American Journal of Men's Health
March-April 1–8

DOI: 10.1177/15579883231165626
journals.sagepub.com/home/jmh
SAGE

Analysis of Knowledge About Male Breast Cancer Among Patients at Tertiary Medical Center

Saygın Altiner[1], Özge Tonbuloğlu Altiner[2], Çağrı Büyükkasap[3], Asiye Uğraş Dikmen[2], Mevlüt Recep Pekcici[1], and Serap Erel[1]

Abstract

In the overall population, the incidence of breast cancer in men is lower than in women. Men's breast cancer awareness is affected both by the low incidence of breast cancer in men and by the presence of a perception that breast cancer can only be seen in women in society. This study aims to determine this awareness and guide future studies on improving social awareness. This study examined male and female patients aged 18 to 75 years who were admitted to our hospital's general surgery outpatient clinic. A questionnaire containing questions about male breast cancer was administered to the patients, and the study was conducted face-to-face voluntarily. A total of 411 patients, 270 female and 141 male, participated in the study. The results showed that 61.1% of the participants were unaware of the possibility of breast cancer in men. Evaluation of the relationship between awareness and gender revealed that women were more knowledgeable than men (p = .006). Educational status also had a significant influence on awareness (p = .001). Awareness of male breast cancer in society is low. Raising public awareness of this issue will enable men to be diagnosed earlier, at a lower stage, and thus to better respond to treatment, increasing their survival time.

Keywords

awareness, breast cancer, male

Received December 10, 2022; revised March 2, 2023; accepted March 6, 2023

Introduction

Breast cancer is the second most common cancer worldwide (Al-Ismaili et al., 2020). Its incidence and mortality rates have been increasing mostly in developing countries including Turkey (Özmen et al., 2019). Despite the developments in the field of screening, diagnosis, and strategy for female breast cancer in recent years, there is still not enough data on male breast cancer strategies. Due to the scarcity of data on male breast cancers and the inadequacy of guidelines, clinicians use data from female breast cancers when determining treatment algorithms. Studies report that although the number of male breast cancer is lower than that of female breast cancer, its incidence has gradually increased in the last 30 years (Leon-Ferre et al., 2018).

The lower incidence of male breast cancer than that of females makes it difficult to conduct a prospective study. As a result, male patients are often excluded from planned studies on breast cancer due to less information (Leon-Ferre et al., 2018). This results in relatively less attention paid to male breast cancer.

A painless subareolar mass is the most common first clinical presentation in men. Nipple ulceration and nipple retraction are other signs of cancer (Culell et al., 2007). A study in Spain has reported that the average time between symptom onset and diagnosis in

[1]Department of General Surgery, Ankara Training and Research Hospital, Ankara, Turkey
[2]Department of Public Health, Faculty of Medicine, Gazi University, Ankara, Turkey
[3]Department of General Surgery, Faculty of Medicine, Gazi University, Ankara, Turkey

Corresponding Authors:
Saygın Altiner, Department of General Surgery, Ankara Training and Research Hospital, Hacettepe, Ulucanlar Cd. No:89, 06230 Altındağ/Ankara, Turkey.
Email: sygn0607@gmail.com

male breast cancer patients is 10 months, and patients diagnosed earlier in this period are more likely to have a lower stage disease (Culell et al., 2007). Studies have shown that men are diagnosed at a later stage than women (Korde et al., 2010). One of the most important reasons for this is the low awareness of male breast cancer in the general population.

This study investigates the general population's awareness of male breast cancer, which is disregarded due to both its low incidence compared with women and the association of breast cancer with women.

