

Effectiveness of the First Mammography Awareness Campaign In Rural Areas Where Participation In The Breast Cancer Screening Program Is Low: “Results of The Healty Women, Healty Generations Project”

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ABSTRACT

To evaluate the effect of a screening mammography awareness campaign in a rural region of Eastern Turkiye, where participation in breast cancer screening programs is low.

This health facility and community based study was conducted in Van province between January 1 and November 13, 2023, within the ongoing “Healthy Women, Healthy Generations” project. Women aged 40–69 who had never undergone mammography were included. Participants received education on breast, cervical, and colorectal cancers, and were invited to free mammography screening. Data were collected via face to face questionnaires. Two view (mediolateral oblique and craniocaudal) digital mammography was performed and interpreted centrally by Ministry of health radiologists.

While the regional participation rate in breast cancer screening was previously 21.5 %, the campaign increased this rate to 93.3 %. A total of 520 women participated (median age: 48.3 years). Mammography reports were issued within a median of 50 days. Most women (83 %) were reported to be in the BI-RADS 2 category, while one woman was found to be in the BI-RADS 5 category and was diagnosed with breast cancer. She underwent breast conserving surgery and adjuvant chemoradiotherapy. Family history of breast cancer was reported by 7.3 %. The median number of births was 5, with median ages of 20 for first and 34 for last birth.

Awareness campaigns significantly improve participation in breast cancer screening. Early detection and successful treatment of one cancer case, among 520 screens support the importance of such interventions. Broader, population-based studies are recommended to assess long term impact.

Key Points

- Breast cancer screening programs with mammography often fail to reach the desired participation rates.
- It is known that; awareness raising activities are effective in increasing participation rates.
- It was observed that; participation in the screening program increased approximately 4 times with the awareness study carried out in rural areas.

Keywords: Breast cancer awareness, screening mammography, BI-RADS, seconder prevention, early diagnosis, breast conservative surgery

Introduction

As with all cancers, early diagnosis of breast cancer is important for both treatment and survival. According to current evidence, while the 5 year survival rate in early stage breast cancer is

99 %, this rate drops to 86 % in locally advanced breast cancer (1). In women with metastasis, the chance of survival for 5 years decreases to 30 %. Diagnosing breast cancer at an early stage highlights the importance of breast cancer screening programs.

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Do women who participate in breast cancer screening programs, have a lower risk of dying from breast cancer than women who do not participate? This important question was answered by a study conducted in Sweden. Women who participate in the screening program reduce their risk of dying by 60 % in 10 years and by 47 % in 20 years, compared to those who do not participate (2). Since the breast cancer screening age group in European Union countries is; 50-69, participation rates in the screening program vary between 20.6 % and 83.2 % (3). In U.S.A, 65.6-67.1 % of women, between the ages of 40-69 participate in screening programs (4). However, in order to achieve the predicted benefit of mammography, participation rates of population based mammographic screening must be; 70-75 % according to the European Union quality assurance guide, in breast cancer screening and diagnosis (5). The benefit of campaigns to increase social participation was shown in a recent study; A meta-analysis of randomized controlled trials showed that; a 1 % increase in the participation rate in screening mammography, resulted in a statistically significant 3 % decrease, in the incidence of advanced breast cancer and deaths from breast cancer (6). In the light of this evidence, we can say that; incentive studies carried out in regions where participation in mammography and breast cancer screening programs is low, will be useful in cancer screening, determining the target population, raising awareness and using resources effectively. In this manner, since 2022 in Van province, the project called "healthy women, healthy generations" has been conducted by Van metropolitan municipality and Van provincial health directorate. The professional health team assigned by the Health directorate went to villages and neighborhoods and provided information and training about three important health screenings (cervix cancer, breast cancer and colon cancer). After this training, suitable patients were referred for mammography. In the current study; women who trained and referred to mammography by mentioned project were also analyzed. For an effective breast screening program in Turkey cooperation is required between the Provincial directorate of health, Cancer Early Diagnosis, Screening and Education Center "KETEM", university hospitals, state hospitals and family physicians. The aim of this study is to increase participation, in breast cancer screening programs by increasing communication and coordination between different institutions.

Materials and Methods

Study Population: Women residing in Van province, constitute the main population. Within the framework of the "healthy women, healthy generations" campaign, which has been carried out by Van metropolitan municipality since 2022, professional health teams go to villages and neighborhoods and implement public health education for prevention, screening and early diagnosis on cervical cancer, breast cancer and colon cancer. This study covers a part of women in the mammography age group within the framework of the mentioned campaign (Figure-1). Women aged 40-69, according to the National breast cancer screening guideline, were included in the study. Women in the specified age group who had not had a mammogram before, had not been diagnosed with breast cancer before, and were not pregnant, were included in this study as "eligible women". Women who had any mammogram before and who did not accept or could not undergo clinical breast examination and who did not want to have a mammography were excluded from the study. This study was approved by the Health Sciences University Ethics Committee with decision number 2024/39-11.

