

# Impact of Pharmacist-Led Training on Breast Cancer Awareness and Knowledge: A Quasi-Experimental Pre-Post Study

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## ABSTRACT

**Background:** Breast Cancer (BC) constitutes the primary cause of cancer-related mortality in females and BC burden is projected to rise to 3.19 million cases and 1.04 million deaths by 2040. Given the increasing prevalence of BC, all healthcare professionals, including pharmacists, are responsible for raising women's Awareness and Knowledge (AAK) of BC and its prevention. The aim of this research was to assess the impact of pharmacist-led training on women's AAK of BC, as well as to evaluate their willingness to receive such training from pharmacist. **Materials and Methods:** This was a quasi-experimental pre-post study conducted in a community pharmacy in Bursa, Türkiye, using a structured, validated questionnaire to assess women's breast cancer AAK and evaluate the impact of pharmacist-led training. The questionnaire was administered face-to-face at baseline and one month following the training. **Results:** 263 women included in the study. The mean age of the participants was  $38.76 \pm 11.42$ . 36.9% of participants had one risk factor for BC. 83.3% of the participants had no training before. Regardless of sociodemographic characteristics, all of the participants' AAK increased significantly post-training ( $p=0.00$ ) and the mean overall breast cancer awareness scale score was increased from  $76.70 \pm 7.71$  to  $87.43 \pm 5.11$ . **Conclusion:** There exists a deficiency in AAK regarding BC among Turkish women, specifically concerning risk factors, signs and symptoms, attitudes toward prevention and methods for breast screening. Therefore, the substantial role of pharmacist in enhancing women's AAK presents a promising development. Although this study was conducted within a limited time frame and in a single pharmacy and has limitations such as the lack of long-term follow-up, it can be considered a complementary strategy to raise breast cancer AAK in the community due to its significant contributions.

**Keywords:** Breast cancer, Knowledge and awareness, Pharmacist, B-cas, Early diagnosis, Training.

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## INTRODUCTION

Breast Cancer (BC) is a general expression used for a set of breast tumor subtypes with distinct molecular and cellular origins and clinical behavior.<sup>1</sup> BC constitutes the primary cause of cancer-related mortality in females and current statistics indicate 2.3 million cases globally and the World Health Organization (WHO) predicts that if no additional precautions are taken, the BC burden is projected to rise to 3.19 million cases by 2040.<sup>2,3</sup> Similarly, in Türkiye, BC is the most frequently diagnosed cancer among women, with 25,249 cases and is expected to increase to 34,900 cases by 2045.<sup>4,5</sup>

The Surveillance, Epidemiology and End Results program underscores the prognostic significance of Early Diagnosis (ED), indicating a 5-year survival ratio varying from 86% to 99% for BC diagnosed at an earlier phase. Conversely, patients diagnosed with advanced BC exhibit a markedly lower 5-year survival rate of 31%.<sup>6</sup> The mean age at presentation of BC in Turkish women is ten years earlier than in Western countries. Such early presentations typically manifest more aggressive pathological features and an unfavorable prognosis.<sup>7</sup> ED constitutes an important part of BC treatment and the rates of ED can be increased by raising Awareness and Knowledge (AAK) about BC. This is particularly valuable in terms of recognizing the signs and symptoms, eliminating the barriers to breast screening and thus allowing individuals to consult a physician before it is too late. Moreover, increasing AAK is also important in terms of avoiding risk factors as much as possible and implementing behaviors aimed at prevention.<sup>8-10</sup>



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Even though BC develops in a visible organ and can be detected at an earlier phase, women's behaviours concerning ED are not satisfactory.<sup>11,12</sup> Studies conducted in China, Nigeria, Singapore, United Arab Emirates support this result and have revealed that women do not know the signs and symptoms sufficiently.<sup>13-16</sup> Additionally, embarrassment, tendency to procrastinate, waiting for a long time to make an appointment, fear of screening methods have been shown as factors that hinder women's behavior towards ED.<sup>17,18</sup> As shown in previous studies, factors that hinder women can be overcome through education as higher education is associated with higher awareness.<sup>9-13,19-21</sup> Since the first step in effective and successful treatment against BC is ED and ED requires that there is good awareness of BC, need for interventions regarding raising AAK level of women can not be dismissed.<sup>8,9</sup> Thus, targeting women with BC education may be an effective strategy to increase their awareness.<sup>22</sup>

