

**LIVING WITH BREAST CANCER IN INDIA: DEVELOPING
TECHNOLOGY AGAINST EXPERIENCES AND
PERCEPTIONS**

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfillment for the award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management

by

Neha Singh

Under the Supervision and Guidance of

Dr. Mahender Kumar

2021

**LIVING WITH BREAST CANCER IN INDIA: DEVELOPING
TECHNOLOGY AGAINST EXPERIENCES AND
PERCEPTIONS**

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfillment for the award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management

by

Neha Singh

Under the Supervision and Guidance of

Dr. Mahender Kumar

2021

DECLARATION BY STUDENT

I hereby declare that this dissertation titled **Living with Breast Cancer in India: Developing Technologies Against Experiences and Perceptions** is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

A handwritten signature in black ink, appearing to read 'Neha Singh', is written over a light blue rectangular background.

Neha Singh

02 Jul 2021

CERTIFICATE

This is to certify that **Neha Singh** in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management from the IIHMR University, Jaipur has successfully completed her internship at **Indian Institute of Health Management Research, Jaipur** during March 22, 2021 to July 02, 2021.

Place: Ahmedabad

Date: 02 Jul 2021

Dr. Mahender Kumar

IIHMR University, Jaipur

CERTIFICATE

This is to certify that dissertation topic **Living with Breast Cancer in India: Developing Technology against Experiences and Perceptions** is a record of the research work undertaken by Neha Singh in partial fulfillment of the requirements for the award of the degree of MBA Hospital and Health Management from the IIHMR University, Jaipur under my guidance and supervision and his/her approach to the research study has been sincere, scientific, and analytical.

Dr. Mahender Kumar
IIHMR University, Jaipur
19 Jun 2021

PR Sodani
IIHMR University, Jaipur
19 Jun 2021

ACKNOWLEDGEMENT

I would like to express my sincere gratitude towards Healthark Insights for adjusting time for my dissertation project and allowing me to work on this project and for providing a good working ambience for the successful completion of this project.

I would like to express my sincere gratitude towards my Mentor Dr. Mahender Kumar for his constant support. His guidance and teaching have been of great help during my project.

Finally, I would like to express a special word of gratitude towards my family and friends. Without their guidance, it wouldn't have been possible for me to look into niche opportunities in my project.

Last but not the least, I would like to express my sincere thanks to my institute IIHMR University for providing me with all kind of support in my dissertation project.

Neha Singh

Hospital Management

IIHMR University, Jaipur

Table of Contents

S.No	Title	Page No.
1.	Abstract	1
2.	Introduction	2
3.	Review of Literature	3
4.	Methodology	6
5.	Result and Observations	8
6.	Discussions	42
7.	Recommendation	43
8.	Limitations	44
9.	References	45

List of Figures

S.No	Title	Page No.
1.	Number of new cases in 2020, both sexes, all ages	9
2.	Number of new cases in 2020, females, all ages	10
3.	Geographical distribution of breast screening across the districts of India	11
4.	Trends for 5-year age distribution among different Indian registries	15
5.	Five-year trends of breast cancer among registries	18
6.	The survival rate for cancer rapidly declining by an increase in the stage	19
7.	Reasons for not getting screened	19
8.	Parameters to analyse patient characteristics	20
9.	Parameters of the patients who have not screened	21
10.	Level of stigmatization	22

List of Tables

S.No	Title	Page No.
1.	Breast Cancer in Mumbai, Bangalore, Chennai, Thiruvananthapuram, Dirbrugh, New Delhi and Barshi Rural	12
2.	Distribution of the respondents' age group	24
3.	Distribution of the respondent's family income in a month	24
4.	Comparison between the age groups and the desire for breast reconstruction	25
5.	Comparison between family income and the desire for breast reconstruction	25
6.	Reasons for low breast reconstruction levels and potential strategies to increase rates	26
7.	Summary of various imaging modalities for screening of breast cancer	32

Abbreviations

NPCDCS : The National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases, and Stroke

ASHA : Accredited Social Health Activist

CR : Crude Rate

AAR : Age Adjusted Rate

PBCRs : Population-based Cancer Registries

APC : Annual Percentage Change

Living with Breast Cancer in India: Developing Technology against Experiences and Perceptions

Keywords-Breast Cancer, India, Perception, Awareness, Experiences, AI, Technology

ABSTRACT

Breast cancer remains the most common cancer among women all over the world, including India. As a result of the growing incidence, advanced stages at diagnosis, and death rates, it is important to investigate breast cancer in women. As the incidence and death rates of breast cancer rise, it's more important than ever to look into the information gaps, drivers of awareness, and stigma associated with the disease among the general public and health-care professionals. Understanding these constraints and drives is critical for the successful implementation of effective cancer prevention and early detection campaigns and interventions. This study identified topics for evaluating the impact of breast disease experiences from detection through treatment, including the role of information, beliefs, cultural norms, awareness of disease, resources, coping strategy and social support. Where the prognosis of breast cancer patients has any direct or indirect influence on health technology deployment and growth in India. The study aims to examine the existing knowledge and attitudes of women living with breast cancer in India. Using this knowledge to learn how breast cancer attitudes and behaviors might impact decision-making and technological progress. Project findings show the ambiguity of patient attitudes regarding proper treatment and care, and an over-the-counter need for standards for clinical practice and particular measures to deal with impacts of breast cancer on women. Awareness of breast cancer is often poor, as is the overall poor health awareness in India. Because of lack of knowledge, together with general indifference to women's health, economic and social factors, breast cancer testing programs are inadequate, and consultation is delayed, leading to a delayed diagnosis. Therefore, it is essential that breast cancer screening programs across the country be expanded in India to lower moral rates. A disease like breast cancer may be effectively fought using sophisticated technology such as digital mammography, AI-based modality and government awareness and screening campaigns.

INTRODUCTION

Breast cancer is three to four times more common in India. In the Northeast and large political metro areas the greatest rates can be noticed (e.g., Mumbai and New Delhi). In addition to initiatives to raise awareness and expand access to the diagnosis, information, statistics, and information of the problems women are facing (for example, how women seek health, engage with the public health system, and decide on breast health care). Awareness of this condition must be stepped up and BSE and CBE need to be strengthened. When the prevalence of increased breast cancer in India and an inexplicable greater mortality, the level of cancer literacy must be understood, especially because, when compared to women in western nations, the diagnostic age of the average age is ten years younger. Evaluation of the present levels of cancer awareness is a must to set up comprehensive health programs, therapy and early detection programs that successfully include patients.

The digital revolution transforms the healthcare world, which overflows with new technology and data flows. Industries are now starting to focus on taking advantage of these developments in their companies, from mining genomic information to identifying new drug targets, to identifying the patients most suited for targeted and personalized treatment and to creating tracking systems to monitor clinical trials in real time.

The aim of the research is to measure the different variables and gaps. As has already been shown, it is necessary to get a better understanding of women's perspectives on breast cancer and how their experience in breast cancer serves to detect obstacles and to enable them to screen, survive ships, treatment and impact healthcare policy and practice.

The study tackles two key issues, namely, 1. Does the experience of Indian women with breast cancer, from diagnosis to treatment, impact knowledge, belief, cultural standards, and understanding of disease, resources, coping methods and social support? 2. Is there a direct or indirect influence on the prognosis on the deployment and growth of health-oriented technology in India on breast cancer? The goal is to study the beliefs and attitudes of women living with cancer of the breast in India and to evaluate how attitudes and practices around breast cancer might affect decision-making and technological progress.

REVIEW OF LITERATURE

Breast cancer is not just the world's most prevalent female cancer but also in India, according to data. Advanced diagnostic phases, death rates, and increasing incidence hence make it crucial to understand the behavior of women in breast cancer. In India, several studies have been conducted to evaluate women's awareness of breast health.

Author, Year	Study Location	Sample Size	Sampling Technique	Salient Features
Mathur P et al. (1),2020	Under the National Cancer Registry Programmer's network, India has 28 population-based cancer registries and 58 hospital-based cancer registries	51,785	The Indian Council of Medical Resources collects data in a systematic manner as part of the National Cancer Registry Program (NCI)	This study evaluated during the presentation and type of treatment of cancer patients from 58 HBCRs (N = 667,666) from the group examination for the composite period 2012 - 2016, cancer incidence, patterns, projections, and death of 28 PBCR components (PCBs).
Bhattacharya et al. (2),2019	Bangalore	4200	Controlled randomized	No doctor or technician is required for this screening procedure (i.e., no touch technique)

Gov. in. (3), 2021	Mumbai, Bangalore, Chennai, Thiruvananthapuram, Dibrugarh, Delhi and Barshi	1,00,000	Cancer registry data	The Health Technology Assessment of Indian Women looked at the clinical efficacy and cost-effectiveness of numerous breast cancer screening technologies in indigenous women from a health-system viewpoint
NybladeL et al. (4), 2017	Karnataka	59	Patients, primary care providers, and health care providers were interviewed in depth	Qualitative exploratory research in which the focus was not on stigma, the misrelation with stigma, and the analysis

Sukhila Baddam Reddy et al. (5)	Telangana	381	A cross-sectional descriptive study, using a pre-tested and semi-structured questionnaire	The issues were based on concentrated talks with a group of medical and non-medical undergraduates, few medical staff, and some professors of medical colleges and hospital managers. The respondents were given signed authorization ensuring that the data they supplied were fully secret and anonymous.
Smith et al. (6),2019	Mumbai		Mumbai population-based cancer registry	There is a trace of India's increasing cancer burden since ancient times, the Pub Med, internet archives, British library and numerous more sources of Indian historical information on cancer.

METHODOLOGY

Basis for spatial dependence

The current study aims at recognizing factors affects uptake for breast screening and creating an inclusive assessment of the uncertainty of patients' beliefs regarding the treatment, appropriate management, and the need for clinical practice guidelines and specific interventions to deal with the effects on patients with breast cancer. It is very important to note that any collection of socioeconomic, demographic, or health data over time produces a spatial pattern and it is to outline the findings of a qualitative study, which includes exploring patients' understandings of technology and their perceived role and perceptions towards the treatment across the continuum of breast cancer care.

Data source

The methodology is followed by a systematic search of literature and news and articles updates utilizing combined keywords on bibliographical databases. The bibliographical lists are searched for further papers from the above-mentioned publications and articles. The framework work covers the identification of research issues, the retrieval of relevant studies, diagrammatic data, collection, selection of studies.

Index keywords, such as (careful or knowledgeable or education related program or (women or women or healthcare workers or healthcare professionals), (the search-based, (breast-neoplasm or breast-related) and (risk-factor or risk evaluation) and India are used. Secondary searches are also conducted using the aforementioned search phrases for qualitative analysis and breast cancer studies. The studies and publications focus on screening and treatment methods for breast cancer. The focus of the dissertation is on risk factor literacy and breast cancer perception in connection to technological advancement.

The risk variables evaluated are then summarized in an organized review. For breast cancer, the strength of current evidence is further classified as sufficient/convincing evidence, insufficient/low evidence, and no definitive evidence.

Study population

The surveyed population reflects and reflects a country's vision and vision of breast cancer. It was determined at specific sites in the Western, Northern and Southern geographical regions of the

country. The National Cancer Registry Program, the World Health Organization, published documents, publications and the NFHS are the other kinds of source information and data generation. Several literary sources have also been used for information collection and analysis of breast cancer.

The data for the CR (crude rate) and AAR (age adjusted rate) per 100,000 population came from the National Cancer Registry Program's 2012–2014 reports, as well as twenty-five population-based cancer registries (PBCRs) across India (Barshi rural and expanded, Bhopal, Bangalore, Delhi, Chennai, Mumbai, Aurangabad, Thiruvananthapuram and Ahmedabad rural and urban) including North-East states (Aizawl District, Cachar District, Kamrup Urban District, Dibrugarh District, Mizoram State, Manipur State and Imphal).(7)

The national cancer recording program, which tracked trends in cancer incidence rates from 1982 to 2010, was also used by 13 PBCRs for APC forecasts (annual percentage change) of the burden of breast cancer in Bhopal, Bangalore, Delhi, Chennai, Mumbai, Barshi, Dibrugarh, Thiruvananthapuram, Kamrup Urban, Kamrup Rural, Imphal West District and Sikkim and Mizoram states. In addition to several review papers, data on breast cancer epidemiology in Indian women were also filtered.

Study variables

The result variable utilized for the analysis is breast cancer. Data for women who were subjected to breast screening were aggregated using NFHS-4 data in the district. The study evaluated the breast screening differences by means of a set of independent variables/ factors, including socio-demographic factors, religious, caste, economic and residential region.

Framework

Understanding the origins and barriers of this disease is extremely important in order to undertake strategic awareness programmes and early breast cancer prevention and diagnosis. Literary studies also evaluate to gain a better understanding of breast cancer risk factors among healthcare professionals and women. To be more comprehensive. The dissertation is split into two parts.

- Section I Existing and relevant material on breast cancer patients and their method of treatment and technological development is examined and focused on the phase of the survival.
- Section II is the comprehensive thesis to explain the findings of a qualitative research to examine the technological knowledge and patients' perspectives on therapy as it relates to

breast cancer treatment across the spectrum.

