

# Awareness of Breast Cancer and Practice of Breast Self-Examination among Urban Underprivileged Women in Bangalore city, India

Avita Rose Johnson<sup>1</sup>, MBBS, MD, DNB, PGDMLE;  Mitchell Singstock<sup>2\*</sup>, BA;  Cency Baburajan<sup>1</sup>, MBBS, MD; Suchitra Bajaj<sup>3</sup>, MBBS; Sulekha Thimmaiah<sup>1</sup>, MBBS, MD

<sup>1</sup>Department of Community Health, St. John's Medical College, Bangalore, India

<sup>2</sup>University of Cincinnati College of Medicine, Ohio, USA

<sup>3</sup>Biocon Foundation, Bangalore, India

\*Corresponding author: Mitchell Singstock, BA; 3230 Eden Ave, P.O. Box: 45267, P.O.# 154, Cincinnati, OH, USA. Tel: +1 513 8333369; Email: singstmd@mail.uc.edu

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## Abstract

**Background:** The low breast cancer survivorship in India compared to developed countries has been found to be attributed to late detection. Breast self-examination (BSE) still remains a viable screening option among poor and marginalised communities. We conducted the present study to determine breast cancer awareness and practice of BSE and their determinants among urban underprivileged women.

**Methods:** We conducted this cross-sectional study in an urban underprivileged area in Bangalore city in early 2020, among women aged 25 years or more. Our sample size was estimated as 714 subjects. The interview schedule included Breast Cancer Awareness Measure. We employed chi-square test for associations and logistic regression analysis for adjusted odds ratios with 95% confidence intervals.

**Results:** Out of the 751 women, 60.3% were not aware of any symptoms and 61.1% were not aware of any risk factors of breast cancer. Only 6% had heard of BSE and 3.4% reported performing BSE in the past year. The practice of BSE was found to be more prevalent among women who were aware of at least one symptom [OR=6.8(2.5-18.2), P<0.001] or one risk factor [OR=12.9(3.9-43.6), P<0.001] of breast cancer and among those with past attendance at a breast cancer screening camp [OR=31.4(13.3-74.1), P<0.001].

**Conclusion:** Poor awareness concerning breast cancer and woefully inadequate practice of BSE among urban underprivileged women highlights the requirement for targeted interventions in such communities. The importance of awareness of breast cancer as a precursor to practice BSE was evident in our study, which emphasizes the need for increased access to quality and credible health information. This study emphasizes the importance of community-based programming, like breast cancer screening camps, in order to improve practice of BSE.

**Keywords:** Breast self-examination, Early detection of cancer, India

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## 1. Introduction

Breast cancer is recognized as the most prevalent cancer among women worldwide and the second most common cancer overall (1). In 2018 alone, there were two million new cases of breast cancer (2). Additionally, breast cancer has overtaken cervical cancer to become the most common cancer among women in India (3). Even though 80% of breast cancer occurs in women above the age of 50, the epidemiological profile of breast cancer in India differs from more developed nations showing that the disease affects younger women, with a significant downward shift into the thirties and forties, thereby, affecting women in the prime of their life (4). The incidence rate has increased over the past several years in India; more than half of women present in advanced stages of breast cancer, with a 66% five-year survival rate as compared to 90% in the

United States of America (5). To improve the survival rate, early detection of breast cancer is critical. This is only possible once women are aware of the disease, its signs and symptoms, and once there are systems in place for screening and referral (6). Taking cognizance of the rising numbers of breast cancer cases in India, the Indian government has recently taken screening into consideration for oral, breast and cervical cancer as part of the National Programme for Control of Cancer, Diabetes, Cardiovascular disease and Stroke (NPCDCS) (7). The uptake of breast cancer screening services depends on the awareness among women and is influenced by socio-demographic and socio-cultural factors, as well as organizational and structural factors associated with the health system (8). For the majority of Indian women, there is poor access to mammogram services or even a clinical breast examination, which indicates that breast self-examination (BSE) is a more

feasible screening method (9). BSE is a self-assessment performed by women to determine the changes in the appearance and consistency of their breasts as an early indicator of breast cancer (10). Most developed countries no longer recommend BSE as a part of breast cancer screening due to the lack of evidence regarding the improved detection or survival of women with breast cancer. However, it is believed that women being familiar with their own breasts is of value since they understand what is normal and promptly report the changes (11). For those who live in poverty and in marginalized communities with very little or no access to breast cancer screening by physicians' examination or mammograms, BSE is still the only screening option available (12). Considering the paucity of literature on this subject among poor urban Indian women, we aimed research to assess the awareness of breast cancer and practice of BSE and their determinants among women residing in an urban underprivileged area of Bangalore.

