



Original Research / Orijinal Araştırma

The Effect of Tailored Interventions on Breast Cancer Screening Behaviors and Health Perceptions in Women with Low Socioeconomic Levels

Sosyoekonomik Düzeyi Düşük Kadınlara Uygulanan Yapılandırılmış Girişimlerin Meme Kanseri Tarama Davranışlarına ve Sağlık Algılarına Etkisi

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Abstract

Introduction: Breast cancer is a prevalent and significant health issue among women both globally and in our country. The aim of this study is to systematically examine the effects of tailored interventions, such as group education and telephone counseling, on breast cancer screening behaviors and health perceptions among women with low socioeconomic status. The study seeks to evaluate how these interventions influence women's health awareness, their adoption of screening behaviors, and their access to healthcare services.

Method: This study is a randomized controlled trial conducted at a family health center. Data were collected by using the Diagnostic Form, Breast Cancer Health Belief Model Scale, Mammography Self-efficacy Scale, and Breast Cancer Fear Scale. The study sample consisted of 123 women. The Tailored Interventions in Breast Cancer Screenings (TIBCS) included group education and telephone counseling. These tailored interventions were based on the health belief model. The study consisted of two experimental groups those receiving tailored group education (N=41) and those receiving tailored telephone counseling (N=41) and one control group receiving standard care (N=41). A pre-test and post-test control group design was used in the study, and the outcome variables were evaluated before the intervention and at the 3rd and 6th months after the intervention. Data were collected by using the Socioeconomic Status Scale, Diagnostic Form, Breast Cancer Health Belief Model Scale, Mammography Self-Efficacy Scale, Breast Cancer Fear Scale, and Breast Cancer Fatalism Scale. The NCSS (Number Cruncher Statistical System) program was used for statistical analysis. Data were evaluated by using descriptive statistical methods.

Results: The study found that TIBCS increased the rates of regular self-breast examinations, clinical breast examinations, and mammography screenings ($p<0.05$). In the experimental groups of the TIBCS, it was observed that self-breast examination benefits, mammography benefits, confidence, and health motivation perceptions increased, while perceived barriers to self-breast examination and mammography decreased ($p<0.05$), with no change in susceptibility perception ($p>0.05$). Similarly, in both experimental groups, women's perceptions of mammography self-efficacy increased, while fear and fatalism perceptions showed a significant decrease ($p<0.05$).

Conclusion: TIBCS applied to women with low socioeconomic status is effective in increasing the rate of breast cancer screening behaviors and improving health perceptions. Therefore, tailored interventions are considered to be beneficial in future studies.

Keywords: Self-breast examination, clinical breast examination, mammography, health perceptions, tailored intervention

Özet

Giriş: Meme kanseri, hem dünyada hem de ülkemizde kadınlar arasında yaygın ve önemli bir sağlık sorunudur. Bu araştırmanın amacı, sosyoekonomik düzeyi düşük kadınlara yönelik yapılandırılmış müdahalelerin, özellikle grup eğitimi ve telefon danışmanlığı gibi stratejilerin, meme kanseri tarama davranışları ve sağlık algıları üzerindeki etkilerini sistematik bir şekilde incelemektir. Çalışma, bu müdahalelerin kadınların sağlık farkındalığı, tarama davranışlarını benimseme düzeyleri ve sağlık hizmetlerine erişimlerinde nasıl bir rol oynadığını değerlendirmeyi hedeflemektedir.

Yöntem: Bu çalışma bir aile sağlığı merkezinde gerçekleştirilen randomize kontrollü bir çalışmadır. Çalışmanın örneklemini 123 kadın oluşturdu. Meme Kanseri Taramalarında Yapılandırılmış Girişimler (METYAG) grup eğitimi ve telefon danışmanlığından oluşmuştur. Yapılandırılmış girişimler Sağlık İnanç Modeline temellendirilmiştir. Çalışma grubu yapılandırılmış grup eğitimi alan (N:41), yapılandırılmış telefon danışmanlığı alanları (N:41) kapsayan iki deney grubundan ve standart bakım alan (N:41) bir kontrol grubundan oluşmuştur. Araştırmada, ön test-son test kontrol gruplu tasarım kullanılmış, girişim öncesi ve girişim sonrası 3. ve 6. ayda sonuç değişkenleri değerlendirilmiştir. Çalışmada veriler, Sosyo- Ekonomik Durum Skalası, Tanılama Formu, Meme Kanseri Sağlık İnanç Modeli Ölçeği, Mamografi Yeterlik Ölçeği, Meme Kanseri Korku Ölçeği ve Meme Kanseri Kadercilik Ölçeği ile toplanmıştır. İstatistiksel analizler için NCSS (Number Cruncher Statistical System) programı kullanılmış olup çalışmanın verileri tanımlayıcı istatistiksel yöntemler ile değerlendirilmiştir.

Bulgular: Çalışmada METYAG'ın düzenli kendi kendine meme muayenesi yapma, klinik meme muayenesi yaptırma ve mamografi çekirtme oranlarını arttığı belirlenmiştir ($p<0,05$). Çalışmada METYAG deney gruplarında kendi kendine meme muayenesi yarar, mamografi yarar, güven, sağlık motivasyonu algılarını artırdığı, kendi kendine meme muayenesi ve mamografi engel algılarını azalttığı ($p<0,05$), yatkınlık algısını ise değiştirmedığı ($p>0,05$) belirlenmiştir. Benzer şekilde, her iki deney grubundaki kadınların, mamografi yeterlilik algıları yükselir iken, korku ve kadercilik algılarında anlamlı azalma belirlenmiştir ($p<0,05$).

