ISSN 0973-2063 (online) 0973-8894 (print)

Bioinformation 22(8): 4645-4549 (2026)

BIOINFORMATION
Discovery at the interface of physical and biological sciences

BIOMEDICAL INFORMATICS

www.bioinformation.net

Volume 22(8)

Research Article

Received August 1, 2026; Revised August 31, 2026; Accepted August 31, 2026, Published August 31, 2026

DOI: 10.6026/973206300224645

SJIF 2026 (Scientific Journal Impact Factor for 2026) = 8.478
2022 Impact Factor (2023 Clarivate Inc. release) is 1.9

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Citation: Brahmbhatt *et al.* Bioinformation 22(8): 4645-4549 (2026)

Knowledge, attitude and practice on human papilloma virus vaccination: A cross-sectional study among second year MBBS students in India

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ISSN 0973-2063 (online) 0973-8894 (print)

Bioinformation 22(8): 4645-4549 (2026)

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Abstract:
Human papillomavirus (HPV) infection remains a major public health concern because of its strong association with cervical cancer and other HPV-related malignancies. Therefore, it is of interest to assess the knowledge, attitudes and practices regarding HPV vaccination among 150 second-year MBBS students using a questionnaire-based cross-sectional design. Most participants showed good awareness of cervical cancer and HPV vaccination, with 96.7% having heard of cervical cancer and 93.3% correctly identifying the primary purpose of HPV vaccination. A positive attitude toward vaccination was observed, as 95.3% supported inclusion of the HPV vaccine in the routine immunization schedule, although important gaps remained regarding high-risk groups, vaccination timing and personal vaccine uptake. Thus, data shows the need for strengthened medical education and continuous training to improve HPV vaccination awareness and cervical cancer prevention practices among future healthcare professionals.

Keywords: Human papillomavirus (HPV) vaccination, cervical cancer, immunization, prevention, adolescents, screening, public health

Background:
The Human Papillomavirus (HPV) is a widespread sexually transmitted infection that has been associated with anal, cervical and penile and oropharyngeal cancers **[1]**. Cervical cancer continues to be among the top causes of cancer deaths in women worldwide, especially in low- and middle-income nations **[2]**. In India, HPV types 16 and 18 account for most of the cervical cancers and significantly contribute to the country's burden of disease **[3]**. Prophylactic HPV vaccination before exposure to the virus is considered one of the most effective strategies to prevent cervical cancer and HPV related diseases **[3, 4]**. Many global and national organisations recommend that people receive HPV vaccinations and regularly screen for cervical cancer as effective prevention measures for these types of cancers **[5, 6]**. The introduction of screening methods, such as HPV testing, Papanicolaou (Pap) smears, visual inspection with acetic acid and liquid-based cytology, has enabled earlier detection of these cancers and reduced disease progression **[5]**. Healthcare Providers have a key role in educating the community about preventive measures for HPV vaccination and cervical cancer screening **[7]**. Unfortunately, healthcare workers also often hold inadequate knowledge and have misconceptions about HPV, which can hinder their acceptance of vaccination and limit the education they can offer to the general public about preventing HPV related diseases **[7]**. Studies conducted with medical students in India have shown that they have variable levels of awareness about HPV, knowledge of HPV vaccines and understanding of HPV vaccination schedules and recommendations **[3, 4]**. Therefore, it is of interest to describe the knowledge, attitudes and practices regarding human papillomavirus vaccination among second-year MBBS students.

Materials and Methodology:
As part of a study to evaluate the experiences of 150 second-year medical (MBBS) students at S.B.K.S. Medical Institute & Research Centre located in the state of Gujarat in India with respect to the Knowledge, Attitudes and Practices (KAPs) of Human Papilloma Virus (HPV) Vaccination, a cross-sectional observational questionnaire-based research was conducted on 14th February, 2020 with prior institutional ethics committee approval dated 7th February, 2020. A simple random sampling method was utilised to select students aged 18-25 years who provided written informed consent and voluntarily participated in the study. A structured, self-administered questionnaire with 26 questions, designed to measure the KAPs of HPV infection and vaccination, was used to collect data on students' responses to NDVI's Risk Factors, Causative Agents, screening Techniques and Vaccine Availability, as well as Willingness to Receive the Vaccine and Willingness to Offer the Vaccine to Others. Each correct answer scored one point toward the student's overall questionnaire score, while each incorrect answer scored zero. All collected data were entered into Microsoft Excel and analysed using percentage analysis.

