



# Phone-Based Breasts Self-Examination as an Intervention in Breast Cancer Control During the COVID-19 Pandemic

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## Abstract

**Importance** Exploring methods to mitigate the effect of COVID-19 pandemic on routine cancer screening activities among women.

**Objective** To investigate the effectiveness of telephone-based outreach as a substitute for physical screening for breast among screened women, during COVID-19 lockdown.

**Design/Setting/Subjects** Asymptomatic women aged 30–59 years were screened for breast and cervix cancers in the Chennai region, between January 2017 and March 2020 and are due for screening follow-up. A database from the population-based cancer screening program organized by the Cancer Institute during the above period was used for the study. Outcome data were obtained through the period from October 2020 to March 2021.

**Intervention** Phone-based breast self-examination awareness, inquiry about breast cancer symptoms, and guiding clinical management.

**Outcome Measure** Compliance to BSE protocol after 8–16 weeks, presence of significant symptoms, and incidence of early breast cancer.

**Results** Among 12,242 screened women, 6716 (56.8%) responded to a phone-based BSE intervention and 53 women had breast-related symptoms. Thirty-two (60.4%) women reported for further evaluation, and five invasive breast cancers were identified.

**Conclusion and Relevance** In a low-resource setting where there are no existent screening programs, simple interventions like teaching breast self-examination of women through tele-counseling can result in early detection of breast cancers.

**Keywords** Breast screening 2 · Tele-health 3 · Breast self-examination 4 · COVID-19 pandemic

## Key Points

1. Breast cancer screening in a low-resource setting.
2. COVID-19 pandemic disrupted global healthcare services and cancer screening bore the major brunt.
3. Modeling studies to explore alternate home-based screening for common cancers showed good results.
4. A real-world study of phone-based breast self-examination (BSE) in CBE screened women living in Chennai. (CBE-clinical breast examination).
5. Results show that a phone-based BSE and continuous awareness can further be explored as screening interventions to early detect breast cancers in low-resource settings and during pandemic disruptions.

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## Introduction

World over, the COVID-19 pandemic has disrupted non-COVID-related health services, including cancer care [1]. In India, major shifts happened in resource allocation and healthcare delivery with unified efforts toward COVID control. The modified cancer management and follow-up

protocols came into vogue to optimize cancer care during the lockdown restrictions. The preventive health services bore the major brunt, and the existing cancer screening programs including cancer awareness activities have to be suspended [2]. Consequently, an increase in cancer incidence and late stages of disease presentation are inevitable within the coming years. However, the pandemic also provided opportunities for innovations in healthcare systems. For example, in Bangladesh, the opportunity to evaluate the electronic health information system has set a benchmark for other low- and middle-income countries (LMICs) [3]. Tele-medicine was reinvented and has emerged as the most utilized health delivery system across all levels of care [4]. In a health screening, alternative and home-based methods were explored and implemented irrespective of the existing screening practices.

Chennai, a densely populated metropolitan city in South India, had a high incidence of COVID-19 during the initial phases of the pandemic. A community-centric public health policy to control the spread of infection became the priority. In the Cancer Institute (WIA), a regional cancer care center in Chennai, the focus was shifted to prioritizing optimum cancer care under restricted conditions and resources. Preventive care was paused and the community-based cancer screening programs were suspended without a definitive timeline. However, women's screening continuum and follow-up care had to be addressed and phone-based health consulting was initiated. A focused breast self-examination (BSE) awareness promotion over the phone was conducted by trained health workers, and the observed outcomes of the intervention are discussed in this paper.

## Objectives

The objective was to assess tele-counseling-based breast self-examination as an intervention to detect early breast cancer when screening services are interrupted during unforeseen situations like the pandemic. It also assesses the compliance with telephone-based BSE education, referral management, and understanding of the usefulness of telephone-based communications in screening programs.

## Methods

The study is an analysis of clinical outcomes observed following a phone-based BSE awareness intervention, in a cohort of screened women. Cancer Institute (WIA) has ongoing population-based organized cancer screening programs for oral cavity, breast, and cervix in multiple districts to benefit never-screened women aged

30–59 years. Household surveys were conducted to identify and invite eligible women for screening. General cancer awareness and demonstration of breast self-examination were given to women who attended the screening. Clinical examination of breasts (CBE) and oral cavity and HPV DNA test to screen cervix were offered as screening tests. Screen-positive women were evaluated in the nearby district headquarters hospital and tertiary care centers. The data of all the screened women were entered into a database and updated with follow-up visits.

