Original Article

Knowledge and attitude towards HPV infection, HPV vaccination and cervical cancer among middle- and high-school students in Gwalior

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Abstract

Background: There is little information available regarding knowledge and attitudes towards the human papillomavirus (HPV) and its vaccines among the students in mainland India. Furthermore, there has not been much information accessible on how to increase their understanding of and readiness to receive HPV and associated vaccines, which could be crucial for the future success of vaccination campaigns. This study aims to assess the knowledge and attitude of middle- and high-school students towards HPV infection, HPV vaccine and cervical cancer prevention. **Method:** The present study was an observational study conducted from July 2023 to December 2023 in the Gwalior District of Northern India among the 490 students aged 11–16 years. A self-administered questionnaire was used to collect information from the students. The collected data was entered into an Microsoft Excel spreadsheet for easy calculation. Frequency and percentage were calculated and significance in proportion was tested using the chi-square test. *P* value was judged at a 5% level of significance. **Results:** The average age of the student was 13.67 ± 1.95 years range between 11 years and 16 years with a 0.52:1 sex ratio. Out of the 490 enrolled participants, 41.0% of subjects had previously heard about cervical cancer. About 64.7% of students heard it from the mass media. A total of 181 (36.9%) knew that cervical cancer was caused by HPV infection. Only 168 (34.3%) participants knew the fact that men were also infected by HPV infection. Only 12.4% knew that a healthy-looking person could have an HPV infection. Only 11.6% had shown their willingness for the HPV vaccination. There was a significant difference observed among the males and females regarding knowledge questions. Males (54.76%) heard more about cervical cancer than females (33.85%). Males had more knowledge (60.1%) regarding cervical cancer caused by HPV infection as compared with females (24.8%). **Conclusion:** Students' awareness of HPV and the HPV vaccine was low. Training that focusses on HPV information in addition to sex education is needed to promote HPV vaccine coverage.

Keywords: Human papillomavirus (HPV), knowledge, vaccine, willingness to be vaccinated

Introduction

Cervical cancer is the fourth most common cancer in females worldwide. The interesting fact about cervical cancer is that it is a preventable cancer by timely action. The incidence of cervical cancer is 18.8 per 100,000 women and 11.2 per 100,000 women while mortality is 12.4 per 100,000 women and 5.2 per 100,000 women in developing countries and developed countries, respectively.[1] Human papillomavirus (HPV) is the most common cause of cervical cancer. HPV is a sexually transmitted infection. Men and women both are at an equal risk for HPV infection.

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Usually, HPV infection clears on its own without producing any diseases but in a few cases, it leads to an increased risk of cancer. HPV 16 and HPV 18 are responsible for 70–80% of cervical cancer cases. HPV infections in boys are associated with penile, anal and oropharyngeal cancers, which are commonly linked to HPV type 16.[2] The HPV vaccine is a highly effective prophylactic vaccine developed to prevent the most common high-risk strains. Many adolescents are unaware of the HPV vaccine, which is a significant obstacle to vaccination.[3] In many countries, the number of new cases and deaths due to cervical cancer has decreased significantly due to an increased awareness about cervical cancer prevention. This awareness helps to reduce the risk of HPV infection through HPV vaccination and screening.[4]

A school is a place that plays a very important role not only in education but also in learning about the reproductive and sexual health among the youth. It is necessary to make every student aware of cervical cancer, HPV infection and HPV vaccination, as it will be an important step towards eradicating cervical cancer as the World Health Organization's (WHO) goal. WHO is also searching for opportunities to prevent HPV infection and to reduce the incidence of HPV-related disease in both men and women.

Through this survey, we can also assess the awareness of HPV infection and vaccine information in various areas of society, e.g., primary healthcare workers, teachers, parents, etc., from where students get information, which will help design HPV vaccination programmes and public health policies in India. So, this makes the present study important for the primary healthcare physician.