Results:
The sample for the current study consisted of 150 second-year medical students, with 62% female and 38% male. Approximately 96.7% of participants reported that they were familiar with cervical cancer and 93.3% were able to identify the primary benefit of an HPV vaccination as its ability to prevent HPV infection leading to cancer. Additionally, 81.3% of participants recognised that an HPV vaccine would protect against the strains it targets and 79.3% identified the recommended vaccination course. Nevertheless, only 48.7% of participants recognised that certain groups are at higher risk of developing cervical cancer and the importance of immunisation before having sexual intercourse. Overall, most participants expressed positive attitudes toward cervical cancer prevention and HPV vaccination, with 95.3% supporting routine immunisation of children with an HPV vaccine. Further, the study found that 64% of participants identified "lack of knowledge" as the most significant challenge to increasing HPV vaccination rates. This study indicates a high level of awareness of HPV vaccination among second-year medical students; however, significant gaps in knowledge about its importance persist. **Table 1** presents the demographic characteristics of study participants by age and gender. **Table 2** shows participants' knowledge regarding high-risk groups and the

ISSN 0973-2063 (online) 0973-8894 (print)
Bioinformation 22(8): 4645-4549 (2026)

importance of HPV vaccination before sexual activity. **Table 3** provides information on participants' perceptions of CDC guidelines and updates as the most reliable sources of information on HPV infection and vaccination. **Table 4** shows participants' knowledge that the HPV vaccine prevents infection from HPV strains covered by the vaccine. **Table 5** shows participants' knowledge regarding the primary purpose of HPV vaccination in preventing HPV infection that may lead to cancer. **Table 6** shows participants' perception that lack of awareness is a major obstacle to widespread HPV vaccination. **Table 7** provides detailed information regarding participants' knowledge about cervical cancer and HPV vaccination. **Table 8** compares participants' attitudes toward cervical cancer prevention and HPV vaccination, including perceptions regarding vaccine safety, effectiveness and inclusion in routine immunisation schedules.

Table 1: Demographic characteristics of study participants (n = 150)

Variable	Category	n (%)
Age	19 years	36 (24%)
	20 years	42 (28%)
Gender	Male	57 (38%)
	Female	93 (62%)

Table 2: Participants' knowledge regarding high-risk groups and importance of HPV vaccination before sexual activity

Response	n (%)
Participants having knowledge	73 (48.7%)
Participants lacking knowledge	77 (51.3%)

Table 3: Participants' perception of CDC guidelines and updates as a reliable source of information

Response	n (%)
Considered the CDC guidelines reliable	99 (66%)
Did not consider CDC guidelines reliable	51 (34%)

Table 4: Knowledge that the HPV vaccine prevents infection from HPV strains covered by the vaccine

Response	n (%)
Correct knowledge present	122 (81.3%)
Correct knowledge absent	28 (18.7%)

Table 5: Knowledge regarding primary purpose of HPV vaccination

Response	n (%)
Prevent HPV infection leading to cancer	140 (93.3%)
Incorrect/No response	10 (6.7%)

Table 6: Perception that lack of awareness is a major obstacle to HPV vaccination

Response	n (%)
Lack of awareness is considered a major obstacle	96 (64%)
Other responses	54 (36%)

Table 7: Knowledge of participants about cervical cancer and HPV vaccine (n = 150)

Knowledge Variable	Frequency (n)	Percentage (%)
Heard about cervical cancer	145	96.7
Knowledge about high-risk groups and vaccination before sexual activity	73	48.7
The HPV vaccine prevents HPV infection, leading to cancer	140	93.3
Correct knowledge of recommended age (13–26 years)	105	70
Knowledge about the vaccine approval	93	62
Knowledge about correct HPV vaccine doses	119	79.3

Table 8: Attitude of participants toward cervical cancer prevention and HPV vaccination (n = 150)

Attitude Variable	Frequency (n)	Percentage (%)
Cervical cancer screening necessary for all women	83	55.3
HPV vaccine important for cervical cancer prevention	88	58.7
HPV vaccine should be included in routine immunisation	143	95.3
Lack of awareness is the main barrier to HPV vaccination	96	64
HPV vaccine considered very safe	79	52.7
HPV vaccine considered very effective	76	50.7

Discussion:

