

An educational intervention study to enhance breast cancer awareness among women and primary healthcare providers of an urban health center area, Visakhapatnam

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ABSTRACT

Background: Breast cancer is the most common malignancy in women worldwide posing greater health challenge. The poor survival rate from breast cancer in India may be attributed to lack of awareness, low rate of screening uptake and presentation of cases in advanced stage. **Objectives:** To assess the baseline knowledge and effectiveness of educational intervention in improving the knowledge regarding breast cancer. **Materials and Methods:** A quasi-experimental community-based health educational intervention study was performed among 100 women and 18 female primary healthcare providers residing in urban field practice area. Face-to-face interviews were performed using a questionnaire adapted from the Breast Cancer Awareness Measure (Breast-CAM) Version 2. Data were analyzed using SPSS version 25. To assess the difference between pre- and postintervention scores, Mc-Nemar's test and paired sample *t* tests were applied. Association between socio-demographic variables and difference in mean scores was assessed by using ANOVA and independent *t* test. *P* value less than 0.05 was taken as statistically significant. **Results:** The mean pre-intervention score of knowledge items (21 including warning signs, risk factors of breast cancer) among 100 women participants was 7.19 ± 3.45 and postintervention mean score was 18.18 ± 2.42 . The mean pre-intervention score among 18 primary healthcare providers was 10.89 ± 4.59 and postintervention score was 19.89 ± 1.28 . There was significant improvement in mean scores. The increase in percentage of scores in all 21 items postintervention was significant (Mc-Nemar's test). There was significant association between socio-demographic profile and increase in mean scores. The study identified various barriers for seeking medical care among women. **Conclusion:** The community-based educational intervention was effective in enhancing the knowledge regarding breast cancer among women.

Keywords: Awareness, breast cancer, education, intervention, women

Introduction

Breast cancer is the most common malignancy in women worldwide. According to WHO fact sheet 2020, there were

2.3 million women diagnosed with breast cancer and 685,000 deaths globally.^[1] The National Cancer Registry Program, India 2020, database reported that 162,468 women were newly detected with breast cancer in India accounting for 27.7% of all cancers. About 87,090 women died due to breast cancer in India, which accounts for 23.5% of all cancer-related deaths in women. Currently, there is an increase in prevalence of breast cancer in younger age group (25 to 49 yrs), which is 37.7% of all cancer cases.^[2]

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According to Global Surveillance of trends in cancer survival 2000-2014, the 5-year survival of breast cancer cases was 89% survival 2000-2014er age group (25 to 49 yrs) or 27. This study analyzed some of the reasons for the low survival rate in India as presentation of 70% of the breast cancer cases in the *advanced stage*; *lack of awareness* of early signs of breast cancer and screening methods; cultural factors, personal beliefs, and stigma acting as *barriers* for under-utilization of available services; and *Lack of capacity building* of primary healthcare providers like ASHA (Accredited Social Health Activists) who are highly accepted as health educators in community.^[3] According to National Family Health Survey-5 data, very low percentage 0.8% (0.7% in urban, 0.8% rural) of adults in age group 30-49 years had ever undergone clinical breast examination.^[4]

Previous studies reported community-based educational intervention as an effective tool to raise the awareness.^[5-7]

Hence, a community-based educational interventional study was performed in an urban setting to improve the baseline knowledge regarding breast cancer among women and to identify the barriers for early detection of breast cancer.

Materials and Methods

A quasi-experimental community-based health educational intervention study was performed in the field practice area of an Urban Health Centre (UHC) of a private medical college in Visakhapatnam, Andhra Pradesh. The educational intervention was administered, and the pre- and postscores were compared in the same group of participants. The study was conducted for period of two months from August to September 2022. Convenient sampling method was used to select the study participants. A total of 112 women residing in the urban field practice area came to participate in study voluntarily after the community was sensitized with study objective. Among them, four participants were excluded as they had previous history of management for tumors in breast and eight women were in their antenatal and postnatal period. Hence, 100 women were considered for study. All the female primary healthcare providers [one Public Health Nurse (PHN), two Auxiliary Nurse Midwives (ANMs), one Health Educator (HE), six Accredited Social Health Activists (ASHAs), and eight Anganwadi workers (AWW) total ($n = 18$)] working under Urban Health Centre were included in the study.

Inclusion criteria

1. Women ≥ 20 years of age and willing to participate in study.
2. Women who were able to understand English or Telugu (local language).
3. Women who were residing in the study area for more than one year.

