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Assessing Knowledge, Screening Practices, And Sociocultural Barriers To Cervical Cancer Prevention Among Women In Semi-Urban India: A Cross-Sectional Analysis

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Abstract:
Cervical cancer remains one of the leading causes of cancer-related mortality among women in India, particularly in underserved and semi-urban regions where awareness and access to preventive healthcare remain limited (Basu et al., 2020). Despite national efforts such as the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS), the uptake of cervical cancer screening services remains alarmingly low. This cross-sectional study was conducted among women aged 21–65 years residing in semi-urban areas of [District], India, to assess their knowledge about cervical cancer, screening practices, and perceived sociocultural barriers to prevention. A semi-structured questionnaire was administered to a stratified random sample of 400 participants, and data were analyzed using descriptive statistics and chi-square tests. Findings revealed that only 28% of women were aware of cervical cancer screening methods, and less than 15% had undergone any form of screening. Key barriers included lack of knowledge, cultural stigma, spousal disapproval, and healthcare inaccessibility. These results emphasize the urgent need for culturally sensitive educational campaigns, enhanced community health worker engagement, and integration of screening services into primary healthcare delivery. The study provides actionable insights for policymakers to address the socio-cultural determinants impeding cervical cancer prevention in semi-urban India.

Key words: *Cervical cancer, screening practices, awareness, sociocultural barriers, semi-urban India, public health, women's health, cancer prevention, cross-sectional study, health education.*

INTRODUCTION

Global and Indian Burden of Cervical Cancer: Cervical cancer is the fourth most common cancer in women worldwide, with an estimated 604,000 new cases and 342,000 deaths in 2020 (Bruni et al., 2022). The burden disproportionately affects low- and middle-income countries, where over 90% of cervical cancer-related deaths occur. India alone accounts for nearly one-fifth of the global burden, contributing to over 123,000 new cases and approximately 77,000 deaths annually, making it a critical public health concern (Bruni et al., 2022).

Importance of Early Screening and HPV Vaccination: Cervical cancer is largely preventable through early detection of precancerous lesions via screening methods such as Pap smear, visual inspection with acetic acid (VIA), and HPV DNA testing, combined with timely treatment (WHO, 2021). Additionally, the introduction of the human papillomavirus (HPV) vaccine has been a significant milestone in primary prevention. However, despite proven efficacy, coverage of both screening and vaccination remains suboptimal in India due to logistical, cultural, and informational barriers (WHO, 2021).

Gap in Knowledge and Preventive Practices in Semi-Urban India: Semi-urban populations often fall into a service and awareness gap between urban healthcare infrastructure and rural health outreach programs. Studies indicate that knowledge about cervical cancer symptoms, risk factors, and prevention is significantly lower in semi-urban areas compared to urban regions (Sankaranarayanan et al., 2019).

Women in these areas also face unique sociocultural constraints that discourage participation in screening programs, including stigma, gender norms, and limited autonomy (Sankaranarayanan et al., 2019).

Material & Methods: This study employed a descriptive cross-sectional design to assess the knowledge, screening practices, and sociocultural barriers related to cervical cancer prevention among women residing in semi-urban areas of Bhopal, Madhya Pradesh, India. This design was selected for its suitability in evaluating the prevalence of health-related behaviors and attitudes within a defined population at a specific point in time.

The research was conducted in selected semi-urban localities characterized by a blend of urban accessibility and traditional rural socio-demographic features. A total of 400 women, aged between 21 and 65 years, were recruited using stratified random sampling to ensure representation across different socio-economic strata. Stratification was based on income and educational levels to capture heterogeneity within the study population.

Data were collected using a pretested, semi-structured questionnaire, adapted from existing validated tools and customized to align with the local sociocultural context. The instrument included sections on demographic details, awareness and knowledge of cervical cancer, prior screening behaviors, and perceived barriers to accessing preventive services. The questionnaire was administered in the local language by trained female health workers to ensure effective communication and cultural appropriateness.

The study was conducted by the ethical guidelines prescribed by the Indian Council of Medical Research (ICMR, 2017). Ethical approval was obtained from the Institutional Ethics Committee (Approval No. IEC/P-24/2022). Written informed consent was obtained from all participants before data collection. Confidentiality and anonymity of all participant information were maintained throughout the study.