The results from the research show the confusion in patients' views about the proper therapy, management and time-consuming requirement for certain interventions and guidelines for clinical practice to tackle impacts on breast cancer patients.

Plan of analysis

Data are analyzed on three main aspects which affect the beliefs, experiences and conduct of women in India who look for breast-health treatment. Sensibilization, beliefs and resources are the key variables. These characteristics are also utilized as categories to demonstrate impediments to the identification, treatment, and support of digital health in the country for survival and growth. The identification, fear, and belief of barriers to treatment are conveyed, while survival facilitators communicate their dignity, faith, awareness, and the development of a technological method.

Ethical considerations

Things like rights, ethics and duties always come up throughout the fight against women's breast cancer. In this study several ethical concerns related to the informed consent; friends, family and public education; access to care; patients' ease of diagnostics and treatment; and the allocation of restricted resources apply.

RESULT & OBSERVATIONS

Prevalence and transience of breast cancer in India

In 2020, the National Cancer Registry Program report, provided important data and trends on mortality, cancer incidence, and treatment across the country. Based on data gathered throughout a network of Cancer population and hospital registries around the country, the ICMR generates cancer data from 58 Hospital-based registries and 28 population-based cancer registries.

Breast cancers of all kinds have become a significant health issue in all Indian cities. More than one quarter of all female malignancies occur particularly in metropolises like Delhi, Bengaluru, and Chennai. In line with the current NCRP study, the number of instances of cancer is anticipated to climb from Lakh 13.2 in 2020 to 15.7 by 2025. By 2025, the number is predicted to rise. This is over 20 percent higher. At least, however, is prevented with one-third cancer.

In 2020, the World Health Organization estimates that 13.5% of all cancers in India are women in both gender and first in incidence, mortality and prevalence, compared to 26.3% of women who

experience breast cancer. Breast cancer is greater in younger groups, both due to incidence and death. The age standard is estimated at around 26.3% by 2020 and in 2026, the figure 1 and 2 show an increase of 35 per lakh female. Among them, about 60 percent are detected in advanced breast cancer stadiums, where colonists voiced concern that Indian males were more aggressive than those in western countries in terms of breast cancer.

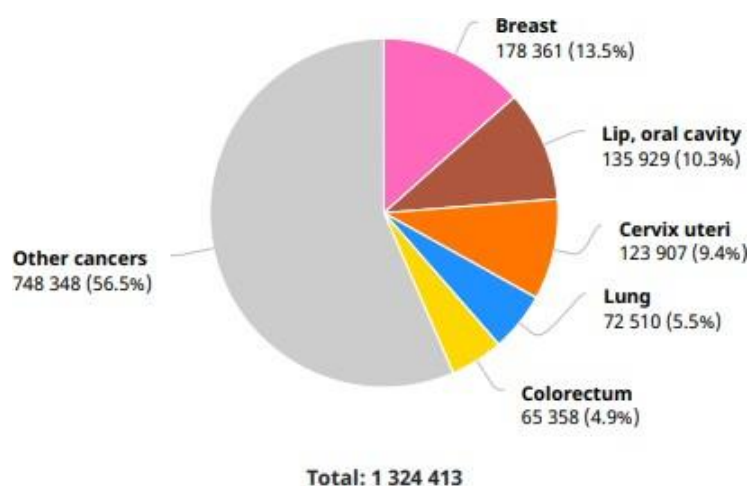


Fig1. Number of new cases (2020), both sexes, all ages

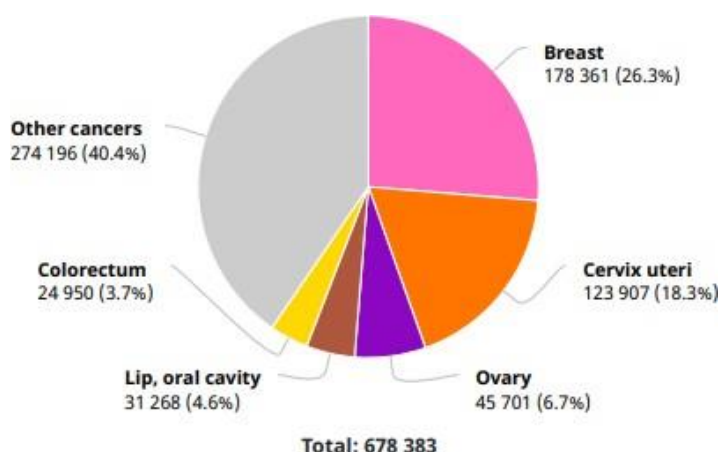


Fig 2. Number of new cases (2020), females, all ages

Geographical distribution of breast screening

There was no proof of breast cancer screening in India. In the NFHS-4 fourth round (National Family Health Survey 2015-2016) information was initially gathered concerning the examination of the breast by more than 6,99,000 women aged 15–49 years. (8) Accessibility of such information in NFHS-4 gave a good possibility of analyzing breast cancer patterns and levels at the state and regional levels in India.

The probability of a woman being given a clinical breast exam or a Pap test depends upon several

aspects, such as income, marital statuses, age, status of health and education, according to Lin SJ. (9) Women with a greater level of education, income, and insurance coverage are more likely to have access to cervical and breast cancer screening services. Wu S (10) considered that employees are more likely to be screened due to their increased risk of failure, higher income, and capacity to pay for additional bags. On the other hand, Beining RM research (11) analysed rural women's risk of cervical and breast screening less than urban women. According to NFHS-4 data, a geographic breast screening distribution throughout India's districts is presented in Figure 3.

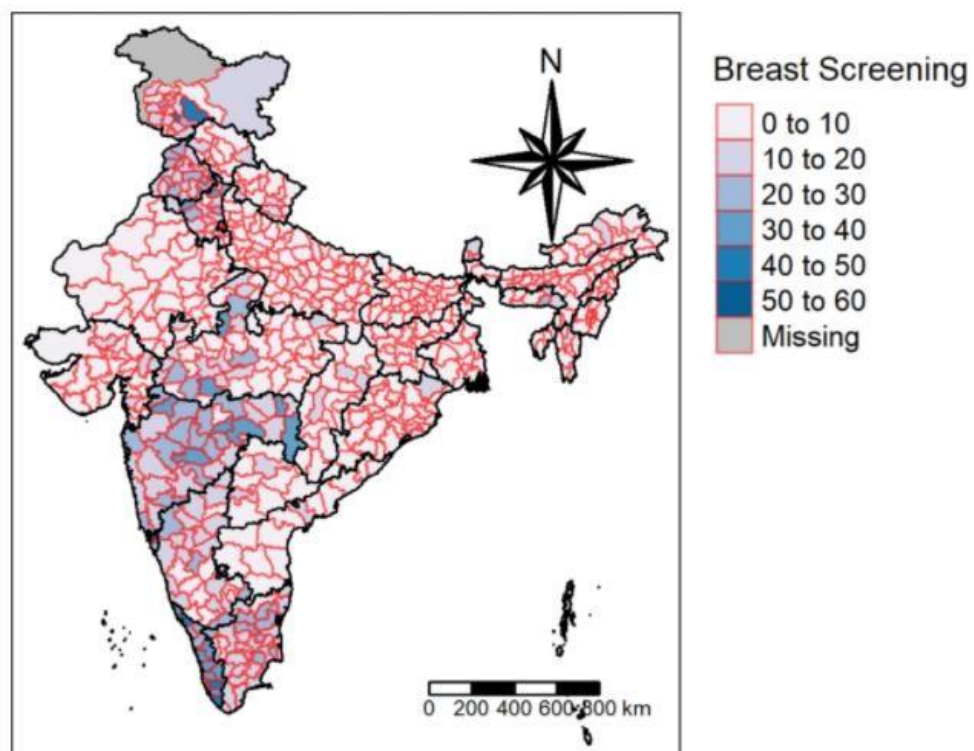


Fig 3. Geographical distribution of breast screening across the districts of India

10% of women had been screened breast according to the NFHS study. Most Kerala's districts have high rates of breast cancer screening, but Northern Goa has the highest rate. The distribution curve revealed that most districts fell between 0% and 10%. Because of lifestyle variables such as obesity, alcohol use, smoking, bad nutrition, chemical exposure and radiation, female hormone exposure (estrogen), late menopause and reproductive history, more than 10 percent can become hereditary.

Burden of breast cancer among Indian women

Ferlay J et al. (12), India is facing a difficult scenario due to an 11.54 percent increase in breast cancer incidence and a 13.82 percent increase in death from 2008 to 2012. The main causes of the reported rise in death include a lack of comprehensive breast cancer screening, early discovery of

the disease, and insufficient medical facilities. Breast cancer ranks first in females in individual registries (Mumbai, Bangalore, Chennai, New Delhi, and Dibrugarh) from 2012 to 2014, as shown in Table 1. In different registries, the proportional proportion of breast cancer ranged from 30.7 percent in Chennai to 19 percent in Dibrugarh. Breast cancer has risen to the top of all major urban registers, owing to increased urbanisation and westernisation, as well as changes in lifestyle and eating habits, although cervical cancer still ranks first among females in the Barshi rural registry, and breast cancer ranks second.

Thiruvananthapuram has the highest crude rate (CR) of 43.9 per 100 000 among different registries, followed by Chennai (40.6), New Delhi (34.8) and Mumbai (33.6). The top four spots were taken by Delhi in the PBCR with AAR 41.0 per 100,000, followed by Chennai 37.9, Bangalore 34.4, and Thiruvananthapuram district 33.7. In India, the age-adjusted minimum incidence rate per 100 000 has been recorded to be more than 20 per 100 000 in the districts of Chandigarh (39.5), Panchkula (34.6), Aizwal (36.2) and Goa (36.8). (13)

Table 1. Breast Cancer in Mumbai, Bangalore, Chennai, Thiruvananthapuram, Dirbrugh, New Delhi and Barshi Rural

Breast Cancer	% (Relative proportion)	R(Rank)	CRper100,000 (Crude rate)	AAR per100,000 (Age Adjusted rate)
Mumbai	28.8	1	33.6	33.6
Bangalore	27.5	1	29.3	34.4
Chennai	30.7	1	40.6	37.9
Thiruvananthapuram	28.5	1	43.9	33.7
Dibrugarh	19.0	1	12.7	13.9
New Delhi	28.6	1	34.8	41.0
BarshiRural	20.0	2	13.2	12.4

Another new metric for assessing cancer mortality in proportion to incidence is the mortality / incidence ratio (MIR). It's used to see if a region has a higher mortality rate than the incidence rate would suggest. Despite the low incidence of breast cancer in rural India, Barshi rural has a MIR

of 66.3, implying a relatively high fatality rate. Despite having a high incidence (28.6%), the Delhi registry had a low MIR of 8.0, presumably because to high literacy, increased awareness, and the availability of better medical facilities in metropolitan areas. Rural cancer patients are diagnosed at late or advanced stages of disease, with a higher proportion of them having broad spread metastases, indicating a need for more awareness, treatment, and early diagnosis services.

Reproductive history and breast cancers among Indian women

In most Indian civilizations, early marriage, numerous childbirths, and long-term breastfeeding of all children are the norm. Because of shifting social attitudes and the pressures of labor on working women, the urban educated class is moving away from this trend, with late age delivery and little or no breastfeeding. These alterations could be partly to blame for the rising incidence of breast cancer. Nulliparity and a late age at first childbirth have both been identified as reproductive risk factors. A case-control study in Mumbai was carried out by Paymaster JC et al. (14) it was discovered that in the age category of 40–54 and above having greater risk of breast cancer when compared to married women. Nulliparous women had a 2.2-fold higher risk than parous women by Rao D Net al. (15).

Familial and genetic breast cancer in Indian population

Almost a third of all breast cancer patients have a family history of the disease, and 5% are thought to be hereditary, with BRCA1 and BRCA2 gene mutations being the most common genetic causes. A favorable family history was found in 20.7 percent of the 226 participants with breast cancer in India. Numerous other research, on the other hand, have found that Indian individuals had a low prevalence of breast cancer with a familial pattern. This is particularly noteworthy given the young age of Indian breast cancer patients. According to the information available from other Indian centers, around 5% of the patients managed at SGPGIMS Lucknow had a family history of breast and / or ovarian cancer in first degree relatives. Due to a lack of money and infrastructure, genetic screening and diagnosis are not routinely performed in most Indian centers. As a result, information on the genetic makeup and BRCA1/2 mutations in Indian patients is limited. According to the research, BRCA mutations are quite rare. According to a study by Valarmathi Mt et al. (16), Regardless of their family history, 6 to 10% of those with breast cancer have a mutation in the BRCA gene. Some of the Indian studies have found BRCA mutations in 9 to 25 percent of family breast cancer cases, while there are no reliable numbers. In Indian breast cancer patients, Hedau et al. (17) discovered three new BRCA1 variants.

