Anxiety and Pain Level Associated with Mammography and the Impact of the Preexistence of Knowledge

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Abstract Background: Breast cancer is the most common type of cancer in women, after skin cancer. Early detection and treatment are recommended for reducing mortality and suffering. However, screening behaviors are often avoided for many reasons, such as anxiety and stress. Mammography screening is the main recommended test for the early detection of breast cancer. The objective of this study was to assess the knowledge, level of pain, and stress in women during the early screening of breast cancer with a mammogram. Materials and methods: This study has been approved by the Local Research Ethics Committee. The study was conducted at Hafr Elbatin Central Hospital in Saudi Arabia among 100 women. Data were collected via a structured interview questionnaire before and immediately after the mammography procedure. The questionnaire consisted of three parts: (1) sociodemographic data and knowledge about the mammogram examination, (2) pain scale, and (3) anxiety scale. Data were entered and analyzed using SPSS version 25. Results: A total of 75% (n=75) of the women reported moderate to severe pain during the mammogram examination. Up to 57% (n=57) of the women expressed severe anxiety about the mammogram procedure. Most of the women -85% (n=85)- were found to have poor knowledge related to mammograms and mammogram preparation. There was a strong correlation between pain before and during the mammogram procedure, P-Value (0.00001*) with Chi-squared (33.40) and a highly significant correlation between satisfactory and unsatisfactory knowledge in women's P -Value (0.00001*) with z test (6.57). A poor knowledge about breast cancer was detected in the overall studied women and those who had never undergone mammography, particularly knowledge related to the risk factors for breast cancer. The most important predictors of the barriers to mammography were incorrect beliefs about mammography and its procedures. Conclusion: Pain expectations can be approached in various ways to make the mammography experience much more tolerable for women, thereby encouraging them to attend and return for their scans. It was determined that women who had mammography had a moderate level of anxiety.

Keywords: mammography, breast cancer, pain, anxiety

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1. Introduction

Breast cancer is the most common type of cancer in women, after skin cancer. Breast cancer is also the second leading cause of death from cancer in women, following lung cancer [1]. In previous studies conducted in the US, it was predicted that approximately one in every eight women will be diagnosed with breast cancer in their lives and that one in every 30 women will die from breast cancer [2,3]. As with many other types of cancer, when breast cancer is found at an early stage during a commonly used screening for lumps, when it is small and has not yet spread, there is an increase in survival and a decrease in mortality.

Illness is a source of stress, whatever one’s age. Everyone who has a health problem experiences anxiety, which is a normal response to facing danger. Anyone who comes to a health care facility with a health problem may be anxious for many reasons, such as being in an unfamiliar environment, having to interact with strangers, having health care personnel speak using medical terminology, and seeking diagnosis and a cure [4].

Mammography remains the most successful widely performed standard breast cancer screening method in Japan and Western countries. In mammography, after the papillary glands are adequately stretched, the breast is compressed with a radiolucent paddle for fixation and a reduction in thickness. In examinees undergoing mammography, not only breast compression but also fixation with the neck being rotated or the shoulder being...
flexed is necessary. These imaging techniques reduce X-ray exposure and ensure the image quality necessary for diagnosis [5].

Undergoing certain diagnostic procedures, such as mammography, may cause some people to think about serious results and increase their anxiety. It has been shown that women who had recently felt tense and nervous or who feared a breast cancer diagnosis had higher anxiety levels. Mammography is the most reliable method for diagnosing breast cancer. When used alone, its reliability is 90%; when used with a clinical examination, its reliability is 95%. It can be used to diagnose breast cancer at an early stage. The American Medical Center recommends that women with no symptoms have their first mammogram at the age of 40 (earlier if they have a positive family history for cancer) and that they have a mammogram once every one to two years (per the physician's recommendation) between the ages of 40 and 50, and then once a year after age 50 [6,7]. Factors associated with screening mammography use are multiple and complex.