Actions of healthcare providers have a great impact on women's participation in educational sessions and screening.<sup>17</sup> However, it is not always easy to access healthcare professionals. Since BC is a growing problem that concerns the whole society, all healthcare professionals are responsible for raising AAK.<sup>8</sup> Therefore, the requirement of pharmacists to be efficaciously involved in initiatives regarding increasing women's AAK cannot be dismissed. Recognizing the pivotal role of healthcare professionals in disseminating BC awareness, Centers for Disease Control and Prevention, Public Health England and WHO support and encourage pharmacists to participate in activities aimed to increase society's knowledge.<sup>23,24</sup> Among the most accessible healthcare professionals are community pharmacists. They can play a momentous role in providing appropriate educational and counselling services regarding BC awareness due to the great number of pharmacies in convenient and accessible places, the long daily working hours and the fact that pharmacists can be contacted without a rendezvous.<sup>25-27</sup> Pharmacists, whom people frequently consult during the day, interact intensively with individuals and studies demonstrate the effectiveness of pharmacist-led educational interventions in improving patients' AAK and decreasing concerns.<sup>28-30</sup> Community pharmacists can provide educational aid and consulting services about BC, screening methods and medication-related issues. In Türkiye, community pharmacists are one of the primary healthcare providers, who also provides educational assist and consultancy services in regard to medication and health-related problems beside the dispensing services.<sup>31-33</sup> However, to our recognition, there is an absence of researches which evaluate the role of pharmacists in improving women's AAK of BC in Türkiye.<sup>34,35</sup> Although campaigns on the importance of ED are shared in society from time to time, considering that BC is the leading cause of cancer-related deaths in women in Türkiye, it is obvious that additional training interventions are required. The aim of this study was to assess the impact of pharmacist-led training on

women's awareness and knowledge of BC, as well as to evaluate their willingness to receive such training from pharmacist.

## MATERIALS AND METHODS

### Study Design and Participants

This was a quasi-experimental pre-post study conducted in a single community pharmacy in Bursa, Türkiye between August and October 2022, involving women who visited the pharmacy. Bursa, with a population of 3,060,177, is the fourth largest city in Türkiye and was chosen for this study because it includes individuals from a wide range of socio-cultural and socio-economic backgrounds. Similarly, the pharmacy where the study was conducted was selected because it is a central pharmacy frequented by people from all educational and socio-cultural levels.

The inclusion criteria were as follows: (1) being over 18 years old; (2) the ability to read; (3) the ability to engage in verbal communication; and (4) not having a breast cancer diagnosis. The exclusion criteria were: (1) a diagnosis of breast cancer; (2) being illiterate; (3) incomplete data; and (4) participants wishing to withdraw from the study for any reason. Participants who met the inclusion criteria were invited and the purpose and description of the study were communicated to each. Participants were assured of their privacy and confidentiality of their responses and they were informed that participation was voluntary. After obtaining written consent, a questionnaire that took approximately 14 min to complete was administered face-to-face. At the end of the questionnaire, a written patient education brochure and a brief training session lasting about 6 min was provided to each participant. Content of the training and the brochure covered the same topics and information. During the training each topic explained to the participants and when there was a question, the participants' questions were answered. The brochure, prepared under the supervision of a clinical pharmacist, included information on the definition of BC, methods to prevent BC, signs and symptoms of BC, risk factors, ED methods, the definition and frequency of mammography and issues to be considered while having mammography. The training was conducted by a pharmacist who had been trained by the clinical pharmacist. Participants were given the opportunity to take the brochure home. One month after the training, the participants called and invited to the pharmacy, the questionnaire was repeated to evaluate the effect of the training. The entire process was carried out in a designated area within the pharmacy.

### Survey sample

826 women visited the pharmacy between August and October. Even though 783 women satisfied the inclusion criteria, 369 women declined to participate. 60 (14.5%) of the 414 women who completed the questionnaire declined to participate in the second phase citing that the survey is long, they have no time, etc., 79

of the women could not be contacted. Thus, the questionnaire was repeated in 275 women, however 12 were eliminated due to incomplete data. The study was completed with 263 individuals in total (Figure 1).

### Questionnaire Design

The survey form consisted of 50 items split into 4 sections. The 1<sup>st</sup> section included eleven questions that comprised participants' sociodemographic information (age, marriage condition, education status, employment situation, earnings situation, cigarette-alcohol usage, estrogen and/or progesterone usage, menstruation age, age at 1<sup>st</sup> birth, family history of BC). The second part included 29 questions about women's awareness of BC. The third part included five questions about women's experiences regarding ED. The fourth part included 5 questions about women's experiences and willingness to get training about BC and screening methods from the pharmacist.

### Awareness and knowledge of women regarding Breast Cancer

The AAK of women regarding BC was assessed utilizing the Turkish version of the Breast Cancer Awareness Scale (B-CAS). The B-CAS was developed by Rakkapao *et al.*, that allows researchers to better understand women's awareness level of BC and Altuntuğ *et al.*, evaluated the Turkish version for validity and reliability. Consent for using the Turkish version was taken from the researchers.<sup>36,37</sup>

The B-CAS consists of 29 items with 5 domains. In the scale scoring, the factors of the first two domains are marked as yes, I don't know, no and are scored as 2 points for the "right answer" / 1 point for the answer "I don't know" / 0 for the "wrong answer". Factors of the third and fourth domains are scored on a 5-point Likert scale (1: strongly disagree -5: strongly agree). Factors of the last domain are also scored on a 5-point Likert scale (1:in 1-2 days -5: never). Minimum (0) and maximum (97) points can be obtained from the questionnaire.