This study investigated second-year MBBS students' Knowledge, attitudes and practices regarding HPV vaccination and found high levels of awareness regarding cervical cancer and HPV vaccination. Most respondents were aware of cervical cancer, as well as the ability to prevent it through HPV vaccination; this could reflect the growing amount of time spent by healthcare faculty in teaching about HPV and cervical cancer to medical trainees **[8, 9]**. In previous studies done in India on Medical students, similar results were found. Medical students had high levels of awareness of HPV Infection and cervical cancer **[17, 19]**. In this study, 93.3% of respondents correctly identified the main purpose of HPV vaccination as preventing HPV-related cancers. However, their knowledge of the correct age to receive the vaccination and which groups of people are most at risk was comparatively lower. The majority of studies by Lin *et al.* and Shetty *et al.* found that, while medical trainees had adequate general awareness, many lacked sufficient understanding of HPV vaccination schedules and who is eligible to receive the vaccine **[12, 13]**. These knowledge gaps could hinder future healthcare practitioners' ability to provide education and counsel patients on timely HPV vaccination **[11].** Approximately 79.3% of respondents were aware of the recommended vaccination schedules, indicating moderate knowledge of vaccination protocols **[10]**. Similar results have been documented in Indian studies evaluating healthcare trainees' knowledge of HPV vaccination, where participants knew about the vaccine's availability but lacked a complete understanding of how to

implement vaccination practices **[14, 15]**. Many studies have also shown that female medical students have higher awareness and more positive attitudes toward receiving the HPV vaccination than male students. This was the same finding that has been shown previously regarding the gender gap in HPV vaccination awareness and acceptance **[16]**. Supporting these observations, Dhargawe *et al.* reported that male medical undergraduate and postgraduate students had acceptable awareness regarding HPV vaccination but showed deficiencies in vaccine uptake and comprehensive knowledge, highlighting the need for targeted educational interventions **[22]**. In this study, the attitude of the participants was predominantly positive regarding the inclusion of the HPV vaccine on the routine immunisation schedule and the importance of preventing cervical cancer. Previous studies conducted among medical students in India also show that they have a very positive attitude toward HPV vaccination **[17]**. Similar findings were reported by Poonia *et al.*, who also observed good knowledge and favourable attitudes toward HPV vaccination among medical students, although important gaps remained in vaccination practices and detailed vaccine-related knowledge **[21]**. While the participants in this study had positive attitudes, their vaccination uptake was low, indicating a disparity between their theoretical understanding and their actual preventive practices. These findings are consistent with previous studies where students did not accept HPV vaccinations due to concerns about vaccine safety and/or cost and perception of insufficient risk associated with the development of cervical cancer **[18]**. The majority of participants identified a lack of awareness as the biggest barrier to healthcare professionals recommending HPV vaccinations **[19]** and correlates with previous studies completed with healthcare trainees, where many participants were found to be unaware of important factors associated with poor HPV vaccination practices, such as misinformation, lack of educational opportunities and socioeconomic and cultural barriers. Lack of continued participation in continuing medical education events and lack of exposure to current clinical guidelines may further contribute to inadequate practical implementation of HPV prevention strategies. Overall, participants were willing to recommend HPV vaccination to others; however, their vaccination practices and screening recommendations were suboptimal. Similar findings were reported by Singh *et al.*, who found that although medical students possessed reasonable awareness regarding cervical cancer and HPV vaccination, gaps in practical knowledge and preventive practices still existed **[23]**. Chawla *et al.* reported that many healthcare workers in India had lower levels of awareness regarding cervical cancer screening recommendations **[20]**. Since medical students will become health care providers, improving their knowledge of HPV and developing their preventive practices will ultimately improve public health and increase community acceptance of the HPV vaccine. These findings highlight the need for improved undergraduate medical education, continuing education and increased institutional vaccination initiatives to improve the theoretical knowledge and practical application of preventive practices related to HPV vaccination among medical students. A recent study by Chatterjee *et al.* among second-year MBBS students similarly demonstrated high awareness and positive attitudes toward HPV vaccination while identifying persistent deficiencies regarding vaccination schedules, high-risk groups and actual vaccination practices, further supporting the need for continuous educational initiatives **[24]**.

Conclusion:

We show that second-year MBBS students possessed satisfactory awareness and positive attitudes toward HPV vaccination. However, important gaps persisted regarding vaccination schedules, high-risk groups and personal preventive practices. Thus, strengthening medical education, institutional vaccination programs and continuous training initiatives may improve future healthcare professionals' ability to promote HPV vaccination and cervical cancer prevention effectively.

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