Sonuç: Sosyoekonomik düzeyi düşük kadınlarda uygulanan METYAG'ın meme kanseri tarama davranışlarının sergilenme oranını ve sağlık algılarını artırdığı etkilidir. Bu nedenle, konu ile ilgili yapılacak çalışmalarda yapılandırılmış girişimlerin faydalı olacağı düşünülmektedir.

Anahtar kelimeler: Kendi kendine meme muayenesi, klinik meme muayenesi, mamografi, sağlık algıları, yapılandırılmış girişim

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Introduction

Breast cancer is a significant issue that affects women's health.^{1,2} According to the International Agency for Research on Cancer (IARC), approximately 2.3 million new cases of breast cancer were recorded worldwide in 2020, with around 685,000 deaths resulting from the disease. Breast cancer is the most common type of cancer among women in Türkiye, accounting for 23.9% of all cancers.³

Breast cancer screening methods aim to detect breast cancer at the earliest stage, before clinical symptoms appear, and reduce mortality rates in women. The recommended population-based screening methods for early detection of breast cancer are mammography, clinical breast examination (CBE), and breast self-examination (BSE).^{4,5,6} However, various national and international reports indicate inadequacies in breast cancer screening behaviors.^{7,8,9} Since 2008, the National Cancer Screening Program has been implemented in Türkiye, with a goal to screen 70.0% of the target population by using mammography. According to the 2020 Turkish Health Statistics Yearbook, only 34.9% of women in Türkiye have had at least one mammogram.¹⁰ Yet, studies have shown that regular mammography in women over the age of 50 can reduce the risk of death from breast cancer by 20-30%.^{11,12}

In Türkiye, numerous interventional studies have been conducted among various groups of women over the past 15 years to improve breast cancer screening behaviors. Methods such as group health education, distribution of brochures and booklets, video screenings, the use of breast models, and phone reminders are among the most frequently tested interventions in these studies. However, research evaluating the effectiveness of tailored interventions in improving breast cancer screening behaviors remains quite limited.⁷ Nevertheless, it is suggested that tailored interventions are highly effective in enhancing breast cancer screening practices.^{13,14,15,16}

There are numerous factors that influence breast cancer screening behaviors. These include low socioeconomic and educational levels, age, marital status, lack of knowledge about breast cancer and screening methods, a family history of breast cancer, and health beliefs.^{7,16} In recent years, the Health Belief Model (HBM) has become one of the most commonly used frameworks to increase screening rates among women and to better understand the impact of health beliefs. This model explains the beliefs and attitudes that affect individuals' behaviors. The key components of the model include perceived susceptibility, perceived benefits, perceived seriousness, perceived barriers, health motivation, and perceived vulnerability.^{16,17,18} In this context, the aim of the research is to examine the effect of tailored interventions (group education, telephone counseling) applied to women with low socioeconomic status on breast cancer screening behaviors and health perceptions. The data obtained is expected to contribute to the planning of screening programs aimed at increasing breast cancer screening behaviors in the community and to the development of healthcare policies.

Method

Research Objective

This study was designed to examine the effect of tailored interventions on breast cancer screening behaviors and health perceptions among women with low socioeconomic status. The study was designed using the CONSORT guidelines.

Study Population and Sample

The study was conducted between September 2017 and June 2019 at a family health center (FHC) in Istanbul. The population of the study consisted of 1,113 women aged 40-69 who were registered at the FHC. The sample group included individuals who visited the FHC, met the inclusion criteria, and expressed willingness to participate in the study. The sample size was calculated by using the Epi Info program, with a 90% confidence interval, a 3% margin of error, and an estimated 10% effect size from previous studies.¹⁸ Based on these parameters, the required sample size was determined to be 41 participants per group. The study was conducted with two experimental groups and one control group. A total of 123 women who met the inclusion criteria were selected, with 41 women assigned to each group (Experimental Group 1 (n=41), Experimental Group 2 (n=41), and Control Group (n=41)).

Data Collection Tools

In the study, the following data collection tools were used: the Socioeconomic Status Scale, the Diagnostic Form, the Breast Cancer Health Belief Model Scale, the Mammography Self-efficacy Scale, the Breast Cancer Fatalism Scale, the Breast Cancer Fear Scale, and the Screening Participation Form.

Socioeconomic Status Scale: The scale was first developed by Kuppaswamy in 1976, and various updates have been made over the years. The most recent version of the scale was created by Singh and colleagues in 2017.¹⁹ The scale is used to measure individuals' socioeconomic status. It assesses socioeconomic status by considering the family's monthly income, educational level, and occupational characteristics, grouping it into upper, upper-middle, middle, lower-middle, and lower categories. The scale yields a minimum score of 3 and a maximum score of 29.^{20,21}

Diagnostic Form: This form includes sociodemographic characteristics of the women participating in the study and questions related to breast cancer. The questionnaire consists of 18 questions, with the first 11 questions addressing the sociodemographic characteristics of the women (name, surname, address, age, education level,

employment status, marital status, social security, income level, having children, and number of children). The remaining questions cover topics such as breast cancer knowledge level, family history of breast cancer, regular doctor visits, breast self-examination practices, knowledge of breast self-examination, mammography uptake, and knowledge about mammography.