This study aims to assess the knowledge and attitude of middle- and high-school students of Gwalior in Madhya Pradesh towards HPV infection, HPV vaccine and cervical cancer prevention. This survey assesses the student's knowledge and simultaneously makes them aware that cervical cancer is preventable by vaccines. It is very important to educate the students since this is a phase where they can easily learn and spread information to their parents and society. So, indirectly through the students, we can educate the parents and elder generations too.

Materials and Methods

Study setting and sampling method

The study was an observational study conducted from July 2023 to December 2023 in the Gwalior District of Northern India. The study subjects were the adolescent girls and boys aged 11–16 years. Study sites were schools within Gwalior City. Study sites were selected based on the availability of adolescent girls/boys of the age group 11–16 years and permission from the school authorities in the conduct of the study.

Development of knowledge questionnaire

The study team developed a questionnaire based on an extensive literature review using the following keywords: human papillomavirus, HPV questionnaire, HPV study, parents' knowledge of HPV, validation of questionnaire, content validity index using search engines such as Google Scholar, Science Direct, PubMed/Medline and Scopus. The questionnaire included questions that sought to gain information about the student's knowledge about HPV infection.

Sample size

A study conducted by Swarnapriya *et al.* (2015)[5] among medical and paramedical students found that about 45% of the participants displayed good knowledge regarding HPV vaccination. So, at a 5% level of significance and 10% relative precision, the sample size was calculated using the formula $4*p*q/l^2$. The calculated sample size was 488.9 which was rounded off to 490.

Sampling procedure

Adolescent students aged 11–16 years studying at the study sites were approached and informed about the purpose and procedure of the study. Students were asked about the questions in the questionnaire. A list of the study participants was obtained from the head of the institution and 490 study participants were selected randomly from the Microsoft Excel random number table method. Students were selected using the simple random sampling without replacement method.

Ethical consideration

Ethical clearance of the study was obtained from the institutional human ethical committee. A study-specific informed consent form was taken from the parents of the students.

Data analysis

The collected data were entered into an Microsoft Excel spreadsheet for easy calculation. Frequency and percentage were calculated, and the value was judged at a 5% level of significance.

Results

A total of six schools were approached for the conduct of the study, and these schools granted permission to conduct the study. In the present study, 490 students were enrolled. The average age of the student was 13.67 ± 1.95 years range between 11 years and 16 years [Table 1].

In the present study, demographic details of the study population are presented in Table 2. A total of 322 (65.7%) participants were girls while 168 (34.3%) were boys. A total of 261 (53.3%) were middle-aged students while a total of 229 (46.7%) were high-school students. In the present study, 404 (82.4%) were the followers of Hindu religion while 52 (10.6%) were the followers of Muslim religion [Table 2].

