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Breast Cancer Knowledge and Practice among Saudi Arabia Women with and Without Positive Family History: A Cross Sectional Study

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Abstract: Knowledge of association between breast cancer and risk factors of family history can help change the health behaviour. To reduce risk factors associated with breast cancer among young women in Saudi Arabia, it is necessary to understand the degree of risk perception and socio-economic differences. A cross-sectional study of 253 Saudi women aged 25-64 years investigated the awareness of risk factors (positive family history) for breast cancer. Standard self-administered questionnaire, screening practices including breast self-examination (BSE), clinical breast examination (CBE), and mammography were included in the data collection and analysed through PRISM (version 8.4.2.) for individuals with and without a positive family history. Prevalence of positive family history and non-family history was 75/253 (30%), and 178/253 (70%) respectively. The mean age of women with a positive family history (FH^+) was 47.1 years and without a positive family history (FH^-) was 43.4 years. The results showed that both groups were low in practicing BSE (FH^+ 23% and FH^- 13%) once a month. The BSE knowledge assessment showed 77% in FH^+ women whereas the knowledge of CBE and mammography in FH^+ women were 75 % and 76% respectively, and 83% and 56% respectively in FH^+ women. Awareness of family history as a risk factor was greater in FH^+ women compared to FH^- women. The women with lower education and low income have less knowledge about breast cancer screening behaviour and FH^+ as a risk factor were identified. The results indicated limited knowledge of risk factors and inadequate breast cancer screening of FH^+ women. Poor knowledge and practice of breast screening can contribute to late-stage breast cancer disease. Understanding the strengths and importance of the relationship between breast screening activity and its risk factors is essential to the emerging and more tailored promotion of breast health.

Keywords: Breast Cancer, Breast self-examination, Clinical breast examination, Family history,

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1. INTRODUCTION

Breast cancer (BC) is the most common cancer among women with over 2 million new cases being diagnosed worldwide in 2018 [1, 2] and causes nearly 15% death among all cancers[3]. The World Health Organization (WHO) recommends early detection to prevent breast cancer and improve the outcome and survival rate of BC. [2,4] In 2018, Saudi Health Council, Saudi Cancer Registry reported over 15.9% new cases of breast cancer among Saudi Arabian women of all ages, and 78.7 % of that was infiltrating duct carcinoma.[5] The city of Riyadh has the second-highest age-specific incidence rate with 33.0/100,000, after the Eastern region.[6,7] According to the 2015 Saudi Cancer Registry (SCR) statistics, (latest report) in 2018, the rate of incidence is increasing in Riyadh (28 %) and most of the cases were diagnosed at late stages. [8,9] Saudi Cancer Registry (SCR) has reported the incidence of breast cancer age group was 50-69 years whereas, a recent study has stated that the highest incidence was seen in 30-44 and 45-59 years' age groups. [6,10] According to the Ministry of Health (MOH) guidelines screening includes; mammography screening for women aged 40-49 years every 1 to 2 years and every 2 years for 50-69 years age group and no screening for group 70-74 years. [6,7,11] Clinical Breast Examination (CBE) screening is important for women with positive family history, an inherited gene mutation, and women reported with changes in the breast.[12] Studies have demonstrated that certain risk factors such as positive family history and/or genetic factors may raise the incidence of breast cancer in Saudi Arabia.[13] Positive family history of breast cancer in the first degree relatives (mother, sister, grandmother) increases the risk factor of breast cancer by 50% - 85%.[14] A systematic review and meta-analysis study reported that 11% of BRCA positive breast cancer patients have BRCA1 mutations 17% are BRCA2 mutation carriers. [15] Moreover, approximately 82.5% of younger Saudi women with a genetic history of cancer are at a higher risk for BC. [9,14,16] Moreover, a recent study reported that the average age for women diagnosed with invasive breast cancer is 56 years and 51 years age for *in situ* ductal carcinoma. [14] Another study observed 43-52 years is the median age group for BC incidence.[17] The breast health global initiative recommends public education and awareness of early detection methods, which means a combination of a monthly Breast Self-Examination (BSE), a regular Clinical Breast Examination (CBE), and a mammogram every two years, after the age of 40.[16, 17] The Saudi Arabia national plan for cancer control (2014-2025) aims to reduce the incidence of cancer and to do that legislation to add effective strategic goals are urgently needed for early detection and prevention of BC screening. [18, 10] Studies have reported an adequate level of knowledge of BC screening whereas studies of risk factors are lacking in Saudi Arabia. So the present study investigates the practice level of breast cancer screening based on the understanding of family history risk factors and correlates with knowledge of risk factors.

