Breast cancer knowledge and screening behaviors of female teachers: A cross-sectional survey in Buraydah, Saudi Arabia

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Abstract

Background: Breast cancer is the second commonest cause of cancer-related deaths in Saudi Arabia. However, several women bypass early discovery and management possibilities. Methods: This cross-sectional study was conducted in the governmental secondary girls’ schools in Buraydah city, Saudi Arabia, during the period from August 2019 to January 2020. The data were collected using a valid pretested structured self-administered questionnaire. Results: The study included 316 female teachers. The total breast cancer knowledge score was abnormally distributed, as evidenced by significant Shapiro-Wilk test, $P < 0.001$. The mean ± SD score was $10.66 ± 3.73$ (maximum possible score: 15) and the median (IQR) was 11 (8–13). Less than half (42.7%) of the teachers reported performing breast self-examination (BSE) (while only 9.5% went to a clinic for clinical breast examination). BSE was performed on monthly basis by only 14.8% of those practiced it. Ignorance of the examination and fear to discover a tumor were mentioned by 24.9% for each as a reason for not performing BSE, whereas 42.5% of those who did not practice it had no definite reason. Mammogram was ever practiced by 22.5% of the female teachers. Older teachers (40–50) reported higher rates of performing mammogram compared to those aged <40, $P = 0.012$. Also, teachers who had friends with breast cancer were practiced mammogram at higher rate than their counterparts, $P = 0.025$. Conclusion: The breast cancer knowledge is overall insufficient regarding risk factors and clinical presentation. Improving knowledge regarding risk factors, presentation, and screening tools as BSE and mammogram through educational programs is highly recommended.

Keywords: Breast cancer, breast self-examination, knowledge, mammogram, risk factors, Saudi Arabia

Introduction

Breast cancer (BC) is the commonest cancer of women worldwide with nearly 1.7 million new cases of BC were diagnosed in 2012, which represents 25% of all women cancers and fifth most common cause of death in women. The worldwide rate for mortality from BC ranged from 6 per 100,000 in Eastern Asia to 20 per 100,000 in Western Africa.

Breast cancer is the second commonest cause of cancer-related deaths in Saudi Arabia and the commonest type of female cancer. In Saudi Arabia, the incidence rate of breast cancer was 1% according to the Saudi Cancer Registry (2001–2008). 29.7% was the incidence of breast cancer among females in 2018. According to the most recent cancer-related mortality survey among Saudi women, breast cancer is the ninth leading cause of death and the overall survival rate was lower than that reported in United Kingdom and United States of America; mostly this attributed to due to the nonexistence of a standard nationwide breast screening program in the kingdom and low uptake of screening.

According to the recommendations from the Society of Breast Imaging and the American college of radiology (ACR),

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women have a sense to recognize and describe any breast abnormalities immediately to their healthcare providers through breast self-examination (BSE). In order to slow down the rising incidence of breast cancer, hindering the increasing prevalence of its risk factors along with improving economic conditions is recommended. The most effective method that can control this is the early detection of breast cancer. Early detection was seen as one of the most promising long-term strategies for preventing disease-related deaths.[12]

In Saudi, primary healthcare centers are the primary centers that communicate with the patient and providing free public healthcare. However, unfortunately several women bypass early discovery and management possibilities related to the shortage of data, knowledge, and recognition of breast cancer, as well as cancer screening manners in general.[13]

Among local published health literacy studies, no studies could be found that examined the knowledge of female teachers in Saudi Arabia particularly in Buraydah. Therefore, our objectives are to assess the knowledge and screening behavior of female teachers regarding breast cancer.

**Material and Methods**

**Participants and procedure**

This is a cross-sectional study conducted among governmental secondary girls’ schools female teachers, in Buraydah city, Saudi Arabia, during the period from August 2019 to January 2020. Those who were absent or could not complete the questionnaire for any reason were excluded from the study.

The sample size was calculated using standard sample size equation: \( n = \frac{z^2 \cdot p \cdot (1 - p)}{e^2} \). Assuming the prevalence of good knowledge regarding breast cancer among teachers as 50%, precision of 4%, and confidence interval of 95%, a minimum sample size of 315 was obtained.

A stratified random sampling technique was followed in this study. Governmental secondary girls’ schools were stratified according to their geographic divisions into two districts (southern and northern) with 40 schools in total, 25 schools in northern district and 15 in southern district of total 1739 teachers. Through a simple random technique, 15 schools in northern district and 5 in southern district were chosen. Therefore, we had 20 schools in total. All teachers who met the inclusion criteria within the selected secondary schools were included till we reached to the required sample size. Each selected school was visited once between 10 am and 12 pm.