Materials and Method

Material and Method

This cross-sectional study was conducted among individuals aged 18 years and older who were admitted to Ankara Training And Research Hospital General Surgery Outpatient Clinic between December 1, 2021, and January 31, 2022. Informed consent was received from participants prior to the commencement of the survey by emphasizing that participation in the study would be optional as well as the nature and justification of the study. The data collection form was prepared by the researchers by reviewing the literature. The questionnaire included questions about the participants' sociodemographic characteristics, general information questions about male breast cancer, whether the participants get involved in any screening methods (breast ultrasonography and mammography), and their knowledge about male breast cancer risk factors. The family history of breast cancer was questioned to measure the awareness of the participants. The definition of "family history" describes the first, second, third, and fourth relatives. At the beginning of the survey, the participants were informed about the purpose and nature of the research, and participation in the study was on a voluntary basis. The questionnaire was performed face to face to the participants by the researchers. The power of the study was calculated as over 80% using the EpiInfo software with a 95% confidence interval, $\alpha = .05$, 50% unknown frequency, and 411 people reached. The research was carried out with the permission of Ankara Training And Research Hospital Scientific Research Board, dated 24.11.2021 and numbered E-21-809.

Statistical Analysis

Statistical Package for Social Sciences (SPSS), version 23.0 for Windows (SPSS Inc. Chicago, USA) software package was used for statistical data analysis. In the descriptive statistics section, categorical variables were presented as numbers and percentages, and continuous variables were presented as mean ± standard deviation. The chi-square test was used to compare categorical variables. The statistical significance level was accepted as $p < .05$.

Results

A total of 411 participants filled out the questionnaire. The mean age of the participants was 39 ± 11·7. The distribution of the participants according to some sociodemographic characteristics is presented in Table 1. The participants were divided into four categories based on their ages. The majority of the participants (47.4%, $n = 195$) were older than 40 years of age. Of the participants, 25.3% ($n = 104$) were primary school graduates, 15.6% ($n = 64$) were secondary school graduates, 30.9% ($n = 127$) were high school graduates, 6.1% ($n = 25$) were associate degree graduates, and 22.1% ($n = 91$) were university graduates. Of all the participants, 72.7% ($n = 299$) were married, and 27.3% ($n = 112$) were single. While 34.1% ($n = 140$) of the participants had a history of cancer in their relatives, 65.9% ($n = 271$) had no family history of cancer. In addition, 17% ($n = 70$) of the participants had a history of breast cancer in their relatives, while 83% ($n = 341$) had no family history of breast cancer. There was a history of breast cancer in the social circle of 39.2% ($n = 161$) of the participants but not in the 60.8% ($n = 250$).

Table 2 presents the distribution of participants' answers to the general knowledge questions about breast cancer in men. Of the participants, 34.3% ($n = 141$) thought that breast cancer occurs only in women, 26.8% ($n = 110$) stated that they did not know about it, and 38.9% ($n = 160$) answered that breast cancer can also occur in men.

Table 3 presents the participants' perception of breast cancer risk factors in men as risk factors. The 10 factors known to be etiological factors of breast cancer in men were given to the participants in alphabetical order. Participants were asked to circle what they thought might be the risk factors of male breast cancer. The most frequently considered risk factors by the participants were genetic factors (55%, $n = 226$), followed by smoking (47.2%, $n = 194$), and family history (42.8%, $n = 176$). Obesity and radiation were reported as risk factors by 26.3% ($n = 108$) and 25.8% ($n = 106$) of the participants, respectively. Of the participants, 15.6% ($n = 64$) considered external hormone intake, 14.6% ($n = 60$) gynecomastia, 12.7% ($n = 52$) not exercising, and 9.5% ($n = 39$)

Table 1. Participants' Sociodemographic Characteristics, Ankara, 2022.

Sociodemographic variables	General Number (%)[a]	Male Number (%)[a]	Female Number (%)[a]
Age (n = 411)			
<21	19 (4.6)	7 (5.0)	12 (4.4)
21–30	94 (22.9)	34 (24.1)	60 (22.2)
31–40	103 (25.1)	31 (22.0)	72 (26.7)
>40	195(47.4)	69(48.9)	126(46.7)
Educational status (n = 411)			
Primary school	104 (25.3)	15 (10.6)	89 (33.0)
Middle school	64 (15.6)	25 (17.7)	39 (14.4)
High school	127 (30.9)	52 (36.9)	75 (27.8)
Associate degree	25 (6.1)	12 (8.5)	13 (4.8)
University	91 (22.1)	37 (26.2)	54 (20.0)
Marital status (n = 411)			
Married	299(72.7)	101(71.6)	198(73.3)
Single	112(27.3)	40(28.4)	72(26.7)
Cancer history in relatives (n = 411)			
Yes	140 (34.1)	32 (22.7)	108 (40.0)
No	271 (65.9)	109 (77.3)	162 (60.0)
Breast cancer history in relatives (n = 411)			
Yes	70 (17.0)	10 (7.1)	60 (22.2)
No	341 (83.0)	131 (92.9)	210 (77.8)
Breast cancer history in social circle (n = 411)			
Yes	161 (39.2)	38 (27.0)	123 (45.6)
No	250 (60.8)	103 (73.0)	147 (54.4)

[a]Column percentage.

