

Cervix Cancer Awareness And Pap Smear Screening Practices Among Urban Indian Women: A Cross-sectional Study

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Abstract:

Background: Cervix cancer is one of the most preventable yet prevalent cancers affecting women in India. Despite the availability of effective screening methods like the Pap smear and preventive vaccines against human papillomavirus (HPV), the burden of cervix cancer remains high due to poor awareness and underutilization of screening services, especially in low-resource settings. Urban women, though with relatively better access to healthcare, may still lack adequate knowledge regarding cervix cancer prevention.

Objectives: To assess the level of knowledge and awareness among urban women regarding Pap smear screening, cervix cancer, and HPV infection and to identify factors associated with awareness levels.

Methods: A cross-sectional, questionnaire-based study was conducted at the Department of Obstetrics & Gynaecology, Jawaharlal Nehru Medical College & Hospital, Bhagalpur, Bihar, India, over a period of 12 months. A total of 480 urban women aged 21–60 years were selected using stratified random sampling. Data were collected through a pre-validated structured questionnaire and analyzed using SPSS v25. Descriptive statistics, chi-square tests, and logistic regression analysis were used to evaluate associations between sociodemographic factors and awareness levels.

Results: Overall, only 41.7% of women had heard of Pap smear screening, while 27.3% were aware of HPV as a causative agent of cervix cancer. Educational level, occupation, and monthly income were significantly associated with awareness ($p < 0.001$). Despite being from urban settings, misconceptions were common regarding the symptoms, risk factors, and prevention methods for cervix cancer.

Conclusion: The study highlights a critical gap in knowledge regarding cervix cancer screening and HPV among urban Indian women. Health education campaigns targeting urban populations are essential to improve awareness and promote early detection through screening practices.

Keywords: Cervix Cancer, Pap Smear, HPV, Awareness, Screening, Urban Women, India.

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Introduction

Cervix cancer continues to be one of the most significant public health challenges affecting women worldwide, particularly in developing countries such as India. Globally, cervix cancer is the fourth most common cancer among women, with an estimated 604,000 new cases and 342,000 deaths reported in 2020 [1]. India alone contributes to nearly one-fifth of the global cervix cancer burden, with approximately 123,000 new cases and 77,000 deaths annually. Despite being preventable and curable when detected early, cervix cancer persists as a major cause of morbidity and mortality in Indian women due to lack of awareness, inadequate screening, and limited access to preventive services [2].

The etiological link between persistent infection with high-risk human papillomavirus (HPV) and cervix cancer is well established. Vaccination against HPV, coupled with regular cervix screening using the Papanicolaou (Pap) smear test or HPV DNA testing, forms the cornerstone of cervix cancer prevention [3]. The Pap smear test, introduced in the mid-20th century, remains a cost-effective and widely recommended screening method, particularly in low- and middle-income countries. In India, the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) advocates cervix cancer screening for women aged 30–65 years. However, the implementation of screening

programs is suboptimal, and participation rates remain low, even in urban areas where healthcare access is relatively better [4].

Several studies conducted across various regions of India have consistently shown that the lack of knowledge about cervix cancer and the role of screening is a major barrier to effective prevention. Myths, stigma, embarrassment, and fear associated with gynecological exams further discourage women from undergoing screening. Furthermore, awareness about HPV infection and the availability of HPV vaccines remains dismally low, even among educated urban women [5].

Given this context, assessing the current level of awareness and understanding of cervix cancer, Pap smear screening, and HPV infection among urban women becomes crucial. While many efforts have been directed towards rural populations, urban women especially from middle and lower-middle socioeconomic backgrounds also face significant informational and behavioral gaps that need to be addressed. Identifying these gaps can help in tailoring community-based interventions and educational campaigns that promote timely screening and prevention strategies [6, 7].

This study, therefore, aims to evaluate the knowledge and awareness regarding Pap smear screening, cervix cancer, and HPV infection among urban women attending the Obstetrics and Gynaecology Department of a tertiary care hospital in Bhagalpur, Bihar. The findings of this study are intended to inform public health initiatives and contribute to improving cervix cancer screening coverage in urban populations.

Materials and Methods

This hospital-based, cross-sectional study was conducted over a period of 12 months in the Department of Obstetrics & Gynaecology at Jawaharlal Nehru Medical College & Hospital, Bhagalpur, Bihar, India. The objective was to assess the knowledge and awareness of urban women regarding Pap smear screening, cervix cancer, and human papillomavirus (HPV) infection. The study design was selected to provide a snapshot of awareness levels and their association with various sociodemographic parameters within the defined population.