Association of religion with breast cancer

According to Paymaster T Cetal (18), Because Indian culture is a secular mash-up of diverse ethnicities and religions, there are substantial disparities in lifestyle patterns and practices among people of various religious faiths. It is most common among Parsis and Christians in Mumbai, whereas it is least common among Buddhists and Jain\s. Because of their westernized lifestyle, consanguineous marriages, and marriage and motherhood at a later age, the Parsi community has a high breast cancer rate. Christians had the highest rates, followed by Hindus and Muslims, according to another survey conducted in Chennai by Paymaster T Cetal. (18) A study conducted in Thiruvananthapuram by Nair M Ketel (19) yielded similar results. Religion, according to Paymaster TC et al. (18), In breast cancer patients, it appears to have no effect on any other clinical or pathological characteristics.

Age wise breast cancer trends

From 1982 through 2005, the Indian Council of Medical Research (ICMR) conducted a survey in metropolitan cities, has been emphasized by Li I et al. (20). Breast cancer incidence has nearly doubled, according to the data. Chopra B et al. (21) observed that Breast cancer attacks Indian women at a younger premenopausal age than it does western women, meaning that breast cancer strikes at a younger premenopausal age in India. Young people's cancers are more aggressive. According to Murthy NS et al. (22) from multiple registries, the AAR for patients increases with age intervals (i.e., 15 to 34, 35 to 44, 45 to 54, 55 to 64, and >64 years). In Nagpur, Mumbai, and Chennai, the APC for the 15–34-year-old age group was 4.24 percent, 1.60 percent, and 0.80 percent, respectively. In the registries, the APC for the 35 to 44 age group ranged from 0.4 percent to 2.9 percent.

In the oldest age group, the APC ranged from 0.53 percent to 2.64 percent, which included individuals over 64 years old. Chopra B et al. (21) found that the disease rises in Indian women between the ages of 40 and 50. ER/PR negative and HER2 positive tumors, as well as HER2/ ER/ PR all three negative tumors, have a dismal prognosis. Except in the north-eastern registries, where the peak is visible in a 10-year younger age group 35 to 39 years—all registries indicated a peak relative proportion between 45 and 49 years, as shown in Fig.4 (23). In India, most patients present at locally advanced or meta-static stages during the diagnosis were examined by Kakarla M et al. (24). According to several studies, in stage I and II of the disease most cases of carcinoma in the west report 45,7 percent in advanced stages of disease.

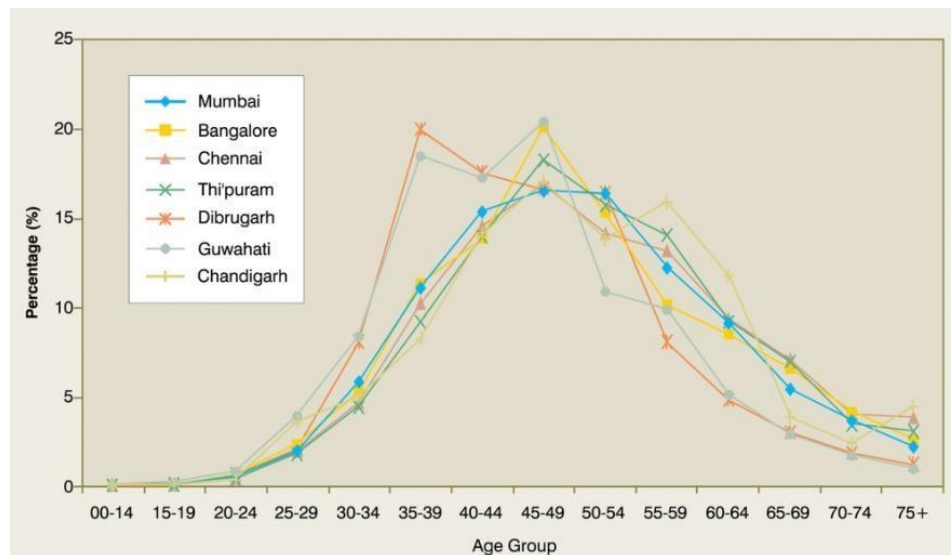


Fig.4 Trends for 5-year age distribution among different Indian registries

Risk Factors

A number of studies in Indian women found that various risk factors have associated to breast cancer by Pakseresht S et al. (25). Women in northern India found that risk factors such as breastfeeding, location (urban/ rural) and BMI with breast cancer have been highly combined ($P < 0.05$). Dey S et al. (26) states that enhanced breasts and physical activity generally protect ER+ and ER–breast cancer. Gaja lakshmi V et al. (27), however, argue that in premenopausal women, the life cycle of their breasts was found to be inversely related to their risk of breast cancer. Based on R Tetel Nagrani. (28) The study, based on their adherence to rural lifestyles, decreases the risk of breast carcinoma in rural areas in relation to urban counterparts. In rural and urban areas, the risk of BC (OR urban = 4.10, 95% CI, 3.03–5.56; OR rural = 3.01, 95% CI, 1.0, 85%–4.90) was strongly associated with the waist-to-hip ratio =0.95 compared with the ratio of 0.84. (30). States that increase anthropometric measures such as bigger body size and obesity in India do not determine the risk of breast cancer in India, but they do not significantly contribute to the differences between rural and urban breast cancer.

Also, according to Rao D N et al. (31) the risk of rising age, low parity (three or more pregnancies are related with a 40% to 50% risk reduction and rising age and obesity is high for Western and South Indian women. Mathew A et al. (32) considered that household activities played a role in the development of BC for urban and rural women. The longer the household time has been spent, the greater the risk of breast cancer. It was found that ORs for 5–6 h activity/day was 0.48(95% CI, 0.32–0.72) in premenopausal and 0.49 (95% CI, 0.34–0.72) in post men o pausal women compared to ORs for 6 or more hours/day which was found to be 0.70 (95% CI, 0.48–1.02) and

0.51 (95% CI, 0.35–0.73), respectively. Ali R et al. (33) studied that women who were unmarried (OR=3.31;95%CI,1.10-9.96), widowed/divorced(OR = 1.46; 95% CI, 0.89-2.37), with lower education (OR = 2.72; 95% CI, 1.06–7.03 for illiterate women and OR = 2.32; 95% CI, 1.05–5.13 for women with primary school education and OR = 2.07; 95% CI, 1.02–4.21 for women with middle school education) and postmenopausal women (OR = 1.45; 95% CI, 0.97–2.19) possessed elevated risks for the disease and presented themselves at late stages. Kaushal M et al. (34), analyzing breast cancer in north-east India and significantly associated in the first childbirth age (P = 0.007) with factors like betel quid and tobacco chewing (P = 0.003), number of children (P = 0.080), age at marriage (P = 0.014). In a study of Murthy NS et. al. (35), women who are <12 years of age have increased the likelihood of breast development compared to those who have been > 12 years. Women also have an increased risk of menopause after 55 years, as the longer period of their menstrual period leads to greater life exposure to hormones of estrogen and progesterone.

While Chopra B et al. (21) say that breast cancer is more likely to develop with an increased age, it is true that younger people in India are becoming more likely to have breast cancer. Anders CK et al. (36) found that breast cancer that is infected early is more aggressive than breast cancer that is infected later, with more estrogen negative or triple-negative subtypes in higher and grades. Thangiam S et al. (37) observed that young women under the age of 40 have more dense mammoth tissue which means that they are less prone to routine screening schemes to make them more likely to have a tangible mass with a tumor that tends to be larger and nodal when present. Furthermore, Gogia A et al. (38) have studied that younger aged patient are triple negatives, which is an important factor in their prognostics. TNBC prevalence in India is significantly higher than that seen by various meta-analysis studies in western populations. Most of the patients also call advanced breast cancer, which logically has a greater aggression (grade 3) history compared to other groups. TNBC tumors are significantly larger with patients. The survival studies conducted by Nair MK et al. (39) have shown that two-thirds of the patients presenting a disease are advanced, making their overall survival poor.

As studied by Bonner M R et al. (40), because India is one of the leading emitters of polycyclic aromatic hydrocarbons (PAHs), environmental chemicals and their exposure have been linked to an elevated risk of breast cancer. PAHs are lipophilic (fat-loving) and are deposited in the breast fat tissue, where they interact with the cellular estrogen receptor. There is a high hereditary family risk in 5% of cases of breast cancer. In encouraging breast cancer such as parental gene mutations, genetic factors play an important function in BRCA1 genes BRCA2. Many studies indicated BRCA1/2 mutations are found in 2.9 percent to 24.0 percent of Indian family cancer patients.

Furthermore, BRCA1/2 mutations are present in 2,8% of Indian patients with early-onset breast cancer as observed by Kim H et al. (41) Notably, BRCA2 mutations occurred at lesser rate than BRCA1 mutations in India. Although most studies have revealed separate sequence variants both in BRCA1 and BRCA2 according to Hedau et al. (42), some of them were unique to the Indians, 185del AG founding mutations have been documented by numerous Indian trials in Ashkenazi Jews. Breast cancer is also connected with other gene alterations such as ATM, TP53, CHEK2, PTEN, CDH11 and STK11. In a community-level breast cancer awareness survey, 53.4 percent of women were aware of some aspects of breast cancer; 49.1% of women believed breast cancer was incurable, according to Dey S et al. (43). Dey S et al. 40.5 percent of women were more aware of socio-economic status.

Time trends of various cancer registries

From 1982 to 2012, a study of time trends for breast cancer incidence from six major PBCRs revealed a statistically significant rise in AARs per 100,000 as shown in Fig.5 Table 1 shows the AARs of breast cancer in five PBCRs: Bangalore, Barshi, Bhopal, Chennai, Delhi, and Mumbai for each calendar year, with statistical significance determined by slope and p-value based on simple linear regression. For all PBCRs, the AARs for breast cancer showed an almost constant growth from 1982 to 2014. A statistically significant increase in AARs over time in PBCRs namely Bangalore (APC: 2.84%), Barshi (1.87%), Bhopal (2.00%), Chennai (2.44%), Delhi (1.44%) and Mumbai (1.42%) was observed. (44) For both 3 and 5 years, all PBCRs except Barshi showed a considerable increase in the annual average of AARs. Barshi showed an increase in only 3 years trend. For the years 1988–2007, Bhopal's APC was 1.35 percent, rising to 5.64 percent for the years 2008–2013. Similarly, Chennai's initial APC was 1.51% from 1982 to 1993, rising to 2.83% from 1994 to 2013. The initial APC for Delhi was 0.91 percent from 1988 to 2007, rising to 5.31 percent from 2008 to 2012. (44)

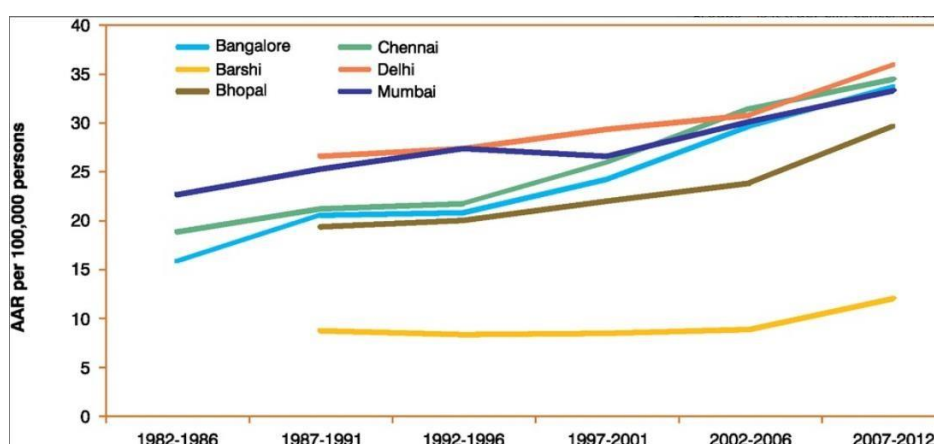


Fig. 5 Five-year trends of breast cancer among registries

Projection of burden of breast cancer

Cancer forecasts are particularly important in developing countries like India, where there is a pressing need to plan and prioritize health-care resources that include both diagnostic and treatment options. Breast cancer is expected to rise to as high as 1797900 in India by 2020, with its relative percentage remaining at 10% among all malignancies. (44)

Experiences and perceptions

In India, the breast cancer screening rate is far lower than in others such as the United States, the UK and Australia, which results in a 3A or later detection of more than 68 percent of breast cancer. As proven in several prior studies, the detection stage or any cancer in this area has an influence on the patient's survival rate. The cancer survival rate decreases fast, as illustrated in Fig. 6. the stage increases.

