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The Effect of Counseling on Breast Cancer Awareness in Rural Iranian Women: a Randomized Controlled Clinical Trial

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Abstract

In a community such as Iran where late presentation is predominant and the majority of breast cancer patients are diagnosed at advanced stages of the disease, there is an urgent need for improving the level of awareness about breast cancer and early detection measures. Given that rural residents are at higher risk for late diagnosis of breast cancer because they have less education, income, and access to advanced screening technologies, this study was conducted to determine the effect of counseling on breast cancer awareness of rural Iranian women. This randomized clinical trial was conducted on 60 rural women from the Abish Ahmad area in northwestern Iran in 2017. The randomized cluster method was used for sampling. From 20 rural health houses and centers, about one third were selected randomly. From the six selected clusters, three were randomly allocated as the control group and three as the intervention group. Using convenience sampling, 30 women between the ages of 40 and 69 were selected from the control group and 30 from the intervention group. The intervention group attended six group counseling sessions. Data was gathered using a demographic and obstetrical information questionnaire and breast cancer awareness measures. The chi-square, independent *t* test and ANCOVA by controlling for the baseline scores were used to analyze the data. After counseling, the mean knowledge about breast cancer score was significantly higher in the intervention group than in the control group (adjusted mean difference, 17.02; confidence interval (CI) 95%, 15.44 to 18.59; $p < 0.001$). The mean barriers to breast cancer screening score showed a significant decrease in the intervention group compared to the control group (AMD, −1.74; 95% CI −3.12 to −0.36, $p < 0.001$). After intervention, the frequency of breast self-exam showed a significant difference between groups ($p < 0.001$); but for confidence about noticing breast changes, no significant difference was observed between groups ($p = 0.08$). Group counseling had a significant effect on enhancing breast cancer awareness of rural Iranian women, except for confidence about noticing breast changes.

Keywords Breast cancer awareness · Breast cancer screening · Counseling

Introduction

Breast cancer comprises 12% of new cancer cases and 25% of all cancer cases and is the second leading cause of mortality by cancer among women after lung cancer [1, 2]. Each year, about 1,380,000 women worldwide are diagnosed with the disease [3]. The incidence rates vary by region globally, from 27 per 100,000 in middle Africa and eastern Asia to 96 per 100,000 in Western Europe [4]. The American Cancer Society reported in 2016 that about 246,660 new cases of breast cancer were diagnosed among women in the USA with 40,450 deaths [5].

About half of breast cancer cases and 58% of deaths occur in less developed countries [3]. It is estimated that by 2020, nearly 70% of new cancer cases will occur in low and middle income countries [6]. The Iranian population-based cancer registration report indicates that breast cancer accounts for 24.82% of all cancers diagnosed among women. The age-adjusted incidence rate was 25.06 per 100,000 [7] and most patients (67.6%) are women aged 35 to 60 years [8]. The incidence in Iran has risen significantly over the last two decades and is expected to continue to rise sharply. The increasing incidence of breast cancer in Iran in recent decades is due to changes in lifestyle and reproductive behavior [9] and also is associated with the aging of the population [10].

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One of the most important factors in decreasing the mortality rate of breast cancer is early diagnosis. The 5-year survival rate for first stage breast cancer is 100%, for the second stage is 86%, for the third stage is 57%, and for the fourth stage is 20% [11]. In developing countries, delayed patient presentation and late breast cancer diagnosis results from insufficient awareness of breast cancer and barriers to access to diagnostic services [12]. In a community such as Iran, where late presentation is predominant and the majority of breast cancer patients are diagnosed at advanced stages of the disease, there is an urgent need for improving the level of awareness about breast cancer and early detection measures [13]. The goal of breast cancer awareness programs is to promote awareness about diagnostic tools, screening, new approaches to prevention and early diagnosis and treatment modalities in the community. These play a major role in the control of breast cancer [14–16].

