Original Article :

Awareness of HPV Vaccine among School-Going Adolescent Girls of Delhi, India

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Abstract

Background and Aims:
Carcinoma of the cervix is the second most common cancer in women worldwide, while it is the commonest cancer among Indian women. Incidence and mortality rates of cervical cancer are found highest in low and middle-income countries. Adolescent girls and young women are at risk of acquiring human papillomavirus (HPV) infection that can lead to cervical cancer later in life. Awareness regarding cervical cancer and its prevention is quite low amongst Indian women. The study was conducted to assess knowledge, awareness, and attitudes regarding HPV, cervical cancer, and HPV vaccine among school-going adolescent girls in Delhi, India.

Methods:
A cross-sectional study regarding knowledge of HPV vaccine was conducted among the school going adolescent girls of Delhi, India. A structured questionnaire with multiple choices was used for data collection. SPSS statistical software was used to generate statistical parameters like proportion, mean, standard deviation, etc. .

Result:
The survey sample consisted of 187 school going girls aged between 13-18 years with a mean age of 15.2 ± 1.2 years. Majority (82%) of students had heard of cervical cancer; symptoms were known to less than half (41.9%) of the students. Only thirty-one percent girls were aware regarding HPV vaccine. HPV vaccine prevents cervical cancer was correctly answered by 5.3% of study participants. Higher grade level was significantly associated with better awareness ($p < 0.05$).

Conclusion:
Knowledge of cervical cancer among young girls is low and poor in this current study setting. Strengthening school-based educational interventions is urgently needed to support India's national cervical cancer prevention strategies.

Keywords:
Cervical cancer, HPV, HPV vaccine

Introduction:

Human Papilloma virus causes most commonly sexually transmitted infection, which also affects skin, genital area and throat. Continuous infection with high-risk HPV can cause growth of abnormal cells which later becomes cancer. Persistent HPV infection of the cervix if left untreated, causes 95% of cervical cancers1. HPV is a group of more than 200 related viruses but sexually transmitted infections fall into 2 groups- High risk HPV type: can cause several types of cancer. There are 12 high-risk HPV types: HPV 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, and 59. Two of these, HPV 16 and 18, are responsible for most HPV-related cancers. Low-risk HPV types rarely cause cancer[2]. Research observed that approximately 5 to 10 years are required for HPV-infected cervical cells to develop into precancers and about 20 years to develop into cancer. Many factors like the HPV type (particularly HPV 16 or 18), smoking, immunosuppressant drugs, immunocompromised patient increases the chances of developing pre-cancerous lesion to cancer as they cause dysplasia[3].

In 2022, the global age-standardized incidence rate (ASIR) of cervical cancer was 14.12 per 100,000 women, while the age-standardized mortality rate (ASMR) was 7.08 per 100,000, making it the fourth most common cause of cancer-related morbidity and mortality among women worldwide[4.] Cervical cancer is the most common cancer affecting women in developing countries. Of the total deaths, eighty percent annually occurred in developing countries[5]. In India, according to GLOBOCAN 2022, the age-standardized incidence rate (ASIR) of cervical cancer was 17.7 per 100,000 women, and the age-standardized mortality rate (ASMR) was 11.15 per 100,000 women[6]. Prevention is the best way to protect from cervical cancer.

Being vaccinated at age 9–14 years is a highly effective way to prevent HPV infection, cervical cancer and other HPV-related cancers[7]. In India, two HPV vaccines were licensed in 2008: a quadrivalent vaccine, Gardasil, and a bivalent vaccine called Cervarix. Both vaccines provide approximately 90% protection from cervical cancer with antibodies remaining stable for at least 10 years. In September 2022, India launched a home-made product marketed as Cervavac[8]. According to WHO, only 2 doses of both vaccine is needed with minimum gap of 6 months for adolescent girls of 9-14 years but 3 doses are recommended for adolescent girls 15 years or more as for Gardasil 0, 2, 6 months or Cervarix 0, 1, 6 months[9]. Apart from public awareness, vaccination is the best way of prevention, so present study focuses on awareness and related factors

regarding HPV vaccine among school going adolescent girls.

Methods:

A School based cross-sectional study was conducted from April 2024 to September 2024 in a government aided school of Delhi. All adolescent girls of grade ninth, tenth, eleventh and twelfth standard were included.

Inclusion criteria:

Adolescent girls, not seriously ill, present during data collection and gave informed written consent to participate in the study.

Exclusion criteria:

Adolescent girls suffering from any gynaecological disease and thus having menstrual problems or under long term medication.

Methodology:

This study was conducted by Department of Community Medicine of a teaching hospital of North Delhi at its field practice area. As there was only one Government school situated in that area and hence convenient sampling method was used for data collection. The prior permission to carry out the research was obtained from school authorities.