BRCA gene mutation as risk factors for breast cancer in men. Testicular pathologies were the least defined risk factor (7.8%, n = 32) by the participants.

Male participants' perceptions of their knowledge of breast cancer were significantly lower than those of female participants (18.4% vs. 61.5%; χ^2 = 17,268, $p < .001$). Compared with female participants, male participants having had a breast examination before (9.2% vs. 69.6%; χ^2 = 135,277, $p < .001$), having had breast imaging before (5.7% vs. 57.8%; χ^2 = 104,864, $p < .001$), having had a breast examination in the last year (5.7% vs. 49.3%; χ^2 = 78,077, $p < .001$) and having had breast imaging within the last year (5.7% vs. 31.9%; χ^2 = 35,897, $p < .001$) were found to be significantly lower (Table 4). Considering that only 1% of breast cancers occur in men, and even less in the overall age range of the study participants, these results result is expected.

Table 5 presents the frequency of reasons for breast self-examination. The reason for doing breast self-examination was having breast-related complaints in 59.2% (n = 119), doctor recommendation in 35.3% (n = 71), and another medical reason in 5.5% (n = 11) of participants.

Table 6 compares the participants' consideration that breast cancer occurs only in women according to their sociodemographic characteristics. Of the participants who thought that breast cancer does not occur only in women, 26.3% (n = 42) were male, and 73.8% (n = 118) were female. The perception that breast cancer occurs only in women differed statistically significantly by gender (χ^2 = 1,990, p = .006). Among the participants, the frequency of considering breast cancer occurs not only in women was determined as 16.9% (n = 27) for primary school graduates, 13.8% (n = 22) for secondary school graduates, 26.9% (n = 43) for high school graduates, 6.3% (n = 10) for associate degree graduates, and 36.3% (n = 58) for university graduates. The perception that breast cancer occurs only in women differed statistically significantly by educational status (χ^2 = 32,855, p = .001). Of the participants who thought that breast cancer does not only occur in women, 66.9% (n = 107) were married, and 33.1% (n = 53) were single. The perception that breast cancer occurs only in women showed a statistically significant difference according to marital status (χ^2 = 4,560, p = .033). Of those who thought that breast cancer occurs not only in women, 22.5% (n = 36) had a family history of breast cancer, and 77.5% (n = 124) had no family history of breast cancer. There was a statistically significant difference between those who thought that breast cancer occurs only in women and those who did not, in terms of the presence of a family history of breast

Table 2. Distribution of Answers to General Knowledge Questions on Breast Cancer in Men, Ankara, 2022.

General knowledge questions	Overall number (%)[a]
Breast cancer only occurs in women	
Yes	141 (34.3)
No	160 (38.9)
Don't know	110 (26.8)
If there is a family history of breast cancer, the risk of male breast cancer increases.	
Yes	52 (12.7)
No	96 (23.4)
Don't know	263 (64.0)
Men don't get mammograms	
Yes	58 (14.1)
No	101 (24.6)
Don't know	252 (61.3)
Chemotherapy can be used to treat male breast cancer	
Yes	103 (25.1)
No	23 (5.6)
Don't know	285 (69.3)
Radiotherapy can be used to treat male breast cancer	
Yes	72 (17.5)
No	20 (4.9)
Don't know	319 (77.6)
Male breast cancer does not spread to the armpit	
Yes	19 (4.6)
No	76 (18.5)
Don't know	316 (76.9)
If breast cancer surgery is performed in men, the entire breast must be removed.	
Yes	22 (5.4)
No	64 (15.6)
Don't know	325 (79.1)
Male breast cancer does not spread elsewhere in the body	
Yes	22 (5.4)
No	74 (18.0)
Don't know	315 (76.6)
The risk of male breast cancer decreases with advancing age	
Yes	9 (2.2)
No	85 (20.7)
Don't know	317 (77.1)
Early diagnosis plays an important role in treatment	
Yes	318 (77.4)
No	8 (1.9)
Don't know	85 (20.7)