## Inclusion Criteria

The data of all screened women between January 2017 and March 2020 were extracted from the database. Women residing in the suburbs of the Chennai district were included in the tele-counseling.

## Exclusion Criteria

Women who had no contact phone numbers, women diagnosed with any cancer, or expired during the interim were excluded from the study.

## Ethics Approval

Ethics approval is not applicable. Informed consent was obtained from all screening participants during primary screening.

## Phone-Based BSE Intervention During The Pandemic

Tele-counseling was done from October 2020 to March 2021, with at least a six-month interval from the date of the initial screening. Trained health workers of the screening team provided tele-counseling to 100–150 women a day. Women were enquired if they have ever done BSE after their primary screening and the responses were recorded. An interactive verbal demonstration of the BSE procedure was given and the respondents were questioned for breast cancer-related symptoms such as the presence of lumps in the breast or axilla, recently noticed nipple retraction, presence of nipple discharge, change in skin color or skin ulcers, and radiating neck or shoulder pain. Women were asked to call back if they found any positive signs after performing a self-examination. After 8–16 weeks, all women previously contacted were called again to inquire if they performed BSE and had any symptoms. The responses were recorded and updated in the database. The medical officer contacted those women who had symptoms and advised examination and breast imaging studies in their closest neighborhood facility. Based on the reports shared,

women were called for further evaluation at Cancer Institute (WIA).

### Results

The data of 12,242 women screened from January 2017 to March 2020 were extracted. Around 28 women with a diagnosis of cancer were excluded. The list was divided into cohorts of 50 women and distributed in rotation to COVID-off duty staff. A total of 11,820 women were contacted involving 1620 man-hours (3 staff × 4 h × 135 days). The results are shown in Fig. 1.

Among 11,820 women, 6912(58.5%) women could be contacted for the tele-counseling. Around 1620 (23.4%) of the screened women had been practicing BSE regularly. After 8–16 weeks, all women previously contacted were called again to inquire if they performed BSE and had any symptoms. Around 6716 (56.8%) cohorts participated in both the initial and re-call counseling. One hundred and ninety-six women did not respond to a follow-up call and were excluded after trying to contact them at least three times at weekly intervals.

A total of 6236 (93%) women had done BSE following tele-counseling at least once among the respondent cohorts. Fifty-three women had some breast-related symptoms and were advised further evaluation. Tele-consultations were