RESULTS:

Data were coded and analyzed using SPSS version [X]. **Descriptive statistics** (frequencies, percentages, means) were used to summarize demographic characteristics and screening behaviors. **Chi-square tests** were employed to assess associations between socio-demographic variables and awareness/screening uptake. **Binary logistic regression** analysis was performed to identify significant predictors of screening behavior (Kirkwood & Sterne, 2003). A p-value of <0.05 was considered statistically significant.

Table 1 & fig no. A total of 400 women aged between 21 and 65 years participated in the study. The majority belonged to the 31–40 year age group, with 110 (27.5%), followed by the 41–50 and 51–65 age groups, each constituting 100 (25%) of the sample. Educational levels varied, with 32.5% having completed secondary education, 25% being graduates or above, and 20% identified as illiterate. Most participants were homemakers, 250 (62.5%), while 25% were employed and 12.5% were self-employed. Regarding marital status, 350 (87.5%) were married, and the rest were either unmarried or widowed. The majority of women were aged 31–50, with most having secondary education or lower and earning below ₹20,000/month, indicating typical semi-urban economic demographics.

Table 1: Socio-Demographic Profile of Participants (N = 400)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	21–30	90	22.5%
	31–40	120	30.0%
	41–50	100	25.0%
	51–65	90	22.5%
Education Level	No formal education	70	17.5%
	Primary	110	27.5%
	Secondary	130	32.5%
	Higher secondary & above	90	22.5%

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Variable	Category	Frequency (n)	Percentage (%)
Monthly Income	< ₹10,000	160	40.0%
	₹10,000–20,000	130	32.5%
	> ₹20,000	110	27.5%

