RESEARCH ARTICLE

Breast Cancer Awareness at the Community Level among Women in Delhi, India

Subhojit Dey[1]*, Arti Mishra[1], Jyotsna Govil[2], Preet K Dhillon[3]

Abstract

Background: To assess women's awareness from diverse sections of society in Delhi regarding various aspects of breast cancer (BC) – perceptions, signs and symptoms, risk factors, prevention, screening and treatment. Materials and Methods: Community-level survey was undertaken in association with the Indian Cancer Society (ICS), Delhi during May 2013-March 2014. Women attending BC awareness workshops by ICS were given self-administered questionnaires before the workshop in the local language to assess BC literacy. Information provided by 2017 women was converted into awareness scores (aware=1) for analysis using SPSS. Awareness scores were dichotomized with median score=19 as cut off, create more aware and less aware categories. Bivariate and multivariate analysis provided P-values, odds ratios (ORs) and 95% confidence intervals (CIs). Results: Broadly, 53.4% women were aware about various aspects of BC. Notably, 49.1% women believed that BC was incurable and 73.9% women believed pain to be an initial BC symptom. Only 34.9% women performed breast self-examination (BSE) and 6.9% women had undergone clinical breast-examination/mammography. 40.5% women had higher awareness (awareness score > median score of 19), which was associated with education [graduates (OR=2.31; 95%CI=1.78, 3.16), post-graduates (OR=7.06; 95%CI=4.14, 12.05) compared to ≤ high school] and socio-economic status (SES) [low-middle (OR=4.20; 95%CI=2.72, 6.49), middle (OR=6.00; 95%CI=3.82, 9.42) and upper (OR=6.97; 95%CI=4.10, 11.84) compared to low SES]. Conclusions: BC awareness of women in Delhi was suboptimal and was associated with low SES and education. Awareness must be drastically increased via community outreach and use of media as a first step in the fight against BC.

Keywords: Breast cancer - awareness - cancer prevention - breast self-examination - Delhi - India

Introduction

Breast cancer (BC) is one of the most common cancers in women across the world accounting for 23% of all cancer cases (Jemal et al., 2011). According to GLOBOCAN 2012 (Ferlay et al., 2013), almost 1.7 million women were diagnosed with BC in 2012 globally. Since 2008, BC incidence has increased by more than 20%, while mortality has increased by 14%. BC is also the most common cause of death among women (522000 deaths in 2012) and the most frequently diagnosed cancer among women in 140 of 184 countries worldwide (Ferlay et al., 2013).

GLOBOCAN 2012 also reveals striking patterns of cancer in women and highlights that priority should be given to cancer prevention and control measures for breast and cervical cancers globally (Ferlay et al., 2013). Incidence of BC has been increasing in most regions of the world, but there are huge differences between rich and poor countries (Ferlay et al., 2013). In many low- and middle-income countries (LMICs), the incidence of BC is now rising sharply due to changes in reproductive factors, lifestyle, and increased life expectancy (Benson and Jatoi,

2012). Today, more than half of incident cases occur in the developing world (Shulman et al., 2010). In India around 145,000 new cases of BC (27% of all cancer cases in both genders) are diagnosed every year with around 70,000 deaths due to BC every year, both of which are higher than any cancer among both genders (Ferlay et al., 2013). Published reports from different cancer registries in India indicate rising trends in BC incidence and declining trends in cervical cancer (Asthana et al., 2014).

In developing countries, women most commonly present at late stages of BC with this figure being around 70% for India (Sankaranarayanan et al., 2010). 5 year survival rate was only around 60% in the 2005-09 period and hadn't increased much from 1995 (Allemani et al., 2014) mostly due to limited access to early detection and treatment in addition to late presentation. Low levels of cancer awareness have been found to be a very important risk factor for delay in presentation by the patient (Ramirez et al., 1999; McDonald et al., 2004). Studies have shown that few women in LMICs have the right knowledge or perform regular breast self-examination (BSE) (Yadav et al., 2010; Shallawani et al., 2010; Shalini et al., 2011; Loh and Chew, 2011; Wu et al., 2012; Yoo et al., 2012;

[1]*Indian Institute of Public Health-Delhi,* [3]*Centre for Control of Chronic Conditions, Public Health Foundation of India, Gurgaon,* [2]*Honorary Additional Secretary, Indian Cancer Society, New Delhi, India* *For correspondence: subhojit.dey@iiphd.org*

Radi, 2013; Karadag et al., 2014). The reasons for the low rate of BSE and sometimes unwillingness to undergo screening among these women include the fear of finding that they have BC, inadequate knowledge regarding how to perform BSE, and lack of awareness about what to do if a lump is found (Wu et al., 2012; Sreedevi et al., 2014). Given the high and increasing burden of disease due to late presentation of BC, early detection and subsequent prompt treatment are the only ways to ensure long-term survival, and awareness of BC and BSE seems to be an essential option for early detection of BC (Serey et al., 2011; Norsa'adah et al., 2012).

