International Journal of Health Sciences and Research
Volume 14; Issue: 12; December 2024
Website: www.ijhsr.org
Original Research Article *ISSN: 2249-9571*

How Informed Are College Students About HPV? Discover the Real Insights behind Their Knowledge, Attitudes, and Acceptance of the HPV Vaccine

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DOI: https://doi.org/10.52403/ijhsr.20241222

ABSTRACT

Background: The study focuses on human papilloma virus vaccination, a common sexually transmitted infection that can causes cervical cancer. In many countries including India there's not enough public awareness or national vaccination programme for HPV. This research aims to evaluate how much college students know about HPV vaccine, understand their attitudes and acceptance towards it and identify obstacles and miss understanding that prevent people from getting vaccinated.
Objective: The study aims to assess the knowledge, attitude and acceptance of the HPV vaccine among college students in Nadiad city. Additionally, the research will analyze the correlation between knowledge, attitude, and acceptance to better understand how this factor influences vaccination decision.
Methods: A cross sectional descriptive study was conducted in Nadiad with a sample of 150 participants aged 18 to 21 years. We Performed Frequency distribution and descriptive statistical analysis to the assess knowledge level, attitude level and acceptance levels towards the human papillomavirus vaccination. Data analysis involved the application of descriptive statistical methods, including frequency distribution and percentage. Additionally, inferential statistical techniques such as the chi- square test and Karl Pearson correlation coefficient were utilized to examine association between the variables.
Result: The study findings reveal that a substantial portion of participants (60%) demonstrated a lack of awareness regarding the HPV vaccine, with 64% failing to recognize vaginal bleeding between menstrual periods as a potential indicator of cervical cancer. Furthermore, 52% of respondents incorrectly believed that only women could contract HPV, while 65.33% considered the HPV vaccine to be safe for all individuals. Additionally, 69.33% agreed that the vaccine should be administered to individuals with multiple sexual partners, and 70.66% were aware that it is recommended for both males and females. A notable 63.33% erroneously believed that the HPV vaccine offers protection against HIV. While 76% acknowledged the importance of vaccination for health, 66.66% expressed willingness to receive the vaccine if offered, and 76.66% indicated they would recommend it to peers. Correlation analyses revealed no statistically significant relationship between knowledge and either attitude or acceptance of the HPV vaccine, suggesting negligible associations between these variables. Similarly, demographic factors such as age, gender,

family type, and marital status were not significantly associated with vaccine acceptance, indicating the absence of clear demographic predictors for HPV vaccine acceptance.

Conclusion: The findings of the study indicate a considerable lack of awareness regarding the HPV vaccine, with 60% of participants being unfamiliar with it. While the majority exhibited an average level of knowledge (60%), several misconceptions were noted, such as 52% believing that only women can contract HPV and 63.33% incorrectly assuming that the HPV vaccine provides protection against HIV. Despite these gaps in understanding, attitudes towards the vaccine were generally positive, with 76.66% of respondents expressing willingness to recommend it, and 66.66% indicating readiness to receive the vaccine if offered. However, there remains a critical need for targeted public health education to address knowledge deficits and promote informed acceptance of the HPV vaccine. The analysis of demographic variables showed no significant correlation with vaccine acceptance, suggesting that educational interventions should be inclusive of all demographic groups.

KEYWORDS: Assess, Knowledge, attitude, acceptance, Human papilloma virus, College students

INTRODUCTION

Cervical cancer is the fourth most common cancer in women globally, with around 660,000 new cases in 2022. Approximately 94% of the 350,000 deaths that year occurred in low- and middle-income countries, especially in sub–Saharan Africa, Central America, and south East Asia. These regions face inequalities in vaccination, screening, and treatment services. Women with HIV are six time more likely to develop cervical cancer, contributing to 5% of all cases. Cervical cancer also affects younger women significantly, with 20% of children losing their mother to this disease.1

India has a population of 511.4 million women aged 15 and above at risk of cervical cancer, with nearly all cases linked to persistent infection by one of 14 high-risk HPV types. HPV types 16 and 18 cause 73% of cervical cancers globally and 80-85% in India. Cervical cancer, the second most common cancer in India, accounts for 123,907 new cases and 77,348 deaths annually (Globocan 2020), representing nearly one-fifth of the global burden. Over three-quarters of cases are diagnosed at an advanced stage, leading to poor survival rates.2

