

Original Research Article

EXPLORING KNOWLEDGE OF SCHOOL STUDENTS REGARDING HUMAN PAPILLOMA VIRUS INFECTION AND ASSOCIATED VACCINE IN MAHARASHTRA: A CROSS-SECTIONAL SCHOOL BASED SURVEY

Prabha Nandkishor Sawant¹, Sushama Basant Malpani², Karan Shrikant Patil²

¹Associate Professor, Department of General Medicine, MGM Medical College Vashi, Maharashtra, India

²Assistant Professor, Department of General Medicine, MGM Medical College Vashi, Maharashtra, India

Received : 15/05/2026
Received in revised form : 28/06/2026
Accepted : 13/07/2026

Corresponding Author:

Dr. Karan Shrikant Patil,
Assistant Professor, Department of
General Medicine, MGM Medical
College Vashi, Maharashtra, India.
Email: drkaranpatil086@gmail.com

DOI: 10.70034/ijmedph.2026.3.209

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (3); 1311-1315

ABSTRACT

Background: Human papillomavirus (HPV) is an important reason of cervical cancer, predominantly in low- and middle-income nations. However, the awareness about HPV infection as well as vaccination is scarce in several settings. The objective is to evaluate the knowledge of HPV infection and its vaccine among female secondary school students in Mumbai District of Maharashtra State.

Materials and Methods: A cross-sectional study was implemented among 645 female students aged 11–19 years in Mumbai District in April 2025. The data was gathered through structured, pre-validated questionnaires. Descriptive statistics and chi-square tests were utilized to examine relationship between knowledge and demographic variables.

Results: The mean age of participants was 13.20 ± 2.41 years. Overall, 72.4% had never heard of HPV, and 84.3% showed inadequate knowledge of the HPV vaccine. Students of 13 years and more and with literate parents revealed significantly greater knowledge. Schools were the most quoted source of information (58%). Misconceptions about HPV related symptomatology and control measures were common.

Conclusion: Knowledge of HPV infection and HPV vaccine was deprived among study participants, emphasizing the necessity for early school-based education as well as potential stakeholder commitment to address myths and improve appropriate knowledge.

Keywords: Human Papilloma Virus, Knowledge, School Students, Vaccine

INTRODUCTION

Cervical cancer is an important public health problem worldwide, predominantly in low- and middle-income nations, where more than 86% of cases and associated mortalities occur.^[1] This is the fourth commonest cancer among females globally, with sub-Saharan Africa showing a inexplicably high magnitude.^[2] Human papillomavirus (HPV), a common sexually transmitted infection (STI), is involved in more than 98% of cervical cancer cases.^[2] Chronic infection with high-risk HPV types, especially types 16 and 18, is known as a potential etiological factor.^[3] Accordingly, prevention approaches aiming on HPV vaccination as well as

cervical cancer screening have crucial role to decreasing morbidity and mortality.

Considering the need to address cervical cancer as a public health concern, the World Health Organization (WHO) introduced a comprehensive plan which comprises attaining 90% HPV vaccination coverage among females till the age of 15, around 70% cervical screening coverage, and 90% access to management by year 2030.^[4] It calls for timely provision of the HPV vaccine to adolescent females aged 9–14 years, preferably prior to sexual debut.^[4] Nevertheless, uptake of the HPV vaccine in several LMICs remains inadequate due to poor awareness, misinformation about vaccine, cultural beliefs and traditions, as well as religious constraints.^[5]

India has already launched a nationwide free HPV vaccination program targeting approximately 11.5 million girls aged 14 years to prevent cervical cancer. However, multiple studies report exceptionally poor awareness of HPV and its vaccine among school students in India.^[6,7] Remarkably, in numerous communities, uncertainties about vaccine-induced infertility have been proliferated by anti-vaccination movements influencing public confidence.^[6,7] These aspects frequently reflect profoundly rooted socio-cultural and religious beliefs, emphasizing the complex connection of health beliefs as well as vaccine hesitancy. Assessing the knowledge levels and perceptions of this group is principally crucial as they represent the primary target for vaccination and establish a significant population for the prevention of HPV-related illnesses.

Educational establishments are one of the most reliable and efficient platforms for disseminating health related information among adolescent population. The existing literature proved that school-based health education significantly increases knowledge and promotes HPV vaccine acceptance.^[8] Though, in India, HPV education is not yet holistically integrated into the school health curriculum, causing missed opportunities for initial intervention and prevention.