Exclusion criteria

1. The women who were diagnosed with breast cancer or having history of breast cancer.
2. Pregnant and lactating women during the study period.
3. The women who were not willing to participate.
4. The women who were seriously ill during period of data collection.

Ethical consideration: Institutional Ethics Committee clearance was obtained prior to initiation of the study. Informed consent was obtained from participants. To ensure confidentiality, coding of questionnaire was performed and interview was conducted maintaining privacy for participants.

Study tools: Face-to-face interview was performed by questionnaire adapted from the Module of Breast Cancer Awareness Measure (Breast-CAM) Version 2.^[8] The questionnaire consists of three components: A) Demographic characteristics of the respondent, B) Questions to assess the Awareness regarding warning signs and risk factors of breast cancer, C) Perceived barriers for health seeking for breast cancer. A pilot study was performed, and necessary modifications were made in the questionnaire.

The barriers for health seeking were categorized into Emotional, Practical, and Service barriers based on items identified from previous studies.^[9-11]

Method of data collection: The data collection was performed in two phases: *pre-intervention and postintervention*. Baseline knowledge regarding breast cancer was obtained by face-to-face interview using the study questionnaire. Group educational intervention sessions were conducted for 15-20 women per session on a mutually convenient day at UHC. A separate session was held for the female primary healthcare providers. The educational resources like Power point presentation, videos, charts, handouts, and models were used. The content of the educational material included general information on breast cancer, risk factors, signs and symptoms, and screening procedures. All recommended modifications in educational material were performed based on the feedback from the experts on clarity and appropriateness of the content. Pamphlets/handouts were distributed to the participants. Interview was conducted 2 weeks after the participant completed educational intervention.

Data analysis: Data were entered in Microsoft Excel and analyzed by using SPSS (Statistical Package for Social Sciences) Version 25. Descriptive statistics represented in percentages, mean, and SD. Shapiro-Wilk test is applied to find normality. To assess the differences between pre- and postintervention scores, Mc-Nemar's test (matched binomial variables) and paired sample *t* tests (comparing the mean scores pre- and post-test in same group) were computed as appropriate. Association between socio-demographic variables and difference in mean

scores was assessed by using analysis of variance (ANOVA) and independent *t* test. *P* value less than 0.05 was taken as statistically significant.

Results

The study was performed among two categories of the participants: 100 women residing in the study area and 18 female primary health workers providing services in field practice area of an UHC. The results of the both categories of participants were analyzed separately.

The women (*n* = 100) were in age group 20 to 60 years with mean age 34.73 ± 12.93 yrs. Majority, 88% were married, 65% were illiterate, 90% were unemployed, and 75% were Hindu by religion. The socioeconomic status of the study participants

Table 1: Socio-demographic characteristics of the women (n=100)

| Variable | Category | Frequency | Percent | 95% CI |
|---|--------------------|-----------|---------|-------------|
| Age in years | 20-30 | 50 | 50.0 | 40-60 |
| | 31-40 | 17 | 17.0 | 9.49-24.53 |
| | 41-50 | 17 | 17.0 | 9.49-24.53 |
| | >50 | 16 | 16.0 | 8.67-23.33 |
| Education | Illiterate | 65 | 65.0 | 55.46-74.54 |
| | Schooling | 16 | 16.0 | 8.67-23.33 |
| | Inter/Diploma | 13 | 13.0 | 6.27-19.73 |
| | Graduate and above | 6 | 6.0 | 1.25-10.75 |
| Religion | Hindu | 75 | 75.0 | 66.34-83.66 |
| | Muslim | 11 | 11.0 | 4.74-17.26 |
| | Christian | 14 | 14.0 | 7.06-20.94 |
| Occupation | Unemployed | 90 | 90.0 | 84-96 |
| | Employed | 10 | 10.0 | 4-16 |
| Socioeconomic status (B.G Prasad socioeconomic scale) | Upper | 0 | 0.0 | 0 |
| | Upper Middle | 17 | 17.0 | 9.49-24.51 |
| | Middle | 32 | 32.0 | 22.67-41.33 |
| | Lower Middle | 21 | 21.0 | 12.85-29.15 |
| Marital status | Lower | 30 | 30.0 | 20.83-39.17 |
| | Unmarried | 12 | 12.0 | 5.5-18.50 |
| | Married | 88 | 88.0 | 81.50-94.50 |

was assessed based on updated B.G Prasad socioeconomic scale for the year 2021.^[12] Among the participants, 32% belonged to middle class followed by 30% in lower class as shown in Table 1. About 7%, had family history of breast cancer, 73% had no family history of breast cancer, and 20% were not aware of the family history.

