



Knowledge and Attitude toward Human Papillomavirus Vaccination among Staff Nurses in Anand District: A Descriptive Study

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Abstract

Background: Human papillomavirus (HPV) is the most common sexually transmitted infection. Persistent infection with HPV, though often initially asymptomatic and self-limiting, can progress to anogenital warts, precancerous changes, and cancers such as cervical, anogenital, and oropharyngeal malignancies in both men and women. Existing HPV vaccines provide coverage against 2, 4, or 9 viral types, including high-risk strains 16 and 18 that contribute to the majority of cervical cancer cases. Widespread vaccination has the potential to prevent approximately 70% of cervical cancers and plays a crucial role in reducing the burden of HPV-related cancers.

Materials and Methods: This study utilized a descriptive cross-sectional approach and included 100 staff nurses from selected Primary Health Centres and Community Health Centres in Anand district. A non-probability convenience sampling technique was used to select participants. Data were collected through a structured questionnaire comprising dichotomous items for knowledge assessment and a 5-point Likert scale to evaluate attitudes. The data were processed and analyzed using descriptive statistics, Karl Pearson's correlation coefficient, and the Chi-square test.

Results: The mean knowledge score was 16.14 ± 3.99 . More than half of the participants (52%) had average knowledge, while 66% demonstrated a negative attitude. A minimal positive correlation was observed between knowledge and attitude ($r = 0.026$); however, the association was not statistically significant ($P = 0.80$). However, professional qualification, work experience, and training/workshops showed a statistically significant association with attitude.

Conclusion: Despite having a fair level of understanding, most staff nurses reported unfavorable attitudes toward HPV vaccination, suggesting a clear mismatch between what they know and their willingness to accept or support it. The absence of a significant knowledge-attitude relationship underscores that information alone does not ensure positive perception. Instead, professional qualification, experience, and prior training emerged as key determinants of attitude. Focused, competency-based training and continuous professional development are essential to shift attitudes and strengthen nurses' role in effective HPV vaccine advocacy.

Keywords: Cervical cancer prevention, human papillomavirus vaccine, knowledge and attitude, primary health centers, staff nurses

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INTRODUCTION

Human papillomavirus (HPV) is one of the most prevalent sexually transmitted infections and plays a central role in the development of cervical cancer, along with other anogenital and oropharyngeal cancers. According to the World Health Organization, cervical cancer remains a significant public health issue worldwide, particularly in low- and middle-income countries where screening and preventive services are often

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insufficient.^[1] Even though it can largely be prevented through vaccination and early diagnosis, cervical cancer continues to cause considerable morbidity and mortality among women, highlighting the urgent need to strengthen vaccination programs and public health initiatives.^[2]

India bears a substantial burden of cervical cancer, with a large number of new cases reported annually. Sustained infection with high-risk HPV strains, particularly types 16 and 18, is responsible for roughly 70% of cervical cancer diagnoses.^[3] Vaccines developed to combat these high-risk strains have demonstrated significant efficacy. The introduction of vaccines such as Gardasil and Cervarix marks a significant achievement in the fight against cervical cancer cases.^[4] Conventionally, HPV vaccination protocols have utilized either two or three doses, with the specific regimen tailored to an individual's age and immune condition. However, newer research indicates that a single dose might provide equivalent protection against lasting infections, especially for high-risk types 16 and 18. In light of this new evidence, the World Health Organization updated its guidelines 2022 to accept a single-dose option for girls aged 9–14.^[5]

Even though HPV vaccines are proven effective, low awareness and inadequate understanding of cervical cancer and its prevention remain major obstacles to vaccine uptake and use. This lack of understanding is evident not only among the general population but also among healthcare professionals, potentially affecting the successful implementation of preventive strategies.^[6] Therefore, enhancing awareness among students and healthcare providers is essential, particularly with regard to affordable and practical interventions that can be implemented in low-resource settings.

Staff nurses posted in Primary Health Centres (PHCs) and Community Health Centres (CHCs) are key frontline healthcare providers who deliver essential health services at the community level. They have an important role in delivering health education, providing counselling, and promoting vaccination programmes. Their level of knowledge and attitude toward HPV vaccination can greatly influence community perceptions and the overall uptake of the vaccine. Consequently, evaluating and improving their knowledge and attitudes is crucial for the effective prevention and control of cervical cancer.