The segments of the B-CAS are as follows: *Domain 1* includes 8 questions that evaluate the knowledge of participants about BC risk factors. *Domain 2* includes 8 questions that evaluate the knowledge of participants about signs and symptoms of BC. *Domain 3* includes 6 questions which are about attitudes regarding prevention of BC. *Domain 4* includes 4 questions which are about factors that create barriers to breast screening. *Domain 5* includes 3 questions which are about health behavior of participants related to BC awareness. Minimum (0) and maximum (16, 16, 30, 20, 15) points can be obtained from each domain, respectively.

### Screening experiences of women regarding breast cancer

A structured survey was created and customised to fit the goals of the research concerning the breast screening experiences of

participants. Following this a widespread and detailed literature search was applied in reputed databases and search engines such as Web of Science, PubMed, Scopus, ISI, Embase and Google Scholar. The survey form was translated both forward and backward from English into Turkish. The structured units of the survey were evaluated for rewording, reformatting and suitability. Further, three expert academicians checked the ultimate drafted survey for face and content validity. The last version of the survey evaluating breast screening experiences of women consisted of 5 units and the participants were given the option to reply "yes" or "no". Moreover, a 5-item survey was utilized to assess participants' experiences and willingness to get training about BC and screening methods from the pharmacist.

### Statistical analysis

Analyses were done using SPSS 29.0 program. Descriptive statistical analyses such as frequency, percentage, mean and standard deviation were utilized to assess demographic data. The distribution normality of the research data was examined with skewness and kurtosis coefficients and the variance homogeneity of the data was examined with the Levene test. The mean scores of two independent groups were compared with Independent-Samples *t* test and the mean scores of 3 or more groups were compared with One-way Anova tests. The score averages of the dependent groups were examined with Paired Samples *t* test. All data were considered statistically significant at  $p$ -value<0.05 and 95% confidence interval.

## RESULTS

The mean age of the participants was 38.7611.42 years and more than half of the them had Bachelor degree or master degree. Approximately one third of the participants got one risk factor for BC. Most commonly seen risk factors were having family member with BC (12.2%) and having first baby after 30 years old (11.8%) (Table 1).

Table 2 presents participants' AAK of BC at baseline and after the training using the B-CAS. At the baseline a high percentage of accurate responses was recorded in knowing the signs and symptoms. In this regard, most of the participants were aware of the lump and thickening of the breast are signs and symptoms of BC. Nevertheless, a low rate was recorded in attitudes in preventing BC. In this context, less than half of the participants were aware that exercise can reduce the risk of BC and reducing fat consumption can reduce the risk of BC. Other responses are presented in Table 2.

Meanwhile, the mean B-CAS total score reported by the participants was significantly increased after the training ( $p=0.00$ ). There was a statistically significant score increase in all sub-dimensions of B-CAS ( $p=0.00$ ). These scores increase in all sub-dimensions indicate an increase in participants' AAK regarding risk factors, signs and symptoms of BC, prevention of

BC, screening barriers and health behavior related to BC. The study participants reported the highest score increase when asked about risk factors for BC and the lowest score increase when asked about breast screening barriers, as presented in Table 3.

When grouping the participants' B-CAS pre-test total score according to their demographic features, neither the age range nor the education level exhibited a significant distinction. Nevertheless, there was a statistically significant distinction concerning clinical breast examination experience ( $p=0.03$ ) and those participants having BC education before ( $p=0.01$ ). On the other hand, when comparing the participants' B-CAS post-test total score, no statistically significant difference was found between participants with clinical breast examination experience and others, or between participants who had received BC training before and those who had not, as presented in Table 4.

When grouping the participants' pre-test and post-test average B-CAS sum points in consideration of the sociodemographic features and experiences regarding BC, there was a statistically significant score raise for each class following the training ( $p=0.00$ ), as shown in Table 4. On the other hand, participants who were 39 years old or younger recorded higher score increase than participants over 39 years old. Similarly, participants who had education level 8 years or under recorded higher score increase than participants whose education level is over 8 years. Married participants also recorded higher score increase than single participants (Table 4).

Majority of the participants have never had training regarding BC (symptoms of BC, risk factors, early diagnosis, etc) before. 68.4% of the participants have never had mammogram and 59.7% of the participants have never had a clinical breast examination. 98% of

**Table 1: Demographic characteristics and breast cancer risk factors of participants (n=263).**

Variables		Mean±SD	
Age		38.76±11.42	
Variables		Number (n)	Percentage (%)
Marital status	Married	154	58.6
	Single	109	41.4
	Primary school	20	7.6
	Secondary school	10	3.8
Education level	High school	86	32.7
	University	135	51.3
	Master	12	4.6
	Working	146	55.5
Working status	Not working	117	44.5
	Income less than expenses	54	20.5
Income status	Income equals expense	157	59.7
	Income more than expenses	52	19.8
Cigarette usage	I don't smoke at all	143	54.4
	I used to smoke but not anymore	24	9.1
	I smoke regularly	65	24.7
	I smoke occasionally	31	11.8
Alcohol usage	I don't drink at all	154	58.6
	I used to drink but not anymore	16	6
	I drink regularly	11	4.2
	I'm a social drinker	82	31.2
Risk factors		Number (n)	Percentage (%)
Medication usage containing estrogen and/or progesterone for 5 years or more		10	3.8
Having family member with breast cancer		32	12.2
Menstruation begins before age 12		24	9.1
Having first baby after age 30		31	11.8

SD: Standart deviation, n: Number of participants.