Table 2 shows the percentage of correct responses for each item related to warning signs and symptoms in pre- and postintervention. The percentage of correct responses improved significantly postintervention. The difference in the percentage of correct responses was significant.

The percentage increase in correct responses of all 10 items regarding risk factors is represented in Table 3. The increase in percentage post intervention was found to be significant.

The quantitative analysis of scores was performed by paired *t* test for warning signs and symptoms and risk factors separately pre- and postintervention. There was significant improvement in mean scores postintervention among women as shown in Table 4. There was significant improvement in confidence levels of the women to detect changes in breast and health-seeking behavior post intervention as shown in Table 5. Stratified analysis was carried out for the difference in mean scores as per socio-demographic variables of study participants. There was significant association between educational level of participants and increase in scores, with more improvement seen among illiterates (11.52 ± 2.65; *P* = 0.038) as shown in Table 6.

About 18 female primary healthcare providers were included in the study. They were in age group of 23-35 years with mean age 28.22 ± 3.191 yrs. All of them were married and literates. Majority 12 (66.7%) were Hindu by religion, 10 (55.6%) belonged to middle class. Among the health care providers, 2 (11.1%) had family history of breast cancer. The correct responses of warning signs and symptoms and risk factors were summated separately and mean scores were calculated pre- and postintervention. The increase in mean scores was found to be significant as shown in Table 7.

Table 2: Comparison of percentage of correct responses of women regarding warning signs and symptoms pre- and postintervention (n=100)

| Warning signs and symptoms | Correct answers (%) | | Percent of change | Mc-Nemar test <i>P</i> |
|---|---------------------|-----------|-------------------|------------------------|
| | Pre-test | Post-test | | |
| Lump or thickening in your breast | 44.0 | 100.0 | 56.0 | 0.000* |
| Lump or thickening under your armpit | 5.0 | 98.0 | 93.0 | 0.000* |
| Bleeding or discharge from your nipple | 32.0 | 87.0 | 55.0 | 0.000* |
| Pulling in of your nipple | 8.0 | 65.0 | 57.0 | 0.000* |
| Change in the position of your nipple | 22.0 | 54.0 | 32.0 | 0.000* |
| Rash on or around your nipple | 11.0 | 87.0 | 76.0 | 0.000* |
| Redness of your breast skin | 37.0 | 96.0 | 59.0 | 0.000* |
| Change in the size of your breast or nipple | 80.0 | 98.0 | 18.0 | 0.000* |
| Change in shape of your breast or nipple | 84.0 | 99.0 | 15.0 | 0.000* |
| Pain in one of your breasts or armpit | 52.0 | 89.0 | 37.0 | 0.000* |
| Dimpling of the breast skin | 14.0 | 82.0 | 68.0 | 0.000* |

Table 3: Comparison of percentage of correct responses related to risk factors of breast cancer pre- and postintervention among women (n=100)

| Risk factors | Correct answers (%) | | Percent of change | Mc-Nemar test P |
|--|---------------------|-----------|-------------------|-----------------|
| | Pre-test | Post-test | | |
| Having a past history of breast cancer | 63.0 | 99.0 | 36.0 | 0.000* |
| Using Hormone Replacement Therapy | 21.0 | 94.0 | 73.0 | 0.000* |
| Drinking >1 unit of alcohol a day | 69.0 | 96.0 | 27.0 | 0.000* |
| Being overweight (BMI over 25) | 18.0 | 80.0 | 62.0 | 0.000* |
| Having a close relative with breast cancer | 53.0 | 99.0 | 46.0 | 0.000* |
| Having children later on in life or not at all | 28.0 | 60.0 | 32.0 | 0.000* |
| Starting your periods at an early age | 18.0 | 93.0 | 75.0 | 0.000* |
| Having a late menopause | 19.0 | 93.0 | 74.0 | 0.000* |
| Doing less than 30 mins of moderate physical activity 5 times a week | 19.0 | 63.0 | 44.0 | 0.000* |
| Increasing age | 22.0 | 86.0 | 64.0 | 0.000* |