Anand district represents a typical primary healthcare setting where nurses play a crucial role in preventive services. However, limited uptake of HPV vaccination suggests potential gaps in awareness and perception among healthcare providers. Assessing staff nurses in this setting helps identify these gaps and provides a basis for developing targeted training and interventions to improve vaccine promotion and cervical cancer prevention.

Objectives

1. To determine the extent of knowledge about HPV vaccination among staff nurses employed in selected PHCs and CHCs of Anand district

2. To explore the attitudes of these staff nurses toward HPV vaccination in the selected PHCs and CHCs of Anand District
3. To analyze the relationship between selected demographic variables and the knowledge and attitudes of staff nurses regarding HPV vaccination in selected PHCs and CHCs of Anand district.

MATERIALS AND METHODS

A descriptive cross-sectional design was employed to study staff nurses working in selected PHCs and CHCs of Anand district. The study included 100 participants, who were chosen using a non-probability convenience sampling approach.

Sampling techniques

Selection of participants was carried out through purposive sampling, guided by clearly defined inclusion and exclusion criteria.

Inclusion and exclusion criteria

Inclusion criteria

1. Staff nurses currently employed in selected PHCs and CHCs of Anand district.
2. Able to read and understand English and/or Gujarati.
3. Individuals who willingly provided informed consent for participation.

Exclusion criteria

1. Staff nurses who declined participation.
2. Staff nurses who were not available during the period of data collection.

Data collection tools

1. Structured dichotomous knowledge questionnaire: The tool included multiple questions aimed at assessing participants' understanding of HPV infection and its vaccination. Correct responses were awarded 1 mark, while incorrect and "don't know" answers received 0 marks. The overall knowledge score was derived by summing the responses across all items, with higher scores representing a better level of knowledge. Based on the final score, knowledge was grouped into poor, average, and good categories according to predetermined cutoff values.
2. Five-point Likert attitude rating scale: Attitudes were evaluated using a five-point Likert scale, where responses ranged from strongly agree (score of 5) to strongly disagree (score of 1). The total attitude score was calculated by summing responses across all items. Higher scores reflected a more negative attitude, while lower scores indicated a positive attitude, as per the defined scoring criteria.

Validity and reliability

Content validity was confirmed through review by experts in community health nursing. Before data collection, the

reliability of the instruments was assessed using the split-half technique, and a reliability coefficient was computed to evaluate internal consistency, ensuring that the tools yielded stable and dependable results.

Data analysis

The collected data were coded, entered into Microsoft Excel, and subsequently analyzed using IBM Statistical Package for the Social Sciences Statistics for Windows, Version 26.0. Descriptive statistical measures, such as frequency, percentage, mean, and standard deviation, were used to summarize and present the data in tables and figures. Inferential statistical techniques, including the Chi-square test and Karl Pearson's correlation coefficient, were employed to assess associations and relationships among variables. A $P < 0.05$ was considered indicative of statistical significance.

Data analysis and interpretation were carried out in line with the study's objectives and stated assumptions.

Analysis and interpretation of the data

1. Description and interpretation of the sample's demographic profile, including age, gender, educational qualification, years of professional experience, and participation in any HPV vaccination-related training or workshops.
2. Analysis and interpretation of data pertaining to participants' knowledge of HPV vaccination.
3. Analysis and interpretation of findings related to attitudes toward HPV vaccination.
4. Examination of the correlation between knowledge scores and attitude scores among staff nurses regarding HPV vaccination.
5. Assessment of the relationship between knowledge and attitude scores and selected sociodemographic variables among staff nurses in the context of HPV vaccination.

Ethical consideration

Ethical clearance for the study was granted by the Institutional Ethics Committee of Manikaka Topawala Institute of Nursing, Charusat University, Changa (IEC/VION/2020/98), and necessary permissions were secured before data collection. All participants provided written informed consent before inclusion in the study. Measures were taken to ensure anonymity and maintain confidentiality throughout the research process. Participation was voluntary, and individuals had the right to discontinue at any point without penalty. The data collected were used solely for research purposes and were securely stored.

