



Living with Breast Cancer in India

Developing Technology against Experiences and Perceptions

Breast Cancer in India: Summary Slide



BREAST CANCER

Breast cancer affects **women** both in the developed **and** the developing **world**

Breast cancer is on the rise, both in **rural** and **urban India**



It is reported that with every **4 minutes**, an Indian woman is diagnosed with breast cancer

The objective of the study is to explore understanding of the knowledge, beliefs, and attitudes of women in India living with breast cancer; and to access how attitudes and practices regarding breast cancer may influence decisions and growth of developing technologies

With advanced technologies like Digital Mammography, AI based modalities and Government's initiatives on awareness and screening programs, Breast Cancer is a disease that can be conquered successfully

There is an urgent need for expansion of breast cancer screening programs across the country to reduce the mortality rate



Low cancer literacy of breast cancer risk factors among Indian women, irrespective of their socio-economic and educational background

There is an urgent need for nation- and state-wide awareness programs, as well as engagements with community-level organizations and the health system to help improve cancer literacy in India



When breast cancer is detected early, and if adequate treatment are available, there is a good chance that breast cancer can be cured

If detected late, palliative care to relieve the suffering of patients and their families is the only option in front

178361

new breast cancer cases each year

50% of Indian women suffer from stage 3 and 4 of breast cancer



90408

Deaths from breast cancer each year

One women dies of breast cancer, every **13 minutes** in India

Author, Year	Study Location	Sample Size	Sampling Technique	Salient Features
Mathur P et al. 2020	28 population based and 58 hospital-based cancer registries in India under the network of the National Cancer Registry Programme	51,785	Systematic collection of data India under the National Cancer Registry Programme– National Centre for Disease Informatics and Research of Indian Council of Medical Research	This study examined the cancer incidence, patterns, trends, projections, and mortality from 28 PBCRs and also the stage at presentation and type of treatment of patients with cancer from 58 HBCRs (N = 667,666) from the pooled analysis for the composite period 2012-2016
Bhattacharya S et al.,2019	Bangalore	4200	Controlled randomized	In this screening technique, no doctor or technician is required (i.e., no touch technique)
Gov.in., 2021	Mumbai, Bangalore, Chennai, Thiruvananthpur am, ibrugarh, Delhi and Barshi	1,00,000	Cancer registry data	Health Technology Assessment (HTA) was carried out to study clinical effectiveness and the cost-effectiveness of various breast cancer screening strategies in Indian women with healthcare system perspective
Nyblade L et al. 2017	Karnataka	59	In-depth interviews with patients, primary caregivers, and Healthcare providers	Qualitative exploratory study where stigma was not the focus of the study, themes relating to stigma emerged and are the focus of the analysis
Sukhila Baddam Reddy et al	Telangana	381	A cross-sectional Descriptive study, using a pre-tested and semi-structured questionnaire	The questions have been based on focused discussions' with a group of undergraduate medical and nonmedical students, few medical Interns, and some medical college faculty and hospital administrators. A written consent was obtained from each one of the respondents, assuring them of complete confidentiality and anonymity as regards the data provided by them.
Smith et al., 2019	Mumbai	NA	Mumbai population based cancer registry	The review traces the growing burden of cancer in India from antiquity, searching PubMed, Internet Archive, the British Library, and several other sources for information on cancer in Indian history

METHODOLOGY

Plan of analysis

Analysis of the data is planned on three major factors which influence women's experiences, perceptions and breast health care seeking behavior in India: beliefs, awareness, and resources. These factors are used as categories to illustrate both barriers to detection and treatment as well as facilitators for survival and growth of digital health in country

Rationale for spatial dependence

This study aims to identify factors affecting uptake of breast screening and to develop a comprehensive assessment of the uncertainty of patients beliefs regarding the appropriate management and treatment and the need for specific interventions and clinical practice guidelines to address the effects on patients with breast cancer

Data source

The methodology is followed through structured literature search and updates from news and articles using combined keywords undertaking on bibliographic databases. From these publications, and articles, the bibliographic lists are hand-searched for more papers

Framework

Understanding the drivers and barriers is important for strategic and effective awareness campaigns. Section I is a review of the existing and relevant literature relating to patients with breast cancer and their approach towards treatment and developing technology. Section II is the detailed thesis formatted to outline the findings of a qualitative study exploring patients' understandings of technology and their perceived role

Study population

The study population is considered from previously surveyed and reported certain specific locations in northern, western, and southern geographical regions of the country to ideate and reflect country's perception and view towards breast cancer. Also, multiple sources from literature were used for gathering information and analysis of breast cancer

Study variables

The outcome variables used in the analysis is breast cancer. The data of women undergoing breast screening was aggregated at the district level using NFHS-4 data. The considered risk factors are summarized in a systematic review

Ethical considerations

In the fight against women's breast cancer, issues of ethics, rights, and responsibilities are always encountered. Numerous ethical issues are applicable in this study viz., informed consent; education of relatives, friends, and public; patients' comfort in discussion of their diagnoses and treatment; access to care; and allocation of scarce resources