The data were collected using a valid pretested structured self-administered questionnaire, adopted from a similar study carried out by Al-Zalabani et al. 2018.[14] The questionnaire included three parts: Part 1 included sociodemographic data such as age (as <40, 40–50), marital situation (single, married, widow/and divorced), family or friend’s history of breast cancer (yes vs. no). Part 2 included 21 questions of knowledge on breast cancer and information associated with the practice, including questions regarding the risk factors of cancer breast (15 questions) and its clinical presentation (5 questions). The final question inquires about the best time to perform BSE. The source of information about breast cancer was added. A score of “1” was assigned to correct answers, while a score of “0” was assigned to wrong or do not know answers. The total score was computed for each participant and tested for normality using Shapiro–Wilk statistical test. Part 3 included questions concerning the practices such as BSE, clinical breast examination, and mammogram. At the end of this part, barriers toward performing mammography were identified in 11 questions which marked as: 1 = totally disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = totally agree. Their responses were re-coded as follows: totally agree and agree = 1, whereas totally disagree, disagree, and neutral = 0.

**Statistical analysis**

Data were analyzed using SPSS 25.0 version statistical software. Descriptive statistics (mean, standard deviation, frequencies, and percentages) were used to describe the quantitative and categorical variables. Pearson's Chi-square test was used to assess the association between the categorical variables. Nonparametric statistical tests (Mann–Whitney and Kruskal–Wallis) were applied to compare groups since the knowledge about breast cancer score was abnormally distributed as evidenced by significant Shapiro–Wilk test. A P value of ≤0.05 was used to report the statistical significance and precision of the results.

**Ethical consideration**

Participants were informed about the purpose and extent of the research, and given formal consent prior to completing the questionnaire. Ethical approval was obtained from the Research Ethics Committee at Qassim University (# 560206) before starting data collection. Verbal consent was taken from school administration and written informed consents were taken from participant teachers. Teachers’ privacy was disclosed for ethical considerations. Ethical considerations were also taken to ensure the confidentiality and privacy of the collected data.

**Results**

**Sample characteristics**

Three hundred and sixteen female teachers completed the questionnaires (response rate of 100%).

Table 1 shows participants’ sociodemographic characteristics. More than half of the participants (55.4%) were below 40 years. As the age has extreme values, we chose the age value 40 as the cutoff point based on the Saudi center of evidence-based healthcare recommendation regarding breast screening.[13] Majority of them were married (91.8%), whereas 4.1% were single. Family history of breast cancer was reported among almost a quarter of them (25.9%), while friend history of breast cancer was mentioned by 22.5% of the teachers.
Knowledge of breast cancer

The majority of teachers had adequate knowledge about breast cancer risk factor; the most knowledgeable factors were oral contraceptive pills (76.9%), smoking (72.5%), and having the first baby after the age of 30 years (63.9%). On the other hand, early menarche (<12 years) and late menopause (>55 years) were recognized as risk factors by only 8.5% and 23.1% of the teachers, respectively. In contrast, only 41.8% of teachers consider obesity to be a risk factor. Moreover, majority of the teachers could recognize concerning symptoms and signs of breast cancer, breast mass (92.1%), changes in color of breast skin (75.6%), and nipple discharge (72.5%). The best time to perform BSE was correctly identified by 61.7% of the respondents [Table 2]. The main source of information about breast cancer was the Internet (42.7%), followed by educational lectures (23.1%) [Table 2].

Table 3 demonstrate a statistically significant association between nonmarried teachers and low breast cancer knowledge compared to others, \(P = 0.047\). Other studied factors (age, family, and friend history of breast cancer) were not significantly associated with knowledge score.

Attitude practice

The participants’ practice toward breast screening examination showed the majority (57.3%) of the teachers did not perform BSE. Seventy-seven (42.5%) of the teachers reported no actual cause that prevents them from doing BSE. On the other hand, half (24.9% and 24.9%) of them reported that ignorance and afraid to discover a tumor are other reasons for not performing and 7.7% do not believe on BSE. In contrast, 42.7% of teachers are performing BSE, in which half of them (49.6%) are performing it irregularly.

The participant’s barriers toward breast screening showed fear to discover something abnormal, being busy, don’t know how to arrange to perform it, and fear of exposing to more unneeded radiation (22.1%, 20.5%, 13.6%, 13.6%; respectively).

Table 4 illustrates no significant association between the studied factors—age, marital status, family and friend history of breast cancer, main source of information, and level of breast cancer knowledge—with performing BSE or clinical breast examination. However, older teachers (40–50) reported higher rates of performing mammogram compared to those aged <40 (29.1% versus 17.1), \(P = 0.012\). Also, teachers who had friends with breast cancer practiced mammogram at higher rate than their counterparts (25.3% versus 12.7%), \(P = 0.025\).

Discussion

In Saudi Arabia, breast cancer ranked first among women and represents almost one-fifth of all newly diagnosed cancers among females and it often presents at advanced stages and more frequently in younger women than in developed countries.\(^\text{[15]}\) Therefore, knowledge of its risk factors, early clinical presentation, and specifying the early screening practices and identifying barriers for their application are essential in our community.