This study was conducted within the boundaries of the Helsinki Declaration. Permission to conduct the study was taken from the institutional ethical committee. The Institutional Ethics Committee gave its clearance before data collection (North MDC Medical College and Hindu Rao Hospital of the Dean, Approval No. 2024/356, dated 15.02.2024). Patient confidentiality was maintained, and informed consent was taken. As the study posed minimal risk, involved non-sensitive, anonymous questionnaires, and targeted adolescents aged 13–18 years capable of understanding the study objectives, a waiver of parental consent was granted by the ethics committee. This was justified under the Indian Council of Medical Research (ICMR) National Ethical Guidelines (2017), which allow mature minors to provide informed consent in minimal-risk public health research.

Each grade had 60-70 students. Complete universe of students was taken. The purpose of the study was explained prior to the data collection. Interview was carried out in a confidential, non-obligatory and non-judgmental manner. Anonymity of the study participants was ensured and utmost confidentiality of the information collected was maintained.

Data collection:

We had stratified school students according to their grades and enrolled at least 60 students from each stratum. We

had fixed the criteria that at least 80-90% of students should be present in each class. Single attempt was made to collect data from each grade.

Data Collection tool:

The questionnaire used in this study was pre-tested and validated prior to data collection. To assess internal consistency, Cronbach's alpha was calculated for the section measuring knowledge and awareness about HPV, cervical cancer, and the HPV vaccine. The Cronbach's alpha coefficient for this section was 0.78, indicating an acceptable level of reliability.

The questionnaire was reviewed by a panel of experts in public health and to ensure content validity, and minor modifications were made based on their feedback. The instrument was pre-tested among 30 adolescent girls from a similar demographic group not included in the main study, to ensure clarity, comprehension, and cultural appropriateness of the items.

The questions were about: Demographic details of participants, knowledge regarding menstrual hygiene, practices during menstruation. The second part formed a set of ten questions involving knowledge of cervical cancer, HPV and awareness about HPV vaccine.

Statistical Methods:

The data was pooled and processed with the help of computer. The data was exported into Microsoft Office Excel spread sheet and analysis was done using SPSS version 21. The data was expressed as proportions and percentages and to see any association among the expected qualitative variables, Chi-square test was applied.

Ethical consideration:

The ethics committee approval was granted by the Institutional Ethics Committee, Approval No. 2024/356. This study was conducted within the boundaries of the Helsinki Declaration. Permission to conduct the study was taken from the department. Patient confidentiality was maintained.

Results:

Socio demographic features:

The survey sample consisted of 187 school going girls aged between 13 18 years with a mean age of 15.2 ± 1.2 years. In the present study, majority of the study participants have attained their menarche at age of 13- 15 years (54.5%) followed by 10-12 years (43.85%) and very few at 16-18 years of age. The majority belonged to social class I according to modified BG Prasad scale (2014)[10]. Table 1, depicts socio-demographic profile of study participants.

Table1: Socio-demographic profile(N=187).

Variable	Frequency	Percentage (%)
Age		
13-≥18	187	100
Religion		
Hindu	154	82.4
Muslim	32	17.1
Sikh	1	0.5
Socio-economic class		
Upper	82	44
Upper middle	56	30
Middle	22	12
Lower middle	12	06
Lower	15	08
Standard of student		
9th	01	0.5
10th	51	27.3
11th	75	40.1
12th	60	32.1
***Socio-economic class as per the modified BG Prasad classification**		

Table1: Socio-demographic profile(N=187)

The majority (82%) of the students were aware of cervical cancer. Out of these 187 students, more than half (65.2%) replied in the negative when asked about the symptoms of cervical cancer. Spotting between periods and unusual vaginal discharge were reported as most common symptoms. Lack of knowledge is reflected in poor understanding of symptoms. The sources of information about cervical cancer were print media and television, followed by family, friends and colleagues. Out of total study participants forty-one percent had ever heard about HPV. Thirty one percent girls had awareness regarding HPV vaccine. (Table 2).

Table2: Knowledge about cervical cancer and HPV.

Variable	Frequency	Percentage (%)
Ever Heard of cervical cancer		
YES	154	82.4
NO	33	17.6
Is Cervical cancer common in India?		
YES	83	44.4
NO	104	55.6
Do you know symptoms of cervical cancer?		
YES	65	34.8
NO	122	65.2
Symptoms of cervical cancer (n=65)*		
Irregular periods	23	35.4
Bleeding after intercourse Unusual vaginal discharge Spotting between periods	28	43.1
	44	67.7
	52	80
Source of information (n=154)*		
Family, friends or colleagues	42	27.3
TV	48	31.2
Print media	63	40.9
Health care provider	24	25.1
Ever Heard of HPV		
YES	77	41.2
NO	110	58.8
HPV infection causes cervical cancer? (n=77)		
YES	39	50.6
NO	38	49.4
HPV Vaccine		
YES	57	30.5
NO	130	69.5
Took HPV Vaccine		
YES	1	0.5
NO	186	99.5
Reasons for not taking HPV Vaccine (n=186)		
Lack of information about vaccine	128	68.8
Financial cost	38	20.4
Concern about side effects and safety	22	11.8
Religious reasons	18	9.7
Parent's negative attitude	42	22.5
***Multiple responses**		

Table 3 depicts association of socio-demographic profile with the awareness regarding HPV vaccine among girls. As the educational status of the adolescent girls in the study population increases, the awareness regarding HPV vaccine increases. This association was found to be statistically significant ($p<0.05$).

