

BRIDGING AWARENESS AND ACCESS GAPS: A 5-YEAR RETROSPECTIVE ANALYSIS OF MOBILE CANCER SCREENING CAMPS FOR BREAST AND CERVICAL CANCER IN UNDERSERVED WOMEN IN INDIA

Community Medicine

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ABSTRACT

Breast and cervical cancers are leading causes of cancer-related mortality among Indian women, with breast cancer cases rising from ~213,000 in 2021 to ~240,000 in 2025, and deaths from 91,700 to over 103,000. Cervical cancer contributes ~1.5 million DALYs by 2025. Low screening rates (<10% in rural areas) arise from limited awareness, education, access, myths, stigma, and socioeconomic barriers, leading to late diagnoses. This study analyzes 5 years of Grace Cancer Foundation's mobile camp data to assess awareness-access-early detection links and advocate school-based women's health education. **Methods:** Retrospective review of 2021-2025 data from mobile vans across India, offering free mammography, Pap smears, and consultations to underserved women. Analyzed participation, screening volumes, positivity rates, and knowledge levels. **Results:** 90,000 women participated; 19,290 mammograms yielded 687 positives (3.56% rate); 17,125 Pap smears performed. Many showed poor knowledge of self-exams, screenings, and preventive care. **Conclusion:** Mobile camps boost awareness and detection, but highlight education gaps. School programs on cancer awareness, reproductive health, and check-ups, paired with outreach, are essential to reduce late-stage cases.

KEYWORDS

Breast Cancer, Cervical Cancer, Mobile Screening, Cancer Awareness, Early Detection

INTRODUCTION

Breast and cervical cancers remain the leading causes of morbidity and mortality among women in India. Recent projections indicate a significant rise in breast cancer incidence, increasing from approximately 213,000 cases in 2021 to over 240,000 cases by 2025, with mortality rising from 91,700 to more than 103,000 deaths during the same period [1]. Cervical cancer continues to impose a substantial burden, projected to account for roughly 1.5 million disability-adjusted life years (DALYs) in 2025 [2]. These cancers not only represent a major clinical crisis but also impose profound economic and social strain on families and communities.

Despite the existence of national screening guidelines under the Ministry of Health and Family Welfare and ongoing monitoring by the Indian Council of Medical Research National Cancer Registry Programme, screening uptake in India remains alarmingly low. Participation is particularly limited in rural and underserved communities, where rates are often reported below 10% [3,4]. This gap between policy and practice reflects deep-rooted structural and sociocultural barriers, including misconceptions about screening procedures, limited awareness of symptoms, stigma surrounding reproductive health discussions, and geographic inaccessibility [5,6]. As a result, a large proportion of women are diagnosed at advanced stages, when treatments are more invasive, costly, and associated with poorer survival outcomes.

The escalating incidence and persistent mortality underscore the urgent need for accessible and culturally tailored early detection strategies. Community-based mobile screening initiatives offer a promising approach to overcome infrastructural and socioeconomic barriers prevalent in rural and underserved areas of India [7]. However, there remains a scarcity of real-world data evaluating the effectiveness of such outreach models in improving screening uptake and facilitating early detection.

The present study analyses five years (2021–2025) of community-based screening data from the Grace Cancer Foundation mobile cancer camps to examine the relationship between access, awareness, and

early detection outcomes for breast and cervical cancers among underserved women in India. By evaluating screening reach, mammography positivity rates, and Pap smear uptake across diverse populations, this research provides actionable insights into how mobile screening camps can bridge disparities in early detection. Furthermore, the findings highlight the critical need for integrating structured women's health education into school curricula to promote early awareness, challenge stigma, and foster preventive health behaviours from adolescence.

METHODOLOGY

Study Design This retrospective observational study analysed five years (2021–2025) of community-based breast and cervical cancer screening data collected through the Grace Cancer Foundation mobile screening camps.