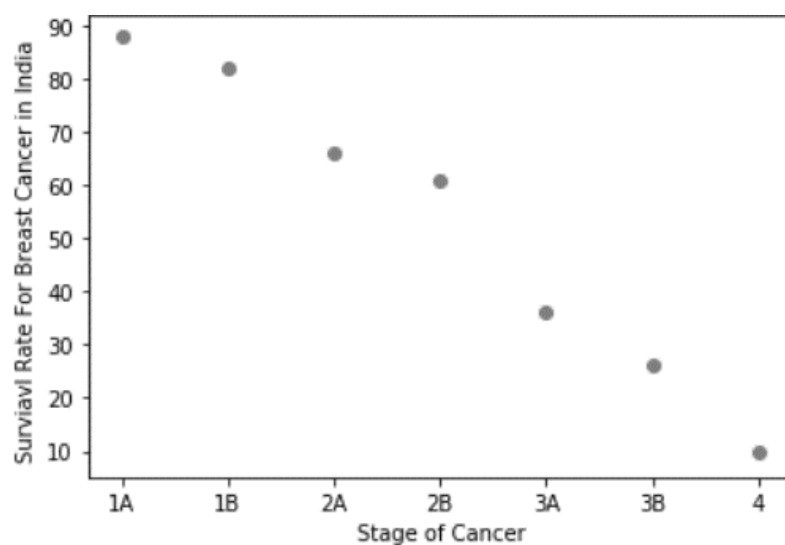
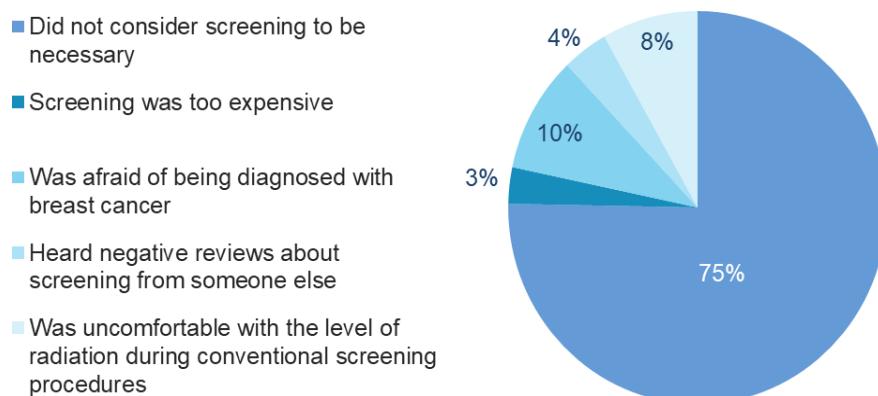


Fig.6 The survival rate for breast cancer rapidly declining by an increase in the stage.

Studies have been undertaken using different means like surveys to evaluate the perceptions and experiences of women in India about breast cancer. A study was carried out by mailing it to a random sample of Indian people through online forums. The interviewees were women. 39 percent of individuals polled received screening, whereas 61 percent did not screen. Fig. 7 shows the key causes for those not screened. The screening was not considered required by most participants. In the majority of cases, the other cause of delayed diagnosis is that the disease is asymptomatic in the early stages with the majority of patients with a painless lump.

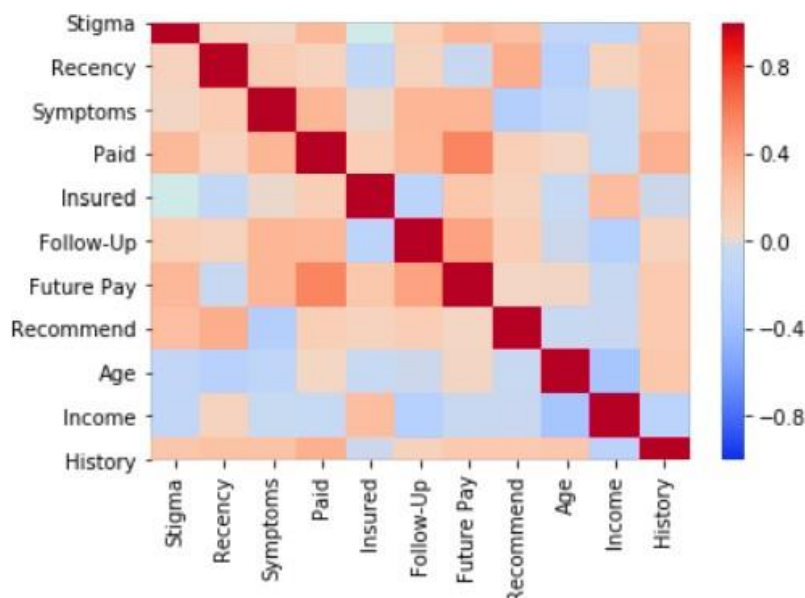


Analysis for different parameters Fig.7 Reasons for not getting screened

Women from the lowest socio-economic level seek little attention when they detect a lump. Either they do not know what the lump stands for or they dread the stigma of your partner and their community rejecting or you might worry losing your breast. The open discussion of breast cancer is high with taboo and many of the women believe that effective medication or treatment for the disease does not exist.

Those who got screened: Age, monthly household income, whether or not the participant showed symptoms of breast cancer, previous family history of breast cancer, how recently the participant had gotten screened, the amount they paid to get screened, whether or not they recommended screening to others, and their perception of societal stigma were all used to analyze those who got screened, how often were they recommended follow-up screening, and whether or not their screening was covered for by insurance or paid by employers as shown in Fig.8.

Fig.8 Parameters to analyze patient characteristics



How recently a response has been vetted and if he recommends a strong relationship to someone else. This could be attributable to improved screening facilities, a rising awareness for screening and the overall increase in screening rates in recent years. Given moderately good relationships between a person's showing symptoms, how much they spend for screening and how much they are willing to pay next time, tangible indications can lead to people willing to pay more to screening. In addition, more current screening for individuals with symptoms has been recommended in comparison with those that showed no symptoms. These symptoms may be the result of later indicators; thus they should be confirmed as breast cancer more frequently. Breast cancer was also more expensive for those with a family history, presumably again because of their future patients who are ready to pay more because they are more vulnerable to breast cancer. Moreover, individuals who paid more presently also pay significantly more for breast cancer, which is suggested by a high positive association between the two parameters, in the future. This could reflect increased knowledge of frequent screening and the need for it or a positive screening experience. This can be substantiated in quantitative terms since no problem has been noted in the screening method or experience by 59,6 per cent of the survey respondents.

Those who have not got screened: The inspected segments for these classes are age, monthly household income, previous family history, awareness without symptoms, the prevalence stigma, if a participant has symptoms and how much he or she would be prepared for screening as shown in Fig. 9. The parameters are considered for this category.

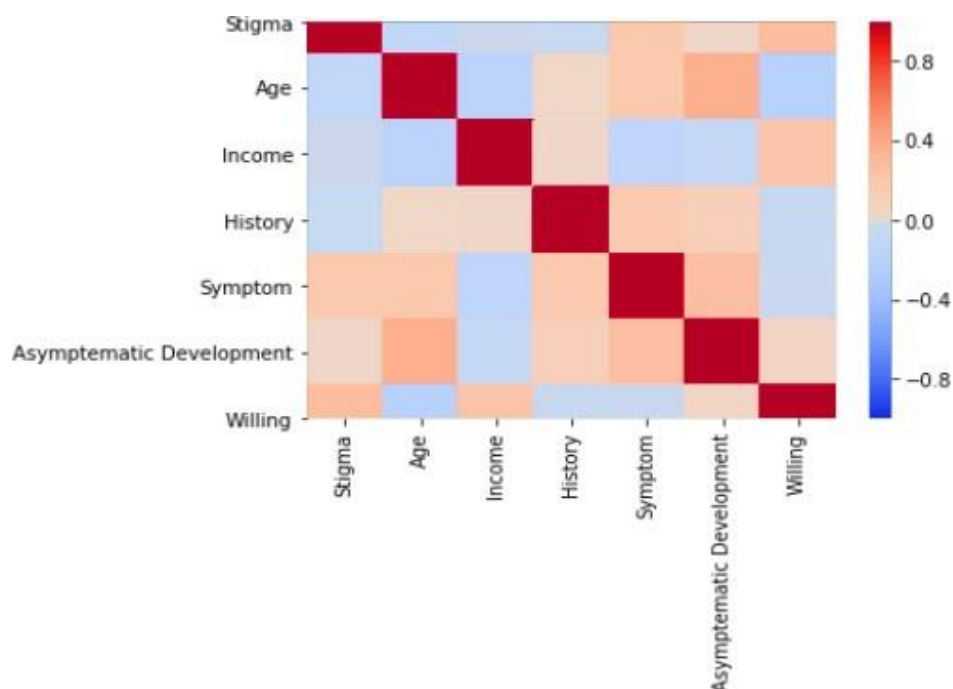


Fig.9.Parameters of the patients who have not screened

Age and familiarity with the symptoms of breast cancer are strongly positive among those who have not yet been screened and indicate that the lower overall screening rate in the younger population may be due to a lack of consideration because they may be relatively unaware of the symptomatic development of the tumor. The revenue and amount you are prepared to spend to get checked have a positive association.

Lack of awareness

Breast cancer awareness ranges from a lack of understanding of the need for screening to a lack of awareness of the importance of early detection. Of those asked, only 41% have stated that they knew about breast cancer without any symptoms. Most respondents had not been acquainted with the development of breast cancer without any symptoms but found it not to be of considerable importance. Breast cancer is diagnosed in more than 70% of cases in stage 3 or later in the general community. Moreover, 74.6 percent of the polled thought screening was not necessary and were therefore not screened.

Psycho logical barrier

Another issue to consider while studying why breast cancer screening rates in India are so low is that women can be faced with psychological obstacles when dealing with the potential for breast cancer diagnosis. First, they would have very poor understanding of breast cancer survival, and so could prevent them from wanting such a severe disease to be detected. Furthermore, even now in Indian society, many women believe that breast cancer is a serious problem, and it may be difficult for them to talk about the chances of being screened or to seek treatment to overcome the mental block caused by their knowledge of the disease's high fatality rates.

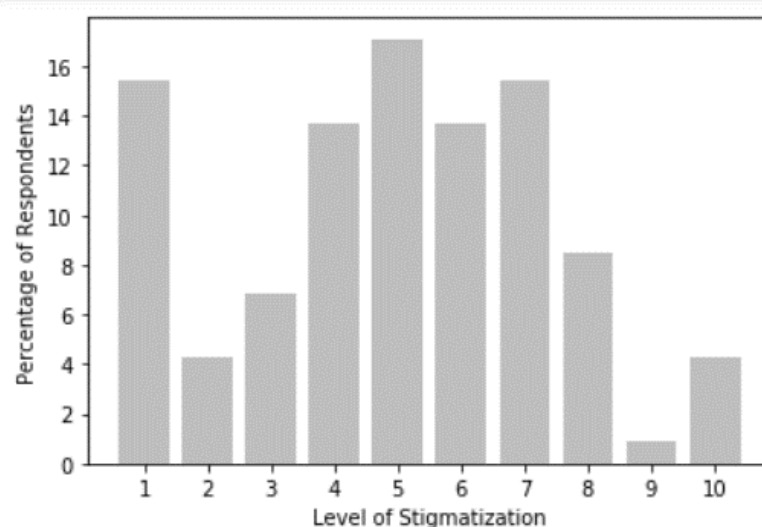


Fig.10 Level of stigmatization

Nearly 9.6% of those who have not been screened reported that the key reason not yet been screened is a fear of diagnosis. It was discovered that when it came to breast cancer, women faced a great deal of stigma. The psychological barrier can be seen in Fig. 10, 1 being no stigma, 10 being a high amount of stigmatic activity.

Financial barrier

From surveys it is found that lack of finances prevents women from screening. Additionally, all the participants who had breast cancer symptoms but did not get screened listed the cost of screening as a reason.

Overdue in screening

Dr Mthangi J, a BGS Global Hospital radiation oncologist says every month, seven days after the age of 20, women should start self-examination, as breasts can be sore before that. After menopause ladies can set a day each month for self-examination or those who do not have time periods for any further reason. In addition, women over 40 years should have annual mammography exams to detect indicators of changes in cancer according to the American Cancer Society. This study did not propose follow-up screening for 48.9% of females, which could not be helpful, given the risk for cancer considerably increases with age and regular screening to identify it was needed. In addition, a follow-up screening of 10 or more years was advocated by 6.9% of respondents. This suggested 10-year time window may be too long, allowing a tumor to form during the interim period without being evaluated until it has progressed to a lethal stage.

Breast reconstruction perceptions among 10,299 Indian women

The other study aimed at understanding women's impression of the reconstruction of the breast. After mastectomy in India, less than 1% of females have breast reconstruction. A survey of 10299 women has conducted to determine whether the perception of breast rebuilding among Indian women contributes. With social workers assistance (10,005) and with the survey monkey application, 10,299 women answered from the questionnaire (294). The estimated breast reconstruction was experienced by 48.8% of women. Roughly 77.5% reported that following mastectomy, the females felt despondent, and 76.5% claimed they prefer breast rehabilitation. Most women want breast reconstruction following mastectomy, regardless of age and financial condition. Automatic logos were selected for the repair of implants (79.6 percent) (20.4 percent). The idea of a DIEP flap was estimated at 71.3%. Only 48.8% of people choose the DIEP flap, which is said to take 6 to 8 hours of surgery and costs roughly US\$3500. Women prefer breast

conservation surgery over mastectomy and breast reconstruction for early breast tumors (65%) (34.3 percent). Women said that social media (47.8%) and word of word (16.4%), television (13.4%), newspapers (11.7%) and magazines were the most effective means to raise awareness of breast reconstruction (10.6 percent). Tables 2 and 3 indicate the distribution of interviewees based on their age and household income.

