Original Article

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Influence of Discomfort Tolerance of Women who Undergo Mammography on the Perceived Pain Intensity Due to the Procedure

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ABSTRACT

Objective: This study aims to determine the capacity to tolerate discomfort by women who undergo mammography.

Materials and Methods: The data were obtained using the face-to-face interview method immediately after the procedure with women who undergo mammography (n=132). Demographic data collection form and the Discomfort Intolerance Scale was used for data collection.

Results: Among the women, 78.8% experienced pain during mammography and the pain intensity was determined as 3.55 (standard deviation=3.00) on the 0-10 Visual Analogue Scale. Women who were not on pain relievers and nonsmokers have high discomfort tolerance. Women who were consuming substances containing methylxanthine (eg. chocolate) tend to avoid discomfort. Women with a history of breast mass and abnormal test results did not avoid discomfort as much as women who undergo regular checkup mammograms. Most of the women experience pain during mammography, and avoidance from discomfort increases as the perceived pain during the procedure increases.

Conclusion: Conducting different studies using the same scale can be useful in evaluating the discomfort experienced during mammography and its contribution to reducing pain.

Keywords: Pain, Discomfort Intolerance Scale, mammography

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Introduction

Cancer is the most frightening disease that causes mortality worldwide (1, 2). The most effective way to decrease the mortality rate is early diagnosis and treatment. American Cancer Society estimates 279,100 new breast cancer cases in 2020, and 42,690 of them are predicted to die due to breast cancer. Diagnosis of breast cancer includes a physical exam done by a physician as well as mammography (3, 4), and it is a reliable diagnosis method used all over the world (5-7). In mammography, breast radiography is obtained using a low dose of radioactive rays. With this procedure, early diagnosis and treatment are possible by detecting the structures that can turn into breast cancer years later (3). Recently, 3-dimensional (3D) mammography has become more popular in achieving better results. In medical imaging methods, the ability to detect pathological conditions depends on the image quality. Compression (pressure) is applied to the breast tissue in mammography to achieve this quality. This compression causes both pain and discomfort in the individuals (5, 8). Additionally, reasons such as the compressor material's being cold, claustrophobia in those who undergo mammography, lack of empathy of healthcare staff, not giving information about the procedure, prolongation of the reporting process cause patients to postpone having a mammography. Negative experiences encountered during mammography affect the patients' compliance, satisfaction, and comfort levels (9). Even the possibility of negative outcomes of mammography impress women's pain and satisfaction from mammography. Feeling of embarrassment and discomfort during the procedure could result in unpleasant perceptions toward this procedure (10). Whelehan et al. (11) reported that 3%-46% of British women did not comply with control mammography, due to previous pain and discomfort they experienced. Pain felt during a mammography is not only limited to the breast, it also could extend to the axilla as well (12). The women's ethnicity, breast density, previous biopsy experience, and psychological factors are causative factors of discomfort during mammography (9). Breast implants also trigger the pain and anxiety of women during the procedure (13).

A study published in the Cochrane database revealed that education is given to patients before mammography may decrease discomfort and pain felt during the procedure. Although using a breast pad decreases discomfort and paracetamol application is not effective (14). Freitas-Junior et al. (5) found that a capsule form of paracetamol given before the mammography procedure is effective in reducing moderate pain. Various studies have examined the effects of administering lidocaine (15), using Mammopad, Bedford, and mattresses (7, 10, 14, 16, 17), and reducing the

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compression force applied during mammography on reducing pain and discomfort due to mammography (7, 17, 18-21). This study aims to assess the effect of the capacity to tolerate discomfort on the pain felt by women undergo mammography.

Materials and Methods

Design

This study was conducted with 132 women who had mammography at the Radiology Department of a University Hospital between February and April 2017 (for three months).

Participants and settings

A total of 225 patients were registered to have mammography for 3 months. Raousoft sample size calculator was used to calculate the sample size. With 90% reliability and 5%, the error margin sample size was calculated as 124 patients.

