Original Study

Breast Cancer Screening Awareness and Practices Among Women Attending Primary Health Care Centers in the Ghail Bawazir District of Yemen

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Abstract

This cross-sectional study aimed to assess breast cancer screening awareness and practices among women attending primary health care centers in the Ghail-Bawazir district of Yemen. A significant association between marital status, level of education, working status, and level of knowledge and breast screening practice was reported. Health care providers play a very limited role in providing awareness to their patients.
Introduction: Women with from breast cancer often present to health care facilities with an advanced stage of disease. This study assessed the breast cancer screening awareness and practices among women presenting to primary health care centers in the Ghail-Bawazir district of Yemen. **Material and Methods:** A cross-sectional descriptive study was carried out from November 1, 2016 through January 31, 2017. A total of 317 women who attended primary health care centers in the Ghail-Bawazir district during the study period were randomly selected for inclusion in the study. Data analysis was carried out using the Statistical Package for the Social Sciences (SPSS) Version 20. Descriptive statistics and χ^2 analysis were used to present the frequency distributions and associations that existed in the data. The data was displayed in tables and graphs. **Results:** Very limited information on breast cancer was obtained from health care providers (14%). Around one-half of the respondents had satisfactory levels of breast cancer knowledge and awareness, whereas 30.3% were practicing self-breast examination, and only 1.6% had ever been exposed to a mammogram test. A significant association between marital status, level of education, working status, and level of knowledge and breast screening practice was reported ($P = .01$). By regression analysis, age and limited level of knowledge on self-breast examination were found determinant ($P < .015$) in factors associated with the use of clinical breast examination. **Conclusion:** The study reveals the satisfactory knowledge of women about breast cancer along with inadequate awareness of breast cancer screening and screening practices.

Introduction

Breast cancer (BC) is the leading cancer in women worldwide and is increasing particularly in developing countries where the majority of cases are diagnosed in late stages.[1,2] It is the most common cancer in women worldwide, with an estimated 1.7 million cases occurring globally in 2012 and a remarkable 20% reported increase in incidence since 2008.[3] BC is the leading cause of cancer mortality in women and constitutes 14% of female cancer deaths. It is anticipated that 41,070 deaths due to BC occurred in the year 2017.[4,5] The increasing global incidence of malignant diseases has been documented by World Health Organization (WHO) and is an issue of serious concern, particularly in developing countries where the increase seems to be more preponderant.[1] By 2035, it is estimated that more than 2.5 million new cases of BC will occur annually. Although the majority of BC deaths occur in low- and medium-income countries (LMICs), wealthier countries have higher

incidence rates of BC.[6] In Arab countries, BC is the most common form of cancer among women. Furthermore, BC incidence rates among Arab women have increased during the last 24 years, and women are currently being diagnosed with BC at more advanced stages of the disease.[7] In Yemen, BC has one of the highest incidence rates among females. According to Globocan statistics in 2012, BC incidence rates are estimated to reach 27.4 per 100,000 females in Yemen.[8] Previous studies focusing on populations from the Aden and Sana'a areas of Yemen have reported that BC accounts for 30% and 26.9% of cancer cases in women, respectively.[9,10] According to data reported from Hadhramout Cancer Registry (HCR) between the years 2000 and 2011, BC is the most commonly occurring type of cancer in women (28.4%).[11] The highest age-specific incidence rate of BC in the female Yemeni population was 27.2 cases per 100,000 females and was observed in the age group of 50-54 years.

The high rate of BC mortality among women of the Middle Eastern countries was primarily due to the delay in the diagnosis of the disease.[12] However, mortality rate could be effectively reduced by the early detection of BC through early detection activities.[13]

The poor knowledge of and wrong beliefs about BC prevention among women are responsible for a negative perception of the curability of the cancer detected early and of the efficacy of the screening tests.[14] As observed from daily practice in the local community, many women diagnosed with BC and referred for more advanced screening procedures such as mammograms and biopsies refused to continue with the required final diagnosis.[15] Such behavior usually generates a lot of questions as to whether these women are aware of BC, its risk factors, and its screening methods. These questions, among others, drive our investigation into the Hadhramout Governorate. We seek to obtain evidence from Hadhrami women regarding BC screening practices for evaluating the level of awareness and practices. The aim of this study was to assess the level of awareness and the practices of women attending primary health care centers (PHCCs) in the Ghail Bawazir District of Yemen regarding BC screening. In addition, we seek to identify the barriers to BC screening among the study group.