There are six licensed HPV vaccines globally: three bivalent, two quadrivalent, and one nonavalent. These vaccines are highly effective in preventing HPV infections, particularly types 16 and 18, which cause 70% of cervical cancers, with the quadrivalent and nonavalent vaccines providing additional protection against genital warts and other HPV types.3

Human papillomavirus (HPV) poses a global health risk, affecting sexually active individuals, particularly women and men, with cervical cancer being its most severe outcome. Early HPV vaccination can prevent the majority of cervical cancer cases. The vaccine protects against genital warts and various HPV-related cancers, including those of the cervix, vagina, vulva, penis, anus, and certain throat cancers. By exposing the immune system to harmless HPV strains, the vaccine enables it to recognize and eliminate the virus before it can lead to serious health complications. 4

Six licensed HPV vaccines are available globally-three bivalent, two quadrivalent, and one nonavalent. These vaccines effectively prevent infections from HPV types 16 and 18, which cause 70% of cervical cancers, and precancerous lesions. The quadrivalent vaccine also protects against anogenital warts caused by HPV types 6 and 11, while the nonavalent vaccine covers additional types 31, 33, 45, 52, and 58.5

HPV is transmitted through direct skin-to-skin contact, including sexual and genital

contact, as well as oral sex. On 1st February, Finance Minister Nirmala Sitharaman announced plans to include HPV vaccination for girls aged 9 to 14 in the national immunization program, aiming to prevent cervical cancer. 6-7

The study found that while 70% of participants were knowledgeable about the vaccine, females were more informed than males (83% vs. 61%). Despite a male HPV vaccine recommendation, only 20% of males and 65% of females had received at least one dose (Schwendener et al. 2022)8

Objectives Of Study

1. To assess the knowledge towards HPV vaccine among college students in Nadiad city.
2. To assess the attitude towards HPV vaccine among college students in Nadiad city.
3. To assess the acceptance towards HPV vaccine among college students in Nadiad city.
4. To correlate the knowledge, attitude and acceptance towards HPV vaccine among college students in Nadiad city.

Assumption

- There may be lack of knowledge towards HPV vaccine among college students.
- There may be negative attitude towards HPV vaccine among college students.
- There may have unwillingness to accept towards HPV vaccination among college students

MATERIALS AND METHODS

This descriptive study, approved by the institutional ethics committee, surveyed 150 students from four colleges in Nadiad City-D.D. I Commerce College, C.B. Patel Arts College, Shri I.V. Patel Commerce College, and J & J College of Science using a structured knowledge questionnaire, Likert scale for attitudes, and an acceptance checklist regarding HPV vaccination. Participants, aged 18-21, were selected via systematic consecutive sampling in July 2024 and provided written informed consent. Participants, aged between 18 and 21 years, provided written informed consent before participating. Data analysis involved categorizing students by demographic factors such as age, gender, and education stream. Statistical methods, including frequency distribution, percentages, chi-square tests, and the Karl Pearson coefficient formula, were applied. The study further investigated the correlation between students' knowledge of HPV vaccination and their attitudes toward the vaccine, as well as their knowledge and acceptance of it. We calculated the sample size using a 98% confidence level, a ±5% margin of error, and an assumed 50% population proportion for a population of 205. This resulted in a required sample size of 150 participants, ensuring accuracy and reliability of the survey data.

Inclusive criteria: 1) College students who willingly participate in the study. 2) College students who are available at the time of the data collection. 3) College students who are above 17 years of age. 4) College students who give consent to answering the questionnaire for the survey. 5)College students who are studying in arts, commerce, and science stream.

Exclusion criteria: 1) Those who refuse to give consent and incomplete questionnaires. 2)Students who are not participated.3) Students who are not present.

Ethical Consideration

The study received approval from the ethical committee of Maganbhai Adenwala Mahagujarat University (Approval No. IEC-MAM Uni/2023-24/59) on April 15, 2024. Participants were informed of the study's purpose and procedures, with informed consent obtained. Confidentiality was ensured, and participants were made aware of their right to withdraw at any time during data collection.

