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Evaluation of a Danish Teaching Program in Breast Self-examination

KEY WORDS

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This study investigated the effect of a BSE training program on women's knowledge, attitudes, and behavior regarding BSE. Postal questionnaires were sent to 629 women who had participated in 1998–2000 in the BSE training program run by Ribe County, Denmark, and to a local matched control group of the same size selected through personal registration numbers. Response rates were 77% and 56%, respectively. A significantly greater number of women who had attended BSE training reported that they knew how and when to do BSE, and what they should do if they discovered breast changes (97% compared to 66% in control group). Similar proportions in each group felt confident of finding any breast changes (57%) and believed that routine BSE can influence the chances of recovery from breast cancer (90%). There were also no significant differences between the intervention and control groups in the reporting of anxiety as a result of performing BSE (24% and 17%, respectively). The intervention group was significantly more likely to perform BSE regularly (66% compared to 52% in control group) and to use a more correct technique (44% compared to 20% in control group). It was concluded that a formal training program increases the likelihood of regular BSE performance with a correct technique.

■ Background

Breast cancer is one of the most common causes of death among women; approximately 134 out of every 100,000

Danish women are diagnosed with breast cancer each year, and a Danish woman's risk of being diagnosed with breast cancer before the age of 75 is approximately 9%.¹ Training programs in breast self-examination (BSE) techniques have been

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introduced in many countries at either the local or regional level in the belief that earlier detection of breast changes will result in a lower incidence of advanced breast cancer and hence better health outcomes for the women involved.²

Several large population studies have investigated the effectiveness of screening for breast cancer,^{3–9} but their conclusions have varied. While several studies^{3,4,7,9} have reported no beneficial effect of BSE on mortality from breast cancer, 2 studies^{6,8} have concluded that BSE can reduce the risk of death from breast cancer. Furthermore, different reviews of the same evidence have resulted in differing recommendations regarding routine use of BSE. This is largely due to the varying methodologies used in the studies, especially in respect to sampling methods, retrospective versus prospective designs, whether or not the study was designed as a randomized control trial, and uncertainty over whether the experiences from one country can be generalized to others.^{10,11} While Canadian authorities do not recommend BSE for women aged between 40 and 69,¹² US authorities have concluded that the evidence is insufficient to determine whether or not BSE reduces breast cancer mortality¹³ and the American Cancer Society recommends that women aged 40 years and over should do a monthly BSE.¹⁴ The Danish authorities do not recommend BSE as a screening method mainly due to the lack of evidence for an effect on mortality and the risk of false-positive findings.¹⁵

Apart from effects on mortality, however, there is evidence that BSE can allow detection of smaller tumors¹⁶ and diagnosis of cancer at an earlier stage, with the chance of more conservative surgery.¹⁷ It has also been suggested that BSE training programs can improve women's knowledge and awareness of breast cancer and have thus contributed to the reduction in breast lump size at diagnosis.^{18,19} Other commentators have noted, however, that the practice of routine BSE may increase the risk of false-positive results and the number of biopsies for benign lesions,^{3,13,20,21} as would also be the case for any screening program, including mammography.

Despite the controversies over BSE, there is agreement that BSE is only likely to be beneficial if it is correctly performed on a routine basis.^{22–26} Health professionals who examined the breast for at least 3 minutes and used a technique that included correct positioning of the patient and a systematic and thorough searching were more accurate in identifying lesions in silicone models.²² Training in BSE techniques appears to increase the frequency of use of BSE, as well as women's understanding of and confidence with the technique.^{23,27} Retraining has been found to also increase the frequency of BSE use and the quality of the technique.²³

Since 1990, Ribe County in Denmark has offered BSE teaching to all women in the county, with participation of just over 10,000 women aged 15 and older in the period 1990–2000. The aim of this study was to investigate the effect of the program on women's knowledge, attitudes and behavior in relation to BSE. The hypotheses were that, compared to women who had not participated in the program, women who had attended BSE training would (1) know more about BSE techniques, (2) be more positive toward BSE and offers of retraining, (3) practise BSE more regularly and use a more correct technique.