Process: The women between the ages of 40 and 69 who educated and encouraged to have mammography during "healthy women and healthy generations" campaign and women who came to the hospital, family medicine centers and KETEM centers during the study time period due to any reason, according to the eligibility criteria were invited to participate in the study. All eligible women were informed about this study and their consent was obtained. Face to face interviews were held in general surgery polyclinics of university hospitals, family physicians' centers and KETEM centers.

Those women referred to the general surgeons for taking medical history and evaluating risk factors and examined for clinical breast examination. All women referred to KETEMs and state hospital or university hospital for mammographic examination free of charge. Two views (mediolateraloblique & craniocaudal) of each breast were examined with digital mammography. Mammograms taken within the scope of the "Healthy Women, Healthy Generations Project" (n=424) were evaluated by the "Ministry of Health Central Report Reading System". Mammograms taken outside the project (n=102) were interpreted by the radiology departments of the hospitals. The mammographic findings were classified according to the Breast

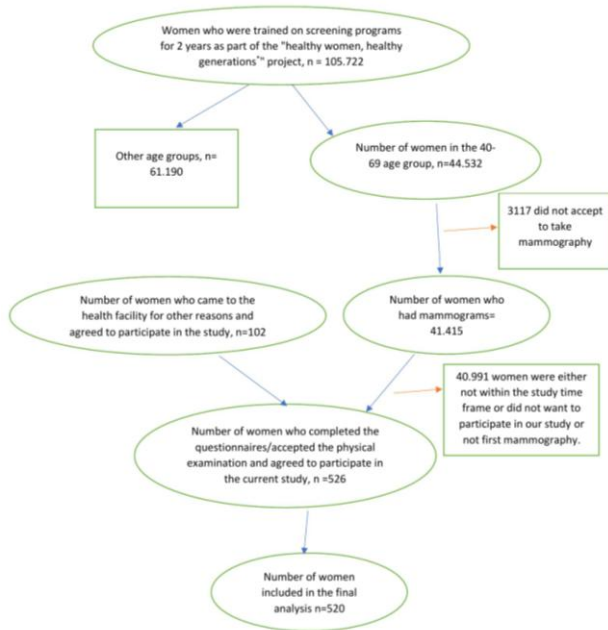


Figure-1: Flow diagram of the study

*Healthy women, healthy generations project is a public health project that has been ongoing since 2022 by Van Metropolitan Municipality and Van Provincial Health Directorate.

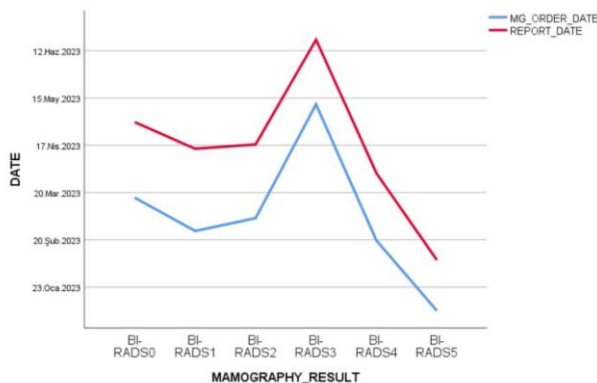


Figure-2: Distribution of mammography order date and report date according to BI-RADS categories. (BI-RADS: Breast imaging-reporting and data system)

Imaging Reporting and Data System (BI-RADS) of the American College of Radiology (ACR). All of the data (mammography rates) are available in the password accessible database of the Ministry of Health, General Directorate of Public Health (7). When the mammography reports finalized, the women were invited back and the report results were evaluated together. In Turkiye, mammography films taken for screening purposes, are reported using the in house reading method within the framework of standards determined by the Ministry of health, General directorate of public health (8). Those whose report results are BI-RADS 0 or BI-RADS 3,4,5 are directed to more experienced centers for further examination.

Study Period: The study was started on 01.01.2023. Patient recruitment ended on 13.11.2023. Analysis of the data started on 01.12.2023. In addition to the demographic data of the participants, the main variables (information in the questionnaire) investigated are as follows; Menopause status, presence of any cancer in the family, presence of breast cancer and/or ovarian cancer in the family, breast-related complaint, breast examination findings, mammography request date, mammography report date, mammography result, ultrasound result if performed, and biopsy result if available.