In the present study conducted among governmental secondary girls’ schools female teachers in Buraydah city, the overall knowledge of breast cancer risk factors and clinical presentation was moderate as the median score (IQR) was 11[8‑13] out of a maximum possible of.\(^\text{[16]}\) However, good knowledge was observed regarding some risk factors such as oral contraceptive pills, smoking, and having the first baby after the age of 30 years. On the other hand, deficient knowledge was observed regarding other risk factors such
as early menarche and late menopause. Regarding symptoms and signs of breast cancer, majority of the teachers could recognize breast mass, changes in color of breast skin, and nipple discharge. Additionally, the best time to perform BSE was correctly identified by a considerable proportion of the respondents. In a study carried out previously in Buraydah,\(^{10}\) quite similar results were reported while in another study conducted in Riyadh,\(^{17}\) only 30% of the women knew that use of oral contraceptives is a risk factor for breast cancer, 39.1% knew that hereditary is an important risk factor for breast cancers, 13.8% knew that the risk of breast cancer increases with advancing age, and 16.2% knew that women with no children are at higher risk. Internationally, an intermediate level of knowledge about risk factors related to breast cancer was observed among majority of female university students in Uganda.\(^{16}\) The noted difference in knowledge level regarding breast cancer risk factors between the present study and others could be attributed primarily to different target populations and breast cancer risk factors between the present study and others could be attributed primarily to different target populations and the nature of the used tool to explore the level of knowledge.

It has been documented that BSE practice makes women more aware of their breasts, which consequently may result in earlier diagnosis of breast cancer.\(^{18}\) In the present study, 42.7% of the teachers reported performing BSE; among them, it was performed on monthly basis by only 14.8%. In a recent study carried out in Al-Madinah among attendees of primary healthcare centers, the rate of performing BSE was 38.5%.\(^{14}\) Different rates were reported elsewhere: 52% in Hong Kong,\(^{19}\) 66% in KSA nursing students,\(^{20}\) 37.5% in Jordan,\(^{21}\) and 76.5% in Uganda.\(^{16}\) The difference in rates between various studies could be attributed to variation in nature of the studied population and the cultural and religious background of the community.

The rate of previous performing of mammogram in the present study was 22.5%, despite mammogram facility is usually provided free to Saudi women. This figure is slightly lower than that has been reported by Al-Zalabani et al. (27.7%).\(^{18}\) Restricting analysis to teachers aged over 40 years showed rates of 39% and 29.1% for BSE and mammogram, respectively. In a study carried out Riyadh region among women attended primary health centers, BSE and mammogram performance were reported by 23.1% and 14.8% of them, respectively.\(^{23}\) The same low rate of mammogram performance has been observed in another Saudi study carried out in Dammam.\(^{23}\) Al-Wassia et al. (2017) reported around 40% of Saudi women have ever had a mammogram, according to the survey. Ahmed et al.\(^{24}\) (2015) reported that 13% of Saudi females have performed mammography. El Beheraoui and colleagues (2015) reported 92% of Saudi women aged 50 years or older never having a mammogram.\(^{13}\) Therefore, routine mammography screening is not always possible in developing countries, including Saudi Arabia. Thus, an emphasis should be directed to encourage Saudi women to practice periodic clinical breast examination and BSE. Although a debate still exists concerning the effectiveness of BSE in reducing mortality from breast cancer,\(^{28}\) it remains an important tool for early detection of breast cancer in many parts of the world.\(^{27}\)

In the current study, the commonest reported barriers of breast cancer screening were fear to discover something

### Table 3: Factors associated with breast cancer knowledge among governmental secondary girls’ schools’ female teachers, in Buraydah city, Saudi Arabia

| Factor                                | Total Breast cancer knowledge score | P     |
|---------------------------------------|------------------------------------|-------|
|                                       | Median | IQR | Mean rank |
| Age                                   |        |     |           |
| <40                                   | 11     | 8-13| 158.47    | 0.995*          |
| 40-50                                 | 11     | 8-13| 158.54    |               |
| Marital status                        |        |     |           |
| Single                                | 8      | 5-11.5 | 97.42     | 0.047*          |
| Married                               | 11     | 8-13.25 | 160.94   |               |
| Divorced/widowed                      | 10     | 9.5-14 | 165.15    |               |
| Family history of breast cancer       |        |     |           |
| Yes                                   | 11     | 8-13-13 | 166.39   | 0.362           |
| No                                    | 11     | 8-13.25 | 155.74   |               |
| Friend history of breast cancer       |        |     |           |
| Yes                                   | 11     | 8-13 | 160.97    | 0.795*          |
| No                                    | 11     | 8-13 | 157.78    |               |