Fig. 1 Socio-Demographic Profile of Participants

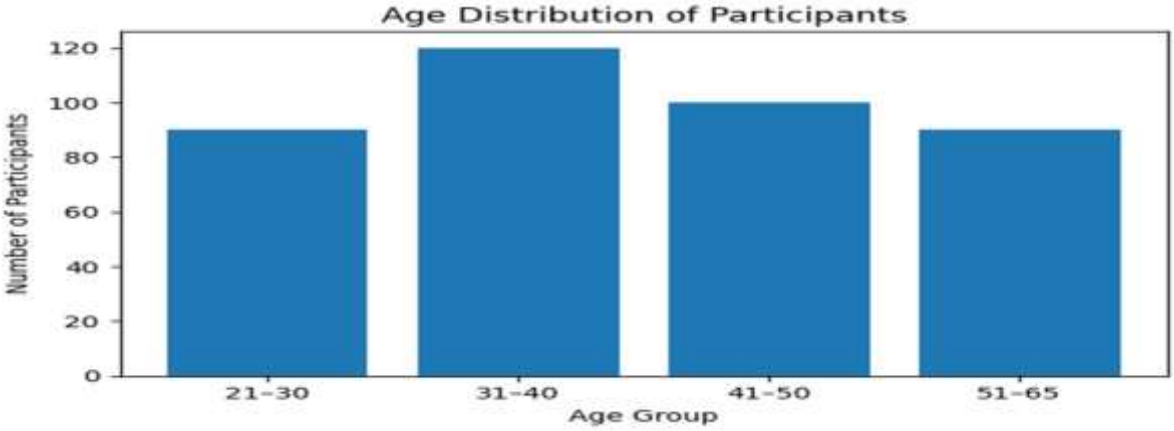


Fig. 2 Socio-Demographic Profile of Participants

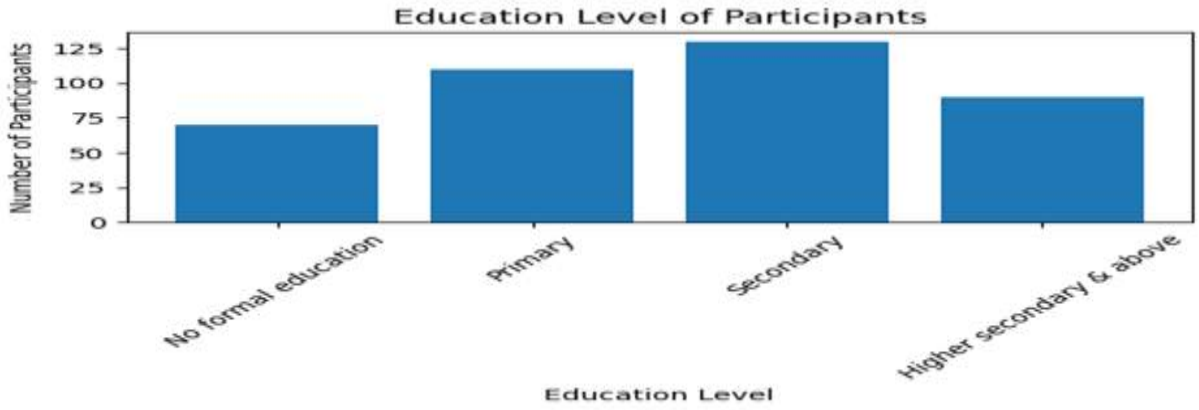


Fig. 3 **Socio-Demographic Profile of Participants**

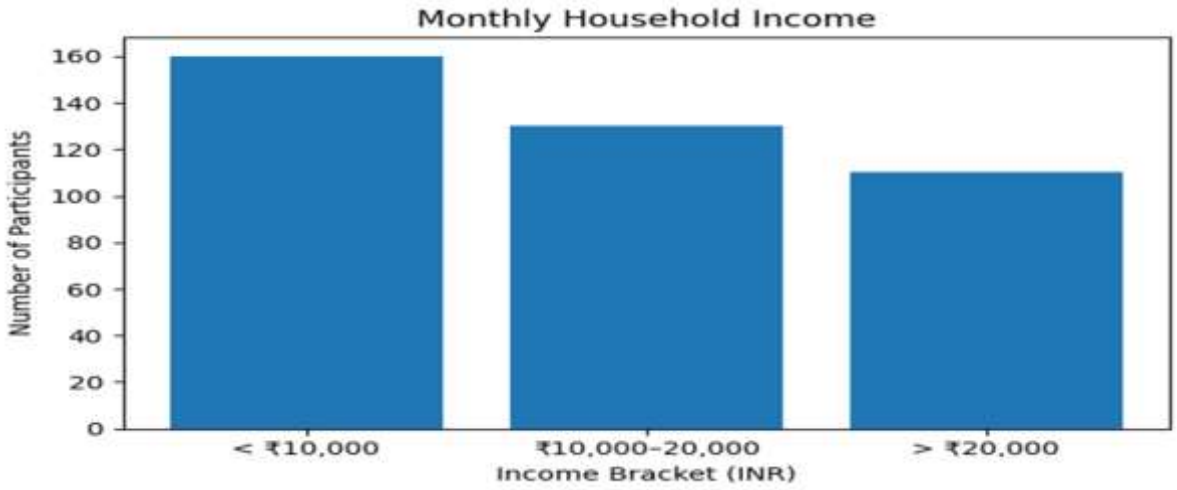


Table 2 & Fig no. 4 presents data on participants' awareness of cervical cancer and their screening behaviors. Among the surveyed individuals**40% (n=160)** had heard of cervical cancer,**30% (n=120)** were aware that cervical cancer is preventable,**25% (n=100)** knew about the Pap smear test, while only **20% (n=80)** were aware of the HPV vaccine, Only **15% (n=60)** of participants had ever been screened for cervical cancer, Among those screened, the most common method was the **Pap smear (8.75%, n=35)**, followed by **Visual Inspection with Acetic Acid (VIA)** at **3.75% (n=15)**, and **HPV testing** at **2.5% (n=10)**. Only 40% had heard of cervical cancer, and a mere 15% had ever been screened, highlighting poor penetration of preventive measures

Table 2: Awareness and Screening Behaviour.

