



## Original article

# Cancer early detection program based on awareness and clinical breast examination: Interim results from an urban community in Mumbai, India



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## ABSTRACT

Indian women with breast cancer are usually diagnosed in advanced stages leading to poor survival. Improving breast awareness and increasing access to early diagnosis and adequate treatment has been advocated for breast cancer control. We implemented a program to increase awareness on breast cancer and access to its early detection in an occupational health care scheme in Mumbai, India. Breast awareness brochures were mailed annually between June 2013 and June 2016 to a cohort of 22,500 eligible women aged 30–69 years old receiving universal health care from an occupational health care scheme comprising of primary health centres and a referral secondary care hospital in Mumbai. Women with suspected breast cancers were provided with diagnostic investigations and treatment. Socio-demographic information and tumour characteristics were compared between the breast awareness pre-intervention period (Jan 2005–May 2013) and the breast awareness intervention period after four rounds of mailers (June 2013–June 2016). The proportion of women with early tumours and axillary lymph node negative cancers increased from 74% to 81% and 46% to 53% respectively, between the two periods. While the proportion of patients receiving breast conserving surgery increased from 39% to 51%, the proportion receiving chemotherapy decreased from 84% to 56%. Interim results following efforts to improve breast awareness and access to care in a cohort of women in an occupational health care scheme indicate early detection and more conservative treatment of breast cancers. Creating awareness and improving access to care may result in cancer down-staging.

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## 1. Introduction

The estimated age-standardized incidence rate of breast cancer in India is around 36 per 100,000 women per year [1]. Although the incidence in India is much lower than that of Europe and North America (ranging from 92 to 112 per 100,000), the breast cancer mortality in India (12.7 per 100,000 women) is similar to that of the developed countries implying a higher mortality to incidence ratio

[2]. There is no national organised population-based breast cancer screening programme in India. Women can receive screening mammography in the private sector. In the public sector, mammography is only performed for diagnosis, not screening. Indian women usually present with advanced tumours leading to poor survival [3–7]. In lower-middle income countries like India, although the 5-year survival for localised tumours exceeds 75%, survival of the larger tumours is as low as 15–32% [3–5]. Clinical down-staging by increasing breast awareness and access to early diagnosis followed by prompt and adequate treatment has been suggested for breast cancer control in low and middle income countries (LMICs) [8]. We implemented a breast awareness-based clinical down-staging program in a cohort of women receiving

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universal health care from an occupational healthcare scheme in Mumbai, India, in collaboration with the International Agency for Research in Cancer (IARC) Lyon, France. The program aims to improve breast cancer awareness and encourage symptomatic women to seek prompt medical attention and diagnostic investigations such as expert clinical breast examination (CBE), imaging and tissue sampling leading to early diagnosis and adequate multidisciplinary management of detected breast cancers. We report the interim results after three years of breast awareness efforts in this manuscript.

## 2. Materials and methods

### 2.1. Study setting

This breast awareness program is undertaken in the context of the Universal Health Care (UHC) system for employees at Bhabha Atomic Research Centre (BARC), a facility of the Government of India. The occupational health scheme comprising of a two tiered network of primary health centres and a secondary care referral hospital (BARC Hospital), hereafter referred as the “central hospital”, offers a lifelong free health care to its employees and their dependent family members. An electronic medical records system (EMR) in the health care scheme enabled retrieval of the past and current medical records as well as demographic details of all the beneficiaries of the healthcare scheme.

### 2.2. Methods

This on-going breast cancer awareness intervention targeting a cohort of women between the ages of 30 and 69 years ( $N = 22,500$ ) enrolled in the health care scheme was initiated in June 2013. The study population and setting have been described by the authors previously [9]. We mailed awareness brochures with information about breast anatomy, physiological changes in the breast and early symptoms and signs of breast cancer, and high cure rates and improved cosmetic following early detection and adequate treatment, to all the eligible women. Brochures were sent on an annual basis in four rounds. Five breast clinics were established in primary health centres of the scheme to enable the targeted women to seek early detection services and further referral for diagnosis and treatment. Five female nurses were trained for educating and counselling women on breast awareness as well as teaching self breast examination. Five female doctors: three General Practitioners, one surgeon and one gynaecologist were trained for performing CBE in women with suspected breast symptoms and signs. The team also included a radiologist and a pathologist for their respective speciality.