Breast Cancer Health Belief Model Scale: The scale was developed in English by Victoria Champion in 1984. It identifies the health perceptions that influence women's practices of breast self-examination and undergoing mammography. The scale consists of a total of eight sub-dimensions and includes 53 items. These sub-dimensions are: perceived susceptibility (5 items), perceived seriousness (7 items), perceived benefits of BSE (6 items), perceived barriers to BSE (6 items), perceived benefits of mammography (6 items), perceived barriers to mammography (5 items), confidence (11 items), and health motivation (7 items). The scale is in a 5-point Likert format, where each item is rated as follows: 1- 'Strongly disagree,' 2- 'Disagree,' 3- 'Neutral,' 4- 'Agree,' 5- 'Strongly agree'. The adaptation of the Breast Cancer Health Belief Model Scale into Turkish was carried out by Seçginli and Nahcivan in 2004²² and by Gözüm et al. in 2003²³. In this study, the scale adapted into Turkish by Seçginli and Nahcivan in 2004, which was used with women having similar characteristics to the sample group, was utilized. The Cronbach's alpha reliability coefficient of the Turkish Health Belief Model Scale ranged between 0.75 and 0.87²².

Breast Cancer Fatalism Scale: The scale consists of 11 questions and is answered in a yes/no format. A 'Yes' response is scored as 1 point, while a 'No' response is scored as 0 points. An increase in the score obtained from the scale indicates a higher perception of fatalism. The minimum score is 0, and the maximum score is 11. The adaptation of the scale into Turkish was carried out by Ersin and colleagues in 2014²⁴. The internal consistency coefficient of the original form of the scale was reported as 0.89.

Mammography Self-efficacy Scale: The scale consists of a total of 10 questions. It is in a 5-point Likert format, where each item is rated as follows: 1- 'Strongly disagree,' 2- 'Disagree,' 3- 'Neutral,' 4- 'Agree,' 5- 'Strongly agree.' The scale includes steps related to the mammography process, such as accessibility, ability to pay, making an appointment, finding the screening center, as well as individual factors like anxiety about mammography and communication with people at the center. The validity and reliability of the Turkish version of the scale were established by Seçginli in 2012.²⁵ The Cronbach's alpha reliability coefficient of the scale is 0.90

Breast Cancer Fear Scale: The scale was developed by Champion and colleagues in 2004 and consists of 8 questions. It is in a 5-point Likert format, where each item is rated as follows: 1- 'Strongly disagree,' 2- 'Disagree,' 3- 'Neutral,' 4- 'Agree,' 5- 'Strongly agree.' The expected score range for the scale is 8-40 (min-max). A total score of 8-15 indicates a low level of fear, 16-23 indicates a moderate level of fear, and 24-40 indicates a high level of fear. The validity and reliability of the scale in our country were established by Seçginli in 2012.²⁵

Data Collection

Data were collected by the researcher through face-to-face interviews and phone calls, after obtaining institutional and ethics committee approvals. The study was conducted in a meeting room designated by the researcher. Data were collected at three different times: before the intervention, and then 3 and 6 months after the intervention, within the specified date range.

Pre-intervention

Before the intervention, meetings were held with the family physicians and nurses to provide information about the study's objectives and content. Initially, a pilot study was conducted with 14 women who met the research criteria. Due to the unavailability of contact records for women aged 40-69 at the FHC, phone numbers of women visiting the FHC twice a week were collected. Women who met the research criteria and agreed to participate were contacted by phone to complete the "Socioeconomic Status Scale" and the Diagnostic Form. After informing the experimental and control groups about the study, pre-tests were conducted using the data collection tools.

Implementation of the Intervention

In this study, tailored interventions targeting women with low socioeconomic status were implemented through both group education and telephone counseling. The first experimental group received group education sessions that included tailored messages based on the health belief model. These sessions were conducted once a week over a total of five sessions, with each session involving 6-9 women. The educational sessions were held in a specially arranged room, and participants were called one day in advance to remind them of the meeting. At the end of the sessions, informative brochures obtained from the Cancer Early Diagnosis, Screening, and Education Center (CEDSECs) were distributed to the women, and they were referred to CEDSECs for mammography screening.

The second experimental group was contacted by phone during the same period, and the tailored messages provided in the group education were shared with them via telephone calls. These calls lasted between 10-20 minutes, during which the women's questions were answered. The telephone counseling was conducted individually by the researcher. Women in both groups were provided with the contact information of the nearest

CEDSECs centers to facilitate their access to screening services. This comprehensive intervention aimed to enhance breast cancer screening behaviors among women and improve their access to healthcare services.

Post-intervention

Women from both the experimental and control groups were invited to the training room 3 and 6 months after the intervention to collect the final test data. During this phase, the data collection tools were used again. After the final test data had been collected, the control group received tailored group education from the researcher. Additionally, the control group was provided with CEDSECs's transportation and contact information and encouraged to visit the facility for clinical breast examinations and mammography.

Interventions: Tailored Interventions in Breast Cancer Screening (TIBCS)

Tailored Group Education

Research has shown that tailored interventions can increase breast cancer screening rates by reducing women's perceived barriers and enhancing their perception of benefits²⁶. In this study, women included in the research received tailored messages based on the Health Belief Model through face-to-face group education sessions.

Tailored Telephone Counseling

Women in this group were contacted by phone, and the messages provided during the tailored group education sessions were conveyed to them. Each phone call lasted between 10 to 20 minutes. Additionally, the women's questions regarding the topic were answered. The telephone counseling was conducted individually by the researcher.

Ethical Principles of the Study

Approval for the study was obtained from the Ethics Committee of Istanbul Arel University (Approval date: May 31, 2018/number:69396709-050.01.01) and the Istanbul Provincial Health Directorate (Approval date: May 25, 2018/number:16867222-799). The purpose and process of the study were explained to the doctors and nurses working at the FHC. Women who agreed to participate in the study were asked to complete an informed consent form.