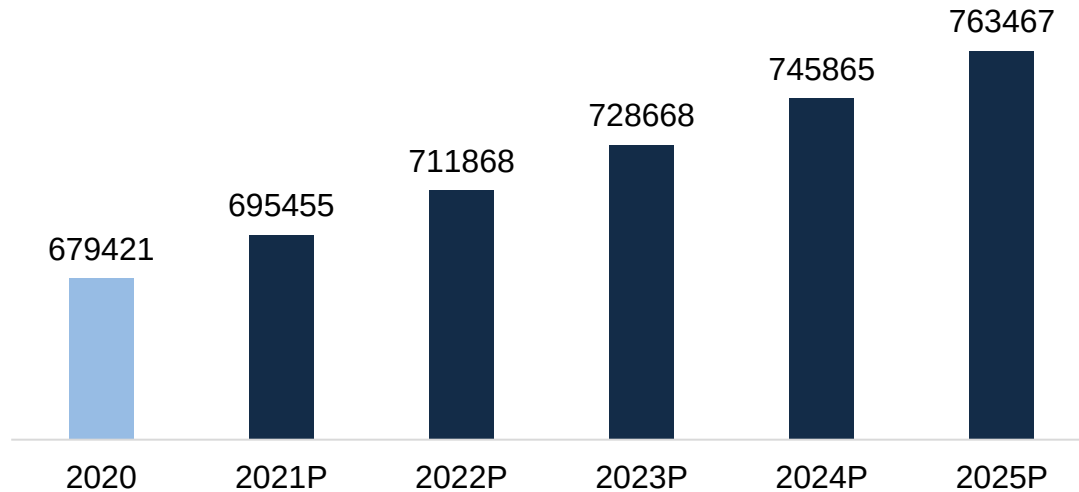
**BREAST
CANCER**

Statistics of Breast Cancer In India

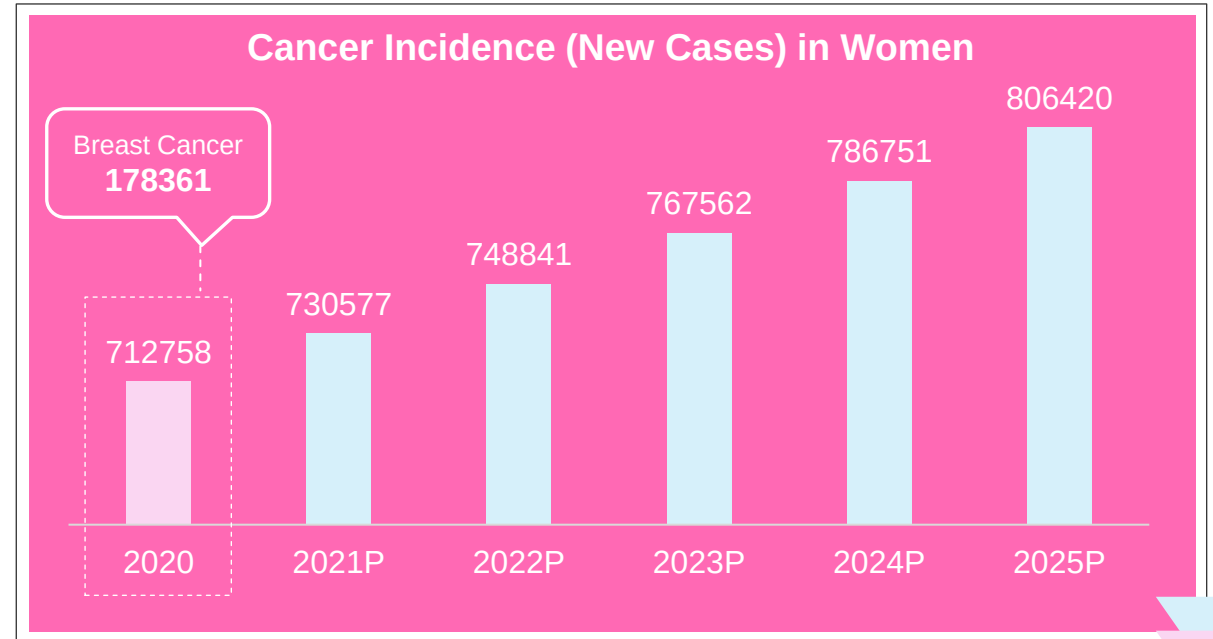


The prevalence and mortality of breast cancer is increasing in India

Cancer Incidence (New Cases) in Men



Cancer Incidence (New Cases) in Women



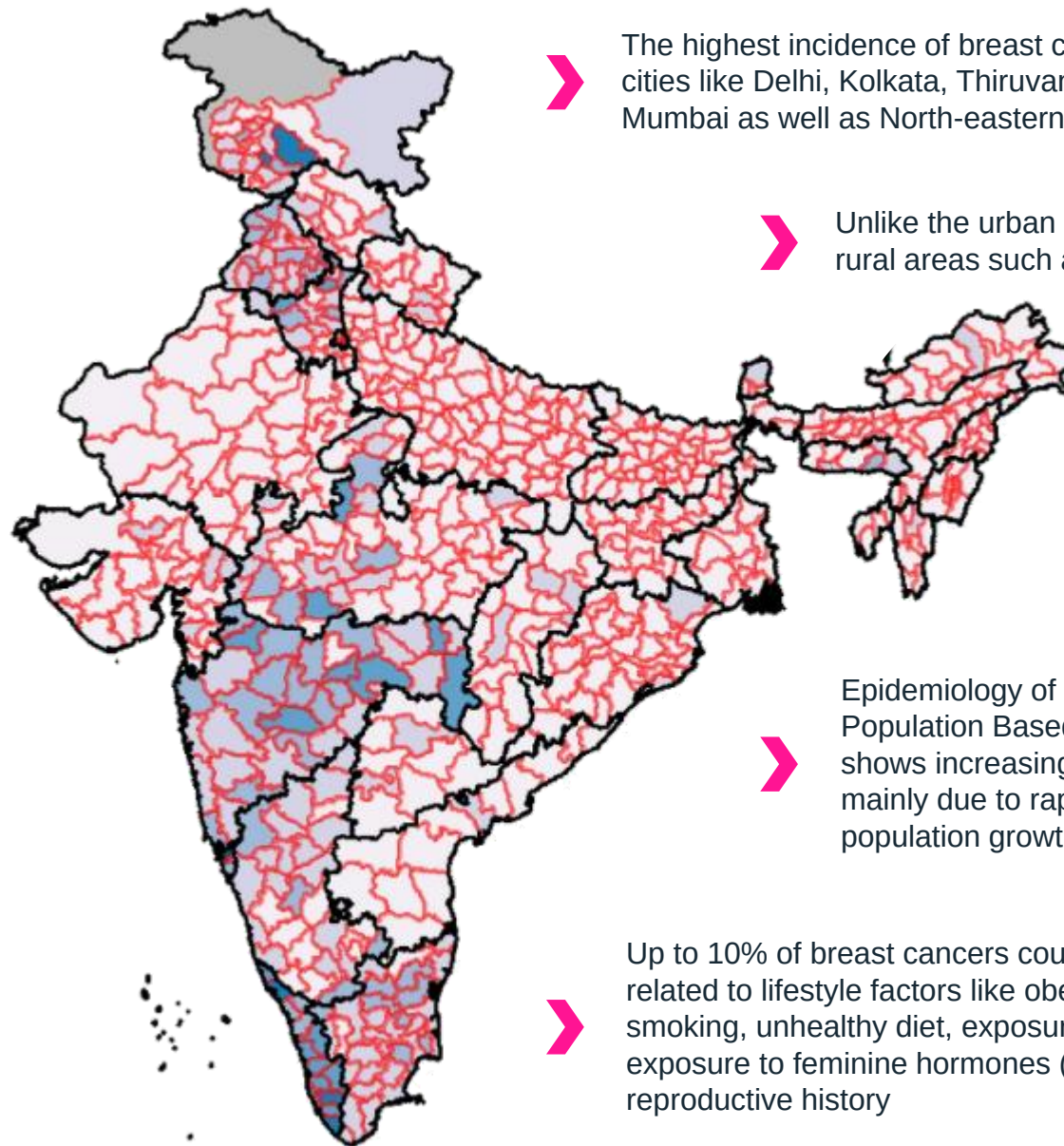
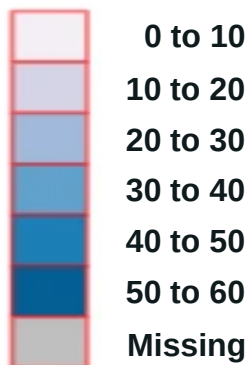
- ✓ Breast cancer accounts for a third of all the cancers that affect women in India. In recent years breast cancer has overtaken cervical cancer in terms of incidence as well as mortality⁴
- ✓ Out of all the types of cancers, breast cancer has become a major health concern across Indian cities, especially in the metropolitan cities like Delhi, Bengaluru, and Chennai as it accounts for more than a fourth of all female cancers²
- ✓ Nearly 60% patients with breast cancers are diagnosed in advanced stages⁵
- ✓ Oncologists have expressed concern over the fact that Indian women have been found to display more aggressive forms of cancers at relatively younger ages as compared to those in western countries⁴

