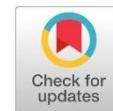


Research Article

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Breast Cancer and Early Screening Among Female Teachers in Misurata: Evaluating Awareness and Practices

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Abstract

Breast cancer is the most common cancer in women in the Eastern Mediterranean region, and the first or second leading cause of cancer-related deaths among females. The study aimed to evaluate the level of knowledge, attitudes, and practices (KAP) of female teachers in Misurata City, Libya, regarding breast cancer risk factors, signs and symptoms, and screening methods. A cross-sectional study was conducted through a web-based validated questionnaire; 430 responses were received. Data analysis was performed using SPSS v26. 60.5% of participants exhibited a low level of knowledge regarding risk factors, about (73.3%) revealed an excellent level of knowledge concerning breast cancer signs and symptoms, and more than half (53.0%) had a low level of knowledge about breast cancer screening. About 65% of participants exhibited a positive attitude towards breast cancer screening, (65.1%) frequently practice breast cancer screening. Although women in Misurata City have a positive attitude toward breast cancer screening, their poor knowledge hinders them from adopting proper practice techniques. This suggests a need to provide more awareness programs for Libyan women to improve their breast cancer knowledge and practice.

Keywords: Breast Cancer, Breast Cancer Risk Factors, Breast Cancer Screening, Misurata, Libya, Teachers.

INTRODUCTION

In 2022, over 2.3 million cases of breast cancer (BC) were diagnosed, leading to 670,000 deaths worldwide (WHO, 2024). BC ranks as the top or second leading cause of cancer-related deaths in 95% of countries, with low- and middle-income nations contributing to 80% of deaths (WHO, 2023). Data on BC in Libya is limited, but a survey in Misurata reported a cancer incidence of 71.7 per 100,000 people, with BC accounting for 19.5% of cases (Zarmouh et al., 2022). Key BC risk factors include female gender (99% of patients are women), advancing age, obesity, family history, reproductive factors, and smoking. Notably, 50% of cases occur in women without clear risk factors beyond gender and age (Harvie et al., 2015; WHO, 2024). The most common early sign of BC is a painless lump or thickening in the breast. Other symptoms can include changes in breast size or shape, dimpling or redness of the skin, changes in nipple appearance, and abnormal or bloody discharge. These symptoms may become more noticeable as BC progresses (WHO, 2024).



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While screening cannot prevent BC, early detection through mammography reduces mortality by 20-25% (Centers for Disease Control and Prevention (CDC, 2024; Fancellu et al., 2019). However, BC screening in Libya remains limited, with most cases diagnosed at advanced stages (IGRC, 2024). This study assesses BC knowledge, attitudes, and practices among female teachers in Misurata, aiming to link these factors with socio-demographics and improve awareness

MATERIALS AND METHODS

This cross-sectional study, conducted from June 1 to October 1, 2023, aimed to assess the knowledge, attitudes, and practices of female teachers in Misurata City regarding breast cancer and screening. Data were collected via digital questionnaires distributed through social media platforms (WhatsApp, Facebook, Instagram) to female teachers from various schools. A 400-sample size was calculated, with 450 questionnaires distributed and 430 valid responses analyzed. The pre-coded questionnaire had six sections: sociodemographic data (5 questions), knowledge of breast cancer risk factors (5 questions), screening and early detection (16 questions), signs and symptoms (5 questions), attitudes toward screening (10 questions), and screening practices (5 questions). Knowledge was assessed on a binary scale, with correct answers scored as 1 and incorrect answers as 0. The overall knowledge score was categorized as low (<50% correct), moderate (50%-75%), and high (>75%). Knowledge of breast cancer signs and symptoms was determined by scores of 3 or more out of 5. Attitudes were classified as negative (<30% score), neutral (30%-60%), or positive (>60%). Practices were evaluated from no practice (score = 0) to consistent practice (score = 4-5).

Data analysis was conducted using the (IBM.SPSS) V26, and descriptive analysis in the form of frequencies, means, and standard deviations was calculated. Chi-squared test was used to assess the associations between variables, a P -value ≤ 0.05 was considered statistically significant at a confidence level of 95%.

RESULTS

Socio-demographic characteristics

The study enrolled a total of 430 participants, 85.2% of whom were less than 46 years old. Among the participants, 64.2% were university graduates, 8.8% had higher education. 59.5% were married. A family history of (BC) was documented in 15% of participants, whereas only 3.3% had a personal history of (BC). (Table 1).