The time from an abnormal screening mammogram to definitive diagnosis causes anxiety and distress for women which may last for months [8]. Lengthy delays in diagnosis have been reported. For those subsequently diagnosed with cancer, this initial period of distress may create difficulty in terms of trust and confidence in the health care system. For the remainder, it may deter further screening compliance. Although identified as a significant concern, few studies have assessed the anxiety associated with the process from screening to definitive diagnosis.

One of the key reasons for patients’ anxiety is a lack of knowledge about the method and how it diagnoses illness. To prevent patients from worrying unnecessarily, it is essential to inform those patients about diagnostic procedures. Anxiety has been determined to be a common problem in all types of medical diagnosis, treatment, and care [9]. Although it is known that patients have the right to be informed about diagnostic procedures and treatment modalities, education is often ignored. It is important to inform patients to reduce their anxiety level and prevent them from developing negative defenses [10]. For this reason, when patients are prepared for special procedures like mammography, it is important to determine their anxiety level and influential factors.

Women's breast cancer screening practices are influenced by certain factors that may act as barriers. To promote screening, these factors must be studied further [11]. Breast cancer mammographic examination experiences greatly influence women’s attitudes toward their future mammography appointments and, thus, their attendance. Numerous female patients complain of pain while going through their mammography examination. Several studies have been conducted to address pain as a limiting factor for mammography appointment participation. Scaf-Klomp et al. [12] report that 55% of the women participating in mammography screening procedures complain about pain.

Mammographic screening continues to provoke intense debate, with some authors arguing that mortality reductions are small and that the benefits are largely outweighed by so-called over-diagnosis [13]. However, even the strongest detractors agree that mammographic screening reduces breast cancer mortality to some degree in those who attend. A comprehensive recent review has supported the continuation of the breast screening program in the UK. It has been suggested that uptake is the most important factor in determining the success of a screening program. In breast screening, overall participation rates are affected by a wide range of factors, including psychological and socio-economic factors [14]. Repeat participation has been studied less often than initial uptake but client experience is one of the factors affecting re-attendance.

The current study aims to:

This study aims to assess the pain and anxiety level in women undergoing mammogram investigation. This study also aims to investigate whether pre-existing knowledge about mammograms has an impact on pain and anxiety.

Hypothesis

H1: Assess the level of pain that women reported immediately before and following the procedure.
H2: Determine whether pain was the most stressful part of the process of obtaining a mammogram.
H3: Assess the anxiety level before the mammogram and the relation of mammogram knowledge.

2. Materials and Methods

2.1. Setting

This prospective study was conducted in the Central Hospital Clinic and Mammography Unit Hafr Elbatin.

2.2. Subjects

All women admitted to the study settings during the time of data collection (three months) from October 2019 to December 2019 were invited to participate in the study.

2.3. Data Collection Tools and Procedures

A- Study tools:

The following tools were used to collect data

Tool 1: A structured interview with the women, divided into three parts.

The first part included socio-demographic characteristics to be completed by the women. The eight items of this part were: (1) age, (2) occupation, (3) educational level, (4) marital status, (5) number of children, (6) menstruation status, (7) number of prior mammogram(s), and (8) level of pain felt during mammography.

The second part included knowledge related to mammogram preparation (9).

The third part of the questionnaire was completed by the principal investigator after having reviewed the report of the mammograms. Three items were included: (10) breast composition, (11) presence of cysts and/or solid nodules, and (12) final assessment according to breast.

Tool 2: Level of pain was measured using an ordinal pain scale. There were five levels: no pain, slight pain, moderate pain, substantial pain, and severe pain that required cessation of compression. Breast composition
was classified as either “dense breast”, which includes extremely dense and heterogeneous dense breasts, or “non-dense breast”, which includes scattered fibro glandular densities and almost entirely fatty tissue.

