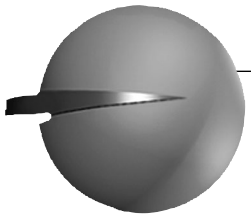

Evidence Review

Interventions Promoting Breast Cancer Screening Among Turkish Women With Global Implications: A Systematic Review

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Keywords

systematic review, intervention, breast self-examination, clinical breast examination, mammography, Turkish women

ABSTRACT

Background: Breast cancer is a major health concern and remains the most common malignancy in women worldwide and in Turkey. Mammography, clinical breast examination (CBE), and breast self-examination (BSE) are recommended methods to detect early breast cancer in women. Many strategies have been developed to increase the rates of mammography, CBE, and BSE among Turkish women. Despite the benefits of breast cancer screening, these modalities are still underutilized by the majority of Turkish women.

Aim: To systematically review the scientific evidence on the effectiveness of various strategies aimed at improving screening behaviors for breast cancer in Turkish women.

Methods: A systematic review of the literature published between 2000 and 2015 was conducted, searching 10 databases of Ovid MEDLINE, PubMed, Cochrane CENTRAL Register of Controlled Trials, CINAHL, PsycINFO, Web of Knowledge, Scopus, Google Scholar, ULAKBIM Turkish Medical Database, and Council of Higher Education Thesis Center.

Results: Twenty-three studies were included in the final review. The majority of the studies investigated the effects of multiple strategies to improve BSE. Group education comprised educational sessions, printed and audiovisual materials, which significantly improved BSE, CBE, and mammography screening rates at 3 months, 6 months, and 12 months after the intervention. One-to-one education demonstrated no significant difference in BSE rates at 6-month and 12-month follow-up. However, one-to-one education demonstrated significant differences in CBE and mammography rates at the 3-month follow-up.

Linking Evidence to Action: The use of group education comprising a multicomponent intervention demonstrated an increase in breast-screening behaviors among Turkish women. Further research investigating the duration of educational interventions is needed in order to suggest a "dose response."

BACKGROUND

Breast cancer is a major health concern and remains the most common malignancy in women worldwide (American Cancer Society, 2015). Among Turkish women, breast cancer accounts for almost one in four newly diagnosed cancers in and is the second leading cause of cancer deaths in women, with an incidence of 40.7 cases per 100,000 (Turkey Ministry of Health, 2013). Although the incidence and mortality rates for breast cancer tend to be lower in Turkey than in Western countries, these rates are gradually increasing.

Screening methods including regular mammography, clinical breast examination (CBE), and breast self-examination (BSE) are key strategies for the early diagnosis of breast cancer (American Cancer Society, 2015). The effectiveness of mammography is well established and is considered to be the most important method for the early detection of breast cancer. Breast self-examination and CBE remain the noninvasive methods to detect potential breast cancer. There is controversy in the literature regarding the benefits of BSE (Thomas et al., 2002), however, if performed regularly and correctly BSE has the potential to detect early breast cancer. Despite the benefits of breast cancer screening, these early detection modalities are still underutilized by the majority of Turkish women. In a recent study conducted with educated women (Avci, Kumcagiz, Altinel, & Caloglu, 2014) aged between 22 and 53, it was reported that only 18% of the sample had a mammogram, 30% had a CBE, and 16% were performing BSE monthly. Similarly, another study (Mermer & Turk, 2014) undertaken on 106

Worldviews on Evidence-Based Nursing, 2017; 14:4, 316–323.

Turkish women aged between 50 and 70 years demonstrated that 54% of the sample had received a mammogram, 49% had a CBE, and 31% performed BSE.