Table2.Distribution of the respondents' age group

Age	No. Women	%
<29	4729	45.9
30-39	993	9.6
40-49	1058	10.3
50-59	522	5.1
>60	163	1.6
Would not reveal the age	2834	27.5
Total	10,299	100

Table 3. Distribution of the respondent's family income in a month

Monthly Family Income	No. Women	%
<20,000 rupees	6519	63.3
20,000–50,000 rupees	2161	21
50,000–100,000 rupees	825	8
>100,000 rupees	441	4.3
Would not reveal income	353	3.4
Total	10,299	100

Breast rebuilding helps to restore the image of the body, sexual life and psycho-social image. In affluent nations, breast reconstruction has thus become an important part of interdisciplinary breast

cancer treatment. 77.5 percent of the women polled said they would be depressed after a mastectomy, and 76.5 percent said breast reconstruction would be beneficial. This shows that most Indian women acknowledge sadness after mastectomy and want breast reconstruction after surgery. Most (63.3 percent) of respondents received < 20,000 monthly household income. In 2018-2019 India had yearly per capita revenue of 135,048 rupees, which helped put the population in context. This data was available in the survey. (45) Women wish to rebuild their breast cancer after their mastectomy regardless of age and family earner, and should be offered for all women, independent of age or economic situation, as indicated in tables 4 and 5. Nevertheless, the rate of breast rebuilding is <1%. This is explained in Table 6 for the reasons and the possible ways to overcome.

Table 4. Comparison between the age groups and the desire for breast reconstruction

Age Group	For Reconstruction (%)	Not for Reconstruction (%)
<30	73	27
31-40	96	4
41-50	94	6
51-60	94	6
>60	88	12

Table 5. Comparison between family income and the desire for breast reconstruction

Family income in month	For reconstruction	Not for reconstruction
<20,000rupees	79	21
20,000–50,000 rupees	73	27
50,000–100,000rupees	71	29
>100,000rupees	80	20

Table 6. Reasons for low breast reconstruction levels and potential strategies to increase rates

Reasons for Low Breast Reconstruction Levels	Potential Strategies to Increase the rates
Public awareness of breast reconstruction is low	Social media, word-of-mouth, television, and print media can all help to raise awareness
It is a common misconception that Indian women do not want breast reconstruction and that it is just for the wealthy and young	Disseminate the notion that all Indian women, regardless of age or income, want breast reconstruction
Unaffordable	Reduce waste, improve efficiency, expand health-care coverage, and save prices
Long operation	Build a team, improve team efficiency, do breast reconstruction frequently, parallel operate, and reduce non-operating time in the operating room
Poor infrastructure	Increase the number of breast reconstruction operating rooms and hospitals; train more surgeons, nurses, and other non-medical personnel in breast reconstruction

Based on the study of Agarwal S et al (46), with desirable but non-essential reconstruction of the breast, the rate of restoration of the breast could be improved by greater the public awareness on breast reconstruction. Understanding how to successfully convey breast reconstruction information is critical to correctly organizing the breast reconstruction campaign. Most women regarded social media as the greatest way to create knowledge of breast reconstruction (47.8 percent) in keeping with the modern age, followed by conventional words in the mouth, television, and print media. Kothari DS et al. (47) noted that awareness initiatives by the various media appear to be the reason why our study (48.8%) is more knowledgeable about breast reconstruction than

Kothari et al (24.2 percent). But much more is needed to raise awareness. Most women preferred the repair of their auto logic (79.6%) compared to the rebuilding of implants (29.4 percent). The high percentages of Indian patients with Stage 2 (23-5%-58%) and Stage 3 (29-5%-5%) diseases have been documented by Leong et al. In most women with advanced cancer, radiation therapy is required. Chetta et al. (49) reported high levels of rehabilitation failure in implant rebuild (29.4 per cent) in irradiated patients compared with self-logical reconstruction (4.3 percent). Auto logos would be safer in this regard for Indian patients. The rebuilding of the automotive logo related to higher levels of happiness, psychological and sexual well-being than implants. According to Sharma HR et al. (50), it has a good perforator, providing significant skin and fat and has a suitable donor and the DIEP flap is an autologous breast reconstruction method of gold standard. 71.3 per cent of women thought of the DIEP flap. Around 48.8 percent considered the DIEP flap to be acceptable in the light of the fact that it takes 6-8 hours and costs around 2,5 lakh rupees (about US\$3,500). 37.2% felt that it was too long, 9.2% believed it was too pricey and 49.4% felt it was too long and expensive. Of those who did not feel that the DIEP bowl was suited for process, cost, and surgical time. This suggests that it is crucial that the surgery be performed fast and reliably to make the DIEP flap more acceptable. Several studies have demonstrated that if the DIEP flap surgery is divided up into several pieces and the DIEP flap is created by a team consistently and dependably.

The operational timing could be decreased using images to map the perforators, parallel operations and reduced time of operation during patient preparedness and displacement by repeated volume effort. The operating space time should be reduced to make it more acceptable and inexpensive. The Indian government spends less on health care (1.6% of GDP) than affluent countries such as the USA (17.7 percent of GDP). (51) 33% of rural diseases and 26% of urban diseases are covered by government hospitals. Private hospitals and clinics treat the rest of the ailments. Between 2017 and 2018, the health insurance coverage was only 14% of the rural and 19% of the urban population. Out of this, the government-supported health insurance systems cover 13 percent of rural population and 9 per cent of the urban population. (52) As a government-sponsored health insurance scheme that provides free medical care for 500 thousand rupees (6821 US\$) to 500 million Indians who make up the lowest 40 percent of its population, the Government of India launched a Pradhan Mantri Mantri Jan Arogya Yojana (PM- JAY) Ayushmans Baharat scheme in September 2018.

Most of the population is reliant on out-of-pocket expenses, such as breast cancer, breast reconstruction, and the repercussions. Consequently, 58.6 percent of women in our study reveal

that the cost element plays an important influence in the choice to undergo reconstruction. The rate of breast reconstruction can be improved if breast rebuilding costs are lowered through waste, efficient use of theatre, and more people being enrolled in health insurance. Immediate breast reconstruction is commonly accepted because just 1 treatment is involved. In combination with skin-sparing or nipple-stretching mastectomy it can produce superior aesthetics than a delayed reconstruction. Different trials, like Thamm OC et al. (53), showed similar results with rapid and delayed rebuilding. The BCS consists of the removal of the breast lump and radiation when the wound heals. As a result, a patient with early breast cancer may be given a choice. The BCS approach may have positive margins. Jeevan et al. observed that 1 in 5 BCS patients needed reoperation because they had positive margins. Related to in situ cancer and multifocal illnesses the reoperation rate was greater. Mastectomy and reconstruction must not be followed up with radiotherapy in the first case of favorable pathologies and node-negative axilla. The operation is nonetheless longer and can relate to microsurgical failure and morbidity in the donor site. Most women prefer BCS (65.7%) in relation to mastectomy and breast reconstruction (34.3%), since they feel that BCS is a much more uncomplicated operation than mastectomy and rebuilding.

The strength of this study is that 10,299 women of all ages and social strata considered their perspectives on breast reconstruction. We feel that this study would help authorities boost people's understanding of breast reconstruction and improve breast reconstruction facilities in different plastic operating units in India and the underdeveloped countries. The weakness of this study is that it does not take account of prospective breast reconstruction perspectives of individuals diagnosed with breast cancer. Decisions on reconstruction could change after diagnosis for several social and financial reasons. Other limitations of this study include inadequate demographic data for women in 2 states in India, the preference to self-selection by those who complete the questionnaire and an assessment of women based on family income rather than educational status. In order to deal with different social and economic conditions, breast reconstruction would improve significantly, which is demonstrated by the great willingness of women in this study to undergo breast reconstruction.

A qualitative survey among women in Delhi, India, was conducted to examine awareness and perceived hurdles to early identification of breast cancer. Waller J et coll. (54) studied qualitative evaluations that were carried out in focus groups (FGDs) prior to the intervention of the Indian Cancer Society's BC awareness campaign (ICS). Due to its well-suited qualitative approach to public themes and a decent means to define group standards and cultural values, the FGD was chosen to generate responses for participants. Theory was generated through a grounded theory technique. The assumption that the theory derives from this kind of work is based on evidence

reflects the term grounded theory. The process of continual comparisons from unstructured or semi-structured qualitative data identified and redefined emerging categories. FGD participants have been chosen with the convenience sampling approach. Participants were randomly included for the FGDs, according to their availability and convenience. In total, only 20 host organizations authorized the pre-workshop FGDs out of a total of 35BC awareness campaigns. During the May 2013–March 2014 study period, a total of 194 women aged between 18 years and 70 years were interviewed by 20 FGDs. The group size ranged from 5 to 15 according on the availability of participants with an average of 10 individuals. Women ages 18 and 70 years, women living in Delhi for at least one year, and those with a literary background are the conditions for selection. Various parts of society have been endeavored to include the FGD. Women participants included personnel from multinational (MNC) corporations, NGOs, students, secondary school teachers, housewives from residential areas and women from slum regions. Women participated in this event. A slum zone is a large-scale, informal urban neighborhood with poor housing and squalor. In most situations, there is a lack of consistent sanitation, clean water sources, stable power, timely enforcement, and other necessities.

Late diagnosis: major concern

Indian women have the most health-related concerns and, paradoxically, the least systemic method to address these problems. Only 30% of all reported cases of breast cancer in India are diagnosed with an early diagnosis, compared to 70% in industrialized countries. With a cancer diagnosis of 70 percent of patients when the disease is much too advanced (stage 3 or 4), the death rate is quite high. The five-year survival rate in breast cancer is projected to drop by 2.7 times when measured against stage I at stage IV. Likewise, late-stage cancer treatment costs 1.5 to 2 times greater than early-stage tumors. Two main variables precipitate the presentation at the late stage: the absence of appropriate breast cancer screening programs and the failure of patients to participate in these programs. The reasons for this are various - unconsciousness, lack of access to proper health facilities and socio-cultural attitudes. To ensure successful screening, there must be high coverage and engagement and the diagnosis and treatment referral system must be functional.

It has been noticed that women from poor socio-economic categories are not looking for care when they feel lumpy. They do not know what the lump implies, or they dread their partner and the community's rejection stigma, or afraid of breast loss. The open discussion of breast cancer is high taboo and many of the women believe that effective medication or treatment for the disease does not exist. Therefore, despite the advent of efficient treatment, the mortality of women due to breast cancer is more widespread.

Tests and surveys show that women can carry out preventive screening, and that they are quite acceptable when the test takes place closer to their place of work or home. Initially it is apparent that doctors are resistant for acceptance, but the radiologists respond positively after clinical trials of technological development. The frequency of breast cancer in women is becoming known. Nearly 60-70% of females that are under 45 years of age who are literate in breast screening. There have also been huge changes in the acceptance of tests for women, physicians, and NGOs. Women especially younger women now have proactive, preventive thinking. Women become more conscious of the test, are more proactive, and are interested in many types of available health services.

Detection of breast cancer in India

According to Agarwal G et al. (55), practically all of the people living with Indian breast cancer find their disease at the stage of a palpable lump or even at the level of secondary changes, like changes in local skin or chest walls or remote sites. Manifestations of invasion of the skin, such as skin, edema, ulceration, and fungation, and/or chest wall are evident in nearly half of all Indian patients who are free of any distant metastases. This is the picture of the developing Arab world, Mexicans and the Indian subcontinent in many other nations with little resources and comparable reports are available. 6-25 percent of Indian patients show meta-static illness outside their ipsilateral axilla. For this late detection phase, a combination of several elements seems to be involved. These include a lack of knowledge about the disease, which leads to few women performing self-breast checks or opting for a regular exam for a health care provider's breast cancer screening or mammography. In the absence of pain or other difficulty signs even after an anomaly such as a lump has been detected, a doctor's visit to the diagnostic and treatment is greatly postponed because its original manifestations - lumps, etc. In appropriate diagnostic facilities in a community/peripheral health center near a woman's home, professional advice is prevented. That could imply long journeys and significant transport and professional charges. Lack of government or non-governmental help for screening, diagnostic, and treatment costs is another key impediment to early counselling and treatment. A cohort research found that the age adjusted incidence of lateral breast cancer in patients treated for unilateral breast cancer is seven times higher than the general population, as noted by Gajalakshmi CK et al. (56) in Chennai. Women with unilateral breast cancer had a relative risk of 4.5 compared to women with and without breast cancer history in their mothers, and 2.8 compared to women between 21 and 25 years old when they had their first child. In comparison to those who got hormone therapy, patients who did not get hormone therapy had a relative risk of unilateral breast cancer of 0.3.