Methods

Setting and Design

A cross-sectional descriptive study was carried out from November 1 to January 31 of 2017 in the Ghail Bawazir District, which is located in the coastal part of Hadhramout Governorate, Yemen. Usually, women residing in this district attend the PHCCs, which are located in different areas of the country, as patients seeking medical advice or antenatal care (ANC), as caregivers seeking medical care for family members, and as mothers bringing in their children for vaccination.

Sample Size and Technique

On the basis of an expected prevalence of 25% of them having poor knowledge from a study previously conducted in the region,[14] a 95% level of confidence, and an 80% power, a total sample size of 288 women ≥18 years of age was generated. After adding a 10% increment to the sample size of 288 to compensate for the potential nonresponse from participants, the total sample size reached 317

women. All the five health care centers in Ghail Bawazir District were included in the study. A sampling technique based on proportional allocation was employed to recruit the participants from the five centers according to the flow rate of attendance in those centers in the last 3 months. In each PHCC, all adult women were deemed eligible for the study with the following criteria: a) age range from 18 to 60 years; b) no previous history of BC; and c) attending the center for routine primary care services or accompanying a patient. The distribution of the sample size in each of the five centers was as follows: 102, 82, 77, 33, and 23 women from centers A, B, C, D, and E, respectively. Moreover, the first enrolled woman was selected randomly, and then, every fourth women entering the PHCC was asked to participate in the study. The same process was repeated for two randomly selected days per week in each health center.

Data Collection Tool

A questionnaire was used as an instrument for data collection and consisted of 67 questions. Questions in this questionnaire were derived from valid and reliable questionnaires in the English language retrieved from previous studies conducted in other populations.[15] Furthermore, the questionnaire was reviewed by experts in the field for relevance, clarity, and appropriateness of the terms used and internal consistency of the questions. Back-to-back Arabic—English translation of the questionnaire was performed by a professional translator to ensure consistency of the translated terms and to correct all discrepancies. The final questionnaire in the Arabic language was further tested on a group of women (n = 21) who were not included in the study.

Participants were invited by the investigator (female family doctor) to personal interviews using the pretested validated questionnaire. The questionnaire was designed to contain four main parts. The first part included questions related to women's socio-demographic status [age (≤30, 31-40, and >40 years), marital status (married or unmarried), educational level (have no formal education for a woman who never attended school and formal education for a women who had ever received some type of formal education such as primary school, secondary school, diploma, or undergraduate and post graduate higher education), and working status (working and housewife/nonworking)]. The second part of the questionnaire was subdivided into two sections. Section 1 included 10 items related to knowledge of BC risk factors such as family history of BC, obesity, the use of oral contraceptive pills (OCPs) and hormonal replacement therapy (HRT), delayed maternal age (>30 years), nulliparity, age at menarche, age at menopause, exposure to ionizing radiation, older age, and lack of physical activity. Section 2 included eight items. The participants were asked to tick all items they were aware of as correct for risk factors, namely, family history of BC, obesity, HRT and OCPs, having the first child at age 30 years or older, nulliparity, age of menarche, age of menopause, ionizing radiation, increasing with age, and lack of exercise, which were scored as one for correct answer "Yes" and zero for "No" and "I don't know". By adding the response to each item, a knowledge scale based on knowledge of BC risk factors was constructed. The lowest possible scale score is zero if no symptoms were known, and the highest possible scale score was 10 if all the risk factors were known. The other section included

eight items related to knowledge of BC warning signs, and the items were scored as one for correct answer "Yes" and zero for "No" and "I don't know." These signs comprised breast lump, dumpling of the breast, bloody nipple discharge, pulling of the nipple, change in the shape and size of the breast, change in the shape and size of the nipple, redness or ulceration of the breast skin, and peau d'orange appearance of the breast skin. A similar approach as that of the above mentioned was used to assess the level of knowledge of BC warning signs, where the lowest possible scale score is 0 if no signs were known and the highest possible scale score was 8 if all the risk factors were known.

The third part is related to knowledge and awareness of BC screening methods, which include questions about the common screening methods (mammography, clinical breast examination (CBE), and breast self-examination (BSE)), as well as assessing the source of information about BC. The last part includes questions regarding activities practiced by the women for screening methods (mammography, CBE, and BSE), which was assessed by asking four questions for each method (have heard about this method, how many times to do it, regularity in practice, purpose for performance, and reasons for not practicing the BC screening method). To score the responses to these questions, a correct answer was allocated a value of "one" and a wrong answer was allocated a value of "zero."

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A pretesting for the questionnaire was conducted on 20 women, and the data were analyzed to ensure proper administration and face validity of the instrument, comprehension, and feasibility. The internal reliability of knowledge for both scales was confirmed by a Cronbach's alpha coefficient of 0.76, which was considered satisfactory for the purpose of this study.