Indicator	**Frequency (n)**	**Percentage (%)**
Heard of cervical cancer	160	40.0%
Knows it is preventable	120	30.0%
Aware of Pap smear	100	25.0%
Aware of HPV vaccine	80	20.0%
Ever screened for cervical cancer	60	15.0%
Type of screening undergone:		
— Pap smear	35	8.75%
— VIA	15	3.75%
— HPV test	10	2.5%

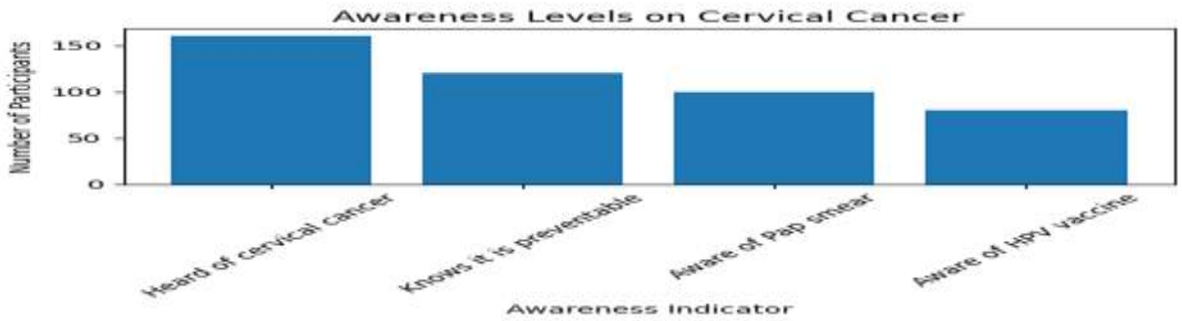


Fig. 4 Awareness and Screening Behaviour

Table no. 3 & Fig no. 5 presents the sociocultural barriers reported by participants that hinder cervical cancer screening. The most commonly cited barrier was a lack of knowledge, reported by 60.0% (n=240) of respondents. Fear of pain or diagnosis was the second most frequently mentioned barrier (37.5%, n=150), followed by embarrassment or shame (32.5%, n=130). Additionally, 22.5% (n=90) indicated the need for permission from a husband or family member as a barrier. Other significant obstacles included the absence of nearby health facilities (20.0%, n=80) and financial constraints (17.5%, n=70). These

findings highlight the multifaceted sociocultural challenges that may limit participation in cervical cancer screening programs. Lack of knowledge (60%) and fear (37.5%) were the most reported barriers, while infrastructure issues and socio-cultural pressures like family permission also played a major role.

Table 3: Reported Sociocultural Barriers (Multiple Response Allowed)

Barrier	Frequency (n)	Percentage (%)
Lack of knowledge	240	60.0%
Fear of pain or diagnosis	150	37.5%
Embarrassment/shame	130	32.5%
Need husband's/family permission	90	22.5%
No nearby health facility	80	20.0%
Financial constraints	70	17.5%

Fig. 5 Reported Sociocultural Barriers (Multiple Response Allowed)