[a]Column percentage.

cancer (χ^2 = 5,544, p = .019). Of the participants who thought that breast cancer occurs not only in women, 50.6% (n = 79) had a history of breast cancer in their social circle 49.4% (n = 81) did not. There was a statistically significant difference between those who thought that breast cancer occurs only in women and those who did not, in terms of the presence of a history of breast cancer in their social circle (χ^2 = 11,445, p = .001).

Discussion

Cancer is one of the most important public health problems worldwide. Although it ranks second among the causes of death, it is estimated to take the first rank until 2030 due to its increasing prevalence (World Health Organization International Agency for Research on Cancer, 2018). Male breast cancer, on the contrary, constitutes 1% of all breast cancers and cancers in men and is rare (Giordano et al., 2004). Major risk factors include advancing age, exposure to radiation, external hormone use, BRCA2 mutation, obesity, and family history (Abdelwahab Yousef, 2017).

Due to the association of the presence of a perception that breast cancer can only be seen in women in society and awareness studies and screening programs focusing on women, the general population does not have enough knowledge about male breast cancer

Table 3. Participants' Perception of Breast Cancer Risk Factors in Men as Risk Factors, Ankara, 2022.

Breast Cancer Risk Factors in Men	Overall number (%)[a]	
	Yes	No
Obesity	108 (26.3)	303 (73.7)
Family history	176 (42.8)	235 (57.2)
Genetic factors	226 (55.0)	185 (45.0)
Not exercising	52 (12.7)	359 (87.3)
Smoking	194 (47.2)	217 (57.8)
Radiation	106 (25.8)	305 (74.2)
Testicular pathologies (testicular inflammation, undescended testis)	32 (7.8)	379 (92.2)
External use of hormones (estrogen, progesterone)	64 (15.6)	347 (84.4)
Gynecomastia (breast enlargement)	60 (14.6)	351 (85.4)
BRCA gene mutation	39 (9.5)	372 (90.5)

[a]Row percentage.

Table 4. Comparison of the Perceptions of Having Sufficient Knowledge About Breast Cancer and Applying to Screening Methods by Gender, Ankara, 2022.

Statements	Overall number (%)[a]	Male number (%)[a]	Female number (%)[a]	χ^2 P^b
Do you have enough knowledge about breast cancer?				
Yes	130 (31.6)	26 (18.4)	104 (38.5)	17,268
No	281 (68.4)	115 (81.6)	166 (61.5)	<.001
Have you ever done a breast self-exam?				
Yes	201 (48.9)	13 (9.2)	188 (69.6)	135,277
No	210 (51.1)	128 (90.8)	82 (30.4)	<.001
Have you ever had breast imaging (ultrasound, mammography)?				
Yes	164 (39.9)	8 (5.7)	156 (57.8)	104,864
No	247 (60.1)	133 (94.3)	114 (42.2)	<.001
Have you done a breast self-exam in the last 1 year?				
Yes	141 (34.3)	8 (5.7)	133 (49.3)	78,077
No	270 (65.7)	133 (94.3)	137 (50.7)	<.001
Have you had breast imaging (ultrasound, mammography) in the last 1 year?				
Yes	94 (22.9)	8 (5.7)	86 (31.9)	35,897
No	317 (77.1)	133 (94.3)	184 (68.1)	<.001

[a]Column percentage. [b] Chi-square test.

Table 5. Frequency of Reasons for Breast Self-Examination, Ankara, 2022.

Reasons for Breast Self-Examination	Overall number	%[a]
Due to doctor's suggestion	71	35.3
Due to another medical cause	11	5.5
Due to complaints about breast	119	59.2

[a]Percentage.