Geographical distribution of breast screening in India



A majority of the districts in **Kerala** have a high uptake of breast cancer screening, whereas **North Goa** has the maximum share. The distribution curve exhibits that most of the districts fall in the range of **0 to 10%**

Prevalence of Breast Screening



The highest incidence of breast cancer, in India, is seen in cities like Delhi, Kolkata, Thiruvananthapuram, Bangalore, Mumbai as well as North-eastern states like Mizoram

Unlike the urban areas where it ranks as number one, in rural areas such as Barshi it still holds a second position

Prevalence of taboos and lack of awareness results in late presentation of the disease. Poor breast cancer screening practices further compound the problem of late diagnosis

Epidemiology of breast cancer across different Population Based Cancer Registries (PBCRs) in India shows increasing trends for incidence and mortality, mainly due to rapid urbanization, industrialization, population growth and increasing age

Up to 10% of breast cancers could be hereditary, over 90% are related to lifestyle factors like obesity, alcohol consumption, smoking, unhealthy diet, exposure to chemicals and radiation, exposure to feminine hormones (estrogen), late menopause, reproductive history

Diagnosis of Breast Cancer In India



Early diagnosis is a key to successful breast cancer treatment (1/2)

Techniques for Diagnosis or Detection of Breast Cancer	Imaging Modality	Principle	Diagnostic Accuracy	Advantages	Limitations
	Mammography (First-line tool for breast screening)	Low-dose ionizing x-ray creates detailed images of the breast	▪ 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	Uses low-energy radio waves and strong magnets to obtain detailed images of structures within the breast	▪ Sensitivity: 75–100% ▪ Specificity: 83–98.4% ▪ 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	Employs magnetic field on body fluids and tissue samples to obtain chemical information of that Region	▪ Sensitivity: 93% ▪ Specificity: 70% ▪ Spatial Resolution: up to 0.25 cm³	▪ Overcomes limitations of mammography ▪ Radiation-free imaging technology ▪ Excellent sensitivity ▪ Excellent spatial resolution ▪ All imaging planes possible	▪ Expensive and time-consuming ▪ Low specificity ▪ Not portable ▪ False-positive results in some benign tumors
	Dynamic Contrast Enhanced MRI (DCE-MRI)	Multiple MRI scans taken post i.v. injection of contrast agent	▪ 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	Employs diffusion of water molecules to generate contrast	▪ Sensitivity: 83% ▪ Specificity: 84% ▪ Spatial Resolution: 25–100 µm	▪ Non-radioactive imaging technique	▪ Failure to detect high water content malignant lesions due to high apparent diffusion coefficients

Early diagnosis is a key to successful breast cancer treatment (2/2)

Techniques for Diagnosis or Detection of Breast Cancer	Imaging Modality	Principle	Diagnostic Accuracy	Advantages	Limitations
	MR Elastography (MRE)	Dynamic elasticity imaging technique that combines MRI imaging with low frequency. Employs mechanical waves to create an elastogram to assess tissue stiffness	▪ Sensitivity: 90–100% ▪ Specificity: 37–80% ▪ Spatial Resolution: 25–100 μm	▪ Non-invasive, non-ionizing and cross-sectional imaging modality	▪ Lacking in spatial resolution and detection of small focal lesions
	Positron Emission Tomography conjugated with computed Tomography (PET-CT)	Combines nuclear medicine technique and computed tomography resulting in high detailed images	▪ Sensitivity: 90–100% ▪ Specificity: 75–90% ▪ Spatial Resolution: 2–10 mm	▪ Non-invasive ▪ Provides twice the diagnostic benefits (Elevated activity within the body detected by PET scan and intricate images of tissues and organs by CT scan).	▪ High-cost ▪ Unable to detect tumors less than 8 mm
	Sentinel lymph node biopsy (SLNB)	Surgical procedure to detect spreading of cancer in lymphatic system	▪ 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 cancer
	Breast Specific Gamma Imaging	Employs use of a radiotracer. Image captured using a special camera	▪ Sensitivity: 90–96% ▪ Specificity: 71–80% ▪ Spatial Resolution: ≥ 7 mm	▪ Able to identify smaller lesions (<1 cm)	▪ High radiation dose ▪ Not suited for routine tumor screening
	Ultrasound	Employs sound waves to image breast tissues	▪ Sensitivity: 80–89% ▪ Specificity: 34–88% ▪ Spatial Resolution: 50–500 μm	▪ Accessible, real-time lesion visualization, cost-effective, patient compliant	▪ Failure to detect micro calcifications, possibility of false-positives

Late presentation of disease a major concern



- Early diagnosis of breast cancer accounts for only **30%** of all reported cases in India, compared to **70%** in the developed world. Since 70% of patients are diagnosed with cancer when the disease is far too advanced (stage 3 or 4), the mortality rate is very high
- It is estimated that the five-year survival rate decreases by **2.7 times** for breast cancer when it is detected at stage IV as against stage I
- An eight-week delay in breast cancer surgery would increase the risk of death by **17%** and a 12 week delay would increase the risk by **26%**
- Treatment cost for late stage cancers is **1.5 to 2 times** higher than early stage cancers

Stage 0

In Situ disease in which the cancerous cells are in their original location within normal breast tissue

Stage I

Tumor that is less than 2 cm in diameter with no spread beyond the breast

Stage II

Tumor that is 2 to 5 cm in size without spread to axillary nodes or tumor less than 2 cm in size with spread to axillary nodes