■ Methods

BSE Training Program

The Ribe County BSE program consisted of a training session lasting up to 2 hours with a maximum of 20 participants in each session. Teachers with medical or nursing backgrounds instructed the participants using a locally produced video and individual instruction on breast models and the women's own breasts. The training sessions took place in local libraries, schools, or businesses and were advertised through general practitioners, pharmacies, libraries, and in local newspapers and on radio. The program did not include retraining. Administration costs of the program were very low and the training costs were covered by a payment of 30 DKK (4 euros) from each participant.

Sample Selection

During the years 1998–2000, 879 women had participated in the BSE training program and had indicated their willingness to be contacted in connection with evaluation of the program and provided their personal registration number. Between 5% and 6% of the participants refused at the time of the training to participate in an evaluation. Fifty-six (6%) of these 879 women had participated in more than one training program and were excluded from further analysis. Owing to budget restrictions, the sample had to be reduced to about 76% of this population. A sample of 640 women was therefore randomly selected, and their personal registration numbers matched with the national personal registry—this led to the exclusion of a further 11 women who had since moved out of the county, died, or had requested protection from mailed research questionnaires. The “intervention group” consisted therefore of 629 women who had participated in one BSE training session between 1998 and 2000.

The “control group” consisted of a random selection of women who lived in Ribe County and who had not participated in BSE training. These 629 participants were selected by the Interior Ministry on the basis of personal registration numbers, with the aim of achieving a group matched for age and residency in the same postal area.

Questionnaire

A questionnaire was designed for the purposes of the study. Minor revisions were made after a pilot test with a convenience sample of 8 women aged between 25 and 45. The questionnaire contained 35 questions with precoded response categories.

Background questions asked about the woman's age, education, employment status, height and weight, living arrangements, and household income. The *knowledge* section asked about the woman's experience of breast cancer among family and friends, and her knowledge about BSE—how often and when this should be done, what she should do if there were breast changes, where she had learnt about BSE (books or pamphlets, magazines, BSE training program, general practitioner, family members), and whether she thought she would benefit from retraining. The

attitude section asked about the woman's confidence in finding changes, whether breast examination made her feel anxious or worried, whether she felt at ease while performing BSE, whether she believed that routine BSE could lead to earlier identification of breast changes or could influence the chances of recovery from breast cancer, whether she would seek medical attention if she found breast changes, whether it would make a difference to receive a personal invitation to participate in a BSE training session, and why she did not perform BSE if this was the case. The *behavior* section asked about frequency of BSE, the technique used (including positioning of body, use of mirror, palpation pattern used), and, in the event of breast changes, how soon the GP was contacted and what treatment was received (mammography, biopsy, hospital admission, and presence of malignancy).

Statistical Analysis

All questions were provided with precoded response options. Many questions had only two response options (Yes/No) while some had several (eg frequency of use of BSE). Comparisons between groups were conducted using χ^2 tests for discrete variables and *t* tests for continuous variables, with the level of significance set at $P = .01$. The statistical package used was SPSS, version 11.

The most important element in the BSE training was that the woman examined her breasts while lying on her back and on her side, as well as while standing. Palpation in vertical patterns down over the breast was the preferred method, but circular movements were also acceptable. Thorough instruction was provided on finger movement and pressure, as well as on inspection using a mirror. The usual recommendation is to perform BSE monthly, to fit with the menstrual cycle with its concomitant breast changes. It could be rational, however, to perform BSE every 3 months, as the average doubling time of a tumor is around 100 days. Because not all details of the BSE technique could be asked about in the questionnaire, the women's performance of BSE was categorized for the purposes of this study as follows:

- *Correct BSE technique*: conducted once a month or once every 3 months, by looking in a mirror, carrying out palpation in both standing and lying positions, and with palpation either in vertical or circular patterns.

- *Nearly correct BSE technique*: conducted once a month or once every 3 months in both standing and lying positions, no use of a mirror, and no systematic palpation pattern.
- *Partly correct BSE technique*: conducted either standing or lying but not both; no use of a mirror, and no systematic palpation pattern; any frequency of BSE (several times a month, once a month, once every 3 months, or once a year).
- *Did not perform BSE*


Results

Response

Significantly more of the intervention group (77%; 485/629) returned the completed questionnaire when compared to the control group (56%; 351/629; $P < .001$). Thirty-eight of the control group were found to have participated in an earlier BSE training program run by Ribe County and were therefore excluded from further analysis, leaving 313 in the control group. Despite the attempt to generate an age-matched control group, the respondents in the intervention group were significantly older (mean 46 years, SD 12.7, range 19–85 years) compared to the control group (mean 43 years, SD 12.3, range 20–77 years; $P = .002$). The 2 groups were otherwise similar with respect to educational background, employment status, living arrangements, household income, and body mass index.