Numerous factors have been reported for the low number of breast screening practices among Turkish women. These include low socioeconomic status; low level of education (Karadag, Gungormus, Surucu, Savas, & Bicer, 2014); nonreferral from a physician (Secginli & Nahcivan, 2006); limited knowledge about breast cancer, BSE, and mammography (Erbil & Bölükbaş, 2012; Gurdal, Saracoglu, Oran, Yankol, & Soybir, 2012); limited health insurance coverage; and family history of breast cancer and health beliefs (Secginli & Nahcivan, 2006). Given the low breast cancer screening rates, several interventions have been developed in the last decade to increase the uptake of breast cancer screening including mammography, CBE, and BSE among Turkish women. These interventions include nurse-led interventions, mass media education, and educational interventions with written materials that have been implemented either in isolation or in combination to improve mammography, CBE, and BSE rates in the general population with varying degrees of success (Avci, Atasoy, & Sabah, 2007; Avci & Gozum, 2009; Elik, 2006; Gursoy et al., 2009a; Ozturk et al., 2000; Parlar, Bozkurt, & Ovayolu, 2004; Secginli & Nahcivan, 2011; Serin, 2009; Soyer & Cicekliogl u, 2007). Despite the various strategies implemented, it is not clear which strategies are effective for improving breast cancer screening practices among Turkish women. But in the literature, it is evident that more education is required to promote the uptake of breast screening practices (Brouwers et al., 2011; Golbasi, Kutlar, & Akdeniz, 2007; Han et al., 2009; Legler et al., 2002; Secginli & Nahcivan, 2006). To our knowledge, there is no published review that is specifically aimed at evaluating interventions promoting breast cancer screening rates among Turkish women. This information will assist health professionals in implementing evidence-based interventions to improve breast cancer screening behaviors among these women.

AIM

The purpose of this study was to systematically review the scientific evidence on the effectiveness of various strategies aimed at improving screening behaviors for breast cancer in Turkish women.

METHODS

Studies were included if they (a) were conducted with Turkish women, (b) were published between 2000 and 2015 in either English or Turkish, (c) were either randomized controlled trials (RCTs), quasi-experimental, or pretest-posttest studies, and (d) investigated breast cancer screening behaviors including mammography, CBE, or BSE.

Search Process

Systematic searches were developed in consultation with a medical librarian. The electronic databases Ovid MEDLINE, PubMed, Cochrane CENTRAL Register of Controlled Trials, CINAHL, PsycINFO, Web of Knowledge, Scopus, Google Scholar, ULAKBIM Turkish Medical Database, and Council of Higher Education Thesis Center were searched. The primary keywords and their Turkish translations used in the search were: breast cancer, breast health, breast cancer screening, breast cancer screening behaviors, early detection behaviors, BSE, CBE, mammography/mammogram, Turkish women, intervention, program, and health education (see Table S1).

Comparable searches were undertaken for Turkish health databases. In addition, the reference lists of included studies were hand searched for other potentially eligible studies. All citations were imported into an Endnote database and duplicates removed. Two of the authors independently evaluated the title and abstracts based on the eligibility criteria. Full text publications of potentially eligible studies were retrieved for detailed examination.

Assessment of Methodological Quality

Two primary reviewers independently assessed the methodological quality of the studies using the 10-item Joanna Briggs Institute-Meta Analysis of Statistics Assessment and Review Instrument (JBI-MAStARI; The Joanna Briggs Institute, 2014) that was translated into Turkish. The Turkish translation checklist has a high interrater reliability value of kappa (.88). The RCTs and pseudo-RCTs were evaluated along 10 criteria: whether the assignment to treatment groups were truly random, whether participants were blinded to treatment allocation, if the allocation to treatment groups was concealed from the allocator, if the outcomes of people who withdrew were described and included in the analysis, if those assessing outcomes were blinded to the treatment allocation, whether the control and treatment groups were comparable at entry, if the groups were treated identically other than for the named interventions, if the outcomes measured were the same way for all groups, whether the outcomes were measured in a reliable way, and whether the appropriate statistical analysis were used. Each item was answered, where "yes" was allocated with one point and "no," "unclear," and "not applicable" with zero. Discrepancies in quality assessment between reviewers were resolved by consensus. In order to include only high-quality studies, a cut off value of mean minus one standard deviation (SD) was used. (Sutton, Abrams, Jones, Sheldon, & Song, 1997). In this study, the mean score was 4.5 and the SD was 0.7. Based on this formula, all 23 studies were included.