Stage III

Tumor that is smaller than 5 cm in size with spread to axillary nodes which are attached to each other or other structure

Stage 0

A tumor that is of any size, with spread beyond the region of the breast and chest wall, such as to liver, bone, or lungs

Late stage presentation is precipitated by two major factors

The absence of proper breast cancer screening programs

The nonparticipation of patients in such programs, if they exist

The situation for breast cancer screening is far worse than the screening programs for cervical cancer

Although it will not eliminate the disease, it surely holds promise and will help reduce the disease burden and stigma associated with breast cancer to a large extent

Breast cancer patients are younger, have higher stage cancers and have poorer survival than western patients

Awareness of breast cancer

Self-breast examination

Breast screening & counselling camp

Avoiding drinking too much alcohol

Quitting smoking

Maintaining a healthy lifestyle

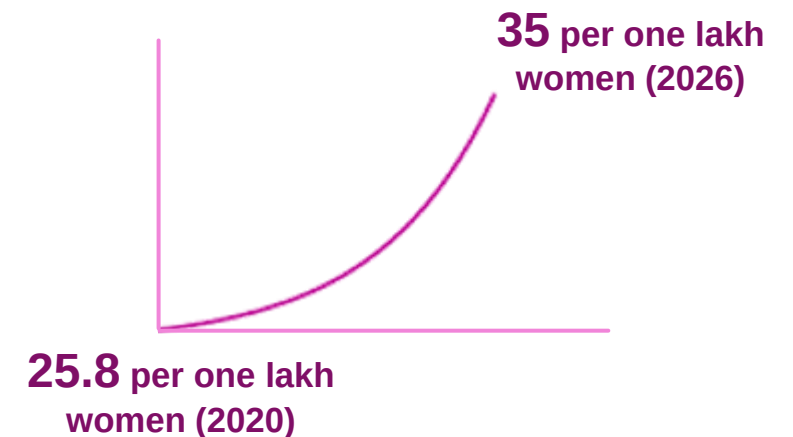
Breast
Cancer
Prevention
Tips

General recommendation for women at average risk for breast cancer

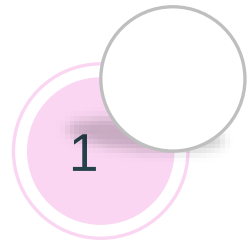
Woman's Age	ACS Recommendation
40-49	An annual mammogram is not recommended. Women should consult with their doctor and proceed
50-74	A mammogram every alternate year is recommended
75+	Mammograms are no longer recommended for women with a life span of 10 years or less

- ✓ *The prevalence of taboos and lack of awareness results in late presentation of the disease. At the same time, poor breast cancer screening practices further compound the problem of late diagnosis*
- ✓ *Up to 10% of breast cancers could be hereditary, over 90% are related to lifestyle factors like obesity, alcohol consumption, smoking, unhealthy diet, exposure to chemicals and radiation, exposure to feminine hormones (estrogen), late menopause, reproductive history*

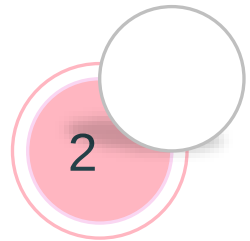
Age standardized rate of breast cancer



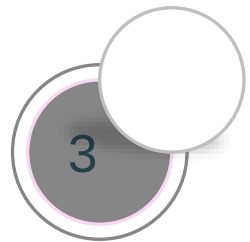
Breast cancer becoming a costly taboo in India



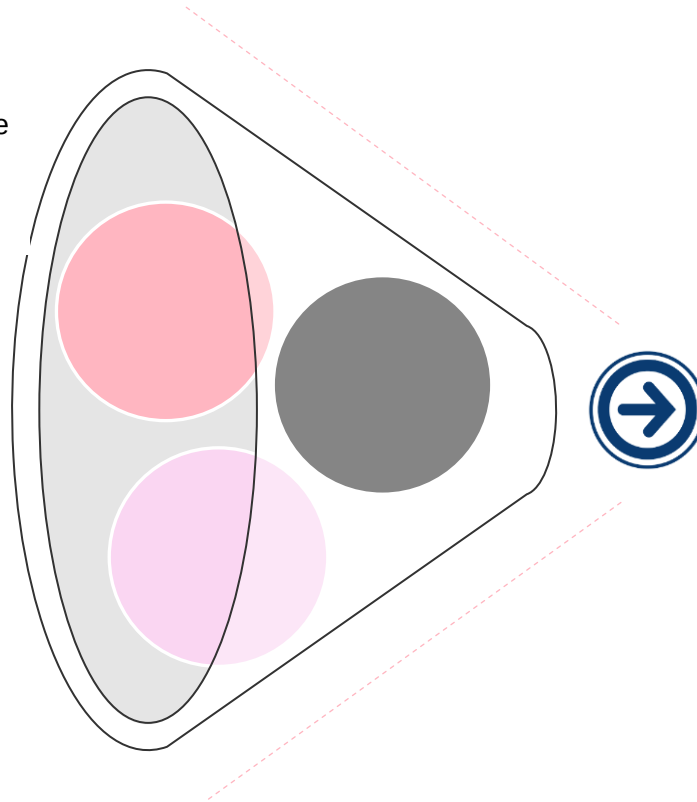
- The reason for delayed diagnosis in most cases is that the disease is **asymptomatic in the early stages**, with most patients presenting with just a painless lump
- Women hailing from lower socioeconomic groups don't seek care when they feel a lump in their breast. They are either unaware of what the lump means, or fear the stigma of rejection by their partner and community, or potentially fear losing the breast



- There is a major taboo against **discussing breast cancer openly**, and many of the women are under **the erroneous notion that there exists no effective therapy or treatment for the disease**



- After successfully mobilize awareness, patients can use **opportunistic screening** to generate the need for organized screening at the primary level and **train more women to perform self exams**
- Training women with the help of community health workers can help set off a positive chain reaction that can bring down instances of mortality without any extra pressure on healthcare system



- ✓ *Self exam can be used to spread awareness about breast health among women. Trained health workers can help disseminate knowledge about the condition and encourage women to carry out a self-exam*
- ✓ *Unlike the Western world, where patients comply with awareness programs conducted by physicians, Indians show a higher acceptance of health workers as educators*
- ✓ *Accredited Social Health Activists (ASHA) must be trained to provide self exam training for women living in rural and remote areas at their doorstep. Since most of the ASHAs are female and from the same community, it is easier for them to strike up a rapport with the women, and this approach can help strengthen their psychological status by means of community outreach programs*