## 2. Methods

### 2.1 Study Design

This was a cross-sectional study in an urban underprivileged area of Austin Town in Bangalore city, the urban field practice area of a medical college. The study was conducted over a period of six months and completed in early 2020.

### 2.2 Selection and Description of Participants

We considered women aged 25 years or more residing in the above-mentioned area for the study. Based on a previous study, where 35% of women were aware of at least one risk factor of breast cancer (13), with 10% margin of error (relative precision) and 95% confidence level, the sample size was calculated to be 714. According to the health management information system of the affiliated medical college, a sampling frame of 883 women aged 25 years or more residing in that area were prepared. We assumed a refusal rate of 15% and decided to perform universal sampling, going house-to-house, inviting all the women in the list to be part of the study, which caused us to slightly exceed the estimated sample size. Those who had completed 25 years of age or more, married or unmarried, residing in the area for the last one year were included in our study. The women who were unable to comprehend the questionnaire due to mental health conditions, and those who could not be contacted even after three home visits were excluded from the study.

### 2.3 Data Collection

Community health workers affiliated to the medical college were trained to administer an interview schedule during the house-to-house visits. They translated the interview into the local language, which comprised two parts: i) socio-demographic details such as age, marital status, education, employment, total monthly income, number of pregnancies, history of ever breastfeeding, use of oral contraceptive pills, family history of breast cancer, whether they have ever been a member of a women's community group, and if they have ever attended a breast cancer screening camp, ii) Breast Cancer Awareness Measure (BCAM), developed by Cancer Research UK, King's College London, and University College London in 2009 (14). BCAM determines the awareness of women concerning the symptoms of breast cancer (11 questions), risk factors of breast cancer (9 questions), and awareness and practice of BSE (6 questions), and is suitable for population-based surveys regarding breast cancer awareness. Even though there is no scoring system, according to BCAM, a woman is said to be aware of breast cancer provided that she states five or more non-lump symptoms and would be aware of older age related risks and monthly frequency of BSE (14). The questions regarding awareness of breast cancer screening programs by the NHS-UK were omitted since they were not relevant to the setting of our study. We found BCAM to have an excellent internal consistency of Cronbach's alpha of 0.90 and efficiency of fit index of 0.80 in Asian study settings (15). Higher levels of cancer awareness among medical professionals as compared to that among non-medical population indicates a good construct validity in BCAM (14). Income categories were determined using Modified BG Prasad's Socio-economic Classification which is categorized based on monthly per capita income, with correction for Indian Consumer Price Index (16). Bottom of Form Written informed consent was taken from each subject ahead of the enrolment into the study. Additionally, the women participated in the study were given health education about breast cancer and were taught how to perform BSE.

### 2.4 Statistics

The data collected was entered in Microsoft Excel and then analysed with R Studio and Sigma Plot 12.5. We described socio demographic variables in terms of frequency, and proportions, as well as mean, standard deviation, median and inter-quartile range as applicable. The outcome variables in our study were i)

awareness of at least one symptom of breast cancer, ii) awareness of at least one risk factor of breast cancer, iii) practice of BSE at least once in the last year. These variables were associated with various independent co-variables utilizing Chi-square test. Subsequently, we entered significantly associated variables into a multiple logistic regression model, and Adjusted Odds Ratios of 95% confidence intervals were calculated. A P value of <0.05 was considered significant for all the analyses.

### 3. Results

*Socio-demographic overview:* A total of 751 urban underprivileged-dwelling women participated in our research. The mean age of the women was 41.5±10.0 years. Half of the subjects belonged to the income group of 29 United States' Dollars (USD) or less per person, per month. The median monthly per capita income was INR 1250 [833,1333] or USD 17.8 [11.9, 19.0]. The majority of them (83%) were married and the average number of pregnancies per mother was 2.5±1.4. Most (76%) of the women were literate. Most mothers (97%) reported having breastfed their children. 11 participants were consuming oral contraceptive pills at the time of our research. Two women reported having a breast lump and four had a family history of breast lump (mother or sister).

*Awareness of breast cancer:* We found the overall awareness of breast cancer to be very poor as per BCAM criteria, with not a single study subject aware of five or more non-lump symptoms along with the awareness of older age related risks and monthly frequency of BSE.

