

Awareness of Breast Cancer Risk Factors, Symptoms and Breast Self-Examination Among Omani Female Teachers

A cross-sectional study

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الوعي بعوامل خطر الإصابة بسرطان الثدي والأعراض والفحص الذاتي للثدي بين المعلمات العمانيات

دراسة مقطعية

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ABSTRACT: Objectives: This study aimed to assess knowledge of breast cancer (BC) risk factors, warning signs and symptoms and breast self-examination (BSE) practice among Omani female teachers in Al-Dhahira Governorate. **Methods:** A cross-sectional sample of female teachers aged 20–50 years was collected from January to December 2018 from three *wilayats* (provinces) in Al-Dhahira—Ibri, Dhank and Yunqal. A questionnaire that included the Breast Cancer Awareness Scale and demographic characteristics was administered. Data were analysed using descriptive statistics, regression analysis and Pearson's Chi-square test. **Results:** A total of 478 female teachers were included in the study (response rate: 72.4%). The majority of participants (60.5%) had good overall knowledge about BC while 19.9% of participants had excellent overall knowledge. Only 9% of participants demonstrating excellent knowledge of BC risk factors. More than half of the participants (56.1%) reported excellent knowledge in screening methods. Unfortunately, only 57% of the female teachers indicated practising BSE. Knowledge of BC symptoms was closely divided between excellent and good levels (45.8 and 42.5%, respectively). BSE practice was significantly ($P < 0.05$) correlated with overall knowledge of BC and its symptoms and screening methods, but not with knowledge of BC risk factors. **Conclusion:** This study revealed unsatisfactory overall knowledge of BC risk factors, symptoms, screening methods and BSE practice among female Omani teachers in Al-Dhahira Governorate. These findings constitute a challenge to healthcare providers to continue developing awareness of BC and providing health information to the public.

Keywords: Breast Cancer; Awareness; Knowledge; Breast Self-Examination; Risk factors; Signs and Symptoms; Oman.

المخلص: الهدف: هدفت هذه الدراسة إلى تقييم معرفة عوامل خطر الإصابة بسرطان الثدي، وعلامات التحذير والأعراض وممارسة الفحص الذاتي للثدي بين المعلمات العمانيات في محافظة الظاهرة. **الطريقة:** تم جمع عينة مستعرضة من معلمات تتراوح أعمارهن بين 20 و 50 سنة في الفترة من يناير إلى ديسمبر 2018 من ثلاث ولايات في الظاهرة-عبري، ضنك وينقل. تم إجراء استبيان يتضمن مقياس التوعية بسرطان الثدي والخصائص الديموغرافية. تم تحليل البيانات باستخدام الإحصائيات الوصفية، وتحليل الانحدار واختبار مربع كاي بيرسون. **النتائج:** شملت الدراسة 478 معلمة (معدل الاستجابة = 72.4%). كان لدى أغلبية المشاركات (60.5%) معرفة شاملة جيدة عن سرطان الثدي في حين كان لدى 19.9% من المشاركات معرفة شاملة ممتازة بالمرض. كانت معرفة عوامل الخطر غير مرضية، حيث أظهرت النتائج أن 9% فقط من المشاركات لديهن معرفة ممتازة. وتبين أن أكثر من نصف المشاركات (56.1%) لديهن معرفة ممتازة بأساليب الفحص. للأسف، أشارت 57% فقط من المعلمات إلى ممارسة الفحص الذاتي للثدي. تم تقسيم معرفة أعراض سرطان الثدي بين المستوى الممتاز والجيد (45.8% و 42.5%) على التوالي). ارتبطت ممارسة الفحص الذاتي للثدي بشكل ملحوظ ($P < 0.05$) بالمعرفة الكلية لسرطان الثدي وأعراضه وطرق الفحص، ولكن ليس مع معرفة عوامل خطر سرطان الثدي. الخلاصة: كشفت هذه الدراسة عن معرفة عامة غير مرضية بعوامل الخطر والأعراض وطرق الفحص وممارسة الفحص الذاتي للثدي لدى المدرسات العمانيات في محافظة الظاهرة. تشكل هذه النتائج تحدياً لمقدمي الرعاية الصحية لمواصلة تطوير الوعي بسرطان الثدي وتوفير المعلومات الصحية لعامة الناس.