Development of Indian tests and Indian research will go a long way in filling the gap in science

The way forward is an affordable test that is validated on Indian patients. There is an Indian company that has developed an indigenous and affordable prognostic test for breast cancer that is showing promise. The Indian oncology community is taking on the burden to conduct well-powered clinical trials to achieve the goal of affordable, world-class care

Western prognostic tests are prohibitively expensive in the Indian context. The cost of the tests run into the thousands of dollars, which is justifiable in developed countries because of the fact that it helps avoid chemotherapy



The cost of chemotherapy in India is generally only 5% to 10% of what it costs in the West, and therefore the cost of Western prognostic tests in India easily exceeds the expected cost of the chemotherapy



Western tests suffer from limitations of high cost and inadequate validation on Indian patients. Indigenously developed tests have the potential to transform care for Indian breast cancer patients

Breast self-examination (BSE) remains as an important inexpensive tool which help in detecting any breast abnormality and diagnosing breast cancer, especially in Indian scenario

OncoStem developed innovative tests to personalize treatment for cancer patients. The startup's flagship product CanAssist Breast has been launched for hormone-positive breast cancer

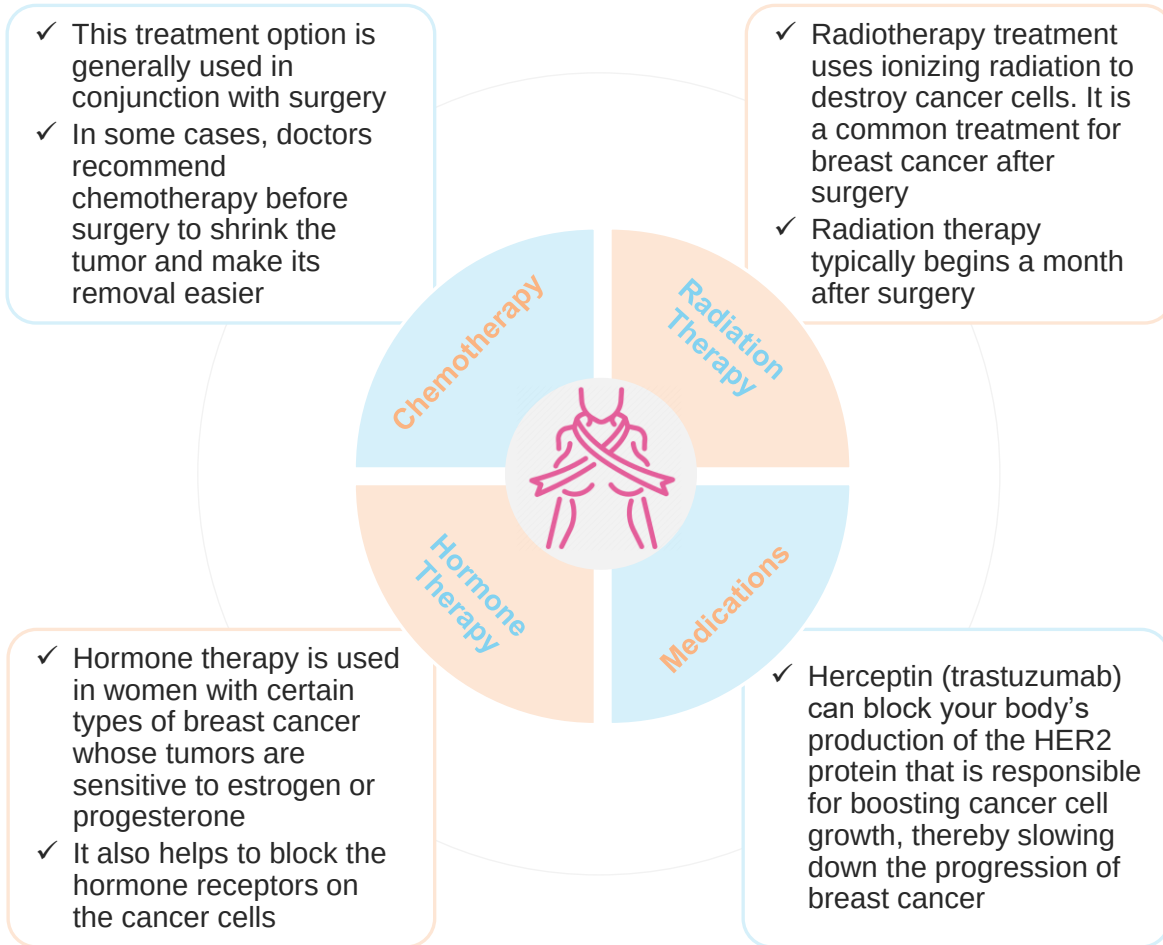
Niramai is a health-tech startup that uses a patented technology called 'Thermalytix' with AI to detect early-stage breast cancer in a radiation-free and non-invasive way

Treatment of Breast Cancer in India



Breast Cancer Treatment Options In India

The treatment methods chosen, which depend on the tumor size and type, cancer stage, the person's sensitivity to hormones, their age, and overall health, and grade (expected growth and spread) of the tumor



The most common type of treatment recommended for breast cancer is surgery. Several types of surgical procedures may be used to remove breast cancer:

- **Lumpectomy:** This option can be considered if the tumor is small and easy to separate from the surrounding tissue
- **Mastectomy:** The surgeon removes an entire breast, including the lobules, ducts of the breast, fatty tissue, nipple, areola, and some skin
- **Sentinel Node Biopsy:** A few of the sentinel lymph nodes – the initial set of nodes to which breast cancer can spread – are tested and removed
- **Axillary Lymph Node Dissection:** Lymph nodes removed during a sentinel node biopsy may contain cancer cells
- **Contralateral Prophylactic Mastectomy:** Used more as a preventive measure, this breast cancer surgery is often opted for to remove a healthy breast to reduce the risk of developing breast cancer again
- **Reconstruction Surgery:** This type of breast cancer surgery allows surgeons to reconstruct the breast to make it appear natural

Managing breast cancer treatment during COVID-19

It has been observed by various health experts that with the pandemic as a major cause for concern, women seem to be neglecting their breast health by delaying mammograms and avoiding visits to doctors



Breast cancer patients undergoing chemotherapy are more prone to catching the COVID-19 infection due to the toxic side effects of the aggressive treatment. Some chemotherapy medicines and targeted therapies can also cause lung problems, which could put people at higher risk for serious COVID-19 complications



It is unfortunate that due to the coronavirus outbreak, many hospitals have stopped doing regular preventive breast cancer screening and checks, not just because of the social distancing rules but also because all the resources have now been diverted to the coronavirus management