Examination and interpretation of the participants' socio-demographic profile

Table 1 reveals that out of the 100 respondents, most participants – 79 (79%) – belonged to the 21–30 years of age group, followed by 17 (17%) in the 31–40 years category, and only 4% ($n = 4$) were aged between 41 and 50 years.

In terms of gender distribution, females constituted the predominant group at 85% ($n = 85$), while males accounted for 15% ($n = 15$).

Table 1: Frequency and percentage distribution of participants based on their socio-demographic characteristics ($n=100$)

Serial No.	Personal data	Frequency	Percentage
1.	Age		
	21–30 Years	79	79.0
	31–40 Years	17	17.0
2.	Gender		
	Males	15	15.0
	Females	85	85.0
3.	Educational qualification		
	General Nursing and Midwifery	78	78.0
	Basic Bachelor of Science in Nursing	22	22.0
	Post Basic Bachelor of Science in Nursing	00	00
4.	Professional experience		
	<1 year	28	28.0
	1–5 Years	54	54.0
5.	5–10 Years	18	18.0
	Attended training		
	No	70	70
	Yes	30	30

Regarding educational qualification, most of the participants, 78% ($n = 78$), were qualified as GNM, whereas 22% ($n = 22$) held a Basic B.Sc. Nursing degree.

With respect to professional experience, 54% ($n = 54$) had 1–5 years of experience, 28% ($n = 28$) had <1 year, and 18% ($n = 18$) had 5–10 years of experience.

With respect to training/workshop on HPV vaccination, the majority of respondents 70 (70%) had not attended any training, while 30 (30%) had attended training.

Analysis and interpretation of data pertaining to participants' knowledge of HPV vaccination

Knowledge related to HPV vaccination was evaluated through a structured 20-item questionnaire. A score of 1 was given for each correct response, while incorrect or “don't know” answers received a score of 0. The cumulative score, based on multiple-choice and dichotomous questions, was classified into three levels: good (15–20), average (8–14), and poor (1–7).

Table 2 shows that the mean knowledge score of the participants was 16.14 ± 3.99 . A majority of participants, 52% ($n = 52$), exhibited an average level of knowledge about cervical cancer and HPV vaccination. In comparison, 29% ($n = 29$) had good knowledge, whereas 19% ($n = 19$) demonstrated poor knowledge. The distribution of knowledge levels is illustrated in Figure 1.

Assessment and interpretation of study findings on attitudes toward HPV vaccination

Table 3 reveals that a higher proportion of participants exhibited a negative attitude (66%) compared to those with a positive attitude (34%). This indicates a need for improving awareness and educational interventions to enhance positive

Table 2: Classification of participants according to knowledge score levels on cervical cancer and HPV vaccination (n=100)

Score	Grade	Mean±SD	Minimum score	Maximum score	Frequency	Percentage
1–7	Poor				19	19
8–14	Average	16.14±3.99	5	20	52	52
15–20	Good				29	29
Total						100

HPV: Human papillomavirus, SD: Standard deviation

Table 3: Frequency and percentage distribution of participants' attitude scores regarding HPV vaccination (n=100)

Attitude	Classification of score	Frequency	Percentage
Positive	22–74	34	34
Negative	75–100	66	66
Total		100	100

HPV: Human papillomavirus

attitudes among the participants. The observed negative attitude may be due to a lack of knowledge, misconceptions, or inadequate exposure to relevant information. This distribution is further depicted in Figure 2.

Examination of the correlation between knowledge scores and attitude scores among staff nurses regarding HPV vaccination

Table 4 indicates that Karl Pearson's correlation coefficient was applied to assess the relationship between knowledge and attitude scores. The obtained correlation coefficient ($r = 0.026$) is close to zero, indicating a very weak positive relationship between knowledge and attitude. The calculated $P = 0.80$ exceeds the significance threshold of 0.05, suggesting that the observed relationship is not statistically significant.

This finding suggests that an increase in knowledge does not necessarily result in a corresponding improvement in attitude among the participants. The absence of a significant association may be attributed to factors such as personal beliefs, cultural influences, misinformation, and lack of motivation, which can independently affect attitudes.