الكلمات المفتاحية: سرطان الثدي. الوعي: المعرفة: الفحص الذاتي للثدي؛ عوامل الخطر: العلامات والأعراض: سلطنة عمان.

ADVANCES IN KNOWLEDGE

- This is the first study to assess breast cancer (BC) awareness in rural areas in Oman.
- The study revealed insufficient overall BC knowledge among female Omani teachers.

APPLICATION TO PATIENT CARE

- Increased public awareness of BC's signs, symptoms and risk factors and breast self-examination (BSE) practice has a substantial impact on the incidence and outcomes of the disease.

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- Early detection of BC leads to better response to therapy and subsequently improves survival rates.
- The World Health Organization stresses promoting awareness of BC in the community and encourages early diagnosis of the disease in the primary care setting.

BREAST CANCER (BC) IS THE SECOND MOST common cancer worldwide and the most frequently diagnosed life-threatening cancer in women. In 2018, more than two million cases of BC were newly diagnosed among women.^{1,2} Case fatality rates from BC are higher in low- and middle-income countries than in most high-income countries.³⁻⁶ These observations have been attributed partially to a lack of awareness of BC risk factors and symptoms and a lack of practice of breast self-examination (BSE).⁴⁻⁶

Increased public awareness of BC is an important factor that has a substantial impact on early detection of the disease. Delayed BC diagnosis in developing countries has been associated with poor BC awareness and barriers to access healthcare services. Cancer that is diagnosed at an early stage is more likely to be treated successfully.⁷⁻⁹ In Oman, BC is the most common cancer in women, with a median age at diagnosis of 48 years, followed by thyroid cancer and colorectal cancer.^{10,11} In 2018, a total of 454 cases of BC were reported, representing 34.15% of total cancers in Omani women.¹² This figure indicates a significant rise in BC cases in comparison to previous reports.^{1,11}

According to several studies, increasing incidents of BC are associated with a combination of several risk factors including delayed childbirth, reduced incidence of breastfeeding, obesity, increased consumption of alcohol and a fatty diet, sedentary lifestyle, environmental pollution, long-term use of hormone replacement therapy (HRT) containing estrogen and progestin and contraceptive use.¹²⁻¹⁴ Other risk factors for BC have been attributed to molecular and genetic determinates.¹⁵

BC screening can be done by BSE, clinical breast examination (CBE) and mammography.¹⁶ The effectiveness of BSE in reducing BC mortality remains controversial. Several studies have shown that trained women practising BSE does not reduce BC mortality.^{17,18} Other studies show that BSE may have a substantial effect in increasing BC awareness and could encourage women to seek CBE, thus leading to earlier detection.¹⁹⁻²¹ The effectiveness of CBE is considered higher than BSE; however, the sensitivity of CBE is dependent on the amount of time taken to do an examination.²² Mammography is used as a sensitive screening method, particularly for women older than 40 years, but it is less effective for younger women.²³

Studies to assess knowledge of BC and BSE practice are limited in Oman. Only two studies related

to BC awareness to Oman have been published focusing on Muscat Governorate.^{24,25} Therefore, further studies are needed. This study aimed to ascertain the knowledge of risk factors, warning signs and symptoms of BC, including BSE practice among Omani female teachers in Al-Dhahira Governorate.

Methods

In this cross-sectional study, stratified random sampling was used to select participants from a total of 22 governmental female schools in Al-Dhahira Governorate, Oman. The schools were selected according to the population size of each *wilayat* (province). Most of Al-Dhahira's population (75%) are concentrated in Ibri, whereas Yanqul and Dhank represent only 25% of the governorate's population. Questionnaires were distributed to 22 schools according to the proportion of population in each area (14 schools in Ibri, four schools in Yanqul and four schools in Dhank).

The sample size was calculated using online Sample Size Calculator.²⁶ The needed sample size was estimated to be 675 female teachers. Schools were selected randomly from each stratum. The study cohort was selected because they were easily accessible and deemed to be educated.

All the participants were female teachers aged between 20–50 years old. The study was conducted from January to December 2018. Non-Omani female teachers, women with a personal history of BC and incomplete questionnaires were excluded.