Menopause was defined as “the time that marks the end of menstrual cycles”. Peri-menopause was the transition phase into menopause that typically manifest with dysregulations in menstrual cycles at an age about forties and fifties. Pre-menopause was the period starts with menarche and stops at onset of peri-menopause.

Statistics: Analyzes were performed using the SPSS package program (IBM SPSS Statistics for Windows Computer software IBM). The Kolmogorov-Simornov test was used to test the normality for continuous variables. Descriptive statistics were given. The main outcomes variable of the study were the attendance rate to mammography screening and “time diagnosis” between the first meeting with the women, referred for mammography, examined by mammography and reports the mammography, the second meeting with the women and organized the follow-up/refer according to the result of mammography.

Results

Our study was conducted in Turkiye/Van. The population of Van Province is 1,127,612 according to the 2023 census. This population consists of 574,993 men and 552,619 women (15). According to Van Provincial Health Directorate data, the number of women (whole population between the ages of 40-69) who needs a mammogram is about 123,162. However, in 2021, the number of mammograms taken for screening purposes is 26,582, for diagnostic purposes (taken in the hospital) 8,166, and the total number of mammograms taken in 1 year is 34,748 (7). While % 21.5 of the target population participates in screening, the total annual mammography rate is % 28.2 (we can estimate that the actual rate is lower since this rate may include women younger than 40 or 70 or older).

Table 1: The Socio-Demographic Characteristics of Participants

Variables	n	%
Age groups		
40-44	148	28,5
45-49	154	29,6
50-54	91	17,5
55-59	52	10,0
60-69	75	14,4
Menopause status (n:470)		
Menopause	200	42,6
Pre-menopause	178	37,9
Peri-menopause	92	19,5
Total births(n:440)		
1-2	36	8,2
3-4	116	26,4
5+	288	65,5
Age at first birth (n:462)		
<=17	111	24,0
18-24	268	58,0
25-34	77	16,7
35+	6	1,3
Age at last birth (n:266)		
<=24	17	8,4
25-34	225	84,6
35+	24	9,0
Marital status (n:488)		
Single	7	1,4
Married	459	94,1
Divorce	22	4,5
Breast cancer history in family (n:491)		
Yes	36	7,3
No	455	92,7
Smoking (n:504)		
Never	342	67,9
Active smoker	109	21,6
Ex-smoker	53	10,5
Total	520	100,0

During the study period, data were successfully collected from 520 women aged 40-69, living in Van (Figure-1). (Of the 526 women whose data were collected, 2 were excluded from the study, because they were younger than 40 years old, and 4 women were older than 70 years old; 520 women were included in the analysis.) The median age was 48,3 years (min:40,0 max:69,6).

The sociodemographic characteristics of women participated in the study are shown in Table-1.

Of the marital status of participants, 94.1% were married. There was a divorce rate of 4.5% in the participants.

Menopause status data of 50 of 520 cases were not included in the analysis because they were not entered in the forms. The remaining (520-50) 470 cases were evaluated. 41.6 % of cases are

Table 2: The Characteristics of Breast Health and Mammography Results of Participants

Variable	n	%
Complaints(symptoms) (n:452)		
No	327	72,3
Yes	125	27,7
Types of symptoms (n:109)		
Pain	89	81,7
Mass	10	9,2
Nipple Discharge	4	3,7
Cysts	3	2,8
Inflammation	1	0,9
Breast swelling	1	0,9
Breast hardness	1	0,9
Signs in Physical examination (n:401)		
Normal	365	91,0
Mass	20	5,0
Mastalgia	9	2,2
Fibrocystic changes	3	0,7
Nipple discharge/Ductal ectasia	3	0,7
Gigantomastia	1	0,2
BI-RADS* category		
0	56	11,5
1	15	3,1
2	402	82,9
3	4	0,8
4	7	1,4
5	1	0,2
Total	485	100,0

*Breast imaging reporting and data system

postmenopausal. The family history on breast cancer was declared as % 7.3. In the population with a median of 5 (range= 17) pregnancies, the age at first birth was a median of 20 (range =32) years old and the last birth age was 34 years old (range=40).

As shown in Table-1, 67.9 % of the women have never smoked. When the age of starting smoking was examined, it was determined that; the age of starting smoking was around 18-20. Characteristics of the participants' breast health and mammography report results are shown in the Table-2. The complaint of 81.7 % of women with breast complaints (n=109) was, breast pain. The findings of 91 % of the women who underwent clinical breast examination by their responsible doctor (family physician or surgeon)

(n=401) were evaluated as normal. A palpable mass was detected in 5 % of the women.