Table 1 Socio-demographic characteristics of participants (N= 430)

Characteristics		Frequency	Percent
Age, (years)	Less than 35	183	42.6
	36-45	183	42.6
	46-55	45	10.5
	Older than 56	19	4.4
Educational level	High school	59	13.7
	University	276	64.2
	Higher education	37	8.8
	Other	57	13.3
Marital status	Married	256	59.5
	Single	126	29.3
	Other	45	10.5
Family history	Yes	64	15
	No	364	85
History of breast cancer	Yes	14	3.3
	No	416	96.7

Breast cancer knowledge:

1) Breast cancer risk factors

The mean score for knowledge of (BC) risk factors was 6.9 (± 3.6). Most participants (60.5%) had low knowledge, 32.1% had moderate knowledge, and only 6.3% had high knowledge. Regarding specific risk factors, 66.3% and 61.9% of participants incorrectly believed that not breastfeeding and using oral contraceptives were major risk factors. Familial predisposition and unhealthy habits were identified by 59.5%. Additionally, 53.5% and 54.9% believed prolonged use of tight bras and breast imaging respectively linked to (BC). However, only 36.5% recognized sleep disorders and lack of exercise as risk factors.

For reproductive factors, only 21.6%, 37.7%, 30.5%, and 18.8% correctly identified early menarche, late menopause, nulliparity, and late first pregnancy respectively, as risk factors. Moreover, 28.8% and 24.2% identified post-menopausal obesity and large breasts as risks, and 33.0% acknowledged advancing age, (Table 2).

No significant associations were found between BC risk factor knowledge and education ($P = 0.356$), family history ($P = 0.952$), personal history ($P = 0.966$), or marital status ($P = 0.073$). However, a significant relationship was found between age and knowledge level ($P = 0.000$).

Table (1). Participants' knowledge of breast cancer risk factors. (N= 430)

Characteristics	Frequency	Percent
Wearing tight-fitting bras for extended periods.	230	53.5
Older age	142	33.0
Nulliparity	131	30.5
Late menopause	162	37.7
Early menarche	93	21.6
Late pregnancy of first child	81	18.8
Obesity after menopause	124	28.8
Taking OCP	266	61.9
Unhealthy habits (smoking, drinking, etc)	253	58.8
Breast imaging	236	54.9
Large breast	104	24.2
Regular daily exercise	177	36.5
Family history	256	59.5
Breastfeeding	285	66.3
Unhealthy diet	266	61.9
Sleep disorders	157	36.5

2) Breast cancer signs and symptoms:

The mean score for the "Signs and Symptoms" section was 3.38 (± 1.67), indicating a generally good level of knowledge among participants, distributed as weak (19.1%), moderate (7.7%), and excellent (73.3%).

The most recognized signs and symptoms were a suspicious mass (79.5%), breast swelling and abnormal discharge (71.9%), and skin changes (70.9%). However, only 65.1% identified nipple distortion, and 50.2% recognized itching and skin lesions around the breast. (Table 3)

No significant associations were found between knowledge of (BC) signs and symptoms and participants' age ($p = 0.638$), marital status ($p = 0.422$), family history ($p = 0.252$), or personal history of (BC) ($p = 0.189$). However, a significant relationship was found between education level and knowledge of signs and symptoms ($p = 0.035$).

Table (3). Participants' knowledge of breast cancer symptoms and signs. (N= 430)

Characteristics	Frequency	Percent
Breast lump	342	79.5
Breast swelling and discharge	309	71.9
Changing the skin form	305	70.9
Nipple distortion	280	65.1
Itching and Skin Lesions Around the Breast	216	50.2

3) Breast cancer screening knowledge:

Breast cancer screening knowledge varied among participants, with 53.0% showing low knowledge, 38.1% moderate, and only 7.7% high. Most participants (80.7%) correctly identified (BC) as the most common cancer among women worldwide, and 78.6% believed it is curable. However, only 47% knew the ideal timing for (BSE). The recommended age to start BSE (21.2%) and mammography (40.9%), and their recommended frequency (39.8% for BSE and 42.1% for mammograms), was lower. (Table 4)

While 38.8% knew mammograms were the preferred screening method, only 33.7% were aware of its safety, and 54.2% knew a prior doctor's examination was needed. The internet (27.9%) and television (21.6%) were the most common sources of information, but 57.9% had no formal training on BSE. Only 19.3% received instruction from a doctor, and 16.3% from online sources. Significant associations were found between knowledge levels and age ($p = 0.000$), marital status ($p = 0.019$), and family history of (BC) ($p = 0.004$). However, no significant correlations were observed with education ($p = 0.470$) or personal history of (BC) ($p = 0.423$).