Results

The ages of the women participating in the study ranged from 40 to 67, with a mean age of 50.68 ± 7.76 years. The majority of the women (91.1%) were married, and 35% had four or more children. Among the participants, 73.2% had an education level of middle school or lower. Additionally, 79.7% of the women were not employed, and most (93.5%) had health insurance.

Prior to the intervention, no statistically significant differences were found between the experimental and control groups in terms of marital status, age, number of children, education level, health insurance, and income level ($p>0.05$) (Table 1).

The status of conducting clinical breast examinations within 6 months after the program showed a statistically significant difference between groups ($p=0.001$). In the study, the rates of conducting clinical breast examinations for those who received tailored group education and telephone counseling were found to be significantly higher than the control group. However, there was no statistically significant difference in the rates of breast self-examination between those receiving group education and those receiving telephone counseling ($p>0.05$). The status of undergoing mammography within 6 months after the program showed a statistically significant difference between the groups. The rates of undergoing mammography for those who received group education and telephone counseling were found to be significantly higher than the control group ($p=0.012$). However, there was no statistically significant difference in the mammography rates between those receiving group education and those receiving telephone counseling ($p>0.05$) (Table 2).

In both experimental groups, women showed increased perceptions of the benefits of breast self-examination and mammography, as well as improved perceptions of self-efficacy and health motivation at both the 3rd and 6th months. Additionally, perceptions of barriers to BSE and mammography decreased, while perceptions of susceptibility remained unchanged (Table 3).

Table 1. Sociodemographic and Breast Cancer-related Characteristics of the Experimental and Control Groups

| | | Experimental Group 1 (n=41) | Experimental Group 2 (n=41) | Control Group (n=41) | |
|---|-------------------------|-----------------------------|-----------------------------|----------------------|------------------------------|
| | | n (%) | n (%) | n (%) | |
| Age (year) | 40-49 | 20 (48,8) | 18 (43,9) | 25 (61,0) | $\chi^2: 2,810$ |
| | 50-59 | 14 (34,1) | 16 (39,0) | 12 (29,3) | ^a p: 0,590 |
| | ≥ 60 | 7 (17,1) | 7 (17,1) | 4 (9,8) | |
| Marital status | Married | 39 (95,1) | 36 (87,8) | 37 (90,2) | $\chi^2: 1,430$ |
| | Single | 2 (4,9) | 5 (12,2) | 4 (9,8) | ^b p: 0,619 |
| Number of children | 1 | 1 (2,4) | 3 (7,3) | 5 (12,2) | $\chi^2: 8,136$ |
| | 2 | 10 (24,4) | 11 (26,8) | 17 (41,5) | ^b p: 0,218 |
| | 3 | 12 (29,3) | 11 (26,8) | 10 (24,4) | |
| | ≥ 4 | 18 (43,9) | 16 (39,0) | 9 (22,0) | |
| Education status | Middle school and below | 30 (73,2) | 33 (80,5) | 27 (65,9) | $\chi^2: 3,749$ |
| | High school | 9 (22,0) | 7 (17,1) | 9 (22,0) | ^b p: 0,433 |
| | University | 2 (4,9) | 1 (2,4) | 5 (12,2) | |
| Working status | Yes | 5 (12,2) | 13 (31,7) | 7 (17,1) | $\chi^2: 5,221$ |
| | No | 36 (87,8) | 28 (68,3) | 34 (82,9) | ^a p: 0,073 |
| Health insurance | Yes | 39 (95,1) | 40 (97,6) | 36 (87,8) | $\chi^2: 3,017$ |
| | No | 2 (4,9) | 1 (2,4) | 5 (12,2) | ^b p: 0,277 |
| Prior knowledge about breast cancer | Yes | 9 (22,0) | 2 (4,9) | 6 (14,6) | $\chi^2: 5,051$ |
| | No | 32 (78,0) | 39 (95,1) | 35 (85,4) | ^a p: 0,080 |
| Having a family history of breast cancer | Yes | 3 (7,3) | 2 (4,9) | 0 (0) | $\chi^2: 2,899$ |
| | No | 38 (92,7) | 39 (95,1) | 41 (100) | ^b p: 0,370 |
| Regular visits to the gynecologist and obstetrician | Yes | 2 (4,9) | 3 (7,3) | 3 (7,3) | $\chi^2: 0,401$ |
| | No | 39 (95,1) | 38 (92,7) | 38 (92,7) | ^b p: 1,000 |
| The state of being informed about breast self-exam in advance | Yes | 1 (2,4) | 2 (4,9) | 5 (12,2) | $\chi^2: 3,017$ |
| | No | 40 (97,6) | 39 (95,1) | 36 (87,8) | ^b p: 0,274 |
| Prior information about mammography | Yes | 3 (7,3) | 1 (2,4) | 6 (14,6) | $\chi^2: 3,855$ |
| | No | 38 (92,7) | 40 (97,6) | 35 (85,4) | ^b p: 0,155 |