RESULTS

Table 1: Data on the frequency and percentage distribution of selected demographic variable. (n=150)

Sr.no	Variables	Frequency	Percentage
1.	Age		
	18-21 years	150	100%
2.	Gender		
	Male	30	20%
	Female	120	80%
3.	Stream of education		
	Arts	50	33.33%
	Commerce	50	33.33%
	Science	50	33.33%
4.	Place Of Residence		
	Rural	102	68%
	Urban	48	32%
5.	Types Of Family		
	Joint Family	105	70%
	Nuclear Family	45	30%
6.	Family Income		
	<10,000	21	14%
	10,000-30,000	58	38.67%
	Above 30,000	71	47.33%
7.	Marital Status		
	Married	6	4%
	Unmarried	144	96%
	Divorced	0	0

A sample of 150 individuals showed a demographic breakdown of 20% male and 80% female, aged 18-21. Education was evenly split among art, commerce, and science. Residence was 68% rural and 32% urban, with 70% from joint families and 30% from nuclear families. Family income was diverse, with 96% unmarried.

Table 2: Assessment of knowledge score on HPV vaccine. (n=150)

Sr. no.	Score of knowledge	Frequency	Percentage
1	Poor (0-9)	55	37%
2	Average (10-18)	90	60%
3	Good (19-27)	5	3%
	Total	150	100%

The data shows the distribution of knowledge scores among 150 participants, categorized into three levels: Poor, Average, and Good. A significant portion, 37%, scored between 0 and 9, falling in the Poor category, while the majority, 60%, scored between 10 and 18, representing an Average level of knowledge. Only 3% scored between 19 and 27, placing them in the good category. This indicates that most participants had average knowledge, with a smaller group showing poor understanding and very few demonstrating a high level of proficiency.

Table 3: Assessment of attitude towards HPV vaccine among college students in Nadiad city. (n=150)

Sr. no.	Statement	Strongly disagree f (%)	Disagree f (%)	Not Sure f (%)	Agree f (%)	Strongly agree f (%)
1	I believe HPV vaccine is important.	8 (5.33)	10 (6.67)	20(13.33)	72 (48)	40(26.67)
2	HPV vaccination preventing the cervical cancer.	6(4)	8(5.33)	18(12)	75(50)	43(26.67)

3	I believe HPV vaccine is effective.	6(4)	24(16)	18(12)	81(54)	21(14)
4	"I believe that current HPV vaccine is capable of preventing the occurrence of cervical cancer."	10(6.67)	6(4)	42(28)	71(47.33)	21(14)
5	The vaccine is a too expensive.	9(6)	16(10.67)	76(50.67)	33(22)	16(10.67)
6	HPV vaccine to be given only sexually affected females.	15(10)	45(30)	49(32.67)	26(17.34)	15(10)
7	Going for HPV vaccination is waste of time.	6(4)	18(12)	34(22.67)	52(34.67)	40(26.67)
8	There is limited information on HPV vaccine.	10(6.67)	48(32)	42(28)	37(24.67)	13(8.67)
9	Awareness regarding HPV vaccine in society is sufficient.	16(10.67)	28(18.67)	42(28)	47(31.33)	17(11.33)
10	Fear of experiencing pain during injections.	12(8)	46(30.67)	43(28.67)	26(17.33)	23(15.33)

A majority of students (26.67% strongly agree, 26.67% agree) consider the HPV vaccine important, with 78.67% believing it prevents cervical cancer. Most students (68%) agree on its effectiveness, while 50.67% disagree that it is too expensive. Opinions are divided on restricting the vaccine to sexually active females, but most do not consider vaccination a waste of time. Concerns about injection pain are minimal, with 30.67% disagreeing.

Table 4: Assess the acceptance towards HPV vaccine among college students in Nadiad city. (n=150)

Sr.no.	Statement	Yes F (%)	No F (%)
1	Do you know about HPV vaccine?	60 (40)	90 (60)
2	Do you think vaginal bleeding between periods could be sign of cervical cancer?	54 (36)	96 (64)
3	Do you believe that only women can be infected with Human papillomavirus?	78 (52)	72 (48)
4	Is the HPV vaccine safe for everyone?	98 (65.33)	52 (34.66)
5	HPV vaccine should be given to people with multiple Sexual partners?	104 (69.33)	46 (30.66)
6	Do you know that the HPV vaccine is recommended for both male and female?	106 (970.66)	44 (29.330
7	HPV vaccine protects against HIV?	95 (63.330	55 (36.66)
8	Do you believe that getting vaccine against HPV vaccine is important for your health?	114 (760)	36 (24)
9	Would you recommend the HPV vaccine to your friends or classmates?	115 (76.660	35 (23.33)
10	Are you willing to receive HPV vaccine if it offered to you?	100 (66.66)	50 (33.33)