**Table 2: B-CAS rate of knowledge of women about breast cancer (n=263).**

Domains	Correct answers	Before Training (BT)		After Training (AT)		
		Number (n)	Percentage of Correct Answer (%)	Number (n)	Percentage of Correct Answer (%)	
1. Contraceptive (birth control) drug usage.	Yes	122	46.4	251	95.4	
2. Using hormone therapy	Yes	156	59.3	255	97.0	
3. The onset of menstruation before the age of 12.	Yes	109	41.4	253	96.2	
4. Cessation of menstruation after the age of 55 (late menopause).	Yes	89	33.8	239	90.9	
5. Infertility	Yes	73	27.8	251	95.4	
6. Having first child after the age of 30.	Yes	72	27.4	246	93.5	
7. Consumption of predominantly fatty foods.	Yes	169	64.3	253	96.2	
8. Being overweight.	Yes	176	66.9	176	66.9	
<b>Knowing the signs and symptoms</b>						
9. Discharge or bleeding from the nipple.	Yes	224	85.2	261	99.2	
10. Partial or complete swelling of the breast or armpit.	Yes	243	92.4	262	99.6	
11. Changes in the shape, size and color of your breast and nipple.	Yes	235	89.4	262	99.6	
12. Pain in one of the breast or armpit.	Yes	232	88.2	250	95.1	
13. Nipple recession.	Yes	192	73.0	234	89	
14. Lump or thickening under armpit.	Yes	244	92.8	255	97	
15. Nipple shrinkage or dimpling.	Yes	214	81.4	263	100	
16. Lump and thickening of the breast.	Yes	236	89.7	263	100	
<b>Attitudes in preventing breast cancer</b>		<b>Strongly disagree n (%)</b>	<b>Disagree n (%)</b>	<b>Undecided n (%)</b>	<b>Agree n (%)</b>	<b>Strongly agree n (%)</b>
17. I think that breast cancer can be prevented by reducing breast cancer risk factors.	BT	8 (3)	14 (5.3)	21 (8)	39 (14.8)	181 (68.8)
	AT	2 (0.8)	5 (1.9)	20 (7.6)	43 (16.3)	193 (73.4)
18. I think breast cancer is curable if detected early.	BT	5 (1.9)	6 (2.3)	2 (0.8)	21 (8)	229 (87.1)
	AT	0	2 (0.8)	7 (2.7)	18 (6.8)	236 (89.7)
19. I think that breast cancer can be detected at an early stage with frequent examinations by healthcare professionals.	BT	12 (4.6)	5 (1.9)	10 (3.8)	21 (8)	215 (81.7)
	AT	1 (0.4)	4 (1.5)	12 (4.6)	26 (9.9)	220 (83.7)
20. I think that breast cancer can be detected at an early stage when mammography is done frequently.	BT	20 (7.6)	14 (5.3)	22 (8.4)	34 (12.9)	173 (65.8)
	AT	2 (0.8)	12 (4.6)	28 (10.6)	52 (19.8)	169 (64.3)

21. I think that exercise can reduce the risk of breast cancer.	BT	23 (8.7)	34 (12.9)	71 (27)	31 (11.8)	104 (39.5)
	AT	0 (0)	15 (5.7)	55 (20.9)	87 (33.1)	106 (40.3)
22. I think that reducing fat intake in my diet can reduce the risk of breast cancer.	BT	27 (10.3)	37 (14.1)	53 (20.2)	41 (15.6)	105 (39.9)
	AT	2 (0.8)	15 (5.7)	52 (19.8)	78 (29.7)	116 (44.1)
<b>Breast screening barriers</b>		<b>Strongly disagree n (%)</b>	<b>Disagree n (%)</b>	<b>Undecided n (%)</b>	<b>Agree n (%)</b>	<b>Strongly agree n (%)</b>
23. It is not appropriate for me to go to a doctor for breast cancer screening.	BT	215 (81.7)	11 (4.2)	14 (5.3)	4 (1.5)	19 (7.2)
	AT	215 (81.7)	11 (4.2)	14 (5.3)	4 (1.5)	19 (7.2)
24. I think it takes a long time to wait for the doctor for breast screening.	BT	187 (71.1)	20 (7.6)	17 (6.5)	8 (3)	31 (11.8)
	AT	187 (71.1)	20 (7.6)	17 (6.5)	8 (3)	31 (11.8)
25. I am busy and do not have time to go to the doctor for breast screening.	BT	188 (71.5)	29 (11)	22 (8.4)	7 (2.7)	17 (6.5)
	AT	188 (71.5)	29 (11)	22 (8.4)	7 (2.7)	17 (6.5)
26. I don't know how to do breast self-exam.	BT	143 (54.4)	30 (11.4)	34 (12.9)	18 (6.8)	38 (14.4)
	AT	196 (74.5)	67 (25.5)	0	0	0
<b>Health behavior related to breast cancer awareness</b>		<b>In 1-2 days n (%)</b>	<b>In 3-4 days n (%)</b>	<b>In 5-7 days n (%)</b>	<b>Rarely n (%)</b>	<b>Never n (%)</b>
27. How many days a week do you eat fried food?	BT	78 (29.7)	43 (16.3)	18 (6.8)	117 (44.5)	7 (2.7)
	AT	1 (0.4)	1 (0.4)	0	259 (98.5)	2 (0.8)
28. How many days a week do you eat dessert?	BT	82 (31.2)	80 (30.4)	31 (11.8)	65 (24.7)	5 (1.9)
	AT	4 (1.5)	10 (3.8)	82 (31.2)	165 (62.7)	2 (0.8)
29. How often do you eat beef, chicken, or duck meat with its skin and fat?	BT	21 (8)	27 (10.3)	17 (6.5)	89 (33.8)	109 (41.4)
	AT	3 (1.1)	4 (1.5)	23 (8.7)	114 (43.3)	119 (45.2)