2. METHODS

2.1 Study design

This cross-sectional study was conducted among female volunteers by random convenient sampling to collect the data. The research was performed for a period of six months, from October 2018 to March 2019. Female participants were informed about the purpose of the research with a standard self-reported questionnaire in the Arabic language for data collection. Written informed consent was received from the participants and the collected data was encoded in a safe with the only reference to the researchers. The questionnaire was ethically approved by the Institutional Review Board (IRB) (BERC-001-05-18) of Prince Sattam bin Abdulaziz University, Alkharj. The survey was conducted through an online form (https://www.surveymonkey.com/) from female participants who lived in and around Riyadh city, aged 25-65 years. Two hundred and fifty-three female participants were surveyed and the data was collected for analysis.

2.2 Socio-demographic details

This section includes questions about age, education level, marital status, and employment status, monthly income, and family history of breast cancer.

2.3 Knowledge of risk factors, and breast screening

Awareness of risk factors for breast cancer was measured based on nine risk factors listed in the American Cancer Society classification. Awareness of risk factors for breast cancer was classified into two: 5-9 risk factors were considered to be good knowledge, whereas 4 or fewer risk factors as poor knowledge.

2.4 Knowledge and practice of breast cancer screening

This section assesses the level of knowledge about breast cancer investigative practice towards early detection; BSE knowledge and practice (once a month, once a year, never); CBE knowledge and practice; mammography knowledge and practice followed by knowledge about genetic screening and BRCA genes.

3. STATISTICAL ANALYSIS

Statistical analysis for social sciences (PRISM 8.4.2) was used for this study. Descriptive and analytic statistics including means, frequencies, percentages, and confidence intervals were used to describe sociodemographic characteristics, breast cancer knowledge, and screening practices. T- tests, Pearson's chi-square test, and Fischer's exact test were applied to investigate the relationship between breast cancer knowledge and screening practices among women with and without a family history of breast cancer, using a significance level of $p < 0.05$. Multivariate logistic regression was conducted to limit the effects of confounding factors and adjust the effects of sociodemographic variables on the correlation between family history of breast cancer and screening practice. This will also aid in analyzing the participant's variables that led towards early detection practice. Bivariate and multivariate analyses were implemented to measure the association between participant's level of breast cancer knowledge and early detection attitudes.

4. RESULTS

The major objective of this research was to evaluate the understanding and performance of breast cancer screening

and its risk factors in women with a strong family history of breast cancer. Two hundred and fifty-three females participated in this study. Figure 1, illustrates the distribution of age group and family history of breast cancer. 62/253 (24.5%) of the female participants were in the age group of 25–34 years, followed by 58/253 (22.9%) of the participants in the 35-44 years' age group, 88/253 (34.7%) of the women in 45-54 years' age group, and 45/253 (17.7%) of the women in 55-64 years' age group. Among the research participants, 29.7% (75/253) of the female participants have a family history of BC while 70.3% (178/253) of the participants had no family history.