Sixty percent of participants were unaware of the HPV vaccine, and 64% did not recognize abnormal bleeding as a sign of cervical cancer. Additionally, 52% believed HPV only affects women. However, 65.33% viewed the vaccine as safe, 69.33% supported its use for individuals with multiple sexual partners, and 70.66% knew it is recommended for both genders. Though 63.33% mistakenly thought it protects against HIV, 76% recognized its health benefits, and 76.66% would recommend it. Lastly, 66.66% were willing to receive the vaccine. These results emphasize the need for better HPV education and a positive vaccination outlook.

Table 5: Knowledge towards HPV Vaccine among College Students in Nadiad City. (n=150)

Sr. no	Demographic variable	Poor	Average	Good	Frequency	Percentage	X^2	DF	Significance
1	Age								
	18-21	54	88	8	150	100	0	0	NS
2	Gender								
	Male Female	9 45	20 68	1 7	30 120	20 80	1.065	4	NS
3	Education								
	Arts Commerce Science	24 28 2	24 20 44	2 2 4	50 50 50	33.33 33.33 33.33	34.052	4	S
4	Residence								
	Rural	36	64	2	102	68	12.194	2	S
	Urban	7	35	6	48	32			
5	Family								
	Joint	34	66	5	105	70	15.429	2	S
	Nuclear	10	32	3	45	30			
6	Income								
	<10,000 10,000- 30,000 Above 30,000	10 10 34	11 43 34	0 5 3	21 58 71	14 38.67 47.33	15.615	4	S
7	Marital status								
	Married Unmarried Divorced	3 51 0	3 85 0	0 8 0	6 144 0	4 96 0	0.754	2	NS

This study assesses the knowledge of the HPV vaccine among 150 college students in Nadiad city, categorized by demographic factors such as age, gender, education, residence, family type, income, and marital status. The majority of students demonstrated poor or average knowledge. Significant differences were observed based on residence, family type, and income, with urban students, those from joint families, and individuals from higher-income groups displaying greater awareness.

Table no 6: Correlation between knowledge and attitude towards HPV vaccine among college student.

Variable	Mean	S.D.	Pearson correlation	P-values
Knowledge	11.686	4.018642241	-0.0622	0.45102
Attitude	33.82	3.720197007		

P<0.45102= Not statically significant

The correlation analysis reveals an R value of -0.0622, indicating a weak negative correlation between the two variables, meaning that as one variable increases, the other tends to decrease slightly, but the relationship is minimal and practically negligible. The associated p-value of 0.45102 suggests that the result is not statistically significant, as it is much greater than the conventional threshold of 0.05. This high p-value indicates a 45.1% chance that the observed correlation could occur by random chance, reinforcing the conclusion that there is insufficient evidence to support a meaningful relationship between the variables; thus, any observed correlation may be due to random variation rather than a true underlying connection.

Table no 7: Correlation between knowledge and acceptance towards HPV vaccine among college student.

Variable	Mean	S.D.	Pearson correlation	P-values
Knowledge	11.686	4.018642241	0.0431	0.600492
Acceptance	6.14	1.507861576		

P<0.600492= statically significant

The analysis revealed an R value of 0.0431, indicating a weak positive correlation between the two variables, which is negligible due to its proximity to zero. The R^2 value of 0.0019 shows that only 0.19% of the variability in one variable is explained by the other. Furthermore, the p-value of 0.600492 is much higher than the 0.05 significance level, suggesting no statistically significant relationship between the variables.