Measurements

The data were obtained using the demographic data form developed by researchers according to relevant literature and the Discomfort Intolerance Scale (7 items) which was adapted to Turkish by Özdel et al. (22). The Discomfort Intolerance Scale (DIS) was originally developed by Schmidt et al. (23) to measure the personal differences to tolerate discomforting sensations. This scale has two dimensions named discomfort intolerance (DI-DI) and discomfort avoidance (DI-DA). Split-half test reliability was 0.710 in the Turkish form of scale (DI-DI measures the capacity to tolerate physical sensations while DI-DA measures the level of avoidance from physical sensations). Each item of the scale includes Likert type options numbered from 0 to 6 defined as; 0= not at all like me to 6= extremely like me (22, 23). The total score that can be obtained from the scale ranges from 0 to 42. The lower scores describe a decline in the person's capacity to tolerate discomforting bodily sensations (22).

Data collection procedure

Data were collected by the researchers using face-to-face interview methods with patients who volunteered to participate in the study after mammography. Each interview took 10-15 minutes.

Ethical consideration

Ethical committee approval was obtained from the Bursa Uludağ University (decision no: 2016-19/6) and institutional approval was obtained from the hospital where the study was going to be conducted The patients were informed that participation is voluntary, and they can leave the study whenever they want, then their verbal and written approvals were obtained.

Data analysis

Data analysis was done by SPSS. Normality analysis was done using the Shapiro-Wilk test. Data were presented in numbers, percentages, means, and SD. T-test, One-Way ANOVA, and Pearson correlation was used for statistical analysis.

Results

Table 1 shows the descriptive characteristics of patients who undergo mammography. The mean age of the patients was 55.62 [standard deviation (SD) =9.83] and their Body Mass Index (BMI) was calculated as 29.62 (SD=6.05). More than half of the participants (52.2%) were primary school graduates. The rate of undergoing mammography

Table 1. Descriptive features of patients

Descriptive variables	Mean ± SD	
Age (years)	55.62±9.83	
Body Mass Index (BMI)	29.62±6.05	
Bra size	81.56±27.80	
Age of menopause (years)	39.02±18.16	-
Pain during mammography (VAS 0-10)	3.55±3.00	
	n	**%**
Marital status		
Single	26	19.7
Married	106	80.3
Education level		
Elementary school graduate + able to read and write	69	52.2
Secondary school + high school	37	28.0
University	26	19.8
Financial status		
Good	18	13.6
Fair	105	79.5
Bad	9	6.8
Place of living		
City	121	61.4
Town + country	11	38.6
Profession		
Salaried employee	7	5.3
Housewife	43	32.6
Retired	82	62.1
Health coverage		
Available	132	100
Health behaviors		
Cigarette smoking		
Yes	19	14.4
No	113	85.6
Consuming chocolate		
Yes	31	23.5
No	101	76.5
Drinking tea		
Yes	124	93.9
No	8	6.1
Drinking coffea		
Yes	66	50.0
No	66	50.0
Taking pain relievers whenever pain persists		
Yes	20	15.2
No	112	84.8
Breast Ca in immediate relatives		
Yes	24	18.2
No	108	81.8

Table 1. Continued

	n	%
Being in menopause		
Yes	110	83.3
No	22	16.7
Breast sensitivity		
Yes	33	25
No	99	75
Previous mammography experience		
Yes	110	83.3
No	22	16.7
Pain during mammography		
Yes	104	78.8
No	28	21.2
Feature of pain during mammography		
Crushing + stinging	104	78.8
No answer	28	21.2
Frequency of having mammography		
Every year	76	57.6
Every two years	6	4.5
Irregular	28	21.2
Never had mammography	22	16.7
Reason for having mammography now		
Check up	108	75.8
Other (abnormal test results etc.)	24	24.2
Total	**132**	**100**
Reason for not having mammography (nβ=22)		
Not having any symptoms	14	63.6
Other (fear, being young, not having any knowledge, etc.)	8	36.4
Total	**22**	**100**

βNumber of women never had mammography before
VAS: Visual analogue scale; Ca: Cancer; SD: Standard deviation; n: Number

annually was 57.6%, and 75.8% of women reported having control mammography (Table 1).