It is recommended that early diagnosis programs should be designed in limited-resource countries and those where women are diagnosed at advanced stages and where rural residents are at higher risk for late breast cancer diagnosis because of a lack of education, household income, and access to advanced screening technologies [14, 17, 18]. Breast cancer awareness is necessary for its early diagnosis. Although improving the education of women might improve their breast cancer awareness, education is not in itself sufficient [19]. Parsa et al. found that educational programs and appropriate counseling methods increased breast cancer awareness, revealed barriers to breast cancer screening, and increased adherence to breast cancer screening programs in a community [20]. In a systematic review conducted on 30 articles from 2001 to 2011 in Iran, the results indicated that knowledge about breast cancer screening methods and its risk factors was 14 to 73%. The prevalence rates of breast self-examination was 1.8 to 9.3%, clinical breast examination was 4 to 25%, and mammography was 3 to 26%. The most common barriers to breast cancer screening were fear of a breast cancer diagnosis, lack of knowledge of screening programs, lack of time, not having breast disease, negligence, and not believing in the necessity of screening [21].

Breast cancer awareness is important for early diagnosis and rural women are at higher risk for a late diagnosis of breast cancer. Because awareness about breast cancer among Iranian women is not well documented [13], the present study was conducted to determine the effect of counseling on breast cancer awareness among rural Iranian women.

Methods

Study Design and Participants

This randomized clinical trial was conducted on 60 rural women from the Abish Ahmad from June to September of 2017. Abish Ahmad is located in East Azerbaijan province in northwestern Iran. It has a population of 18,000 with 20 health houses and rural health centers. The inclusion criteria were being a female aged 40 to 69 years, not having carrying out a breast exam for at least four times during the past year, not having a history of breast cancer, and having a phone number for follow-up. The exclusion criteria were being pregnant or breastfeeding and having participated in educational classes related to breast cancer screening. Eligible participants were randomized in a 1:1 allocation ratio to either the intervention or the control arms. The intervention arm received six weekly consecutive counseling sessions about breast cancer awareness in groups of 8–12 women. The control arm received two educational sessions about cervical cancer screening.

Sample Size

The main outcome of the study was to compare the mean of breast cancer awareness before and after intervention between groups. G Power software was used to determine the sample size. Based on the study of Schilling et al. [22] about the knowledge of symptoms and risk factors of breast cancer in rural women, and considering M1 = 17.7 and assuming a 20% increase M2 = 23.1, SD1 = SD2 = 6.61, power = 80%, and one-sided $\alpha = 0.05$, the sample size was calculated as 20 participants for each group. Cluster sampling was used to avoid contamination bias.

The sample size required for a cluster-randomized study is calculated by multiplying the sample size of the study with individual randomization and the design effect (DE), which is calculated from the intracluster correlation coefficient (ICC; ρ) and fixed cluster size *n* as [23]:

$$DE = 1 + \rho\ (n-1)$$

DE was estimated considering ten individuals from each cluster and an ICC of 0.05 based on a pilot study. The final sample size was calculated to be 30 (20 × 1.5) per group for a total of 60 participants. This number was sufficient for comparison of the means of the groups.

Sampling

After obtaining the ethics code from the Ethics Committee of Tabriz University of Medical Sciences (IR.TBZMED.REC.1396.113) in 2017 and registering the study in the Iranian randomized clinical trial site (IRCT2017050933834N1), sampling was carried out. The randomized cluster method was used for sampling. From 20 rural health houses and centers, about one third were selected randomly. From the six selected clusters, three were randomly allocated as the control group and three as the intervention group. This was done to reduce contamination bias originating from the close relationships

between the rural women. Using convenience sampling, 30 women between the ages of 40 and 69 were selected from the control group and 30 from the intervention group. Each woman was called and asked to participate. Those who accepted were evaluated for the inclusion and exclusion criteria and the eligible women were invited to participate in a briefing session. In the briefing session, the goals and method of the study were explained and written informed consent forms were obtained from all participants.

Data Collection Tools

A demographic and obstetrical characteristics questionnaire was used to obtain information about the age, occupation, education, income, insurance coverage, marital status, number of children, age at menarche, and history of breastfeeding. The breast cancer awareness measure (B-CAM) as developed by the Cancer Research UK, King's College London and University College London in 2009 was used. The tool contains 41 questions in the seven domains of knowledge of symptoms (11 questions), knowledge of risk factors (9 questions), knowledge of breast cancer screening (4 questions), knowledge of age-related and lifetime risk (2 questions), confidence, skills and behavior in relation to breast changes (3 questions), anticipated delay in contacting the doctor (1 question), and barriers to breast cancer screening (11 questions). Scoring for the knowledge questions was true (1) or false (0). For the domain of breast cancer screening knowledge, the questions were open-ended. For the confidence about noticing a change in a breast, the responses were rated using a 4-point Likert scale (not at all confident = 0, slightly confident = 1, fairly confident = 2, and very confident = 3). Scoring for the domain of barriers to breast cancer screening was yes, often (2), yes, sometimes (1), and no (0). The designer of the tool did not considered a cutoff point for it. It was validated with the support of Breast Cancer Care and Breakthrough Breast Cancer. Test-retest reliability was moderate to good (0.42–0.7) for most items [24].