*Awareness of symptoms of breast cancer:* The overall awareness of the symptoms of breast cancer was low with 453 (60.3%) of the women being unable to state a single symptom of breast cancer. Only 9% were aware that a lump in the breast could be a sign of breast cancer. The least recognizable symptom of breast cancer was redness of the skin (3.3%) while the most recognized symptom was discharge or bleeding from nipples (35.1%) (Table 1).

*Awareness of risk factors for breast cancer:* Alcohol consumption in excess of one unit per day was the most commonly stated risk factor for breast cancer (29.1%) whereas a past history of breast cancer was the least recognized risk factor (6.2%) (Table 2). However, 459 (61.1%) of the participants were not able to state a single risk factor of breast cancer.

*Determinants of awareness:* The awareness of at least one symptom of breast cancer and at least

**Table 1:** Awareness of symptoms of breast cancer (N=751)

Awareness of Symptoms of Breast Cancer	N (%)
Not aware of any symptoms	453 (60.3)
Discharge of blood from the nipple	264 (35.1)
Pain in one of the breasts	77 (10.3)
Lump or thickening of the breast	68 (9.0)
Puckering or dimpling of the skin	54 (7.17)
Pulling in of the nipple	50 (6.6)
Lump or thickening under the armpit	48 (6.4)
Nipple Rash	41 (5.5)
Changes in the shape of the breast or nipple	42 (5.5)
Changes in the size of the breast or nipple	41 (5.4)
Change in nipple position	39 (5.1)
Redness over the breast skin	25 (3.3)

**Table 2:** Awareness of risk factors for breast cancer (N=751)

Risk factors for breast cancer	N (%)
Not aware of any risk factor	459 (61.1)
Drinking more than 1 unit of alcohol a day	226 (29.8)
Inadequate physical activity	123 (16.3)
Being overweight	83 (11.0)
Greater occurrence in older women	75 (9.9)
Having a close relative with breast cancer	75 (9.9)
Late menopause	63 (8.3)
Early menarche	58 (7.7)
Having children later in life or not at all	30 (6.8)
Past history of breast cancer	47 (6.2)

one risk factor of it were significantly higher among gainfully employed women ( $P<0.001$ ) with monthly per capita income of  $\geq$ USD 30 ( $P<0.001$ ) aged below 50 ( $P<0.001$ ), among those who attended a breast cancer screening camp before ( $P<0.001$ ), and among those who were part of a community group ( $P<0.001$ ) (Table 3). Due to the small number of past diagnosis of breast cancer among family members or self ( $n=6$ ), it was not possible to determine if this variable had an impact on their awareness of the symptom. There was no significant association between the awareness and literacy ( $P=0.357$ ) or marital status ( $P=0.058$ ).

*Breast Self-Examination:* Among all our participants, only 45 (6%) had heard of BSE. Among them, 16 erroneously believed it was best to perform BSE around 11-20 days after a period, and 18 wrongly believed that women should perform BSE once every six months. None of the subjects knew about monthly frequency for BSE. Only 26 (3.4%) reported having performed BSE at least once in the past year, 15 of whom had performed BSE in the last six months, with none having performed BSE in the last one month. The source of information about BSE was a doctor or healthcare worker (4.13%), television (1.19%), and friends / relatives (1.19%).

**Table 3:** Association of awareness of symptoms and risk factors of breast cancer with various independent co-variables (N=751)

Variable	Category	Total N (%) #	Aware of at least one symptom of breast cancer N (%)			Aware of at least one risk factor of breast cancer N (%)		
			Yes	No	P value	Yes	No	P value
			298 (39.7)	453 (62.3)		292 (38.9)	459 (61.1)	
Age in years	25-49	596 (79.3)	266 (44.6)	330 (55.4)	<0.001*	251 (42.1)	345 (57.9)	<0.001*
	≥ 50	155 (20.7)	26 (16.8)	129 (83.2)		32 (20.6)	123 (79.4)	
Employment	Employed	261(34.8)	125 (47.9)	136 (52.1)	<0.001*	133 (51.0)	128 (49.0)	<0.001*
	Unemployed	447 (59.5)	156 (34.9)	291 (65.1)		144 (32.2)	303 (67.8)	
Monthly per capita income	≥ USD 30	389 (51.8)	190 (48.8)	199 (51.2)	<0.001*	176 (45.2)	213 (54.8)	<0.001*
	< USD 30	358 (47.7)	106 (29.6)	252 (70.4)		114 (31.8)	244 (68.2)	
Ever attended breast cancer screening camp	Yes	51 (6.8)	34 (66.7)	17 (33.3)	<0.001*	33 (64.7)	18 (35.3)	<0.001*
	No	696 (92.7)	264 (37.9)	432 (62.1)		259 (37.2)	437 (62.8)	
Ever been a member of a women's community group	Yes	296 (39.4)	175 (59.1)	121 (41.9)	<0.001*	174 (58.7)	122 (41.3)	<0.001*
	No	448 (59.7)	121 (26.8)	327 (73.2)		117 (25.9)	331 (74.1)	