(Robinson et al., 2008). Its rare incidence compared with women has caused it to be ignored by society. This has resulted in men being less aware of the possibility of developing breast cancer than women. Despite noticing some signs and symptoms, men are hesitant to reach for the necessary medical help as the disease is perceived as a female disease in society. Male patients are diagnosed later, both because of these hesitations and because they do not see this risk in themselves (Culell et al., 2007). Indeed, in a study in which men's awareness of breast cancer was questioned, the responses "men get prostate cancer, women get breast cancer" and "men don't have breasts, women have breasts" reflect the social perception in this regard (Thomas, 2010).

Literature on male breast cancer awareness is limited. Awareness studies generally focused on male high school students (Al-Amoudi et al., 2016), female teachers (Al-Ismaili et al., 2020), migrant agricultural

Table 6. Comparison of Thinking That Breast Cancer Occurs Only in Women According to Sociodemographic Characteristics, Ankara, 2022.

Sociodemographic variables (n = 411)	No, number (%)[a]	Yes/don't know, number (%)[a]	χ^2 p[b]
Age			
<21	7 (4.4)	12 (4.8)	1,990
21–30	41 (25.6)	53 (21.1)	.574
31–40	35 (21.9)	68 (27.1)	
>40	77 (48.1)	118 (47.0)	
Gender			
Female	118 (73.8)	152 (60.6)	7,546
Male	42 (26.3)	99 (39.4)	.006
Educational status			
Primary school	27 (16.9)	77 (30.7)	32,855
Middle school	22 (13.8)	42 (16.7)	.001
High school	43 (26.9)	84 (33.5)	
Associate degree	10 (6.3)	15 (6.0)	
University	58 (36.3)	33 (13.1)	
Marital status			
Married	107 (66.9)	192 (76.5)	4,560
Single	53 (33.1)	59 (23.5)	.033
Cancer history in relatives			
Yes	63 (39.4)	77 (30.7)	3,291
No	97 (60.6)	174 (69.3)	.070
Breast cancer history in relatives			
Yes	36 (22.5)	34 (13.5)	5,544
No	124 (77.5)	217 (86.5)	.019
Breast cancer history in social circle			
Yes	79 (50.6)	82 (67.3)	11,445
No	81 (49.4)	169 (32.7)	.001

[a]Column percentage. [b]Chi-square test.

workers (Furgurson et al., 2019), nursing students (Yakar et al., 2021), women, and men (Alsowiyan et al., 2020; Farsi et al., 2020), yet all these studies questioned breast cancer regardless of gender.

In our study, the rate of participants aware that men can have breast cancer in the general population was 38.9%, that is, 61.1% of society does not know that men can have breast cancer. When considered based on society, it is seen that awareness is very low. Although there is no other study on male breast cancer awareness in the literature, studies with low awareness of breast cancer in general support our findings (Dandash & Al-Mohaimeed, 2007; Izanloo et al., 2018; Leslie et al., 2003; Sunil et al., 2014).

Despite the low level of knowledge, our study noted that women had a higher level of awareness than men. The results of a study conducted in Saudi Arabia were similar to our findings (Farsi et al., 2020). This finding can be explained by the fact that women acknowledge breast diseases more than men, and as a result, they are more open to knowledge. The fact that screening and education programs focus on women is a consequence of this finding.

The campaign that the Susan G Komen Foundation started by distributing pink visors in 1990 turned into a pink ribbon over time. For years, it has been supporting developments in the field of breast cancer and raising awareness with funds (Edge, 2014).

After the success of the Pinktober campaign, the Movember campaign started in 2003 to improve men's health. Men tried to raise awareness by growing long handlebar mustaches. With the funds it has created since its inception, it has supported studies on subjects that are more concerning to men, such as prostate and testicular cancer (Paine & Smith, 2015).

There is no doubt that the pink ribbon movement has increased awareness about breast cancer. However, the pink color combined with the perception of breasts contributed to the distancing of men from this subject. While colon, stomach, or pancreatic cancer are not seen as belonging to a single-gender in society, the mentioned factors created a social perception that breast cancer is specific to women. To avoid this misunderstanding to some extent, we think that the pink ribbon figure should be partially modified (Figure 1).