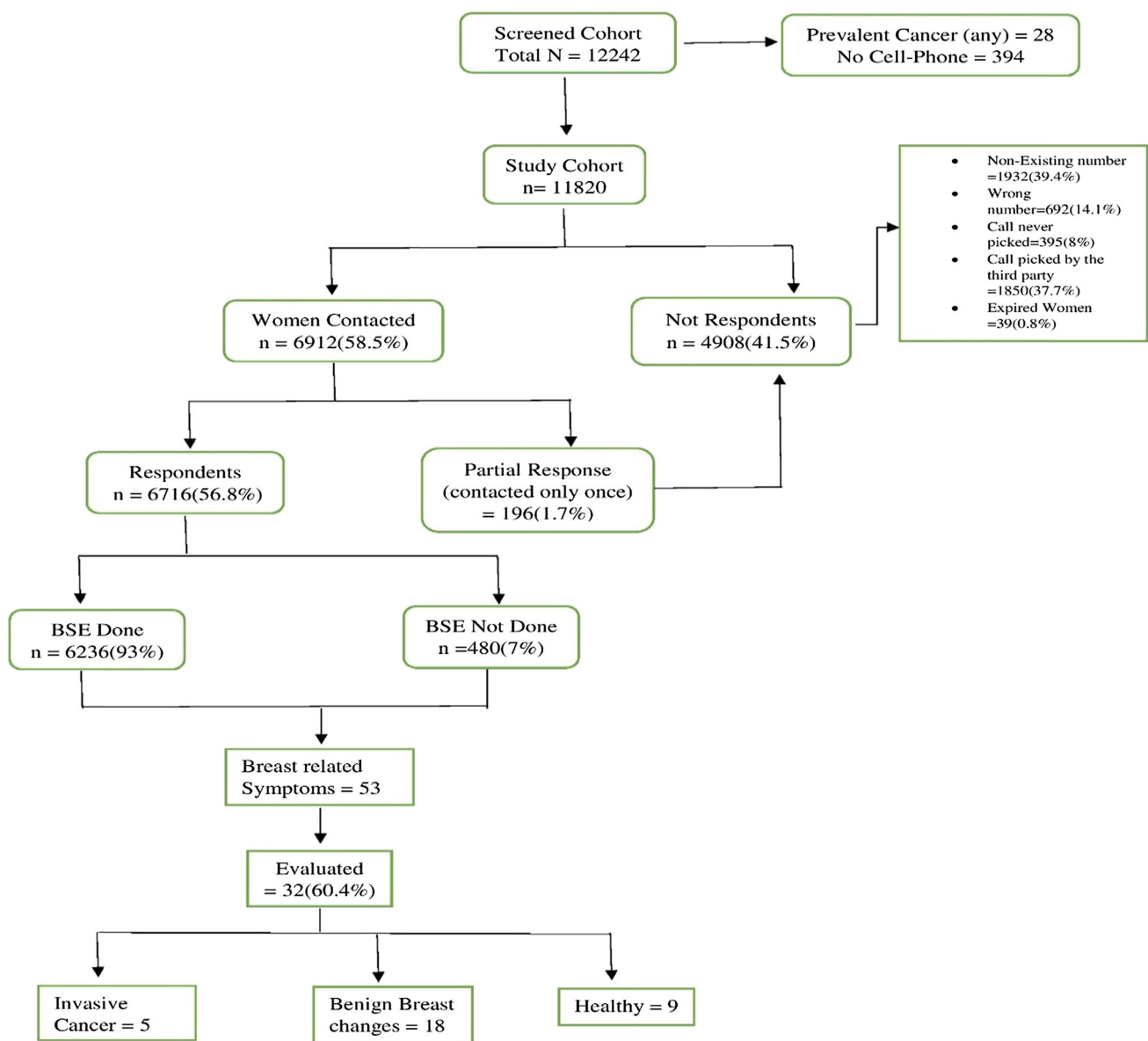


Fig. 1 Study overview-phone based BSE follow-up

**Table 1** Sociodemographic characteristics of study cohort

Characteristics	Total Women		Respondents	
	Frequency	%	Frequency	%
<i>Age group</i>				
30–39	5272	44.6	3085	58.5
40–49	3989	33.7	2298	57.6
50–59	2559	21.6	1333	52.1
Total	11,820		6716	
<i>Religion</i>				
Hindu	10,408	88.1	5913	56.8
Muslim	450	3.8	260	57.8
Christian	962	8.1	543	56.4
Total	11,820		6716	
<i>Education</i>				
Nil	2106	17.8	890	42.3
Primary	1397	11.8	701	50.2
Middle	3613	30.6	2039	56.4
High school	3135	26.5	1965	62.7
College	1569	13.3	1121	71.4
Total	11,820		6716	
<i>Occupation</i>				
Homemaker	8523	72.1	4942	58
Laborer–unskilled	1900	16.1	938	49.4
Laborer–skilled	802	6.8	402	50.1
Office jobs	595	5	434	72.9
Total	11,820		6716	
<i>Marital status</i>				
Married	11,024	93.3	6282	57
Never married	56	0.5	32	57.1
Widowed	662	5.6	360	54.4
Divorced	78	0.7	42	53.8
Total	11,820		6716	
<i>No. of pregnancies</i>				
0	367	3.1	204	55.6
1–2	5693	48.2	3356	58.9
3 +	5760	48.7	3156	54.8
Total	11,820		6716	
<i>Breastfed</i>				
Nil	687	5.8	384	55.9
< 12 months	931	7.9	600	64.4
> 12 months	10,202	86.3	5732	56.2
Total	11,820		6716	
<i>Contraception ever</i>				
Yes	8973	75.9	4991	55.6
No	2847	24.1	1725	60.6
Total	11,820		6716	

provided until the clinical examination was possible. Clinical evaluation of 32 women resulted in the identification of invasive ductal carcinoma in five women. The