Available studies depict that majority of the research on cancer in LMICs is related to treatment with miniscule amounts of research devoted to BC prevention, awareness, early detection and palliation (Lodge and Corbex, 2011). A quick review of literature in India strongly suggests that BC prevention, awareness and early detection remain neglected areas in our health system. Compared to hospital based studies we have very weak community based studies to assess BC awareness (Parmeshwari et al., 2013). BC mortality rates being much higher in LMICs such as India compared to high income countries (Parkin and Fernandez, 2006), it is imperative that BC awareness and prevention should be given its due importance. In light of above and to fulfil the gaps in BC awareness research, the present study attempted to assess the awareness of various aspects of BC among the diverse society of women in Delhi, India.

Materials and Methods

With the collaboration of Indian Cancer Society (ICS) a community-level survey was designed to evaluate the level of BC awareness among women from diverse sections of society in Delhi during May 2013-March 2014. In particular, we focused on perceptions about the causes of BC, risk factors associated with BC, knowledge of BSE, clinical breast examination (CBE) and mammography, and knowledge of BC treatment. Women participants were drawn from people who came to attend a BC awareness campaign organized by the ICS. As a part of this campaign, workshops were purposively organized in various parts of Delhi by ICS. Ethical permission to conduct the study was granted by the Public Health Foundation of India's (PHFI) Institutional Ethics Committee (TRC-IEC-165/13). At participating institutions, a trained research assistant described the purpose of the study and emphasized the confidentiality and anonymity of the responses. Verbal consent was taken and participants who freely agreed to participate were enrolled in this study. A total of 2017 volunteered and successfully completed the survey.

Study tool

We used a semi-structured self-administered questionnaire to collect the data. Questionnaires were administered prior to the workshops. Only women, 16 years or older were included in the survey. We did not have any refusals to participate although a small proportion of women did provide incomplete information. In case where participants were unable to fill the questionnaire (due to illiteracy) an interviewer assisted the respondent

in filling the questionnaire. To make it comprehensible, English and Hindi, which are commonly used languages in Delhi, were used. The questionnaire was pilot tested before administered to participants in the study. Results of the pilot test were used to modify the wording of questions in order to maximize their easy comprehension. Cronbach's alpha coefficient was calculated to check the internal consistency among the different questions available in the questionnaire. Value of Cronbach's alpha was 0.821 which shows a high level of internal consistency or reliability of the study tool. Participant identification number was assigned to each participant and additional information like name, address, contact numbers and email ID (if available) was collected to identify each and every participant. We adapted items for use in this study by including the response, "Don't know" in addition to the yes (agree) and no (disagree). The questionnaire used in this study had a total of 40 questions, of which 7 assessed knowledge about general perception about BC, 11 assessed knowledge related to BC epidemiology and risk factors, 4 assessed about BC symptoms, 18 assessed BC detection methods and treatment. A socio-demographic section of the questionnaire was used to acquire participants' information such as gender, age, education, marital status, religion, family type and total monthly expense. Based on previous studies, we hypothesized that these factors could potentially influence BC knowledge among the participants. Examining these variables can also help in identifying women groups lacking BC awareness. The survey also intended to identify the source of information of these women and hence the most suitable medium for future activities to raise their awareness levels.

Data management and statistical analysis

The data collected were entered in Excel 2010. Different numerical codes were given for different responses and categories. Self- reported average monthly family expense was used to assess socio-economic status (SES) of the respondent. Respondent who reported average monthly family expense 10 to 25,000 per month and 26 to 50,000 per month, were respectively classified in lower middle and middle SES categories while who reported average monthly expense <10,000 and >50,000 were respectively classified as low and upper-middle SES categories. The SES classification was based on quartiles.