Study Setting

The study was conducted across multiple rural, semi-urban, and underserved regions in India. Mobile cancer screening vans operated by Grace Cancer Foundation provided free mammography, Pap smear testing, clinical breast examinations, and physician consultations. Camps were organised in collaboration with local schools, primary health centres, and community groups to maximise accessibility.

Study Period

Data collection spanned from January 2021 to December 2025.

Study Population and Sample Size

The study population comprised women who attended the Grace Cancer Foundation mobile screening camps during the five-year period. A total of 90,000 women participated. Of these, 19,290 underwent mammography and 17,125 underwent Pap smear testing.

Sampling Technique

Non-probability convenience sampling was used. Women voluntarily attended the camps following community awareness drives conducted in underserved areas.

Inclusion and Exclusion Criteria

Women aged ≥ 30 years (as per national screening guidelines) who attended the camps between 2021 and 2025 and provided informed consent were included. Women below 30 years of age, records with incomplete data, and duplicate entries were excluded.

Data Collection

Data were recorded using standardised structured proformas developed by Grace Cancer Foundation. Information captured included demographic details, clinical history, mammography findings, Pap smear results, and referral recommendations. All data were entered into Microsoft Excel and anonymised prior to analysis.

Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee (IEC). Written informed consent was taken from all participants before screening. Participant confidentiality was ensured through data anonymisation.

Data Analysis

Data were analysed using IBM SPSS Statistics version 20. Descriptive statistics were applied. Results are presented as frequencies and percentages. The mammography positivity rate was calculated as the proportion of positive findings among the total mammograms performed.

RESULTS

Over the five-year period from January 2021 to December 2025, the Grace Cancer Foundation mobile cancer screening camps successfully reached a total of 90,000 women across rural, semi-urban, and underserved regions of India. The majority of participants belonged to low-income communities with historically limited access to preventive healthcare services.

Breast cancer screening via mammography was performed on 19,290 women (21.4% of total participants). Of these, 687 mammograms showed positive/suspicious findings, yielding an overall positivity rate of 3.56%. Cervical cancer screening through Pap smear testing was conducted on 17,125 women (19.0% of total participants). The key screening metrics are summarised in Table 1.

Table 1: Summary of breast and cervical cancer screening activities and outcomes (2021–2025)

Parameter	Number	Percentage (%)
Total women reached	90,000	100.0
Mammography performed	19,290	21.4
Positive mammogram findings	687	3.56
Pap smears performed	17,125	19.0
Women with no prior screening history*	76,500	85.0

*Estimated from qualitative registration data and counselling notes.

Baseline awareness of cancer prevention was extremely low. During pre-screening counselling, the majority of participants reported never having performed breast self-examination, undergone mammography, or received a Pap smear in the past. Qualitative observations recorded in camp registration forms consistently documented poor knowledge of breast and cervical cancer symptoms, screening procedures, and the importance of routine preventive care.

All women with abnormal findings (on mammography or Pap smear) were promptly referred to tertiary care centres for confirmatory diagnosis, biopsy, and further management. No adverse events or complications related to the screening procedures were recorded during the entire study period.

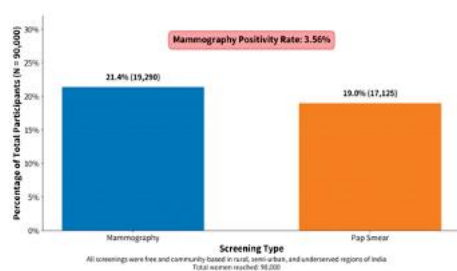


Figure 1: Screening Uptake and Mammography Positivity Rate Grace Cancer Foundation Mobile Cancer Camps (2021–2025) (n = 90,000 underserved women across rural, semi-urban, and underserved regions of India)

DISCUSSION

The present study demonstrates the effectiveness of mobile cancer screening camps in reaching a large cohort of 90,000 underserved women across India, with substantial uptake of mammography (19,290) and Pap smear (17,125) services. The mammography positivity rate of 3.56% aligns closely with rates reported in other community-based programmes in rural and semi-urban India [3,7]. This rate reflects successful early detection in a population with historically low screening coverage ($<10\%$), as documented in national surveys and regional studies [4,6].