Knowledge of BSE and Breast Cancer

More women in the intervention group reported experience of breast cancer in their near circle of friends (57% compared with 45% in the control group; $P = .001$) (Table 1). In addition, more women in the intervention group indicated that they knew how and when they should do BSE, and what they should do if they discovered breast changes (97% compared with 66% in the control group; $P < .001$). In comparison to the intervention group, who attended the BSE training program, the control group had more often obtained information from printed sources such as information booklets (53%) and magazines (30%), as well as their own doctor

 **Table 1 • Knowledge of BSE and Breast Cancer**

	Intervention Group (n = 485)	Control Group (n = 313)
<i>N</i> (%) with breast cancer		
In close family	118/463 (25)	74/296 (25)
In close circle of friends	263/458 (57)*	129/287 (45)
<i>N</i> (%) reporting that they know how and when to do BSE and what to do if they find changes	458/474 (97)*	202/306 (66)
<i>N</i> (%) who learnt about BSE from		
BSE training course	485/485 (100)	9/232 (4)
Books/leaflets	62/478 (13)*	122/232 (53)
Weekly magazines	19/478 (4)*	69/230 (30)
General practitioner	29/478 (6)*	88/232 (38)
Family member	3/478 (1)	6/232 (3)

*Significant difference ($P < .001$) between intervention and control groups.

 **Table 2 • Attitudes Toward BSE**

	Intervention Group (n = 485)	Control Group (n = 313)
N (%) who		
Believe that they can find any breast changes	186/328 (57)	96/169 (57)
Feel anxious when perform BSE	77/327 (24)	28/169 (17)
Felt at ease while performing BSE	244/319 (76)	135/166 (82)
N (%) who believe that routine BSE		
Affects chance of finding early breast changes	458/481 (95)	285/308 (93)
Influences recovery chances from breast cancer	434/480 (90)	274/308 (89)
N (%) who would go to doctor if found breast changes	477/481 (99)	298/309 (96)

(38%) (all $P < .001$). A small number of women in the control group had attended a BSE training program different to that run by Ribe County. Approximately half (57%) the intervention group answered that they would benefit from a BSE refresher course.

Attitudes Toward BSE

No statistically significant differences were found between the intervention and control groups in relation to attitudes toward BSE. The majority of women in both groups reported that they felt at ease while performing BSE and just over half of each group felt confident of finding any breast changes (Table 2). About one fifth of each group reported feeling anxious when they performed BSE. In both groups, most women thought that BSE was beneficial in identifying early breast changes and in increasing the chances of recovery from breast cancer, and most indicated that they would seek medical attention within a week if they found any breast changes.

Approximately one third (33%) of the intervention group and one half (48%) of the control group reported that they did not perform BSE regularly. The most frequent explanations were uncertainty about their ability to perform it correctly (answered positively by 64%), forgetting to do it (61%), and preference for either their own doctor to do it or to receive

mammography (27%). Further reasons were that they were too busy (17%), BSE made them feel anxious (14%), they did not want to worry about cancer (8%), they did not like to examine themselves (8%), and they did not think they were at risk from breast cancer (7%). Responses from the intervention and control groups were similar except that women in the control group were more likely not to perform BSE because they were uncertain of what to look for (41% compared with 12% in the intervention group, $P < .001$), while women in the intervention group were more likely to forget to perform BSE (69% compared with 52%, $P = .005$) or to prefer mammography (12% compared with 2%, $P = .002$).

Around half of the women in both the intervention group (54%) and the control group (50%) would prefer a personal invitation to attend a BSE training course, as opposed to a general invitation for all women in the relevant age group.