Regarding questions related to BC awareness, each correct answer on the questionnaire was assigned a score of 1 (aware), while an incorrect answer was awarded a score of 0 (not aware). A total score for each participant was computed by summing the number of correct answers. We had a total of 40 questions and median of awareness score (19) was used as a cut-off point. Based on cut-off points participants were categorised in more aware (scores above 19) and less aware (scores of 19 and less). Also, for each response the proportion of women who knew the right answer (or were aware) was calculated to give us the prevalence of awareness.

After cleaning and checking for consistency, data was exported into analytical software IBM Statistical Product and Service Solutions (SPSS) version 20 for the purpose of analysis. Pearson Chi-square tests was used to examine

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the association between socio-demographic variables and BC awareness score. Statistical significance was assessed at P<0.05. Associations of BC awareness score with various factors was investigated using bivariate analysis and multivariate logistic regression which provided odds ratios (OR) and 95% confidence intervals (CIs).

Results

Socio-demographic profile

A total of 2017 women from diverse sections of the society participated in the study and provided information for assessment of awareness related to various aspects of BC. Age group of women ranged from 14-75 years (Mean=30.7 years, SD=10.5) (Table 1). Majority (86.5%) of women were below 50 years. Most of the women were married (62.6%) and Hindu (75.8%) by religion. Most women were graduate (51.2%), employed (51.6%) and belonged to nuclear families (57.2%). Women were almost equally distributed in lower-middle and lower categories

(35%). Regarding average number of visits to health care provider, majority (61.5%) of the respondents had reported 0 to 2 visits per year and most (78.3%) of the respondents reported good quality of life (Table 1).

Associations of BC awareness and socio-demographic factors

Table 1 also explores the associations between awareness scores and various socio-demographic factors. 817 (40.5%) women were more aware (awareness score > median score of 19). Awareness status was found to be associated with different age groups (P < 0.0001), religions (P=0.005), education status (P < 0.0001), occupations (P < 0.0001), average monthly expenses (P < 0.0001), visits to health care provider (P < 0.0001) and self-assessed quality of life (P < 0.0001) (Table 1).

Prevalence of awareness regarding various aspects of BC

General perception about BC: Regarding general perception it was noticeable that 49.1% women thought

Table 1. Distribution of Socio-demographic Factors and their Association with Awareness Scores Among 2017 Women in Delhi

Socio-demographic factors	Awareness status*			P-value#
	Total (N = 2017)	More aware (N = 817; 40.5%)	Less aware (N = 1200; 59.5%)	
	N (%)	n (%)	n (%)	
Age (30.71±10.48)				
<18	166 (8.2)	70 (8.6)	96 (8.0)	<0.0001
18 to <30	789 (39.1)	257 (31.5)	532 (44.3)	
30 to <50	956 (47.4)	431 (52.8)	525 (43.8)	
≥ 50	106 (5.3)	59 (7.2)	47 (3.9)	
Marital status				
Married	1262 (62.6)	525 (64.3)	737 (61.4)	0.43
Unmarried	670 (33.2)	259 (31.7)	411 (34.2)	
Other	85 (4.2)	33 (4.0)	52 (4.3)	
Religion				
Hindu	1529 (75.8)	639 (56.3)	893 (74.4)	0.005
Muslim	215 (10.7)	65 (8.0)	150 (12.5)	
Other	273 (13.5)	116 (14.2)	157 (13.1)	
Education				
High school and less	863 (42.8)	200 (24.5)	663 (55.2)	<0.0001
Graduation	1032 (51.2)	532 (65.1)	500 (41.7)	
Post-Graduation	122 (6.0)	85 (10.4)	37 (3.1)	
Occupation				
Employed	1041 (51.6)	486 (59.5)	555 (46.2)	<0.0001
Housewife	485 (24.0)	143 (17.5)	342 (28.5)	
Student	491 (24.3)	188 (23.0)	303 (25.2)	
Family type				
Nuclear	1119 (57.2)	435 (55.0)	684 (58.6)	0.112
Joint	839 (42.8)	356 (45.0)	483 (41.4)	
Average monthly expense (in INR)				
Low (<10,000)	392 (19.4)	37 (4.5)	355 (29.6)	<0.0001
Lower-middle (10-25,000)	706 (35.0)	289 (35.4)	417 (34.8)	
Middle (26-50,000)	704 (34.9)	359 (43.9)	345 (28.8)	
Upper-middle (>50,000)	215 (10.7)	132 (16.2)	83 (6.9)	
Visit to health care provider				
0-2	1140 (61.5)	554 (72.2)	586 (53.5)	<0.0001
<5	429 (23.2)	121 (16.0)	308 (28.1)	
≥5	284 (15.3)	82 (10.8)	202 (18.4)	
Self-assessed quality of life				
Poor to average	398 (21.7)	117 (15.2)	281 (26.4)	<0.0001
Good	1436 (78.3)	652 (84.8)	784 (73.6)	