Table 1: Descriptive statistics for the age of the participants

	Mean	Median	SD	Minimum	Maximum	Q3-Q1
Age	13.67	14.00	1.95	11	16	15.0-12.0

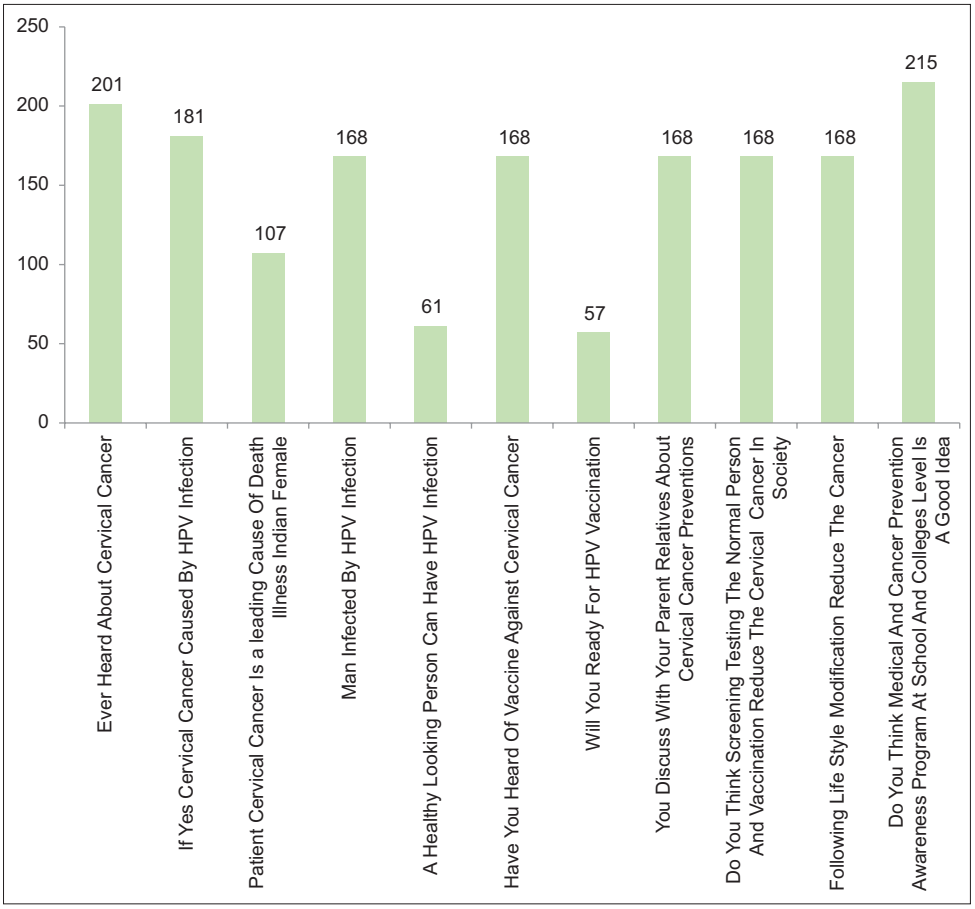
Out of the 490 enrolled participants, 41.0% of subjects had previously heard about cervical cancer. About 64.7% of students had heard about it from the mass media. A total of 181 (36.9%) knew that cervical cancer was caused by HPV infection. Among the study participants, 21.8% knew that cervical cancer is a leading cause of death and illness in Indian females. Only 168 (34.3%) study participants knew the fact that a man could be infected by HPV infection. Only 12.4% knew that a healthy-looking person could have an HPV infection [Table 3 and Graph 1].

Table 2: Distribution of the students for their socio-demographic characteristics

Variables	Frequency	Percentage
Age		
11	118	24.1
12	73	14.9
14	70	14.3
15	119	24.3
16	110	22.4
Gender		
Female	322	65.7
Male	168	34.3
Education		
High School	229	46.7
Middle School	261	53.3
Religion		
Hindu	404	82.4
Muslim	52	10.6
Sikh	15	3.1
Christian	9	1.8
Jain	10	2.0

Only 11.6% had shown their willingness for the HPV vaccination. Among all the students interviewed, 168 (34.3%) participants thought that screening/testing the normal person and vaccination reduces cervical cancer in the society. A total of 215 (56.1%) participants thought that medical and cancer prevention awareness programmes at the school and college levels were a good idea [Table 4 and Graph 1].

There was a significant difference observed for the males' and females' knowledge questions. Males (54.76%) heard more about cervical cancer than females (33.85%). Males had more knowledge (60.1%) regarding cervical cancer caused by HPV infection as compared with females (24.8%). It was found that more male students (25.0%) as compared to female students (5.9%) believed that a healthy-looking person can also have HPV infection. About half of the male students (52.4%) thought that medical and cancer prevention awareness programmes at the school and college levels were a good idea [Table 5].