Table 2 shows the effect of patients' demographic characteristics on their DIS scores. As the BMI and weight increase, women tend to have more discomfort, and their score increase ($p<0.05$). Nonsmoking women had more discomfort tolerance power than smokers ($p<0.05$). The chocolate-eating routine had significantly increased DI-DA scores of women ($p<0.05$), and women who custom to take analgesics for their pain regularly were more intolerant to discomfort ($p<0.05$). The patients' other demographic variables did not have any influence on their discomfort ($p>0.05$) (Table 2).

Table 3 shows the influence of women's mammography-related characteristics on their DIS scores. Characteristics of pain felt during mammography did not influence discomfort intolerance scale scores and DI ($p>0.05$). The discomfort avoidance was high among women who reported crushing and stinging pain during mammography ($p<0.01$) (Table 3).

Discussion and Conclusion

Not having breast tenderness is associated with feeling less pain during mammography (24). The majority of the patients (75%) who underwent mammography did not report any breast tenderness and most of them were not used to take pain relievers. This study did not assess whether the analgesics that the patients used were prescribed. The majority of the patients (78.8%) reported having pain during mammography, and the pain intensity was calculated as 3.55 (SD=3.00) on Visual Analogue Scale 0-10 (VAS 0-10); (0= no pain, 10= intense pain), the pain characteristics were mostly crushing/stinging (Table 1). The presence of a mass in the breast and abnormal findings on physical examination are associated with extreme pain during the mammography (24). Yılmaz and Kıymaz (25) emphasized that patients may experience anxiety due to the possibility of being diagnosed with cancer. The burden of having a mammography, feeling discomfort, and being anxious resulted in dissatisfaction with mammography (26). Sufficient knowledge of the procedure tend to decrease the anxiety among women (25), and pain perception is usually associated with personal sensitivity rather than the pressure itself (12). The presence of a breast mass and previous abnormal tests may have influenced the majority of the women's pain perception. Therefore, not starting the mammography procedure with the tender breast may decrease the unpleasant outcomes of the procedure (12). Pain and discomfort are subjective concepts that vary among people. While a study revealed that the explanatory information given to patients decreased pain sensation due to procedure (24), another study emphasizes that written information provided did not influence susceptibility to procedural pain (25). Additionally, applying standardized pressure results in less pain, less discomfort, and prevents excessive compression especially in small-breasted women (8). Pain felt during mammography with flexible and standard compression did not differ between groups, and 34% of them experienced moderate or severe discomfort (20). A study conducted with experimental and control groups showed that the severity of pain during the mammography was 3.5 in the experimental group that took paracetamol, while it was 2.9 in the placebo group (5).

Some of the demographic characteristics (age, breast size, marital status, education, income level, place of residence, profession, breast cancer history in first degree relatives, being in menopause, presence of breast tenderness, tea-drinking routine) of the patients in this study did not have any influence on DIS and sub-dimension scores (Table 2). Another study found that age, education level, breast size, breast cancer history in first degree relatives, being in menopause, and drinking coffee did not influence the pain experience and discomfort due to mammography (5). Chan et al. (7) reported that the age and breast size of women were not related to the discomfort felt during mammography. They also found that Mamopad application significantly decreased the discomfort experienced during mammography, and women with low breast density experienced less discomfort. On the contrary, there is also a study showing that smaller breasts are more sensitive to the compression that occurs during mammography (12, 18). Thus mammography procedure applied with the pressure standardization method in women with small breast decreased the pain and discomfort felt during the procedure (8, 21). Moreover, it provided better results on the image quality, and eased the diagnosis process (8). A study conducted with technicians who take