Figure 1. Example of Ribbon That Can Be Used for Both Men and Women

Study Limitations

The current study's design contains limitations, like with other studies. The study's first limitation is that it was restricted to a single site. The location of our facility and the demographics of the patient population are additional constraints. Patients travel from distant cities as well as from different parts of the city to see our facility. The neighborhood's sociocultural and socioeconomic standing, however, is lower. We could get different awareness outcomes if we conducted the study at a university hospital in a more affluent part of the city. The older patients, who are the most vulnerable and afflicted demographic, are reluctant to visit the hospital throughout the study's time period as the Covid-19 epidemic is still a problem. The younger demographic has now been allowed to participate in our research as a result. We believe that multicenter research with a bigger sample size will lead to a more comprehensive understanding of perceptions and awareness of male breast cancer.

Conclusion

Awareness of male breast cancer in society is low. Society's level of knowledge about the possibility of breast cancer in men is limited. Raising public awareness of this issue will enable men to be diagnosed earlier, at a lower stage, and thus to better respond to treatment, increasing their survival time. In addition, increasing the awareness of men on this issue will secondarily contribute to the increase of awareness of women and the whole society. Health system administrators and public health professionals should work to raise awareness of male breast cancer in society.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Saygın Altiner https://orcid.org/0000-0001-6118-9984

References

Abdelwahab Yousef, A. J. (2017). Male breast cancer: Epidemiology and risk factors. *Seminars in Oncology*, *44*(4), 267–272. https://doi.org/10.1053/j.seminoncol.2017.11.002

Al-Amoudi, S., AlHomied, M. T. A., AlSayegh, N. Y. N., Radi, O. N. I., Zagzoog, M. M. S., Aloufi, O. F. M., Al-Harbi, A. A. A., Tayeb, S., Hassanien, M., Al-Ahwal, M., Eldeek, B., & Harakeh, S. (2016). Breast cancer knowledge among male high school students in Saudi Arabia. *Journal of Cancer Education*, *31*(4), 784–788. https://doi.org/10.1007/s13187-015-0951-8

Al-Ismaili, Z., Al-Nasri, K., Al-Yaqoobi, A., & Al-Shukaili, A. (2020). Awareness of breast cancer risk factors, symptoms and breast self-examination among Omani female teachers: A cross-sectional study. *Sultan Qaboos University Medical Journal*, *20*(2), e194–e201. https://doi.org/10.18295/squmj.2020.20.02.010

Alsowiyan, A. A., Almotyri, H. M., Alolayan, N. S., Alissa, L. I., Almotyri, B. H., & AlSaigh, S. H. (2020). Breast cancer knowledge and awareness among females in Al-Qassim Region, Saudi Arabia in 2018. *Journal of Family Medicine and Primary Care*, *9*(3), 1712–1718. https://doi.org/10.4103/jfmpc.jfmpc_1065_19

Culell, P., Solernou, L., Tarazona, J., Roma, J., Martí, E., Miguel, A., Buxó, J., Yanguas, C., & Badal, J. M. (2007). Male breast cancer: A multicentric study. *The Breast Journal*, *13*(2), 213–215. https://doi.org/10.1111/j.1524-4741.2007.00412.x

Dandash, K. F., & Al-Mohaimeed, A. (2007). Knowledge, attitudes, and practices surrounding breast cancer and screening in female teachers of Buraidah, Saudi Arabia. *International Journal of Health Sciences*, *1*(1), 61–71.

Edge, J. (2014). Pink ribbons for breast cancer awareness—A perspective. *South African Medical Journal*, *104*(5), 321. https://doi.org/10.7196/samj.8300

Farsi, N. J., Al-Wassia, R., & Merdad, L. (2020). Do men and women in Saudi Arabia have the same level of awareness and knowledge of breast Cancer? A cross-sectional study. *Breast Cancer: Targets and Therapy—Dove Medical Press*, *12*, 131–139. https://doi.org/10.2147/bctt.S262544

Furgurson, K. F., Sandberg, J. C., Hsu, F. C., Mora, D. C., Quandt, S. A., & Arcury, T. A. (2019). Cancer knowledge among Mexican immigrant farmworkers in North Carolina. *Journal of Immigrant and Minority Health*, *21*(3), 515–521. https://doi.org/10.1007/s10903-018-0771-0