Graph 1: Frequency distribution of knowledge questions

Table 3: Distribution of the students for their knowledge regarding

Variables	Frequency	Percentage
Ever heard about cervical cancer		
No	289	59.0
Yes	201	41.0
If yes, where did you hear about the first time		
Health Worker	36	17.9
Mass Media	130	64.7
Relatives and friends	30	14.9
Others	5	2.5
Cervical cancer is caused by HPV infection		
No	309	63.1
Yes	181	36.9
Patient cervical cancer is a leading cause of death and illness in Indian females		
No	383	78.2
Yes	107	21.8
HPV infection transmitted by		
Sexual contact	145	29.6
Do not know	345	70.4
Men are infected by HPV infection		
No	322	65.7
Yes	168	34.3
A healthy-looking person can have HPV infection		
No	429	87.6
Yes	61	12.4
Have you heard of vaccine against cervical cancer		
No	322	65.7
Yes	168	34.3
Following lifestyle modifications reduces cancer		
No	322	65.7
Yes	168	34.3

Table 4: Distribution of the students regarding attitude

Attitude Questions	Frequency	Percentage
Will you be ready for HPV vaccination		
No	433	88.4
Yes	57	11.6
You discuss with your parents and relatives about cervical cancer prevention		
No	322	65.7
Yes	168	34.3
Do you think screening and testing the normal person and vaccination reduces cervical cancer in society		
No	322	65.7
Yes	168	34.3
Do you think medical and cancer prevention awareness programmes at the school and college levels should be organized		
Yes	275	56.1
No	215	43.9

Discussion

This study provides useful information on cervical cancer and HPV among middle-school and high-school students in Gwalior. It provides information that may help design the HPV vaccination programme and public health policy in India. HPV vaccine has proven efficacy and safety for the prevention of cervical cancer.

According to WHO, the recommended primary target group of adolescents of 9 years to 14 years old middle-school students and 11 to 16 years aged high-school students would be the best candidates for HPV vaccination. It is important to understand the attitude of these students about cervical cancer, HPV and its vaccine, as well as how to educate these students to ensure a successful vaccination programme that aims to decrease cervical cancer and HPV burden in the future.

In our study, 41% of the students ever heard about cervical cancer while a study done by Liu *et al.* (2019)[6] reported that only 34.3% of students had heard of cervical cancer/genital warts. Another study conducted in India reported that 18% of medical students did not know that HPV vaccination prevents cervical cancer.[7] A similar study conducted by Xue *et al.*[8] among the 1021 junior middle-school students found that 15.5% had heard of HPV and 18.9% of them had heard of the HPV vaccine. It was observed that the general public has a low level of knowledge about HPV infection, so the younger population also had low knowledge about this.

A meta-analysis done by Addisu D *et al.*[9] among the adolescent school girls included eight studies comprising 3936 participants for knowledge and attitude regarding HPV vaccine and the estimated pooled proportions were 55.12% for good knowledge and 42.05% for good attitude. Another study done by Iova CF *et al.*[10] found that about 70% of girls who had participated had heard about HPV infection and reported the source of information as medical personnel (27.82%), school (22.17%), family member or friend (19.56%), television (TV)/radio (9.71%), internet (32.03%), and 1.16% reported that they read about it in the magazines related with medical fields. A systematic review done by Eleni Krokidi *et al.*[11] reported that health education is a useful method for raising young Indian people's knowledge, acceptability and uptake. The unique traits of each target group should be considered by policymakers, and communication strategies should be modified accordingly. The effectiveness of HPV vaccination programmes has been influenced by stakeholders like political and religious leaders.

Ahmed D *et al.*[12] demonstrated that Sikkim successfully introduced the HPV vaccine to multiple-age cohorts of girls through school-based vaccination, demonstrating a model that could be replicated in other regions in India or similar low- and middle-income country settings.