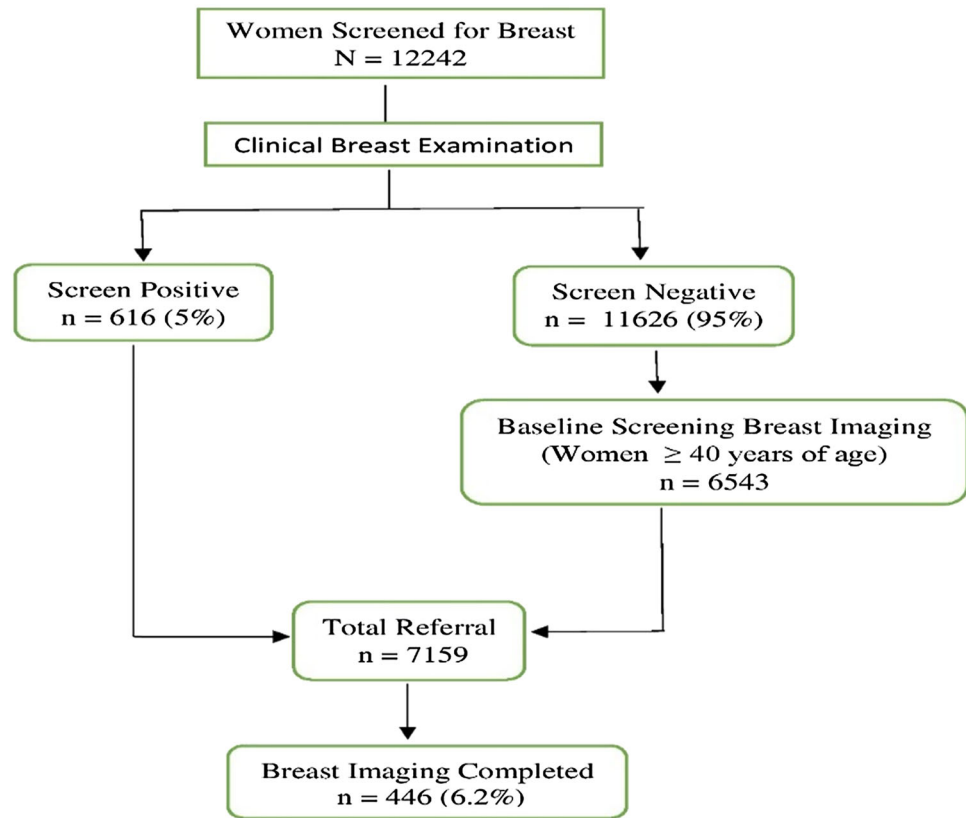
stage at diagnosis was T1N0M0 and T1N1M0 in two women and T2N1M0 in the third woman. The stage is unknown to one woman who was not willing to share the details. All these women except one were screened by CBE and documented to screen normal within the past 24–36 months. A 32-year-old young woman had a lump > 5cms and a defaulter of screening evaluation during 2018. All women have either completed or are under treatment.

## Discussion

The effect of the first COVID-19 wave on cancer screening based on a survey of 40 member countries found that screening was suspended at all levels of health settings[5]. Modeling studies are available on alternative home-based cancer screening interventions during disruptions like the pandemic for common cancers[6–8]. Prolonged disruptions of screening have led to a 6% lower effectiveness in reducing colorectal cancers mortality in the Asia–Pacific region [6]. However, increased screening participation rates were found with a FIT-based CRC screening that could mitigate the consequences of reduced screening[7]. Disruption of cervical screening services in a select population group has led to an increase of ASIR by 5.3%, upstaging of disease by 0.0–10.2, and an additional death rate ranging from 0 to 16.6 cases[8]. The present study demonstrates that a simple intervention using telephone-based education and follow-up of screened women helps in the early detection of breast cancer in a real-world setting.