Data Analysis

According to our sample size, we used the prevalence of 25% of them having poor knowledge. Therefore, we used the 75th percentile as a cutoff score to distinguish between a low level of knowledge and a high level of knowledge in each dimension. The overall possible knowledge score of 18 (range: 0-18) was dichotomized to a low level of knowledge if the total score was <14 (75th percentile of the total score) or a high of level knowledge if the score was ≥14 as a cutoff point. A similar approach was used to identify the level of knowledge of the awareness of BC risk factors (10 questions) or warning symptoms and signs of BC (8 questions). Accordingly, the 75th percentile (8/10 questions) of the total score and higher was considered as a high level of knowledge and that below this cutoff was considered as a low level of knowledge (6/8 questions). Knowledge and awareness of BC screening is defined as awareness of BSE, CBE, and use of a mammogram as common screening methods of BC. For each domain, three main questions

were asked on the basis of two knowledge scales created as "zero" for "No" and "one" for "Yes" based on the options available. Barriers toward CBE were constructed in a closed end format with multiple options. Participants were asked to tick the answer they were about such as if they heard about the specific method, frequency of performing the procedure, and when a woman has to perform the specific procedure?

The deidentified responses were numerically coded and entered into Statistical Package for the Social Sciences (SPSS) version 20.0 for statistical analysis. Data were represented as frequencies and proportions, and categorical variables were compared by using the chi-square test. The binary logistic regression model was fitted to define sociodemographic and other variables that may be associated with levels of knowledge by inclusion of significant variables at univariate analysis. Variables found to be significant in the univariate analyses were included in the final multivariate logistic regression analysis, with a score of knowledge of ≥75th percentile considered as knowledgeable. All tests were two-sided at a confidence interval of 95%, and the statistical significance level was considered at a P value of <.05.

Ethical Consideration

The study was granted ethical clearance by the Research Committee Family Medicine Department (Ethical Research Committee), College of Medicine, Hadhramout University (HUCOM), Mukalla, Yemen.

Participants were given an information statement outlining the study aims and benefits, and if they agreed to participate, they were asked to sign the provided consent form ensuring them that the information was only going to be used in the research and that their privacy was respected and the confidentiality of their information was assured. All participants who verbally agreed and signed the consent form were face-to-face interviewed in a comfortable room and in the local Arabic language.

Table 1	Sociodemographic Characteristics of Participants	
	No.	**%**
Age group (years)		
≤30	175	55.2
31-40	81	25.6
>40	61	19.2
Marital status		
Married	238	75.1
Unmarried	79	24.9
Level of education		
Illiterate/read and write	55	17.3
Primary	145	45.7
Secondary and higher	117	37.0
Working status		
Nonworking/Housewives	246	77.6
Working	71	22.4

Figure 1 Sources of Information About Breast Cancer Screening
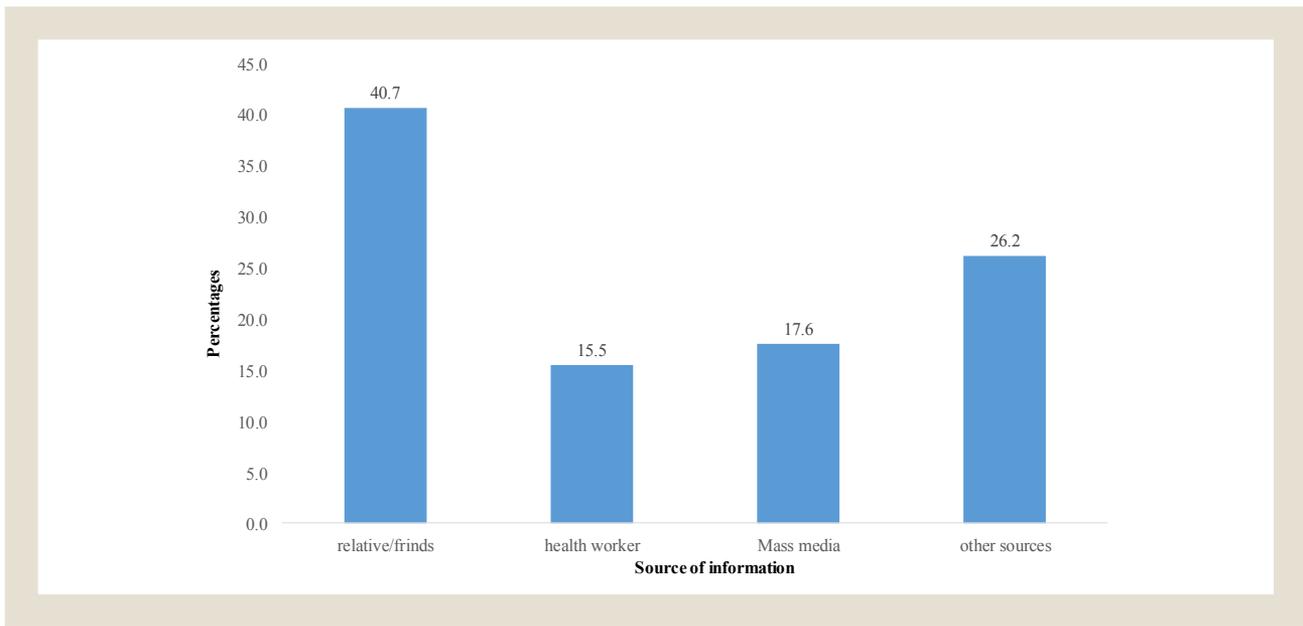
Results