Data presented as number (n) and (%).B-CAS: Breast Cancer Awareness Scale, BT: Before Training, AT: After Training.

the participants have never consulted their pharmacist regarding BC before. On the other hand, 73,8% of the participants expressed that they would want their pharmacist to inform them about BC. Moreover, 95% of the participants stated that if the pharmacist identifies a risky situation and refers them to a doctor, they would follow through and go (Figure 2).

## SUMMARY

It was determined that regardless of participants's sociodemographic characteristics and previous breast examination experiences, after the training, all of the participants recorded statistically significant raise in B-CAS total score (Table 4).

Participants who were 39 years old or younger, who had education level 8 years or under, who were married exhibited higher score increase than other participants (Table 4).

A statistically significant increase in scores were recorded in all sub-dimensions of B-CAS (Table 3).

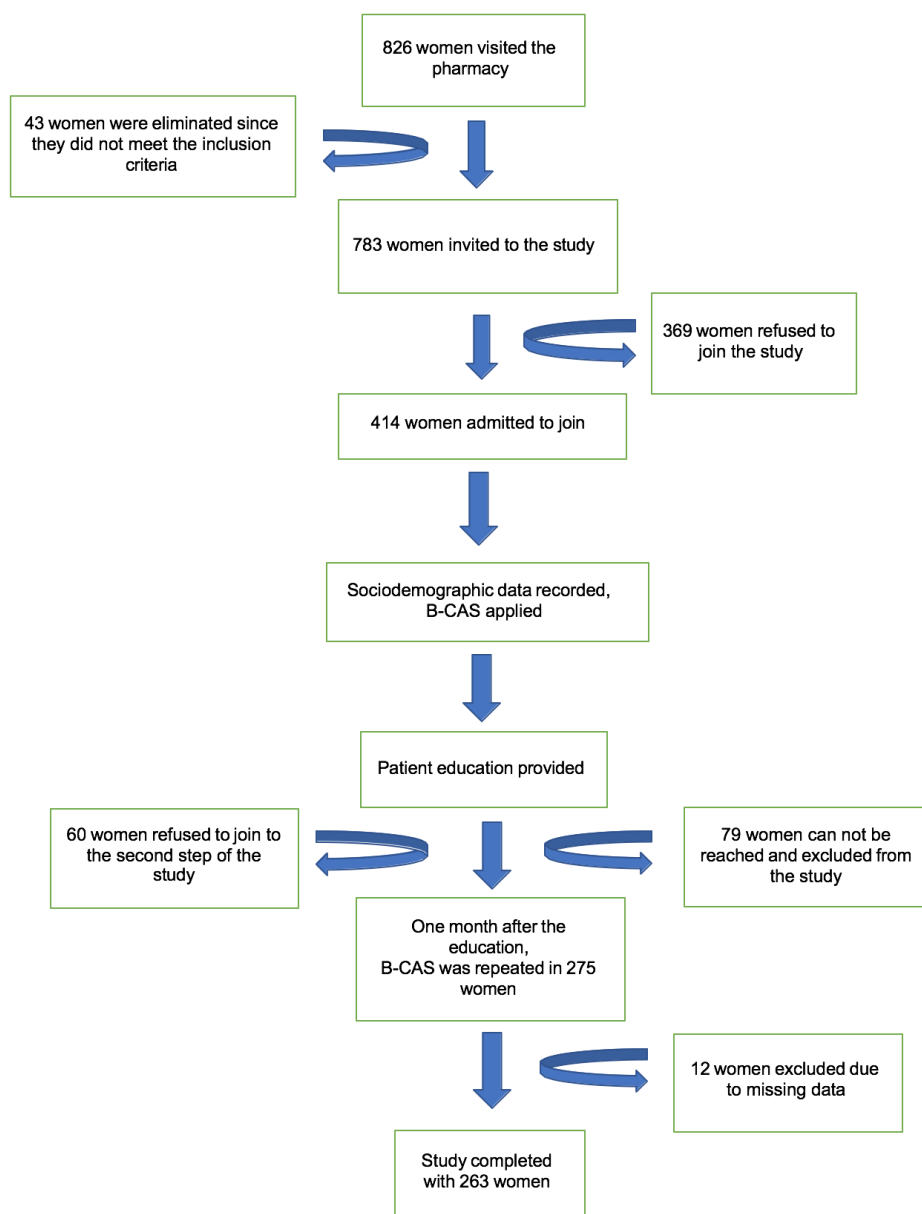
## DISCUSSION

In the present study, the average B-CAS total score reported by women at the baseline was relatively low; this indicates low sensibility to attitudes towards BC prevention, awareness of signs and symptoms of BC and participation in screening tests. The participants reported knowledge gaps similar to those, reported by women from different studies. In a study conducted by Kan'an to explore the awareness of women about BC, women reported low scores regarding knowing the risk factors (5.51±2.80) and knowing the signs and symptoms (8.34±2.99).<sup>19</sup> Similarly in another study conducted by Gündoğmuş *et al.*, participants notified low scores regarding knowing the risk factors (11.22±2.37) and knowing the signs and symptoms (14.94±2.10).<sup>20</sup> Consequently, these results are in agreement with earlier researches conducted in China,<sup>13</sup> Jordan,<sup>19</sup> Türkiye,<sup>20</sup> India<sup>38</sup> and worldwide,<sup>21</sup> which revealed that

**Table 3: Mean of B-CAS knowledge of participants about breast cancer before and after training.**

Domains of B-CAS	Score Ranges	Pre-test Score (Mean±SD)	Post-test Score (Mean±SD)	t	p
Domain 1: Knowing the risk factors	0 - 16	10.65±3.00	15.13±1.16	-27.79	0.00
Domain 2: Knowing the signs and symptoms	0 - 16	14.84±1.88	15.75±0.69	-7.71	0.00
Domain 3: Attitudes in preventing breast cancer	0 - 30	25.23±4.31	26.81±3.24	-5.48	0.00
Domain 4: Breast screening barriers	0 - 20	16.98±3.73	17.88±3.19	-10.58	0.00
Domain 5: Health behavior related to breast cancer awareness	0 - 15	9.00±2.57	11.86±1.06	-21.42	0.00
Total score	0 - 97	76.70±7.71	87.43±5.11	-26.37	0.00

B-CAS: Breast Cancer Awareness Scale, SD: Standart deviation, statistically significant ( $p < 0.05$ ).