^aPearson Chi-square Test

^bFisher Freeman Halton Test

Table 2. Evaluation of the Results of Mammography and Clinical Breast Examination by Groups (6 months after the program)

| | | Experimental Group 1 (n=41) | Experimental Group 2 (n=41) | Control Group (n=41) | | |
|--|-----------|-----------------------------|-----------------------------|----------------------|------------------|--|
| Having a clinical breast examination (6th month) | Yes | 13 (31,7) | 15 (36,6) | 0 | $\chi^2: 18,400$ | ^p ₁₋₃ :0,001** ^p ₂₋₃ :0,012* |
| | No | 28 (68,3) | 26 (63,4) | 41 (100) | p:0,001** | |
| Having a mammogram (6 months) | Yes | 7 (17,1) | 7 (17,1) | 0 | $\chi^2: 9,690$ | ^p ₁₋₃ :0,001** ^p ₂₋₃ :0,012* |
| | No | 34 (82,9) | 34 (82,9) | 41 (100) | p:0,012* | |
| Breast self-exam (3 months) | None | 9 (22,0) | 14 (34,1) | 39 (95,1) | $\chi^2: 50,948$ | ^p ₁₋₃ :0,001** ^p ₂₋₃ :0,001** |
| | 1-2 times | 16 (39,0) | 15 (36,6) | 2 (4,9) | p:0,001** | |
| | 3 times | 16 (39,0) | 12 (29,3) | 0 | | |
| Breast self-exam (3 months) | None | 20 (48,8) | 15 (36,6) | 39 (95,1) | $\chi^2: 32,93$ | ^p ₁₋₃ :0,001** ^p ₂₋₃ :0,001** |
| | 1-2 times | 11 (26,8) | 14 (34,1) | 2 (4,9) | p:0,001** | |
| | 3 times | 10 (24,4) | 12 (29,3) | 0 | | |
| ^z p | | 0,019* | 0,981 | 1,000 | | |

Chi-square test

^zWilcoxon signed Rank test

**p<0,01

*p<0,05

Table 3. Effect of TIBCS Program on Breast Cancer Health Beliefs

| | | | Experimental Group1 (n=41) | Experimental Group2 (n=41) | Control Group (n=41) | | | |
|--------------------------------|-----------------------------------|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|------------------|------------------------------|--------------|
| BSE perception of benefit | Before education | Min/Max (Median) | 12/ 28 (17) | 12/ 24 (14) | 12/ 29 (15) | χ^2 :4,774 | - | |
| | | Mean±SD | 17,27±3,85 | 15,73±3,37 | 16,12±3,23 | p:0,092 | | |
| | Post education 3.month | Min/Max (Median) | 14/ 27 (23) | 20/ 28 (23) | 12/ 20 (16) | χ^2 :80,511 | P1-3:0,001** | |
| | | Mean±SD | 22,56±2,07 | 23,20±1,52 | 15,54±2,13 | p:0,001** | P2-3:0,001** | |
| | Post education 6.month | Min/Max (Median) | 18/ 25 (22) | 20/ 26 (23) | 12/ 18 (15) | χ^2 :86,011 | P1-3:0,001** | |
| | | Mean±SD | 21,76±1,71 | 22,85±1,37 | 14,49±1,72 | p:0,001** | P2-3:0,001** | |
| | | Test value; ^d p | χ^2 :36,167 p:0,001** | χ^2 :51,652 p:0,001** | χ^2 :5,934 p:0,048* | | | |
| | BSE Perception of Barrier | Before education | Min/Max (Median) | 10/ 27 (20) | 9/ 24 (19) | 10/ 24 (19) | χ^2 :1,560 | - |
| | | | Mean±SD | 19,20±4,51 | 18,54±4,25 | 18,20±3,65 | p:0,458 | |
| | | Post education 3.month | Min/Max (Median) | 12/ 17 (14) | 12/ 18 (14) | 12/ 24 (18) | χ^2 :32,834 | P1-3:0,001** |
| Mean±SD | | | 14,05±1,41 | 13,80±1,83 | 17,59±3,43 | p:0,001** | P2-3:0,001** | |
| Post education 6.month | | Min/Max (Median) | 12/ 18 (13) | 12/ 19 (14) | 16/ 24 (19) | χ^2 :77,648 | P1-3:0,001** | |
| | | Mean±SD | 13,66±1,68 | 14,10±1,70 | 19,71±2,29 | p:0,001** | P2-3:0,001** | |
| | | Test value; ^d p | χ^2 :38,993 p:0,001** | χ^2 :30,871 p:0,001** | χ^2 :8,975 p:0,011* | | | |
| Mammography Benefit Perception | | Before education | Min/Max (Median) | 12/ 28 (18) | 12/ 29 (16) | 12/ 29 (16) | χ^2 :4,482 | - |
| | | | Mean±SD | 18,29±3,49 | 16,98±3,83 | 17,54±4,21 | p:0,089 | |
| | | Post education 3.month | Min/Max (Median) | 20/ 27 (23) | 20/ 25 (23) | 12/ 23 (16) | χ^2 :78,201 | P1-3:0,001** |
| | Mean±SD | | 22,83±1,43 | 22,54±1,32 | 15,76±2,40 | p:0,001** | P2-3:0,001** | |
| | Post education 6.month | Min/Max (Median) | 17/ 24 (21) | 20/ 24 (22) | 12/ 19 (15) | χ^2 :81,388 | P1-3:0,001** | |
| | | Mean±SD | 21,56±1,95 | 22,02±1,27 | 15,05±1,75 | p:0,001** | P2-3:0,001** | |
| | | Test value; ^d p | χ^2 :34,265 p:0,001** | χ^2 :43,745 p:0,001** | χ^2 :7,125 p:0,028* | | | |
| | Mammography disability perception | Before education | Min/Max (Median) | 10/ 20 (17) | 10/ 21 (18) | 6/ 21 (18) | χ^2 :1,566 | - |
| | | | Mean±SD | 16,32±2,39 | 16,54±3,16 | 16,41±3,69 | p:0,457 | |
| | | Post education 3.month | Min/Max (Median) | 10/ 13 (11) | 8/ 17 (12) | 12/ 20 (19) | χ^2 :81,776 | P1-3:0,001** |
| Mean±SD | | | 10,93±0,85 | 11,63±1,70 | 18,17±1,95 | p:0,001** | P2-3:0,001** | |
| Post education 6.month | | Min/Max (Median) | 10/ 14 (11) | 10/ 15 (13) | 10/ 20 (19) | χ^2 :83,591 | P1-2:0,019* | |
| | | Mean±SD | 10,95±1,00 | 12,37±1,55 | 18,85±1,81 | p:0,001** | P1-3:0,001** P2-3:0,001** | |
| | | Test value; ^d p | χ^2 :64,723 p:0,001** | χ^2 :40,248 p:0,001** | χ^2 :16,451 p:0,001** | | | |