Moreover, the influence of parents and religious organizations cannot be overstated. Studies have revealed that parental education and their occupation considerably influence child's health behaviors.^[6-8] Also, faith-based establishments in India play a vital role in influencing community insights and behaviors. When engaged properly, they can serve as influential partners in reducing myths and improving precise health information.^[9] Therefore, the active alliance of healthcare professionals, schools, faith-based groups, and policy administrators is indispensable in promoting HPV vaccine sensitization and acceptance.

The current study was planned to evaluate the baseline knowledge and views of HPV infection and vaccination among female secondary school students in Mumbai district of Maharashtra State. The study inferences are projected to guide policy design and stakeholder commitment approaches which corroborates with national as well as global strategies to reduce cervical cancer through effective HPV vaccination.

MATERIALS AND METHODS

Study Design and Setting: The present study was a cross-sectional study which was carried in April 2025 among randomly selected schools in Mumbai district of Maharashtra State. The present study was approved by Brij Niramaya Memorial Hospital and Research Center in Maharashtra, India (approval number: BMC/EC/637/2025). The written informed

consent was acquired from parents/guardians, and assent was received from the study participants.

Study Population and Sample Size: Two schools from the study area were randomly selected through random sampling method. A total of 658 female school students aged 11 to 19 years were recruited through complete enumeration sampling method. Inclusion criteria were female students belonging to 6th to 12th class and who gave assent/ consent and received parental consent accordingly.

Data Collection Procedures: A pre-validated, structured self-administered questionnaire was utilized to gather data on demographic features, knowledge regarding HPV infection, modes of transmission, symptomatology, prevention measures, and knowledge about HPV vaccine. The questionnaire was used in local language (Marathi). The collected data was incorporated into a Microsoft Excel sheet and was analyzed using suitable statistical tests.

Statistical Analysis: The data was analysed by SPSS version 30 (IBM Corp, Armonk, New York). Socio-demographic features and knowledge of HPV and related vaccine were studied using percentages, frequencies, and standard deviations. Understanding of HPV associated ailments and HPV vaccine were gauged through four stem questions each. Each accurate response was assigned score one and every single incorrect response was given score zero. The total assigned score was 4. Satisfactory knowledge was considered if it was above 2 while unsatisfactory knowledge was 2 or below 2. All discrete variables were computed through frequency tables as well as percentages, whereas quantitative variables were computed using the mean and standard deviation. Chi-square tests as well as Fisher's exact test were utilized to evaluate relationship between knowledge and demographic attributes. The statistical significance was used at $p < 0.05$.

RESULTS

Demographics Attributes of Participants: A total of 658 female students were involved in the current study but the data analysis was performed only for 645 participants as 13 (1.97%) did not complete questionnaire. The participants' age ranged between 11 to 19 years, with a mean age of 13.20 ± 2.41 years. The majority (89%) of participants identified as Hindu. Most participants' mothers (88%) had post-primary education. Approximately 65% of their fathers were doing private or government service followed by business.

Knowledge and Perceptions of HPV Infection: A considerable proportion of participants reported poor knowledge about different aspects of HPV infection (Table 1). The majority (86%) of them had never heard of HPV infection. Among those who were aware, 68% of them identified school-based instructions as their major source of information

followed by social media and friends/ relatives (23%). Nearly 20% correctly identified sexual intercourse as one of the main routes of transmission. In context of HPV-related health problems, 60% of participants showed no knowledge of any disease related to the infection. Additionally, 27% incorrectly linked HPV with respiratory diseases. Regarding prevention approaches, only 12% mentioned vaccination and 19% stated safe sexual practices could prevent HPV infection. The majority of them were uncertain about correct prevention strategies and more than 50% believed “cough etiquettes”, “wearing mask” and “social isolation” were the major control measures of HPV infection.

Education of Mother and HPV Knowledge: Participants (27%) whose mothers had at least primary or secondary education were comparatively more likely to have satisfactory knowledge. However, participants with illiterate mother or

unaware of their mother’s educational status had the lowest awareness (6.5%). Overall, there was statistically significant difference ($p < 0.05$) between HPV knowledge of participants and parents’ (father and mother) education level.

Knowledge and Perceptions about HPV Vaccine: Table 2 delineates knowledge of study participants about HPV vaccine. Overall, the study revealed poor knowledge and perceptions about HPV vaccine among participants. Only around 18% of the study participants knew that there is a vaccine against HPV, with social media being the most common source of information regarding the vaccine. However, only 35.65% of participants were willing to take HPV vaccination if available. Only 10.65% and 9.85% of participants stated “cervical cancer” and “HIV/AIDS” respectively as HPV vaccine preventable diseases. It was also observed that knowledge and perceptions about vaccine improved with academic level ($p < 0.005$).