Breast cancer screening in India

In India there is no national or regional screening program for breast cancer. Currently, an outside investigation at a few institutes or women in specialist clinics to provide these services is not available for a dedicated screening of breast cancer by clinical breast exam or mammography. Mammography can be used as a diagnostic service in many public and private hospitals in practically every town which provides an opportunity for women who are prepared to pay for it. In India, mammography is not used for mass screening and may not be cost-effective, it is commonly felt. (56) In the context of several programs on public health, such as the 'Health of Everyone' and the National Rural Health Mission, the first step towards building a ground for a nationwide breast cancer screening program is breast awareness and breast self-examination. Breast self-examination and clinical exams are thought to be potentially the proper instruments to screen the enormous Indian population, however no solid statistics are available to support these beliefs. Breast awareness and the advantages of a periodic breast exam are advanced by printing, electronic media, and healthcare staff in varied environments for an early detection of breast cancer.

Diagnostic treatments

The early diagnosis of the disease is critical for effective treatment and optimistic forecasts since at diagnosed time, the likelihood of dying is much lower and the survivor rates are higher [Duncan, W.; Kerr, G.R. Breast cancer curability, Br. Med. J. 1976, 2, 781–783], respectively. The fundamental aim of all imaging approaches is consequently the early diagnosis of breast cancer and accurate lesion assessment. Currently, the two main pillars for efficient breast cancer therapy include: (i) early breast cancer diagnosis and (ii) rapid treatment after lifesaving diagnosis. Table 7 provides a summary of the various screening methods for breast cancer. (57)

Diagnosis and treatment procedures for breast cancer have changed enormously over the past two decades, with an emphasis on treating the disease with minimal patient discomfort, improved patient conformity and fewer side effects off-target. However, it has found that each modality is limited by its exactness. To overcome this, various new technologies are being developed and used that enhance the accuracy of diagnosis, namely the usage of nano-methods and the creation of diagnostics.

Table7. Summary of various imaging modalities for screening of breast cancer

IMAGING MODALITY	DIAGNOSTIC ACCURACY	ADVANTAGES	LIMITATIONS
MAMMOGRAPHY (FIRST-LINE TOOL FOR BREAST SCREENING)	Sensitivity:75–90% Specificity: 90–95% Spatial Resolution:50 μm	Most cost-effective. Good response with high specificity and sensitivity. Portable device	Uses ionizing radiation. Sensitivity decreases with increasing breast density. Accuracy is low in young women. High false-positive results in young women due to dense breasts. Poor contrast compared to MRI
MAGNETIC RESONANCE IMAGING	Sensitivity:75–100% Specificity: 83-8.4% Spatial Resolution: 25–100 μm	Ability to detect breast malignancies that often escape from clinical, mammograms, and ultrasound detection	Expensive, inability to standardize the test. Unnecessary breast biopsies due to inability to distinguish between malignant and benign lesions
MAGNETIC RESONANCE SPECTROSCOPY	Sensitivity:93% Specificity: 70% Spatial resolution: up to 0.25 cm	Overcomes limitations of mammography. radiation-free imaging technology. Excellent sensitivity. excellent spatial resolution. All Imaging planes	Expensive and time-consuming. Low specificity. Not portable. False-positive results in some benign tumors

		possible	
DYNAMIC CONTRAST ENHANCED MRI(DCE-MRI)	Sensitivity:89–99% Specificity:37–86% Spatial resolution:25–100 µm	Exhibits good performance in monitoring response post therapy	False negative results observed due to artifacts based on bleeding and tumor structure
DIFFUSION- WEIGHTED IMAGING	Sensitivity:83% Specificity: 84% Spatial resolution:25–100 µm	Non-radio-active imaging technique	Failure to detect high water content malignant lesions due to high apparent diffusion coefficients
MR ELASTO GRAPHY(MRE)	Sensitivity:90 – 100%specificity: 37– 80%spatial Resolution: 25–100µm	Non-invasive, non-ionizing and cross-sectional imaging modality	Lacking in spatial resolution and detection of small focal lesions
POSITRO NEMISSIONTO MOGRAPHYC ONJUGATED WITHCOMPUT EDTOMOGRAP HY(PET-CT)	Sensitivity:90 – 100%specificity: 75– 90%spatial Resolution: 2–10mm	Non-invasive. provides twice the diagnostic benefits (elevated activity within the body detected by pet scan and intricate images of tissue sand organs by CT- Scan)	High-cost. Unable to detect tumors less than 8mm

SENTINEL LYMPHNODE BIOPSY(SLNB)	Sensitivity:90.5% Specificity: 85.7% Spatial resolution: not applicable	Significantly reduces post- operative complications	Not useful for patients with locally advanced cancers and inflammatory breast cancers
---------------------------------------	--	--	---

Nanomedicine enables to deliver encapsulated drugs to the tumor site in an ordered manner while at the same time increasing their capabilities and retention in the tumor, thereby reducing bioavailability and drug pharmaceutical co- kinetics, as well as minimizing severity side effects on healthy cells. The diagnosis has shown to be an invaluable, overly impersonalized medicine since these platforms may be utilized to detect, treat, and manage cancer simultaneously. However, the nano medicine has enormous potential for diagnosis of breast cancer and custom treatment. It is obvious. Given that new field of research, new multifunctional formulations are anticipated to enter clinical trials shortly, which can be tracked and targeted and successful breast cancer therapy followed by an application.

Development in tests and research

A cost-effective diagnostic for Indian patients is the way forward. There is an Indian firm with a promising indigenous and economical breast cancer prognostic test. The Indian oncology community takes on the responsibility of conducting well-powered clinical trials to accomplish the objective of affordable international attention. In the Indian context, Western forecast testing is excessively costly. The test costs amount to thousands of dollars, which in wealthy nations can be justified because they can prevent chemotherapy. The cost of chemotherapy in India is usually just between 5 and 10%, and the cost of Western prognostic tests in India is thus easily higher than the anticipated costs for chemotherapy. Western testing has severe cost restrictions and poor validation of Indian patients. Indian breast cancer sufferers may be transformed using indigenous diagnostics.

Breast self-examination remains an important cheap tool for the detection of breast abnormalities and diagnosis, particularly in Indian circumstances. A cross-sectional study among 553 females studying in and working in a tertiary care facility in Mumbai was carried out to determine awareness of breast cancer, self-breast exam and its practice in educated women. There was a questionnaire, and the answer was logged and statistically analyzed. According to our investigation, BSE, its practice, and its usefulness for daily life were not fully known even to

educated women who worked in the Medical Institute. Students and teachers were aware of breast cancer, yet most of them have little knowledge of the correct BSE method and interval. The principal media was audio-visual information. To encourage individuals to do BSE and obtain early medical treatment, the awareness efforts must be more effective. Several Indian startups work hard to give back the hope which has already been lost among cancer sufferers by means of cultural acceptable breast cancer screenings, using artificial intelligence, to assist the health care business and concurrently bring life-changing innovation to the table. There are some well-known startups, like UE Lifesciences, Niramai, White rabbit etc., which have accurately diagnosed breast cancer through artificial intelligence. Due to mapping body heat incorporated into artificial intelligence technology, Niramai Health Analytics (Bangalore) developed a low-cost, non-invasive technique to early breast cancer screening in 2016. (67)

Bengaluru-based NIRAMAI is a deep-tech firm that gives hospitals and diagnostic facilities a radiation-free, non-touch, breast screening solution. To combat the accessibility of breast examinations, Niramai employs ML and AI. They employ a cheap, portable gadget that takes thermal pictures at high speeds. Their technology can detect cancer considerably sooner than conventional methods for diagnosing and auto examining, therefore improving the rate of survival. Niramai is an acronym for machine-learning and artificial intelligence, non-invasive risk assessment. Five years earlier than mammography or clinical examinations, this technology can spot cancers. No doctor or technician is required for this testing approach (i.e., no touch technique). The machine is portable and costs one-tenth of the price of standard mammography (3500–5000 INR). The machine is computer free of charge. In addition, the necessary skills are not very high for this machine to work. It can be operated extremely easily by nurses and paramedics. This technology also allows remote consultation through telephone radiology, therefore reducing hospital staffing costs in full. Now the enterprise / engineering is rising fast. To date, 12 hospitals have teamed up with this startup, which represents a non-invasive machine learning risk assessment. Almost 4,200 women have been examined and cancer identified early in some of them. The patient enters a room in this test and is given instructions from outside. The test is done with full confidentiality. The privacy component, in especially for rural women, played a very significant role later. This made this technology easier and wider to accept.

Alexander Sardiña MD, new CEO and the just launched FDA permission for his first medical software application (WR Density), today unveiled White Rabbit, a technology firm dedicated to early breast cancer diagnosis. White Rabbit addresses three major factors, assuring prompt screening through enhanced compliance, rapid turnaround times, and providing AI-supported radiologist with tools to improve clinical performance. The goal of White Rabbit is to improve life

by earlier, more accurate identification of cancer. By focusing initially on compliance with AI-driven conditions, White Rabbit increases the chance of earlier detection of malignancies. Furthermore, their focus on clinical AI-supported software allows radiologists to interpret mammograms for screening by more accurately decreasing unneeded retractions and reducing patient anxiety. It has produced mammography-specific solutions through partnerships with several of the country's major providers of radiology. The result was AI software taught with the worth of the screening data for breast cancer for decades. This method has also been tested for timely and confirmed outcomes in many radiology lab incubators.

Founded in 2011, OncoStem intends to offer novel individualized cancer therapy testing. Can Assist Breast have been established as a flagship product for hormonal breast cancer. The company is currently working on similar tests for other types of cancer, such as triple negative breast cancer. In parallel with startups there are many camps organized to raise awareness of stigmata, tabus and myths among women.

UE Life Sciences invented a breast testing gadget using cold air and hot sensors to monitor breast vascular reactivity, metabolism, and thermal symmetry. This operates differently from a mammogram which tests physical issues such as tumors, the No Touch Breast Scan. Development of innovative but economical equipment that can be used with basic training by any medical worker or physician. The handheld, clinically verified and non-invasive radiation-free system can assist in the early detection of breast lesions as well as in early treatment. It generates a "map" of the breast tissue indicating anomalies which may be assessed for cancers. Also, a pioneer of this breast cancer screening gadget is Dr. Katke, Cama and Albless Hospitals Medical Superintendent and professor of obstetrics and gynecology at the Grant Medical College.

Over a year, about 50,000 women have been examined with the I Breast Exam, 2251 women of which were found carcinogenic with breast lump sand. At first, only a few patients turned around, but the number progressively grew. This easy-to-use approach can therefore aid underserved people and enhance the survival rate of the patients afflicted over five years.

In addition to this technology, techniques such as telemedicine play an important role in making access to cancer treatment for people with breast cancer in remote places. All cancer patients have been assisted via telemedicine through consultation amid the continuing pandemic. Mobile van-based screening programs with sensitive 2D/3D ultrasound have been diagnosed early in small towns and villages/doorsteps. In addition, targeted cancer therapy is another wonderful example of breast cancer technological progress through stopping cancer growth and spread by attacking certain biomolecule.

Technology changing the outlook of breast cancer treatment and diagnosis

More than 1000 new patients are consulted every year by several Indians on colonists, with the world's greatest workload. Cancer treatment has progressed enormously over the past two decades. A better knowledge of the bio-based basis of cancer and the faster application of technology such as artificial intelligence and machine learning have altered cancer care. Technology has become a critical factor in improving breast cancer diagnosis and treatment. In addition to increasing awareness, progress in science and technology over the past 50 years has led to massive breast cancer breakthroughs.

A further step is being taken to estimate who will develop breast cancer in the future. In a larger spectrum of companies, we are able to see the effects of machine learning and artificial intelligence (ML). The recent study of the new profound research model by a famous university in the United Kingdom that can detect development of breast cancer up to 5 years in advance, is one example.

Radiation therapy is part of the treatment of cancer. More and more women have been permitted to select BCS rather than mastectomy, particularly in cases of breast cancer. Similar long-term results in patient survival BCS and mastectomy are nevertheless significantly influenced in the psycho-social part of the treatment. Women can keep their breasts and report more fun and better physical images. Recent advances have been achieved to increase efficiency while reducing problems with radiation therapy. These achievements include stereotactic, modulated intensity, brachy and intra-operative radiation. The new approaches have enhanced radiation focusing on the target tissue, sparing healthy tissue in the vicinity. The administrator is called radiation therapy so that alterations occur. The use of short fractionated regimens and partial breast irradiation are further improvements which improve the quality of life of the patient.

We have a more tailored strategy rather than a single-sized approach to cancer treatment more and more. Personalized medicine works by analyzing and prescribing patient unique information to cure and prevent their cancer. Personalized treatment can be game-changing in numerous ways: in a country such as India, where the most healthcare expense goes out of hand, it can help many patients to improve their quality of life by reducing over-treatment, and it can save them enormously in terms of cost.

For instance, usage of early-stage breast cancer prognostic testing. The development of prognostic tests that shape the tumor biology of patients has been demonstrated by the fact that all early-stage patients do not receive chemotherapy. Most women with breast cancer, were offered chemotherapy based on cancer guidelines before prognostic testing were available.