Table 4: Paired t test showing the significant improvement in the knowledge scores of warning signs and risk factors among women postintervention (n=100)

| Knowledge indicator | | Mean | SD | P |
|---------------------|-----------|------|------|--------|
| Warning signs | Pre-test | 3.90 | 2.04 | 0.000* |
| | Post-test | 9.55 | 1.52 | |
| Risk factors | Pre-test | 3.30 | 2.15 | 0.000* |
| | Post-test | 8.65 | 1.55 | |

There was significant improvement in behavior of healthcare providers in terms of frequency of checking breast, confidence in detecting changes in breast, health seeking behavior postintervention. The association of age, type of job, years of experience, family history of breast cancer and increase in mean scores among healthcare providers was found to be significant as shown in Table 8.

The study identified barriers for seeking health care among the study participants. The responses of women and primary healthcare providers were represented separately as shown in Table 9. Multiple responses were noted.

Discussion

The present study was aimed at improving the awareness regarding breast cancer among women and female primary healthcare providers in the field practice area of an UHC.

In the pre-intervention, the women considered change in the shape (84%) or size of breast or nipple (80%), pain in one of the breasts or armpit (52%), lump or thickening in breast (44%), bleeding or discharge from nipple (32%) as the most common warning signs. Very few women responded that lump in arm pit (5%), pulling in of nipple (8%), and dimpling of the skin (14%) as warning signs and symptoms of breast cancer. This showed that some of the participants had knowledge regarding common symptoms of breast cancer than atypical symptoms of breast cancer prior to intervention. The study performed by Schilling MP et al.^[13] in western Amazon reported that women tend to be highly aware of some common breast cancer symptoms

such as a lump in the breast and nipple discharge and had poor awareness of other breast cancer-related atypical symptoms such as nipple retraction and redness of breast skin. After intervention, the knowledge regarding all warning signs and symptoms of breast cancer significantly improved. Other targeted educational intervention studies performed by Gupta SK et al.,^[5] Nisha B et al.,^[6] S.A. Rabbani et al.,^[7] Schilling MP et al.,^[13] and Rezaein M et al.^[14] indicated low baseline knowledge prior to intervention and significant increase in the knowledge scores after intervention.

In current study, having past history of breast cancer (63%), drinking >1 unit of alcohol per day (69%), and breast cancer in close relative (53%) were considered by majority of the women as risk factors. A very low percentage of women (<20%) considered early menarche, late menopause, having children at later age, advancing age, and using hormonal replacement therapy as risk factors during pre-intervention. After intervention, the percentage scores regarding risk factors significantly improved. These results align with studies performed in India by Gupta SK et al.,^[5] Nisha B et al.,^[6] Prusty RK et al.,^[15] and in Bangladesh by Sarker R et al.^[9]

The confidence levels in identifying changes in breast among women improved postintervention. Frequency of checking changes in breast at least monthly increased from 15% to 64%, health seeking behavior (visiting doctor) increased from 11% to 75%. Hence, the educational intervention proved to be successful in improving the confidence, skills, and health-seeking behavior among the women. This would further prevent delay in timely diagnosis of breast cancer. These findings were supported by the studies performed by Gupta SK et al.^[5] in urban Madhya Pradesh, Nisha B et al.^[6] in rural Tamil Nadu, S.A. Rabbani et al.^[7] in UAE, and Rezaein M et al.^[14] in Iran.

The study showed noticeable net difference in the mean knowledge scores of all 21 items (warning signs and symptoms and risk factors) among women across all the categories of socio-demographic profile postintervention. Stratified analyses revealed that the intervention was more beneficial to the women with no formal education as compared to those with formal

Table 5: Change in confidence, skill, and health-seeking behavior for breast cancer among women (n=100)

| Variable | Correct answers (%) | | Percent of change | Mc-Nemar test P |
|---|---------------------|-----------|-------------------|-----------------|
| | Pre-test | Post-test | | |
| Checking of breast | | | | |
| Rarely or never | 72.0 | 8.0 | -64.0 | 0.000* |
| Once in 6 months | 13.0 | 28.0 | 15.0 | |
| Monthly | 10.0 | 54.0 | 44.0 | |
| Weekly | 5.0 | 10.0 | 5.0 | |
| Confidence levels to detect changes in breast | | | | |
| Not at all confident | 75.0 | 6.0 | -69.0 | 0.000* |
| Not very confident | 9.0 | 6.0 | -3.0 | |
| Fairly confident | 10.0 | 38.0 | 28.0 | |
| Very confident | 6.0 | 50.0 | 44.0 | |
| Visit doctor after noticing changes in breast | | | | |
| ≤3 months | 11.0 | 75.0 | 64.0 | 0.000* |
| >3 months | 33.0 | 19.0 | -14.0 | |
| Never visit | 56.0 | 6.0 | -50.0 | |