Study Population and Sample Size: The study targeted women residing in urban areas who visited the Obstetrics & Gynaecology outpatient department during the study period. Women aged 21 to 60 years, who provided informed consent and had no history of hysterectomy or cervix malignancy, were eligible to participate. Based on a prevalence estimate from prior studies suggesting an awareness level of around 40%, a minimum sample size of 369 was calculated using the standard formula for

proportions with a 95% confidence interval and 5% absolute precision. To enhance statistical robustness and allow subgroup analyses, a final sample size of 480 women was considered.

Sampling Technique: Participants were selected using stratified random sampling. Urban residential zones under the hospital's catchment area were identified and proportionally represented. Within each zone, women attending the outpatient department were approached consecutively and enrolled based on eligibility and consent, ensuring diversity in age, education, and socioeconomic status.

Data Collection Tool: Data were collected using a pre-designed, pretested, and semi-structured questionnaire developed in both English and Hindi. The questionnaire was prepared after extensive literature review and consultation with experts in gynecology and public health. It consisted of four sections:

1. Sociodemographic details
2. Awareness and knowledge regarding cervix cancer (risk factors, symptoms, prevention)
3. Understanding of Pap smear and its purpose
4. Knowledge about HPV infection and vaccination

The questionnaire was administered through face-to-face interviews by trained female healthcare workers to minimize bias and ensure participant comfort and comprehension.

Data Management and Statistical Analysis: All collected data were entered into Microsoft Excel and analyzed using SPSS software version 25. Descriptive statistics such as frequencies and percentages were used to summarize categorical variables. Awareness scores were computed based on correct responses to knowledge-based questions and categorized into adequate and inadequate awareness levels using median as cut-off. Chi-square tests were used to assess associations between awareness levels and sociodemographic variables. A p-value of less than 0.05 was considered statistically significant. Multivariable logistic regression was performed to identify independent predictors of adequate awareness.

Results

This section presents the demographic profile of participants, their awareness of cervix cancer, Pap smear screening, and HPV infection, along with associations between awareness and selected variables.

A total of 480 urban women participated in the study, with a response rate of 96%. The mean age of participants was 36.4 ± 8.5 years. Most participants were married, and the majority belonged to middle socioeconomic status.

Table 1: Sociodemographic Characteristics of Participants (n = 480)

Variable	Frequency (n)	Percentage (%)
Age Group (years)		
21–30	124	25.8
31–45	216	45.0
46–60	140	29.2
Educational Status		
Illiterate	48	10.0
Primary/Secondary	168	35.0
Higher Secondary & Above	264	55.0
Marital Status		
Married	408	85.0
Unmarried/Widow/Divorced	72	15.0
Socioeconomic Class		
Lower	94	19.6
Middle	304	63.3
Upper	82	17.1

Table 2: General Awareness about Cervix Cancer (n = 480)

Awareness Aspect	Yes (n/%)	No (n/%)
Heard about cervix cancer	328 (68.3%)	152 (31.7%)
Aware it is preventable	214 (44.6%)	266 (55.4%)
Knows it can be detected early	186 (38.8%)	294 (61.2%)
Aware it can be fatal if untreated	305 (63.5%)	175 (36.5%)

Table 3: Awareness of Risk Factors and Symptoms (n = 480)

Risk/Symptom	Correctly Identified (n/%)
Early sexual activity	118 (24.6%)
Multiple sexual partners	104 (21.7%)
Persistent vaginal discharge	143 (29.8%)
Post-coital bleeding	126 (26.3%)
Lower abdominal pain	92 (19.2%)

Table 4: Awareness Regarding Pap Smear Screening (n = 480)

Item	Yes (n/%)	No (n/%)
Heard of Pap smear test	200 (41.7%)	280 (58.3%)
Knows Pap smear is for cervix cancer	174 (36.3%)	306 (63.7%)
Ever undergone a Pap smear	88 (18.3%)	392 (81.7%)
Knows recommended screening frequency	65 (13.5%)	415 (86.5%)

Table 5: Awareness of HPV and Vaccination (n = 480)

Item	Yes (n/%)	No (n/%)
Heard of HPV	132 (27.5%)	348 (72.5%)
Knows HPV causes cervix cancer	109 (22.7%)	371 (77.3%)
Aware of HPV vaccine availability	96 (20.0%)	384 (80.0%)
Heard vaccine is effective in youth	82 (17.1%)	398 (82.9%)

Table 6: Association of Awareness Level with Age Group

Age Group (years)	Adequate Awareness (n=192)	Inadequate Awareness (n=288)	p-value
21–30	38	86	0.019
31–45	104	112	
46–60	50	90	

Table 7: Association of Awareness Level with Education

Education Level	Adequate (n=192)	Inadequate (n=288)	p-value
Illiterate	6	42	<0.001
Primary/Secondary	44	124	
Higher Secondary & Above	142	122	

