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**Research Article**

# A Cross-Sectional Study on Cervical Cancer Awareness and its Association with Demographic Factors in India

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**ABSTRACT**
**Introduction:** Cervical cancer is a significant public health concern, ranking as the fourth most common cancer among women worldwide. India contributes nearly one-quarter of the global burden, with low screening and vaccination rates despite available preventive measures. Demographic factors may influence awareness levels, impacting early detection and prevention.
**Aims and Objectives:** This study aimed to assess cervical cancer awareness among reproductive-age women attending a tertiary care hospital in West Bengal and to analyze its association with demographic factors such as age, education, marital status, and place of residence.
**Materials and Methods:** A cross-sectional study was conducted among women aged 18–49 years visiting a tertiary care hospital. Data on demographics and cervical cancer awareness were collected using structured questionnaires. Associations between awareness and demographic variables were analyzed using Chi-square tests.
**Results:** Most participants were aged 20–25 years (31.4%) and had education above the 10th standard (45.3%). A majority were married (75.9%) and resided in urban areas (62.5%). Statistically significant associations were found between cervical cancer awareness and education ($x^2$=48.03, p=2.1×$10^{-10}$), marital status ($x^2$=30.45, p=3.43×$10^{-8}$), living area ($x^2$=9.59, p=0.0083), and age group ($x^2$=37.67, p=3.32×$10^{-8}$).
**Conclusion:** Demographic factors significantly influence cervical cancer awareness. Tailored public health interventions focusing on less-educated, unmarried, rural, and older women are essential to improve preventive practices.

**Keywords:** Cervical Cancer, Awareness, Demographic Factors, Screening, HPV Vaccination, India.

## INTRODUCTION

Cervical cancer continues to pose a significant public health challenge worldwide and is the fourth most common cancer among women globally [1]. The burden of disease is disproportionately higher in low- and middle-income countries, with India accounting for nearly one-quarter of the global cervical cancer burden [2]. According to the GLOBOCAN 2022 estimates, approximately 127,526 new cases of cervical cancer are diagnosed annually in India, making it the second most common cancer among Indian women and a leading cause of cancer-related mortality. Despite being largely preventable, cervical cancer remains a major contributor to morbidity and mortality due to gaps in prevention and early detection strategies. Persistent infection with high-risk human papillomavirus (HPV) is well established as the primary etiological factor in cervical carcinogenesis, with HPV types 16 and 18 responsible for more than 70% of cases worldwide [3]. The disease is characterized by a long premalignant phase, often spanning several years, which provides a critical window of opportunity for early detection and effective intervention [4]. Screening modalities such as the Papanicolaou (Pap) smear, visual inspection

with acetic acid (VIA), and HPV DNA testing have demonstrated significant effectiveness in detecting precancerous lesions and reducing cervical cancer incidence and mortality when implemented at scale. However, despite the availability of these cost-effective screening tools, cervical cancer screening coverage in India remains unacceptably low, with reported uptake ranging between 2% and 5%. Similarly, HPV vaccination, which is recommended globally and nationally as a key strategy for primary prevention, continues to be grossly underutilized in the country [5,9]. Several barriers hinder the uptake of screening and vaccination services, including lack of awareness, sociocultural stigma, misconceptions, limited access to healthcare facilities, and inadequate health education and public health communication. Given these challenges, assessing women's awareness regarding cervical cancer, its risk factors, and preventive measures is crucial for designing effective and targeted public health interventions [10]. Understanding demographic determinants influencing awareness and preventive practices can help address existing gaps and improve program implementation. Therefore, the present study aims to evaluate cervical cancer awareness and its demographic correlates among reproductive-age women attending a tertiary care hospital in West Bengal.

## MATERIALS AND METHODS

**Study Design:** The sample size was increased to 500.

**Place of Study:** A hospital-based cross-sectional observational study was conducted from August to October 2024

**Period of Study:** The gynaecology outpatient department of Diamond Harbour Government Medical College, West Bengal.

**Study Population:** The study included women aged 18–50 years attending the outpatient department who provided informed consent. Exclusion criteria were refusal to participate and age outside the specified range.