According to a recent survey by SurvivorNet, 1 in 3 women reported that they have delayed taking their annual mammogram and about 45% of women said that the outbreak has made them nervous about visiting their physicians



Clinicians are also worried that breast cancer cases and surgeries being reported during the pandemic are less than usual, which may lead to potential rebound in the number of cases, once the fear of coronavirus subsides

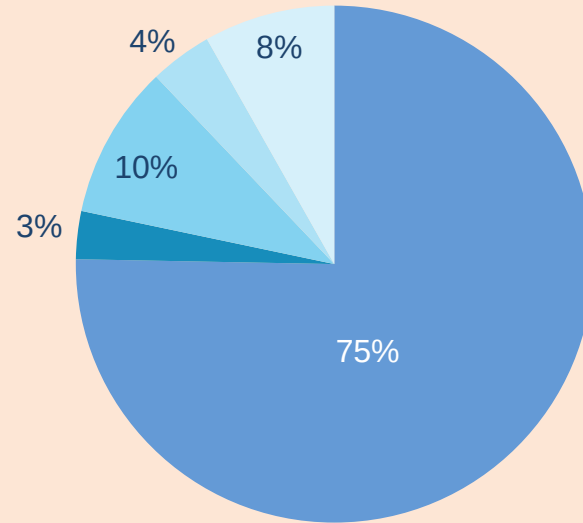
Knowledge and Perception of Breast Cancer among Indian Women



75% Indian women shy away from breast cancer screening

Reason For Not Getting Screened

- Did not consider screening to be necessary
- Screening was too expensive
- Was afraid of being diagnosed with breast cancer
- Heard negative reviews about screening from someone else
- Was uncomfortable with the level of radiation during conventional screening procedures



A study was conducted by sending it on online forums to a random sample of residents of India. The respondents were female. Among those surveyed, **39%** of respondents had got screened while **61%** of them had not screened. Among those who had not got screened, these were the primary reasons



Around **60%** of women are not comfortable speaking about the disease with their friends and family. Almost **12%** of the respondents themselves were suffering or had suffered from breast cancer



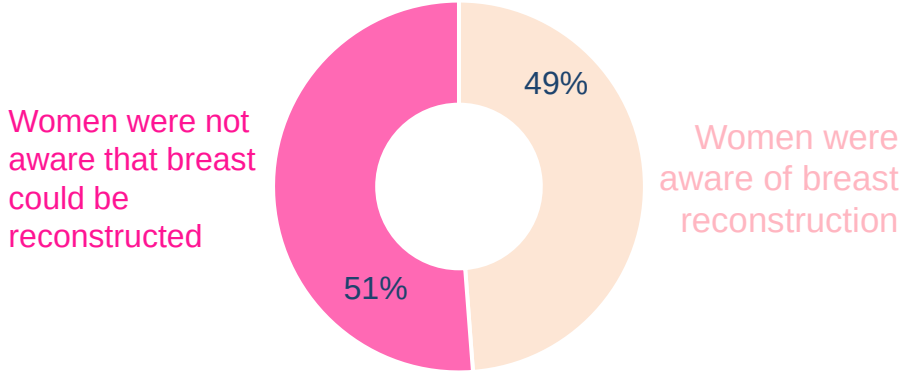
Almost **75%** of the respondents did not undergo screening for breast cancer due to ignorance or inertia. **80%** of the respondents know that they need to get regular check-ups for breast cancer. Whereas, only **25%** women have gone through screening for the ailment



2 out of 3 women were unaware of the simple self-examination that can help them detect the disease at an early stage. While **65%** of the respondents had not heard about mammography as a screening test for breast cancer, a whopping **80%** did not have the slightest idea about clinical breast examination

Perception of breast reconstruction among Indian women

Awareness of Breast Reconstruction



The Association of Breast Surgeons of India has strongly recommended immediate breast reconstruction. Although multiple studies have shown the advantages of breast reconstruction, the percentage of breasts reconstructed after mastectomy remains **<1%** in India



The low percentage of reconstruction is probably related to women's cultural and social perception of breast reconstruction. We wanted to know if that perception was correct and also to know the extent of awareness of the possibility of breast reconstruction in a developing country like India

Reasons for Low Breast Reconstruction Levels and Potential Strategies to Increase the Rates

Reasons for Low Breast Reconstruction Levels	Potential Strategies to Increase the Rates
➤ Low awareness of breast reconstruction among the public	Increase awareness by social media, word of mouth, television, and print media
➤ Misconception that Indian women do not desire breast reconstruction and that it is a procedure for the rich and young women	Spread the message that Indian women desire breast reconstruction regardless of age and income
➤ Unaffordable	Reduce wastage, increase efficiency, increase health insurance coverage, and reduce costs
➤ Long operation	Build a team, increase the efficiency of the team, do breast reconstruction often, parallel operating, and reduce the nonoperating time in the theater
➤ Poor infrastructure	Increase the number of operation theaters and hospitals specializing in breast reconstruction; train more surgeons, nurses, and other nonmedical staff in breast reconstruction

