

Public health awareness towards cervical cancer and hpv vaccination: a cross-sectional study on medical students of central India

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ABSTRACT

Background

Cervical cancer is the third most common cancer in India with an incidence rate of 18.3% and the second leading cause of death with a mortality rate of 9.1%. It is a potentially preventable disease if there is adequate vaccination against HPV and through proper screening and treatment of pre-cancerous lesions.

Objective

This study aims to assess the awareness, attitude, and practices of female undergraduate and postgraduate medical students of MGM Medical College, Indore regarding cervical cancer and their vaccination status against HPV.

Methods

A cross-sectional study was conducted using a predesigned, validated, and self-administered questionnaire distributed through google forms after obtaining informed consent from participants. Data was analyzed using descriptive statistics.

Results

A total of 132 participants responded out of which 79 were undergraduates and 53 were postgraduate residents. 87.1% of them were aware of the risk factors leading to cervical cancer while 53% of them agreed that vaccination is effective in preventing HPV infection and cervical cancer. We found that 14.4% of the participants were vaccinated against HPV. Half of the study population strongly agreed that all married women aged between 30-65 years should undergo screening for cervical cancer while only less than one-tenth of them had done prior screening of the eligible females in their families.

Conclusion

Our study population showed good knowledge of cervical cancer and the role of HPV vaccination as a preventive measure, but very few of them were vaccinated or had undergone screening themselves. Therefore, this study highlights the need for more promotion and encouragement of medical students to get themselves vaccinated and opt for early cancer screening.

Keywords: Cervical cancer; HPV vaccination; public health; Cervavac; medical students

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INTRODUCTION

Cervical cancer is the fourth most common cancer among women worldwide, with an estimated 604,127 new cases and 341,831 deaths in 2020 [1,2,3]. In India, it is the third most common cancer with an incidence rate of 18.3% (123,907 new cases), and the second most common cause of cancer-related deaths with a mortality rate of 9.1% (77,348 deaths) according to GLOBOCON 2020 [1]. The age-standardized incidence and mortality rate were 18 and 11.4 respectively, while the five-year prevalence rate across all ages was 42.82 per 100,000 population [1]. Data collected from the National Cancer Registry program stated that cancer of the breast and cervix are the most common cancers among women in India. There is an existence of a socioeconomic gradient factor which is seen in the case of cervical cancer as it has been observed that with the increase in the Human Development Index (HDI), the prevalence of cervical cancer decreases [2,4]. Approximately ninety percent of deaths related to or directly caused by cervical cancer occur in low and middle-income countries, and India is among them. Cervical cancer is a malignant neoplasm arising from the normal cervical epithelium of the transformation zone after the progressive development of low-grade and high-grade cervical intraepithelial lesions [5]. It remains asymptomatic in the initial stage and only at the later stages of the disease it presents with clinical symptoms which include intermenstrual, post coital and post-menopausal bleeding, foul-smelling vaginal discharge, persistent pelvic pain, weight loss, and fatigue [6,7,8]. Multiple risk factors contribute to the high incidence of cervical cancer all over the world including early onset of sexual activity, multiple sexual partners, increased number of pregnancies, consumption of oral contraceptives, smoking and tobacco use, and other epidemiological factors (9). More than ninety percent of all cases of cervical cancer are caused by high-risk Human Papillomavirus (HPVs)(9,10). They

are also responsible for the causation of a majority of cases of anal cancer, oropharyngeal, vaginal, vulval and penile cancers [9,10]. A total of 216 subtypes of HPV have been identified till now and they have been categorized as low, moderate, and high-risk types. High-risk HPVs are caused by subtypes 16 and 18, which have the highest potential for malignant transformation, leading to the development of approximately 70% of cervical cancers [9,10,11]. In India, currently there are four HPV vaccines licensed. Gardasil is a quadrivalent vaccine protecting against subtypes 6,11,16 and 18, Gardasil 9 is a nonavalent vaccine protecting against subtypes 6,11,16, 18, 31, 33, 45, 52 and 58, Cervarix is a bivalent vaccine protecting against subtypes 16 and 18 and Cervavac which is India's first indigenously developed cervical cancer vaccine (launched in January 2023) is a quadrivalent vaccine against subtypes 16,18,6 and 11. The vaccine is recommended to be administered at an age where the girls have not yet started sexual activity i.e. their exposure to HPV is low[6,12]. Two doses of vaccine are recommended for both girls and boys aged 9-14 years. Pioneering the initiative, the Government of Sikkim became the first state in India to implement the HPV vaccination Programme in their immunization schedule for the girls aged 9-13 years (12).

