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10.4103/jehp.jehp_301_23

Breast screening practices of 35–65 years old women – A cross-sectional survey in Alappuzha, Kerala, India

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Abstract:

BACKGROUND: Enhancing cancer literacy, promoting early detection, and avoiding treatment delays are essential for reducing breast cancer mortality and ensuring a good quality of life among women in less developed countries. The present paper describes the breast screening practices of women in the Alappuzha district of Kerala state, India.

MATERIALS AND METHODS: A multi-stage cluster sampling method was used to select study participants. Data were collected using a structured questionnaire, entered using Kobo Toolbox, and analyzed using IBM SPSS Statistics-25 for Windows. The proportions of women who practiced breast examinations were estimated with 95% confidence intervals. The Chi-square test was used to test the associations, and binary logistic regression was used to estimate odds ratios.

RESULTS: Among 320 women, 55% were less than 50 years old, 45% had higher secondary education or above, and six were already diagnosed with breast cancer (1.9%, 95% CI: 0.4%–3.4%). Of the 314 women, 73.2% were practicing breast self-examination (95% CI: 68.4%–78.1%), and 25.2% ever attended clinical breast examination (95% CI: 20.4%–30.0%). Working/retired/self-employed women with higher secondary education and above had almost 10 times higher odds (OR = 10, 95% CI: 3.35–29.86) of practicing breast self-examination (BSE) compared to homemakers or women working under rural employment schemes with a low level of education.

CONCLUSION: A higher percentage of women practicing BSE and clinical breast examination (CBE) in the present study indicates that women in this population are more concerned about breast cancer. Women should be educated more on the symptoms and risk factors, the proper ways of practicing BSE, and the importance of consulting a health practitioner for CBE. Also, it is crucial to ensure that awareness and screening programs reach marginalized women.

Keywords:

Breast cancer, breast self-examination, Kerala, screening

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Received: 02-03-2023

Accepted: 03-05-2023

Published: 27-11-2023

Introduction

Globally, breast cancer is the most commonly diagnosed cancer, with the majority of disease burden occurring among females. The world estimates of age-standardized incidence and mortality rates for breast cancer were 47.8 and 13.6 per 100,000 population, respectively, in 2020. There is a considerable geographic variation in the incidence of breast cancer,

with the lowest in south-central Asia (26.2 per 100,000) and the highest in Australia/New Zealand (95.5 per 100,000) and Western Europe (90.2 per 100,000). The variation in mortality due to breast cancer was smaller across world regions than the variation in breast cancer incidence worldwide. However, a significant contribution of breast cancer deaths from transitioning countries was observed, with the highest in Melanesia and Western Africa (27.5 and 22.3 per 100,000 population, respectively).^[1]

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How to cite this article: Mohan R, Thulaseedharan JV. Breast screening practices of 35–65 years old women – A cross-sectional survey in Alappuzha, Kerala, India. J Edu Health Promot 2023;12:402.

The World Health Organization's (WHO) Global Breast Cancer Initiative aims for an annual mortality reduction of 2.5%, thereby preventing 25% of breast cancer deaths by 2030 and 40% of breast cancer deaths by 2040 among women under 70 years of age. Health promotion for early detection, timely diagnosis, and comprehensive breast cancer management are the three pillars for achieving these targets.^[2]

A systematic review of global guidelines for breast cancer screening reported mammography screening as the recommended primary screening modality for average-risk women. Out of the 23 reviewed guidelines, the majority recommended mammograms for 40–74-year-old women, specifically recommending 50–69 years as the optimal age and suggesting annual or biannual screening for women in this age group. Women with a history of precancer/breast cancer, a family history of breast cancer, a history of mantle or chest radiotherapy, or dense breasts are considered at high risk. Early age screening, annual mammograms, or magnetic resonance imaging are recommended for high-risk women.^[3]

Breast ultrasound is a supplementary breast cancer screening modality to mammography in high-resource settings. It can be used as a viable alternative for early breast cancer detection in resource-limited settings due to its portability, low cost compared to mammography, and effectiveness for imaging palpable abnormalities in the breast.^[4] Fine Needle Aspiration Cytology (FNAC) is a cost-efficient and time-saving modality for screening nonpalpable breast masses as a first-line investigation technique.^[5] A clinical examination followed by radiological (mammography or ultrasound) and pathological investigations (FNAC and core Biopsy), that is, the triple test assessment, provides a much more reliable diagnosis than the tests used individually.^[6]