Table 1: Knowledge of Participants about HPV infection (n=645)

Parameter	Participants with correct knowledge (%)	Participants with incorrect knowledge (%)	P value
Agent and host factors	74 (11.47)	571 (88.52)	0.001*
Modes of transmission	86 (13.33)	559 (86.66)	0.52
Symptomatology	112 (17.36)	533 (82.63)	0.002*
Diagnosis	65 (10.07)	582 (90.23)	0.001*
Prevention measures	137 (21.24)	508 (78.75)	0.005*

*p value is statistically significant

Table 2: Knowledge of Participants about HPV Vaccine (n=645)

Parameter	Participants with correct response (%)	Participants with incorrect response (%)	P value
Have you heard of HPV vaccine?	112 (17.36)	533 (82.63)	0.002*
Safety of vaccine	68 (10.54)	577 (89.45)	0.37
Side effects of vaccine	70 (10.85)	575 (89.14)	0.001*
Vaccine beneficiaries	115 (17.82)	530 (82.17)	0.001*
Uses of vaccine	108 (16.74)	537 (83.25)	0.38
Efficacy of vaccine	52 (8.06)	593 (91.93)	0.005*
Doses of vaccine	74 (11.47)	571 (88.52)	0.001*

*p value is statistically significant

DISCUSSION

The current study reported surprisingly poor level of awareness and perspectives of HPV infection and its vaccine among adolescent school going girls, with almost more than 80% of them unacquainted of the virus and nearly 85% lacking baseline knowledge of the vaccine. This finding was consistent with previous studies.^[7,10,11]

Comparatively, knowledge as well as uptake of HPV vaccination was considerably less in sub-Saharan Africa than in high-income nations.^[12,13] A study implemented in South Africa stated that only 22% of adolescent females were aware of the HPV vaccine,^[14] whereas less than 10% of participants were vaccinated. This inadequate awareness might be due to poor incorporation of HPV education into school curriculum, false information regarding vaccine and fragile policy execution as emphasized in the study by Bruni et al.^[15]

In this study, one of the most noteworthy inferences is the role of school in enabling HPV related information to participants. The majority of the participants who had heard of HPV mentioned school-based teaching as their key source of information. The significance of the school environment in fostering adolescent health knowledge was well reinforced by several studies,^[16,17] which reported that school driven health information significantly upsurge knowledge and developed positive perceptions about HPV and its vaccine. Although the proven impact, HPV education is still not comprehensively included into school curriculum in many Indian schools. To address such gap, inclusion of HPV education into health program at school level essential. School oriented health interventions, comprising planned classroom sessions, peer-based education, as well as teacher training programs, have played an instrumental role in promoting adolescent sexual and reproductive health knowledge.^[17,18]

Furthermore, instigating HPV awareness drives through school meetings and virtual learning platforms may further strengthen the information. A foremost concern underlined in the present study was the discrepancy between the ideal age for HPV vaccination and the age at which good knowledge of HPV begins to arise. As per WHO recommendations, the optimum age for HPV vaccination is 9–14 years, preferably before the onset of sexual activity.^[16-18] Conversely, our findings revealed that better HPV knowledge was more prevalent in females elder than 14 years, signifying that maximum girls are not informed regarding HPV at the time when vaccination would be most effective. This inconsistency reiterates the need for early education and intervention.

In our study, the progressive rise in awareness with age and academic level was consistent with previous studies.^[12,13] reflecting collective exposure to health education as students proceed to next academic level. The existing study also reported few misconceptions about HPV where participants mentioned that HPV is respiratory illness. Similar findings were also documented in other school-based studies.^[14,16] However, this misinformation about basic aspects of disease may persist due to constrained access to health education. Furthermore, the role of social media as the second commonest source of information also focuses on a double-edged dynamic as it not only provides access to information but also it offers a potential platform for misleading information. The flawed opinions perceived by many participants like “HPV causes respiratory illnesses” or “HPV is waterborne disease” emphasize the risks of unregulated sources. Hence, synchronized digital literacy and virtual health education programmes in partnership between educationalists, healthcare professionals, and community stakeholders are essential to warrant that adolescents obtain precise, evidence-based information from reliable sources.

In the current study, the influence of parental education as well as occupation was significantly seen which favours a family-centered approach to adolescent health education. Strategies that involve parents, specifically mothers through community outreach, parent-teacher meetings, and local media may boost home based as well school-based learning. One of the limitations of this study is lack of multiple settings as the study focused on only limited schools. However, multicentric studies are highly warranted to generalize the inferences. Despite this, the present study acts as a staging point to evaluate acceptance for vaccination and the need of structured health education and awareness programs at school level.