Although participants from higher socio-economic strata showed higher awareness levels of the HPV vaccine, the association between socio-economic status and awareness was not statistically significant ($\chi^2 = 11.6915$, $p = 0.1655$). This suggests that, within this study population, socio-economic status did not have a meaningful impact on HPV vaccine awareness. Factors beyond socio-economic status may play a more critical role in influencing awareness. The lack of statistical significance suggests that socio-economic status may not be a primary determinant of HPV vaccine awareness in this population.

Table 3: Association of socio-demographic profile with the awareness regarding HPV vaccine among study participants.

Study Variables	Awareness regarding HPV vaccine		
	YES	NO	
Socio economic status			
Upper (82)	26	56	Chi-square test value= 11.6915 P value=0.1655
Upper middle (56)	12	44	
Middle (22)	08	14	
Lower Middle (12)	06	06	
Lower (15)	05	10	
Mother's education			
Illiterate (32)	09	23	Chi-square test value=7.3251 P value=0.1196
Less than graduate (144)	42	102	
Graduate and more than graduate (11)	06	05	
Grades			
9th (1)	0	02	Chi-square test value= 13.4953 P value=0.0358
10th (51)	21	30	
11th (75)	20	55	
12th (60)	16	44	

Out of 187 students, half (50.6%) were able to correctly identify HPV as the cause of cervical cancer. Majority (86%) of the study participants were unaware that which type of cancer is prevented by HPV vaccine. Five percent were of the opinion that HPV vaccine prevents breast cancer. HPV vaccine prevents cervical cancer

was correctly answered by 5.3% of study participants. Only three percent thought throat cancer can be prevented by HPV vaccine.

Among the students who were aware of the HPV vaccine, only one student had actually received it. Students who were hesitant or unwilling to get vaccinated commonly cited a lack of adequate information about the vaccine (69%) and parental attitudes (23%) as key deterrents. Financial cost (20.4%), concerns regarding the vaccine's safety and efficacy (12%) and religious reasons (9.7%) cited as other reasons.

Discussion:

In the present study majority of participants (82%) had heard of cervical cancer. In a similar study conducted in Delhi, majority (83%) of the students were aware of cervical cancer[11]. Of the sample of 230 women surveyed in a study conducted in China, 80.9% had heard of cervical cancer[12]. In a study conducted among women in Puducherry (44.5%) showed lower awareness compared to our study as almost half of the participants in that study were either illiterate or only educated up to primary school[13]. Another study reported that 53.3% of the female students had heard about cervical cancer and 37.8% knew about HPV in Durban, South Africa[14]. Symptoms pertaining to cervical cancer were known to only half of them in our study. The most common symptoms of cervical cancer recognized by our study population were spotting between periods and unusual vaginal discharge as found in other studies11. The persistently low level of awareness, even years after the initiation of the National Cancer Control Programme, may be attributed to the overburdened and understaffed nature of primary healthcare services in India[15].

The source of information was mainly mass media (25.1%) in a study conducted in Mangalore city. Print media emerged as the primary source of information (41%) in our study, which is consistent with, yet significantly higher than, findings from a South African study where only nineteen percent of participants reported receiving information through media sources[16]. In contrast, a study conducted in North Korea identified healthcare providers as the predominant source of information (69%)[17]. These discrepancies may be attributed to variations in media coverage, access to healthcare services, and levels of health service utilization across different countries.

In our study only forty-one percent of students had ever heard of HPV. A study from Korea showed a mere 9.5% of female high school students had ever heard of HPV[18]. Even a study from US

showed that 21.5% of the college women have never heard of HPV[19]. Seventy-two percent have not heard of HPV in a study by Ramavath KK et al[20]. In contrast, a relatively high level of HPV awareness (51.2%) was reported in an Australian study, which may be attributed to greater media coverage, particularly surrounding the introduction and promotion of the national HPV vaccination program[21]. In developing countries, a lack of knowledge is recognized as a significant barrier to the widespread implementation of HPV vaccination programs. Enhancing the knowledge base of educators, healthcare providers, and social workers may play a critical role in improving public understanding of HPV and its associated diseases, thereby supporting more effective vaccine uptake in India.