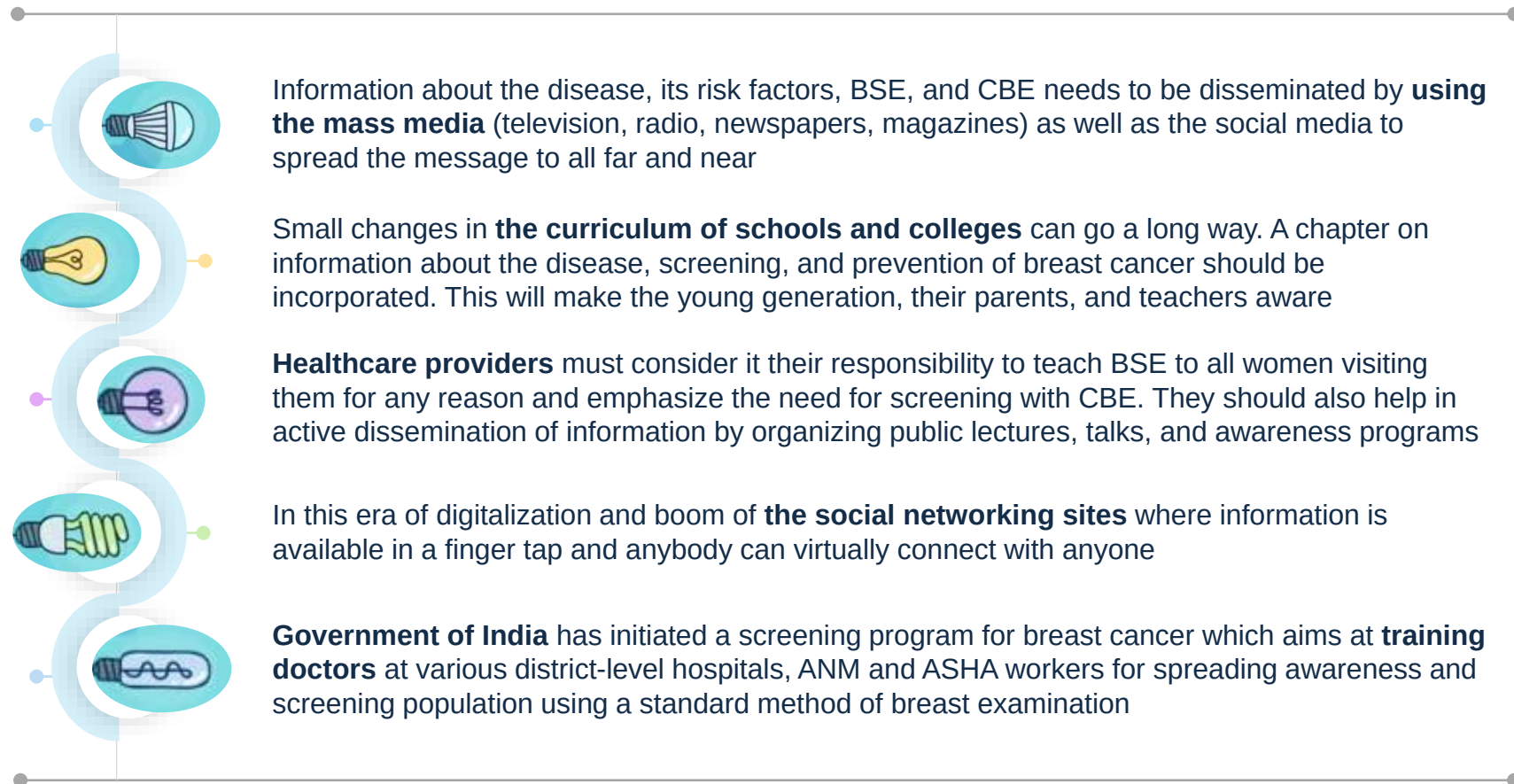


Improving outcomes for Indian women by changing perceptions of cancer

- ✓ *India lacks a nationwide organized screening program, so treatment occurs only after a woman seeks care for symptoms, putting Indian women at a disadvantage in fighting breast cancer*
- ✓ *This disadvantage can be readily seen when comparing survival rates of **50%** in India with the **90%** survival rate for breast cancer patients in the United States*

There are a few reasons for the lower survival rate in India:

- Lack of awareness about breast cancer and the signs to detect it
- Unavailability of proper medical facilities and infrastructure to provide screening facilities
- Lack of skilled medical health professionals (who can diagnose, treat or do a timely referral to a specialized center and spread awareness about breast health)
- Expensive procedures to screen for breast cancer
- No large-scale screening program for breast cancer in India
- Societal stigma in India associated with breast cancer



Technology has become a key force in improved diagnosis and treatment of breast cancer

Whiterabbit's AI technology increases breast cancer screening compliance and empowers radiologists to interpret results faster, improving patient experience and outcomes

AI-supported clinical software will allow radiologists to more accurately interpret screening mammograms thereby reducing unnecessary callbacks and lessening patient anxiety

Whiterabbit has raised more than \$49MM in funding. Its investors include WRVI Capital and Aceso Technology Partners

Niramai uses ML and AI to fight against the inaccessibility of breast examinations. They use a low-cost, portable device that takes high-res thermal images

Their solution can detect cancer at a much earlier stage than traditional diagnostic methods and self-examination and can therefore improve survival rates

Niramai has raised a total of \$6.1M in funding over 3 rounds. Dream Incubator and Pi Ventures are the most recent investors

UE LifeSciences created a breast exam device that uses cold air and heat sensors to check for vascular responses, metabolic activity, and thermal symmetry between breasts. Called the NoTouch BreastScan, this works different from a mammography that tests for physical concerns like tumors

Developing innovative yet affordable & easy-to-use tools that any health worker or doctor can operate with basic training

UE LifeSciences has raised a total of \$4.2M in funding over 2 rounds



Tools like tele-medicine have really helped patients in remote areas to get access to cancer care. Tele-medicine has also helped all cancer patients during the ongoing pandemic



Mobile van-based screening programs using sensitive 2D/3D ultrasound can go to small villages/door steps and diagnose breast cancer early



Targeted cancer therapies are another great example of technical advancement in breast cancer. Targeted therapies or drugs block the growth and spread of cancer by attacking specific biomolecules

DISCUSSIONS



Diagnosis of Breast Cancer

- ✓ A general indifference towards women's health, the lack of breast cancer screening programs, and delay in seeking advice for a recognized health problem due to financial and social reasons, result in delayed diagnosis
- ✓ As a result, Indian breast cancer patients present with advanced disease stage and have numerous poor prognostic factors such as large tumor, lymph node metastases, high pathological grade, and poor hormone receptors status
- ✓ Introduction of screening programs involving annual mammograms has had a positive effect on the number of people being diagnosed earlier



Treatment of Breast Cancer

- ✓ Poor access to high-quality multimodality treatment facilities, few treatment facilities for a huge population, and poor financial resources on the patient's part as well as the health care provider's part result in compromised quality of care to patients with established disease
- ✓ Majority of patients here are still treated at locally advanced and metastatic stages
- ✓ Number of treatment facilities is low for a huge number of patients
- ✓ Due to a large variation in the health care standards between regions, the quality of treatment available for breast cancer patients varies from pathetic to world-class

Epidemiology of breast cancer across different PBCRs in India shows increasing trends for incidence and mortality mainly due to rapid urbanization, industrialization, population growth and ageing affecting almost all parts of India

Factors as marital status, location (urban/rural), BMI, breast feeding, waist to hip ratio, low parity, obesity, alcohol consumption, tobacco chewing, smoking, lack of exercise, diet, environmental factors were major risk factors in India leading to increasing incidence cancer; however, the reason for high incidence of breast cancer in younger women are not well known

For trying to increase breast cancer screening on a population level, the development and implementation of AI to diagnose breast cancer is paving its way towards destigmatization, beliefs and early diagnosis of breast cancer in women of India

Tools like tele-medicine have really helped patients in remote areas to get access to cancer care. Mobile van-based screening programs using sensitive 2D/3D ultrasound can go to small villages/doorsteps and diagnose breast cancer early