*Median awareness score = 19; More aware – awareness score > 19; Less aware – awareness score ≤ 19; # Chi-square test

BC to be incurable and 60.4% women thought that BC is inheritable. However, very few women thought that BC was due to supernatural causes related to disregard of religious or cultural factors (93.4% aware) (Table 2).

Knowledge related to BC epidemiology & risk factors

70.9% women reported BC as uncommon disease in India (Table 2). Most of the women were aware that dietary and life style related factors affect BC risk (70.3%). Although most women also thought that having a risk factor for BC meant having BC (69.2%). 70.9% of women thought that family history is the main risk factor for BC which is consistent with our earlier finding of most

women considering BC to be inheritable. Most of the women (66.4%) fallaciously reported breast augmentation and wearing under wire bras can cause BC. Interestingly 75.3% women were found aware of breast feeding as a preventive measure of BC (Table 2).

Knowledge about BC symptoms

Although 84.5% of women were aware of BC usually presenting as a lump, 73.9% women spuriously believed pain to be an initial sign of BC. Most women were also not aware that BC can also present without a lump (62.9%) (Table 2).

Table 2. Number and Proportion of Women Aware about Various Aspects of Breast Cancer (BC) among 2017 Women in Delh

Items	Aware n (%)*	Not aware n (%)*	Total N	% of 2017#
General Perception about BC				
Breast cancer is an incurable disease. [Cannot be cured]	1007(50.9)	970(49.1)	1977	98
Breast cancer is contagious / communicable / infectious	1727(87.6)	244(12.4)	1971	98
Breast cancer is usually inherited.	777(39.6)	1183(60.4)	1960	97
Breast cancer can be caused by,				
supernatural causes of due to disregard to religious or cultural factors	1848(93.4)	130(6.6)	1978	98
Certain breast conditions, like harmless breast lump, can predispose to BC	1548(80.0)	388(20)	1936	96
Cancer cannot be cured	1007(50.9)	970(49.1)	1977	98
Cancer cannot be prevented	1007(50.9)	970(49.1)	1977	98
Knowledge related to BC epidemiology and risk factors				
Breast cancer is uncommon in India	581(29.1)	1417(70.9)	1998	99
Only women get breast cancer	656(33.1)	1315(66.9)	1981	98
Breast cancer occurs more commonly in older women,aged 40 years and older	975(49.3)	1004(50.7)	1979	98
Chance of breast cancer is increased by,				
dietary and lifestyle related factors, e.g. sedentary,lifestyle high fat diet,drinking	1390(70.3)	588(29.7)	1978	98
Having a risk factor for breast cancer means I will get breast cancer	600(30.8)	1349(69.2)	1949	97
A family history of breast cancer is the main risk factor for getting breast cancer	571(29.1)	1394(70.9)	1965	97
Breast augmentation, under wire bras can cause breast cancer	653(33.6)	1292(66.4)	1945	96
If I do certain chest /breast exercises, I will never get breast cancer	649(33.5)	1288(66.5)	1937	96
Being physically active early in life may reduce the risk of developing breast cancer	1263(65.0)	680(35)	1943	96
Obesity [being very fat] increases one's risk of getting breast cancer	973(49.9)	976(50.1)	1949	97
Breast feeding is protective against breast cancer	1464(75.3)	480(24.7)	1944	96
Knowledge about BC symptoms				
Breast cancer usually presents as a lump	1647(84.5)	303(15.5)	1950	97
Pain is one of the initial sign of breast cancer.	508(26.1)	1440(73.9)	1948	97
All breast lumps are breast cancer	1516(77.9)	429(22.1)	1945	96
Breast cancer can also present without any palpable breast lump	719(37.1)	1217(62.9)	1936	96
Knowledge of BC detection methods				
With appropriate technology, breast cancer can be detected in early stage	831(42.7)	1117(53.3)	1948	97
Early detection improves one's survival from breast cancer.	1755(90.1)	193(9.9)	1948	97
Observing one's breast is useful in early detection of breast cancer	1730(89.0)	214(11)	1944	96
Have you heard of: Clinical Breast Examination (CBE)	959(50.1)	955(49.9)	1914	95
Have you heard of breast self-examination (BSE)	1118(58.5)	793(41.5)	1911	95
Have you heard of mammography	1101(57.3)	820(42.7)	1921	95
Detection practice				
Do you perform BSE currently?	692(34.9)	1290(65.1)	1982	98
Have you undergone CBE / Mammography in last two years?	140(6.9)	1877(93.1)	2017	100
If you were told that CBE / Mammography is helpful in early detection of breast cancer would you undergo CBE / mammography?				
	1294(66.1)	664(33.9)	1958	97
Knowledge of BC treatment				
Breast cancer is curable when detected early and treated appropriately and adequately.				
	1729(89.1)	211(10.9)	1940	96
Surgery / operation for breast cancer means removal of entire breast.	507(26.2)	1428(73.8)	1935	96
Alternative healthcare modalities like yoga/ayurveda etc. have been proven to cure breast cancer				
	402(20.9)	1523(79.1)	1925	95
What would you do if you find a lump in your breast?	1684(89.4)	199(10.6)	1883	93