Intervention

The demographic and obstetrical characteristics questionnaire and B-CAM were completed by both groups through face-to-face interviews before intervention. The intervention group participated in six consecutive weekly counseling sessions in groups of 8–12 women. All counseling sessions were 45 to 60 min in length. In the first session, the counselor introduced herself, described the sessions and outlined the goals of the counseling process. Counseling was designed to make participants familiar with breast anatomy and physiology, breast cancer symptoms and risk factors, risk of late stage diagnosis of breast cancer, breast cancer screening methods, the national breast screening program, how to conduct a breast self-exam, and discussing barriers to breast cancer screening. An instructional manual on breast cancer awareness was distributed among the women in the intervention group at the end of the first session.

The control group attended two educational sessions about cervical cancer screening. Two months after the end of intervention, arrangements were made with the participants over the phone to present at their own health houses or centers to be further interviewed so that the researcher could fill out their post-test B-CAM questionnaires. After completion of the post-test questionnaire, the instructional manual also was distributed to the control group.

Statistical Analysis

The data was analyzed using SPSS software version 24. The chi-square, independent *t* test, and ANCOVA by controlling for the baseline scores were used to analyze the data. The cluster effect was not meaningful.

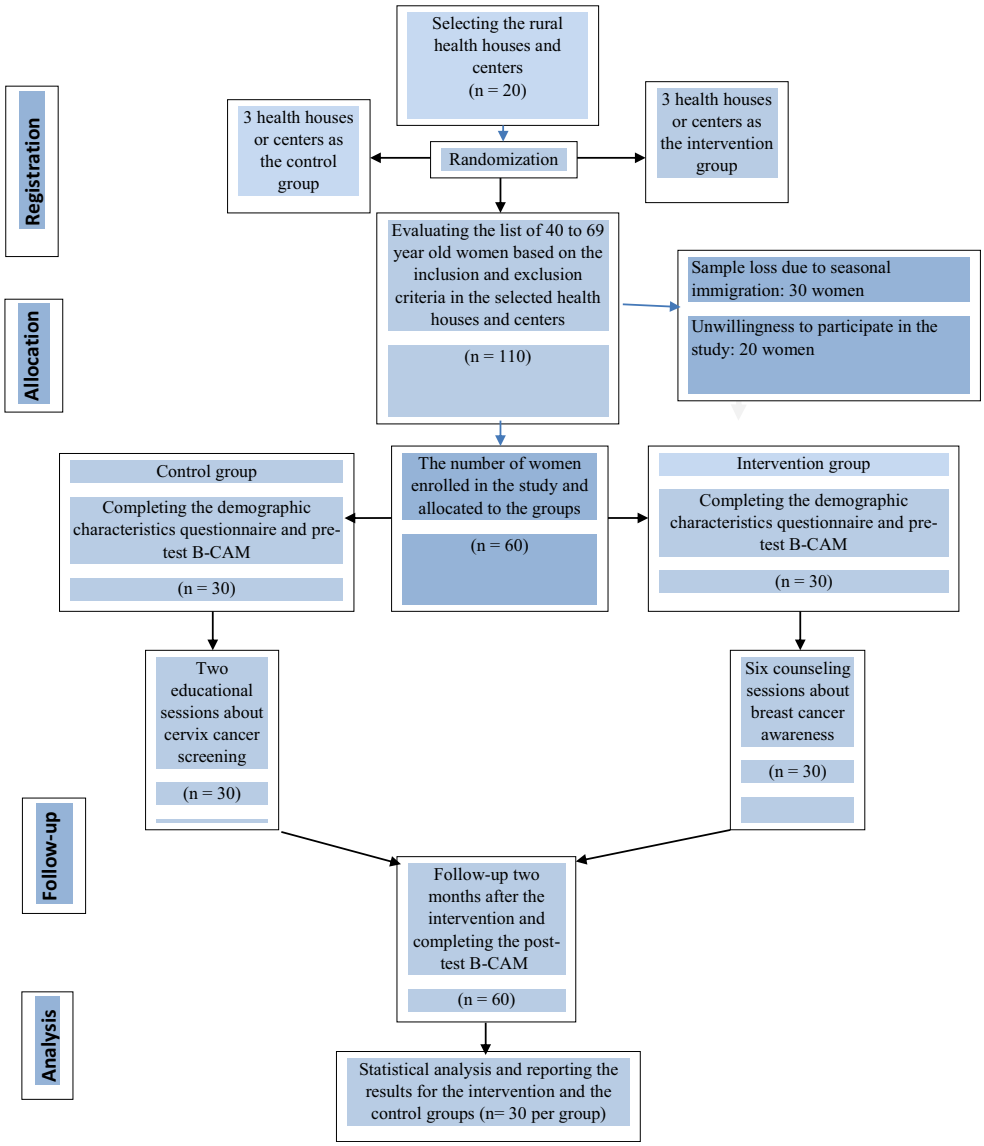
Results

In the clinical trial, 110 women were assessed for eligibility and 60 women ultimately were included (Fig. 1). The mean (standard deviation) of age of the intervention and control groups were 47.6 (5.7) and 48.2 (5.8), respectively. The majority of participants (93.3% of intervention group and 90% of control group) were illiterate. Most (100% of intervention group and 96.7% of control group) were housewives. There were no significant differences between groups in terms of demographic and obstetrical characteristics (Table 1).