Data Extraction

One reviewer extracted data from each article by using a standard data extraction form and the second reviewer confirmed the accuracy of the data extracted. The retrieved data are listed in Table S2. Any disagreements that arose between the reviewers were resolved through discussion.

Data Analysis

All calculations were made using Review Manager 5.2 and all results were subject to double data entry. Odds ratios (OR) and 95% confidence intervals (CI) were calculated for dichotomous data. Clinical heterogeneity was assessed by considering the populations, interventions, and outcomes between the studies. Statistical heterogeneity was investigated by calculating the I^2 statistic (Higgins, Thompson, Deeks, & Altman, 2003), and if this indicated a high level of heterogeneity among the trials included in an analysis, a random effects meta-analysis was preferred for the overall summary. Where synthesis was inappropriate, a narrative overview was undertaken.

RESULTS

Search Results

The initial search identified 304 articles and 23 studies met the inclusion criteria (Figure S1). The majority ($n = 19$) of the studies were published between 2007 and 2012. Eleven studies were published in Turkish and 12 in English. The included studies were conducted in six different parts of Turkey (western, north-western, northern, eastern, south-eastern, and middle).

Methodological Quality of the Included Studies

None of the studies met all the quality criteria related to methodology. The randomization process was reported in three studies, and none of the studies reported on the method of allocation to treatment groups and if an intention-to-treat analysis was undertaken.

Characteristics of Eligible Studies

Study population. The number of participants in the studies ranged from 32 (Avci et al., 2007) to 1,342 (Gursoy et al., 2009a) and participants in more than half of the studies ($n = 13$) were housewives (Table S2). The minimum age of the women in the studies was 20 years (Malak & Dicle, 2007) and the maximum age was 87 (Gözüm, Karayurt, Kav, & Platin, 2010).

Study design. In the review, three studies used an experimental design (Kissal, 2012; Secginli & Nahcivan, 2011; Tuzcu, Bahar, & Gozum, 2016). Eleven studies were quasi-experimental with one group pretest-posttest; eight were pretest-posttest design with one, two, or three groups and one was posttest only (Table S3).

Characteristics of Interventions

In all studies, promotion of breast cancer screening was commonly implemented through educational approaches. Educational approaches included written materials such as pamphlets, brochures, booklets, posters, calendars, and cards on breast cancer screening. The type of interventions used in each study varied markedly as shown in Table S2. In the majority of the studies (84%), the interventions were delivered by one or more healthcare providers and some included peer educators (Gözüm et al., 2010; Karayurt, Dicle, & Malak, 2009; Malak, Bektas, Turgay, Tuna, & Genc, 2009; Malak & Dicle, 2007).

Outcomes were assessed at 1-month, 3-month, and 6-month follow-up. (Table S3) All studies used self-reports of screening rates to measure outcomes.

Outcomes—Breast Cancer Screening Behaviors

BSE: group education compared to other methods. Nine comparative (Figure S2) and seven pre- and poststudies (Table S3) investigated the effect of group education compared to other methods on rates of BSE. All studies used audiovisual materials and written information for education.

Pooled results for the comparative studies demonstrated a statistically significant increase in BSE rates at the 3-month follow-up (OR 5.59; 95% CI 3.85, 8.12). Similarly, at the 6-month follow-up, a statistically significant increase in BSE rates among women who received group education compared to those who did not was observed (OR 1.85; 95 % CI 1.14, 3.01; Figure S2). The heterogeneity among the studies included in the 6-month follow-up was 74% and removal of individual studies from the analysis did not change the heterogeneity therefore all studies were included in the meta-analysis and a random effects model was used (Figure S2). No difference in rates of BSE between groups was observed at the 2-month and 12-month follow-up (Figure S2).