Table 2. Influence of patients' demographic variables on discomfort intolerance scale scores

		Discomfort Intolerance Scale (DIS)		Discomfort Intolerance (DI-DI)		Discomfort Avoidance (DI-DA)
Age		r=0.020, p=0.817	-	r=0.105, p=0.233	-	r=-0.027 p=0.761
Weight (kg)		r=-0.193*, **p=0.027**	-	r=-0.151 p=0.084	-	r=-0.101 p=0.250
Body Mass Index (BMI)		r=-0.250** **p=0.004**	-	r=-0.210* **p=0.016**	-	r=-0.093 p=0.293
Bra size		r=0.020 p=0.821	-	r=-0.037 p=0.679	-	r=0.044 p=0.621
	n	**Mean ± SD**	**n**	**Mean ± SD**	**n**	**Mean ± SD**
Marital status						
Single	26	18.88±3.91	26	12.92±4.53	26	8.28±4.45
Married	106	18.81±4.77	106	13.42±4.50	106	6.77±4.13
		t=0.072		t=-0.499		t=1.617
		p=0.942		p=0.619		p=0.108
Education level						
Elementary school + able to read/write	69	18.45±472	69	13.43±4.24	69	6.30±4.22
Secondary school + high school	37	18.86±4.84	37	12.78±5.07	37	7.78±4.17
University graduate	26	18.83±4.60	26	13.77±4.38	26	8.08±4.00
		F=0.776		F=0.413		F=2.439
		p=0.462		p=0.663		p=0.091
Financial status						
Good	18	18.11±4.89	18	12.05±4.59	18	7.94±4.49
Fair	105	18.76±4.38	105	13.34±4.39	105	7.01±4.18
Bad	9	22.57±6.21	9	16.71±4.88	9	6.28±4.46
		F=2.585		F=2.763		F=0.504
		p=0.079		p=0.067		p=0.606
Place of living						
City	121	18.74±4.55	121	13.12±4.39	121	7.24±4.25
Town + country	11	19.73±5.27	11	15.54±5.20	11	5.09±3.33
		t=-0.067		t=1.731		t=1.630
		p=0.500		p=0.086		p=0.106
Profession						
Salaried employee	7	16.71±6.78	7	11.43±5.59	7	6.71±5.65
Housewife	43	19.14±3.89	43	13.42±4.06	43	7.74±4.35
Retired	82	18.84±4.75	82	13.43±4.63	82	6.73±4.02
		F=0.835		F=0.651		F=0.839
		p=0.436		p=0.660		p=0.435
Smoking						
Yes	19	16.68±5.45	19	10.84±4.68	19	7.17±4.83
No	113	19.19±4.37	113	13.73±4.35	113	7.04±4.13
		t=-2.225, **p=0.028**		t=2.657 **p=0.009**		t=0.114 p=0.909
Consuming chocolate						
Yes	30	18.33± 4.77	30	11.90± 4.58	30	8.48± 3.97
No	101	18.93±4.57	101	13.70 ±4.41	101	6.62±4.22
		t=-0.622		t=1.949		t=-2.117
		p=0.535		p=0.053		**p=0.036**