To compare the mean scores of knowledge about symptoms, risk factors, breast cancer screening, age-related and lifetime risk, and barriers to breast cancer screening between groups after intervention, ANCOVA was used while controlling for the baseline scores. Before intervention, there was no significant difference between groups for the mean knowledge of symptoms score ($p = 0.12$). The mean knowledge of symptoms in the intervention group increased from 9.03 (2.3) before intervention to 10.8 (0.76) after intervention. In the control group, this was 7.27 (3.4) before intervention and 7.33 (2.5) after intervention. Using the general linear model and controlling for the baseline value, the mean knowledge of symptom score in the intervention group was significantly higher than in the control group (AMD, 3.14 (0.4); 95% CI, 2.22 to 4.06; $p < 0.001$).

The most common risk factors for breast cancer mentioned by participants in the pre-test were having a past history of breast cancer (76.7%), using hormone replacement therapy (71.7%), physical inactivity (71.7%), and being overweight (70%), respectively. Before intervention, the mean knowledge of breast cancer risk factor scores for the intervention and

Fig. 1 The flowchart of the study



control groups were 32.73 (2.24) and 31.33 (4.09), respectively ($p = 0.6$). After intervention, using the general linear model and controlling for the baseline values, the mean scores of the intervention and control groups were 42.8 (2.44) and 31.63 (2.31), respectively (AMD, 11.05 (0.54); 95%CI, 9.95 to 12.14; $p < 0.001$).

In the pre-test, 18 women (30%) were not aware of an age-related risk of breast cancer and 42 women (70%) believed that risk of breast cancer was the same at any age. Also, 59 women (98.3%) were not aware of the lifetime risk of breast cancer. Before intervention, the mean knowledge of age-related and lifetime risk scores in the intervention and control groups were 0.66 (0.47) and 0.76 (0.5), respectively ($p = 0.4$). After intervention, using the general linear model and controlling for the baseline values, the mean scores for the intervention and control groups were 1.33 (0.54) and 0.83 (0.37), respectively (AMD, 0.48 (0.12); 95% CI, 0.24 to 0.73; $p < 0.001$).

Before the intervention, there was no significant difference between groups regarding knowledge of breast cancer screening ($p = 0.8$). The mean knowledge of breast cancer screening score in the consultation group increased from 1.2 (0.92) before intervention to 3 (1.05) after intervention. The same value in the control group was 0.73 (0.62) before intervention to 0.7 (0.87) after intervention. Using the general linear model and by controlling for the baseline values, the mean knowledge of breast cancer screening score in the intervention group was significantly higher than in the control group (2.31 (0.23); 95% CI, 1.84–2.78; $p < 0.001$).