One study (Malak & Dicle, 2007) that provided group education using peers demonstrated a significant increase in the number of women who had BSE at the 1-month follow-up (67/202) when compared to baseline rates (3/202; $p < .05$). Similarly at the 3-month (Avci et al., 2007; Serin, 2009), 4-month (Gözüm et al., 2010), 6-month (Balkaya, Memis, & Demirkiran, 2007; Mermer & Turk, 2014), and 9-month (Ciceklioglu, Ege, Soyer, & Cimat, 2005) follow-up, there was a significant increase in the number of women who had BSE when compared to baseline rates (Table S3).

Comparison between two group education methods. One study (Avci & Gozum, 2009) compared the use of videos to verbally teaching and showing women how to conduct BSE. All participants were trained in groups. The results demonstrated no statistically significant difference in BSE rates between the two groups (OR 0.96; 95% CI 0.38, 2.45). However, there was a significant increase in BSE rates from baseline to follow-up in both groups.

1-1 education compared to other methods. Two comparative (Ersin, 2012; Gursoy et al., 2009a) and four pre- and poststudies (Budakoglu, Maral, Ozdemir, & Bumin, 2007; Golbasi et al., 2007; Malak et al., 2009; Soyer & Ciceklioglu, 2007) investigated the effect of 1-1 education compared to other methods on rates of BSE. All studies used audiovisual materials and written information for education. The results demonstrated a statistically significant increase in BSE rates at the 3-month follow-up (Ersin, 2012) among the 50 women who received 1-1 education (84%) compared to those who did not ($n = 50$; 12%, $p < .05$). However, at the 6-month and 12-month follow-up, there was

Worldviews on Evidence-Based Nursing, 2017; 14:4, 316–323.

no significant differences in BSE rates between the two groups (Gursoy et al., 2009a). At the 1-month (Golbasi et al., 2007), 3-month (Malak et al., 2009), and 6-month (Budakoglu et al., 2007; Soyer & Ciceklioglu, 2007) follow-up, there was a significant increase in the number of women who had BSE when compared to baseline rates (Table S3).

Clinical Breast Examination

Five comparative (Figure 1) and three pre- and poststudies (Table S3) investigated the effect of group education compared to other methods on rates of CBE. Pooled results for the comparative studies demonstrated a statistically significant increase in CBE rates at the 3-month (OR 7.86; 95% CI 1.32, 46.67) and 6-month (OR 3.14; 95% CI 1.28, 7.70) follow-up among women who received group education compared to those who did not. Similar results were observed at the 12-month follow-up (Figure 1).

There was a significant increase in the number of women who had CBE at the 4-month follow-up (1006/1017) when compared to baseline rates (142/1017; $p < .05$; Gözüm et al., 2010). However, at the 3-month (Serin, 2009) and 6-month (Mermer & Turk, 2014) follow-up, there was a nonsignificant increase in the number of women who had CBE when compared to baseline rates (Table S3).

1-1 education compared to other methods. One comparative (Ersin, 2012) and one pre- and poststudy (Budakoglu et al., 2007) investigated the effect of 1-1 education compared to other methods on rates of CBE. The results demonstrated a statistically significant increase in CBE rates at the 3-month follow-up among the 50 women who received 1-1 education (22%) compared to those who did not (4%; Ersin, 2012). At the 6-month (Budakoglu et al., 2007) follow-up, there was a significant increase in the number of women who had CBE when compared to baseline rates (Table S3).

Mammography

Five comparative (Aydogdu, 2011; Ceber, Turk, & Ciceklioglu, 2010; Kissal, 2012; Secginli & Nahcivan, 2011; Tuzcu et al., 2016) and two pre- and poststudies (Gözüm et al., 2010; Mermer & Turk, 2014) investigated the effect of group education on rates of mammography. Pooled results for the comparative studies demonstrated a statistically significant increase in mammography rates at the 3-month (OR 10.08; 95% CI 3.87, 26.28) and 6-month (OR 2.18; 95% CI 1.19, 4.02) follow-up among women who received group education compared to those who did not. Similar results were observed at the 12-month follow-up (Figure S3).