Table 2. Continued

		Discomfort Intolerance Scale (DIS)		Discomfort Intolerance (DI-DI)		Dıscomfort Avoidance (DI-DA)
	n	**Mean ± SD**	**n**	**Mean ± SD**	**n**	**Mean ± SD**
Drinking tea						
Yes	124	18.83±4.58	124	13.33±4.30	123	7.05±4.19
No	8	18.75±5.20	8	13.13±7.22	8	7.25±4.89
		t=-0.48		t=0.125		t=-0.130
		p=0.962		p=0.901		p=0.896
Drinking coffee						
Yes	66	18.59±4.54	66	12.95±4.18	66	7.19±4.26
No	66	19.06±4.69	66	13.68±4.79	66	6.94±4.20
		t=-0.585		t=-0.930 p=0.354		t=0.332
		p=0.560				p=0.741
Breast Ca in immediate relatives						
Yes	24	17.48±3.96	24	12.00±4.08	24	7.00±4.40
No	108	19.13±4.71	108	13.65±4.53	108	7.04±4.20
		t=1.576		t=1.610		t=-0.038
		p=0.117		p=0.110		p=0.969
Being in menopause						
Yes	110	18.96±4.31	-	13.54±4.46	-	7.02±4.17
No	22	18.14±5.92		12.23±4.60		7.27±4.55
	-	t=0.623	-	t=1.251	-	t=-0.257
		p=0.539		p=0.230		p=0.797
Using pain relievers						
Yes	20	17.20±4.80	20	11.05±4.78	20	7.85±3.83
No	112	19.12±4.53	112	13.72±4.34	112	6.92±4.28
		t=-1.728		t=2.500		t=0.909
		p=0.086		**p=0.014**		p=0.365
Breast sensitivity						
Yes	33	19.42±4.17	33	13.42±3.72	33	7.67±4.22
No	99	18.63±4.74	99	13.29±4.74	99	6.86±4.22
		t=0.862		t=0.156		t=0.954
		p=0.390		p=0.876		p=0.342

SD: Standart deviation; t: T-test, F: One-Way ANOVA; r: Pearson correlation; Ca: Cancer; n: Number
*Significant at p<0.05 level; **Significant at p<0.001 level

Tablo 3. Influence of patients' experiences related to mammography on Their Discomfort Intolerance Scale scores

	Discomfort Intolerance Scale (DIS)		Discomfort Intolerance (DI-DI)		Discomfort Avoidance (DI-DA)	
	n	**Mean ± SD**	**n**	**Mean ± SD**	**n**	**Mean ± SD**
Previous mammography experience						
Yes	110	19.06±4.55	110	13.35±4.35	110	7.38±4.31
No	22	17.64±4.80	22	13.18±5.27	22	5.38±3.26
		t=1.332		t=0.155		t=2.017
		p=0.185		p=0.877		**p=0.020**

Tablo 3. Continued

	Discomfort Intolerance Scale (DIS)		Discomfort Intolerance (DI-DI)		Discomfort Avoidance (DI-DA)	
	n	Mean ± SD	n	Mean ± SD	n	Mean ± SD
Pain severity during mammography (VAS=0-10)						
		r=0.159		r=-0.110		r=0.361**
		p=0.069		p=0.209		**p=0.000**
Feature of pain experienced during mammography						
No answer	28	18.00±4.51	28	14.07±4.21	28	5.11±3.95
Crushing + stinging	104	19.05±4.62	104	13.11±4.51	104	7.56±4.15
		t=-1.070		t=1.000		t=-2.841
		p=0.287		p=0.322		**p=0.005**
Frequency of having mammography						
Every year	76	19.07±5.58	76	13.34±4.49	76	7.46±4.42
Every two years	6	19.66±5.27	6	13.33±5.53	6	6.00±4.24
Irregular	28	18.89±4.45	28	13.14±3.76	28	7.46±4.10
Never had mammography	22	17.63±4.79	22	13.18±5.27	22	5.38±3.26
		F=0.630		F=0.121		F=1.572
		p=0.597		p=0.947		p=0.199
Reason for having mammography now						
Routine procedure	108	19.13±4.59	108	13.51±4.44	108	7.36±4.41
Other (abnormal test results etc.)	24	17.46±4.48	24	12.42±4.72	24	5.62±2.81
		t=-1.619		t= -1.088		t=-2.364
		p=0.108		p=0.279		**p=0.022**
Reason for not having mammography previously (n^{β}=22)						
Not having any symptoms	14	18.14±5.26	14	13.43±5.75	14	5.38±3.28
Other (fear, being young, not having any knowledge, etc.)	8	16.75±4.03	8	12.75±4.65	8	5.39±3.46
		t=0.646		t=0.284		t=0.006
		p=0.526		p=0.779		p=0.995