Sample Characteristics

A total of 317 women were included in this study. Table 1 displays sociodemographic characteristics of the participants who attended PHCCs in Ghail Bawazir District. The mean (±SD) and range of age for the study participants were 31.9 (±10.2) and 18 to 60 years, respectively. Of the total participants in this study, 175 (55.2%) were aged 30 years or less, 238 (75.1%) were married, 246 (77.6%) were not working or housewives, and nearly half of them (45.7%) had primary school education.

Knowledge of Breast Cancer and Source of Information

On asking the participants if they have ever heard about the BC screening and their sources of information, almost the majority (91.2%) of the responses were that they had heard about BC screening. Over one third of the participants had received information about BC screening from their relatives and friends (37.2%), followed by mass media (16.10%), and only few of them (14%) reported that they had received this information from health care workers in their center, as shown in Figure 1.

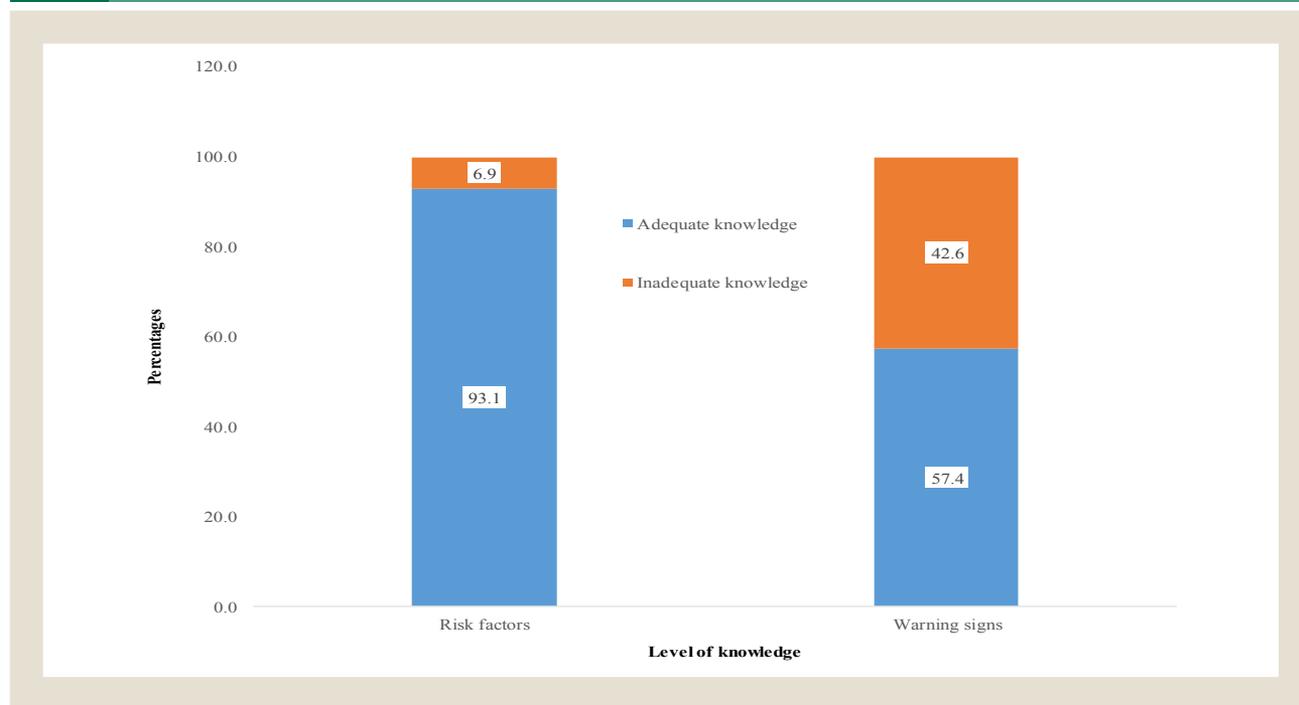### Knowledge of Breast Cancer Risk Factors and Warning Signs