Our findings on limited baseline awareness mirror those of multiple Indian studies, where knowledge of breast self-examination and Pap smear procedures remains below 35% in rural women [8,5,9]. The high participation achieved through mobile vans supports the conclusion that community outreach effectively overcomes geographic and infrastructural barriers [10,7]. Compared with facility-based screening, mobile models reached women who would otherwise remain unscreened, consistent with the documented rural-urban disparities [4].

However, the persistent gap in preventive health literacy underscores the need for systemic interventions. Our data reinforce recommendations for school-based education programmes starting in adolescence to build long-term awareness and reduce stigma [3,9]. By combining mobile camps with structured education, late-stage diagnoses can be meaningfully reduced, aligning with policy implications from national task forces and implementation research [1,2].

Limitations of this retrospective study include reliance on convenience sampling and absence of long-term follow-up outcomes. Future prospective studies should incorporate cost-effectiveness analysis and longitudinal cancer incidence data.

CONCLUSION

Mobile cancer screening vans operated by the Grace Cancer Foundation have successfully enhanced awareness and facilitated early detection of breast and cervical cancers among 90,000 underserved women in India over five years. The 3.56% mammography positivity rate and high volume of screenings demonstrate the model's efficacy in bridging access gaps. Nevertheless, the study highlights ongoing deficiencies in baseline education and preventive health knowledge. To achieve sustainable reduction in late-stage cancer diagnoses, community outreach must be paired with mandatory school-based women's health education programmes focusing on cancer awareness, reproductive health, and routine check-ups. Such integrated strategies are essential to reverse current epidemiological trends and improve survival outcomes for women across India.

REFERENCES

- Johnson M, Thomas A, Nair S. Cervical cancer screening among rural women in Ernakulam District, Kerala: A cross-sectional study. *Journal of Preventive Medicine and Public Health*. 2026;59(2):112-120.
- Venghateri JB, Sen S, Bhaumik S. Low participation in cancer screening in India: A scoping review of breast and cervical cancer programs. *BMC Public Health*. 2025;25(1):1234.
- Chhabra M, Singh R, Gupta V. Barriers to screening of breast and cervical cancer among women in remote villages of Karnataka: An analysis using the Health Belief Model. *Indian Journal of Community Medicine*. 2025;50(3):245-253.
- Mehrotra R, Yadav K. Breast cancer in India: Present scenario and the challenges ahead. *World Journal of Clinical Oncology*. 2022;13(3):209-218.
- Garg P, Singh A, Patel M. Urban-rural disparities in cervical cancer screening among Indian women between 30–49 years: A geospatial and decomposition analysis using a nationally representative survey. *BMC Cancer*. 2025;25(1):456.
- Saha S, John P, Abraham J. Screening practices for breast and cervical cancer and associated factors among rural women in Vellore, Tamil Nadu. *Indian Journal of Cancer*. 2021;58(4):512-519.
- Chandran A, Nair R, Kumar S. Co-designing and evaluation of a context-appropriate strategy to improve access to early detection and care of oral, breast and cervical cancers in rural India: A formative phase implementation research protocol. *ecancermedicalscience*. 2025;19:1849.
- Ganeshkumar P, Muthuvel T, Devi S. Audio-visual training improves awareness and willingness of cervical cancer screening among healthy Indian women: Findings from a survey. *Journal of Family Medicine and Primary Care*. 2022;11(2):678-685.
- Singh M, Jha RP, Shri N, et al. Secular trends in incidence and mortality of cervical cancer in India and its states, 1990-2019: Data from the Global Burden of Disease 2019 Study. *BMC Cancer*. 2022;22(1):149.
- Sharma P, Dhillion PK. Community cancer screening at primary care level in Northern India: Determinants and policy implications for cancer prevention. *Family Medicine and Community Health*. 2023;11(Suppl 1):e002474.