All participants were involved in the National Health Educational and Screening Programme initiated in 2010 by the Ministry of Health. School teachers were included in this programme through the School Health Section of the Directorate General of Health Services in Al-Dhahira Governorate. Regrettably, the success of this programme has not been assessed yet. The findings of this study may contribute to understanding the effectiveness of this programme.

Data were collected using a self-administered questionnaire which contained seven parts: (1) demographic data; (2) general BC knowledge; (3) presence of family history of BC and personal history of breast lump; (4–6) overall knowledge of BC (i.e. knowledge of risk factors, screening methods and symptoms of BC); and (7) practice of BSE. The questionnaire was adapted from previously validated breast cancer awareness surveys.^{7,25,27}

Risk factors for BC were assessed according to age, family history, having a personal history of BC, early menarche, late menopause, having the first child after the age of 30, not breastfeeding, recent use of combined oral contraceptive (COC) or HRT, exposure to radiation, obesity, following a sedentary lifestyle, eating a diet high in fat, alcohol consumption or smoking and exposure to environmental pollution. The questionnaire was scored according to awareness of BC risk factors, with 0–6 items considered reflective of poor awareness, 7–12 considered indicative of good awareness and 13–16 items considered excellent awareness.

Women's knowledge about screening methods (i.e. CBE, BSE and mammography) was assessed by asking three separate questions associated with these methods. Poor awareness was reflected in a score of 0–1 items, good awareness was reflected in a score of two items and excellent awareness was reflected in a score of three items. Additionally, the questionnaire included eight questions about BC symptoms in relation to breast pain, painless or painful breast lumps, a change in the size of the breast, nipple or skin colour, bloody nipple discharge and a loss of weight and appetite. Levels of awareness of symptoms were classified as poor (aware of 0–3 items), good (aware of 4–6 items) and excellent (aware of 7–8 items).

Overall knowledge was calculated by adding the score of the three subscales (i.e. risk factors, symptoms and screening methods) and was interpreted as poor (aware of 0–11 items), good (aware of 12–20 items) and excellent (aware of 21–27 items).

Statistical Package for the Social Sciences (SPSS), Version 20 (IBM, Corp., Armonk, New York, USA) was used to analyse the data. Participants' demographic characteristics were summarised using means and standard deviation (SD) for continuous variables, and frequencies and percentages were used for categorical data. Inferential analyses (Pearson's Chi-square test and correlation and regression analyses) were also used to analyse the data. Descriptive statistics, including percentages, means and SD, were calculated.

To find the most important predictors of having better BC and BSE knowledge, a logistic regression analysis was used. Positive knowledge and practice of BSE were considered dependent variables, whereas age, educational level, income, family history of BC, previous history of breast lump, knowledge of general facts about BC and geographical location were considered independent variables.

The study was approved by the Research and Ethics Committee at the Directorate General of Health Services of Al-Dhahira Governorate, Oman. Informed consent was obtained from all participants.

Results

A total of 478 female teachers completed the questionnaire (response rate: 72.4%). The mean age of the participants was 33.3 ± 5.5 years old. As shown in Table 1, the majority of participants (58.8%) were 30–39 years old, and most had a bachelor's degree (88.1%). Most participants (72.3%) were from Ibri, while 17.4% were from Dhank and 10.3% were from Yanqul. More than half of the women (54.4%) had a monthly income of 1,001–1,500 Omani rials (OMR), followed by an income of 500–1,000 OMR per month (39.1%), and only 6.5% of the participants had an income >1,500 OMR per month. In total, 10.5% of participants had a positive family history of BC and 3.5% had a history of a breast lump [Table 1].

Table 1: Demographic characteristics of the included female teachers from Al-Dhahira Governorate (N = 478)

Variable	n (%)
Age (years)	
20–29	131 (27.4)
30–39	281 (58.8)
>40	66 (13.8)
Educational level	
Diploma	46 (9.6)
Bachelor's degree	421 (88.1)
Masters	10 (2.1)
PhD	1 (0.2)
Wilayat	
Ibri	346 (72.3)
Dhank	83 (17.4)
Yanqul	49 (10.3)
Income (OMR)	
500–1000	187 (39.1)
1001–1500	260 (54.4)
>1500	31 (6.5)
Family history of BC	
Yes	50 (10.5)
No	418 (87.4)
Unknown	10 (2.1)
Personal history of breast lump	
Yes	17 (3.5)
No	454 (95)
Unknown	7 (1.5)

OMR = Omani riyal; BC = breast cancer.