Table 2 displays the percentage and mean high level of the participants' knowledge about each studied domain of BC risk factors and warning signs as well as the overall knowledge of these two domains. The calculated mean and standard deviation of the overall high level of knowledge (18 questions) of BC risk factors (10 questions) and warning signs (8 questions) showed a clear disparity in the findings. The high level of knowledge of risk factors was presented by only one quarter of the participants (27.3 ± 28.2) with a high score; however,

Table 2 Correct Answers on Risk Factors and Warning Signs of Breast Cancer

Items	Correct answer	
	No.	**%**
Correct knowledge of risk factors		
Hormonal replacement therapy	154	48.6
Ionizing radiation (harmful radiation)	133	42.0
Obesity	113	35.6
Lack of exercise	93	29.3
Family history of breast cancer	92	29.0
Increasing with age (aging)	89	28.1
Late menopause	66	20.8
Early menarche	58	18.3
Having their first child at the age of 30 years or older	38	12.0
Nulliparity	30	9.5
Average high level of knowledge of risk factors		**27.3 ± 28.2**
Correct knowledge of warning signs		
Breast lump	282	89.0
Change in the breast shape and size	240	75.7
Change in the nipple shape and size	238	75.1
Bloody nipple discharge	224	70.7
Redness and ulceration of the breast skin	209	65.9
Pulling of the nipple	160	50.5
Dumpling of the breast	135	42.6
Peau d'orange appearance of the breast skin	152	48.0
Average high level of knowledge of warning signs		**64.7 ± 34.4**
Overall high level of knowledge (18 questions)		**43.9 ± 27.5**

Figure 2 Level of Knowledge of Risk Factors and Warning Signs of BC

Table 3 Association Between Participant Characteristics and Limited Level of Knowledge of Breast Cancer Risk Factors and Warning Signs

Characteristics	Overall knowledge		Knowledge of risk factors		Knowledge of warning signs	
	No.	%	No.	%	No.	%
Age group						
≤30 years	115	83.3	128	92.8	67	48.6*
30-39 years	81	84.4	88	91.7	52	54.2
≥40 years	77	92.8	79	95.2	63	75.9
Marital status						
Unmarried	39	75.0*	48	92.3	22	42.3*
Married	234	88.3	247	93.2	160	60.4
Level of education						
Below secondary	185	92.5*	192	96.0*	140	70.0*
Secondary and higher	88	75.2	103	88.0	42	35.9
Occupation						
Unemployed	251	88.4*	270	95.1*	165	58.1
Employed	22	66.7	25	75.8	17	51.5
SBE performed						
No	204	92.3*	212	95.9*	153	69.2*
Yes	69	71.9	83	86.5	29	30.2
CBE performed						
No	205	86.1	221	92.9	142	59.7
Yes	68	86.1	74	93.7	40	50.6
Mammogram performance						
No	268	85.9	290	92.9	180	57.7
Yes	5	100.0	5	100.0	2	40.0

*P value < .01.

Table 4	Univariate and Multivariate Logistic Regression Model of Factors Associated With the Limited Performance of BSE					
	OR	95% CI	*P* value	AOR	95% CI	*P* value
Age group						
≤30 years	1.752	0.679-4.524	.247	-	-	-
30-39 years	1.597	0.612-4.169	.339	-	-	-
≥40 years	1.00	-	-	-	-	-
Marital status						
Unmarried	0.772	0.324-1.841	.560	-	-	-
Married	1.00	-	-	-	-	-
Level of education						
Below secondary	0.627	0.309-1.271	.195	0.510	0.264-0.987	.046
Secondary and higher	1	-	-	1	-	-
Occupation						
Housewife	0.323	0.112-0.933	.037	0.358	0.130-0.983	.046
Working	1	-	-	1	-	-
Knowledge of:						
Risk factors				-	-	-
Limited	1.694	0.494-5.815	.402	-	-	-
Adequate	1.00	-	-	-	-	-
Warning signs						
Limited	0.351	0.181-0.683	.002	0.350	0.184-0.666	.001
Adequate	1.00	-	-	1	-	-
BSE						
Limited	0.105	0.053-0.210	<.001	0.093	0.050-0.175	.001
Adequate	1.00	-	-	1	-	-
CBE						
Limited	0.498	0.226-1.093	.082	-	-	-
Adequate	1.00	-	-	-	-	-
Mammogram use						
Limited	1.469	0.273-7.923	.654	-	-	-
Adequate	1.00	-	-	-	-	-