Predictive diagnostics can now enable physicians predict whether chemotherapy can be prevented

by the patient, saving them from chemotherapeutic physique and financial toxicity. The use of early-stage breast cancer treatment in the western world has decreased dramatically due to the use of these predictive diagnostics. Such a technique truly enhances the quality of life of breast cancer patients. Another good example of technical progress in breast cancer are targeted cancer therapy. Targeted treatments or medicines prevent cancer from developing and spreading by attacking certain biomolecules involved in cancer signals compared to most typical chemotherapies that affect all cells dividing quickly, whether they are cancerous. The FDA has approved many targeted medications for the treatment of certain cancers. The capacity to use one's own immune system to combat cancer is also an intriguing area of targeted cancer therapy. Another interesting subject is cancer vaccinations. Vaccines are already in place to prevent infection with these cancer-causing substances in malignancies caused by viruses such as HBV, which can produce liver cancer, and the human papilloma virus, which can cause cervical cancer. These immunizations prevent the virus from developing an illness linked with the virus by avoiding infecting the body's cells. Researchers are working on cancer vaccinations other than viral malignant tumors that include the immune system to attack cancer cells consistently and effectively. If these cancer immunizations succeed, they can become an important game changer in the future. Breast cancer is a life-changing disease that affects the patient physically, emotionally, and financially. Cancer treatment is not as frightening as modern science and technology has previously been. Modern advancements in breast cancer therapy and diagnostics provide a ray of hope for patients suffering from the disease.

Breast cancer treatment in COVID

The World Health Organization declared COVID-19 a pandemic on March 11, 2020. This puts countries throughout the world in a state of anarchy and leads to a strict lockdown to prevent the spread of the virus. The constraints in the movements to stop the spread of COVID-19 have delayed and degraded care for persons fighting different other illnesses of health, including breast cancer.

Breast cancer will be of concern to any individual, whether freshly diagnosed, in long-term survival or in active therapy. The surge of COVID cases in India has added to a difficult scenario. Check, treat and follow-up for cancer patients has been affected by the hospitals which mainly limit their services to safeguard individuals against COVID-19 exposure.

One of the susceptible groups that are at greater risk for capturing the severe signs of COVID-19 is that they are cancer patients – which is a reason enough to have them look after when they need a hospital during the pandemic. The chance of significant consequences from cancer can increase if COVID-19 is infected. But COVID-19 and cancer are relatively restricted in the clinical trials.

According to a recent Survivor Net poll, 1 in 3 women reported delaying their mammography every year and approximately 45% of women reported being frightened about the outbreak contacting their physicians. Clinicians are concerned that cases of breast cancer and pandemic surgeries are less than normal, and this can potentially lead, if the fear of corona virus subsides, to a potential related re-connection in the number of cases. (60)

Awareness and acceptance

In a rural hospital managed by the missionaries in the Ramanagara District, around 70 kilometers from City of Bangalore, South India, Somdatta P et al. (61) did an eight-week sectional study on whether rural women have breast disease and are self-examination. Before beginning the study, the approval and authorization of the institutional ethical committee was obtained by the hospital authorities. Based on the previous study, 51% of women were aware of at least the symptoms of breast cancer, and the minimum required sample size was 384 with an absolute precision of 5%. A research was opened to women aged 18 years and older who either used the hospital or were visiting a patient. Participants were selected using the sampling approach. Prior to administering the tool in the local language, written informed consent was received from each subject. The study tool used was the Breast Cancer Awareness Measure (Breast-CAM). Cancer Research UK, King's College London, and University College London have created Breast-CAM in 2009, which records awareness of the signs and risks of breast cancer and of BSE sensitivities and practice. The language Kannada for rural use was translated in the native tongue. A questionnaire was also provided to collect the socio-demographic characteristics of the subjects. Those ladies who were involved were subsequently taught how to do BSE and were provided health education in breast cancer. Less than 1 out of 10 women was found to be aware of the breast lump as a symptom of breast cancer. A majority of 338 (81.2%) have not even reported a single breast cancer symptom, and 365 (87.7%) have not reported a single breast Cancer Risk Factor. Most of the females in the survey had never heard of BSE in 354 (85.1 percent). In the trial, none of the women did BSE monthly. In the recent 6 months, just 40% (9.6%) of women had had BSE. Women with higher education and people who had reported breast lump history in themselves, or family had at least one breast cancer symptom and were more likely to have BSE.

In this study, rural women had little awareness of breast cancer and inadequate BSE practice. Sensitivity to a minimum of one breast cancer symptom was linked to 18-fold increase in BSE practice. The findings of this study demonstrate that rural women's health awareness of breast cancer and BSE is critical.

Using opportunistic screening following successful awareness mobilization, patients can create

the need for coordinated primary testing and train more women to conduct self-tests. The training of women with the support of community health professionals can trigger a positive chain reaction, which can reduce deaths in cases without further burden on the health system. Self-examination can be done to increase women's knowledge of breast health. Trained health personnel can contribute to spreading the knowledge and encouraging the self-examination of women.

In contrast to Western World, this offers patients greater acceptability as educators with doctors' awareness-raising campaigns. A qualified social health activist (ASHA) should have been trained for self-examination training for women living at their doorstep in rural and remote locations. As most ASHAs are women and belong to the same community, they can easily make contact with the women and by means of community outreach programs, this technique can help to strengthen their emotional condition.

Mammography, clinical breast examination, and self-examination are some of the most widely used breast cancer screening tools. Mammography and clinical breast examinations can help to minimize the death rate for asymptomatic women. However, in developing nations its expense and difficult nature limit widespread adoption. Self-examination is the most workable and practical method to the diagnosis and prevention of late-stage disease. Self-examination can be done to increase women's knowledge of breast health. Trained health personnel can contribute to spreading the knowledge and encouraging the self-examination of women. In contrast to western countries, where people adhere to medical awareness campaigns, the Indians exhibit greater acceptance as educators for health personnel. Accredited social health activists (ASHA) should be taught to give women living on their doorstep self-examination training in rural and remote locations. Because most ASHAs are women and come from the same community it is simpler for them to establish relationships with the women, and this method can enhance their psychological status via initiatives in the community.

Once awareness is properly mobilized, opportunistic screening can raise the need for structured primary screening and train more women to self-examine. Training women with the support of health workers in the local communities can contribute to a positive chain reaction that can reduce mortality without any additional load on the health system. While the disease is not removed, it will certainly deliver and contribute to a significant reduction in breast cancer disease burden and stigma.

Breast cancer awareness programs

A randomized and controlled experiment (n= 150,000) has engaged TMH Mumbai which compares the efficacy of health education to that of screening mammography, and clinical breast

testing by trained mostly health care professionals. The study is now in its sixth year and third round. The survey already reveals a good percentage of compliance (70 percent), and there is a downgrading rate. In their own way there are many additional initiatives that have a slight impact. A door-to-door mobile service for people who have registered with area coordinators for the NGO (Group Coordinators) "Helping Hand 4 Cancer Care" is provided in Mumbai City to promote awareness of the problem of breast cancer. Around 100 rupees a year are required for checks and counselling. Numerous NGOs and charities are supporting breast cancer sufferers to cope with post- treatment problems and lifestyle problems.

The SMGPI Breast Health Initiative is one such institution which involves screening, early detection, education of patients and physicians and collaborative multi-center search for "socially, culturally and cost-effectively acceptable solutions to local issues." The organization gives an email and phone assistance service to the patient for free secondary opinions and also provides counselling to healthy women regarding various breast health issues including breast cancer screening, via its website www.sggpibreasthealth.org. Other such organizations are the Prashanti Cancer Care Mission Pune and the Mumbai Center for Cancer Patient Aid (CPAA). A conscientiousness and screening program is provided by Manipal Hospital Bangalore. The Indian Society of Medical and Patient Oncology (ISMPO) in Pune is another help line for breast cancer, providing information and support for patients with breast cancer.

The most important activities in the coming years are raising public awareness about the risk of breast cancer, early detection, screening for those at risk, and multimodality for the majority at a fair cost. Small community cancer centers that are cost-effective and capable of treating most cancer patients in their home communities may be better suited to meet the demands of the next decades.

DISCUSSIONS

A delay in diagnosis is caused by a disparity in women's health, a lack of breast cancer screening programs, and a delay in seeking advice on a recognized health issue for economical and social reasons. This means that patients with Indian breast cancer are at advanced stage with several poor prognostic markers such as big tumors, lymphnodemetastasis, high degree of pathology and weak hormone receptors. Furthermore, poor quality of care for the diseased is caused by a lack of access to high-quality multi-modal treatment facilities, a scarcity of healthcare facilities for a big population, and a lack of financial resources on the part of the patient, combined with the provider's share. As a result, it's not unexpected that Indian breast cancer patients had a higher rate of local recurrence and a lower overall survival rate.

Breast cancer epidemiology across several PBCRs in India indicates increasing incidence and death rates mainly as a result of fast urbanization, industrialization, population increase and ageing in nearly every portion of India. Due to factors such as marital status, location (urban-rural), BMI, feeding, hip-waist ratio, waist-to-hip ratio, lack of parity, obesity, alcohol intake, cigarette chewing, smoking, lack of exercise, diet, and environmental factors, the high incidence of younger women's breast cancer is not well known in India. Late diagnostics result in late diagnosis as a result of delayed illness presentation due to analphabetism, lack of knowledge, and budgetary constraints, resulting in increased mortality. Lack of coordinated breast screening program, lack of diagnostic equipment and a general difference in female health also cause the occurrence of breast cancer in predominantly patriarchal Indian society. Thus, most cases here are untreated at advanced and meta-static phases locally.

The level of treatment available to breast cancer patients ranges from poor to excellent, due to the wide diversity in the level of health care between locations. The ICMR/WHO national protocols for the administration of breast cancer nevertheless remain basic and far from country-wide. Aside from a patient's personal perspective, various factors influence the quality of breast cancer therapy, including where the patient lives and what she achieves, what she can afford to use for her treatment, whom she trusts, and so on. Some of the patients are treated in protocol-based highly equipped clinics, with many compromise therapeutic modalities based on criteria including cost, tolerance, dietary deprivation. For a high number of patients, the number of treatment facilities is insufficient. Poor treatment and monitoring compliance is caused by social stigma associated with the condition and the expensive treatment expense. Mass media advertisements can aid to change against the lack of awareness and stigmatization already addressed. These media advertisements can also serve to raise awareness of breast cancer among the population, paving the road towards progress to overcome certain psychological obstacles that women may experience to avoid their screening. The development and deployment of AI for the diagnosis of breast cancer is opening the way for de-stigmatization, beliefs, and early diagnosis in women in India with the attempt to enhance breast cancer screening at community level. The introduction of screening programs for the number of persons diagnosed sooner with annual mammograms had a good effect. Patients who are found during the early stages of breast cancer are most probably affected by the disease early catching. Some malignancies have a survival rate of approximately 100 percent, if detected at an early stage.

Tools such as telemedicine have significantly helped people obtain cancer care in rural locations.

Ultra-sensitive 2D/3D sound could be used to diagnose breast cancer at an early stage with moving van-bases. Also, during the current pandemic, telemedicine truly assisted every cancer patient. Different new screening methods have been developed during the last 10 years to increase access to screening and to increase early detection. The latest approaches of thermal imaging and piezoelectric technologies are non-invasive and portable, and may readily be used in poor countries such as India in level 2 and 3 cities.

CONCLUSION AND RECOMMENDATION

Breast cancer is much less common in Indian women than in women in developed countries. Breast cancer in urban Indian women has, nevertheless, emerged as the most frequent malignancy. Sensitivity to breast cancer is poor like overall poor public health awareness. Through a multidisciplinary approach to breast cancer, including awareness, preventive measures, early detection screening programs, and the availability of treatment facilities, both incidence and breast cancer mortality among Indian women is essential. As can be seen from the cancer projections, the number of cases doubled most by 2020. The forecasts of cancer incidence showed that the current carcinogenic charge in India needs to be strengthened and increased by the existing diagnostic/therapy facilities. Perceptions and experiences in some ways impair the treatment and early treatment diagnosis. The success of developing medical innovations requires a patient-centered approach. Startups show, how it becomes easy and quick to diffuse a new technology throughout people if the cultural feature of a certain community is considered. Whenever new technology is implemented, the cultural and intellectual aspects of local people must be considered so that rapid dissemination of medical technology takes place across all segments of society to make acceptability easier. We need advanced technology like fluorescence imaging to successfully combat the disease burden of breast cancer, which is highly helpful in laying out the way to better detect the spread of cancer and preventing difficulties in breast cancer operations. The need of breast cancer screening is another key element which cannot be overlooked. Each woman should be educated to search for symptoms at an early time in life. The recent emphasis on enhanced health awareness, promotion of early detection, protocol comprehensive multifaceted treatment and support for breast and rehabilitation cancer control, has led to a steadily improving trend, with more and more early support for breast cancer management and screening,

The result of the studies is that it was intended to explain why early diagnosis of breast cancer, female awareness in various parts of India and technology development are vital for increasing Indian community acceptability. Studies have shown that most women prefer to ignore it, regardless of age and financial condition. The delayed diagnosis is in most cases because to the

asymptomatic nature of the early stage of the disease with only one painless lump in most people. Women from lower socio-economic categories are not looking for attention when they feel a bump on their breasts. Either you don't know what it signifies or you worry about your partner's stigma of rejection, or you may be afraid of losing your breast. There is an important tabu against open discussions of breast cancer and many of the women believe that no effective medication or treatment is available for the condition. Through to promote preventative behavior between persons, the students may grasp how severe the consequences are and how positive the conclusion is seen through an effective course of action, whether or not they are susceptible to the disease.