Table 2: Knowledge of risk factors for breast cancer among the included female teachers from Al-Dhahira Governorate (N = 478)

Risk factor	n (%)		
	Yes	No	I don't know
Exposure to high doses of radiation	385 (80.5)	19 (4)	74 (15.5)
Family history of BC	342 (71.5)	53 (11.1)	83 (17.4)
Personal history of BC	329 (68.8)	43 (9)	106 (22.2)
Smoking	322 (67.4)	43 (9)	113 (23.6)
Environmental pollution	298 (62.3)	50 (10.5)	130 (27.2)
Alcohol	281 (58.8)	38 (7.9)	159 (33.3)
No physical exercise	271 (56.7)	65 (13.6)	142 (29.7)
High fat intake	246 (51.5)	51 (10.7)	181 (37.9)
Obesity	237 (49.6)	67 (14)	174 (36.4)
Use of HRT	232 (48.5)	30 (6.3)	216 (45.2)
Late menopause (ending periods after the age of 55 years)	175 (36.6)	67 (14)	236 (49.4)
Use of COC	154 (32.2)	67 (14)	257 (53.8)
Delivery of first child after 30 years of age	118 (24.7)	123 (25.7)	237 (49.6)
Old age	101 (21.1)	174 (36.4)	203 (42.5)
Early menarche (before 12 years old)	76 (15.9)	121 (25.3)	281 (58.8%)
Not breastfeeding	27 (5.6)	411 (86)	40 (8.4)

BC = breast cancer; HRT = hormone replacement therapy; COC = combined oral contraceptive.

Most participants believed that BC is the most common cancer in females and that early detection and treatment will lead to a favourable outcome (86.2% and 94%, respectively).

The most reported risk factor was exposure to a high dose of radiation (80.5%), followed by a family history (71.5%) and personal history of BC (68.8%). Smoking and environmental pollution were reported by 67.4% and 62.3% of the participants, respectively, as risk factors for BC. Some participants reported hormonal factors as a risk factor including recent use of HRT (48.5%), late menopause (36.6%) and the use of COC (32.2%). Not breastfeeding (5.6%) was the least identified risk factor [Table 2].

Regarding the knowledge of screening methods, BSE was the most familiar method (88.1%), followed by CBE (71.1%) and mammography (68%). The most reported symptoms of BC were a painless breast lump (82.2%), changes in breast size (82%) and changes in the nipple (80.8%). The least reported symptoms were

Table 3: Knowledge of screening methods and symptoms of breast cancer among the included female teachers from Al-Dhahira Governorate (N = 478)

Variable	n (%)		
	Yes	No	I don't know
Knowledge of screening methods			
BSE	421 (88.1)	22 (4.6)	35 (7.3)
CBE	340 (71.1)	34 (7.1)	104 (21.8)
Mammography	329 (68)	43 (9)	106 (22.2)
BC symptoms			
Painless breast lump	393 (82.2)	44 (9.2)	41 (8.6)
Change in the size of the breast	392 (82)	32 (6.7)	54 (11.3)
Change in the nipple	386 (80.8)	33 (6.9)	59 (12.3)
Change in skin colour	366 (76.6)	37 (7.7)	75 (15.7)
Bloody nipple discharge	364 (76.2)	37 (7.7)	77 (16.1)
Breast pain	339 (70.9)	89 (18.6)	50 (10.5)
Painful breast lump	334 (69.9)	93 (19.5)	51 (10.7)
Loss of weight and appetite	240 (50.2)	74 (15.5)	164 (34.3)

BSE = breast self-examination; CBE = clinical breast examination; BC = breast cancer.

breast pain (70.9%), a painful breast lump (69.9%) and loss of weight and appetite (50.2%) [Table 3]. The latter are considered symptoms of metastasis that appear at the end stage of the disease.