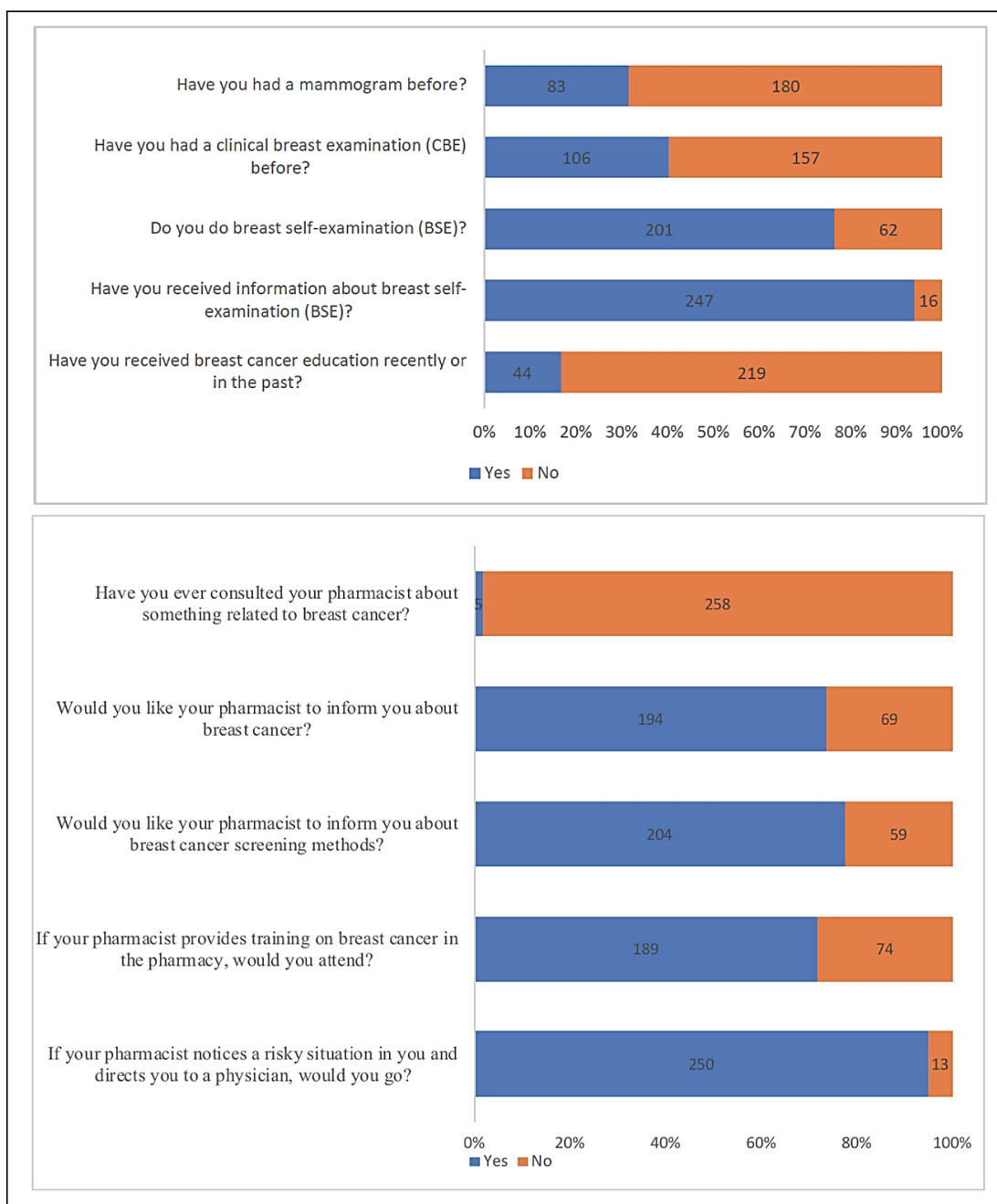


**Figure 1:** Flowchart of the study.

**Table 4: Comparison of participants' pre-test and post-test B-CAS knowledge according to demographic variables.**

Variables	Groups	B-CAS Total Score		
		Pre-test (Avg score±SD)	Post-test (Avg score±SD)	p*
Age	18 - 39 years	75.82±7.91	87.04±5.12	0.00
	≥ 40 years	77.56±7.44	87.80±5.01	0.00
	p**	0.07	0.22	
Education level	≤ 8 years of education	75.10±7.12	87.81±5.09	0.00
	High school graduate	76.17±8.60	87.56±5.61	0.00
	≥12 years of education	77.35±7.23	87.27±4.82	0.00
	p**	0.25	0.83	
Marital status	Single	77.15±7.13	87.11±5.40	0.00
	Married	76.38±8.11	87.65±4.90	0.00
	p**	0.43	0.40	
Working status	Working	76.86±87.33	87.33±5.00	0.00
	Not working	76.14±7.88	87.31±5.18	0.00
	p**	0.48	0.98	
Income status	Income less than expenses	76.30±7.49	87,02±4,64	0.00
	Income equals expense	76.54±7.79	87.55±4.99	0.00
	Income more than expenses	77.60±7.76	87.46±5.93	0.00
	p**	0.63	0.80	