Recommended Immunization Schedule (2023) given by Indian Academy of Pediatrics (IAP) Advisory Committee on Vaccines and Immunization Practices (ACVIP), recommended the following vaccination schedules (13):

- i) 9-valent HPV vaccine to be given to females and males aged 9-14 years (2 doses at an interval of 6 to 12 months) and for females aged 15-26 years (a 3-dose schedule administered at 0, 2, and 6 months)
- ii) 4-valent HPV vaccine (**Cervavac**): 9-14 years of age (boys and girls): Two-dose schedule (0.5 mL at 0 and 6 months), 15-26



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years of age (females and males): 3-dose (0.5 mL at 0, 2, and 6 months)

The main treatment modality for cervical cancer includes radical hysterectomy with postoperative radiotherapy and chemotherapy as required (14). This cancer can be potentially prevented if there is regular screening done at proper intervals. Screening techniques include the Papanicolaou test, HPV DNA testing, Visual Inspection with Acetic acid (VIA), cytology or a combination of any of these methods. According to the National Screening Programme for cervical cancer, VIA is the primary screening test used to screen women aged 30-65 years with an interval of 5 years for the early detection of the first symptom [15]. But at a community level, there is very little awareness about these screening methods. According to WHO, in India, fewer than 1 in 10 women have been screened for cervical cancer in the last 5 years. The availability of these screening programs takes a backfoot due to a lack of adequate infrastructure in a majority of low and middle-income developing countries (16,17). Lack of knowledge about the disease and its causation has played a major role in being the reason for the high burden of cancer cervix in India and similarly in all developing countries. Medical students are the future of our healthcare system, and there is a need to step up awareness about this cancer and its preventive methods among them. Therefore, this study aims to know the level of awareness of medical students towards cervical cancer and their HPV vaccination status at a tertiary care hospital in Indore, MP.

Methods

The present cross-sectional study was conducted among the female undergraduate and postgraduate medical students of Mahatma Gandhi Memorial Medical College, Indore, Madhya Pradesh, India. Written informed consent was taken from all the participants, and only those willing to participate were included in the study. Students not willing to

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give their consent were excluded from the study. Due approval was sought from the Institutional Review Board and Independent Ethics Committee, and based on their consideration, the current study was deemed eligible for exemption from further review. This study was conducted from November to December 2023 over a period of two months, with all procedures carried out in accordance with the Declaration of Helsinki. A semi-structured, predesigned, validated, and self-administered questionnaire comprising closed and open-ended questions was developed after an extensive review of the literature. This questionnaire was distributed to the students through Google Forms. Questions were divided and provided in the form of four sections. In section one, we gathered information about sociodemographic characteristics of the study population, second and third parts of the questionnaire were based on obtaining their knowledge and attitude towards cervical cancer, its risk factors, and the screening methods currently available now. In the fourth section, we sought to elicit data about the participants' HPV vaccination status and their practices towards cancer cervix screening. Feedback data was generated by applying a five-point Likert scale. Data was analyzed by using appropriate statistical tests, including descriptive statistics (percentage, mean, tables and graphs) by using Microsoft Excel software.

Results

In our study, a total of 132 participants responded out of which 59.8% (79) were undergraduate students and 40.2% (53) were postgraduate residents. The majority of the respondents were in the age group of 18-32 years. 86.4% of them were unmarried, while 5.3% were married with one or more than one child. 3% of the students had a first-degree relative with a history of cancer cervix while 18.9% of them had a second-degree relative or a known person with the same disease (Table 1).