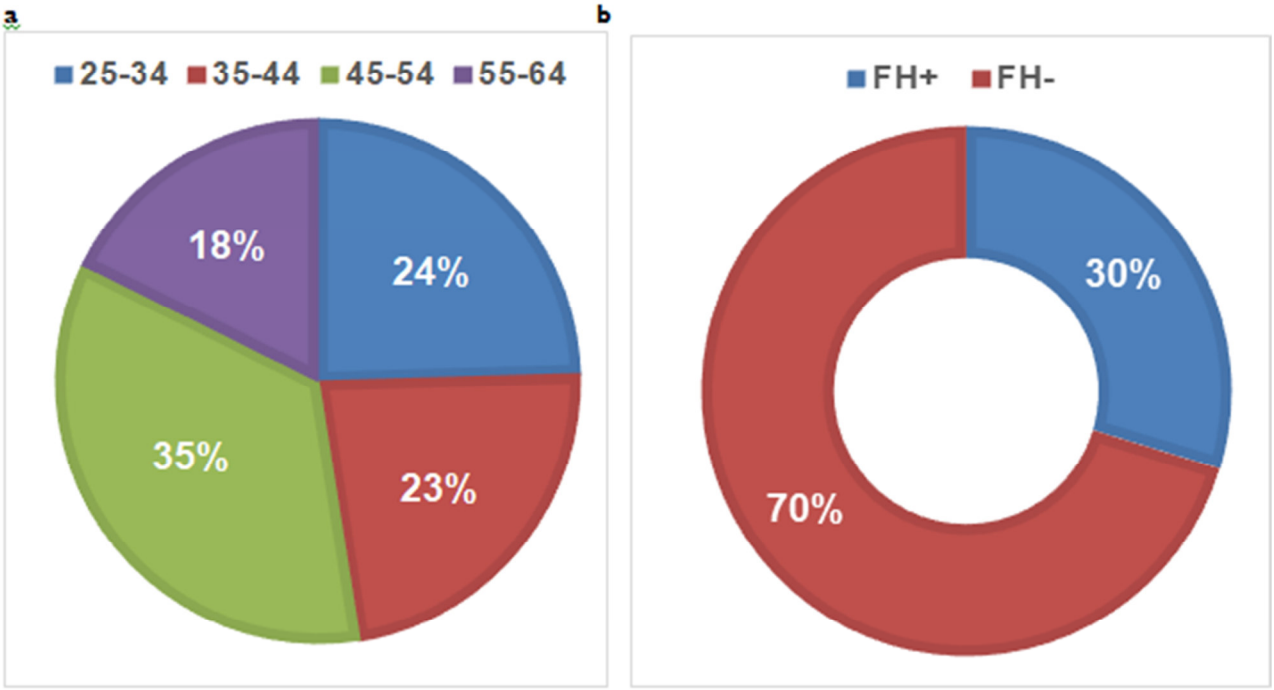

Figure 1: illustrates the distribution of age group and family history of breast cancer. a. age group; b. family history of breast cancer.

4.1 Demographic data

This study investigated the understanding of risk factors and screening for breast cancer. Table (1) describes the distribution of socio-demographic data among Saudi women with and without a positive family history. The correlation of age range was 25-64 (M=43.79, SD ± 10.5) years with nearly 35 % of women in 45-54 years' age group in both FH^+ and FH^- (p = 0.298) were part of this research. All of the respondents had basic education, 51% had successfully completed university degree (M=63.25, SD ± 52; FH^+ =48%, FH^- = 52%), while 13% of the participants were Ph.D. holders (FH^+ =7%, FH^- =6%). Also, it shows most of the participants in both groups were married (M= 42, SD=20.85). Despite, more percentage differences between employment status of both groups were housewife / unemployed (FH^+ = 34%, FH^- = 58%). The research participants came from the same ethnic group (Saudis) (100%). Among the FH^+ respondents, 68% had a first degree (blood) relationship with a breast cancer patient, 25.7% had a breast cancer mother, and 6.3% had a breast cancer sister and daughter.

Table 1: Distribution of Saudi women with positive family history (FH^+) and without (FH^-) by socio-demographic characteristic aged 25-64 years

Socio-demographic Characteristics	Positive family history (FH+)		Negative family history (FH-)
	Percent (95% CI)	P value	Percent (95% CI)
Overall	45.37(42.89- 47.86)	0.429	43.12(41.58-44.65)
Age at survey (years)			
group age		0.298	
25-34	27.46(26.01-28.91)		30.27(29.37-31.16)
35-44	39.56(37.88-41.25)		39.56(38.45-40.67)
45-54	48.83(47.69-49.96)		49.35(48.52-50.17)
55-64	58.65(57.18-60.11)		58.75(57.51-59.93)
Education		0.8402	
High School	6 (2.56-9.43)		14.50(2.42- 26.58)
University	9(3.04-14.9)		23 (10.8 - 35.12)
Master	2.75 (0.363-5.137)		4.250(-0.32-8.82)
PhD	1(-1.25 -3.25)		2.75(-2.17-7.67)
Marital status		0.079	
Single	3(-4.57-10.58)		6.5(1.223 -11.78)
Married	11.5(-0.58 - 23.58)		30.50(-6.32-54.68)