Abbreviations: AOR = adjusted odds ratio; BSE = breast self-examination; CBE = clinical breast examination; CI = confidence intervals; OR = odds ratio.

around two third of the responses (64.7 ± 34.4) showed a high level of scores for knowledge of the BC warning signs, while the overall mean of high knowledge results in less than half of the participants (43.9 ± 27.5). On asking the participants about the possible risk factor to develop BC, higher percentages of the responses indicate the use of HRT (48.6%), followed by exposure to harmful ionizing radiation (42.0%), obesity (35.6%), lack of exercise (29.3%), and family history of a member with BC (29.0%). However, few respondents answered that having the first child at age 30 years or older or nulliparity were the risk factors with more chances of a woman to get BC (12% and 9.5%, respectively), as seen in Table 2. Similarly, participants' knowledge of the warning signs of BC showed that almost the majority (89%) of participants answered breast lump as the most common warning sign, followed by change in breast shape and size (75.7%), change in nipple shape and size (75.1%), bloody nipple discharge (70.7%), and ulceration or redness of the breast skin (65.9%). Only half of the women (50.5%) correctly answered the questions on pulling of nipple, 48% about peau d'orange appearance of the breast, and 42% about dimpling of the breast. The total knowledge score among our sample was low, with a median of 8 (out

of 18) and a mean of 7.9 ± 4.9. The better level, which included moderate and high scores, was presented by less than half of the participants (47.9%).

The participants' overall knowledge of BC risk factors and warning signs was calculated as described in the methodology of this study. Figure 2 shows significant differences in responses related to limited level of knowledge between knowledge of risk factors and knowledge of warning signs (*P* = < .001). Higher percentages of adequate level of responses were found for knowledge of risk factors, followed by knowledge of the warning signs of BC (limited level of knowledge 93.1%, and 57.4%, respectively).

Factors Associated with Knowledge of Risk Factors and Warning Symptoms of Breast Cancer

Table 3 shows the association between knowledge of BC risk factors and warning symptoms, overall knowledge, and characteristics of the study group. Around one third (30.3%) of women had performed BSE, 21.9% had performed CBE, and only 1.6% used the mammogram. A chi-square test identified that women participants with an overall limited knowledge of BC were significantly

Table 5 Univariate and Multivariate Logistic Regression Model of Factors Associated With the Limited Performance of CBE

	OR	95% CI	*P* value	AOR	95% CI	*P* value
Age group						
≤30 years	0.384	0.181-0.814	.044	0.419	0.216-0.815	.010
30-39 years	0.598	0.291-1.230	.012	0.626	0.315-1.245	.182
≥40 years	1.00	-	-	1.00		.037
Marital status						
Unmarried	0.517	0.223-1.201	.125	-	-	-
Married	1.00	-	-	-	-	-
Level of education						
Below secondary	0.788	0.397-1.565	.495	-	-	-
Secondary and higher	1.00	-	-	-	-	-
Occupation						
Unemployed	1.465	0.543-3.950	.450	-	-	-
Employed	1.00	-	-	-	-	-
Knowledge of:						
Risk factors				-	-	-
Limited	2.478	0.765-8.028	.130	-	-	-
Adequate	1.00	-	-	-	-	-
Warning signs						
Limited	0.780	0.425-1.430	.421	-	-	-
Adequate	1.00	-	-	-	-	-
BSE						
Limited	0.419	0.215-0.817	.011	0.472	0.252-0.884	.019
Adequate	1.00	-	-	1.00	-	-
CBE						
Limited	0.448	0.217-0.926	.030	-	-	-
Adequate	1.00	-	-	-	-	-
Mammogram use						
Limited	2.763	0.494-15.462	.248	-	-	-
Adequate	1.00	-	-	-	-	-

Abbreviations: AOR = adjusted odds ratio; BSE = breast self-examination; CBE = clinical breast examination; CI = confidence intervals; OR = odds ratio.

more likely married, with an education level below secondary, unemployed, and who never had BSE (*P* < .01). Additionally, women with an education level below secondary, unemployed, and who never had BSE were found significantly likely to have limited knowledge of risk factors (*P* < .01). Similarly, a significant limited level of knowledge of warning signs were found more likely among women who were older, married, with an education level below secondary, and who never had BSE (*P* < .01).