CONCLUSION

The present study emphasizes a substantial gap between the age of recommended HPV vaccine

eligibility and the age of actual understanding regarding HPV vaccine. Schools can be the most strategic and accessible avenue to address such gap. Faith based organizations (FBOs) and community stakeholders must also be integrated in public health promotion to counteract socio-cultural and religious myths about vaccine. The systematic incorporation of HPV education into school curriculum, along with community oriented and digital interventions, is necessary to enhance knowledge, address fallacies, and eventually strengthen vaccine uptake among Indian adolescents.

REFERENCES

1. Kombe Kombe AJ, Li B, Zahid A, Mengist HM, Bounda GA, Zhou Y, et al. Epidemiology and Burden of Human Papillomavirus and Related diseases, Molecular Pathogenesis, and vaccine evaluation. *Front Public Health* 2020; 8(55): 1-8.
2. De Martel C, Georges D, Bray F, Ferlay J, Clifford GM. Global burden of cancer attributable to infections in 2018: a worldwide incidence analysis. *Lancet Glob Health*. 2020;8(2):180–90.
3. Ali MAM, Bedair RN, Abd El Atti RM. Cervical high-risk human papillomavirus infection among women residing in the Gulf Cooperation Council countries: prevalence, type-specific distribution, and correlation with cervical cytology. *Cancer Cytopathol*. 2019;127(9):567–77.
4. Baghi HB, Yousefi B, Oskouee MA, Aghazadeh M. HPV vaccinations: a Middle Eastern and north African dilemma. *Lancet Infect Dis*. 2017;17(1):18–9.
5. Abdulla M, Shah SM, Abosoudah W, Bader S, Shamsi SMF, Aldiab R, Alsafadi B, Yaqinuddin SA, Hussain SSM, Chishtee LMF, Alghalyini B, Zaidi ARZ. Breaking barriers: unraveling the impact of cultural beliefs and misconceptions on HPV vaccination uptake-the narrative review. *Front Public Health* 2026;2(4): 81-98.
6. Josten K, Rose Dhar R, Reshmi B, Natti Krishna V, Vennila J. Barriers to HPV vaccination among adolescent girls in India: A scoping review. *Indian J Med Res* 2025;162(6):743-753.
7. Ridhi Mehra, Yachna Setu. Awareness of HPV Vaccine among School-Going Adolescent Girls of Delhi, India. *Majmaah Journal of Health Sciences* 2026; 14(2): 70-83.
8. Ning YE, Liu Y, Xu XY, Zhang XY, Wang N, Zheng LQ. Knowledge of Cervical Cancer, Human Papilloma Virus (HPV) and HPV Vaccination Among Women in Northeast China. *J Cancer Educ*. 2020 ;35(6):1197 -1205.
9. Mengesha A, Messele A, Beletew B. Knowledge and attitude towards cervical cancer among reproductive age group women in Gondar town, North West Ethiopia. *BMC Public Health*. 2020;20 (3) :209-14.
10. Fagbule OF, Kanmodi KK, Aliemeke EO, et al. Knowledge of HPV and HPV vaccine among senior secondary school students in Nigeria: Implications on cancer prevention strategies, the CHANCE Study. *Population Medicine*. 2020;2 (20): 31-45.
11. Cheema S, Abraham A, Maisonneuve P, Jithesh A, Chaabna K, Al Janahi R, Sarker S, Hussain A, Rao S, Lowenfels AB, Mamtani R. HPV infection and vaccination: a cross-sectional study of knowledge, perception, and attitude to vaccine uptake among university students in Qatar. *BMC Public Health* 2024;24(1):2316-21.
12. Black E, Richmond R. Prevention of cervical cancer in sub-Saharan Africa: the need for new paradigms. *J Prev Med Hyg*. 2018;59 (3):89–E93.
13. Gallagher KE, et al. Factors influencing completion of multi-dose vaccine schedules in low-income settings. *Vaccine*. 2017;35(17):2123–2130.
14. Masika MM, et al. Knowledge and perception of HPV and HPV vaccine among primary school girls in South Africa. *PLOS One*. 2016;11(3): 1-12.

15. Bruni L, et al. Global progress in HPV vaccine introduction and coverage. *Lancet Glob Health*. 2016;4(7):e453–e463.
16. Turiho AK, et al. Influence of school-based HPV vaccination on adolescent girls' knowledge and acceptability of the vaccine in Uganda. *BMC Public Health*. 2015;15:1–8.
17. Wachira J, et al. Impact of a school-based HPV vaccination program on knowledge and perceptions in Kenya. *Health EducBehav*. 2018;45(3):441–447.
18. Bassey G, et al. Perception and practice of HPV vaccination in Cross River State. *Niger J Clin Pract*. 2019;22(1):50–56.