There was a significant increase in the number of women who had mammography at the 4-month follow-up (1,006/1,017) when compared to baseline rates (142/1,017; $p < .05$; Gözüm et al., 2010). However, at the 6-month (Mermer & Turk, 2014) follow-up, there was a nonsignificant increase in the number of women who had CBE when compared to baseline rates (Table S3).

1-1 education compared to other methods. One comparative (Ersin, 2012) and two pre- and poststudies (Budakoglu et al., 2007; Soyer & Ciceklioglu, 2007) investigated the effect of 1-1 education compared to other methods on rates of mammography. The results demonstrated a statistically significant increase in mammography rates at the 3-month follow-up among the 50 women who received 1-1 education (34%) compared to those who did not (6%; Ersin, 2012). At the 6-month follow-up, there was a significant increase in the number of women who had mammography when compared to baseline rates (Budakoglu et al., 2007; Soyer & Ciceklioglu, 2007; Table S3).

DISCUSSION

Breast cancer is a major health concern among Turkish women. The present review, to the best of our knowledge, is the first to focus on interventions designed to increase rates of BSE, CBE, and mammography among Turkish women. Twenty-three experimental studies that examined the efficacy of interventions on these behaviors with objective outcome measures—that is, self-reports or recorded receipt of BSE, mammograms, and CBE were included in the final review. The majority of the studies was pre- and poststudies and the reporting of the methods was inadequate. The methodological quality of the studies was variable and important information about allocation concealment, blinding, and use of intention-to-treat analysis was often missing.

Studies that compared group education to other methods of education demonstrated a statistically significant increase in rates of BSE at the 3-month and 6-month follow-up. Similarly, group education also increased the rates of CBE and mammography at the 3-month, 6-month, and 12-month follow-up. This result is congruent with the evidence in the literature relating to other chronic conditions that indicates group education results in better outcomes compared to individual counseling or no education (Duke, Colagiuri, & Colagiuri, 2009; Hwee, Cauch-Dudek, Victor, & Shah, 2014). Various reasons could be hypothesized for the increase in rates of screening among those who received group education. First, participating in the group education programs could have encouraged the women to interact with each other and they could have felt that they were not being judged on their screening behaviors by other participants. Second, the group education could have provided participants with a unique opportunity to understand and learn from others who had similar or different experiences to them, which could help to expand their knowledge on breast screening practices. These results relating to group education can be applicable to women globally as evidence suggests that a small-group learning environment in which women can talk to each other and relate information to their personal situation is effective in knowledge transfer (Nolan, 2009).

It is clear from the studies reviewed that a wide range of initiatives have been implemented to promote breast cancer screening behaviors among Turkish women. Although the