Before intervention, there was no significant difference between groups regarding the mean total knowledge score ($p = 0.06$). The mean total knowledge score about breast cancer in the intervention group increased from 43.63 (4.13) before intervention to 57.93(3.61) after intervention. This score in the control group was 42.2 (6.86) before intervention to 40.5

Table 1 Demographic and obstetric characteristics of the participants

Variable	Intervention group ($n = 30$) N (%)	Control group ($n = 30$) N (%)	p value	Variable	Intervention group ($n = 30$) N (%)	Control group ($n = 30$) N (%)	p value
Age (year)*	47.6 (5.7)	48.2 (5.8)	0.66**	Freelancer	7 (23.3)	15 (50.0)	
Husband's age*	51.4 (6.5)	51.8 (5.7)	0.80**	Employee	2 (6.7)	0	
Duration of marriage*	15.9 (1.7)	15.2 (1.9)	0.172**	Retired	0	1 (3.3)	
Marital status			0.492§	Income level			0.42†
Single	1 (3.3)	0		Not sufficient	8 (26.7)	4 (13.3)	
Married	27 (90)	30 (100)		Relatively sufficient	20 (66.6)	21 (70)	
Widowed	2 (6.7)	0		Sufficient	2 (6.7)	5 (16.7)	
Educational level			0.9§	Insurance status			1.00§
Illiterate	28 (93.3)	27 (90)		Yes	30 (100)	30 (100)	
Elementary school	2 (6.7)	3 (10.0)		No	0	0	
Husband's educational level			0.387†	Transportation			0.567§
Illiterate	15 (50.0)	13 (43.3)		Yes	17 (56.6)	16 (53.3)	
Elementary school	7 (23.3)	13 (43.3)		No	13 (43.4)	14 (46.7)	
Middle school	2 (6.7)	0		Number of pregnancy*	4.4 (2.07)	4.6 (1.7)	0.594**
High school	2 (6.7)	1 (3.3)		Number of delivery*	3.7 (1.5)	4.1 (1.5)	0.315**
Diploma	3 (10.0)	3 (10)		Age of first pregnancy*	17.0 (4.3)	16.7 (2.3)	0.359**
University	1 (3.3)	0		Ag of first menstruation*	13.07 (0.8)	12.77 (0.7)	0.167**
Occupation			0.9§	Age of menopause*	49.8 (4.5)	47.1 (4.4)	0.157**
Housewife	30 (100)	29 (96.7)		History of breast feeding			0.91§
Employed	0	1 (3.3)		Yes	30 (100)	28 (93.3)	
Husband's job			0.91§	No	0	2 (6.7)	
Unemployed	6 (20.0)	0		History of infertility			0.74§
Laborer	8 (26.7)	6 (20.0)		Yes	4 (13.3)	7 (23.3)	
Farmer	7 (23.3)	8 (26.7)		No	26 (86.7)	23 (76.6)	

*Mean (SD), **independent sample t test, § Chi-square, † trend Chi-square

(3.18) after intervention. Using the general linear model and controlling for the baseline value, the mean total knowledge about breast cancer score in the intervention group was significantly higher than in the control group (17.02 (0.78); 95% CI, 15.44–18.59; $p < 0.001$) (Table 2).

In the pre-test, the barriers to breast cancer screening were too many other things to worry about (47 participants; 78.4%), too busy to take the time (45 participants; 73.4%), and difficulty arranging transport (42 participants; 70%) (Table 3). Before intervention, the mean barriers to breast cancer screening score in the intervention and control groups were 7.67 (3.89) and 6.33 (4.4), respectively ($p = 0.2$). After intervention, using the general linear model and controlling for the baseline value, the mean scores for the intervention and control groups were 7.27 (3.34) and 8.47 (2.87), respectively (AMD, − 1.74 (0.69); 95% CI, − 3.12 to − 0.36; $p = 0.01$).

Before intervention, no significant difference was observed between groups regarding the frequency of breast self-exam ($p = 0.15$). After intervention, the difference was significant ($p < 0.001$). There were no significant differences for the chi-square test between groups for noticing a change in the breast before and after intervention ($p = 0.08$ and $p = 0.05$, respectively).