Divorced/Widowed	4.25(0.96-7.53)		7.25(3.065-11.43)
Employment		0.0126	
Employ	6.75 (-11.69-25.19)		12.5(-2.68-27.68)
Retired	2.75(-2.66-8.16)		4.5(-4.64-13.64)
Student	2.0(-3.57-7.357)		1.75(-3.81-7.319)
House wife/ unemployed	7.5(0.708-14.79)		25.75(7.405-44.10)

4.2 Knowledge of risk factors for breast cancer

Based on the American Cancer Society (ACS), the knowledge of breast cancer risk factors (nine factors) were measured among the participants. Table (2) represents the nine risk factors tested in this research. Awareness of about 5 to 9 risk factors was defined as good understanding and fewer than 5 risk factors to be poor understanding about breast cancer. The majority of the participants, in both FH^+ and FH^- (76.25%) had a poor understanding of the breast cancer risk factors, which means they were able to identify less than five risk factors, and statistical significance of p <0.0001 between FH^+ and FH^- respondents were observed. Most of the research participants considered a family history of cancer (72.6%), followed by age factor (57.4%), cyst in breast/prior history of the benign tumour (54.3%) as risk factors, whereas 36.7% identified hormone treatment before/during menopause period, and 38.6% woman breastfed as risk factors. Less than 29% recognized age factors at first menstrual, age at menopause, birth control, and childlessness methods as risk factors.

Table 2: Knowledge and understanding of Breast Cancer Risk Factors

Risk factors for breast cancer	Positive family history (n=75) (FH^+) n (%)		Negative family history (n=178) (FH^-) n (%)	
	Yes	No	Yes	No
Family history of cancer	56 (74.6)	19 (25.4)	106 (59.5)	72 (40.5)
Age	46 (61.3)	29 (38.7)	96 (53.9)	82 (46.1)
Prior history of benign tumour/cyst in breast	51 (68)	24 (32)	83 (46.6)	95 (53.4)
Hormone therapy before/during menopause	20 (26.6)	55 (73.4)	31 (17.4)	147 (82.6)
If and how long a woman breastfed	39 (52)	36 (48)	76 (42.6)	102 (57.4)
Birth control methods	26 (34.6)	49 (65.3)	88 (49.8)	90 (50.2)
Childlessness	37 (49.3)	38 (50.7)	79 (44.3)	99 (55.7)
Age at menopause	34 (45.3)	41 (54.7)	72 (40.4)	106 (59.6)
Age at the first menstrual period	25 (33.3)	50 (66.6)	63 (35.3)	115 (64.7)

4.3 Awareness and Practice of breast cancer screening

Table (3) reveals the respondent's knowledge of breast cancer screening and practice. Examination of breast self-examination (BSE), clinical breast examination (CBE), mammography, and genetic testing for breast cancer screening was evaluated by clear questions stating yes or no answer for all the participants. The majority of the respondents were aware of BSE (FH^+ 77% and FH^- 62%), CBE (FH^+ 75% and FH^- 38%), and mammogram methodology (FH^+ 56% and FH^- 57%) and were able to recognize the benefits of practicing BSE and mammogram. Whereas, knowledge about genetic testing and/or counselling (BRCA genes) showed a p =0.012 significant difference between the FH^+ and FH^- groups. Multiple comparisons between groupage and knowledge within the two groups showed a p <0.0001 significant difference between 45-54 years' age group with other age groups.

Table 3: Knowledge of Breast Cancer Screening and Practice

Knowledge of breast screening	Positive family history (FH+)		Negative family history (FH-)
	Percent (95% CI)	P Value	Percent (95% CI)
BC screening knowledge		<0.0001	
BSE Knowledge	16 (4.45- 27.55)	0.822	25.7 (11.38 - 40.12)
CBE knowledge	13.5(2.28- 24.7)	0.073	17 (1.57- 32.4)
Mammography knowledge	14.25 (6- 22.4)	0.195	22 (5.4- 38.5)
Genetic knowledge (testing)	5.25 (0.155- 10.34)	0.647	8 (-0.91- 16.91)
BRCA genes	11 (0.85 -21.15)	0.012	9.7 (3.6- 15.9)
BSE performance	12 (2.5 - 21.4)	0.059	20 (3.2 - 36.7)
CBE performance	11.25 (1.84- 20.6)	0.108	16 (0.63 -31.3)
Mammography performance	8 (3.49-12.5)	0.17	12.7 (-1.02 - 26.5)
CBE Knowledge	13.5 (2.28 -24.7)	0.073	17 (1.57 -32.4)
CBE practice	11.25 (1.84 -20.6)	0.031	16 (0.62 -31.3)
CBE no practice	2.5 (0.44-4.5)	0.051	1 (-0.29 -2.29)
Mammography knowledge	14.25 (6.09- 22.4)	0.51	22.25 (9.6 -34.8)