**Tool 3:** Anxiety level scale (the questions in this scale ask women about their feelings and thoughts during the mammogram by requiring them to circle how often they felt or thought a certain way: 0=Never, 1=Almost Never, 2=Sometimes, 3=Fairly Often, and 4=Very Often).

**2.4. Operational Design**

The operational design included the preparatory phase, content validity, the pilot study, and fieldwork.

**A. Preparatory phase:**

This included a review of relevant studies and theoretical knowledge of various aspects of the study problem using textbooks, articles, medical websites, periodicals, and magazines concerned with the topic of breast cancer and mammogram. These were available in PubMed, Ovid, and Cochrane library.

**B. Pilot study:**

A pilot study was carried out to test the study tools' clarity, applicability, objectivity, and feasibility. To achieve this, the tools were tested on 10% of the participants.

**2.5. Statistical Design**

- The collected data were coded and analysed using the Statistical Package for Social Sciences (SPSS version 25).
- Tabulated frequencies and percentages were calculated.
- The level of significance selected for this study was P-value ≤ 0.05.

**3. Results**

This Table 1 shows that (42%) of studied women are aged between (45-54) and that (76%) of them are married, (46%) have a middle school education, and (81%) are non-working. The table also shows that most of the studied women have irregular menstruation; (39%) experience menstruation that lasts less than three days, while (42%) have a normal amount. Meanwhile, (79%) have five or six children and (86%) breastfeed for less than six months.

| Sociodemographic data | No. (100) | %  |
|-----------------------|-----------|----|
| Age                   |           |    |
| 25 to 44 Years        | 27        | 27%|
| 45 to 54              | 42        | 42%|
| 55 years or more      | 31        | 31%|
| Minimum               | 25.00     |    |
| Maximum               | 70.00     |    |
| Mean ± SD             | 49.64±8.51| years|
| Marital status        |           |    |
| Married               | 76        | 76%|
| Divorced              | 12        | 12%|
| Widow                 | 12        | 12%|
| Education             |           |    |
| Elementary School     | 20        | 20%|
| Middle School         | 46        | 46%|
| Technical school      | 20        | 20%|
| High School           | 11        | 11%|
| University            | 3         | 3% |
| Occupation            |           |    |
| Working               | 19        | 19%|
| Non-working           | 81        | 81%|
| Obstetrical and breastfeeding history | | |
| Status of menstruation|           |    |
| Regular               | 31        | 31%|
| Irregular             | 69        | 69%|
| Duration of menstruation (days) | | |
| Less than 3 days      | 39        | 39%|
| 3 to less than 6 days | 37        | 37%|
| 6 days and more       | 24        | 24%|
| Amount of menses      |           |    |
| Normal                | 42        | 42%|
| Low                   | 24        | 24%|
| Heavy                 | 34        | 34%|
| No of children        |           |    |
| 1-2                   | 7         | 7% |
| 3-4                   | 14        | 14%|
| 5-6                   | 79        | 79%|
| Duration of breastfeeding |        |    |
| Less than 6 months    | 86        | 86%|
| 6 months to less than 12 months | 3 | 3% | |
| 12-18 month           | 1         | 1% |
| 18-24 months          | 10        | 10%|

**Table 2. Distribution of the Studied Women According to Their Knowledge About the Mammogram Procedure**

| Women Knowledge related to Mammogram procedure | Incorrect answers | Correct answers | Doesn’t Know |
|-----------------------------------------------|-------------------|-----------------|--------------|
| Have you ever heard about a screening called mammography | 42 | 35 | 23 | 23% |
| Mammography is a way to find out if there is a problem in the breasts or not | 41 | 25 | 34 | 34% |
| Do you think with this examination, women can prevent breast cancer | 32 | 18 | 50 | 50% |
| Is the examination only important for women over 50 years of age | 24 | 16 | 60 | 60% |
| Is screening important only for women who have had breast cancer in the family? | 27 | 16 | 57 | 57% |
| Do you think this is an important test to be conducted brigade experienced by the doctor or the woman herself | 27 | 14 | 59 | 59% |
| Do you think that mammography puts a woman's breast in an x-ray machine, where the breast is compressed, then the doctor makes the picture | 28 | 13 | 59 | 59% |
This Table 2 shows participants’ knowledge regarding mammogram.