Discussion

Most research into breast cancer awareness has been conducted in Western countries [24–27]; however, beliefs and misconceptions are likely to be driven by the cultural context [28, 29]. This was the first interventional study in Iran based on B-CAM that is applicable across cultures about raising awareness of breast cancer.

After intervention, the mean knowledge of breast cancer symptom score was significantly different between groups. Similar to the results of the present study, Kisuya et al. found that the effect of conducting educational sessions using B-CAM content in Kenya resulted in a significant difference between the mean knowledge of breast cancer symptom score before and after intervention. In their single-group trial, the

Table 2 Results of comparing the mean scores of breast cancer awareness between two groups, before and after the intervention

Variable	Before the intervention				2 months after the intervention			
	Intervention ($n = 30$) mean (SD)	Control ($n = 30$) mean (SD)	t	p	Intervention ($n = 30$) mean (SD)	Control ($n = 30$) mean (SD)	Adjusted mean difference (0.95% CI)	p
Knowledge of symptoms	9.03 (2.3)	7.27 (3.4)	− 1.54	0.12	10.8 (0.76)	7.33 (2.5)	3.14 (2.22–4.06)	< 0.001
Knowledge of risk factors	32.73 (2.24)	31.33 (4.09)	− 0.40	0.68	42.8 (2.44)	31.63 (2.31)	11.05 (9.95–12.14)	< 0.001
Knowledge of age-related and lifetime risk	0.66 (0.47)	0.76 (0.50)	0.78	0.43	1.33 (0.53)	0.83 (0.37)	0.48 (0.24–0.73)	< 0.001
Knowledge of breast cancer screening	1.20 (0.92)	0.73 (0.62)	0.134	0.89	3.00 (1.05)	0.70 (0.87)	2.31 (1.84–2.78)	< 0.001
Total Knowledge	43.63 (4.13)	42.20 (6.86)	− 0.98	0.06	57.93 (3.61)	40.50 (3.18)	17.02 (15.44–18.59	< 0.001
Barriers to breast cancer screening	7.67 (3.89)	6.33 (4.06)	− 1.24	0.2	7.27 (3.24)	8.47 (2.87)	− 1.74 (− 3.12–0.036)	0.01

For comparing groups, before intervention, independent t test was used and after intervention, ANCOVA was used

mean score before intervention was 7.09 (2.52), which increased to 9.89 (2.38) after intervention [30]. In the present study, before intervention, the mean score in the intervention group was 9.03 (2.3) and increased to 10.8 (0.76) after intervention. The knowledge of breast cancer symptoms in the rural Iranian participants was higher than in Kenya.

At pre-test, the most common risk factors of breast cancer mentioned by the participants were having a past history of breast cancer, using hormone replacement therapy, lack of physical inactivity, and being overweight. However, in another Iranian study (2014), the age at menarche and infertility were reported as the main risk factors for breast cancer [31]. In a study in Indonesia, having a family history of breast cancer was reported to be the main risk factor for breast cancer [32].

In the present study, after intervention, the mean knowledge of breast cancer risk factor score was significantly different between groups. In a study conducted in Northern Sudan, after three educational sessions for 69 women, a significant difference was observed between the mean knowledge of breast cancer risk factor score before and after intervention [33].

The pre-test results of the present study about the knowledge of age-related and lifetime risk of breast cancer showed that 30% of participants were not aware of age-related risk and 70% believed that the risk could exist at any age. Also, 98.3% of participants were not aware of a lifetime risk. In an Indonesian study, 49.4% of women believed that the risk for developing breast cancer could exist at any age and 31% of participants were able to correctly report the breast cancer lifetime risk [32]. The results of a study in London showed that 13% of participants were aware of breast cancer age-related risk [34]. A study in Ireland found that only one third of participants were aware of the breast cancer lifetime risk [35]. Linsell et al. reported that 50% of participants believed that the lifetime risk of breast cancer was less than 1 in 100 [36]. By comparison, knowledge of age-related and lifetime risk of breast cancer was low in the present study, possibly because of the target population being rural women and mostly illiterate. Moser et al. also reported that women with fewer educational qualifications had poorer knowledge of lifetime and age-related risks of breast cancer than more highly educated women [37].