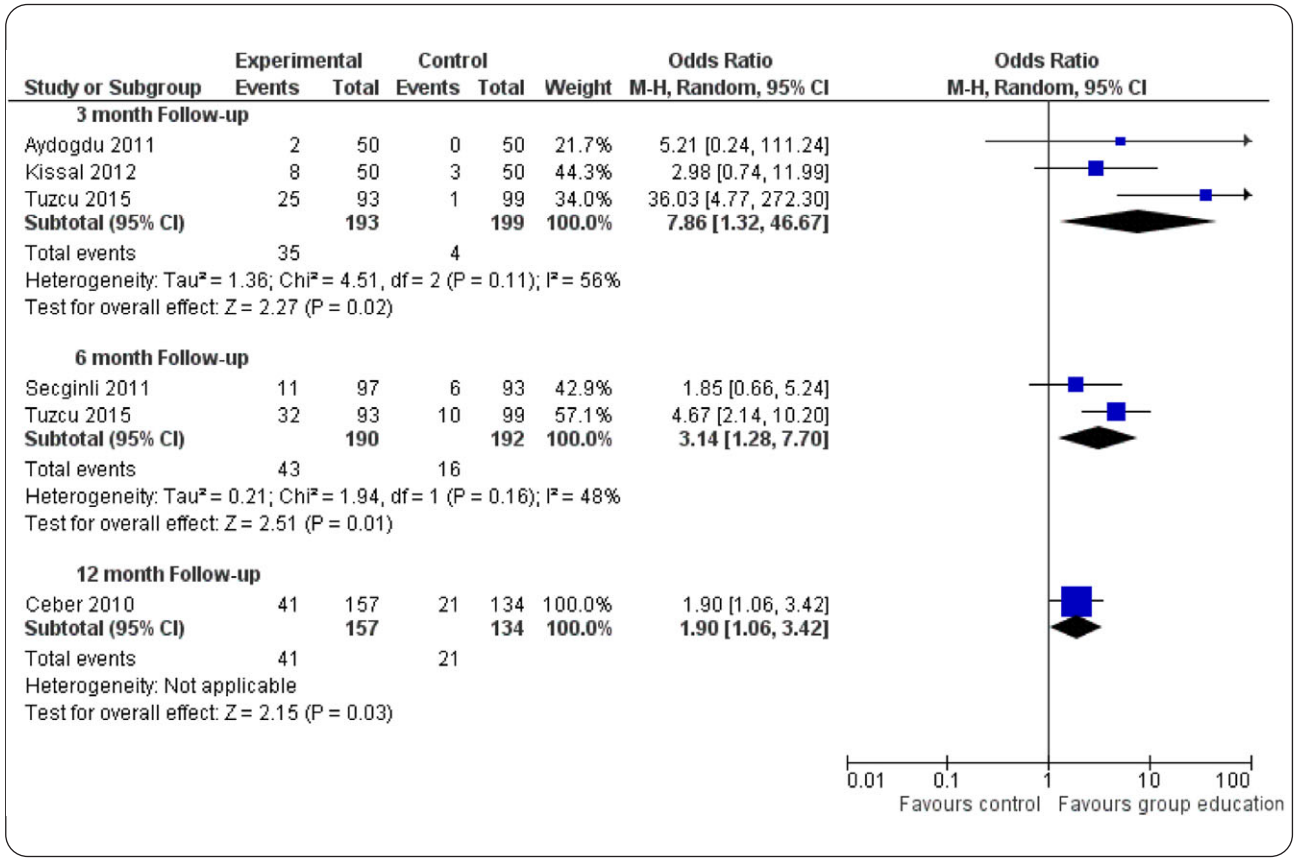

Figure 1. Group education compared to other methods on rates of CBE.

content of the educational interventions varied between studies, a common factor across all these studies was that the interventions were comprised of audiovisual materials, training with breast models, verbal and written information about screening for breast cancer, and the use of reminders. These results are similar to those reported in the literature for women globally where client reminders, health education booklets delivered during a home visit, community-based group education plus culturally sensitive educational materials, small media (videos or tailored or untailored printed materials such as letters, brochures, pamphlets, flyers, or newsletters distributed), and provider audit and feedback have been found to be effective strategies in increasing mammography intake (Brouwers et al., 2011; Han et al., 2009; Legler et al., 2002; Lu et al., 2012). In addition, the use of active strategies such as an invitation letter, mailed educational material, phone calls, and training activities and reminders for women seem to increase the number of women undertaking breast screening (Bonfill Cosp et al., 2001). In one study, education was provided by peers. There is evidence that peer education can be effective in conveying health messages and changing attitudes, thereby influencing behavioral intentions (Gursoy et al., 2009b; McDonald, Roche, Durbridge, & Skinner, 2003). Peer education can also empower women to make informed decisions about their health and well-being (Webel, Okonsky, Trompeta, & Holzemer, 2010). Given that the interventions implemented were multifactorial, it is not possible to determine which individual initiative had a better effect on outcomes.