Overall knowledge of BC was calculated by adding the scores for knowledge of risk factors, screening methods and symptoms of BC. The majority of participants (60.5%) had good overall knowledge about BC, while 19.9% had an excellent overall knowledge. The rest of the participants (19.7%) were categorised as having poor overall knowledge. About half of the participants (49.6%) had good knowledge of BC risk factors, whereas 9% had scores reflective of excellent knowledge of risk factors. More than half of the participants (56.1%) reported excellent knowledge of screening methods. Knowledge of BC symptoms (i.e., a painless breast lump; bloody nipple discharge; changes in breast skin colour, breast size or the nipple; breast pain; a painful lump; and loss of weight and appetite) was closely divided between excellent and good levels (45.8 and 42.5%, respectively) [Table 4].

The main source of information about BC was received from health institutions (64.7%) followed by the media (31.6%); however, only 3.7% of the participants had obtained information from relatives and friends.

Table 4: Overall knowledge of breast cancer among the included female teachers from Al-Dhahira Governorate (N = 478)

Variable	n (%)		
	Excellent	Good	Poor
Overall knowledge	95 (19.9)	289 (60.5)	94 (19.7)
Knowledge of risk factors	43 (9)	237 (49.6)	198 (41.4)
Knowledge of screening	268 (56.1)	97 (20.5)	113 (23.4)
Knowledge of symptoms	219 (45.8)	203 (42.5)	56 (11.7)

Table 5: Logistic regression analysis for the practice of breast self-examination among the included female teachers from Al-Dhahira Governorate (N = 478)

Variable	Wald test	P value
Knowledge of BC screening methods	14.327	0.001*
Age	5.39	0.023*
Personal history of breast lump	6.34	0.042*
Wilayat	6.97	0.031*

BC = breast cancer.

*Statistically significant.

Multiple regression analysis using backward elimination method for overall knowledge of BC indicated a significant association with knowledge of the fact that early BC detection can lead to successful treatment ($P = 0.001$) and that BC is the commonest cancer among females ($P = 0.001$).

Among the participants, 57.5% indicated practicing BSE. The best timing for practicing BSE was assessed among participants. In total, 55.2% of them believed that the best time for practicing BSE was after menstruation while 18% replied that any time was a good time, 13.6% responded when a woman feels breast pain and 13.2% said before menstruation.

The majority of participants (54.2%) attributed not practicing BSE to a lack of time, while 30.5% did not know how to perform BSE. Only 8.2% considered BSE embarrassing and 7.1% of participants had a fear of finding BC if they practiced BSE.

BSE was significantly correlated with overall knowledge of BC ($P < 0.05$), screening methods ($P < 0.001$) and knowledge of symptoms ($P = 0.014$), but not with knowledge of risk factors ($P = 0.23$). The logistic regression model for practicing BSE showed the most powerful associations with knowledge of BC screening methods ($P = 0.001$), age ($P = 0.023$), having a personal history of a breast lump ($P = 0.042$), and geographical location ($P = 0.031$) [Table 5].

Table 6: Variables associated with overall knowledge and practice of breast self-examination among the included female teachers from Al-Dhahira Governorate (N = 478)

Variables	Overall BC knowledge		Practice of BSE	
	Chi-square value	P value	Chi-square value	P value
Demographic characteristic				
Age	3.11	0.540	7.27	0.026*
Educational level	12.55	0.051	1.68	0.64
Province	5.45	0.244	6.61	0.037*
Income	6.08	0.193	2.09	0.35
Experience with BC				
Family history of BC	1.1	0.881	3.29	0.193
Personal history of breast lump	9.07	0.059	7.34	0.015*
Knowledge of general facts about BC				
BC is the commonest cancer among females	21.6	0.001*	5.79	0.016*
Early detection of BC can lead to successful treatment	21.57	0.001*	0.015	0.903

BSE = breast self-examination; BC = breast cancer.

*Statistically significant.

Among demographic characteristics, age and geographical location were significantly associated with BSE ($P = 0.026$ and 0.037 , respectively) [Table 6]. General knowledge of BC as the most common cancer among females and having a personal history of breast lumps were significantly associated with practicing BSE ($P = 0.016$ and 0.015 , respectively). Knowledge of general facts about BC were significantly associated with overall knowledge of BC ($P = 0.001$).