**Table 3. Total Knowledge Score and Association Between Women’s Knowledge Regarding the Mammogram Procedure**

| Knowledge Score regarding Mammogram | NO (100) | %  | Test of significance |
|-------------------------------------|----------|----|----------------------|
| Satisfactory                        | 15       | 15%| Z: 6.57              |
| Unsatisfactory                      | 85       | 85%| P: 0.00000*          |

* Significance at P-value ≤0.05, P < 0.001 HS.

Table 3 shows that most of the participants unsatisfactory knowledge regarding mammography. Table 4 shows that (50%) of the participants had undergone a mammogram for the first time, (35%) had mild pain before the mammogram, (77%) have abnormal breast formation (i.e., (25%) have a mass while (61%) have a cyst or tumors), and (57%) had a positive breast evaluation.

This Table 5 shows that 38% and 37% of the participants experienced severe to moderate pain during mammography respectively.

This Table 6 shows that (19) of the studied women who had moderate pain ranged in age from 45-54 years; (24%) of women with severe pain during mammograms had a positive assessment.

Table 7 shows that (18%) of the women had moderate pain before and during mammograms.

Table 8 shows the anxiety levels among women.

Table 9 shows the correlation between the level of anxiety and sociodemographic data; (42%) of studied women between the ages of (45-54) are more anxious, while (46%) of the middle-school-educated women have an anxiety level of 50.22±5.91. Meanwhile, (81%) of non-working women have an anxiety level of 49.41±5.54, while (69%) of studied women have irregular menstruation and an anxiety level with mean and SD of 49.49±6.38.

Table 10 shows that (57%) of studied women with a positive assessment have an anxiety level of 49.47 and that (35%) of women have mild pain before mammogram with an anxiety scale mean of 49.21. Meanwhile, (85%) of women have unsatisfactory knowledge, with a mean SD of 49.50±6.00 for the anxious condition.

**Table 4. Distribution of the Studied Women According to Their Breast Examination Findings**

| Breast examination findings                  | No. (100) | %  |
|----------------------------------------------|-----------|----|
| number of prior Mammograms                   |           |    |
| Once                                         | 50        | 50.0%|
| Twice                                        | 26        | 26.0%|
| Three times or more                          | 24        | 24.0%|
| Pain level before the Mammogram procedure    |           |    |
| No pain                                      | 19        | 19% |
| Mild pain                                    | 35        | 35% |
| Moderate pain                                | 29        | 29% |
| Severe pain                                  | 17        | 17% |
| Breast formation                             |           |    |
| Normal breast                                | 23        | 23% |
| Abnormal breast                              | 77        | 77% |
| benign LN                                    | 5         | 5%  |
| breast lamp                                  | 3         | 3%  |
| Cyst                                         | 3         | 3%  |
| Moderately fibro glandular                   | 10        | 10% |
| cystic lesion                                | 17        | 17% |
| Mass                                         | 25        | 25% |
| intramammary LN                              | 2         | 2%  |
| RT mammillary13mm, 7mm lymphadenopathy       | 1         | 1%  |
| microcalcification                           | 2         | 2%  |
| focal lesion                                 | 1         | 1%  |
| Duct ectasia                                 | 2         | 2%  |
| oval cyst                                     | 2         | 2%  |
| microcalcification                           | 3         | 3%  |
| multiple cysts                               | 1         | 1%  |
| Presence of cysts or tumors                  |           |    |
| No                                           | 39        | 39% |
| Yes                                          | 61        | 61% |
| Final breast evaluation                      |           |    |
| Negative                                     | 43        | 43% |
| Positive                                     | 57        | 57% |