Mammography practice	8 (3.49 -12.5)	0.07	12.5 (0.004-25)
Mammography no practice	6.5 (2.27 -10.2)	0.96	9.5 (1.13- 17.8)

Overall, 59.2% (150/253) of the participants had only performed mammograms, whereas all the participants were between the 25-64 years age range commonly recommended for a mammograms. Within the age group 40 and 60 years, there was a significant gap between awareness and practice, as the majority 32 (68.1%) had not performed mammograms. On the other hand, mammography knowledge was varying between both the groups (FH^+ 76% and FH^- 49%) but mammography practice was nearly similar between both groups FH^+ 56% and FH^- 57% with lowest compared to other breast cancer screening. In comparison, 103 (40.8%) of the participants had not performed BSE, despite their understanding and confidence in the benefits of breast screening. Overall, 82.3% of participants accepted that BSE and mammogram will aid early diagnosis of an abnormal mass in the breast, 86.4% accepted early detection, 81.4 % confirmed that it shortens treatment time and avoid the anxiety of developing breast cancer, and 87.5% are successful in identifying breast anomalies. However, the BSE practice once a month in both groups was very less (FH^+ 31% and FH^- 27%), and once a year were FH^+ 69% and FH^- 72%. CBE knowledge among FH^+ was 75% and FH^- was 38% whereas, CBE practice in FH^+ was around 83 % and FH^- 44%. This data demonstrates a high degree of understanding of the advantages of BSE, CBE, and mammogram among Saudi women. All participants who have never undergone mammogram, BSE, and CBE have answered about the obstacles during breast screening. 20.7% of women never underwent a mammogram, 32% of the respondents had never performed BSE and 28.7% had not performed CBE found several obstacles to their inability to perform the breast cancer examination that was mainly due to lack of knowledge and performance (58.7%), majority of the respondents feared a positive result (61.3%). Therefore, key reasons were lack of understanding about BSE and fear of a positive result were the main factors as barriers for BSE. Correlational analysis reveals a significant association between knowledge of BSE performance practice association with demographic characterization in Table (4). The Chi-Square test was conducted to further verify this connection. Most of those who practised BSE had a significant association between FH^+ (mean =12, SD =5.9) and FH^- (mean =20, SD=10.5) with p= 0.0448. The analysis showed that 45-54 years' age group had the most significant association (p = 0.01) performed BSA once a month and a year in both FH^+ and FH^-. Furthermore, it also shows that significant difference, university degree holder applicants were the highest (p = 0.0193) and employed applicants were the highest in FH^+. The housewife applicants in FH^- were significant as well as with the married woman were the most significant group performed BSE (p = 0.064). Knowledge of the risk factors for breast cancer, mammogram, and breast cancer positive family history were statistically significant for the distinction of breast screening behaviour. The data indicate that women with a poor understanding of risk factors of breast cancer were 67.4% (95% CI, 0.946, 2.964) unable to have undergone mammograms than those with good knowledge.

Table 4: Association between Performance of Breast Cancer Screening and socio- demographic characteristic for FH^+ and FH^-

Factors	Performance of Breast Cancer Screening		
	χ2	df	P value
FH^+ vs FH^-	5.33	1	0.0448
Age group	3.459	3	0.01
Education	0.475	1	0.019
Marital status	3.44	1	0.064
Employment	2.867	2	0.0323
Knowledge of breast	3.072	1	0.539