*Row percentages of actual total for each item. #Percentage of the full sample size of 2017 - to depict missing information for each item

Knowledge of BC detection methods

Almost all women (90%) were found to be aware of the importance of early detection of BC (Table 2). But this awareness was lacking regarding the specifics related to early detection of BC. Only about half of the women (49.9%) were aware of clinical breast examination (CBE). Even less (41.2%) were aware of BSE and mammography (42.7%). When asked about the source of information for CBE/BSE/Mammography majority of women reported media (25%), health worker (19%) and friends or family (14%) as a source of information (Figure 1).
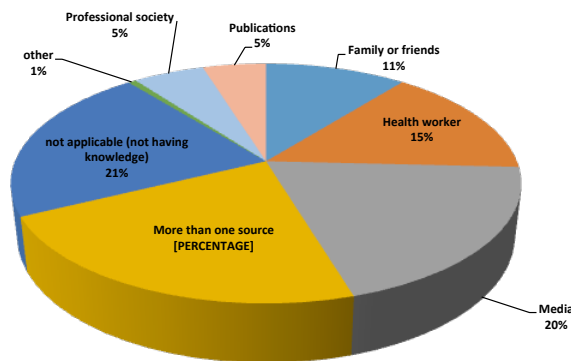
Figure 1. Source of Information for Breast Cancer Detection Methods

Table 3. Unadjusted and Adjusted Odds Ratios (ORs) and 95% Confidence Intervals (CIs) of Awareness Scores in Association with Various Factors among 2017 Women in Delhi

Socio-demographic factors	Unadjusted		Adjusted*	
	OR	95% CI	OR	95% CI
Age (30.71 ± 10.48)				
<18	1	-	1	-
18 to <30	0.66	0.47-0.93	0.26	0.16-0.42
30 to <50	1.13	0.81-1.57	0.38	0.22-0.67
≥ 50	1.72	1.05-2.82	0.45	0.22-0.91
Religion				
Hindu	1	-	1	-
Muslim	0.61	0.45-0.83	1.88	1.25-2.81
Other	1.04	0.8-1.35	0.87	0.63-1.2
Education				
High school and less	1	-	1	-
Graduation	3.53	2.89-4.31	2.38	1.78-3.17
Post-Graduation	7.62	5.02-11.6	7.06	4.14-12.1
Occupation				
Employed	1	-	1	-
Housewife	0.48	0.38-0.6	0.79	0.59-1.07
Student	0.71	0.57-0.88	0.49	0.33-0.72
Average monthly expense				
<10,000	1	-	1	-
10-25,000	6.65	4.59-9.63	4.2	2.72-6.5
26-50,000	9.98	6.9-14.5	6	3.82-9.42
>50,000	15.3	9.87-23.6	6.97	4.11-11.8
Visit to health care provider				
0-2	1	-	1	-
<5	0.42	0.33-0.53	0.53	0.4-0.7
≥5	0.43	0.32-0.57	0.78	0.55-1.1
Self-assessed quality of life				
Poor to average	1	-	1	-
Good	2	1.57-2.54	1.72	1.29-2.28

*Adjusted for all variables in the table using unconditional logistic regression model

Detection practice

In contrast to having knowledge about "BC detection methods", detection practice was woefully lacking (Table 2). Only 34.9% women reported that they performed BSE and very few (6.9%) women were found to have undergone CBE/ mammography, although most women (66.1%) women were willing to undergo early detection (Table 2).