**Table 5. Distribution of the Studied Women According to Their Numeric Rating Scale of Pain During the Mammogram Procedure**

| Numeric rating scale of pain       | No. (100) | %  |
|------------------------------------|-----------|----|
| No pain                            | 0         | 0% |
| Mild Pain Levels                   |           |    |
| Pain Level 1 Very Mild             | 25        | 25%|
| Pain Level 2 Discomforting         |           |    |
| Pain Level 3 Tolerable             |           |    |
| Moderate Pain Levels               |           |    |
| Pain Level 4 Distressing           | 37        | 37%|
| Pain Level 5 Very Distressing      |           |    |
| Pain Level 6 Intense Pain          |           |    |
| Severe Pain Levels                 |           |    |
| Pain Level 7 Very Intense Pain     | 38        | 38%|
| Pain Level 8 Horrible Pain         |           |    |
| Pain Level 9 Excruciating           |           |    |
| Pain Level 10 Unimaginable Pain    |           |    |
Table 6. Relation of Pain Level Scale and Age With the Final Assessment

| Pain Level Scale | Age Groups                  | Chi-squared | P-Value |
|------------------|-----------------------------|-------------|---------|
|                  | 25 to 44 years              |             |         |
| Mild             | 5                           | 8           | 12      |
| Moderate         | 9                           | 19          | 9       |
| Severe           | 13                          | 15          | 10      |
|                  | 45 to 54 years              |             |         |
| Mild             | 4                           | 15          | 5       |
| Moderate         | 17                          | 15          | 2       |
| Severe           | 14                          | 17          | 4       |
|                  | 55 years or more             |             |         |
| Mild             | 8                           |             |         |
| Moderate         | 13                          |             |         |
| Severe           | 14                          |             |         |

Table 7. Relation of Pain Level Before and the Pain Level Scale During Mammogram

| Pain Level Scale | No pain | Mild | Moderate | Sever |
|------------------|---------|------|----------|-------|
| Mild             | 6       | 13   | 5        | 1     |
| Moderate         | 2       | 15   | 18       | 2     |
| Sever            | 11      | 7    | 6        | 14    |

Table 8. Distribution of the Studied Women According to Their Anxiety Level Assessment Scale

| Anxiety Level Assessment Scale | Level of women’s anxiety (n.100) | Level of women’s anxiety (n.100) |
|--------------------------------|----------------------------------|----------------------------------|
|                                | Never anxious | Rarely anxious | Sometimes anxious | Fairly Often anxious | Very Often anxious | Total |
| 1-In the last month, how often have you been upset because of something that happened unexpectedly? | 8 | 8.0% | 38 | 38% | 28 | 28% | 22 | 22% | 4 | 4% | Slightly Anxious | 43 |
| 2-In the last month, how often have you felt that you were unable to control the important things in your life? | 7 | 7% | 36 | 36% | 31 | 31% | 23 | 23% | 3 | 3% | Very Anxious | 57 |
| 3-In the last month, how often have you felt nervous and “Anxiety”? | 6 | 6% | 31 | 31% | 28 | 28% | 26 | 26% | 9 | 9% | Maximum | 72.5 |

Table 9. Correlation Between Anxiety Level Assessment Scale and Sociodemographic Data