*Significance at P<0.05

### Table 4: Association between sociodemographic data and performing BSE and clinical breast examination

|                       | BSE      | Clinical BE | Mammogram |
|-----------------------|----------|-------------|-----------|
|                       | No n=181 | Yes n=135   | P         |
| Age                   |          |             |           |
| <40 (n=175)           | 95 (54.3)| 80 (45.7)   | 0.231     |
| 40-50 (n=141)         | 86 (61.0)| 55 (39.0)   |           |
| Marital status        |          |             |           |
| Single (n=13)         | 10 (76.9)| 3 (23.1)    | 0.256     |
| Married (n=290)       | 165 (56.9)| 125 (43.1)|           |
| Divorced/widowed (n=13)| 6 (46.2)| 7 (53.8)    |           |
| Family history of breast cancer |          |             |           |
| Yes (n=82)            | 40 (48.8)| 42 (51.2)   | 0.071     |
| No (n=234)            | 141 (60.3)| 93 (39.7)|           |
| Friend history of breast cancer |          |             |           |
| Yes (n=71)            | 41 (57.7)| 30 (42.3)   | 0.928     |
| No (n=245)            | 140 (57.1)| 105 (42.9)|           |

|                       | No n=286 | Yes n=30   | P         |
|                       |          |             |           |
| Age                   |          |             |           |
| <40 (n=175)           | 163 (93.1)| 12 (6.9) | 0.075     |
| 40-50 (n=141)         | 123 (87.2)| 18 (12.8)|           |
| Marital status        |          |             |           |
| Single (n=13)         | 12 (92.3)| 1 (7.7)    | 0.948     |
| Married (n=290)       | 262 (90.3)| 28 (9.7) |           |
| Divorced/widowed (n=13)| 12 (92.3)| 1 (7.7)    |           |
| Family history of breast cancer |          |             |           |
| Yes (n=82)            | 73 (89.0)| 9 (11.0)   | 0.590     |
| No (n=234)            | 213 (91.0)| 21 (9.0) |           |
| Friend history of breast cancer |          |             |           |
| Yes (n=71)            | 66 (93.0)| 5 (7.0)    | 0.424     |
| No (n=245)            | 220 (89.8)| 25 (10.2)|           |

|                       | No n=245 | Yes n=71   | P         |
|                       |          |             |           |
| Age                   |          |             |           |
| <40 (n=175)           | 145 (82.9)| 30 (17.1)| 0.012     |
| 40-50 (n=141)         | 100 (70.9)| 41 (29.1)|           |
| Marital status        |          |             |           |
| Single (n=13)         | 11 (84.6)| 2 (15.4)   | 0.822     |
| Married (n=290)       | 224 (77.2)| 66 (22.8)|           |
| Divorced/widowed (n=13)| 10 (76.9)| 3 (23.1)   |           |
| Family history of breast cancer |          |             |           |
| Yes (n=82)            | 59 (72.0)| 23 (28.0)  | 0.159     |
| No (n=234)            | 186 (79.5)| 48 (20.5)|           |
| Friend history of breast cancer |          |             |           |
| Yes (n=71)            | 62 (87.3)| 9 (12.7)   | 0.025     |
| No (n=245)            | 183 (74.7)| 62 (25.3)|           |
abnormal (50.9%), being busy (49.4%), not knowing how to arrange to perform it (40.8%), and not knowing how it will be performed (37.3%). In a study carried out in Al-Madinah among primary healthcare centers attendees, 12 incorrect beliefs about mammography as being a painful procedure and the exposure of women to more unneeded radiation were the main barriers. However, bad communication with mammography personnel and the perception of mammography as being shameful were also important barriers in that study. The difference between the results of the two studies is expected due to differences in the characteristics of the target population.

**Limitations**

Limitations in the current study include the inclusion of only governmental secondary school female teachers, which could impact the generalizability of findings over the female general population in Buraydah city, Saudi Arabia. The use of a self-administered questionnaire may have led to the overestimation of their breast cancer screening practice. The cross-sectional nature of the study with its inherent disadvantages is another limitation.

**Conclusion**

Conclusively, this study indicates that breast cancer knowledge among governmental female secondary school teachers in Buraydah city, Saudi Arabia, is overall insufficient regarding risk factors and clinical presentation. The performance of breast cancer screening techniques is not enough. Therefore, improving knowledge regarding breast cancer risk factors, presentation, and screening tools as BSE and mammogram through educational programs is highly recommended for prevention and early detection. Primary health care professionals should effectively play a role in conveying correct information regarding breast cancer and its early detection during regular physician office visits for other health problems. Encouraging practice of BSE through the audiovisual media, lectures, and symposia is needed.

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**Declaration of patient consent**

The authors certify that they have obtained all appropriate participant consent forms. In the form, the participants have given their consent for their clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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