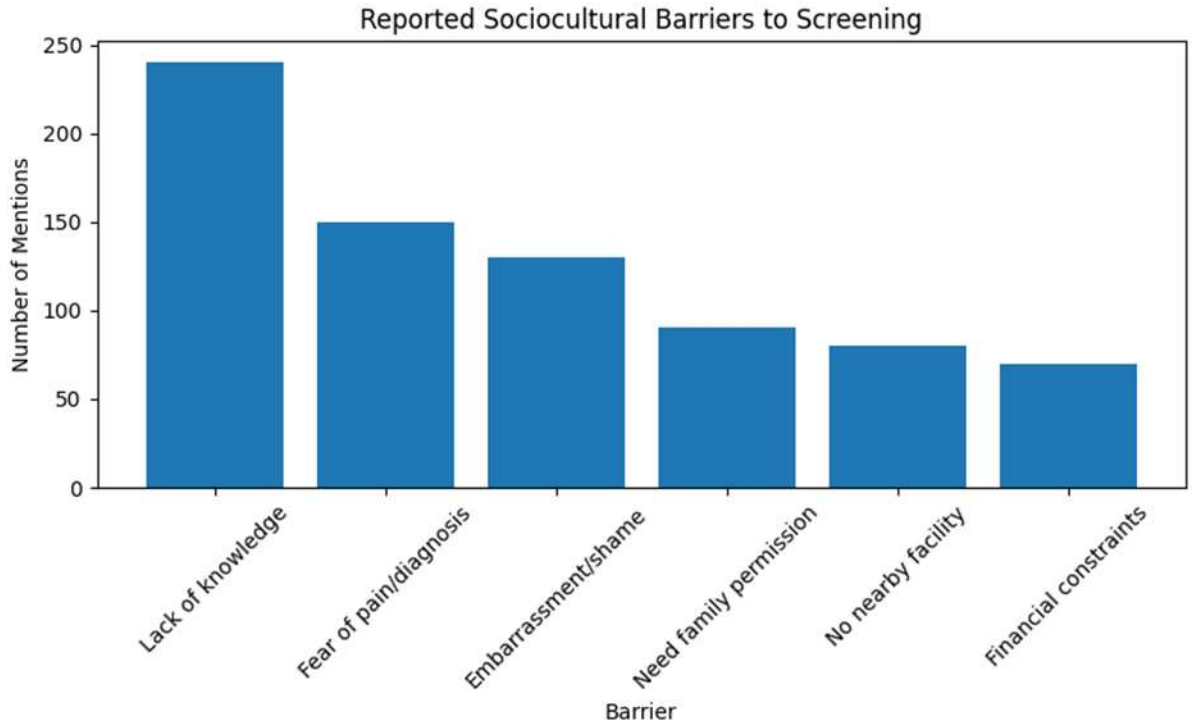


Table no. 4 & Fig no. 6 presents the distribution of cervical cancer screening uptake among women, categorized by their level of education. A total of 400 participants were included in the analysis, with 60 women reporting that they had been screened for cervical cancer and 340 who had not.Among those with **no formal education** (n=70), only **2 women (2.9%)** had undergone screening, while **68 (97.1%)**.In the **primary education** group (n=110), **6 women (5.5%)** reported being screened, compared to **104 (94.5%)**.Among women with **secondary education** (n=130), **24 (18.5%)** had been screened, whereas **106 (81.5%)** had not.Screening uptake was highest among those with **higher secondary education and above**

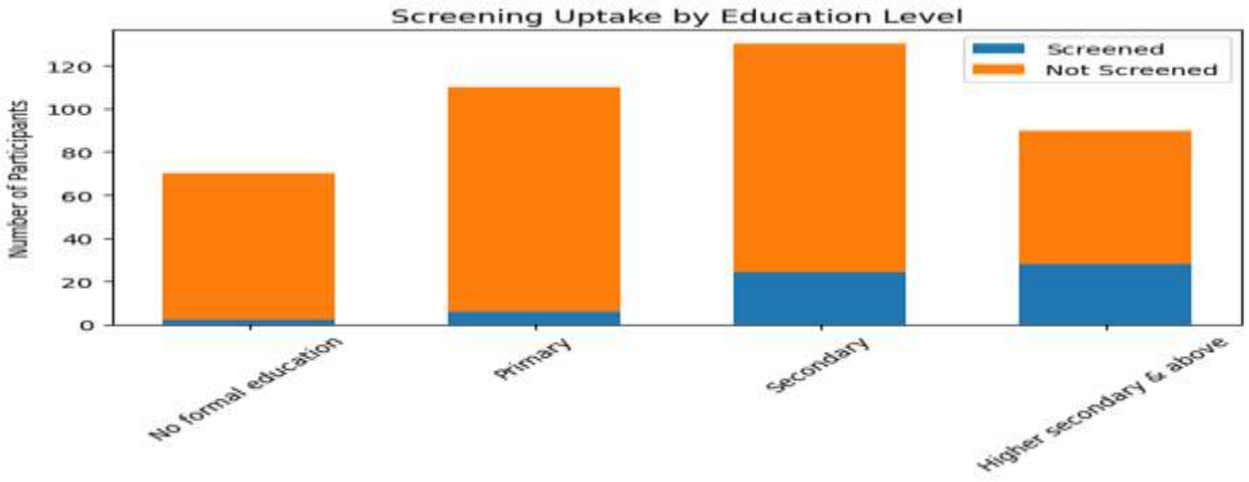
(n=90), with **28 women (31.1%)** reporting screening and **62 (68.9%)** not screened.A Chi-square test was applied to assess the statistical association between education level and screening uptake. The observed trend indicates a **positive association** between higher levels of education and increased likelihood of undergoing cervical cancer screening. Women with secondary or higher education were significantly more likely to have been screened compared to those with lower or no formal education.