Tables 4, 5, and 6 show the univariate and multivariate analysis for analyzing the association of factors with the limited performance and use of BSE, CBE, and mammogram as screening tools for BC. For BSE factors such as working status, those with limited knowledge of warning signs and BSE were likely associated with limited performance of BSE when tested with the univariate analysis, and all factors together with the level of education below secondary were also associated with the performance of BSE among the study population.

A similar analysis was applied to test the performance of factors associated with the use of CBE. Age was found to be a determinant in both nonadjusted and adjusted ORs also among those women with limited knowledge of BSE or CBE methods. No likely associations were found when testing the use of mammogram as a screening method by either the analysis of univariate modality or the multivariate one.

Knowledge and Barriers of Breast Cancer Screening Methods

As demonstrated in Table 7, participants were recognized as less knowledgeable in all the three known types of screening methods. The most likely knowledge of the screening methods were for CBE (47.0%), less knowledge for BSE (58.0%), and the least amount of knowledge for mammogram and ultrasound (89.3%).

Some participants reported barriers that will not allow them to practice different BC screening methods, namely, BSE, CBE, and mammogram. The responses of the participants were summarized in four main areas, which were considered as a barrier for not performing one or more of the screening methods. Most of the participants indicated that they had no health problems that required practicing any screening method. These findings were more apparent for the use of CBE (57.9%), mammogram (44.2%), and also BSE (38.9%). Another reported barrier was the lack of information about the

Table 6	Univariate and Multivariate Logistic Regression Model of Factors Associated With the Limited Use of Mammogram						
	OR	95% CI	*P* value	AOR	95% CI	*P* value
Age group						
≤30 years	<0.001	0.000	.995	0.000	0.000	.996
30-39 years	0.173	0.012-2.530	.200	0.567	0.092-3.480	.540
≥40 years	1.00	-	-	1	-	.829
Marital status						
Unmarried	<0.001	0.000	.997	-	-	-
Married	1.00	-	-	-	-	-
Level of education						
Below secondary	0.496	0.028-8.859	.633	-	-	-
Secondary and higher	1.00	-	-	-	-	-
Occupation						
Unemployed	22.711	0.000	.997	-	-	-
Employed	1.00	-	-	-	-	-
Knowledge of:						
Risk factors						
Limited	60.789	0.000	.998	-	-	-
Adequate	1.00	-	-	-	-	-
Warning signs						
Limited	0.373	0.041-3.428	.384	-	-	-
Adequate	1.00	-	-	-	-	-
BSE						
Limited	0.583	0.055-6.122	.653	-	-	-
Adequate	1.00	-	-	-	-	-
CBE						
Limited	1.064	0.062-18.140	.966	-	-	-
Adequate	1.00	-	-	-	-	-
Mammogram use						
Limited	0.039	0.001-1.709	.092	-	-	-
Adequate	1.00	-	-	-	-	-

Abbreviations: AOR = Adjusted odds ratio; BSE = Breast self-examination; CBE = Clinical breast examination; CI = Confidence intervals; OR = Odds ratio.

different screening methods such as BSE, CBE, and mammogram (42.1%, 25.2%, and 39.0%, respectively). Some women expressed their feelings of fear from knowing the results of screening tests for BC and the possibility of finding cancer, while others expressed negative interest in practicing any type of BC screening method.

Discussion

The aim of this exploratory study was to provide initial information about the knowledge of BC and its screening practices among Yemeni women attending PHCCs in Ghail Bawazir, Hadhramout Province.

Table 7	Barriers to Practicing BSE, CBE, and Mammogram and the Use of BC Screening Methods					
	BSE		**CBE**		**Mammogram**	
Reasons	No.	%	No.	%	No.	%
Had no health problems	86	38.9	137	57.9	138	44.2
Lack of information	95	42.1	60	25.2	124	39.0
Afraid of result	33	14.9	35	14.3	28	9.0
Lack of interest (unnecessary examination)	9	4.1	6	2.6	22	7.0
Level of limited knowledge of the use of BC screening	184	58.0	149	47.0	283	89.3

Abbreviations: BSE = Breast self-examination; CBE = Clinical breast examination.