Table (4). Participants' knowledge of breast cancer screening. (N= 430)

Characteristics	Frequency	Percent
Breast cancer is the most common cancer among women worldwide	347	80.7
Breast cancer is curable	338	78.6
Regular BSE improves patient outcomes	337	78.4
BSE helps in early detection of the disease	346	80.5
Training on BSE	83	19.3
Age of starting BSE	91	21.2
The best time for BSE before menopause	204	47.4
The best time for BSE after menopause	205	47.7
Frequency of BSE	171	39.8
The Mammogram is the best method for screening	167	38.8
Safety of mammogram	145	33.7
Pain and discomfort after mammogram	102	23.7
Doctor examination before the mammogram	233	54.2
Age of starting mammogram	176	40.9
Frequency of mammogram	181	42.1

Attitudes towards Breast cancer screening:

The mean score for teachers' attitudes toward (BC) screening was 7.10 (± 2.71). A positive attitude was exhibited by 65.1% of participants, 18.4% had a neutral stance, and 15.1% displayed a negative attitude. Most participants (82.3%) believed that (BSE) aids in early detection of BC, and 81.9% agreed that early detection improves prognosis. Interestingly, 76.0% considered BSE important even without risk factors, and similar percentages for obesity (72.3%), family history (76.5%), stress (69.8%), and lack of exercise (68.6%). However, only 43.3% were willing to participate in awareness campaigns. (Table 5)

Significant associations were found between attitudes and both age ($p = 0.001$) and educational level ($p = 0.003$). No significant correlations were observed with marital status ($p = 0.466$), family history ($p = 0.744$), or personal history of BC ($p = 0.880$).

Table (5). Participants' attitude toward breast cancer screening. (N= 430)

Characteristics	Frequency	Percent
BSE is helpful in early detection of breast cancer	354	82.3
Early detection improves prognosis	352	81.9
No need for BSE if I don't smoke or drink	327	76.0
No need for BSE if I'm not obese and on a healthy diet	311	72.3
No need for BSE if there is no family history	329	76.5
No need for BSE if there are no stress or sleep disorders	300	69.8
No need for BSE if I don't take OCP	295	68.6
No need for BSE if there is no radiation exposure	292	67.9
No need for BSE if I do regular exercise	295	68.6
Willing to participate in awareness campaigns	186	43.3

Breast cancer screening Practice:

Frequent (BC) screening was reported by 65.1%, while 38.8% practiced it rarely, and 7.7% did not screen at all. Only 8.4% performed monthly BSE, with 45.1% not knowing how to perform BSE. Annual mammograms were done by 16.0%, while 58.6% never had one, with 30% unaware of the procedure. Reasons for avoiding mammograms included shyness (21.4%), fear (18.6%), and cost (2.8%). Most participants (77.2%) would visit a doctor upon noticing symptoms, (Table 2). Significant relationships were found between breast cancer screening practices and educational level ($p = 0.025$), marital status ($p = 0.041$), and family history ($p = 0.009$). However, no associations were observed with age ($p = 0.095$) or personal history of breast cancer ($p = 0.890$).

Table (3). Participants' practice toward breast cancer screening. (N= 430)

Practice	Frequency	Percent
No Practice	33	7.7
Rare	167	38.8
Occasional	140	32.6
Frequent	280	65.1
Consistent	33	7.7

DISCUSSION

Several studies have been conducted in western and eastern Libya to assess the knowledge, attitudes, and practices regarding breast cancer (BC). This study is the first to shed light on breast cancer awareness among Libyan female teachers in Misurata city.

Our findings show that 60.5% of participants exhibited a low level of knowledge about BC risk factors, while 73.3% demonstrated excellent knowledge of BC signs and symptoms. In terms of screening, (53%) had insufficient knowledge, though 65% displayed a positive attitude, and 65.1% reported frequently practicing BC screening.

