

Breast cancer screening among adult women aged 30 to 49 years: Insights and analysis of NFHS 5 (2019-2021)

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Abstract

Of all the cancer types, breast cancer is the most frequently diagnosed in women, with 2.3 million new cases and 670,000 cases attributable to this type of cancer in 2022. Girls from puberty onwards may be at the potential risk of breast cancer, especially as the population ages, and the treatment is only successful if the disease is detected early using screening methods. The present study is a secondary analysis using the data from the National Family Health Survey-5 conducted in India from 2019 to 2021 to analyse the trends in breast cancer screening.

The findings suggest that the Indian southern zone had the highest estimated screening proportion of 54%. In contrast to this, the Central and Eastern zones had the lowest screening rates, which were 5% and 3%, respectively. Within Tamil Nadu, however, the Central region had the highest screening rate of 33%, with the West region following close with 29% and the North region at 22%. The South region recorded the least screening with an estimated proportion of 16 percent.

This study reveals that Tamil Nadu has one of the highest rates of breast cancer screening in India, although there is imbalance at the district level. In addition, breast cancer screening should be given as part of an annual health checkup for all women over 30 years of age in order to enhance early diagnosis and therapy and consequently lower rates of deaths.

Keywords: Breast Cancer Screening; Adult Women; NFHS 5; India; Tamil Nadu

1. Introduction

Breast cancer is a non-communicable disease that primarily affects women over men. Worldwide, women develop breast cancer in around 99% of circumstances, and men have 0.5–1% of occasions(1). In 2020, 2.3 million women were diagnosed with breast cancer, resulting in 685,000 deaths worldwide(2). In 2021, breast cancer has overtaken lung cancer to be the world's most commonly diagnosed cancer, accounting for the severe burden globally, especially among women(3). The incidence of the disease varies according to the region or country's developmental index. According to HDI, the developed countries have an incidence rate of less than 0.5% compared to the developing countries, where it rises more annually(4). BC is the disease that affects the breast for both genders and grows out of order if not detected early. The breast is covered by three parts: lobules, ducts, and connective tissue, where the major cancer cells develop in the ducts or lobules(5). It is a multifactorial disease where there are different types of risk factors, which may be divided into modified and non-modified risk factors, still for many women the risk factors are not known(6,7). The aetiology of breast cancer is a complex interplay between multiple risk factors, including prior history of breast cancer, positive family history, obesity, tall stature, smoking, alcohol consumption, early menarche, late menopause, sedentary lifestyle, nulliparity, and hormone replacement therapy. Factors associated with decreased risk of breast cancer include multiparity, history of breastfeeding, physical activity, and weight loss(6).

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The oestrogen level in women is higher than that in men, which poses a major risk for the cause in this particular gender(8). The screening and diagnostic tests play a crucial role in BC, which will reduce the mortality rate of the disease(9). The early detection of BC by diagnosis will reduce up to 60% of the impact of causing BC, and completing the recommended treatment will reduce the impact by 80%(10). One way of early detection is screening, which is identification of unrecognized disease by using simple tests or examinations among those individuals who have the disease but do not yet have symptoms. NFHS-5 collected information about whether women had ever undergone a screening test for breast cancer(11). *This study is a secondary data analysis examining patterns in breast cancer screening in India & Tamil Nadu using data from NFHS-5.*

1.1. Breast Cancer Screening (BCS)

Breast cancer screening (BCS) is defined as testing women before any evident symptoms appear, generally by mammography and clinical breast examination (CBE) to detect and treat cancers or pre-cancers(12). The primary aim of breast cancer screening is to reduce mortality from the disease. Screening mammography aims to reduce breast cancer mortality through detection and treatment of tumours at an early stage, leading to better survival than symptomatically detected tumours(13).

1.1.1. Types of Tests

- **Mammogram:** It is an x-ray of the breast. For many women, mammograms are the best way to find breast cancer early, when it is easier to treat and before it is big enough to feel or cause symptoms. Having regular mammograms can lower the risk of dying from breast cancer. At this time, a mammogram is the best way to find breast cancer for most women of screening age(14).
- **Breast magnetic resonance imaging (MRI):** A breast MRI uses magnets and radio waves to take pictures of the breast. Breast MRI is used along with mammograms to screen women who are at high risk for getting breast cancer. Because breast MRIs may appear abnormal even when there is no cancer, they are not used for women at average risk(14).
- **Clinical breast exam:** It is an examination by a doctor or nurse, who uses his or her hands to feel for lumps or other changes(14).
- **Breast self-awareness:** Being familiar with how your breasts look and feel can help you notice symptoms such as lumps, pain, or changes in size that may be of concern. These could include changes found during a breast self-exam. You should report any changes that you notice to your doctor or health care provider(14).