Giordano, S. H., Cohen, D. S., Buzdar, A. U., Perkins, G., & Hortobagyi, G. N. (2004). Breast carcinoma in men: A population-based study. *Cancer*, *101*(1), 51–57. https://doi.org/10.1002/cncr.20312

Izanloo, A., Ghaffarzadehgan, K., Khoshroo, F., Erfani Haghiri, M., Izanloo, S., Samiee, M., Tabatabaei, A., Mirshahi, A., Fakoor, M., Moghadam, N. J., & Sadrzadeh, S. M. (2018). Knowledge and attitude of women regarding breast cancer screening tests in Eastern Iran. *Ecancermedicalscience*, *12*, 806. https://doi.org/10.3332/ecancer.2018.806

Korde, L. A., Zujewski, J. A., Kamin, L., Giordano, S., Domchek, S., Anderson, W. F., Bartlett, J. M., Gelmon, K., Nahleh, Z., Bergh, J., Cutuli, B., Pruneri, G., McCaskill-Stevens, W., Gralow, J., Hortobagyi, G., & Cardoso, F. (2010). Multidisciplinary meeting on male breast cancer: Summary and research recommendations. *Journal of Clinical Oncology*, *28*(12), 2114–2122. https://doi.org/10.1200/jco.2009.25.5729

Leon-Ferre, R. A., Giridhar, K. V., Hieken, T. J., Mutter, R. W., Couch, F. J., Jimenez, R. E., Hawse, J. R., Boughey, J. C., & Ruddy, K. J. (2018). A contemporary review of male breast cancer: Current evidence and unanswered questions. *Cancer and Metastasis Reviews*, *37*(4), 599–614. https://doi.org/10.1007/s10555-018-9761-x

Leslie, N. S., Deiriggi, P., Gross, S., DuRant, E., Smith, C., & Veshnesky, J. G. (2003). Knowledge, attitudes, and practices surrounding breast cancer screening in educated Appalachian women. *Oncology Nursing Forum*, *30*(4), 659–667. https://doi.org/10.1188/03.Onf.659-667

Özmen, V., Özmen, T., & Doğru, V. (2019). Breast cancer in Turkey; An analysis of 20.000 patients with breast cancer. *European Journal of Breast Health*, *15*(3), 141–146. https://doi.org/10.5152/ejbh.2019.4890

Paine, M. F., & Smith, B. P. (2015). Movember is mustache month. *Clinical Pharmacology & Therapeutics*, *98*(6), 562–564. https://doi.org/10.1002/cpt.262

Robinson, J. D., Metoyer, K. P. Jr., & Bhayani, N. (2008). Breast cancer in men: A need for psychological intervention. *Journal of Clinical Psychology in Medical Settings*, *15*(2), 134–139. https://doi.org/10.1007/s10880-008-9106-y

Sunil, T. S., Hurd, T., Deem, C., Nevarez, L., Guidry, J., Rios, R., Guerra, H., Ortiz, J., & Jones, L. (2014). Breast cancer knowledge, attitude and screening behaviors among Hispanics in South Texas Colonias. *Journal of Community Health*, *39*(1), 60–71. https://doi.org/10.1007/s10900-013-9740-7

Thomas, E. (2010). Original research: Men's awareness and knowledge of male breast cancer. *The American Journal of Nursing*, *110*(10), 32–37, 39–40. https://doi.org/10.1097/01.NAJ.0000389672.93605.2f

World Health Organization International Agency for Research on Cancer. (2018). *Latest global cancer data: Cancer burden rises to 18.1 million new cases and 9.6 million cancer deaths in 2018*. https://www.iarc.fr/featured-news/latest-global-cancer-data-cancer-burden-rises-to-18-1-million-new-cases-and-9-6-million-cancer-deaths-in-2018

Yakar, H. K., Oguz, S., Öktem, N., & Yürük, S. (2021). Nursing students' awareness about the warning signs of cancer. *Asia-Pacific Journal of Oncology Nursing*, *8*(1), 81–85. https://doi.org/10.4103/apjon.apjon_34_20