positive correlation between knowledge and attitude. [82]

There are lack of studies showing the correlation between knowledge and attitude regarding HPV vaccination among mothers of adolescent girls.

Fourth objective of the study

- Determine the association between Knowledge regarding HPV Vaccination among mothers of adolescent girls with selected socio personal variables
- Determine the association between Attitude regarding HPV Vaccination among mothers of adolescent girls with selected socio personal variables.

The study is incongruent with knowledge and attitudes among mothers about HPV Vaccination to Prevent Cervical Cancers which shows that there was a significant association between the educational status of the mothers and their knowledge about HPV vaccination ($p < 0.05$). The same study findings also supported the present study in which no significant association in terms of income and knowledge ($p > 0.05$).

The present study is inconsistent with a community based cross-sectional study conducted to assess Knowledge and attitude towards Human Papilloma Virus Vaccine and Associated Factors Among 601 Mothers who Have Eligible Daughters in Debre Markos Town, Northwest Ethiopia which shows that there is association between knowledge and education. ($p = 0.005$).^[85]

There is scarcity of studies depicting the association between knowledge and attitude towards HPV vaccination among mothers of adolescent girls.

VI. CONCLUSION

Based on the study findings, the following conclusions are drawn:

The level of Knowledge about Human Papillomavirus (HPV) vaccination among mothers of adolescent girls is low, with 83 mothers (51.9%) demonstrating poor knowledge, despite all having a favorable attitude toward the vaccine.

- There is no significant correlation between Knowledge and Attitude regarding HPV vaccination among these mothers.
- The study highlights a significant Knowledge gap concerning HPV vaccination among mothers, despite their positive attitude toward it.
- The lack of awareness may impede informed decision-making and optimal vaccine uptake. This gap underscores the need for targeted

interventions.

- Educational programs are crucial to bridging this Knowledge gap, ensuring that mothers and fathers are well-informed about the benefits, safety, and importance of HPV vaccination. Such initiatives could lead to higher vaccination rates, contributing to a reduction in HPV-related diseases and improved public health outcomes.
- The implementation of school-based education programs and the inclusion of HPV and its vaccination in health education curricula are essential to achieving 90% vaccine coverage for adolescent girls.
- With the introduction of Cervavac in India, schools could serve as a key entry point for HPV vaccination among adolescents, and educating parents would facilitate this process.
- Future research should focus on developing and evaluating effective educational strategies to enhance HPV vaccine Knowledge and address potential barriers to vaccination acceptance and completion.

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