Table 1. Sociodemographic Characteristics of the participants (n=132)

Variable	Categories	Frequency	%
1.Age group (in years)	<20	52	39.39
	20-29	70	53.03
	30 and above	10	07.57
2.Qualification	Undergraduates	79	59.8
	Postgraduates	53	40.2
3.Marital status	Married	18	13.6
	Unmarried	114	86.4
4.Parity	None	127	96.21
	1 or >1	5	03.78
5.First degree relative with H/O CA cervix	Yes	4	03
	No	128	97
6.Second degree relative or any known person with H/O CA Cervix	Yes	25	18.9
	No	107	81.1

87.1 % of the participants were aware of the risk factors leading to cervical cancer while more than 90 % of them agreed that a history of multiple sexual partners and HPV infection play an important contributing factor. Approximately three fourth of

the respondents said that foul-smelling vaginal discharge, post-coital and intermenstrual bleeding are the most important symptoms of the disease (Table 2).

Table 2. Knowledge of the participants towards Cervical Cancer (n=132)

Question	Response	Frequency	%
1. Are you aware about the risk factors which can lead to cervical cancer?	Yes	115	87.1
	No	17	12.9
2. Multiple sexual partners are a risk factor?	Yes	122	92.4
	No	10	7.6
3. HPV infection is a risk factor?	Yes	130	98.5
	No	02	1.5
4. What are the signs and symptoms of carcinoma cervix?	• foul smelling vaginal discharge	05	3.78
	• Intermenstrual bleeding	03	2.27
	• Post coital bleeding	10	7.57
	• All the above	102	77.27
	• Do not know	12	9.09

5. Are you aware of the appropriate age to take HPV vaccination?	• Children and adults aged 9 to 26 years	74	56.06
	• Adults aged 26 to 45 years		
	• Both	17	12.87
	• Do not know	12	9.09
		29	21.96
6. What are the methods of screening cancer cervix?	• PAP smear/liquid-based cytology	11	8.33
	• Visual inspection of cervix		
	• HPV DNA testing	09	6.81
	• All the above	10	7.57
	• Do not know	83	62.87
7. Are you aware how often females should be screened for cervical cancer?		18	13.63
	• Once in a year	42	31.81
	• Once in 3 years	50	37.87
	• Once in 5 years	10	7.57
	• Do not know	30	22.72

56.1% of them were aware that the appropriate age to take HPV vaccination is 9 to 26 years while 29.5% of respondents agreed that all sexually active females aged 30 years and above should be screened for cervical cancer. More than half of the participants strongly agreed that all married women aged 30-65 years should undergo screening for cervical cancer, while only 44.7% agreed that they themselves would

be willing to go for screening (Table 3). Regarding the attitude of participants, 37.1% of students strongly agreed that carcinoma cervix is one of the leading causes of death for females among all malignancies in India. 56.8% of them strongly agreed that any woman can be at a risk of acquiring cancer cervix while 53% agreed that vaccination is effective in preventing it (Table 3).

Table 3- Attitude of the respondents towards cervical cancer and HPV vaccination (n=132)

Question	Response	Frequency	%
1. Carcinoma cervix is one of the leading causes of death for females among all malignancies in India?	1. Strongly agree	49	37.1
	2. Agree	69	52.3
	3. Neutral	10	7.57
	4. Disagree	02	1.51
	5. Strongly disagree	00	0
2. Vaccination is effective in preventing HPV infection and cervical cancer?	1. Strongly agree	51	38.63
	2. Agree	70	53.03
	3. Neutral	11	8.33
	4. Disagree	00	0
	5. Strongly disagree	00	0
3. Screening helps in early detection and better treatment of cervical cancer?	1. Strongly agree	69	52.27
	2. Agree	57	43.18
	3. Neutral	06	4.54
	4. Disagree	00	0
	5. Strongly disagree	00	0

4. All married women age 30- 65 years should undergo screening for CA Cervix?	1.Strongly agree	68	51.5
	2.Agree	54	40.9
	3.Neutral	10	7.6
	4.Disagree	00	0
	5.Strongly disagree	00	0
5. Would you be willing to go for screening?	1.Strongly agree	26	19.69
	2.Agree	59	44.69
	3.Neutral	46	34.84
	4.Disagree	01	0.75
	5.Strongly disagree	00	0

Among responses regarding practice, only 7.6% of the participants had screened the eligible females in their families for cancer cervix before, and 17.4% of the whole study population admitted that the main reason for not getting screened themselves was

because it is an embarrassing procedure. 14.4% of the respondents were vaccinated against HPV, while high cost and lack of knowledge about the vaccine was the common reason for not getting vaccinated (Table 4).