The dates of getting mammogram and reporting the results, which is the one of the main purposes of the study, are given in the Figure 2. It was found that mammography was reported a median of 50 (min.=5, max.=60) days after mammography was performed. When those mammography reports were evaluated, as seen in Table 2; most (82,9 %) of the cases are BI-RADS 2. One case was BI-RADS 5.

Women whose mammography results were suspicious or needed further evaluation (BI-RADS 0, 4 and 5) (n: 64) were referred to a higher medical center for further examination. And biopsy decision had been made for 4 women. One of these 4 women had diagnosed as "invasive ductal carcinoma", 2 of them were evaluated as

fibrocystic changes and 1 were evaluated as the fibroepithelial lesion containing sclerosing areas.

The patient with Invasive Ductal Carcinoma (Left breast, outer quadrant, tumor diameter was 12 mm, ER 90 % +, PR 80 % +, HER2 negative, Ki67 10 %) underwent breast-conserving surgery and was subsequently referred to adjuvant treatment.

Discussion

The most common type of cancer in the female population is breast cancer. According to GLOBOCAN 2020 statistics; approximately 2 million 261 thousand 419 new breast cancer cases are observed annually worldwide, and approximately 685 thousand of all cancer deaths are due to breast cancer (9). It has been reported that; breast cancer has been increasing worldwide since the 1990s, when cancer records were kept regularly, until today. Although it is known that the frequency of breast cancer varies according to geographical regions, it is reported that; this increase occurs in all geographical regions (10). Also it is reported that; the annual increase is 1.44 % worldwide and there is a 0.23 % increase in mortality (8).

We know that the best way to protect against this frightening mortality and increasing incidence of breast cancer is; early diagnosis through screening programs. Mammography was accepted as an effective screening method in many studies conducted in the following years, although a Cochrane review in 2001 (10) reported that; national screening with mammography was not an effective method as a historical research, (12-13). Almost all countries conduct national screening programs with mammography. Since low participation reduces the effectiveness of the mammography screening program, some countries have suggested awareness raising campaigns should be carried out and that mammography should be encouraged (5). It is reported that 70-75% of the female population of mammography age must participate in the screening program to be effective (5). Unfortunately, a country with community-based participation at these rates has not yet been reported. Even in Europe and America, participation rates vary widely (3,4). In the incentive strategy study to participate in the mammography screening program conducted in Quebec, Canada; It was stated that the target population was 684,028 and it was reported that the number of participants who get mammography upon invitation (by letter)

increased by approximately 30 % (14). Bonfill X et al. recommended a 70 % participation rate for an effective screening program. The study, which compared different strategies to increase the participation of target groups of women in the screening program, suggests the following: Whichever method is chosen, such as letter, telephone, home visit, or educational documentation, participation is better than doing nothing (16). Within the scope of the healthy women healthy generations project, which was started 2 years ago and is still ongoing out of 44.732 women in 40-69 age group, 41.415 women had mammography. This means the participation rate was 93.3 %. This rate is higher than many reported rates. Although our study was conducted on a small proportion of mentioned campaign from the information and experience we have gained, we can say that; providing transportation to health institutions from rural areas by vehicle and directing people towards health services is effective. Women who come to hospital or their family physician for other reasons are more likely to participate in recommended breast screening than women who are not in hospital. As a result, we can say that women view such awareness and promotion activities positively. Another important point is the time, between the mammography performed date and the report date. According to WHO, treatment should be started within 3 months after breast cancer is diagnosed (17). Diagnosis (mammography + biopsy+ pathology) should be completed within 2 months at the latest (17). According to our data, it takes approximately 50 days for mammograms to be reported. Depending on the pathology result, this period may exceed 2 months. We recommend that; mammography and pathology reports should be accelerated a little more.

The important weaknesses of this study are;

- 1- A sample representative of the general population could not be created.
- 2- It is not a completely community-based study.
- 3- There is a lack of long-term follow-up to assess efficacy.

Mammography screening of 520 women was completed. One of these women, who had her first mammogram, was diagnosed with breast cancer. The first mammogram is taken approximately 8 years after the mammography screening age of 40. We found that birth rates were high and the age at first birth was around 20. While approximately 11 % of mammography results show BI-RADS 0, BI-RADS 2 is most

common. The reporting process exceeds 1 month. Despite the small number of sample, we observed that mammography was effective and diagnosed 1 patient early. Consistent with the literature, we think that; such mammography awareness and promotion studies are effective and should be done on a community basis.

Conflict of interest: None

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