Table 6: Distribution of mean knowledge scores pre- and postintervention as per socio-demographic characteristics (n=100)

| Variable | Pre-test score Mean±SD | Post-test score Mean±SD | Difference Mean±SD | Significance test P |
|---------------------------------|---------------------------|----------------------------|-----------------------|------------------------|
| Age group in years | | | | |
| 20-30 | 7.30±3.80 | 18.68±2.22 | 11.38±2.88 | 0.414 |
| 31-40 | 7.18±2.79 | 17.65±1.80 | 10.47±2.62 | |
| 41-50 | 7.18±3.43 | 18.29±2.49 | 11.12±3.22 | |
| >50 | 6.88±3.18 | 17.06±3.17 | 10.19±2.23 | |
| Educational status | | | | |
| Illiterate | 6.23±2.89 | 17.75±2.33 | 11.52±2.65 | 0.038* |
| Schooling | 7.69±3.24 | 18.19±3.06 | 10.50±2.48 | |
| Inter/Diploma | 10.54±4.25 | 19.77±1.54 | 9.23±3.14 | |
| Graduate and above | 9.00±2.68 | 19.33±1.63 | 10.33±3.33 | |
| Occupation | | | | |
| Unemployed | 7.00±3.36 | 18.07±2.49 | 11.07±2.71 | 0.416 |
| Employed | 8.90±3.93 | 19.20±1.40 | 10.30±3.65 | |
| Socio-economic status | | | | |
| Upper middle | 7.59±3.62 | 18.59±1.94 | 11.00±2.26 | 0.999 |
| Middle | 7.50±3.43 | 18.50±2.00 | 11.00±2.63 | |
| Lower middle | 7.05±4.02 | 17.95±2.56 | 10.90±3.25 | |
| Lower | 6.73±3.03 | 17.77±2.96 | 11.03±3.07 | |
| Family history of breast cancer | | | | |
| Yes | 8.57±2.37 | 19.00±1.15 | 10.43±1.4 | 0.516 |
| No | 7.32±3.61 | 18.19±2.56 | 10.88±2.99 | |
| Don't Know | 6.25±2.99 | 17.85±2.23 | 11.60±2.48 | |

Table 7: Paired t – test showing the significant improvement in the knowledge of warning signs and risk factors among primary healthcare providers postintervention (n=18)

| Knowledge items | | Mean | SD | P |
|-----------------|-----------|-------|------|--------|
| Warning signs | Pre-test | 6.94 | 2.86 | 0.000* |
| | Post-test | 10.56 | 0.62 | |
| Risk factors | Pre-test | 3.94 | 2.36 | 0.000* |
| | Post-test | 9.33 | 0.91 | |

education similar to the studies performed by *S.A. Rabbani et al.*^[7] in UAE and *Prusty RK et al.*^[15] in India.

The healthcare workers at the primary healthcare settings act as frontline health providers. They play an important role in providing information, education, and communication to the community. In the current study, the educational intervention improved knowledge mean scores among all socio-demographic categories of the workers. The study showed significant improvement in knowledge in age group 20-30 years, among Anganwadi workers, those with <3 years of job experience, with family history of breast cancer. Previous studies^[5-7,13,15,16] also reported association of socio-demographic factors with increase in awareness. The studies performed by *Prusty RK et al.*,^[15] *Hing JJX et al.*,^[16] and *Khokhar A et al.*^[17] proved that

Table 8: Distribution of mean knowledge scores pre- and postintervention as per socio-demographic characteristics among primary healthcare providers (n=18)