In our study, female students (33.85%) had less knowledge about HPV and cervical cancer than male students (54.76%). Our study was dissimilar to the study conducted by Hussain *et al.*[13] in India who showed that 68.5% of female students were aware of cervical cancer whereas only 31.5% of male students were

Table 5: Association of knowledge and attitude questions with the gender

Questions	Female	Male	Chi-square	*P*
Ever heard about cervical cancer	109 (33.85%)	92 (54.76%)	19.95	0.000
Cervical cancer is caused by HPV infection	80 (24.8%)	101 (60.1%)	58.97	0.000
Patient cervical cancer is a leading cause of death and illness in Indian females	73 (22.7%)	34 (20.2%)	0.383	0.536
HPV infection is transmitted by sexual contact	86 (26.1)	59 (35.1)	3.75	0.053
Men are infected by HPV infection	92 (28.6%)	76 (45.2%)	13.61	0.000
A healthy-looking person can have HPV infection	19 (5.9%)	42 (25.0%)	36.95	0.000
Have you heard of vaccine against cervical cancer	92 (28.6%)	76 (45.2%)	13.61	0.00
Will you be ready for HPV vaccination	25 (7.8%)	32 (19.0%)	13.67	0.00
You discuss with your parents and relatives about cervical cancer prevention	92 (28.6%)	76 (45.2%)	13.61	0.00
Do you think screening and testing the normal person and vaccination reduces cervical cancer in society	92 (28.6%)	76 (45.2%)	13.61	0.00
Following lifestyle modifications reduces cancer	92 (28.6%)	76 (45.2%)	13.61	0.00
Do you think medical and cancer prevention awareness programmes at the school and college levels are a good idea	127 (39.4%)	88 (52.4%)	7.51	0.006

aware of the same. This study found that the difference in the more awareness among the males may be due to changes in the environment of society and better access to the internet to the males. Not all studies reported the gender difference separately, so data are limited. Though education with an emphasis on male-specific HPV-related illnesses and vaccine benefits is needed to enhance HPV vaccine uptake among male students. Mass education programmes are needed for female students to increase awareness among them.

Mass media are the main source of HPV infection and HPV vaccine information in our study (64.7%). A study conducted by Makwe CC *et al.*[14] found that the most common source of information was from television/radio (21%), print media (12.7%), health campaigns (12.2%), family/friends (9.9%) and healthcare providers (9.4%) in 16–29 years female students in Nigeria. Young adults frequently use radio and television as electronic mass media for amusement and leisure. These mediums can also be used to spread knowledge about HPV infection and the HPV vaccine.

We found that 88.4% of the students were not willing to HPV vaccination. In contrast, a Chinese study showed a willingness of 55.2% to be vaccinated even before any intervention.[6] Students did not show high willingness for the vaccination and this may be due to several possible reasons; one is that the majority of students had never heard of cervical cancer or HPV or HPV vaccinations. Another possible explanation for their lack of motivation to get vaccinated could be that they were afraid of getting an injection, were unsure about getting one or were unaware of the significance of the HPV vaccine.

Although students are not ready for vaccination, they are willing to discuss this with their parents. This showed that they are curious to know about the HPV vaccine and its effects. They may get ready for vaccination after a discussion with their parents. So, it is necessary to educate society at all levels for this vaccination. Several studies proved that increased knowledge of HPV and HPV vaccine had a positive effect on willingness to be vaccinated.

Only 17.9% of the students in our survey received information from a healthcare provider. By introducing preventative interventions like HPV screening and vaccination as well as disseminating information about the importance of HPV infection and the risk of developing cancer, primary care physicians can play a special role in improving outcomes. Increasing knowledge in both high-risk subpopulations and the general public is thought to be the most effective way to prevent HPV infection. To effectively promote the vaccine and other preventative measures within the community, physicians—particularly those practicing obstetrics and gynaecology, family medicine and primary healthcare—need to be actively involved in this endeavour. Nonetheless, doctors' inadequate understanding and awareness of the significance of the HPV vaccine was noted.