**Sample Size:** The sample size was increased to 500.

**Inclusion Criteria:**

- Women aged 18–49 years (reproductive age group).
- Women attending the outpatient or inpatient services of the selected healthcare facility during the study period.
- Women who are residents of India.
- Women who are able to understand the study questionnaire (local language or English).
- Women who provide written informed consent to participate in the study.
- Women who are apparently healthy and not previously diagnosed with cervical cancer.

**Exclusion Criteria:**

- Women who have been previously diagnosed with cervical cancer or are currently undergoing treatment for the same.
- Women who are critically ill or not in a condition to respond to the questionnaire.
- Women with severe cognitive impairment or psychiatric illness affecting comprehension.
- Women who refuse or withdraw consent at any stage of the study.
- Women who have already participated in the study to avoid duplication.
- Healthcare professionals or students with formal medical training, if excluded to prevent knowledge bias (optional, depending on study design).

**Study Variable:**

- Cervical cancer awareness (measured by knowledge of cervical cancer risk factors, screening methods, and prevention).
- Independent Variables (Demographic Factors):
- Age group
- Educational status
- Married
- Unmarried (if included)
- Urban
- Rural

**Statistical Analysis:** For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analyzed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while Data were entered into Excel and analyzed using SPSS and GraphPad Prism. Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests were used to compare independent groups, while paired t-tests accounted for correlations in paired data. Chi-square tests (including Fisher's exact test for small sample sizes) were used for categorical data comparisons. P-values $\leq 0.05$ were considered statistically significant.

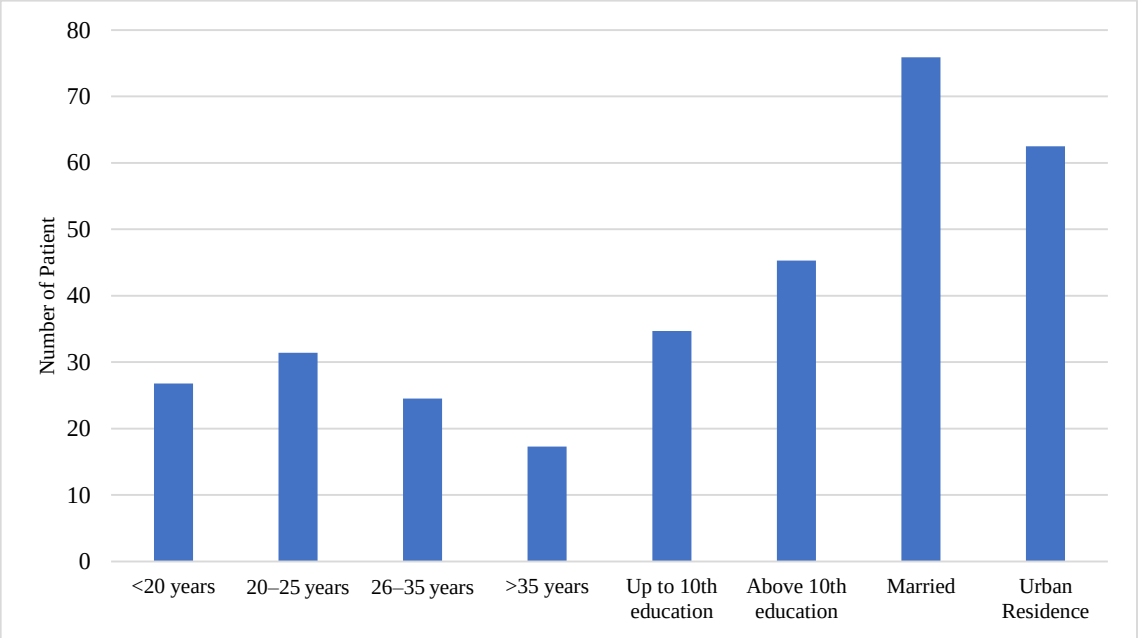
Table 1: Demographic Characteristics

| Variable | Percentage |
|---|---|
| <20 years | 26.8 |
| 20–25 years | 31.4 |
| 26–35 years | 24.5 |
| >35 years | 17.3 |
| Up to 10th education | 34.7 |
| Above 10th education | 45.3 |
| Married | 75.9 |
| Urban Residence | 62.5 |