Breast cancer risk factors can be categorized as modifiable and non-modifiable. Non-modifiable factors include sex, age, family history, genetic mutations, and previous breast conditions (Łukasiewicz et al., 2021). In our study, approximately 60% of participants were knowledgeable about non-modifiable risks like family history, breastfeeding, and breast imaging but showed low

awareness of advanced age (33%), late menopause (37.7%), early menarche (21.6%), and large breast size (24.2%). This is consistent with other studies in Libya, such as in Benghazi, where 88.5% of women recognized breastfeeding's protective role, but only 34% in Tripoli did (Taher et al., 2016; Ziuo et al., 2018). Awareness of age as a risk factor was low across the country, with similar findings in Derna (38%) (Elzahaf et al., 2018), and Misurata (33%). (El-Hamadi et al., 2019) reported better awareness of (BC) risk factors (52.7%). In our study, only 37.7% recognized late menopause as a risk factor, and early menarche (before age 12) had the lowest awareness at 21.6%. These results align with previous studies showing similar or lower awareness across Libya (El-Hamadi et al., 2019; Elsaid & Tunis Meidan, 2023; Elzahaf et al., 2018).

In other Arab countries, knowledge of family history as a BC risk was relatively high, with 75.4% in Jordan (Al-Mousa et al., 2020), and 59.1% in Saudi Arabia (Almanie et al., 2018). But, awareness of age as a risk factor remained low (Abbas & Baig, 2023; Al-Mousa et al., 2020; Almanie et al., 2018). In Jordan, 56.1% and (67.6%) were aware of radiation exposure and not breastfeeding as risks (Al-Mousa et al., 2020), while in Iran, 87% of women and 68% In Qatar knew nulliparity increased BC risk (Atashi et al., 2020; Hamed et al., 2022).

Modifiable risk factors for BC include the use of oral contraceptives, alcohol consumption, smoking, unhealthy diets, and lack of regular exercise (Łukasiewicz et al., 2021). In the current study, 61.9% of participants recognized oral contraceptive use and unhealthy habits, consistent with findings from Tripoli (63.4%) and other Libyan studies (Elzahaf et al., 2018; Taher et al., 2016). While 61.9% of Misurata teachers were aware of the impact of an unhealthy diet, lower awareness was reported in Tripoli (45.2%), Benghazi (45.7%), and Derna (40%) (El-Hamadi et al., 2019; Elzahaf et al., 2018; Ziuo et al., 2018). Only 36.5% of our participants knew regular exercise reduces BC risk, a much lower figure than Ziuo *et al.*'s study (65.2%) (Ziuo et al., 2018).

Approximately 54% of participants believed wearing tight-fitting bras for long periods was a BC risk, higher than the 15.1% reported in Jordan (Al-Mousa et al., 2020). Awareness of high glycemic index foods and low-fiber diets as BC risk factors was poor, with 31.2% recognizing these as risks, similar to figures from other surveys (Abbas & Baig, 2023; Al-Mousa et al., 2020). By contrast, 91.9% of Iranian women knew regular exercise could protect against BC (Atashi et al., 2020). Sleep disorders as a risk factor were poorly recognized by 36.5% of participants, in line with findings from the UAE 13.8% (Abbas and Baig, 2023). A significant relationship between participants' age and knowledge of BC risk factors was found, consistent with (El-Hamadi et al., 2019) findings that education and marital status also influenced knowledge and attitudes. However, Elzahaf *et al.* (2018) found no significant demographic associations. The overall low awareness of modifiable risk factors highlights the need for targeted education to promote BC prevention and screening.

Awareness of BC warning signs can lead to earlier detection and better treatment outcomes. In this study, 73.3% of participants had excellent knowledge of BC symptoms, similar to findings from Tripoli (El-Hamadi et al., 2019). The most recognized symptom was a breast lump 79.5%, which aligns with the Tripoli study (El-Hamadi et al., 2019), though higher knowledge levels were reported in other Libyan cities (Elsaid et al., 2023; Elzahaf et al., 2018). About 71% of participants identified breast swelling, discharge, and skin changes as warning signs, which is lower than in eastern Libya, where over 90% of participants recognized these symptoms (Elzahaf et al., 2018). Knowledge of nipple distortion and skin lesions around the breast was consistent with previous Libyan studies (El-Hamadi et al., 2019; Elsaid & Tunis Meidan, 2023; Elzahaf et al., 2018), but Iranian midwives showed superior knowledge (95%) which might be due to their health-related education (Atashi et al., 2020).