Table 8: Association of Awareness Level with Socioeconomic Class

Socioeconomic Class	Adequate (n=192)	Inadequate (n=288)	p-value
Lower	22	72	0.003
Middle	134	170	
Upper	36	46	

Table 9: Association of Awareness Level with Marital Status

Marital Status	Adequate (n=192)	Inadequate (n=288)	p-value
Married	174	234	0.41
Unmarried/Other	18	54	

Table 10: Multivariable Logistic Regression Predicting Adequate Awareness

Variable	Adjusted OR	95% CI	p-value
Higher Education	2.87	1.89 – 4.37	<0.001
Age 31–45	1.56	1.01 – 2.41	0.045
Middle Socioeconomic	1.68	1.07 – 2.63	0.024

Table 11: Reasons for Not Undergoing Pap Smear (n = 112)

Reason	Frequency (n)	Percentage (%)
Lack of symptoms	48	42.9
Fear or embarrassment	28	25.0
Unaware of procedure location	22	19.6
Cultural/social stigma	14	12.5

Table 12: Awareness Score Distribution

Score Range	Participants (n)	Percentage (%)
0–4 (Very Low)	104	21.7
5–7 (Moderate)	184	38.3
8–10 (Adequate)	192	40.0

Discussion

This study aimed to assess the awareness and knowledge levels of urban women regarding cervix cancer, Pap smear screening, and HPV infection, which are crucial elements in cervix cancer prevention. The findings reflect a substantial gap in awareness, with only 41.7% of women having heard of the Pap smear test and just 18.3% reporting ever having undergone the screening, despite 68.3% being aware of cervix cancer in general. This reveals a disconnection between disease recognition and adoption of preventive practices [8,9].

Educational status emerged as a significant determinant of awareness, as participants with higher secondary education and above showed markedly better knowledge across all domains, consistent with previous Indian and global studies. The association of awareness with age, socioeconomic status, and education suggests that targeted education campaigns focusing on low-literacy and low-income populations are urgently needed [10]. The findings also indicate that the middle age group (31–45 years), often considered more health-conscious, showed higher awareness, possibly due to more frequent healthcare interactions or family planning services [11].

HPV awareness was notably low, with only 27.5% having heard of the virus and a mere 20% aware of the vaccine. This is concerning given the established

link between HPV and cervix cancer and the availability of preventive vaccines. Cultural taboos, lack of access to accurate information, and healthcare barriers likely contribute to this gap [12]. Many participants expressed reasons such as fear, embarrassment, and lack of symptoms as causes for avoiding screening, highlighting the need for destigmatizing reproductive health topics and increasing accessibility of women-centric preventive services [13, 14].

Multivariable logistic regression emphasized education, socioeconomic class, and age as independent predictors of adequate awareness, underscoring the importance of a multi-pronged approach that includes public health education, school-based programs, and community outreach initiatives [15]. Despite national efforts through programs like the Universal Immunization Programme and National Cancer Control Programme, ground-level awareness and participation remain insufficient [16].

Compared to previous Indian studies in urban and semi-urban settings, the current study reports relatively moderate awareness levels but poor implementation in terms of screening uptake. These findings emphasize the importance of shifting from awareness generation to behaviour change models in public health strategies, especially regarding routine cervix screening and HPV vaccination [17].

Conclusion

The present study highlights a significant gap in awareness and utilization of cervix cancer screening and preventive measures among urban women in Bhagalpur, Bihar. Although over two-thirds of the participants had heard of cervix cancer, their knowledge regarding Pap smear testing and HPV infection was considerably low. Only a minority had ever undergone screening, and most were unaware of the recommended screening intervals or the availability of the HPV vaccine. Educational status, socioeconomic class, and age group were found to be strongly associated with higher awareness levels, indicating that these factors play a pivotal role in shaping health-seeking behaviour.

Barriers such as fear, embarrassment, lack of perceived symptoms, and social stigma continue to hinder women from accessing preventive services. These findings underscore the urgent need for comprehensive awareness programs that not only provide information but also empower women to act on that knowledge. Community-based outreach, integration of cervix cancer education into routine health services, and training of primary healthcare providers can be effective strategies to bridge this knowledge gap.

The study emphasizes that raising awareness must be accompanied by practical interventions such as accessible screening facilities, subsidized HPV vaccines, and culturally sensitive educational campaigns. Policymakers and healthcare providers must collaborate to make cervix cancer prevention an accessible and acceptable part of women's healthcare. By addressing both informational and systemic barriers, it is possible to reduce the burden of cervix cancer and improve women's reproductive health outcomes in urban India.

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