Have you received breast cancer education recently or in the past?	Yes	79.32±7.41	88.16±4.66	0.00
	No	76.17±7.68	87.28±5.19	0.00
	p**	0.01	0.30	
Have you had a mammogram before?	Yes	79.01±7.45	88.93±4.75	0.00
	No	75.63±7.61	86.73±5.13	0.00
	p**	0.00	0.00	
Have you had a clinical breast examination (CMM) before?	Yes	77.96±7.59	87.79±4.92	0.00
	No	75.85±7.70	87.18±5.23	0.00
	p**	0.03	0.34	
Do you do breast Self-Examination (BSE)?	Yes	77.52±7.61	87.71±4.81	0.00
	No	74.03±7.48	86.52±5.92	0.00
	p**	0.00	0.11	
If you perform Breast Self-Examination (BSE), what is its frequency?	Frequently	79.00±7.86	88.76±4.44	0.00
	Once in a month	78.57±7.63	86.73±4.77	0.00
	Once in three months	79.64±6.41	87.04±6.20	0.00
	Rarely	75.64±7.69	87.36±4.82	0.00
	p**	0.01	0.33	

B-CAS: Breast Cancer Awareness Scale, SD: Standart deviation, Statistically significant ( $p < 0.05$ ), p\*: Comparison of groups pre-test and post-test average B-CAS total score, p\*\*: Comparison of groups average B-CAS total score.