The results are in agreement with earlier studies, which suggest that knowledge alone may not be adequate to induce positive shifts in attitude or behaviour. This highlights that, in addition to providing information, behavioural change interventions, counseling sessions, and structured awareness programmes are essential to enhance attitudes toward HPV vaccination.

Therefore, the study emphasizes that educational interventions should be integrated with motivational and behavioural approaches to effectively influence attitudes and practices related to HPV vaccination.

Assessment of the relationship between knowledge and attitude scores and selected socio-demographic variables among staff nurses in the context of HPV vaccination

Table 5 presents the association between selected socio-demographic factors and knowledge levels regarding HPV vaccination among the study participants.

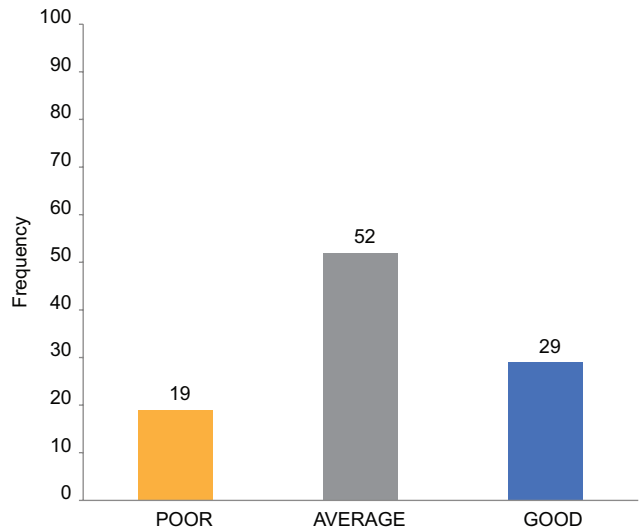


Figure 1: Bar graph depicts the frequency distribution of participants' knowledge levels regarding human papillomavirus vaccination

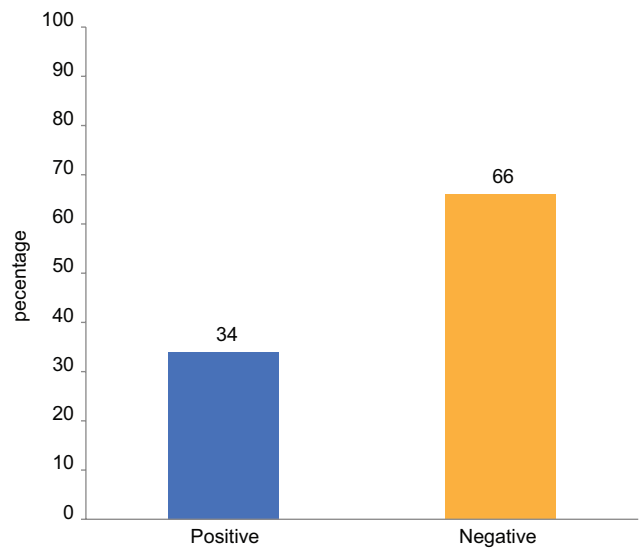


Figure 2: Bar graph shows the percentage of attitude score of respondents regarding human papillomavirus vaccination

The analysis showed that age did not have a statistically significant relationship with knowledge level ($\chi^2 = 1.631$, $df = 4$, $P = 0.80$). Similarly, gender was also not significantly associated with knowledge level ($\chi^2 = 0.22$, $df = 2$, $P = 0.89$).

On the other hand, professional qualification demonstrated a statistically significant association with knowledge level ($\chi^2 = 11.94$, $df = 4$, $P = 0.02$), indicating that participants

with higher educational qualifications tended to have better knowledge. Likewise, professional experience was also significantly associated with knowledge level ($\chi^2 = 11.57$, $df = 4$, $P = 0.02$), suggesting that greater experience in the profession is linked with improved knowledge regarding HPV vaccination.

Furthermore, attendance at training or workshops was significantly associated with knowledge level ($\chi^2 = 8.38$, $df = 2$, $P = 0.02$), indicating that participants who had attended training programmes possessed higher levels of knowledge compared to those who had not.

