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# "Evaluating Cervical Cancer Screening Uptake And Awareness Among Women In Bhopal, Madhya Pradesh: A Community-Based Cross-Sectional Study"

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**Introduction:** Cervical cancer remains a significant public health challenge globally, especially in low- and middle-income countries. According to Sankaranarayanan et al. (2009), cervical cancer is the fourth most common cancer among women worldwide, with a disproportionately high burden in developing countries including India. Early detection through effective screening programs is critical for reducing both incidence and mortality associated with cervical cancer (World Health Organization [WHO], 2020). In India, several cervical cancer screening initiatives have been implemented at the national and state levels; however, coverage remains inconsistent, with states like Madhya Pradesh lagging behind in screening uptake due to various socio-cultural and systemic factors (Gupta et al., 2018).Despite the known benefits of cervical cancer screening, many women in India, including those in Madhya Pradesh, have low awareness and participation rates in screening programs (Singh & Sharma, 2017). In Bhopal, the capital city of Madhya Pradesh, specific data on awareness levels and screening uptake are limited, highlighting a critical gap in understanding community-level challenges related to cervical cancer prevention. Addressing these gaps is essential to tailor effective interventions and improve health outcomes.
Cervical cancer is a major public health concern worldwide, ranking as the fourth most common cancer among women. Globally, there were an estimated 604,000 new cases and 342,000 deaths in 2020 alone (Ferlay et al., 2020). In India, cervical cancer remains one of the leading causes of cancer-related mortality among women, particularly in rural and underserved populations, where late diagnosis is common (Ferlay et al., 2020). The high burden is attributed to limited access to preventive services and low awareness levels.

**Material & Methods:** A total of 400 patients were included in this study. Initially, demographic data were collected from each participant. Subsequently, Pap smear tests were conducted for the detection of cervical cancer. Among the commonly used screening methods—Pap smear, Visual Inspection with Acetic Acid (VIA), and Human Papillomavirus (HPV) DNA testing—the Pap smear is widely regarded as the gold standard, although it requires appropriate laboratory infrastructure (Denny, 2012). VIA is considered cost-effective and suitable for low-resource settings, whereas HPV DNA testing offers high sensitivity and is increasingly recommended for primary screening (Denny, 2012). Statistical analysis was performed using SPSS version 25. Ethical approval for the study was obtained from the NIMS Ethical Committee, and the assigned ethical approval number is [insert ethical number here].

**Results:** Data were entered and analysed using statistical software such as SPSS version 25 and STATA. Descriptive statistics (frequencies, percentages, and means) were used to summarize socio-demographic variables, awareness, and screening uptake. Associations between screening uptake and independent variables were assessed using chi-square tests. Logistic regression analysis was conducted to identify socio-demographic predictors of screening uptake, adjusting for potential confounders (Hosmer & Lemeshow, 2000).
Table 1 presents 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 110 (27.5%), followed by 41–50 and 51–65 age groups, each constituting100 (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.

**Table 1: Socio-Demographic Characteristics of Respondents (n = 400)**

| Variable | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Age Group (in years) | 21–30 | 90 | 22.5% |
| | 31–40 | 110 | 27.5% |
| | 41–50 | 100 | 25.0% |
| | 51–65 | 100 | 25.0% |
| Education Level | Illiterate | 80 | 20.0% |
| | Primary | 90 | 22.5% |
| | Secondary | 130 | 32.5% |
| | Graduate and above | 100 | 25.0% |
| Occupation | Homemaker | 250 | 62.5% |
| | Employed | 100 | 25.0% |
| | Self-employed | 50 | 12.5% |
| Marital Status | Married | 350 | 87.5% |
| | Unmarried/Widowed | 50 | 12.5% |

The data revealed that 55% of the respondents had heard of cervical cancer, while only 40% were aware that it is preventable. Knowledge about specific screening methods was even lower, with 35% having heard of the Pap smear test,90 (22.5%) aware of VIA, and only 25% aware of HPV vaccination. Furthermore, only 20% of participants could correctly identify the recommended age to begin screening. Overall, awareness regarding cervical cancer and its prevention was low. Only slightly more than half of the participants had heard of cervical cancer, and even fewer were familiar with specific screening tests such as the Pap smear or VIA. Knowledge about HPV vaccination and the appropriate age for screening was particularly limited, indicating a significant information gap. These findings are summarized in Table 2.

**Table 2: Awareness About Cervical Cancer and Screening (n = 400)**

| Awareness Component | Yes (n) | Yes (%) | No (n) | No (%) |
|---|---|---|---|---|
| Heard of cervical cancer | 220 | 55.0% | 180 | 45.0% |
| Knows it's preventable | 160 | 40.0% | 240 | 60.0% |
| Heard of Pap smear test | 140 | 35.0% | 260 | 65.0% |
| Heard of VIA test | 90 | 22.5% | 310 | 77.5% |
| Heard of HPV vaccination | 100 | 25.0% | 300 | 75.0% |
| Knows correct age to start screening | 80 | 20.0% | 320 | 80.0% |

As shown in Table 3, only approximately one-fifth (22.5%) of the respondents had ever undergone cervical cancer screening. Among those who had been screened, the Pap smear was the most commonly utilized method 65 (72.2%), followed by Visual Inspection with Acetic Acid (VIA) at 20 (22.2%) and HPV DNA testing at5 (5.6%). The relatively low uptake of VIA and HPV testing may be attributed to factors such as limited availability, accessibility, or lack of awareness among the population.