2. Material and methods

The study utilizes data from NFHS-5, which was gathered between 2019 and 2021. NFHS-5 fieldwork for India was conducted in two phases—Phase-I from 2019 to 2020, covering 17 states and 5 UTs, and Phase-II from 2020 to 2021, covering 11 states and 3 UTs—by 17 field agencies and gathered information from 636,699 households, 724,115 women, and 101,839 men. Household, women's, men's, and biomarkers were canvassed in local languages using Computer Assisted Personal Interviewing (CAPI). Questionnaire information was collected only with informed consent from the respondents. NFHS-5 fieldwork for Tamil Nadu was conducted in two parts for all 32 districts of the state from January 2020 to March 2020 and December 2020 to March 2021. Information was collected from 27,929 households, 25,650 women age 15-49-, and 3,372-men age 15-54. The state-wise and district-wise fact sheets of India and Tamil Nadu about breast cancer screening among the age group of 30 to 49 were taken for this study from NFHS-5.

3. Results

Table 1 Women in the age group of 30-49 in India had undergone screening tests for breast cancer

State Wise List	Percent (%)
Andhra Pradesh	0.8
Assam	0.2
Bihar	0.3
Goa	1.3
Gujarat	0.1

Himachal Pradesh	0.4
Karnataka	0.4
Kerala	2.4
Maharashtra	1.3
Meghalaya	0.5
Manipur	1.6
Mizoram	2.7
Nagaland	0.3
Sikkim	0.1
Telangana	0.3
Tripura	0.4
West Bengal	0.2
Arunachal Pradesh	0.3
Chhattisgarh	0.2
Haryana	0.3
Jharkhand	0.1
Madhya Pradesh	0.5
Odisha	0.2
Punjab	0.3
Rajasthan	0.2
Tamil Nadu	5.5
Uttar Pradesh	0.4
Uttarakhand	0.2

SOURCE: NFHS 5 (2019-2021)(15,16)

Table 2 Women in the age group of 30-49 in Tamil Nadu had undergone screening tests for breast cancer

District Wise List	Percent (%)
Ariyalur	4.3
Chennai	6.3
Coimbatore	8.4
Cuddalore	4.6
Dharmapuri	1.2
Dindigul	2.1
Erode	8.7
Kanchipuram	6.8
Kanyakumari	3.9
Karur	5.8

Krishna Giri	0.4
Madurai	2.4
Nagapattinam	11
Namakal	1
Perambalur	10.3
Pudukkottai	7.6
Ramanathapuram	5.3
Salem	14.6
Sivaganga	1.5
Thanjavur	4.5
Nilgiris	12.3
Theni	4.9
Tiruvallur	7.9
Thiruvavur	10.4
Thoothukkudi	1.7
Tiruchirappalli	5.4
Tirunelveli	5.5
Tirupur	3.7
Tiruvannamalai	4.3
Vellore	0.5
Villupuram	8.8
Virudhunagar	1.8

SOURCE: NFHS 5 (2019-2021)(17)

Table 1 represents that almost all Indian states had a low breast cancer screening rate. While Tamil Nadu did have a 5.5% screening rate, most others had much lower rates. Kerala (2.4%) and Mizoram (2.7%) were a few other states that had relatively higher rates. But states like Gujarat, Sikkim, and Jharkhand had very low rates of about 0.1%.

Table 2 represents the screening test for breast cancer for women in Tamil Nadu. The breast cancer screening reports in Tamil Nadu varied greatly between districts. Salem led the list, with 14.6% of women screened, followed by Nilgiris (12.3%) and Nagapattinam (11%). Places like Chennai (6.3%) and Coimbatore (8.4%) were in the middle. But some areas lagged behind, like Namakal (1%), Vellore (0.5%), and Krishna Giri (0.4%).

Table 3 95% CI of a Proportion for Breast Cancer Screening in Tamil Nadu

Tamil Nadu	Proportion	95 % CI of a Proportion	
		Lower limit	Upper limit
Central	33	24	42
West	29	21	38
South	16	10	24
North	22	15	31

This study divided Tamil Nadu into four regions based on the district-wise list from NFHS 5. The central region had the estimated proportion of 33% (24-42% CI), followed by 29% (21-38% CI) in the west region and 22% (15-31% CI) in the north, and the south region had the lowest estimated proportion of 16% (10-24% CI).

Table 4 95% CI of a Proportion for Breast Cancer Screening in India

India	Proportion	95 % CI of a Proportion	
		Lower limit	Upper limit
Northern Zone	7	3.4	13
North Eastern Zone	21	14	29
Eastern Zone	3	1	8
Central Zone	5	2	11
Western Zone	10	5.5	17
Southern Zone	54	44	63

This study divided India into 6 different zones based on the state-wise list from NFHS 5. The Northern zone had the estimated proportion of 7% (3.4-13%CI), followed by 21% (14-29%CI) in the North Eastern Zone and 3% (1-8%CI) in the Eastern Zone, and the western and southern zone had the estimated proportion of 10% (5.5-17%CI) and 54% (44-63%CI). The Central Zone had a proportion of 5% (2-11% CI).