Overall, the findings show that age and gender do not significantly affect knowledge levels regarding HPV vaccination. However, factors such as educational qualification, professional experience, and participation in training or workshops are important contributors to better knowledge among staff nurses.

Table 6 describes the relationship between selected socio-demographic variables and attitudes toward HPV vaccination among participants.

Age was not found to have a significant association with attitude ($\chi^2 = 2.478$, $df = 2$, $P = 0.29$). Similarly, gender also showed no statistically significant relationship with attitude toward HPV vaccination ($\chi^2 = 3.359$, $df = 1$, $P = 0.07$).

Table 4: Association between participants' knowledge levels and attitudes toward HPV vaccination

Variables compared	Statistical Measure	Attitude
Knowledge	r (Karl Pearson correlation coefficient)	0.026
	P-value	0.80

Statistical significance was determined at a $P < 0.05$, HPV: Human papillomavirus

In contrast, professional qualification demonstrated a statistically significant association with attitude ($\chi^2 = 7.799$, $df = 1$, $P = 0.005$), indicating that participants with higher levels of education tended to exhibit more positive attitudes toward HPV vaccination.

Professional experience was also significantly associated with attitude ($\chi^2 = 7.181$, $df = 2$, $P = 0.03$), suggesting that increased work experience contributes to a more favourable attitude.

Moreover, attendance at training programs or workshops was significantly associated with participants' attitudes ($\chi^2 = 5.171$, $df = 1$, $P = 0.02$), indicating a meaningful link between training exposure and attitude toward HPV vaccination. Participants who had attended training programmes exhibited a more positive attitude compared to those who had not attended such programmes.

Overall, the findings indicate that while age and gender do not significantly influence attitude toward HPV vaccination, factors such as professional qualification, work experience, and participation in training programs play an important role in shaping a positive attitude.

Declaration of consent

Formal approval was obtained from the respective institution before conducting the study, and written informed consent was collected from all participants. The participants understand that their names and initials will not be published, and due efforts will be made to hide their identities. Confidentiality and anonymity were maintained.

RESULTS

Participants demonstrated a moderate level of knowledge (mean score = 16.14). The correlation between knowledge

Table 5: Association of knowledge scores with selected socio-demographic characteristics (n=100)

S.No.	Personal data	Knowledge			Calculated value of χ^2	Tabulated value of χ^2	DF	P-value
		Good	Average	Poor				
1.	Age				1.631	9.49	4	0.80 (Not significant)
	21–30 Years	24	40	15				
	31–40 Years	04	09	04				
	41–50 Years	1	03	0				
2.	Gender				0.22	5.99	2	0.89 (Not significant)
	Males	5	7	3				
	Females	24	45	16				
3.	Educational qualification				11.94	5.99	4	0.02 (significant)
	General Nursing and Midwifery	17	42	19				
	Basic Bachelor of Science in Nursing	12	10	0				
	Post Basic Bachelor of Science in Nursing	00	00	00				
4.	Professional experience				11.57	9.49	4	0.02 (significant)
	<1 Year	8	13	7				
	1–5 Years	10	32	11				
	5–10 Years	11	7	1				
5.	Attended training				8.38	5.99	2	0.02 (significant)
	No	6	22	2				
	Yes	23	30	17				

Table 6: Association between participants' attitude levels and selected socio-demographic characteristics (n=100)

Sr. No.	Personal data	Attitude			Calculated value of χ^2	Tabulated value of χ^2	DF	P-value
		Positive	Negative	Total				
1.	Age							
	21–30 Years	50	29	79	2.478	5.99	2	0.29 (Not significant)
	31–40 Years	12	5	17				
	41–50 Years	4	0	4				
Total	66	34	100					
2.	Gender							
	Males	13	2	15	3.359	3.84	1	0.07 (Not significant)
	Females	53	32	85				
Total	66	34	100					
3.	Educational qualification							
	General Nursing and Midwifery	46	32	78	7.799	3.84	1	0.005 (significant)
	Basic Bachelor of Science in Nursing	20	2	22				
Total	66	34	100					
4.	Professional experience							
	<1 Year	20	8	28	7.181	5.99	2	0.03 (significant)
	1–5 Years	29	25	54				
	5–10 Years	17	1	18				
Total	66	34	100					
5.	Attended training							
	No	24	6	30	5.171	3.84	1	0.02 (significant)
	Yes	42	28	70				
Total	66	34	100					

and attitude was negligible and not statistically significant ($r = 0.026$, $P = 0.80$).