LIMITATIONS

The results may not be extrapolated nation-wide as they are obtained from some specific locales in the north, west and south of the country and may also not be generalized to bigger populations. With varied economic, cultural, and social characteristics, heterogeneous populations from India may produce more variety than observed, but literacy levels are unlikely to be higher since that thesis encompasses huge urban centers such as Mumbai. In order to evaluate important changes and their attitude towards breast cancer, the number of studies and the duration of their time are too narrow. While literacy, technology development and awareness are important. Increased knowledge levels may not necessarily result in improved results for Indian women. Some study suggests that women, regardless of their socioeconomic status, have compliant attitudes after breast cancer screening in diagnostic proceedings for abnormal findings disclose additional reasons such as concern, stigma, prejudice, negation, and distrust in the health care system.

REFERENCES

1. Mathur P, Sathishkumar K, Chaturvedi M, Das P, Sudarshan KL, Santhappan S, et al. Cancer statistics, 2020: Report from National Cancer Registry Programme, India. JCO Glob Oncol. 2020;6(6):1063–75.
2. Bhattacharya S, Sharma N, Singh A. Designing culturally acceptable screening for breast cancer through artificial intelligence-two case studies. J Family Med Prim Care. 2019;8(2):760–2.
3. Gov.in. [cited 2021 Jun 23]. Available from: https://dhr.gov.in/sites/default/files/HTA%20_Breast%20Cancer%20Screening.pdf

4. Nyblade L, Stockton M, Travasso S, Krishnan S. A qualitative exploration of cervical and breast cancer stigma in Karnataka, India. BMC Womens Health [Internet]. 2017;17(1). Available from: <http://dx.doi.org/10.1186/s12905-017-0407-x>
5. 291- :. Cross-Sectional study on knowledge about breast cancer and [Internet]. Medicinearticle.com. [cited 2021 Jun 23]. Available from: http://www.medicinearticle.com/JMR_20206_07.pdf
6. Smith RD, Mallath MK. History of the growing burden of cancer in India: From antiquity to the 21st century. J Glob Oncol. 2019;5(5):1–15.
7. Three Year Report of Population Based Cancer Registries 2012–2014. Indian Council of Medical Research (ICMR), Bangalore, India 2016.
8. International Institute for Population Sciences (IIPS) and ICF. National Family Health Survey (NFHS-4), 2015–16: India. Mumbai: IIPS; 2017.
9. Lin SJ. Factors influencing the uptake of screening services for breast and cervical cancer in Taiwan. J R Soc Promot Heal. 2008;128(6):327–34.
10. Wu S. Sickness and preventive medical behaviour. J Health Econ. 2003;22(4):675–89.
11. Beining RM. Screening for cervical cancer: an exploratory study of urban women in Tamil Nadu. India: University of Iowa; 2012.
12. Ferlay J, Soerjomataram I, Dikshit R et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. Int J Cancer 2015; 136: E359–86.
13. Three Year Report of Population Based Cancer Registries 2012–2014. Indian Council of Medical Research (ICMR), Bangalore, India 2016.
14. Paymaster JC, Gangadharan P. Some observations on the epidemiology of cancer of breast in women in western India. Int J Cancer. 1972;10:443–50.

15. Rao DN, Ganesh B, Desai PB. Role of reproductive factors in breast cancer in a low-risk area: a case-control study. *Br J Cancer*. 1994;70:129–32.
16. Valarmathi MT, A A, Deo SS, Shukla NK, Das SN. BRCA1 germline mutations in Indian familial breast cancer. *Hum Mutat*. 2003;21:98–9.
17. Hedau S, Jain N, Husain SA, Mandal AK, Ray G, Shahid M, Kant R, Gupta V, Shukla NK, Deo SS, Das BC. Novel germline mutations in breast cancer susceptibility genes BRCA1, BRCA2 and p53 gene in breast cancer patients from India. *Breast Cancer Res Treat*. 2004;88:177–86.
18. Paymaster TC, Gangadharan P. Cancer in Parsi community of Bombay. *Int J Cancer*. 1970;5:426–31.
19. Nair MK, Sankaranarayanan R, Nair KS, Amma NS, Varghese C, Padmakumari G, Cherian T. Overall survival from breast cancer in Kerala, India, in relation to menstrual, reproductive, and clinical factors. *Cancer*. 1993;71:1791–6.
20. li I, Wani WA, Saleem K. Cancer scenario in India with future perspectives. *Cancer Therapy* 2011; 8: 56–70.
21. Chopra B, Kaur V, Singh K, Verma M, Singh S, Singh A. Age shift: breast cancer is occurring in younger age groups—is it true? *Clin Cancer Investig J* 2014; 3: 526–29.
22. Murthy NS, Agarwal UK, Chaudhry K, Saxena S. A study on time trends in incidence of breast cancer: Indian scenario. *Eur J Cancer Care (Engl)* 2007; 16: 185–6.
23. National Cancer Registry Programme 2007—2011. Indian Council of Medical Research (ICMR), Bangalore, India 2013.
24. Kakarala M, Rozek L, Cote M, Liyanage S, Brenner DE. Breast cancer histology and receptor status characterization in Asian Indian and Pakistani women in the U.S.: a SEER analysis. *BMC Cancer* 2010; 10: 191.

25. Pakseresht S, Ingle G, Bahadur A et al. Risk factors with breast cancer among women in Delhi. *Indian J Cancer* 2009; 46: 132–38.
26. Dey S, Boffetta P, Mathews A, Brennan P, Soliman A, Mathew A. Risk factors according to estrogen receptor status of breast cancer patients in Trivandrum, South India. *Int J Cancer* 2009; 125: 1663–70.
27. Gajalakshmi V, Mathew A, Brennan P et al. Breastfeeding and breast cancer risk in India: a multicenter case-control study. *Int J Cancer* 2009; 125: 662–5.
28. Nagrani RT, Budukh A, Koyande S, Panse NS, Mhatre SS, Badwe R. Rural urban differences in breast cancer in India. *Indian J Cancer* 2014; 51: 277–81.
29. Waist-to-hip ratio of ≥ 0.95 compared to ratio ≤ 0.84 was found strongly associated with risk of BC in both rural and urban populations (OR urban = 4.10, 95% CI, 3.03–5.56; OR rural = 3.01, 95% CI, 1.85–4.90).
30. Mathew A, Gajalakshmi V, Rajan B et al. Anthropometric factors and breast cancer risk among urban and rural women in South India: a multicentric case–control study. *Br J Cancer* 2008; 99: 207–13.
31. Rao DN, Ganesh B, Desai PB. Role of reproductive factors in breast cancer in a low-risk area: a case-control study. *Br J Cancer* 1994; 70: 129–32.
32. Mathew A, Gajalakshmi V, Rajan B et al. Physical activity levels among urban and rural women in south India and the risk of breast cancer: a case-control study. *Eur J Cancer Prev* 2009; 18: 368–76.
33. Ali R, Mathew A, Rajan B. Effects of socio-economic and demographic factors in delayed reporting and late-stage presentation among patients with breast cancer in a major cancer hospital in South India. *Asian Pac J Cancer Prev* 2008; 9: 703–7.
34. Kaushal M, Mishra AK, Sharma J et al. Genomic alterations in breast cancer patients in betel quid and non betel quid chewers. *PLoS One* 2012; 7: e43789.

35. Murthy NS, Agarwal UK, Chaudhry K, Saxena S. A study on time trends in incidence of breast cancer: Indian scenario. *Eur J Cancer Care (Engl)* 2007; 16: 185–6.
36. Anders CK, Hsu DS, Broadwater G et al. Young age at diagnosis correlates with worse prognosis and defines a subset of breast cancers with shared patterns of gene expression. *J Clin Oncol* 2008; 26: 3324–30.
37. Thangjam S, Laishram RS, Debnath K. Breast carcinoma in young females below the age of 40 years: a histopathological perspective. *South Asian J Cancer* 2014; 3: 97–100.
38. Gogia A, Raina V, Deo S, Shukla N, Mohanti B. Triple-negative breast cancer: An institutional analysis. *Indian J Cancer* 2014; 51: 163–66.
39. Nair MK, Sankaranarayanan R, Nair KS et al. Overall survival from breast cancer in Kerala, India, in relation to menstrual, reproductive, and clinical factors. *Cancer* 1993; 71: 1791–6.
40. Bonner MR, Han D, Nie J et al. Breast cancer risk and exposure in early life to polycyclic aromatic hydrocarbons using total suspended particulates as a proxy measure. *Cancer Epidemiol Biomarkers Prev* 2005; 14: 53–60.
41. Kim H, Choi DH. Distribution of BRCA1 and BRCA2 mutations in Asian patients with breast cancer. *J Breast Cancer* 2013; 16: 357–65.
42. Hedau S, Jain N, Husain SA et al. Novel germline mutations in breast cancer susceptibility genes BRCA1, BRCA2 and p53 gene in breast cancer patients from India. *Breast Cancer Res Treat* 2004; 88: 177–86.
43. Dey S, Mishra A, Govil J, Dhillon PK. Breast cancer awareness at the community level among women in Delhi, India. *Asian Pac J Cancer Prev* 2015; 16: 5243–51.
44. Three Year Report of Population Based Cancer Registries 2012–2014. Indian Council of Medical Research (ICMR), Bangalore, India 2016.

45. Financial Express. Good news! India's per-capita income rises 6.8 per cent to Rs 11,254 a month in FY20. Available at: <https://www.financialexpress.com/economy/good-news-indias-per-capita-incomerises-6-8-per-cent-to-rs-11254-a-month-in-fy20/1816070/>
46. Agarwal S, Pappas L, Neumayer L, et al. An analysis of immediate postmastectomy breast reconstruction frequency using the surveillance, epidemiology, and end results database. *Breast J.* 2011;17:352–358.
47. Kothari DS, Ghalme AN, Gundewar SR. Breast reconstruction awareness among educated women in a metropolitan city. *Indian J Plast Surg.* 2012;45:577–579.
48. Leong SP, Shen ZZ, Liu TJ, et al. Is breast cancer the same disease in Asian and Western countries? *World J Surg.* 2010;34:2308–2324.
49. Chetta MD, Aliu O, Zhong L, et al. Reconstruction of the irradiated breast: a national claims-based assessment of postoperative morbidity. *Plast Reconstr Surg.* 2017;139:783–792.
50. Sharma HR, Rozen WM, Mathur B, et al. 100 steps of a DIEP flap—A prospective comparative cohort series demonstrating the successful implementation of process mapping in microsurgery. *Plast Reconstr Surg Glob Open.* 2019;7:e2016. / Marsh D, Patel NG, Rozen WM, et al. Three routine free flaps per day in a single operating theatre: principles of a process mapping approach to improving surgical efficiency. *Gland Surg.* 2016;5:107–114. / Canizares O, Mayo J, Soto E, et al. Optimizing efficiency in deep inferior epigastric perforator flap breast reconstruction. *Ann Plast Surg.* 2015;75:186–192.
51. National Health Expenditure Data. Available at: [https:// www.cms.gov/Research-Statistics-Data-and-Systems/ Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsHistorical](https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsHistorical).
52. Summary Analysis_Report_586_Health.pdf. Government of India Ministry of Statistics and Programme Implementation. Available at: mospi.nic.in.
53. Thamm OC, Andree C. Immediate versus delayed breast reconstruction: evolving concepts and evidence base. *Clin Plast Surg.* 2018;45:119–127.

54. Waller J, Douglas E, Whitaker KL, Wardle J. Women's responses to information about overdiagnosis in the UK breast cancer screening programme: a qualitative study. *BMJ Open*. 2014;3(4):e002703.
55. Agarwal G, Pradeep PV, Aggarwal V, Yip CH, Cheung PS. Spectrum of breast cancer in Asian women. *World J Surg*. 2007;31:1031–40.
56. Mitra I. Breast screening: the case for physical examination without mammography. *Lancet*. 1994;343:342–4.
57. Bhushan A, Gonsalves A, Menon JU. Current state of breast cancer diagnosis, treatment, and theranostics. *Pharmaceutics*. 2021;13(5):723.
58. Agarwal G, Pradeep PV, Aggarwal V, Yip CH, Cheung PS. Spectrum of breast cancer in Asian women. *World J Surg*. 2007;31:1031–40.
59. Niramai – A Novel Breast Cancer Screening Solution [Internet]. Available from: <https://niramai.com/>
60. Managing breast cancer treatment during COVID-19 [Internet]. *Expresshealthcare.in*. 2021 [cited 2021 Jun 17]. Available from: <https://www.expresshealthcare.in/blogs/guest-blogs-healthcare/managing-breast-cancer-treatment-during-covid-19/428623/>
61. Somdatta P, Baridalyne N. Awareness of breast cancer in women of an urban resettlement colony. *Indian J Cancer* 2008;45:149-53.