Table 2: Association between Awareness and Demographics

| Factor | Chi-Square ($X^2$) Value | Exact P-Value | Statistical Significance |
|---|---|---|---|
| Education | 48.03 | 2.1E-10 | Significant |
| Marital Status | 30.45 | 3.43E-08 | Significant |
| Living Area | 9.59 | 0.0083 | Significant |
| Age Group | 37.67 | 3.32E-08 | Significant |

Figure 1: Demographic Characteristics




The majority of participants belonged to the 20–25 years age group (31.4%), followed by those aged below 20 years (26.8%) and 26–35 years (24.5%), while 17.3% of women were aged above 35 years. Regarding educational status, 45.3% of participants had education above the 10th standard, whereas 34.7% had education up to the 10th standard. A substantial proportion of the study population was married (75.9%). With respect to place of residence, 62.5% of participants were from urban areas, while the remaining participants resided in rural settings.

A statistically significant association was observed between cervical cancer awareness and all the assessed demographic factors. Educational status showed a strong association with awareness levels ($\chi^2 = 48.03$, $p = 2.1 \times 10^{-10}$). Marital status was also significantly associated with awareness ($\chi^2 = 30.45$, $p = 3.43 \times 10^{-8}$). Place of residence demonstrated a significant relationship with cervical cancer awareness, with urban and rural differences being evident ($\chi^2 = 9.59$, $p = 0.0083$). Additionally, age group was significantly associated with awareness levels ($\chi^2 = 37.67$, $p = 3.32 \times 10^{-8}$). These findings indicate that demographic factors play a crucial role in influencing cervical cancer awareness among the study population.

## DISCUSSION

The present study demonstrates that demographic factors such as age, education,

marital status, and place of residence significantly influence cervical cancer awareness among reproductive-age women attending a tertiary care hospital in West Bengal. The predominance of participants in the 20–25 years age group aligns with the reproductive demographic typically targeted for cervical cancer screening and HPV vaccination programs [11]. Our finding that higher education levels are strongly associated with greater awareness is consistent with multiple previous studies that emphasize education as a key determinant of health literacy and preventive health behavior [12–14]. Reported similar trends in a community-based study in northern India, where women with education beyond the secondary level were significantly more likely to be aware of cervical cancer and its prevention. Marital status also emerged as a significant correlate of awareness in our cohort, reflecting the social and cultural context where married women often have increased interactions with healthcare services, such as antenatal and family planning clinics, which provide opportunities for health education [15, 16]. This is supported, who noted higher screening uptake among married women compared to unmarried counterparts in a south Indian population. The urban-rural disparity observed in our study, with urban residents showing greater awareness, underscores persistent inequities in health information dissemination and access to healthcare infrastructure [17]. This echo reports from other Indian studies [18, 19] where rural women had limited exposure to cervical cancer education and screening services, often due to poor healthcare outreach and sociocultural barriers. Strategies to enhance awareness in rural areas remain a critical priority to bridge this gap.Age-wise differences in awareness observed in our study, with younger women showing relatively better knowledge, may be attributable to increased exposure to mass media and educational campaigns targeting younger demographics [20]. Who emphasized the role of media and peer education in improving awareness among young women. Overall, our results highlight the need for tailored public health interventions that address demographic disparities in cervical cancer awareness. Enhanced education programs, particularly targeting less-educated, unmarried, rural, and older women, could improve uptake of preventive services such as screening and HPV vaccination. Integrating awareness initiatives within existing maternal and reproductive health services may also increase reach and effectiveness.

## CONCLUSION

The study underscores that demographic factors including age, education, marital status, and place of residence significantly influence cervical cancer awareness among reproductive-age women in West Bengal. The observed disparities highlight the urgent need for targeted public health interventions that prioritize vulnerable groups such as less-educated, unmarried, rural, and older women. Strengthening education and awareness programs, along with integrating cervical cancer prevention efforts within existing reproductive and maternal health services, can enhance screening and HPV vaccination uptake. Addressing these demographic gaps is essential to reduce the burden of cervical cancer and improve women's health outcomes in India.

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