Table 3 The barriers to breast cancer screening between two groups, before and 2 months after intervention

Variable	Before the intervention		2 months after the intervention	
	Intervention group ($n = 30$) N (%)	Control group ($n = 30$) N (%)	Intervention group ($n = 30$) N (%)	Control group ($n = 30$) N (%)
1. Being embarrassed	1 (3.3)	6 (20)	1 (3.3)	4 (13.4)
2. Fear of the physician	1 (3.3)	6 (20)	1 (3.3)	7 (23.4)
3. Difficulty in talking to the physician	1 (3.3)	8 (26.6)	0	5 (16.7)
4. Difficulty in making an appointment with the physician	17 (56.7)	9 (30)	21 (70)	21 (70)
5. Being too busy	25 (83.3)	19 (63.3)	21 (70)	27 (90)
6. Having other concerns and worries	24 (80)	23 (76)	25 (83.3)	26 (86.7)
7. Difficulty in finding the means of transportation	24 (80)	18 (60)	22 (73.3)	23 (76.6)
8. Fear of discovering a mass	22 (73.3)	12 (40)	19 (63.3)	20 (66.7)

Before intervention, the mean of both the control and intervention groups indicated that participants' knowledge about the age of screening methods and their intervals were low. In line with the current study, Tazhibi reported that, in young Iranian women, knowledge of screening methods was low and only 32% had good knowledge [31]. In another study in Iran (2018), of 1469 women referring to outpatient clinics in Mashhad city, 25.8% of the participants had poor knowledge about breast cancer screening and 37.4% had no knowledge about screening methods [38] .

After intervention, the mean knowledge of breast cancer screening score was significantly different between groups. A semi-empirical single-group research in Turkey also significantly increased the mean knowledge scores of women who participated in public breast cancer training from pre-test to post-test [39]. The use of a control group helped to ensure the internal and external validity of the present study.

The most common barriers to breast cancer screening in the pre-test were too many other things to worry about, too busy to take the time, and difficulty arranging transport. Intervention most strongly affected the barrier of "too busy to take the time." A qualitative study in Iran (2014) reported that low awareness, worry, and lack of motivation were three concept categories extracted as barriers to breast cancer screening [40].

Mardela et al. found that the most common barriers to breast cancer screening among South Asian, black, and white women were fear of discovering a mass, being too embarrassed to go see a doctor and difficulty making an appointment with the doctor, respectively. In that study, South Asian women (Indian, Pakistani, and Bangladeshi) reported more emotional barriers to breast cancer screening than the other two groups of women [32]. It is clear that the target population and cultural differences must be considered when planning for breast cancer screening programs.

After intervention, the frequency of breast self-exam showed a significant difference between groups. A study conducted in Malaysia also found that an educational program about breast cancer awareness caused a significant difference in frequency of breast self-exam, between the intervention and control groups at 6- and 12-month follow-ups [41]. Other studies have also reported a significant relation between breast cancer awareness and breast self-examination [42, 43].

There was no significant difference in confidence about detecting breast changes between groups. Despite the results of previous studies about the significant relation between breast cancer knowledge and confidence about detecting breast changes [43, 44], such a relation was not observed in the present study. It could be because most participants (more than 90%) in the current study were illiterate. Linsell et al. also reported a significant association between education and confidence about detecting breast changes [36]. The application of specific counseling approaches with a focus on self-efficacy for enhancing breast cancer awareness among rural and illiterate or semi-literate women is suggested.

The design of the study as a randomized clinical trial and the absence of attrition bias were strengths of the present study. Designing a comprehensive and multicomponent breast cancer awareness program, applying the standard scale (B-CAM) for measuring the effectiveness of intervention, and distributing an instructional manual among the participants along with counseling were other strengths of this study. The limitation of this study was its short follow-up period (2 months). Longer follow-up periods (6 to 12 months) are suggested for future studies in order to evaluate the long-term effectiveness of the intervention.

Conclusions

This was the first interventional study in Iran based on B-CAM designed to raise awareness of breast cancer. Group counseling had a positive effect on increasing breast cancer awareness of rural Iranian women, except for confidence about detecting breast changes. The application of specific counseling approaches with a focus on self-efficacy for enhancing breast cancer awareness among rural women with low literacy is suggested.

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Compliance with Ethical Standards

Conflict of Interests The authors declare that they have no conflict of interest.

Ethical Approval Research involved human participants. All procedures performed in studies involving human participants were in accordance with the ethical standards of the National Research Committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from each individual participant.

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