Besides the variations in the content and the duration of the educational interventions, approximately 40% of the studies the interventions designed to improve rates of breast screening were based on a theoretical framework, namely the "Health Belief Model." Although multiple theories and frameworks for behavior change exist, interventions designed using the health belief model have successfully been extensively used to successfully improve breast-screening rates (Austin, Ahmad, McNally, & Stewart, 2002; Hajian-Tilaki & Auladi, 2014; Lee, Stange, & Ahluwalia, 2014; Wang, Hsu, Wang, Huang, & Hsu, 2014). Similarly, in this review studies that used the health belief model demonstrated improvement in breast screening practices. This could be because the interventions, although diverse, were targeted at the model's key constructs namely perceived severity, perceived susceptibility, perceived benefits, and perceived barriers. For example, providing education about prevalence, incidence, and consequences of disease could increase the women's knowledge about the severity of the illness thus empowering and encouraging them to engage in breast screening practices.

Although educational interventions have been reported to be successful, lack of access to services can pose a barrier to

Worldviews on Evidence-Based Nursing, 2017; 14:4, 316–323.

breast cancer screening among women. In order to overcome this barrier, since 2008, Turkey has adopted a nation-wide population-based mammography screening program. In addition, there has been a significant increase in the number of Cancer Early Detection, Screening, and Training Centers (CEDSTCs) in all provinces of Turkey (EU Delegation in Ankara, 2011). Breast cancer screening activities are carried out in 126 CEDSTCs, which are integrated into the state hospitals. However, it is reported that although CEDSTCs offer screening services, these are limited due to organizational and technical constraints. Hence, the coverage rate of breast cancer screening is only 18% and far from the ultimate goal of 70% before 2011 that was set by Ministry of Health (EU Delegation in Ankara, 2011).

Future research should measure the effects of the different strategies used, and their intensity, to evaluate the effectiveness of each element that comprises an intervention package. Practitioners and policy makers should be encouraged to select and promote efficacious interventions. Thus, although the positive results of the majority of studies indicate some evidence, studies of better methodological quality are needed. Many of the studies described in this review were small or provided too little detail on design or how the interventions were carried out. Therefore, there is an urgent need for well-designed RCTs that are sufficiently powered and provide detailed description of the study and interventions used to increase breast-screening rates. This review highlights the need for designing interventions specifically for promoting BSE proficiency and mammography and CBE frequencies. Given that this review was limited to studies undertaken in Turkey, the results will enable the use of culturally appropriate interventions for Turkish women.

Limitations

There are several limitations to this systematic review. The wide range of follow-up length in the studies reviewed limits the ability to adequately compare the effectiveness of intervention across studies. The use of multicomponent interventions made it difficult to assess which component was most effective. The duration of the educational interventions varied among the studies hence a "dose response" could not be evaluated. Finally, trust in the healthcare provider or the health system plays a vital role in the uptake of breast screening programs. However, none of the included studies measured the participant's level of trust in the healthcare provider or the health system.

CONCLUSIONS

In conclusion, the evidence from this systematic review supports the use of group education comprising of a multifactorial intervention to increase breast-screening behaviors among Turkish women. In the current health environment, where there is increasing pressure to find efficient methods for healthcare delivery, implementing a multifactorial intervention delivered in a group setting may be an approach to deliver less resource-intensive care and at the same time improve health outcomes. **WVN**

LINKING EVIDENCE TO ACTION

- The use of group education comprising a multicomponent intervention has been demonstrated to increase breast-screening behaviors among Turkish women.
- Interventions designed using the health belief model improves breast screening rates, with success.
- Determining the duration of the educational interventions in order to provide a "dose response" is needed.
- One to one education although beneficial may be resource-intensive without significantly improving health outcomes.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article at the publisher's web site:

Figure S1. Flow diagram for study selection according to PRISMA.
Figure S2. Group education compared to other methods on rates of BSE.
Figure S3. Group education compared to other methods on rates of mammography.
Table S1. Search Strategy.
Table S2. Breast Cancer Screening Intervention Studies on Turkish Women.
Table S3. Effect of Educational Interventions on BSE, CBE, and Mammography.