SD: Standart deviation; t: T-test; F: One-Way ANOVA; r: Pearson correlation; VAS: Visual Analogue Scale; n: Number
*Significant at p<0.05 level; **Significant at p<0.001 level; $^{\beta}$Number of women never had mammography before

mammography revealed that small breast size increased discomfort during mammography and the discomfort levels of women with high breast density during mammography were similar to that of women who had a previous lumpectomy or biopsy experience (9).

In this study patients' power to tolerate discomfort decreased as their weight increased. Similarly, the negative correlation between BMI and DIS score was evaluated that as the BMI increases, the patients' tolerance towards the disturbing stimulus decreases. Apart from the results of this study, Moshina et al. (27) found that BMI did not interfere with pain experienced due to compression paddle during mammography.

Women who did not use to taking pain relievers had significantly high DI. Not being able to tolerate discomfort is among the important risk factors on the emergence, development, and continuity of anxiety (28). In some studies, smoking is presented as an excuse to cope with stress, and individuals continue smoking when they feel stressed (29). This study revealed that nonsmokers were more resistant to disturbing stimuli.

The craving to eat chocolate was determined to be triggered through stress or important events in North American women (30). This study found that the DI-DA scores of women who consume chocolate were significantly higher than those who did not (p=0.036). DI-DA scores of women with no mammography experience (p=0.020), and were unable to define the pain experienced during mammography (p=0.000) were low (Table 3). Based on these results, women with previous mammography experience display more discomfort avoidance behaviors. Similarly, the severity of pain sensation due to the procedure increases discomfort avoidance (p<0.001). The DIS total score and DI sub-dimension scores of women with previous mammography experiences were higher but statistically insignificant.

The burden of having mammography was found to increase dissatisfaction (26). DA scores of women undergone mammography

due to the presence of mass or abnormal test results were lower (p=0.041) than those who had control mammography in this study. Having mammography for checkup purposes resulted in more discomfort in women than the women who had a mass in the breast, and or abnormal test results. The reason for this outcome could be due to women's anxiety related to pending results.

Limitations of the study

The limitations of the study are that the study data were collected in one center and a specific time frame. The study data were written by discussing with other studies on mammography since there is no scientific study using the discomfort scale in this subject.

In conclusion, most of the women experience pain during mammography. The ability to tolerate discomfort shows how well people can tolerate conditions that disrupt comfort. Women who were not on pain relievers and non-smokers have high discomfort tolerance. Women who were consuming substances containing methylxanthine (eg. chocolate) tend to avoid discomfort. Women with a history of breast mass and abnormal test results did not avoid discomfort as much as women who undergo regular checkup mammograms.

Conducting different studies using the same scale can be useful in evaluating the discomfort experienced during mammography and its contribution to reducing pain.

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Ethics Committee Approval: Approval was obtained from the Bursa Uludağ University Ethics Committee (approval number: 2016-19/6; December 16th,2016) and institutional approval was obtained from the Bursa Uludağ University Medical Hospital where the study was conducted.

Informed Consent: The patients were informed that participation is voluntary, and they can leave the study whenever they want, then their verbal and written approvals were obtained.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Conception: N.A., M.G., Mu.G.; Design: N.A., M.G., Mu.G.; Supervision: N.A., M.G., Mu.G.; Fundings: M.G.; Materials: N.A., M.G., Mu.G.; Data Collection and/or Processing: M.G., Mu.G.; Analysis and/or Interpretation: N.A.; Literature Review: M.G., Mu.G.; Writing: N.A., M.G.; Critical Review: N.A., M.G.

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