**Figure 2:** Distribution of participants according to their experiences with breast cancer screening methods and their willingness regarding breast cancer training from the pharmacist. Data presented as number (n) and percentage (%).

women have low levels of AAK about BC. In the current study, the participants recorded a low ratio for the first pregnancy age and menstruation at an early age which are risk factors of BC. Similar to our findings, a lack of understanding about risk factors such as age at first pregnancy and early menstruation, as well as other risk factors of BC has also been reported among women in Iran,<sup>39</sup> Indonesia,<sup>40</sup> and Oman.<sup>41</sup>

The participants who had bachelor or master’s degree or had BC education before reported higher B-CAS points. An increased level of BC AAK has a favorable influence on recognizing

symptoms and taking the necessary steps for ED.<sup>42</sup> Therefore, continuing education activities and collaborative educative approaches, like person-based training, counselling services and joint sessions should be taken into consideration as additional strategies executed by authorities in health system and policy-makers to raise women’s AAK. This might also require multidisciplinary collaboration between pharmacists and other healthcare professionals, as patients visit their community pharmacists almost twice as often as they visit other healthcare professionals.<sup>43,44</sup> Further, these results emphasize the need for integration of BC educational interventions into pharmacy

services. The findings of the current research are coherent with previous studies presenting that education increases AAK and that highly educated participants report better knowledge levels and better participation in screening tests.<sup>35,39,42</sup> Moreover, in a research implemented by Oqal *et al.*, it was reported that as pharmacists have the potential to promote public health issues, they are responsible to take a pivotal role in community health education regarding BC.<sup>45</sup>

A major finding of the existing research in comparison to previous literature was the assessment of the impact of pharmacist-led training on women's AAK regarding BC. The participants reported poor knowledge about BC in different phases, whereas, after pharmacist-led training participants' AAK regarding all topics significantly improved ( $p=0.00$ ). Moreover, independently of participants' sociodemographic characteristics, all of the participants' AAK increased significantly. This finding is important as it shows that the training provided by the pharmacist benefits whole the participants regardless of age, education level, marital status, etc. Our findings were also in accordance with the findings of previous BC educational interventions which were conducted in different international studies and demonstrated that there was a highly significant improvement in all items provided to the intervention group from the pre to the post-test.<sup>46-49</sup> However, unlike these studies in which the training was given by a nurse, physician, or other healthcare professional, in our study the training was given by the pharmacist in the community pharmacy and similar success was achieved with the previous studies.

Strong consultation abilities enable pharmacists to effectively address patients' needs and concerns.<sup>50</sup> Furthermore, community pharmacists are healthcare professionals who are conveniently located in society, have long working hours and are easily accessible.<sup>42-43</sup> As the incidence of women diagnosed with BC increases with each year, pharmacists could work with the women to develop goals to better improve AAK. The pharmacist's consultancy role concerning BC can be achieved via training and assistance to increase women's awareness of aspects associated with BC, to address women's concerns about factors that hinder breast screening and to refer women to a physician in cases of risky situation.<sup>24,51</sup>

## STRENGTH AND LIMITATIONS

To the best of our knowledge, this is the first study conducted to evaluate the role of pharmacist in improving women's AAK of BC in Türkiye. Nevertheless, there are some limitations of the study. First off, we were able to carry out the study at a single pharmacy because we conducted this study as part of a project. Second, we were unable to assess the training's long-term impacts because of time constraints. Third, some participants chose not to engage in the second phase of the survey because the questions were too lengthy. To more accurately evaluate the study's generalizability

and the long-term impacts of education, further long-term researches on larger population, using more concise surveys in more than a single pharmacy are required.

## CONCLUSION

In conclusion, the findings of the present study highlight that there is a lack of AAK in several domains of BC among Turkish women. In addition, this study also revealed that the training provided by the pharmacist in a community pharmacy, achieved significant improvement in women's AAK regarding BC. An increase in awareness about signs and symptoms and attitudes in preventing BC are important for the foremost prevention of BC and awareness-based ED as an intervention for improving BC survival rates. Thus, this study can be a peer for further studies to formulate a sustainable educational paradigm within all pharmacies nationwide, thereby facilitating widespread accessibility to BC training and, consequently, contributing to increased rates of ED and survival. Considering the impact and importance of the Ministry of Health in raising public awareness and implementing preventive health measures, the support of policy makers and the Ministry of Health for these studies will provide great contribution and momentum. We believe that taking action with the support of the Ministry of Health in formulating and implementing a sustainable education paradigm regarding BC in pharmacies will contribute to reaching more people in a shorter period of time.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## ABBREVIATIONS

**AAK:** Awareness and Knowledge; **BC:** Breast Cancer; **B-CAS:** Breast cancer awareness scale; **ED:** Early diagnosis; **WHO:** World Health Organisation.

## ETHICAL APPROVAL

Acibadem Mehmet Ali Aydınlar University and Acibadem Healthcare Institutions Medical Research Ethics Committee gave their ethical approval (decision number: 2021-14/23) for the study to be conducted. The 1964 Helsinki Declaration and the ethical guidelines established by the institutional research committee were followed when conducting the study.

## SUMMARY

The leading cause of cancer-related death among women is breast cancer and if present trends continue, estimates suggest that the number of women receiving a breast cancer diagnosis will rise. Increasing women's awareness and knowledge regarding BC is essential because early diagnosis is a significant component of breast cancer treatment and early diagnosis rates can be raised by increasing awareness and knowledge. Women's breast cancer

awareness and knowledge increased significantly as a result of pharmacist-led training and the positive impact of pharmacists on women's awareness and knowledge is encouraging. This contribution might be seen as an additional strategy to raise breast cancer awareness and knowledge within the community.

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