Conclusion

Students at junior, middle and high schools in Gwalior, Madhya Pradesh, had very little background knowledge of HPV, its vaccinations and cervical cancer. Due to ignorance, they had a poor willingness to receive vaccinations. Health education delivered in schools is a suitable and successful way to raise people's knowledge of HPV and readiness to get vaccinated against it. To increase the adoption of HPV vaccination, steps should be taken simultaneously to improve the awareness of healthcare professionals at all levels. A good strategy to raise the HPV vaccination rate in India would be to incorporate health education on vaccines into the already existing school-based sexual health curriculum and provide health professionals more confidence to recommend the HPV vaccine.

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Conflicts of interest

There are no conflicts of interest.

References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, *et al.* Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 2021;71:209–9.
2. de Sanjosé S, Serrano B, Tous S, Alejo M, Lloveras B, Quirós B, *et al.* Burden of human papillomavirus (HPV)-related cancers attributable to HPVs 6/11/16/18/31/33/45/52 and 58. JNCI Cancer Spectrum 2018;2:pky045.
3. Loke AY, Kwan ML, Wong YT, Wong A. The uptake of human papillomavirus vaccination and its associated factors among adolescents: A systematic review. J Prim Care Community Health 2017;8:349-62.
4. Bray F, Loos AH, McCarron P, Weiderpass E, Arbyn M, Møller H, *et al.* Trends in cervical squamous cell carcinoma incidence in 13 European countries: Changing risk and the effects of screening. Cancer Epidemiol Biomarkers Prev 2005;14:677-86.
5. Swarnapriya K, Kavitha D, Reddy GM. Knowledge, attitude and practices regarding HPV vaccination among medical and para medical in students, India a cross sectional study. Asian Pac J Cancer Prev 2015;16:8473-7.
6. Liu CR, Liang H, Zhang X, Pu C, Li Q, Li QL, *et al.* Effect of an educational intervention on HPV knowledge and attitudes towards HPV and its vaccines among junior middle school students in Chengdu, China. BMC Public Health 2019;19:1-9.
7. Mehta S, Rajaram S, Goel G, Goel N. Awareness about human papilloma virus and its vaccine among medical students. Indian J Community Med 2013;38:92–94.
8. Xue L, Hu W, Zhang H, Xie Z, Zhang X, Zhao F, *et al.* Awareness of and willingness to be vaccinated by human papillomavirus vaccine among junior middle school students in Jinan, China. Hum Vaccin Immunother 2018;14:404-11.
9. Addisu D, Gebeyehu NA, Belachew YY. Knowledge, attitude, and uptake of human papillomavirus vaccine among adolescent schoolgirls in Ethiopia: A systematic review and meta-analysis. BMC Womens Health 2023;23:279.
10. Iova CF, Badau D, Daina MD, Șuteu CL, Daina LG. Evaluation of the knowledge and attitude of adolescents regarding the HPV infection, HPV vaccination and cervical cancer in a region from the northwest of Romania. Patient Prefer Adherence 2023;17:2249-62.
11. Krokidi E, Rao AP, Ambrosino E, Thomas PPM. The impact of health education interventions on HPV vaccination uptake, awareness, and acceptance among people under 30 years old in India: A literature review with systematic search. Front Reprod Health 2023;5:1151179.
12. Ahmed D, VanderEnde K, Harvey P, Bhatnagar P, Kaur N, Roy S, *et al.* Human papillomavirus (HPV) vaccine introduction in Sikkim state: Best practices from the first statewide multiple-age cohort HPV vaccine introduction in India-2018-2019. Vaccine 2022;40(Suppl 1):A17-25.
13. Hussain S, Nasare V, Kumari M, Sharma S, Khan MA, Das BC, *et al.* Perception of human papillomavirus infection, cervical cancer and HPV vaccination in North Indian population. PLoS One 2014;9:e112861.
14. Makwe CC, Anorlu RI, Odeyemi KA. Human papillomavirus (HPV) infection and vaccines: Knowledge, attitude and perception among female students at the University of Lagos, Lagos, Nigeria. J Epidemiol Glob Health 2012;2:199-206.