Half (51%) of the students were able to correctly identify HPV as the cause of cervical cancer. Similarly, only 18.6% of the participants who had heard about it knew that HPV is a cause of cervical in a study conducted in Ethiopia22. Less than half of the study population (44.5%) knew about cervical cancer in a study in Puducherry[13]. These differences might be due to differences in access to health care services, utilization, and health education programs among the countries. It may be also due to differences in the educational level of the study participants. The poor baseline knowledge found in this study is similar to that of other studies where the majority of participants did not know the aetiology of cervical cancer.

In our study 31% girls had knowledge regarding HPV vaccine. In a similar study 44% girls were aware about the existence of HPV vaccines[23].

In our study only one student received HPV vaccine. In a similar study conducted in Delhi very few students (15%) had received the HPV vaccine[24]. Majority of participants were unwilling for vaccination due to lack of knowledge of HPV vaccine and its safety which were the major reasons for them. In a similar study acceptability of HPV vaccine was found to be poor (40%)[25]. Besides religious beliefs, high cost of the vaccine and unavailability of proper information about the vaccine can be cited as other reasons for poor acceptability of HPV vaccine. These findings are consistent with other studies in low- and middle-income countries, where vaccine hesitancy is often driven by knowledge deficits, fear of side effects, and general mistrust of new vaccines[26-28]. In the Indian context, additional cultural and social factors—such as stigma associated with a sexually transmitted infection, fear of parental disapproval, and limited adolescent autonomy in health decisions—may

further compound hesitancy. Therefore, it is extremely important to raise general awareness about HPV, de stigmatization of HPV infection and subsequently to gain acceptance for a mass vaccination program for pre-adolescent and adolescent girls in India.

Five percent participants gave correct answer regarding HPV vaccine prevents cervical cancer. In a study conducted by Mehta et al forty four percent of the students answered that HPV causes vulval, penile, oral and vaginal cancers while 12% students gave weird answers like leiomyoma of uterus, seminoma and hepatocellular malignancy[29].

Health education campaigns that emphasize the safety, effectiveness, and cancer-prevention benefits of the HPV vaccine—especially when delivered by trusted sources such as schoolteachers, doctors, and ASHA workers—could help bridge this gap. Moreover, integrating HPV vaccination into school health programs and offering the vaccine free of cost or at subsidized rates may further reduce barriers to access.

Overall, this gap between knowledge and vaccination behaviour highlights the need for comprehensive adolescent health strategies that combine awareness, accessibility, and behavioural reinforcement to achieve India's cervical cancer elimination goals. By addressing these multifaceted barriers—through educational initiatives, reassurance from trusted healthcare figures, and improved access—India can significantly move toward its goal of cervical cancer elimination.

Limitations:

This study was limited by its convenience sampling from a single government school, which restricts generalizability to wider adolescent populations. The reliance on self-reported data may introduce recall and social desirability biases.

Conclusion:

Knowledge of cervical cancer among young girls is low and poor in this current study setting. Cervical cancer education should be imparted to young girls. Awareness and knowledge towards this deadly disease can influence their attitudes and behaviour for future. It should be considered for adoption into high school curricula to positively impact on the WHO proposed pillars to eliminate cervical cancer globally. The low levels of awareness regarding HPV and its vaccine observed in this study highlight the urgent need for targeted policy interventions, especially in light of India's nationwide rollout of Cervavac, the country's first indigenously developed HPV vaccine. Despite government efforts to provide cost-effective immunization, lack of

awareness remains a key barrier to vaccine uptake.

This study provides valuable insights that may contribute to the design of effective HPV vaccination programs and inform public health policy development in India. Notably, school- and college-based studies assessing HPV awareness remain limited. Our findings reveal an interesting correlation between increasing age and greater awareness of HPV, highlighting the need for targeted educational interventions among younger age groups. Addressing the burden of cervical cancer in India necessitates the immediate implementation of comprehensive awareness and vaccination strategies. Public education efforts should be intensified through both print and electronic media, utilizing targeted messaging and evidence-based information. The organization of free screening camps is essential for early detection and increasing public engagement with preventive health services. Furthermore, collaboration with non-governmental organizations (NGOs) and the strategic involvement of influential public figures—including prominent personalities from the film industry and sports sector—can significantly aid in dispelling myths and misconceptions associated with the cervical cancer vaccine. It is imperative to prioritize the sensitization of the younger population to enhance vaccine acceptance and ensure the long-term success of cervical cancer prevention initiatives in India. The Ministry of Health and Family Welfare should consider including HPV vaccination modules in adolescent health workshops. School-based vaccination drives must be paired with comprehensive education campaigns targeting both students and educators. Efforts to dispel myths and misinformation surrounding HPV must be intensified through community outreach and digital campaigns.

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