These trained personnel provided such services in the breast clinics and referred women with suspected breast cancer to the central hospital. Silicon breast models were available in each breast clinic to educate women on normal breast consistency and appearance and the features breast abnormalities such as breast lumps, lumpiness, changes in breast size, skin and nipple changes. These services were run once a week where women could walk into the clinics without prior appointment. The women with abnormal or suspicious findings on CBE were referred to the central hospital for registration, diagnosis and treatment. The central hospital is equipped with a diagnostic mammography/ultrasonography unit, a pathology laboratory and a multidisciplinary team comprising of breast surgeons, physicians, pathologists and radiologists. A fully free multidisciplinary breast cancer management with adjuvant treatment was carried out at the central hospital which has adapted the standard treatment protocol for breast cancer cases as advocated by the Tata Memorial Hospital (TMH), Mumbai, a major

national tertiary cancer centre in India. Training of personnel, technical support in the form of brochures and self-breast examination models, management of database and analysis of results were carried out by the IARC. The study protocol was reviewed and approved by the institutional Ethics committee of the central hospital in June 2012.

Women referred from the breast clinics underwent triple testing (triple diagnosis) procedure in which an expert CBE was performed by a breast surgeon followed by diagnostic ultrasonography or mammography or both. If any of these procedures indicated an abnormality, fine needle aspiration cytology (FNAC) was performed by the radiologist under ultrasonography control; core biopsy was undertaken in cases with equivocal FNAC findings, completing the triple diagnosis procedure. Women with confirmed breast cancer underwent surgical treatment at the central hospital. All women who had breast-conserving surgery underwent mandatory radiotherapy as planned and executed by radiation oncologists at the TMH. Whenever indicated, adjuvant chemotherapy and hormone therapy were planned and advised by medical oncologists at TMH as per the standard protocol and these were carried out at the central hospital. The patients were followed up at regular intervals in the breast clinics at the hospital to monitor the local as well as systemic control of the disease.

### 2.3. Statistical analysis

A specific database including all the cancer cases in the pre-intervention and intervention periods was constructed. The data from the EMR were uploaded on the online study database. The database was free from personal identifier. The methodology used for the cases diagnosed between January 2005 and May 2013 (pre-intervention period), and the cases diagnosed between June 2013 and June 2016 (intervention period) was exactly the same. Data entry operators with experience in online data entry were recruited and trained by the program coordinators. The data analysis was done at IARC. The number of distributed brochures, breast clinics conducted, CBE screened patients, as well as mammography and ultrasonography investigations, FNAC and core biopsy were recorded. We compared breast cancer cases diagnosed between the period January 2005 and May 2013 defined as the “pre-intervention period”, and the cases diagnosed from June 2013 to June 2016 referred to as the “intervention period”. The pre-intervention data were available from the electronic medical records and the ongoing cancer registration in this occupational health care system. The socio-demographic characteristics as well as the tumour stage, hormonal receptor positivity, surgery performed and adjuvant treatment received were reported as proportions. Comparison of the patients' socio-demographic characteristics between the pre-intervention and intervention periods was done using the Pearson's chi-square test. The tumour characteristics and treatment details of the two periods were compared using the test of equality of proportions using large-sample statistics. Data were analysed using statistical software Stata 13.0 (StataCorp LP, Texas, USA) and a  $p$ -value  $< 0.05$  was considered statistically significant.

## 3. Results

Around 88,000 brochures containing breast awareness messages were sent during the 4 rounds of mailing. During the intervention period, a total 400 breast clinics were conducted and 2709 women attended the clinics seeking care. Of them, 427 women were referred to the central hospital for mammography and further evaluation. A total of 93 FNAC were performed, and 77 cancers were diagnosed.

The demographic characteristics of women diagnosed with

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