Table 4 – Practice of participants towards CA cervix screening and HPV vaccination status (n=132)

Question	Response	Frequency	%
1.Have you ever done screening for eligible females in your families?	Yes	10	7.6
	No	122	92.4
2.Are you vaccinated against HPV?	Yes	19	14.4
	No	113	85.6
3.Do you advise women visiting the hospital to get screened by PAP smear?	Yes	119	90.15
	No	13	9.85
4. Do you recommend HPV vaccination for females of appropriate age group coming in your contact?	Yes	116	87.9
	No	16	12.1

DISCUSSION

This study explored the knowledge, attitude and practices of female undergraduate medical students and postgraduate residents of a tertiary care teaching hospital in Indore, Madhya Pradesh towards cervical cancer, its screening methods, and the role of HPV vaccination as a preventive measure. The data from our study revealed that almost all the participants had adequate knowledge about the risk factors, symptoms and preventive measures of cervical cancer, similar to a study done by Tahiri et. al (18) where primary health care physicians were

the target population. This result contrasted with a study conducted by Tadesse et. al in Ethiopia (19) on undergraduate students of a science university, where only 14.8% demonstrated good knowledge about cervical cancer and mass media was stated as the most frequent source of information. Since our study was done in a tertiary care teaching hospital and all the study participants were medical students, this level of heightened awareness among them was expected.



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Approximately 20% of the participants had a second-degree relative or a known person with history of cervical cancer which shows the higher prevalence rate of this disease in India. Only half of the participants were aware of the appropriate age to take HPV vaccination and less than one-tenth of them were vaccinated which shows a lack of interest of the participants towards getting themselves vaccinated, similar to a study done by Khanna et.al (20) and in contrast to a study conducted by Horio F et. al on the pharmacy students and working adults in Japan, where >90% of the women were aware about HPV vaccination and 30% of them had undergone screening. The reason might be a better educational opportunity, socio-economic status and the coverage of HPV vaccination in the National Health Insurance in Japan (21). This vaccination is not included in the national vaccination schedule in India which may be one of the reasons for this gap in knowledge and diminished coverage of HPV vaccination Programme.

Higher cost of the vaccine also played a role in the smaller number of people getting vaccinated, similar to a study conducted by Enebe et. al on the female school teachers of Enugu, Nigeria, which stated that if the vaccine was made to be available free by the Government, majority of people would recommend this to their children and students (22). Another reason could be that the age range for HPV vaccination is 9 to 26 years and adolescents and new adults at this age are not aware of and do not care enough about cervical cancer and the role of HPV vaccination in its prevention. Misinformation and inadequate insight regarding the safety and efficacy profile of the vaccine among the new adults may also play a role in this attitude of indifference (23,24). Only less than half of the respondents were willing to get themselves screened, which is not very convincing data since this study was done on medical students. The reason for this hesitancy was that they did not feel the need for it and would go for screening if any symptoms occurred. Among the undergraduate students the main reason for not getting screened was the procedure itself being an

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embarrassing one, therefore, vaginal self-sampling promises to be a more acceptable and accessible screening method (25).

There are various limitations of this study. Since the sample size of our study was relatively small and medical students were the study cohorts, we could not get accurate data and therefore, the results obtained would not be generalizable to the concerned population. Male students were not included in our study, so their awareness towards cervical cancer and HPV vaccination status could not be obtained. A study done by Horio F et. al has stated that males show apathy and a lesser level of comprehension towards cervical cancer due to a perpetuated myth that HPV affects the female population only (21). This finding is similar to a study done by Zhang F et. al among college students of China where male students had less knowledge and willingness to undergo vaccination (26). Therefore, there is a need to impart equal educational interventions targeting both men and women regarding this disease to enhance awareness.

CONCLUSION

Our study population included female undergraduate and postgraduate medical students who showed good knowledge of cervical cancer and the role of HPV vaccination as a preventive measure. Still, very few of them were vaccinated or had undergone screening themselves. Therefore, this study highlights the need of academic exposure, more promotion, and encouragement of medical students to get themselves vaccinated and go for cancer screening at the appropriate time. School-based vaccination programs might help and concerned efforts to ensure the involvement of government as well as private healthcare facilities in rolling out cancer screening programs and vaccination drives might be the way ahead which could be helpful in effectively reducing the burden of cancer cervix in our country.

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