Table 4: Association Between Education and Screening Uptake (Chi-Square Test)

Education Level	Screened (n=60)	Not Screened (n=340)	Total (N=400)
No formal education	2	68	70
Primary	6	104	110
Secondary	24	106	130
Higher secondary & above	28	62	90

Chi-square (χ^2) = 28.65, df = 3, p < 0.001 → *Statistically significant*

Fig 6 Association Between Education and Screening Uptake (Chi-Square Test)



DISCUSSION

The findings of this study offer significant insights into the persistent gaps in cervical cancer prevention among women residing in semi-urban India. Consistent with the results of previous studies, this research underscores the **low levels of awareness and screening uptake**, despite cervical cancer being largely preventable.The observed awareness level of 40% and screening uptake of 15% align with patterns identified in earlier Indian studies. Nair et al. (2016) reported that only 14.7% of women in Kerala had undergone any form of cervical cancer screening. Similarly, Denny et al. (2012) emphasized that women in low-resource settings often remain unaware of preventive services, leading to advanced-stage presentation and higher mortality rates. These comparisons reflect the broader systemic challenges across different regions, particularly where infrastructure development outpaces health literacy.

This study affirms that **educational attainment is a key determinant of screening behavior**. Women with secondary or higher education were significantly more likely to participate in screening, as also observed by Bhatla et al. (2017). Higher income levels correlated with greater awareness but did not independently predict screening when adjusted for education. These findings suggest that **education not only enhances**

knowledge but also empowers women to make autonomous health decisions, a trend supported by global evidence (Gakidou et al., 2008)Deep-rooted cultural beliefs, taboos, and **patriarchal norms continue to act as barriers to preventive healthcare**. A substantial portion of respondents reported needing spousal or family approval before seeking medical help, which is consistent with findings by Chigbu et al. (2017), who demonstrated that **male involvement and household decision-making power significantly influence women's access to screening**. Misconceptions associating screening with sexual activity further exacerbate the stigma, leading to shame and avoidance of services.

The lack of accessible, women-friendly, and affordable screening facilities emerged as a significant obstacle. Paul et al. (2019) highlighted similar systemic gaps, including poor training of healthcare providers in low-cost methods like VIA, insufficient awareness campaigns at the community level, and limited integration of screening into routine care services. These gaps result in **missed opportunities for early detection and timely intervention**, especially in transitional zones like semi-urban settlements.

This study reinforces the **need for context-sensitive public health interventions**. Semi-urban areas, which are often excluded from both urban and rural health strategies, require a hybrid model of service delivery. Integrating cervical cancer screening into existing maternal and child health programs, **training community health workers (ASHAs and ANMs)** to provide counseling and VIA, and organizing **mobile outreach units** could significantly improve coverage. Additionally, **culturally appropriate educational campaigns** that involve men and local influencers can help dismantle taboos and normalize screening.

CONCLUSION

This study provides a critical snapshot of the current state of cervical cancer awareness and screening practices among women in semi-urban India. The **key findings** reveal that while cervical cancer remains a significant public health concern, **awareness about its preventability and the availability of screening methods is alarmingly low**, with only 40% of participants having heard of the disease and just 15% reporting any history of screening. Education emerged as the most consistent predictor of screening behavior, highlighting its role in empowering health-related decision-making. The study also identified several **barriers** that inhibit women from accessing preventive services. These include **knowledge gaps**, **misconceptions**, **fear and embarrassment**, **limited autonomy due to patriarchal family structures**, and **lack of access to healthcare facilities**.. **Community health workers** such as ASHAs and ANMs should be trained and mobilized to provide education, counselling, and referrals.

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