Knowledge of BC treatment

Majority of women (89.1%) being aware of BC being curable if detected early and treated appropriately and adequately (Table 2). On investigating specific areas of BC treatment though majority (73.8%) of women believed that surgery/operation for BC means removal of entire breast. 79.1% women also thought that alternative healthcare modalities like yoga/ayurveda could result in BC cure. Also, on asking what women would do if they found a lump, most women (89.4%) responded that they would visit an allopathic doctor (Table 2).

Socio-demographic profile and BC awareness status

Table 3 depicts the associations between BC awareness scores and various sociodemographic variables using unconditional logistic regression. BC awareness was found to increase with increasing age compared to the lowest age-group [18 to < 30 (OR=0.26; CI=0.16, 0.42), 30 to < 50 (OR=0.38; 95% C I=0.22, 0.67) and ≥ 50 (OR=0.45; 95%CI=0.22, 0.91)] but remained lower than the youngest age-group. Compared to Hindus, Muslims women were more aware (OR=1.88; CI=1.25; 2.81). Predictably BC awareness increased with education. On comparing with high school or less education, graduates (OR=2.38; 95%CI=1.78, 3.17) and post-graduates (OR=7.06; CI 4.14, 12.1) were more aware. Compared to employed women, students (OR=0.49; 95%CI=0.33, 0.72) were less aware. Awareness increased with average monthly expenditure compared to the lowest levels (<10,000) [10-25,000 (OR=4.2; 95%CI=2.72, 6.5), 26-50,000 (OR=6; 95%CI=3.82, 9.42) and >50,000 (OR=6.97; 95%CI=4.11, 11.8)]. Increasing visits to the health provider did not increase awareness [< 5 visits per year (OR=0.53; 95%CI=0.4, 0.7) compared to 0-2 visits]. Awareness increased with higher self-assessed quality of life [good (OR=1.72; 95%CI=1.29, 2.28).

Discussion

To summarize our findings, in our sample of 2017 women from the city of Delhi, most of whom were below 50, Hindu, married and belonging to lower-middle and lower socioeconomic class with good quality of life, we discovered that around half of the women thought cancer was incurable. Around 70% of women were aware of the dietary and lifestyle risk factors of BC, thought BC to be inheritable and feared getting BC if they had a risk factor for it. More than 70% women also knew about the protective effects of breastfeeding. While more than 80% women knew that BC presented as lump, more than 70% also thought pain to be an initial symptoms of BC. While 90% women were aware of the importance

of detecting BC early, less than half knew about CBE, BSE or mammography. Prevalence of practicing early detection methods was much lower, with only around 35% women currently conducting BSE and a dismal 7% having undergone any CBE/mammogram in last 2 years. Women had some misconceptions regarding BC treatment with more than 70% women believing that the entire breast is removed during surgery and almost 80% believing that alternative therapies held cure for BC. Associations with various sociodemographic factors depicted that BC awareness tended to increase with age, higher among Muslim women, increased with education, higher among employed women, increased with income, was less with higher visits to healthcare providers and is better in those women with higher quality of life.

To the best of our knowledge, this is the largest community based study from India to assess the BC awareness in women. The findings indicated that the level of awareness of BC is sub-optimal among the women participants of Delhi. Our overall results are consistent with studies done in other parts of the India (Somdatta and Baridalyne, 2008; Gupta, 2009; Khokhar, 2009; Yadav and Jaroli, 2010; Shalini et al., 2011; Grosse et al., 2013; Parameshwari et al., 2013; Sathian et al., 2014; Sreedevi et al., 2014) and world (Okobia et al., 2006; Elsie et al., 2010; Forbes et al., 2011; Samganje and Mafuvadze, 2012; Radi, 2013; Karadag et al., 2014; Kratzke et al., 2014; Asif et al., 2014).