Behavior in Relation to BSE

More women from the intervention group reported that they regularly examined their breasts (66% compared to 52% in the control group; $P < .001$), as shown in Table 3. Nearly one half (46%) of the control group and 32% of the intervention group reported that they never examined their breasts ($P < .001$).

 **Table 3 • Behavior in Relation to BSE**

	Intervention Group (n = 485)	Control Group (n = 313)
N (%) performing regular BSE	314/472 (66) [*]	161/310 (52)
N (%) who never examine breasts	149/468 (32) [*]	141/309 (46)
N (%) of those with regular BSE who perform BSE	(n = 305)	(n = 160)
Once a month ^{*,†}	149 (49)	66 (41)
Once every 3 months	110 (36)	45 (28)
Several times a month	41 (13)	40 (25)
Once a year	5 (2)	9 (6)
N (%) of those with regular BSE who perform BSE	(n = 305)	(n = 160)
Correctly ^{*,‡}	68 (22)	8 (5)
Nearly correctly	66 (22)	24 (15)
Partly correctly	171 (56)	128 (80)

^{*}Significant difference ($P < .001$) between intervention and control groups.

[†]Statistical test on 2×2 table: once a month/every 3 months vs several times a month and once a year.

[‡]Statistical test on 3×2 table.

Of the women who performed BSE regularly, a greater proportion (85%) of those in the intervention group performed BSE with the recommended intervals (monthly or quarterly) compared with 69% in the control group ($P < .001$).

Women in the intervention group were more likely to use a correct or nearly correct BSE technique ($P < .001$). Among the women who performed BSE regularly, 44% in the intervention group used a correct or nearly correct technique, as opposed to 20% in the control group. The use of a correct or nearly correct BSE technique was more likely with recent training—45% of those who attended the course in 2000 used a correct or nearly correct technique, compared to 25% of those who trained in 1998 ($P < .001$).

In both the intervention and control group, 38% of women had experienced breast changes. Unfortunately, the time period was not stated in the question, so that women answered whether they had ever experienced breast changes. There were no statistically significant differences between the groups in relation to the events that followed: nearly all of the women had gone to their doctor within a month and had received mammography and/or biopsy. A diagnosis of breast cancer had been made in 4% of the women in the intervention group and 3% of the women in the control group (Table 4).

Controlling for the Effect of Age

As the women in the intervention group were significantly older than those in the control group, there was a possibility that the differences found in knowledge and behavior in relation to BSE were due to older age rather than participation in the BSE training program. The mean age of the sample was 44.5 years (SD 12.6). The analyses were therefore repeated for women aged 45 years and older (53% of the sample), and for those under age 45 (47% of the sample).

Nearly all the differences between groups remained statistically significant. Thus, women in the intervention group were still significantly more likely to know how and when to do BSE ($P < .001$ for both age groups), to perform BSE regularly ($P < .001$ for the younger group), to perform BSE at the recommended intervals of once a month or once a quarter ($P <$

.001 for both age groups), and to do BSE with a correct or nearly correct technique ($P < .001$ for both age groups).

While older women in the intervention group were also more likely to perform regular BSE than those in the control group, this difference was not statistically significant. Older women in the intervention group were still more likely to report experience of breast cancer in their near circle of friends when compared to those in the control group ($P = .001$), but there was no statistically significant difference among younger women.

Discussion

This study investigated the effect of a BSE training program on women's knowledge, attitudes, and behavior in relation to BSE. As expected, virtually all (94%) the women who had participated in the program reported that they knew how and when to perform BSE and what to do if they discovered breast changes (compared to 68% of the control group). Furthermore, women who had participated in the program were more likely to practise BSE regularly and to use a correct technique. The results are in line with those of earlier studies reporting that BSE training increases the frequency of BSE and increases women's understanding of the technique.^{23,27}

Contrary to expectations, however, there were no statistically significant differences between the BSE and control groups in regard to attitudes toward BSE. Similar proportions of women in both groups reported feeling confident that they could find any breast changes when performing BSE, while the majority in each group felt at ease while performing BSE. Around 90% of women in both groups believed that BSE would help in identifying early breast changes and would increase the chances of recovery from breast cancer. It was clear that the women in the study had access to information about BSE from a variety of sources, including brochures, weekly magazines, and the general practitioner.