LIMITATIONS



India's heterogeneous populations with different socioeconomic, cultural, and social factors may yield wider variations than observed, though it is unlikely that literacy levels would be higher as this dissertation includes major metropolitan cities



The findings may not be generalized across the country as they will be derived from certain specific locations in northern, western, and southern geographical regions of the country and the results of this research may also not be generalized to larger groups



The number of studies and time span are too narrow for an evaluation of significant changes in breast cancer and their attitude towards it over time



Higher awareness levels in Indian women may not always translate to better outcomes. Some evidence might suggest or be uncertain on a non-compliant attitude of women after breast cancer screening in terms of diagnostic follow up for abnormal findings, irrespective of their socio-economic status, suggesting other factors related to fear, stigma, discrimination, denial, and distrust in the health system

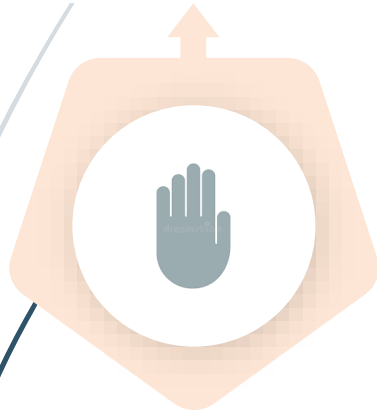


There is emphasize on importance of literacy, developing technologies, awareness

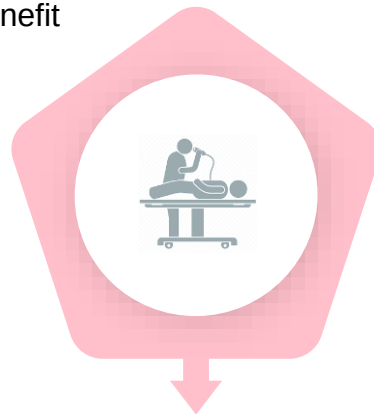


CONCLUSION AND RECOMMENDATION

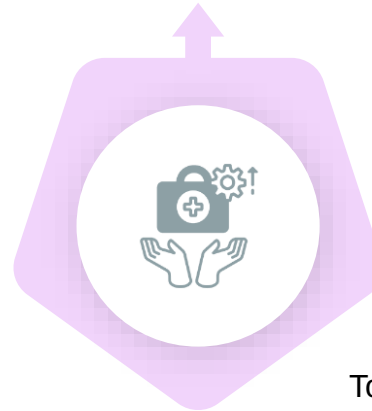
There is a major taboo against discussing breast cancer openly and many of the women are under the erroneous notion that there exists no effective therapy or treatment for the disease. By promoting preventive behavior among individuals, it is possible to make them understand the severity of a possibly serious consequence and the perceived benefit of a positive outcome



As the cancer projection data showed that the number of cases almost doubled by 2020. The projections of cancer incidence showed an urgent need for strengthening and augmenting the existing diagnostic/treatment facilities, which is inadequate and unable to handle the current load of cancer in India



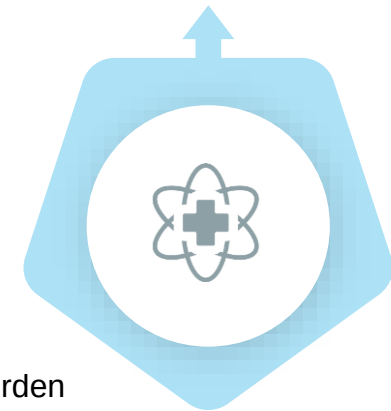
The recent emphasis by governmental agencies, institutions, and non-governmental and charity organizations on improved health awareness, promotion of early detection, providing comprehensive multimodality treatment in a protocol-based manner, and providing support for breast cancer management



To effectively fight the disease burden of breast cancer, we need evolved technologies like fluorescence imaging which are quite beneficial in laying out the road to detect the spread of cancer with better precision and in preventing complications in breast cancer surgeries. Every woman should be taught at an earlier stage in life to look out for symptoms



Patient centered approach is the key to success of emerging medical technologies. The startups demonstrate that how diffusion of a new technology among populations become easy and fast if it considers the cultural aspect of a specific population



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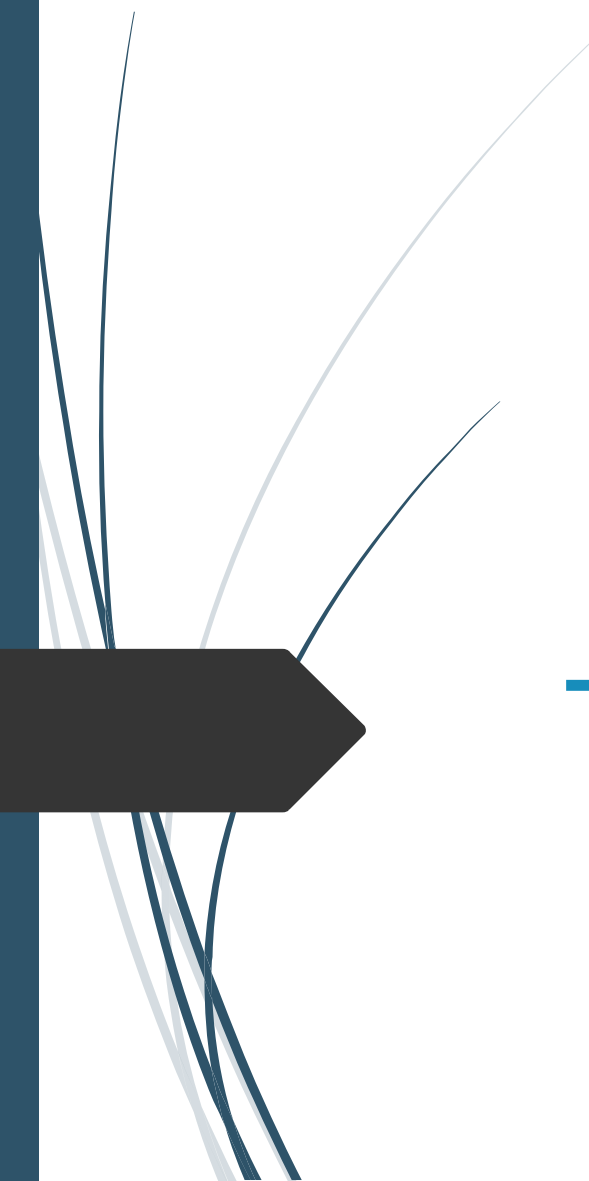
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THANK YOU