# Total for some variables may be <751 because of missing responses; \* statistically significant at P<0.05; All numbers in parentheses are row totals except in the total columns where they are column totals

**Table 4:** Association of practice of breast self-examination with various independent co-variables (N=751)

Variable	Category	Total N (%) #	Practiced BSE at least once in the past year N (%)		
			Yes 26 (3.4)	No 725 (96.6)	P value
			Age in years	25-49	596 (79.3)
	≥ 50	155 (20.7)	4 (2.6)	151 (97.4)	
Employment	Employed	261(34.8)	14 (5.4)	247 (94.6)	0.066
	Unemployed	447 (59.5)	12 (2.7)	435 (97.3)	
Ever attended breast cancer screening camp	Yes	51 (6.8)	16 (31.4)	35	<0.001*
	No	696 (92.7)	10 (1.4)	686	
Ever been a member of a women's community group	Yes	296 (39.4)	4 (1.4)	292	0.011
	No	448 (59.7)	22 (4.9)	426	
Aware of at least one symptom of breast cancer	Yes	298 (39.7)	23 (7.9)	275	<0.001*
	No	453 (62.3)	3 (0.7)	450	
Aware of at least one risk factor of breast cancer	Yes	292 (38.9)	21 (7.0)	271	<0.001*
	No	459 (61.1)	5 (1.1)	454	

# Total for some variables may be <751 because of missing responses; \* statistically significant at P<0.05; All numbers in parentheses are row totals except in the total columns where they are column totals

**Table 5:** Logistic regression of factors determining practice of breast self-examination (N=751)

Variable	Category	Adjusted Odds Ratio	95% Confidence intervals	P value
Aware of at least one symptom of breast cancer	No	1	-	<0.001*
	Yes	6.8	2.5–18.2	
Aware of at least one risk factor of breast cancer	No	1	-	<0.001*
	Yes	12.9	3.9–43.6	
Ever been a member of a women's community group	No	1	-	0.020*
	Yes	0.3	0.1–0.8	
Ever attended breast cancer screening camp	No	1	-	<0.001*
	Yes	31.4	13.3–74.1	

\* Statistically significant at P<0.05

*Determinants of Breast Self-Examination:* The practice of BSE within the past year was significantly associated with having ever attended a breast cancer screening camp (P<0.001), the awareness of at least one symptom of breast cancer (P<0.001), and the awareness

of at least one of its risk factors (P<0.001) (Table 4). There was no association between the practice of BSE and literacy (P=0.058) or per capita income (P=0.31). After regression analysis, the practice of BSE was found to be much more prevalent among women with



past attendance at a breast cancer screening camp [OR=31.4(13.3-74.1)] and among those who were aware of at least one symptom [OR=6.8(2.5-18.2)] or one risk factor [OR=12.9(3.9-43.6)] (Table 5).

#### 4. Discussion

Our study, among urban underprivileged women, revealed the poor awareness concerning breast cancer and breast self-examination. Practice of breast self-examination was virtually non-existent among this group of women. This finding is could be alarming since the early detection of breast cancer is a crucial step in increasing the rate of cancer survivorship (17). The Indian government demonstrated an increased interest in providing screening services to women, yet women must be primarily aware of the symptoms and risks of breast cancer to be motivated to effectively utilize these screening services. Our study assessed 'awareness' of breast cancer rather than 'knowledge'. In the context of understanding, awareness is considered more general and sits at a level below knowledge, which is more detailed and specific (18). Gupta and colleagues have argued that women in India suffer an "awareness deficiency" in their systematic review of breast cancer awareness (19). With nearly two third of the women participating in our study unaware of a single symptom or risk factor of breast cancer, our results are in accordance with the finding indicating that living in poverty and in marginalized communities could be the leading reason for the lack of awareness in this regard (13). A possible mechanism for why low awareness exists in this population includes the fact that residents of underserved urban areas typically tend to be of lower income, with women being disadvantaged in view of social norms and gender disparities, as well as, lacking power, resulting in reduced access to health information and health care. As a result, women in these areas have lower chances of becoming 'health-literate'. This mechanism is also supported by the results of a study on barriers to early detection of breast cancer among rural Indian women, which similarly found that the overall awareness of breast cancer was very low as a result of similar social and gender norms (17). In rural India, higher awareness of breast cancer has been linked to gainful employment rather than education (17, 19). Similarly, in our studied population, we found that the urban underprivileged women support the idea that awareness is linked to women's autonomy and financial independence. This is illustrated in our study through the fact that women who participated in women's groups were significantly more likely to be aware of breast cancer compared to those who did not. Women's