The study could not confirm the hypothesis that women who have been taught BSE worry more and use more healthcare services. Around one-fifth of the women in each group reported that they felt anxious when performing BSE. Similar proportions in each group had experienced breast changes, and

 **Table 4 • The Reported Consequences of Women Who Had Experienced Breast Changes**

	Intervention Group ($n = 178$)	Control Group ($n = 115$)
<i>N</i> (%) who went to GP	($n = 173$)	($n = 113$)
Within a week	129 (75)	85 (75)
Within a month	29 (17)	20 (18)
Between 1 and 3 months later	5 (3)	1 (1)
After 3 months	3 (2)	2 (2)
Did not go to a doctor	7 (4)	5 (4)
<i>N</i> (%) who consequently had		
Mammography	138/176 (78)	78/114 (68)
Biopsy	48/178 (27)	30/115 (26)
Hospital admission	25/176 (14)	12/115 (10)
Diagnosis of breast cancer	7/176 (4)	4/114 (3)

the subsequent sequelae were also similarly distributed, with approximately 75% undergoing mammography, just under 30% having a biopsy, and around 5% being diagnosed with breast cancer. The sample size in this study was relatively small, however, and it cannot be ruled out that significant differences might have emerged with a larger sample size.

A postal self-completion questionnaire was used to collect data on women's knowledge, attitude, and behavior in relation to BSE. There was clearly self-selection in the intervention group, as women who attended the training program would have been motivated to learn about BSE. Even though only 5% to 6% of all participants at the time of the training course refused to participate in an evaluation, it is likely that the women who agreed to participate in the current study had had a positive experience from the training program. Although the control group was drawn randomly from the local population, it may also have been influenced by selection bias, as responding to the questionnaire probably requires women to be interested in health issues and prevention of ill health.

There appears to be a contradiction between the high proportion of women who know about BSE and believe it to be effective in identifying early breast changes, and the relatively low proportion of women who actually perform BSE routinely and with an appropriate technique. Although participation in a BSE program appears to increase the proportion of women who use BSE regularly and with a correct technique, only 28% of the women in this study who had participated in the BSE program used a correct or partly correct technique (that would be most effective in identifying breast changes). In a review of the literature from the period 1977–1989, Coleman reported that, while 96% of American women had heard about BSE, only 19–40% performed BSE on a monthly basis.²⁷ Rosvold et al reported that, out of 284 Norwegian women doctors, only 31% performed BSE on a monthly basis and 19% performed BSE less than once every year or not at all.²⁸ Among the reasons for not performing BSE were that they forgot to do it, that they did not think they were in a risk group, or that they had not had any symptoms of breast cancer. The results of the current study can also be interpreted another way—nearly one third of the women who had participated in the training program performed regular and correct BSE, and this result was actually better than expected when the program was planned. BSE is difficult to learn and requires thoroughness and a high level of motivation.

The present study found that women who had been trained more recently in BSE methods were more likely to use a correct technique than those who had participated earlier. These women were also generally positive about participating in a further retraining, which has been reported elsewhere as increasing the frequency and quality of BSE performance.²³

■ Conclusion

The results of the present study confirmed the hypotheses that women who had attended BSE training saw themselves as more

knowledgeable about BSE and were more likely to practise BSE regularly and to use a correct technique. Those with more recent training also used a more correct technique than what those with earlier training did. The study could not confirm, however, that women who have participated in BSE training were more anxious about BSE. The incidence of breast cancer was also the same in both the intervention and control groups, although it is not known whether there were differences in stage of cancer at presentation. Notwithstanding the controversies over the effects of BSE on breast cancer mortality rates, it is likely that length of survival is not the only concern for women—the degree of ill health and the extent of treatment or operation are also likely to be important factors.

Ninety percent of the women in this study believed that performance of BSE could help them to discover breast cancer at an earlier stage and that it could influence the course of the disease. Many of them must therefore have relatively high motivation to perform BSE on a regular basis. BSE is only effective, however, when it is done both regularly and with a correct technique. The problem is that BSE is a difficult technique that requires skill and thoroughness, and a certain resolve is required to perform BSE regularly enough to be effective. It is concluded from the current study that a formal training program increases the likelihood of regular BSE performance with a correct technique.

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