Most often, breast cancer is initially identified by the woman herself.^[7] Breast self-examination (BSE) allows women to examine their breast tissue for any physical or visual changes in their privacy, and practicing BSE is widely accepted and promoted as a simple and effective method for the early identification of breast cancer.^[8,9] However, the effectiveness of BSE depends on knowledge regarding BSE among women and their adherence to regular examinations. The two components of BSE include the visual and tactile examination of the breasts. During the visual examination of the breast, women become familiar with their breasts to identify changes in color, form, and shape. The tactile examination of the breast includes examining changes based on the breast's texture and feel using various palpation techniques. A woman should consult a physician for a clinical breast examination (CBE) if she feels any changes in her breast(s) during BSE.^[10]

Breast cancer awareness, early clinical diagnosis, and appropriate treatment are vital for mortality reduction due to breast cancer and to ensure a good quality of life.^[9] Socio demographic, cultural, and facility-related barriers in developing countries contribute to late-stage diagnosis and breast cancer mortality. In addition, the poor knowledge regarding BSE and early detection strategies among women in these countries also adversely affects the early detection of breast cancer.^[11]

Awareness of BSE and its regular practice will help women identify any warning signs or symptoms of breast cancer without using any special tools or undergoing invasive procedures.^[12] However, during BSE, women cannot always detect abnormalities around their breasts. With limited access to mammography screening, CBE is explicitly important in rural areas and developing countries.^[13] WHO does not recommend population-based CBE, but in the absence of organized mammogram-based screening, CBE is considered a reasonable approach in low-resource settings for the early detection of breast cancer.^[14] In a cluster randomized controlled trial in Mumbai, CBE performed by trained female health workers significantly reduced the proportion of women with stage III or IV cancers at diagnosis, and a breast cancer mortality reduction of nearly 30% among women aged 50 and older was achieved.^[15]

Population-based screening for cervical, breast, and oral cancers is implemented under the National Health Mission as part of comprehensive care, complementing the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke in India. However, as per the National Family Health Survey (NFHS-5) data on screening participation in India, the proportion of women and men who have ever undergone screening for cervical, breast, and oral cancer was only nearly 1% in India, which shows the inadequacy of cancer screening status in India.^[16,17]

However, the demonstration projects and cross-sectional surveys in Kerala showed a higher percentage of women underwent breast screening. In the breast cancer screening trial conducted in Trivandrum district in Kerala, among 52,011 participants, 23.2% reported practicing BSE. Trained health workers examined 97% of women during house visits, and half of the screen-positives attended the referral clinic for an examination by the clinician.^[18] In the community-engaged breast cancer screening program conducted in Kannur District, of the one million women above 30 years old, 93% were screened using a symptom-risk factor checklist. Of those women referred with symptoms ($n = 5353$), 81% attended the screening camp.^[17] In a cross-sectional survey conducted in Vypin, Ernakulam district, Kerala, among 809 rural women,

nearly 47% ($n = 377$) had undergone some screening. Of them, almost every woman had done BSE (97.3%), 8.1% had mammography, and 27% practiced BSE monthly.^[19]

Kerala is one of the states with high literacy rates for women in India, where 77% of women have 10 or more years of education.^[20] The educational status of women in Kerala may contribute to the awareness regarding breast cancer and screening practices as compared to other states. There were no recent studies on the breast cancer screening practices of women in the general population in Kerala. The present paper describes the breast examination practices of women aged 35–65 years in the Alappuzha district, Kerala.

Materials and Methods

Study design and setting

The study was conducted in Alappuzha district. As per provisional population figures from the 2011 census, there are 72 panchayats and six municipalities in Alappuzha district. The total population was 2,127,789, of which the female population was 1,114,647, and the number of households in the Alappuzha district was 534,994.^[19]

Study participants and Sampling

Based on a study conducted in Vypin, Ernakulam, in 2009,^[18] the proportion of women who underwent breast examinations is expected to be 50%. The formula used for sample size estimation was $n = \frac{Z^2 P(1 - P)}{D^2}$, where $z = 1.96$ for alpha at 5% and two-sided, $P = 0.50$, and $D = 0.10$. Using a design effect of three ($Deff = 1 + \rho(m-1)$), assuming an average cluster size of 15 and an intra class correlation of 0.15 ($\rho = 0.15$), and an additional 10% of non-response, the final sample size was rounded to be 320.