4. Discussion

Cancer is an increasing health challenge in India, impacting lives across diverse socio-economic and geographic regions of the country. The burden of cancer in the country is on the rise, with an increasing number of cases reported each year. Looking ahead, an estimated 12.8% increase in cancer incidence by 2025 is expected as compared to 2020. Approximately one in nine people in India is expected to face a cancer diagnosis during their lifetime. Notably, lung cancer ranked highest among males, while breast cancer held the top spot for females (18). The rise in disability-adjusted life years for cancer indicates a decline in premature mortality. Efforts should focus on sustaining and scaling up NCD screening, education, and health promotion at the population level. Various factors contribute to the rising magnitude of cancer in India: lifestyle changes, environmental factors, etc. As one main factor is age

In India, among the women in the age group of 15-49, only 0.6% have had a screening test for breast cancer. The age plays a major role in BCS. The percentage of women with an examination for screening breast cancer increases from 0.1 percent among women age 15-19 to 0.9 percent among women age 35-49. Older women (age 35-49) are slightly more likely to have undergone an examination for breast cancer screening (0.9%) than younger women (age 20-24) (0.3%)(11). The increased breast cancer incidence with advancing age parallels the age dependence of many common cancers that is partly due to age-related increases in carcinogenesis and the accumulation of cellular modifications throughout time. There is also a relationship between age of diagnosis and outcome prognosis. Women diagnosed with breast cancer at an age lower than 50 have lower survival rates than those diagnosed at ages between 50 and 70(6).

The findings of this research offer a thorough knowledge of how different demographic variables are distributed geographically in India. Significant geographical differences in the estimated proportions of various demographic subgroups across the nation are revealed by the analysis of data from the National Family Health Survey 5(19). With an estimated proportion of 54% (44-63% CI), the Southern zone was found to have the greatest, followed by the North-Eastern zone with 21% (14-29% CI). The estimated proportions for the Central and Eastern zones were notably low, at 5% and 3%, respectively, indicating a more uneven distribution of the people throughout the nation.

The observed variations in the zone's demographic profiles most likely correspond to underlying socioeconomic, cultural, and health system elements that have contributed to India's regional disparities. To overcome the pronounced spatial disparities, further study is required to fully understand the intricate interactions among these drivers and how they may affect focused policy initiatives.

In Tamil Nadu, only 4 percent of women age 15-49 have ever undergone a screening test for breast cancer(11). The findings reveal significant differences in the estimated proportion of women undergoing breast cancer screening across the four regions of Tamil Nadu.

The central region had the highest estimated proportion of breast cancer screening at 33% (95% CI: 24-42%), followed by the western region at 29% (95% CI: 21-38%), the northern region at 22%, and the southern region had the lowest at 16%. These regional disparities in breast cancer screening utilization highlight the need for targeted interventions to address the barriers and promote equitable access to preventive services. Previous studies have reported similar patterns of disparities in breast cancer screening, with women in rural or semi-rural areas often facing greater challenges in accessing and utilizing these services(20). Factors such as socioeconomic status, education level, cultural beliefs, and access to healthcare infrastructure can contribute to these regional variations. The national breast cancer screening estimates from this study have several uses. They can help to roll out the program, set up implementation benchmarks, and evaluate the program. These align with the WHO cancer indicator for women between 30 and 49 years old. The broad disparity in screening coverage makes it essential to decentralize testing and treatment policies. Planners must tackle the unfairness found in this study when organizing health care delivery. We need a way to use the chances we miss to screen women of childbearing age for common cancers. These chances include visits to family planning, baby wellness clinics, postpartum clinics, and regular outpatient departments. Research shows that screening by local health workers cuts down cancer deaths, so it's key to get them on board with active screening(21). We should look into using the Ayushman Bharat scheme to boost awareness, highlight the effects of common cancers, and promote available screening and treatment options. To wipe out breast cancer as a public health issue in India, we need a strong system to keep track of things. This system should include national surveys, cancer registries, or records that measure screening, along with modelling.

5. Conclusion

This study identifies that the state of Tamil Nadu has the highest screening rates in India, although there are significant disparities at the district level. In order for the improvement of screening rates throughout the country, annual breast cancer screening tests during medical check-ups should be added for women aged above 30 years. This would enable a more proactive approach towards early detection and treatment, reducing mortality rates due to breast cancer by a significant margin.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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