Among the few weak studies that have been carried out in India to assess awareness about BC and its prevention, Shalini et al. (2011) discovered that in a sample of 40 young college going girls, approximately 72% had an average idea of BSE and only 1 out of 40 girls performed BSE. In another small study by Yadav et al. (2010) done in the North-Indian state of Rajasthan, all college-going women were aware of BC although 28% did not know about BSE. A cross-sectional study of 441 school teachers in Delhi regarding BC awareness only 36.1% teachers had heard about BSE and very few knew about the details of doing a BSE and none had ever done a BSE (Khokhar, 2009). In our study 41% women knew about BSE but only around 35% practised it. Half of the women in our study were graduates and employed which might explain a higher prevalence of BSE practise compared to school teachers. BSE practise has been found to be high if women are employed especially in health related professions (Sreedharan et al., 2010; Andsoy and Gul 2014).

Apart from BSE, participation in other early detection/screening practises was quite low in this sample. Only 6.9% of women had undergone CBE/mammography in the previous 2 years. Thus although half of the women in the sample were graduates and employed, early screening/early detection behaviour did not correlate with it. This is however in the context of India where BC screening/early detection are not provided at the population level by the health system. Even in countries such as Malaysia, where screening and early detection are standard provisions in the health system, studies discovered 10.5% (Rosmawati et al., 2010) to 13.6% (Parsa and Kandiah, 2010) to 19% (Kanaga et al., 2011) women having had undergone mammography with slightly higher numbers for CBE

underlining the need for increasing awareness.

In our study we also discovered that college going and younger women had the highest levels of awareness. Awareness in higher ages was lower than the lowest age group but kept on increasing with age. These findings are similar to other studies which found higher awareness among college going young women (Shalini et al., 2011). However other studies have depicted an increase in awareness with age such as a study on Nigerian women which has found that older women (≥50) appear to have higher awareness scores compared with younger women (Okobia et al., 2006).

We had only 10.7% Muslim women in our study. Multivariate results showed that Muslims had better awareness regarding BC compare to Hindu, a finding which was absent in unadjusted results. On deeper investigation it was revealed that participants from the area of residence of Muslim women had benefitted from BC screening program organized by ICS earlier, consequently they were found more aware compare to Hindu and other religion's participants. This was a consequence of the purposive nature of selecting areas for conducting workshops where ICS had better community presence, which might be a potential limitation.

In our study, it was observed that women belong to high SES had better knowledge about BC, and it's in agreement with the study done by Samina Khokher et al., (2011) which reveals that BSE frequency is highest among professional women on job (57%) and most educated women groups (46.9%). Recent study done on awareness of BC warning signs and screening methods among female residents of Pokhara Valley at Nepal by Sathian et al. (2014) also supported finding by adding that high SES women are exposed to health-related issues through mass media, internet and a better socioeconomic status enables support of screening services. Similar associations with SES were observed by Kanaga et al. in Malaysia (Kanaga et al., 2011) and Amin et al. in Saudi Arabia when enquiring about BC gene testing awareness (Amin et al., 2012).

It's evident from different studies done on BC awareness (Gupta, 2009; Al-Naggar et al., 2011; Rasu et al., 2011; Kanaga et al., 2011; Khokher et al., 2011; Kumar et al., 2011; Grosse et al., 2013; Karadag et al., 2014; Sreedevi et al., 2014) that there has been positive association between BC awareness and educational status, including the present study. Grosse et al. (2013) has emphasised that education programmes, aiming to increase BC awareness should target less educated women to increase their knowledge about BC. In our study, about 30% of women belonged to low income level and we endeavoured to include more women from this section of society in our study and in the BC awareness workshops.

Parallel to our findings, the study done by Samina Khokher et al., (2011) revealed that only ~29% of respondents correctly identified "family history" as a risk factor for the BC. Unlike previous studies 75.3% Delhi women were found aware of breast feeding as a preventive measure of BC. While Aswathy Sreedevi et al., (2005) and Sambanje et al. (2012) have noted in their studies that less than 9.85% and 8% respectively were aware of

breastfeeding in reducing BC risk. This might be due to the fact that we had urban women in our sample, almost half of whom were graduates and employed.

Regarding BC symptoms majority (73.9%) of women in the current study reported pain as the initial sign of BC. This is similar to the figures reported by Powe et al., (2005) and is a widespread misconception as most people associate pain with occurrence of cancer. The fact is that pain is not necessarily an early sign of BC (Sambanje and Mafuvadze, 2012). Study done by Ukwenya et al. (2008) reported from Nigeria that a majority of BC patients cited ignorance of the seriousness of a painless lump as a reason for prolonged delay before seeking medical advice.