A multi-stage cluster sampling method was used for the selection of study participants. In the first step, 10 local self-government institutions (LSGIs) out of the 78 LSGIs in the Alappuzha district were selected using a computer-generated random list. Again, using the same procedure, two wards were randomly selected from each LSGI, and then 16 women were chosen from each ward. The study setting and the selected panchayaths are shown in Figure 1.

Data collection tools and technique

The data collection was conducted from March to May 2022. After obtaining permission from the respective LSGIs, the investigator went to each of the wards, and the location of the ward was chosen as the starting point. Then, a direction was selected to visit all consecutive households until 16 women aged 35–65 years were interviewed. If

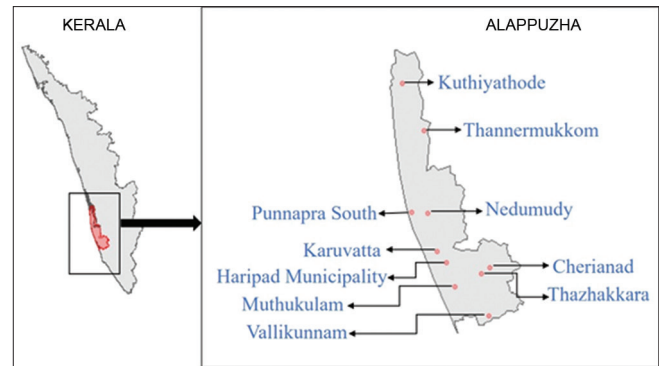


Figure 1: Map of the study location and sampled areas

more than one eligible woman were found in a particular house, one eligible woman was included in the study based on their choice, but there were very few instances like that. Accredited Social Health Activist (ASHA) workers, health volunteers, or ward members of the respective wards accompanied the investigator during household visits. A checklist was used to record the house visits and availability of women during the survey. After explaining the information sheet and obtaining consent, the investigator interviewed the women.

A structured interview schedule was developed in English and translated into the local language, Malayalam. The participants were interviewed in Malayalam, and their responses were recorded in the hard copy of the tool. The socio demographic details of women and their breast cancer screening practices were captured using a series of questions related to their breast self-examination practices, visits to a health facility for clinical breast examination, mammography, ultrasonography USG, or CT to examine their breasts. The BSE practices were assessed by asking whether the women practiced breast examination using a mirror, by hand, or using both, and also whether they practiced BSE monthly, occasionally, or rarely.

Data entry and analysis

The information was recorded in the hard copy of the interview schedule and entered into the system using the data entry platform prepared in Kobo Toolbox. The data were analyzed with the aid of IBM SPSS Statistics 25 for Windows. The proportion of women practicing BSE and women who visited a health facility for CBE, mammography, and other screening methods was estimated with 95% confidence intervals. A flow chart illustrating the breast examination practices and reported abnormalities was prepared. The Chi-square test, or Fischer's exact test, was used to test the associations. A stratified analysis to estimate the combined role of the significant factors identified in the bivariate analysis was also performed. Binary logistic regression was used to estimate the odds ratios and 95% confidence intervals.

Ethical considerations

The clearance was obtained from the Institutional Ethics Committee well before the conduct of the study. Participation in the study was completely voluntary. The participant's identity and personal information were kept confidential.

Results

The total number of women who participated in the study was 320, and all were married. Around 55% were 35–49 years old, and 45% had higher secondary education or above. Nearly half of the women were homemakers, and 67% had a monthly income above Rs. 10000. Thirteen of them reported a first-degree relative with breast or ovarian cancer [Table 1]. There were six women already diagnosed with breast cancer (prevalence: 1.9%, 95% CI: 0.4%–3.4%), and among them, two were detected with stage II cancer and the remaining with stage I cancer. Two of them had cancer recurrences and were seeking treatment at the time of the survey.

Among the women with no breast cancer ($n = 314$), the proportion of women who practiced either hand or visual breast examination was 73.2%, with a confidence interval of 68.4%–78.1%. The percentage of women who underwent clinical breast examinations by a doctor, nurse, or other health worker to detect any abnormality

was 25.2% (95% CI: 20.4–30.0), and the women who ever underwent mammography was 6.4% (95% CI: 3.7–9.1). Among the 314 women without breast cancer, 6.1% (95% CI: 3.4%–8.7%) had detected some kind of non-cancerous abnormalities by a clinical breast examination [Table 2].