Table 3(continued). Effect of TIBCS Program on Breast Cancer Health Beliefs

| | | | Experimental Group1 (n=41) | Experimental Group2 (n=41) | Control Group (n=41) | | | |
|------------------------------|---------------------------------|----------------------------|----------------------------|----------------------------|----------------------|------------------|-----------------|---|
| Perception of Confidence | Before education | Min/Max (Median) | 11/ 46 (24) | 11/ 35 (21) | 12/ 40 (22) | χ^2 :18,305 | P1-2:0,001** | |
| | | Mean±SD | 26,15±6,74 | 19,98±6,89 | 21,46±6,57 | p:0,001** | P1-3:0,002** | |
| | Post education 3.month | Min/Max (Median) | 33/ 44 (39) | 35/ 44 (40) | 11/ 30 (22) | χ^2 :82,308 | P1-3:0,001** | |
| | | Mean±SD | 39,49±2,23 | 39,93±2,17 | 21,17±4,64 | p:0,001** | P2-3:0,001** | |
| | Post education 6.month | Min/Max (Median) | 32/ 44 (39) | 33/ 42 (39) | 22/ 28 (24) | χ^2 :82,091 | P1-3:0,001** | |
| | | Mean±SD | 38,29±2,57 | 38,32±2,41 | 24,05±1,86 | p:0,001** | P2-3:0,001** | |
| | | Test value; ^d p | χ^2 :53,471 | χ^2 :65,850 | χ^2 :17,104 | | | |
| | | | p:0,001** | p:0,001** | p:0,001** | | | |
| | Perception of Health Motivation | Before education | Min/Max (Median) | 14/ 32 (23) | 15/ 28 (21) | 17/ 30 (21) | χ^2 :5,066 | - |
| | | | Mean±SD | 22,68±4,05 | 21,12±2,92 | 21,17±3,07 | p:0,079 | |
| Post education 3.month | | Min/Max (Median) | 20/ 30 (26) | 20/ 29 (23) | 18/ 27 (21) | χ^2 :45,309 | P1-2:0,001** | |
| | | Mean±SD | 26,15±2,38 | 23,10±2,25 | 21,93±2,44 | p:0,001** | P1-3:0,001** | |
| Post education 6.month | | Min/Max (Median) | 20/ 32 (23) | 20/ 27 (24) | 19/ 26 (22) | χ^2 :14,530 | P1-3:0,002** | |
| | | Mean±SD | 24,07±2,81 | 23,71±2,30 | 21,98±1,94 | p:0,001** | P2-3:0,004** | |
| | | Test value; ^d p | χ^2 :19,307 | χ^2 :20,626 | χ^2 :2,579 | | | |
| | | | p:0,001** | p:0,001** | p:0,275 | | | |
| Perception of Predisposition | | Before education | Min/Max (Median) | 16/ 43 (25) | 12/ 45 (22) | 18/ 43 (24) | χ^2 :1,464 | |
| | | | Mean±SD | 12,95±2,93 | 12,32±3,49 | 12,93±3,07 | p:0,481 | |
| | Post education 3.month | Min/Max (Median) | 10/ 17 (15) | 10/ 20 (12) | 5/ 15 (13) | χ^2 :2,146 | | |
| | | Mean±SD | 13,71±2,66 | 13,17±3,32 | 12,83±2,48 | p:0,342 | | |
| | Post education 6.month | Min/Max (Median) | 10/ 17 (13) | 10/ 19 (13) | 10/ 15 (13) | χ^2 :0,123 | | |
| | | Mean±SD | 13,02±2,63 | 13,37±3,67 | 12,80±2,12 | p:0,941 | | |
| | | Test value; ^d p | χ^2 :3,938 | χ^2 :1,179 | χ^2 :0,328 | | | |
| | | | p:0,140 | p:0,555 | p:0,849 | | | |

The mammography self-efficacy scores at the 3rd and 6th months were significantly higher in the tailored telephone counseling and group education groups compared to the control group (p = 0.001) (Table 4).

The breast cancer fatalism scores were also lower in the tailored telephone counseling and group education groups at both the 3rd and 6th months compared to the control group (p = 0.001 for both). Additionally, at the 6th month, the fatalism scores for women receiving telephone counseling were significantly higher than those receiving group education (p = 0.001) (Table 5).