| Variable | Category | Prescore Mean±SD | Postscore Mean±SD | Difference Mean±SD | P |
|---------------------------------|------------|------------------|-------------------|--------------------|--------|
| Age | 20-30 | 9.79±4.54 | 19.71±1.33 | 9.93±3.87 | 0.05 |
| | 31-40 | 14.75±2.06 | 20.50±1.00 | 5.75±1.71 | |
| Job/role in community | ANM** | 13.50±0.71 | 21.00±0.00 | 7.50±0.71 | 0.022* |
| | ASHA** | 12.83±3.19 | 20.33±0.82 | 7.50±2.88 | |
| | AWW** | 7.13±3.14 | 19.00±1.31 | 11.88±3.18 | |
| | HE** | 17.00 | 21.00 | 4.00 | |
| | PHN** | 18.00 | 21.00 | 3.00 | |
| Experience in years | <3 | 6.33±3.93 | 19.33±1.21 | 13.00 | 0.000* |
| | ≥3 | 13.17±2.92 | 20.17±1.27 | 7.00 | |
| Family history of breast cancer | Yes | 7.50±3.54 | 20.00 | 12.50±3.54 | 0.002* |
| | No | 13.82±2.64 | 20.55±0.82 | 6.73±2.41 | |
| | Don't Know | 5.80±2.68 | 18.40±1.14 | 12.60±3.21 | |

*P<0.05 taken as significant; **ANM, ASHA, HE, PHN- definitions of abbreviations provided in methodology

Table 9: Perceived barriers for seeking health care among study participants

| Perceived barriers | Primary healthcare providers (n=18) | Women (n=100) |
|---|-------------------------------------|---------------|
| Emotional barriers | | |
| Too scared of treatment and outcome | 16.6% | 63% |
| Too embarrassed | 5.5% | 48% |
| Not confident to talk about symptom | 22.2% | 67% |
| Stigma following diagnosis of cancer | 11.1% | 76% |
| Ignorance/felt not important/myths | 5.5% | 38% |
| Practical barriers | | |
| Lack of time/Loss of wages | 5.5% | 44% |
| Financial constraints | 22.2% | 70% |
| Lack of family support | 27.7% | 60% |
| Service barriers | | |
| Lack of accessibility to health services | 38.8% | 31% |
| Lack of screening services at nearest health facility | 33.3% | 18% |
| Male healthcare providers at facilities | 11.1% | 51% |
| Lack of awareness programs/lack of information | 55.5% | 79% |

capacity building of the primary healthcare providers regarding breast cancer will help in increasing screening uptake and early detection of breast cancer in the community. A recent study from Mumbai performed by *Mitra I et al.*^[18] reported that clinical breast examination conducted every two years by primary health workers led to significant reduction in morbidity and mortality due to breast cancer.

In the present study, the perceived barriers for seeking medical care among the women study participants were mostly emotional/psychosocial barriers like stigma, fear, embarrassment, lack of confidence in talking to doctor, and ignorance. Some of the practical barriers identified were lack of family support, financial constraints. The barriers perceived by healthcare providers were mostly related to accessibility, feasibility, and affordability of the services in the community related to breast cancer. They were identified as lack of awareness programs in the community, lack of screening services at nearest health facility, lack of accessibility for health care, financial constraints, presence of male doctors at health center, etc., Previous studies^[9-11] identified psychosocial barriers as the major barriers for screening uptake in breast cancer

among women. In the current study, the barriers were identified before intervention and necessary efforts were made during intervention session to help women in overcoming the barriers. This was evident by positive health seeking behavior among participants after intervention. Thus, educational intervention proved to be effective in overcoming barriers in seeking health care.

The strengths of the present study were it was a community based educational intervention study which proved to be effective in disseminating information. Standardized and validated data collection tools were used to collect the data. The baseline findings for breast cancer awareness in the study were consistent with findings of the other studies performed in India and globally. This study was a combined effort to educate both women and healthcare providers. By capacity building the primary healthcare providers, the knowledge can be retained for long time in community and this would further lead to early detection of cases. The limitation of the study was that the results of the study may not be generalized as sample obtained by convenient sampling.

Conclusion

The current study showed there was a lack of awareness regarding breast cancer among women and primary healthcare providers. The study identified barriers for seeking health care among women. The educational intervention was successful in decreasing the knowledge gap and also addressing the barriers to seek medical care for breast cancer.

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Conflicts of interest

There are no conflicts of interest.

List of abbreviations

| Abbreviation | Definition |
|--------------|---|
| Breast-CAM | Breast Cancer Awareness Measure |
| SPSS | Statistical Package for the Social Sciences |
| WHO | World Health Organization |
| ASHA | Accredited Social Health Activist |
| UHC | Urban Health Centre |
| PHN | Public Health Nurse |
| ANM | Auxiliary Nurse Midwives |
| HE | Health Educator |
| AWW | Anganwadi worker |
| ANOVA | Analysis of variance |

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