Figure 2 describes the breast examination practices of study participants in detail. Among the 230 women who practiced BSE, 55% ($n = 125$) were practicing BSE monthly, and of those women who practiced BSE monthly, one-fourth (33/125) noticed abnormalities around their breasts. In contrast, among those who practice BSE rarely or occasionally, only 14% (15/105) of women observed abnormalities around their breasts. Altogether, 21% of women (48/230) practicing BSE monthly or rarely found any abnormalities, and 79% (38/48) of those who found abnormalities visited a health facility for further evaluation. Among those who did not find abnormalities, 29% (31/107) visited a health facility to consult a doctor. Overall, women found with abnormalities during the consultation were 10% (13/125) among those who practice BSE every month compared to 5.7% (6/105) among those who rarely or occasionally practice BSE [Figure 2].

BSE and CBE were significantly low among homemakers [Table 3]. The combined role of education and working status for women was analyzed further to determine the association with BSE [Table 4]. Working or retired women with higher secondary education and above had 10 times higher odds (OR = 10, 95% CI: 3.35–29.86) of practicing BSE compared to the reference group of homemakers or women working under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) with a primary level of education.

Discussion

The present study helps to understand the breast cancer screening practices of 35–65-year-old women in Alappuzha. One significant observation from the study is that 73% of the participants practiced BSE, and more than half of them practiced it monthly (39%). The proportion of women who consulted a doctor/health worker for a breast examination (CBE) was 25%. Also, it is found that education and working status together contribute to the breast self-examination practice of women in this population.

In a study conducted about a decade ago in Ernakulam among women aged 35–50, almost half of the respondents ever practiced breast screening, of which BSE was the most commonly practiced method (97.3%). Among them, less than 30% of women did the monthly practice of BSE.^[21] This observation is different from the present study, where only three-fourth of study participants practiced BSE, and

Table 1: Background details of the study participants

Background details	Participants	
	<i>n</i>	%
All	320	
Age group		
35–39	69	21.6
40–44	50	15.6
45–49	58	18.1
50–54	45	14.1
55–59	49	15.3
60–65	49	15.3
Education		
Primary level (1–7 STD)	38	11.9
High school level (8–10 STD)	137	42.8
Higher secondary and above	145	45.3
Working status		
Homemaker	159	49.7
MGNREGA	48	15.0
Working/Retired/Self-employed	113	35.3
Monthly income		
Below 5000	78	24.4
5001–10,000	27	8.4
10,001–20,000	35	10.9
20,001–30,000	107	33.4
Above 30,000	73	22.8
First-degree relative with breast or ovarian cancer		
No	307	95.9
Yes	13	4.1