Table 4. Mammography Proficiency Scale Total Score by Groups

| | | Experimental Group 1(n=41) | Experimental Group 2(n=41) | Control Group (n=41) | | |
|----------------------------------|------------------|--------------------------------------|--------------------------------------|-----------------------------------|------------------|---------------------------|
| Before education | Min/Max (Median) | 16/ 43 (25) | 12/ 45 (22) | 18/ 43 (24) | χ^2 :4,631 | - |
| | Mean±SD | 26,78±6,59 | 24,27±7,69 | 25,54±6,68 | p:0,099 | |
| Post education 3.month | Min/Max (Median) | 34/ 40 (38) | 33/ 40 (37) | 15/ 34 (23) | χ^2 :84,685 | P ₁₋₃ :0,001** |
| | Mean±SD | 38,07±1,93 | 36,95±1,88 | 23,22±3,99 | p:0,001** | P ₂₋₃ :0,001** |
| Post education 6.month | Min/Max (Median) | 32/ 40 (37) | 30/ 40 (36) | 20/ 28 (23) | χ^2 :82,171 | P ₁₋₃ :0,001** |
| | Mean±SD | 36,83±2,20 | 36,37±2,08 | 23,34±2,28 | p:0,001** | P ₂₋₃ :0,001** |
| Test value; ^dp | | χ^2 :42,051 p:0,001** | χ^2 :41,195 p:0,001** | χ^2 :0,854 p:0,653 | - | - |

^cKruskal Wallis Test
**p<0.01

^dFriedman Test
*p<0.05

^eBonferroni Dunn Test

Table 5. Breast Cancer Fatality Score by Groups

| | | Experimental Group 1 (n=41) | Experimental Group 2(n=41) | Control Group (n=41) | | |
|----------------------------------|------------------|-----------------------------------|--------------------------------------|--------------------------------------|------------------|--|
| Before education | Min/Max (Median) | 0/ 11 (5) | 1/ 11 (6) | 0/ 11 (6) | χ^2 :0,729 | - |
| | Mean±SD | 5,39±3,43 | 5,90±2,91 | 5,73±2,83 | p:0,695 | |
| Post education 3.month | Min/Max (Median) | 3/ 5 (5) | 1/ 6 (4) | 3/ 11 (6) | χ^2 :43,777 | P ₁₋₃ :0,001** |
| | Mean±SD | 4,49±0,81 | 3,80±1,33 | 6,34±2,00 | p:0,001** | P ₂₋₃ :0,001** |
| Post education 6.month | Min/Max (Median) | 3/ 6 (5) | 1/ 6 (4) | 5/ 11 (9) | χ^2 :92,228 | P ₁₋₂ :0,007** |
| | Mean±SD | 4,78±0,65 | 3,51±1,47 | 8,98±1,59 | p:0,001** | P ₁₋₃ :0,001** P ₂₋₃ :0,001** |
| Test value; ^dp | | χ^2 :2,262 p:0,323 | χ^2 :14,192 p:0,001** | χ^2 :33,760 p:0,001** | - | - |

^cKruskal Wallis Test ^dFriedman Test ^eBonferroni Dunn Test **p<0.01 *p<0.05

Evaluations between the groups revealed statistically significant differences in breast cancer fear scores at the 3rd and 6th months following the intervention (p=0.001). Pairwise comparisons showed that women who received group education and telephone counseling had lower breast cancer fear scores at both the 3rd and 6th months compared to those in the control group (p = 0.001 for both) (Table 6).

Table 6. Breast Cancer Fear Score by Groups

| | | Experimental Group 1 (n=41) | Experimental Group 2 (n=41) | Control Group (n=41) | | |
|----------------------------------|------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------------|--------------|
| Before education | Min/Max (Median) | 14/ 37 (23) | 16/ 38 (24) | 15/ 40 (24) | $\chi^2:0,848$ | - |
| | Mean±SD | 23,51±5,07 | 24,12±4,38 | 24,63±5,23 | p:0,655 | - |
| Post education 3.month | Min/Max (Median) | 16/ 23 (19) | 16/ 22 (18) | 16/ 31 (23) | $\chi^2:45,505$ | P1-3:0,001** |
| | Mean±SD | 18,68±1,97 | 18,02±1,90 | 22,78±3,38 | p:0,001** | P2-3:0,001** |
| Post education 6.month | Min/Max (Median) | 16/ 23 (16) | 16/ 23 (17) | 16/ 27 (22) | $\chi^2:31,291$ | P1-3:0,001** |
| | Mean±SD | 17,61±2,13 | 18,07±2,26 | 21,10±3,20 | p:0,001** | P2-3:0,001** |
| Test value; ^dp | | $\chi^2:39,678$ p:0,001** | $\chi^2:42,915$ p:0,001** | $\chi^2:15,880$ p:0,001** | - | - |

^cKruskal Wallis Test^dFriedman Test^eBonferroni Dunn Test

**p<0.01

*p<0.05

Discussion

National and international studies emphasize the need for tailored interventions to enhance breast cancer screening behaviors among women. Therefore, planning and implementing initiatives to increase screening practices in the community is of significant importance.

The results of the study demonstrate that the Tailored Interventions in Breast Cancer Screening (TIBCS) program was effective in improving health beliefs and breast cancer screening behaviors among women with low socioeconomic status. The findings indicate that both tailored group education and telephone counseling significantly increased the rates of breast self-examination, clinical breast examination, and mammography screening among women.

After the intervention, in the experimental group that received tailored group education, the mammography screening rate was found to be 17% and the CBE rate was 32% at the 6th month. Similarly, the rates for BSE were 39% and 24% at the 3rd and 6th months, respectively. In the group that received tailored telephone counseling, the mammography screening rate was 17% at the 6th month, the CBE rate was 37%, and the rates for regular BSE were 29% at both the 3rd and 6th months.