groups could be regarded as social networks for information exchange and health-related conversations which may result in an increase in women's awareness concerning breast cancer, as well as a source of women's support and empowerment.

Our study also answered the question of whether increased awareness of breast cancer results in improved practice of BSE. We found that the awareness of at least one symptom or risk factor of breast cancer was significantly associated with increased practice of BSE. This indicates that efforts in educating women regarding breast cancer is a strategy of great importance towards improving BSE practice. In another study in an urban resettlement colony in New Delhi, the awareness in this regard was similar to our study, but in spite of their lower rate of literacy (54%) compared to ours (76%) (13), they reported 11% awareness of BSE, which was higher than ours. This supports the trend identified in our study that literacy rates are not associated with awareness and practice of BSE. In fact, our work revealed that the strongest predictor for actual practice of BSE was the subjects' attendance at a breast cancer screening camp in the past. This finding would be explained through the fact that the attendance at a breast cancer screening camp is a first-hand experience on breast cancer education and clinical examination of the breast. Health education at such camps may encourage women to examine their own breasts once they become familiar with the concept of palpating for lumps and other breast changes (20). The importance of screening camps has been also identified in other studies as a low-cost accessible way to provide point-of-care health education and diagnosis, both in rural and urban underserved environments (20, 21). Screening camps could be an effective solution to improve the awareness and practice of BSE among underserved communities. However, not all women would access screening camps. Other studies have identified several barriers to their attendance, including the fear of being diagnosed with cancer, inaccessibility of the camps, lack of females administering screening test, and the discomfort of exposing one's breasts to a health care professional (17, 22). Furthermore, it is of great necessity to take the psychological impacts of screening into consideration since certain women may forego screening to avoid an upsetting diagnosis (23, 24).

Current recommendations suggest that BSE should be performed once a month, a week after menstruation when breasts are the least tender and lumpy (10). For BSE to be effective, it is important for women not only to perform it regularly, but also to do so at the appropriate

point during their menstrual cycle, so that they could correctly detect any unusual lumps or tenderness. The lack of such awareness observed in our study implied that BSE is likely to have limited success if women continue to perform it wrongly. As such, in addition to screening camps, community-based education programs focused on teaching women the importance of BSE, the correct method, frequency, and timing of BSE are critical. In a study in a peri-urban underserved area in Mumbai, the major source of information on breast cancer was friends/relatives (46.1%) (22) and in our study, women who participated in women's groups were significantly more likely to be aware of breast cancer compared to those who did not. This demonstrates that education through social ties may be an efficient resource for generating breast cancer awareness. To increase the awareness concerning this health issue, health care workers must utilize platforms like community women's groups to disseminate reliable health information and improve the utilization of breast cancer screening services.

*Limitations of the study:* The design of the current study did not permit the collection of qualitative data for exploring the barriers to improve the awareness of breast cancer and practice of BSE. However, our work could provide direction for further qualitative research into this topic, which would help develop breast cancer screening programs that are culturally sensitive to women's concerns.

## 5. Conclusion

The poor awareness concerning breast cancer and woefully inadequate practice of BSE among urban underprivileged women in Bangalore highlights the urgent requirement for targeted interventions in such communities. The importance of awareness as a precursor to practice was evident in our study. We illustrated that increased awareness of breast cancer results in improved practice of BSE. This indicates the need for access to quality and credible health information through community platforms, for instance women's groups. Our study also emphasized the importance of community-based programming, like breast cancer screening camps and wide-spread dissemination of breast cancer awareness to improve the practice of BSE.

**Ethical Approval:** The Institutional Ethics Committee of St. John's Medical College, Bangalore, India, approved of the present study with the following number: # 203/2018.

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**Conflicts of interest:** None to declare.

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