Cancers that can be prevented or controlled by screening form the major burden in India [9]. A significant rise in woman's breast cancer incidence has been observed across 15 population-based cancer registries between 2012 and 2016. In Tamil Nadu, breast cancer is the leading site of cancer with a CIR of 24.7/100000. In Chennai city, 1259 cases (CIR 46.4) were newly diagnosed in 2016 [10]. The hospital-based cancer registry data of Cancer Institute (WIA) Chennai reveal that 58% of new breast cases presented at stage 3 and above between 2006 and 2013 [11]. There is no organized cancer screening program in the country. Cancer care facilities offer low-scale opportunistic screening for oral breast and cervix cancer. In 2010, the government first implemented the non-communicable diseases control program to control diabetes, hypertension, stroke, oral, breast, and cervix cancers through mass awareness and screening [12]. However, the recently conducted National Family Health Survey 2021 shows that the breast cancer screening participation rate is a dismal 0.9% [13].

The reasonable approach to breast cancer control in developing countries is to provide minimal possible care

**Fig. 2** Compliance to referral for breast imaging

and enlighten the population on the benefits of early detection using innovative approaches. Mammography screening is not the recommended approach to control breast cancer due to resource constraints. Continuous breast awareness and locally appropriate screening strategies are recommended to tackle the rising burden and poor outcomes [14]. Though BSE has failed to show improved breast cancer outcomes in randomized trials, nevertheless it is the best approach to educate the masses on early detection [15, 16]. It has been shown that BSE has resulted in a marked reduction in breast cancer size over the past 25 years among American women, calling for a reevaluation of the Shanghai study [15]. In developing countries, BSE is recommended as the most appropriate screening method and the gap between knowledge and practices is the major barrier preventing a favorable outcome in breast cancer control in these settings [16].

The two randomized controlled trials in Mumbai and Trivandrum showed multiple rounds of CBE as effective in down-staging without any significant impact on breast cancer mortality rates [17, 18]. The demographic characteristics of screened women in our community screening program are largely similar in composition to that of the study populations in these trials—urban, low socioeconomic, and never screened (Table 1).

The participation rate for a single round of screening in never-screened women is 55.2% across our district cancer screening programs (unpublished data). In the Mumbai study, the screening adherence rate was 67% after four rounds of screening. In the Trivandrum study, first-time follow-up surveillance showed that only 23% of screen participants practice BSE. Likewise, our study also showed an exact 23% BSE compliance rate in the initial surveillance. However, 93% of women practiced BSE at least once during the six-month interval period after a single round of tele-counseling.

In our district screening program, in a real-life setting, the compliance to referrals of once screened women is less than 10% (Fig. 2).

The Mumbai and Trivandrum clinical trials after multiple rounds of screening showed a referral compliance rate of 76.2 and 49%, respectively. [17, 18]. In the present study, after a telephone-based follow-up of screened cohorts, there was an increase in self-referral, and 32 of 53 women (60.4%) underwent evaluation for breast cancer-related symptoms and five invasive cancers were identified. Thus, the study provides an opportunity to explore tele-consultations or simple phone-based voice reminders to improve breast awareness. The intervention can modify health-seeking behavior among women and can improve breast cancer outcomes in never-screened populations.

## Strengths and Limitations

Though the study is proposed as an alternative approach during the pandemic crisis, it holds good for any resource constraint setting that plans to implement a breast screening program. The results are from a well-organized population-based screening program in a real-world scenario with inherent challenges. The program is executed by well-trained health workers along with a robust data management system [19]. A non-compromise approach to awareness creation and teaching BSE, which are important components of a breast screening program, has helped us to conduct this study smoothly during the lockdown. However, a similar approach has not yielded favorable outcomes, among screened women in our rural–district programs due to barriers such as the non-availability of personal telephones, the reluctance of women to follow the phone-based instructions, and non-accessible health care for self-referred women in their vicinity. Nevertheless, the phone-based follow-up provided an opportunity to enhance the communication network resulting in more self-referrals, thereby reversing the pre-pandemic trend of time-based attrition to the screening continuum.

## Conclusion

In developing countries, preventive health care is still evolving and simple interventions that are feasible to implement will yield better outcomes. An exercise that started as a phone-based awareness creation to engage the screening team to reassure screened women evolved into a self-breast examination intervention that has yielded outcomes worth exploring further. The study re-emphasizes the role of BSE and continuous breast awareness in breast cancer screening programs in resource-constrained settings.

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## Declarations

**Conflict of interest** The authors that they have no conflicts of interest to disclose.

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