Higher education was associated with better knowledge of BC signs, unlike in Iran, where family history rather than education correlated with knowledge (Atashi et al., 2020). Screening knowledge was varied: 53% had low awareness, and only 7.7% showed good knowledge. Other Libyan studies reported higher levels of screening awareness (Ziuo et al., 2018; Elzahaf et al., 2018), though Misurata participants demonstrated better knowledge compared to respondents from Qatar and Bahrain (Donnelly et al., 2015; Fikree et al., 2011). Knowledge of BC as the most common cancer among women was high (80.7%), in line with other studies (Alwan et al., 2012; Elsaid & Tunis Meidan, 2023), and over 70% recognized its curability if detected early, similar to Jordan (Al-Mousa et al., 2020) and the UAE (96.6%) (Abbas and Baig, 2023).

Regarding breast self-examination (BSE), 80% of participants knew it aids in early detection, which aligns with studies from Benghazi and other Arab countries (Al-Mousa et al., 2020; Eldessouki et al., 2019; Ziuo et al., 2018). However, only 19.3% of participants had been trained to perform BSE, with higher training rates reported in Tripoli (62%) and lower rates in India and Iran (3.1%) (Atashi et al., 2020; Prusty et al., 2020). Less than one-fifth of participants knew the correct age to start BSE, similar to other studies in Libya (Ziuo et al., 2018) and all over the world (Akpınar et al., 2011). The best time to perform BSE was known by 47.4%, slightly lower than Turkish women (55.6%) (Akpınar et al., 2011). Knowledge of the correct frequency of BSE was low, consistent with findings from eastern Libya (Ziuo et al., 2018) and Egypt (Eldessouki et al., 2019).

Mammogram awareness was insufficient, with only 38.8% recognizing its importance, which is lower than 80% of UAE residents (Abbas and Baig, 2023) and Jordanian women (Al-Mousa et al., 2020). Safety concerns about mammograms persisted, with only 33.7% of participants recognizing them as safe. In Tripoli, 60% believed mammograms could cause BC (Taher et al., 2016), and, like other studies, mammogram frequency knowledge was insufficient (Abbas and Baig, 2023). Respondents' main sources of BC information were the internet (28%), television (21.6%), and healthcare professionals (19%), similar to findings from Ethiopia (Asmare et al., 2022) and Iraq (Alwan et al., 2012).

A positive attitude toward BC screening was shown by 65.1% of participants. While 15.1% showed a negative attitude, aligning with other studies from Libya (Ziuo et al., 2018) and other African Arab countries (Eldessouki et al., 2019). Attitudes toward screening were significantly associated with age and education, similar to other surveys (Abbas & Baig, 2023; Elzahaf et al., 2018). However, an Iranian study found family history and marital status significantly influenced screening attitudes (Atashi et al., 2020), while another Libyan study found no association between attitudes and demographic factors (Elzahaf et al., 2018). Contrary to previous studies in Libya and other countries where BC screening practice was low (Atashi et al., 2020; Ziuo et al., 2018), 65.1% of our participants frequently practiced screening, with only 7.7% never doing so. Screening practice was significantly associated with education, marital status, and family history, which is supported by other studies (Atashi et al., 2020; Ziuo et al., 2018). However, an Iranian study on midwives found no impact of marital status and family history on BC screening (Atashi et al., 2020), and a 2017 Libyan study showed no association between breast examination and demographic factors (Elzahaf et al., 2018).

This study is more comprehensive than previous Libyan surveys, as it extensively evaluated BC awareness, including risk factors, symptoms, screening methods, and the importance of early diagnosis. However, it was limited by its focus on female teachers and the use of convenience sampling, which may limit generalizability. Despite these constraints, the findings may prompt a reevaluation of the national health education strategy.

The lack of BC knowledge among educated Libyan women highlights the need for widespread dissemination of information about BC, its risk factors, and screening methods. While the effectiveness of BSE in reducing mortality is debated (Thomas et al., 2002), it remains a culturally appropriate and cost-effective method for resource-limited countries like Libya. Until routine mammography is available, promoting BSE should be prioritized. A comprehensive national policy is needed to raise awareness and improve women's health-seeking behaviors.

CONCLUSION

Women in Misurata city have a positive attitude toward (BC) screening. However, their poor knowledge will not help them to adopt proper practice techniques. Adoption of a dual approach integrating primary prevention measures to decrease the overall risk burden in the community with early detection methods to improve patient outcomes is advised. In addition, Further research is needed to identify the magnitude of the problem nationwide, assess responses to future corrective measures, and identify barriers and promoters of breast cancer screening.

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ETHICS

The data collection tools were anonymous, and data confidentiality was maintained throughout the study.

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