Chi-square analysis revealed no significant association of attitude with age ($\chi^2 = 2.478$) or sex ($\chi^2 = 3.359$). In contrast, course of study ($\chi^2 = 7.799$), professional experience ($\chi^2 = 7.181$), and training/workshop attendance ($\chi^2 = 5.171$) showed statistically significant associations with attitude.

These findings indicate that attitude is influenced more by educational and professional factors than by knowledge or basic demographic characteristics.

DISCUSSION

The present findings are consistent with previous research conducted in both Indian and international settings. Evidence suggests that knowledge alone is not sufficient to shape a favorable attitude toward HPV vaccination. Studies by Tobaiqy and MacLure and Patel *et al.* indicate that misconceptions, safety concerns, and lack of trust significantly influence vaccine acceptance, often independent of knowledge levels.^[3,7]

Similar observations were reported by Saha *et al.* and Mehta *et al.*, where awareness did not consistently translate into positive attitudes, largely due to cultural beliefs and social influences.^[8,9] Findings from Pandey *et al.* and Kwan *et al.* further highlight that hesitancy persists despite adequate knowledge, driven by factors such as perceived risk, cost, and limited awareness initiatives.^[10,11]

In contrast, Shah *et al.* found a moderate positive correlation between knowledge and attitude, suggesting that structured educational interventions can improve outcomes, although external factors may also influence this relationship.^[12] Wong *et al.* also emphasized the stronger role of cultural norms and

perceived susceptibility in shaping attitudes, particularly in Asian populations.^[13]

Overall, these findings indicate that while knowledge is necessary, it is not a standalone determinant of attitude. Psychosocial, cultural, and systemic factors play a critical role. Therefore, improving attitudes toward HPV vaccination requires a well-rounded approach that combines education, individualized counselling, community involvement, and enhanced training programs.

Implications of the study

The results of this study carry significant implications for nursing practice, nursing education, nursing research, and the promotion of community health with particular reference to HPV vaccination.

Need for regular in-service training programs on HPV vaccination

Regular in-service education programs are needed to improve nurses' knowledge and attitude regarding HPV vaccination. Strengthening client education should be emphasized as a key nursing responsibility to support informed decision-making and promote preventive health practices. Educational role will enable them to guide patients and families in making informed decisions regarding HPV vaccination and promote overall family health.

Integration of HPV vaccine awareness in nursing curricula

Nursing curricula should include HPV vaccination awareness to equip students with adequate knowledge and health education skills. This will help in improving their competence in delivering vaccine-related education in clinical and community settings.

Implications for nursing research

The study also highlights the need for further nursing research in the area of HPV vaccination to assess knowledge, attitude, and effectiveness of different teaching strategies.

Strengthening community-level vaccine promotion strategies

At the community level, HPV vaccine promotion should be strengthened through health education programs, school health initiatives, and mass awareness campaigns. Involvement of schools, parents, and community leaders, along with ensuring vaccine availability and accessibility, is essential to improve acceptance and uptake.

Limitations

The study was confined to selected primary and community health centers within a single district, limiting the generalizability of the findings. The limited sample size (n=100) may restrict the reliability and generalizability of the study findings. The use of a non-probability sampling method could also lead to selection bias, thereby affecting how well the sample represents the target population. In addition, reliance on self-reported information may introduce response biases, including social desirability and recall bias.

CONCLUSION

The study concludes that knowledge alone does not determine attitude toward HPV vaccination. Focused educational and training interventions are needed to strengthen vaccine advocacy and improve cervical cancer prevention practices.

Recommendations

- Conduct interventional studies to evaluate effectiveness of educational programs
- Expand study to multiple districts
- Examine and identify the factors that hinder healthcare providers from recommending the HPV vaccine in clinical settings.

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CONFLICTS OF INTEREST

The authors report no conflicts of interest related to this study.

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