| Sociodemographic data | Anxiety level mean percent ± SD | Test of significance | P-Value |
|-----------------------|---------------------------------|----------------------|---------|
| Age                   | F                               | P                    |
| 25 to 44 Years        | 27                              | 49.17± 5.19          | F:0.34  |
| 45 to 54              | 42                              | 50.12 ± 6.00         | P: 0.71478 P > 0.05 NS |
| 55 years or more      | 31                              | 49.11± 6.34          | P        |
| Education             | F                               | P                    |
| Elementary School     | 20                              | 48.38±4.00           | 1.62    |
| Middle school         | 46                              | 50.22±5.91           | 0.18914 |
| Technical school      | 20                              | 50.88±7.40           |         |
| High school or university | 14                           | 47.14±4.99           |         |
| Occupation            | T                               | P                    |
| Working               | 19                              | 50.13±7.24           | 0.48    |
| Non-working           | 81                              | 49.41±5.54           | 0.63341 |
| Obstetrical history   | t                               | p                    |
| Status of menstruation | mean percent ± SD              |                      |         |
| Regular               | 31                              | 49.68±4.60           | 0.15    |
| Irregular             | 69                              | 49.49±6.38           | 0.88508 |

P-value of ANOVA test F: ANOVA test, * Significance at P-value ≤0.05.
Mammography is an ideal method of providing regular screening for the early diagnosis of breast cancer. The most effective way to decrease mortality from breast cancer is through early diagnosis. Mammography is not the most successful imaging technique for the early diagnosis of breast cancer but it is cheap, easy to perform, and readily available [6].

The current study was conducted to assess the pain and anxiety levels in women who were undergoing a mammogram. It also aimed to investigate whether pre-existing knowledge about mammograms has an impact on pain and anxiety. We showed low knowledge about the mammogram procedure and moderate to severe pre-existing knowledge about mammograms has an impact on the studied women being very anxious.

This study showed that less than half of the studied women in age between 45 to 54 years. Most of them were married, while less than half of the middle school education. Most of the studied women were non-working. In terms of obstetric history, over half had irregular menstruation, while less than half had the normal amount. Finally, most of them breastfeed for less than six months. These results align with those of Keemers et al. [19], who reported that, in terms of an individual's knowledge about mammographic screening benefits in the age group from 40 to 49 years. However, there is evidence that the balance between possible benefits and damages is more unfavorable in the age group from 50 to 69 years.

The deficient knowledge among the studied women may stem from the fact that most of them have a middle school education. Moreover, regarding the women's knowledge in the present study, most of them had unsatisfactory knowledge about mammogram procedures and this is expected because of their level of education. There was a highly significant difference between satisfactory and unsatisfactory knowledge in the present study, most of the study subjects were found to have good knowledge. The current study showed that barriers against the implementation of mammographic procedures in women were related to a lack of knowledge about these methods. Level of education and lack of adequate information about mammogram screening, as well as symptoms of breast cancer, may result in late diagnosis. Health care providers play a key role in increasing breast cancer early detection rates through early diagnosis with mammogram screens.

In over 77% of the studied women, the screening mammograms detected abnormal breast findings. Half of the women were undergoing a mammogram procedure for the first time, while less than half had mild pain before the procedure. Also, over half had a cyst and positive final breast assessment. These findings were similar to Liberman and Menell [18], who reported that the ratio between benign lesions and malignant neoplasms in surgical biopsies of palpable lesions was over three times greater than the internationally adopted pattern (≤2). This indicator, together with the positive predictive value, seems to suggest the existence of an excessively elevated number of false-positive results in the screening.

Pain expectation can be approached in various ways to make the mammography experience much more tolerable for women and to encourage them to attend their scans. One method could be the psychological approach, to be carried out by the screening staff. Time can be taken to speak to the patient, informing her fully and correctly about the procedure while addressing any of her questions and concerns [11].

In our study, 35% of the women expected to experience mild to moderate pain before going in for the scan. Post-mammography, 38% of the women reported experiencing severe pain. There was a highly significant difference in the mean scores for pain before and after the mammogram (p<0.005). If women continue to face pain during their mammography scans, this result was in the same line as that of Keemers et al [19]. Who reported that pain is associated with mammogram examinations and hence some of the participants to abstain from the examination?