Table 8: Association between Demographic variable and acceptance of HPV vaccine. (n=150)

Sr. no	Demographic Variable	Acceptance of HPV vaccine		Chi Square	P value
		Yes (%)	No (%)		
1.	Age				
	18-21 years	93	56.9	0	1.0000
2.	Gender				
	Male Female	17.8 75	13.4 43.9	0.38	0.5376
3.	Stream of education				
	Arts Commerce Science	29.8 34.6 28.6	20.2 15.3 21.4	0.753	0.1855
4.	Place of residence				
	Rural Urban	60.2 25.8	44.7 19.2	0	1.0000
5.	Types of family				
	Joint family Nuclear family	61.8 30.8	39.8 17.5	0.12	0.7290
6.	Family income monthly				
	<10,000 10,000-30,000 Above 30,000	10.7 35.4 45.8	8.3 19 31.1	0.638	0.4244
7.	Marital status				
	Married Unmarried Divorced	2.5 90.5 0	1.5 55.4 0	0	1.0000

This analyzes the relationship between demographic factors (age, gender, education stream, residence, family type, income, and marital status) and acceptance of the HPV vaccine. The data shows no significant correlation between age, gender, residence, or marital status with vaccine acceptance, as all p-values are greater than 0.05. Similarly, family type and income also show no significant association. The education stream shows a slightly closer correlation, but it remains non-significant with a p-value of 0.1855.

DISCUSSION

The present study was conducted "to assess the knowledge, attitude and acceptance towards HPV vaccine among college students in Nadiad city". The assess knowledge, attitude and acceptance towards HPV vaccine to the 150 sample. It was knowledge score 38% poor, 60 % average score and 3% is good score. The analysis of college students' perceptions of the HPV vaccine in Nadiad city shows a generally positive attitude. A significant number recognize the vaccine's importance and effectiveness in preventing cervical cancer, with 26.67% strongly agreeing on its importance and 50% agreeing it prevents cancer. However, concerns about the vaccine's cost are prevalent, as 50.67% disagree that it is affordable. There are mixed opinions on whether the vaccine should be given only to sexually active females. While many students do not view HPV vaccination as a waste of time, a substantial portion believes there is limited public information about it. Data shows 25.475% responded "Yes" while

40.14375% said "No," indicating a majority opposition to the issue.

The present study can be supported with the cross-sectional study conducted by Khalid O Alhusayn et al. (2022) reveals low awareness (70.6%) and acceptance of the HPV vaccine among Saudi parents, with only 28.6% recognizing it as a means to prevent cervical cancer. The findings emphasize the need for enhanced educational programs. In a separate analysis of 150 college students, no demographic factors-such as age, gender, or income-were significantly correlated with HPV vaccine acceptance. However, students generally held a positive view of the vaccine's importance and effectiveness. Knowledge levels varied significantly based on residence, family type, and income, indicating a need for targeted education to improve HPV vaccine uptake.9

The present study can be supported with the cross-sectional study conducted by the study by Mayithari Balaji et al. (2020) assessed the awareness of HPV among dental and medical students, revealing an average knowledge score of 10.75 out of 20, dictating a significant educational gap regarding HPV and its prevention. A subsequent analysis of 150 individuals showed no significant demographic correlations (age, gender, education, residence, family type, income, marital status) with HPV vaccine acceptance, suggesting that these factors do not influence willingness to receive the vaccine. Despite a generally positive attitude towards the HPV vaccine-over 50% acknowledging its importance and effectiveness-concerns about cost and the availability of infraction persist. Knowledge levels varied significantly based on geographic residence and educational background, particularly among science students.10

CONCLUSION

The study reveals that while the majority of college students in Nadiad city possess moderate knowledge about HPV and its vaccination, there is a considerable gap in awareness, with a significant portion having poor knowledge. The attitudes towards the HPV vaccine are generally positive, indicating a willingness among students to accept vaccination, especially recognizing its role in preventing cervical cancer. However, misconceptions persist regarding the vaccine's safety and effectiveness, highlighting the need for enhanced public health education. Although the correlation between knowledge and attitude, as well as knowledge and acceptance, was found to be weak, the overall findings suggest that targeted interventions could improve vaccination uptake.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: Special thanks to all the participants from the Arts, commerce, and science colleges, the faculty who validated the tool, the colleges in Nadiad for allowing us to conduct the study and the research guide for their constant support and guidance.

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

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How to cite this article: Neha N Parmar, Anshu Yadav, Arpita Nayi, Bharti Kunvar, Dharmishtha Vasava, Digisha Chaudhari. How informed are college students about HPV? discover the real insights behind their knowledge, attitudes, and acceptance of the HPV vaccine. *Int J Health Sci Res.* 2024; 14(12):191-199. DOI: *10.52403/ijhsr.20241222*

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