In research conducted in our country, the rates of regular breast self-examination among women have been reported to range between 6% and 27%.^{8,9} In our study, tailored group education and telephone counseling interventions were found to enhance women's perceptions of the benefits of BSE and mammography, as well as improve their health motivation and self-efficacy. These interventions also reduced perceptions of barriers to BSE and mammography, although no changes were observed in perceptions of susceptibility. Additionally, women in the experimental groups showed increased perceptions of mammography self-efficacy and reduced fear. Regarding fatalism, no change was observed in the group receiving tailored group education, while a reduction was noted in the group receiving telephone counseling.

Consistent with our study, Gathirua-Mwangi et al. (2016) examined the effects of tailored telephone counseling and DVD interventions. Their study found that women who received the DVD intervention had significantly higher rates of mammography screening. However, no significant change in mammography screening rates was observed among women who received telephone counseling.²⁶

Wang et al. (2011) conducted a study among Chinese women, finding that tailored education based on the Health Belief Model was more effective in promoting mammography screening compared to standard educational methods.¹⁵ Similarly, Champion et al. (2016) identified that low-income women had higher perceptions of barriers to screening, while high-income women had higher rates of mammography screening.¹⁴ Additionally, other international studies^{27,28} have also demonstrated that tailored interventions effectively increase mammography screening behaviors.

In this study, women who received tailored education showed significantly higher perceptions of benefits and lower perceptions of barriers to mammography screening at both the 3rd and 6th months compared to before the intervention. Similarly, in the group that received tailored telephone counseling, lower barrier perceptions and higher benefit perceptions were observed. These findings indicate that tailored interventions significantly impact women's health beliefs regarding breast cancer screening behaviors. Perception of benefits reflects an individual's belief in the potential of a behavior to reduce the risk of disease development. In line with these results, Akkaş Gürsoy et al. (2009) reported a significant increase in perceptions of benefits following educational interventions.²⁹

In this study, women who received tailored education demonstrated significantly higher health motivation perceptions at the 3rd month compared to those who received tailored telephone counseling and those in the control group. By the 6th month, both the tailored education and telephone counseling groups had notably higher health motivation perceptions compared to the control group. Additionally, the group that received tailored education had significantly higher self-efficacy scores at both the 3rd and 6th months compared to before the intervention. Women who received telephone counseling also reported higher self-efficacy scores. Health motivation perception reflects beliefs and behaviors related to maintaining health and detecting health issues early. Women with higher health motivation perceptions are expected to have a greater likelihood of maintaining regular screening behaviors.³⁰

The study concluded that group education based on the Health Belief Model effectively increased women's perceptions of the benefits of mammography and health motivation, while reducing perceptions of barriers to mammography. Similarly, Anakwenze et al. (2015) found in their study with Jamaican women that interventions based on the HBM and the Transtheoretical Model were effective in reducing perceptions of barriers to mammography and increasing perceptions of its benefits and self-efficacy.³¹

According to the model, women who perceive themselves as at higher risk for breast cancer are expected to have a greater tendency to undergo screening. However, in this study, no significant increase in perceptions of susceptibility was observed in either experimental group at the 3rd and 6th months compared to before the intervention. In contrast, Farhadifar et al. (2016) found that tailored interventions based on the Health Belief Model significantly increased perceptions of susceptibility and mammography screening rates among Iranian women.³²

Perception of mammography self-efficacy is a crucial factor influencing women's regular mammography screening behaviors. Research indicates that women with higher perceptions of self-efficacy for mammography are more likely to undergo screening.^{33,34,35} In our study, significant differences were found in mammography self-efficacy scores at the 3rd and 6th months compared to before the intervention. Women who received tailored group education and telephone counseling had higher mammography self-efficacy scores at both the 3rd and 6th months compared to before the intervention.

Fatalistic approach is a significant factor influencing both early detection and screening behaviors as well as health beliefs and attitudes, playing a critical role in behavior change.^{36,37,38,39} Research has demonstrated that perceptions of fatalism have a marked effect on women's attitudes and behaviors.^{37,38} In this study, both experimental groups demonstrated lower fatalistic attitudes toward breast cancer at the 3rd and 6th months post-intervention compared to the control group. Akhigbe et al. (2012) found that fatalistic attitudes significantly impacted screening behaviors among Nigerian women. Similarly, Kulakçı et al. (2015) reported that nursing students had low levels of fatalism regarding breast cancer and identified a weak and negative relationship between fatalistic attitudes and perceptions of the benefits of self-breast examination.³⁹

Breast cancer fear is another significant factor influencing screening behaviors.^{40,41} Ersin et al. (2015)⁴² found that women who underwent mammography had higher levels of breast cancer fear compared to those who did not. Conversely, Donnelly et al. (2013)⁴³ found that breast cancer fear did not affect screening behaviors among Arab women. A similar finding was reported by Seçginli (2012). Another study noted that women's fear of breast cancer was moderate and did not influence early detection behaviors.⁴⁴ In our study, women who received telephone counseling and group education had significantly lower breast cancer fear scores at the 3rd and 6th months compared to those in the control group.

Limitations of the Study

The study's limitations include the follow-up period being restricted to only 6 months and the reliance on subjective self-reported data regarding women's mammography screening status.

Conclusion

The study results indicate that tailored health education and telephone counseling are effective in positively enhancing women's health perceptions and breast cancer screening behaviors. Particularly, tailored telephone counseling is noted for its cost-effectiveness and feasibility, suggesting it could be more widely utilized by nurses working at CEDSECs and family health centers.

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Conflict of Interest:

The authors declare no conflicts of interest.

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Artificial Intelligence

The authors confirm that no artificial intelligence (AI) tools or AI-assisted technologies were used in the writing or preparation of this manuscript.

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