The presence of pain during mammogram examination might reduce women's likelihood of attending their upcoming exams. To boost the chances that women will return for a future mammography examination and to optimize the procedure experience itself, it is of great benefit to minimize pain risks. Previous breast procedures also had a significant impact on women's pain perception of mammography. To obtain adequate images of the
breast tissue of women who have been diagnosed with breast cancer and who have undergone procedures, repeated increased compression studies are required. Ongoing breast pain in breast cancer survivors can influence more mammography-related pain, and 88% experienced pain [20].

The time from an abnormal screening to definitive diagnosis causes anxiety and distress for women which may last for months. For those subsequently diagnosed with cancer, this initial period of distress may create difficulty with trust and confidence in the health care system; for the remainder, it may deter further screening compliance [21].

In this study, over half of the studied women experienced severe anxiety during the mammogram procedure, with mean: SD49.55±5.86. The inclusion of both qualitative methods in analyzing focus group data and quantitative methods in analyzing data revealed differences in the interpretation of women's experiences and satisfaction with the diagnostic process. Responses to the survey questionnaire indicated easily accessible and reasonably clear information about the diagnostic process and high satisfaction. This result aligns with that of Brunton et al. [22] who reported that the level of anxiety about mammography screening was found to be higher in women with low education levels.

The number of mammograms done increased, the anxiety level increased. This difference was found to be statistically significant. The reason for this may stem from the notion that, because the physicians recommended that women have regular mammography screenings, the women thought there was a suspicion of cancer [22,23].

From the results of this study, it has been determined that women undergoing mammography have a moderate level of anxiety. Statistically, no significant differences were found for age, education level, occupation, obstetrical history, information resources, knowledge about the illnesses that mammography detects, and number of mammograms.

One of the important reasons for women's anxiety is a lack of knowledge about the method and how it diagnoses the illness. [24], pointed out that it is necessary to inform women about diagnostic procedures to prevent women from worrying unnecessarily. Anxiety has been determined to be a common problem in all kinds of medical diagnosis and treatment. Although it is known that women have the right to be informed about diagnostic procedures, education is often ignored. It is important to provide information to women so as to reduce their anxiety and prevent them from developing negative defenses. For this reason, when women are prepared for special procedures like mammography, it is important to determine their anxiety level and influential factors.

This study showed a strong relationship between anxiety and final assessment and positive cases, with 49.47±5.17. This result aligns with that of Hafsulund [25].

The literature has reported that women feel anxious about mammography due to a fear of cancer and the pain experienced during the procedure. Women are not willing to undergo mammography again because they experienced pain and anxiety during their first mammogram. The present study showed that less than half of studied women had mild pain before mammogram, with a mean of ±5.48, and were severely anxious. Most of the women noted that they would have a mammogram again, while the rest did not want to have a mammogram due to pain. The women were allowed to control the compression of their breasts during mammography and felt moderate pain. It has been emphasized that self-control over a painful procedure helps women adapt to pain more easily and feel less pain.

A painful experience during a mammography exam is of special importance and should be further considered, as a mammogram is an essential element of the success of early breast cancer prevention campaigns. There was no statistically significant relationship between the anxiety and pain levels during the mammogram. This result aligns with that of Mandelblatt and Yabroff [6] who reported no statistically significant relationship between anxiety and pain levels.

This study showed no significant relationship between anxiety and women's knowledge (49.50±6.00), although most of the studied women had unsatisfactory knowledge. The current study showed that barriers to the implementation of breast cancer screening methods in women were related to a lack of knowledge about these methods. This result is the same as that of Smith et al. [2], who reported that the most important barriers to obtaining screening mammography were a lack of information about breast cancer and a low level of education. They also stated that a lack of knowledge about breast cancer was the main reason why women did not obtain mammograms.

It can be concluded that women feel anxiety and severe pain concerning mammography and that unsatisfactory knowledge about mammography may contribute to their feelings. It might be useful to conduct educational sessions for each woman who is supposed to undergo mammogram examination.

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