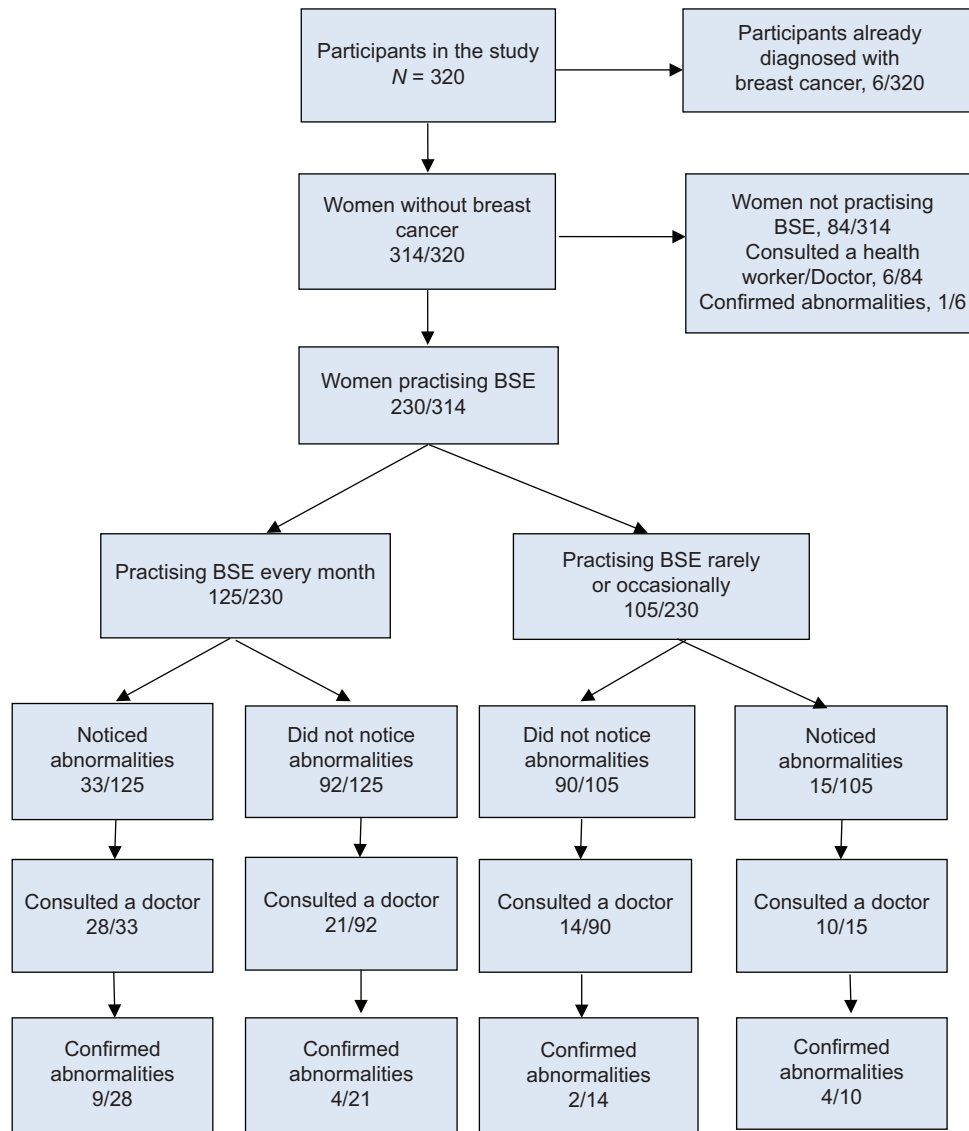


Figure 2: Breast self-examination, clinical breast examination, and confirmed abnormalities reported by women

Table 2: Screening practices of women without breast cancer

Breast examination practices Among women without breast cancer (n=314)	Frequency	Percentage	95% Confidence interval
Women practicing BSE	230	73.3	68.4–78.1
Women practicing BSE monthly	125	39.8	34.4–45.2
Women practicing BSE rarely or occasionally	105	33.4	28.2–38.7
Women ever consulted a doctor/health worker for a breast examination (CBE)	79	25.2	20.4–30.0
Women ever underwent mammogram	20	6.4	3.7–9.1
Women practices any breast screening method*	237	75.5	70.7–80.2
Women found with abnormalities	19	6.1	3.4–8.7

*Women reported practicing BSE or underwent CBE or mammogram

more than half of them practiced BSE monthly. In another study conducted in Delhi among adult women above 30 years, almost 40% of the women practiced BSE at least once a month, similar to the present study.^[22]

The present study also highlights the importance of practicing BSE regularly. Those regularly practicing BSE

observed more abnormalities in and around their breasts. Also, one-fourth of women ever consulted a doctor/health worker for breast examination in this population. Among 92 women who did not find any abnormalities during BSE, 21 reported they underwent CBE (22.8%). These findings show that women are concerned about breast cancer in this population. On the contrary, in

Table 3: Breast self-examination and clinical breast examination among women with different characteristics

Background details	Women without breast cancer n=314	Breast Self-examination		P	Clinical breast examination		P
		n	%		n	%	
All		230	73.2		79	25.2	
Age group							
35–39	69	46	66.7	0.199	15	21.7	0.319
40–44	50	43	86.0		15	30.0	
45–49	58	41	70.7		14	24.1	
50–54	44	34	77.3		16	36.4	
55–59	48	36	75.0		8	16.7	
60–65	45	30	66.7		11	24.4	
Education							
Primary level (1–7 STD)	37	21	56.8	0.032	9	24.3	0.764
High school level (8–10 STD)	133	98	73.7		31	23.3	
Higher secondary and above	144	111	77.1		39	27.1	
Working status							
Homemaker	154	100	64.9	<0.001	29	18.8	0.040
MGNREGA	48	32	66.7		15	31.3	
Working/Retired/Self-employed	112	98	87.5		35	31.3	
Monthly income							
Below 5000	76	54	71.1	0.293	17	22.4	0.535
5001–10,000	27	21	77.8		8	29.6	
10,001–20,000	34	25	73.5		11	32.4	
20,001–30,000	105	71	67.6		22	21.0	
Above 30,000	72	59	81.9		21	29.2	
First-degree relative with breast or ovarian cancer							
Yes	14	10	71.4	1.000	3	21.4	0.742
No	300	220	73.3		76	25.3	

Table 4: The association between the combined effect of education and working status on the breast self-examination practice