A large percentage of women (90.1% and 89.1% respectively) were found aware of the fact that early detection improves one's survival from BC and that BC is curable if detected early and treated appropriately and adequately. This is in agreement with the studies done by Khokher et al., (2011) and Okobia et al., (2006) in which most Pakistani women (81%) and lesser number of Nigerian women (41%) were respectively found aware of life saving benefits of early detection. 80.7% women in Saudi Arabia were also aware that cancer is curable if detected early (Ravichandran et al., 2010).

However, we must also note that the awareness about 'cancer being curable if detected early' is in conjunction with the fact that simultaneously nearly half of the women think BC to be incurable. This is probably due to the fact that very few women had seen other women cured of BC and survive the disease. While there have been widespread campaigns in India that have spread the message that cancer is curable if detected early, when it comes to the specifics nearly 74% women also thought that surgery for BC meant removal of entire breast. May be it is this fear of treatment that led nearly 80% women to believe that alternative healthcare modalities have a cure for BC, which are known to have less side effects and no surgery or chemotherapy. Previous studies have found an association between having advanced BC and belief in alternative medicine (Norsa'adah et al., 2012). The high belief in alternative medicine is in the light of the fact that more than 89% women replied rightly that they will visit an allopathic doctor if they found a breast lump. Some of these contradictions in perceptions need to be investigated more deeply to further dissect the various complex aspects related to BC awareness.

As far as the source of information is concerned, media (25%) was found to be one of the most important sources of information for BC awareness. This is in agreement with the study done in Delhi (Somdatta, 2008) where 80% of women reported television as one of the most important sources of information for the BC awareness. Study done in educational institute of Lahore, Pakistan also reported television (14%) and hearsay (17%) as most common sources of information (Khokher, 2011). Similar evidence exists about electronic media and television being the most important sources of information on BC (Montazeri et al., 2010; Ravichandran et al., 2010; Yoo et al., 2012) followed by relatives and friends for less educated women (Hatefnia et al., 2010).

Also, the odds of being aware decreased with increasing visits to the health provider. This concurs with the known evidence and is contrary to the expected prevalent opinion. In general, healthcare providers are not known to be knowledgeable about screening/early detection techniques, nor do they encourage women to apply screening/early detection behaviour (Akhigbe and Omuemu, 2009; Harirchi et al., 2009). In a study in Korea by Yoo et al. only 17.2% women had been recommended by medical staff to practise BSE (Yoo et al., 2012).

The most important strength of this study was the large sample size of more than 2000 women. To the best of our knowledge, this is larger than any other study on BC awareness in India so far. However, this study also had some limitations. We had organized this study around workshops organized by ICS which were purposive. Although we involved many sections of the society in this study, the sample of our study may not be strictly random. Also, we had nearly 50% women who were graduates or employed. As such, the awareness levels we found in our study might be representative of urban areas of India but cannot be generalized to other parts of India. Also for the same reason, it is quite possible that the prevalence of awareness observed in our study is higher than what might be expected in other parts of India. As such, it can be expected that BC awareness might be much lower in less urban parts of India which is a matter of concern. This warrants further investigation and might require more intense interventions if BC awareness is to be increased in less urban and non-urban populations.

In conclusion, the present study covers diverse section of women at the community level in Delhi, the capital of India. Findings of the study revealed that BC awareness of women in Delhi was suboptimal and was associated with low SES and education levels. Less than half of the women were aware of BC detection methods but prevalence of practice was much lower especially CBE or mammography. There is an urgent need to increase the awareness of women regarding BC and BSE so that BSE may become a routine practice among women. In our previous studies in other LMICs we have depicted that regular practice of BSE increases early presentation among women substantially (Stapleton et al., 2010). There are lots of myths and stigma related to BC in society and awareness needs to be drastically increased as a first step in fight against BC. Lack of evidence on the interventions to promote cancer awareness and improve early presentation has been dampening the development of policy and action especially in LMICs (Austoker et al., 2009). Active steps should be taken to generate more evidence regarding BC awareness and the necessary interventions to increase awareness such as BC awareness campaigns via community outreach - especially in low socioeconomic sections of the society, educating healthcare providers, and use of electronic media in order to reduce the BC burden..

Acknowledgements

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