5. DISCUSSION

The research discusses awareness and understanding of risk factors and screening practices of breast cancer among women with a positive family history. Breast cancer is the most common in Saudi Arabia and with the second-highest number of cases in Riyadh. A strong understanding was determined as the ability to identify more than 4 out of 9 risk factors of breast cancer. Study findings indicate that the knowledge of the positive family history as a risk for both groups was high, FH^+ (68%) and FH^- (63%) unlike other findings in Riyadh city which showed 25% understand the effect of positive family history. [20] Furthermore, this study describes that no significant variation has been observed by the socio-demographic characteristic of risk perception of family history between FH^+ and FH^-. Although, positive family history was assessed as a high risk in Riyadh city based on risk assessment with breast cancer [21, 22, 23] whereas lack of research regarding the family history, knowledge, and practice in Riyadh city help a better understanding for cancer prevention. Study results demonstrate that the most knowledgeable group was among the age group of 45-54 years and most of them were university degree holders (30.3%) but, compared to a previous study done in Al Hassa city 19.5% had a perceived a high risk significant among women less than 40 years and women in FH+ only. [24] A study highlighted the importance of women's awareness of breast risk factors [25] (Washbrook, 2006) found that the level of knowledge and understanding of risk factors for breast cancer was too low (29%) and supported by earlier reports [26]. Besides, present research reveals that women with strong knowledge of risk factors performed breast cancer screening frequently than those with poor understanding. Sadler *et al.* (2001) suggested that women's awareness of breast cancer screening should be modified to help them make easy decisions that can improve their health. [27] Awareness of breast cancer risk factors play a major role in prevention, but knowledge alone may not be adequate to help for breast cancer screening and practice. However, understanding of breast cancer may give rise to beliefs of breast cancer and

assessment of perceived individual risk and susceptibility that would lead to behavioural change. [28] In terms of practice, it clearly states that a significant correlation between knowledge and practice in general was observed. However, awareness of risk factors increases the attitude toward breast screening practice. A large number of participants have very good knowledge of BSE with practice (FH^+ (82 %) FH^- (72%)) however, BSE once a month practice was low compared to once a year revealed that people need more knowledge to practice about BSE. [26] Most participants in this research possessed knowledge about BSE (FH^+ 77% and FH^- 62%), CBE (FH^+ 75% and FH^-38%), and mammograms (FH^+ 56% and FH^- 57%) and their benefit for management and prevention. Moreover, participants with FH^+ had a good understanding of CBE compared to FH^-. However, both groups had high practice correlated to the knowledge and this finding was similar to another that reported low knowledge of CBE among women including working health professional women in Riyadh city .[13] Surprisingly, although, clinics for mammography are more distributed in Riyadh city, according to the Ministry of health mammography clinical, the knowledge of it was varied between FH^+ and FH^-. The participants with FH^+ had higher knowledge and practice than the FH^- group similar to earlier studies. [13,29] However, this research also indicates a discrepancy in understanding, knowledge of risk factors, and the current use of breast screening procedures. It suggests that health practice is not only confirmed by awareness or knowledge but possibly a pure understanding of a combination of education or understanding, socio-economic status, cultural values, attitudes, and practices. Awareness combined with trust about the values of BSE, CBE, mammogram, and genetic testing is expected to contribute to preventive actions. Although the performance of breast screening was less in this research and not studied in Saudi Arabia, more women (32.9%) were practicing BSE followed by CBE (27.3%) compared to 20.7% for mammogram.[30]

6. CONCLUSION

In conclusion, the argument in favour of and against screening breast cancer is broad and well documented. However, the lack of consensus on the basic prescription for BSE appears as a challenge to patients and treatment providers. Poor understanding of risk factors and the practice of breast screening resulting in a late-stage diagnosis of breast cancer. This adds a high pressure on overburdened healthcare systems as well as the inaccurate practice of BSE may lead to missed chances for early diagnosis and treatment. Preventive health activity in women with FH^+ is an effective approach that should be encouraged. Women, particularly those with an FH^+, need to be more educated about the risk factors for breast cancer and proper screening protocols for BSE. Understanding the major role of risk factors such as age and relationship with FH^+ as described in this analysis is critical for designing programs for health promotion and prevention of breast cancer. Health care professionals and nurses have more chances to educate women with an FH^+ about the breast cancer screening and practices as well as their thoughts and experiences with breast cancer. Intervention services that overcome obstacles to breast screening practice would be more helpful for women facing these difficulties. The beneficial outcomes of the role of health care providers in educating the women about breast cancer are intended to promote educational intervention and improve outcomes to women's consultation and examination of breast cancer, thus helping to decrease the incidence of late diagnosis. Future research should aim to examine the perspectives of women with a positive family history of breast cancer using a qualitative phenomenological method. This strategy may help towards a better understanding of the mechanics of family experience influencing their breast screening protocols and practice.

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8. CONFLICT OF INTEREST

Conflict of interest declared none

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