Discussion

This study confirms Omani women's unsatisfactory overall knowledge about BC risk factors and screening methods.^{24,25} Similar observations have previously been made in developed and developing countries, with participants showing poor understanding of major BC risk factors.²⁷⁻³² Because the majority of female teachers involved in the current study had only good-to-poor knowledge of BC, the results indicate that an educational programme is needed to increase awareness of BC risk factors.

Unsatisfactory knowledge of BC risk factors was observed with risk factors such as non-breastfeeding, being overweight, having their first pregnancy after 30 years of age, having menopause after the age of 50 and doing less physical activity. This finding agrees with those reported by other studies.^{28,33} Moreover, knowledge of BC risk factors among Omani female teachers is different from that reported in previous studies conducted in the region. For instance, the current study showed that most participants (80%) identified exposure to radiation as the highest risk factor for BC, whereas a previous study conducted in Muscat showed that only 24% of participants identified exposure to radiation as a risk factor.²⁴ This observation also contrasted with a previous study done in Saudi Arabia, which showed that participants most often identified not breastfeeding as a BC risk factor, whereas it was the least reported risk factor in the current study.²⁸

Similarly, contradictory findings were observed with overall knowledge of BC. Overall knowledge in Al-Dhahira Governorate was much higher than in the Muscat region.²⁴ This difference may be attributed to differences in the study cohort and ongoing campaigns under the National Health Educational and Screening Programme in recent years. This programme may also have had a positive effect on knowledge of screening methods, since the majority of the current participants recognised the most common methods of BC screening (i.e., BSE, CBE and mammography). Participants' knowledge related to BSE was also satisfactory; most participants were aware of the importance of BSE. This finding is much higher than knowledge rates for BSE seen in some other studies.^{24,27–34} Nevertheless, Omani women's attitudes towards BSE need improvement, since only 57% of participants indicated practicing BSE. Other studies in Saudi Arabia reported 67.6% of participants had never tried BSE.²⁸ In contrast, a study in Uganda revealed that 76.5% of participants practiced BSE.²⁹ On questioning current participants about reasons for not practicing BSE, 54.2% reported not having time, 30.5% of participants stated that they did not know how to do it and a few reported fear of having BC and embarrassment at the process (8.2% and 7.1% respectively). These findings may be attributed to unawareness of practicing BSE. Although the usefulness of BSE as an appropriate method for early BC detection has been debated in recent years, the awareness of the importance of practicing BSE should be encouraged via an intensive health education programme.^{15,18–22}

Income and level of education had no association with the level of knowledge or the practice of BSE. However, practicing BSE, knowledge of BC risk

factors and symptoms were significantly correlated ($P < 0.05$) with knowledge of screening methods. This finding may be attributable to increased general awareness of BC and BSE among participants through healthcare providers. A similar study conducted in Iran revealed an association between educational level and knowledge of BC.³¹

The sources of information about BC in the current study included health institutions, followed by the media (i.e. TV, radio, and the Internet). This finding was inconsistent with previous studies conducted in Saudi Arabia, the United Arab Emirates, Egypt and Yemen, which showed that mass media (i.e. TV and radio) were the main sources of information about BC.^{28,33–36} Therefore, this study suggests that creating awareness of BC through media and campaigns needs to be strengthened in order to raise awareness of BC in the community.

The main limitations of this study are that the findings cannot be generalised to all females in the country because the female teachers included in this study were only from Al-Dhahira Governorate and mainly from Ibri *Wilayat* (72.4%). Such a cohort may not be representative of all females in Oman and, to a lesser extent, from Al-Dhahira Governorate. In addition, the response rate of this study (72.4%) should be considered a limitation because in survey research a response rate of $\geq 80\%$ is expected.

Conclusion

The study revealed insufficient overall BC knowledge (especially knowledge of risk factors and BSE practice) among female Omani teachers. This finding signals a need for prompt interventions to raise awareness about BC and BSE among females. Healthcare providers need to continue educating the community about BC. The media, including TV and newspapers, also need to be involved in raising BC awareness. In addition, BC awareness should be included as a part of teacher training programmes at schools and colleges. Further studies involving a larger sample size and participants from different sectors are recommended.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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