Education	Working status	All women	Practice BSE		Crude odds ratio	95% Confidence interval
			n	%		
Primary level	Homemakers/MGNREGA	31	16	51.6	Reference	
	Working/Retired/Self-employed	6	5	83.3		
High school	Homemakers/MGNREGA	97	69	71.1	2.31	1.01–5.30
	Working/Retired/Self-employed	36	29	80.6		
Higher secondary and above	Homemakers/MGNREGA	74	47	63.5	1.63	0.70–3.81
	Working/Retired/Self-employed	70	64	91.4		

a study conducted in the hard-to-reach rural areas of western India, less than 1% of women participants had a breast examination by any health provider.^[23] Women's educational attainment in Kerala is markedly different from many other states, which may influence the awareness level of women regarding cancer screening and contribute to the higher percentage of BSE and CBE among women in the study population.

However, the observations contradict the fifth round of the NFHS-5 report, where the proportion of women who had undergone a breast examination by a healthcare provider is less than 1% in India and around 2% in Kerala.^[17,24] In Alappuzha, the proportion of women who have undergone a breast examination for breast cancer is 2.6%.^[25] The questions in the NFHS survey were limited

to whether the women underwent any screening for breast cancer, and it was one of the large sets of questions in the survey tool. But when we focused on assessing the breast screening practices as a specific objective, the women gradually reached out to understand the questions correctly, recollected their practices, and reported them to the interviewer. That may be one reason for such a big difference in the proportion of women who attended the screening between the NFHS-5 report and the present study.

A systematic review comprising 15 studies during 2010 and 2020 in India with a total of 7545 women between the ages of 14 and 75 found that BSE was the most practiced method by nearly 27% of women, followed by CBE (16%) and mammography (7%). But the review states that even

though women had proper knowledge and a positive attitude toward breast cancer screening, the practice levels of screening methods were comparatively low. The reasons could be lack of time, embarrassment, or negligence.^[26] Interventions based on educational models encourage self-care and enhance the screening behavior of women for breast cancer, especially through trained local volunteers.^[27]

In the intervention study conducted in Trivandrum, women with manual occupations were 35% less likely to practice BSE than homemakers.^[18] In the present study, the practice of BSE among homemakers and women working in the rural employment scheme was almost similar. The MGNREGA 2005 is an Indian labor law and social security measure that provides at least 100 days of work per rural household in a year. The women in the low socioeconomic group are primarily the beneficiaries of the act, and the work provided by the scheme is mainly manual labor.^[28] The present study also observed the importance of education as a crucial factor related to breast cancer screening practices. Although education played a vital role in the BSE practices of women, the working status of women also played a significant role in the same. Women with a better employment status practiced BSE more frequently than others, possibly due to the chances of having more exposure to learn about BSE in their respective workspaces.

The potential to generalize the findings due to the representativeness of the study participants to the target population is the major strength of the study. The limitation of the study is that the breast self-examination practices were not assessed in detail to determine whether the women followed the correct method of BSE.

The main objective of any cancer control program is to reduce the mortality and morbidity associated with cancer. Community-level participation and the cooperation of various health agencies are essential for a sustainable cancer control program. Early Cancer Detection Clinics as part of the District Cancer Control Programme (DCCP), are being conducted at Government health centers in Kerala. Information collected by ASHA workers on lifestyle diseases and associated risk factors is being used to identify individuals for screening at health centres.^[29] Dissemination of specific messages on the importance of BSE and CBE can be easily integrated during health workers' house visits as part of the DCCP.

Conclusion

The proportion of women who reported doing BSE and CBE in the present study indicates that women in this population are more concerned about their breasts. The education level of women in Kerala may contribute to

the high proportion of women practicing BSE in the present study. Also, the study pointed out the combined role of education and the working status of women in determining BSE practice. The observations suggest that women, in general, are aware that breast cancer is one of the most common cancers affecting women and that they should examine their breasts to detect any abnormal changes. However, the women should be educated more on the symptoms and risk factors, proper ways of practicing BSE, and the importance of consulting a health practitioner at the earliest if they suspect any abnormalities. The awareness and screening programs should ensure that such programs reach the eligible women in the households, especially homemakers and women working under MGNREGA with a low level of education. That will further help detect the disease early, improve the quality of life of women, and reduce mortality due to breast cancer. Providing education and awareness among women regarding breast cancer screening is not only enough, but the authorities should also ensure that such activities reach marginalized women.

Financial support and sponsorship

This study is based on a student dissertation for the Master of Public Health course requirement, it was self funded, and there was no sponsorship.

Conflicts of interest

There are no conflicts of interest.

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