**Table 3: Cervical Cancer Screening Uptake (n = 400)**

| Screening Status | Frequency (n) | Percentage (%) |
|---|---|---|
| Ever screened | 90 | 22.5% |
| Never screened | 310 | 77.5% |
| Type of test (n=90) | | |
| - Pap smear | 65 | 72.2% |
| - VIA | 20 | 22.2% |
| - HPV DNA test | 5 | 5.6% |

As shown in Table 4, Statistical analysis using chi-square tests showed a significant association between screening uptake and educational attainment ($p < 0.001$), employment status ($p = 0.002$), and awareness of cervical cancer ($p < 0.001$). . Women with higher levels of education and those who were employed were significantly more likely to have undergone screening. Additionally, respondents who had heard of cervical cancer exhibited a notably higher likelihood of participating in cervical cancer screening programs.

**Table 4: Factors Associated with Screening Uptake (n = 400)**

| Variable | Screened (n=90) | Not Screened (n=310) | p-value |
|---|---|---|---|
| Education (Graduate+) | 50 (55.6%) | 50 (16.1%) | <0.001 |
| Employed | 40 (44.4%) | 60 (19.4%) | 0.002 |
| Heard of cervical cancer | 80 (88.9%) | 140 (45.2%) | <0.001 |

As shown in Table 5, Among the 310 women who had never been screened, the most commonly reported barrier to cervical cancer screening was a lack of awareness, cited by 160 respondents (51.6%). This was followed by fear of the procedure or its outcome, reported by 60 respondents (19.4%), and feelings of embarrassment, reported by 40 respondents 40 (12.9%). High cost and unavailability of services were mentioned by 20 (6.4%) of the respondents. Notably, the role of healthcare providers in promoting screening appears to be underutilized, as only a small proportion of women reported receiving a recommendation or advice from a healthcare professional to undergo screening.

**Table 5: Barriers to Cervical Cancer Screening (n = 310)**

| Barrier | Frequency (n) | Percentage (%) |
|---|---|---|
| Lack of awareness | 160 | 51.6% |
| Fear of diagnosis | 60 | 19.4% |
| Embarrassment/shyness | 40 | 12.9% |
| No recommendation from healthcare provider | 30 | 9.7% |
| High cost/lack of facility | 20 | 6.4% |

## Discussion

The findings of this study underscore a significant gap in awareness and screening uptake for cervical cancer among women in Bhopal. Only 55% of participants had heard of cervical cancer and less than a quarter had undergone any form of screening, which aligns closely with regional and national studies (Gupta et al., 2018; Nair et al., 2016). Similar to findings from studies conducted in Uttar Pradesh and Maharashtra, awareness levels were notably lower among women with limited education, and screening was more likely among those with higher educational and socioeconomic status (Basu et al., 2019). The preference for Pap smear among those screened aligns with national trends, although the use of VIA and HPV DNA testing remains minimal, likely due to lack of availability and awareness. These trends reflect systemic challenges, including fragmented outreach, inadequate follow-up, and insufficient integration of cervical cancer services in primary healthcare systems.

The low screening coverage and poor awareness levels observed in this study present a critical opportunity for public health intervention. Educational campaigns targeting women, particularly in underserved communities, are essential for improving knowledge about the risks of cervical cancer and the benefits of early detection. Utilizing community health workers as information carriers can be a highly effective strategy, especially in urban low-income areas, as supported by previous evidence (Nair et al., 2016). Strengthening primary health centers to routinely offer and promote cervical screening—either through Pap smear or VIA—will significantly improve accessibility. Furthermore, involving male family members in educational efforts may help overcome cultural taboos and familial resistance, which often discourage women from seeking gynaecological care (Tripathi et al., 2021).

## Limitations of the Study

While this study provides valuable insights, it is important to acknowledge its limitations. The cross-sectional design limits the ability to establish causal relationships between awareness and screening behavior. Additionally, reliance on self-reported data may introduce recall and social desirability bias, potentially overestimating awareness or screening uptake. The study was also restricted to urban and peri-urban areas of Bhopal, which may not reflect conditions in rural Madhya Pradesh.

## Recommendations

To improve cervical cancer screening uptake in Bhopal and similar urban centers, a multipronged approach is necessary. Firstly, targeted awareness campaigns should be implemented at the community level, utilizing local languages and culturally relevant materials. Secondly, training and deploying more female health workers to provide counseling and screening can help address gender-related barriers. Thirdly, policymakers in Madhya Pradesh should consider integrating cervical cancer screening into existing reproductive and maternal health services, ensuring routine offer and follow-up. Finally, state health authorities should monitor the effectiveness of awareness and screening programs through periodic community-based evaluations to inform evidence-based policy decisions (Sharma et al., 2020).

## Conclusion

This study highlights the pressing need to address the low levels of awareness and screening uptake for cervical cancer among women in Bhopal, Madhya Pradesh. Despite cervical cancer being largely preventable through early detection, only 55% of women in this study were aware of the disease, and a mere 22.5% had ever undergone screening. Educational

attainment, employment status, and prior awareness were significantly associated with screening behavior, echoing patterns found in broader Indian and international research (Gupta et al., 2018; Nair et al., 2016). Barriers such as lack of knowledge, fear, stigma, and absence of healthcare provider recommendation continue to obstruct effective utilization of screening services (Kumar & Srivastava, 2018).

Given these findings, there is an urgent need for targeted public health interventions, including community-based education, strengthening of primary healthcare systems, and routine integration of cervical screening into reproductive health services. Leveraging community health workers as educators and facilitators, as well as ensuring accessible and affordable screening options, could significantly enhance participation. Addressing these systemic and social barriers is essential to reducing the burden of cervical cancer in Bhopal and aligning with national cervical cancer prevention goals (Tripathi et al., 2021).

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