Many studies from Yemen have shown that BC is the most commonly occurring type of cancer among Yemeni women.[8,10,11] Despite the ascending increase in the incidence of BC among women within the last decade,[16] it is reported that like the rest of the Arab women, Yemeni women are diagnosed at advanced stages of the diseases, which will eventually lead to poor prognosis.[6-8] Recently, a study conducted to measure the Years Lost due to Disability (YLD), among other measures, for Yemeni women living with BC found that the rate of YLD has increased approximately twofold between 1990 and 2010, with a more substantial increase in older age groups (22.4 per 100,000 women in 1990 to 43.1 per 100,000 women in 2010) than in the younger age groups (2.1 per 100,000 women in 1990 to 4.2 per 100,000 women in 2010).[16]

Detecting BC at an early stage remains the most essential step for BC control.[12,17] The results demonstrated that although the majority of the women participants claimed that they have heard information about BC and as much as two third of them demonstrated good overall knowledge about the topic, only around half of the women knew about the risk factors for BC and screening modalities. In the current study, more than half of the participating women never performed BC screening using BSE and CBE, and very few had a mammogram. Screening practices for BC (BSE, CBE, or mammogram) were generally less than average, most likely to be affected by several negative perceptions about BC and screening practices among this population[14], and these screening practices were considered as tools for early diagnosis of BC.[18] Reports from this study are useful for examining the factors associated with screening practices and for designing and implementing interventions targeting prevention practices of this population. For BC, primary health care clinics in Yemen are a venue to include primary prevention (which incorporates educating attending women on BC risk factors and influencing behavior change to avoid these risk factors) and secondary prevention such as screening practices for the detection of cancer in its early stages.

A comparison of women with knowledge of BC risk factors or warning signs and an education level of lower than secondary to those with a higher education level showed that there were no statistical differences between the groups despite the higher percentage of those with an education level lower than secondary showing limited level of knowledge. Previous studies have identified that a low level of education is a proxy measure for a lower socioeconomic status, which has been proven in western studies to be associated with the late-stage diagnosis of BC and higher rates of mortality.[19,20] The results demonstrated that although the majority of the women participants claimed that they have heard information about breast and as much as two thirds of them demonstrated good overall knowledge of the topic, only around half of the women knew about the risk factors for BC and screening modalities. The multiple logistic regression analysis conducted in this study confirmed that level of education and knowledge of warning signs and BSE were predictors of performance of BSE in this population. Despite the fact that the effectiveness of BSE as a screening modality has been a debate,[21,22] it is recommended that women practice this type if self-detected. Our study revealed that around one third of the participants (30.3%) had performed BSE; however, it was not regularly practiced. Authors from Saudi Arabia, Yemen, and Iran have shown that BSE examination was performed with regular base in their study population by 4.0%, 4.2%, and 7.1%, respectively.[23-25] The low rate of practicing BSE was also extended to CBE, and the use of mammogram could be included as barriers among the study women. Knowledge of BSE showed to be significantly associated with performance of CBE in this study, thereby highlighting the importance of BSE. CBE is recommended once every 3 years for women in their 20s and 30s and annually for women aged 40 years and older.[26]

In this study, mammography was noted to be a rare practice, and none of the study factors showed significant association with its performance. The use of mammography by this group is lower than that reported in global and regional reports in literature.[1,27] It is recommended that future studies should assess the factors related to the scarcity of this practice in particular and include a larger sample of older women who are most likely to be recommended to receive mammography. The highest reported barrier to performance of all screening methods was "not having health problems," which is a misconception that needs to be corrected among this group of women through an influential BC campaign. In addition to lack of information, being afraid of the results is another reported barrier to practicing screening among this sample of women. Primary healthcare clinics have a pivotal role in strengthening awareness of breast health and prevention behaviors among the women population. Hence, an investigation of women's perception about BC and its screening practices and factors enabling and inhibiting these practices in Yemen is essential to promote this preventive behavior. Avoiding BC assessment has been linked to cancer-related worry and anxiety in several studies.[28,29] These studies also suggested that the primary healthcare setting provides more health education and strategies to relieve worries and anxiety for better screening opportunities.

Limitations

The data collected in this study are self-reported and most likely prone to measurement errors associated with recall of information and social desirability. Additionally, the sample size is limited, and it has been collected from a single region, thus restricting the generalizability of the results to all the Yemeni women. Future studies should include diverse populations from different regions to assess the association of factors with knowledge of BC and its screening among Yemeni women and make recommendations at the national level that will affect the entire country.

Conclusion

Although most of the surveyed women reported receiving information of BC screening from relatives and friends, it is deemed essential that this information be incorporated in health education delivered, and practicing CBE in the primary healthcare setting is strongly recommended. This could engage a large number of Yemeni women in BC prevention and screening practices by themselves with an active role in promoting this behavior among their families and friends.

Clinical Practice Points

- BC among females has one of the highest incidence rates in Yemen.
- The poor knowledge and wrong beliefs about BC prevention among women are responsible for a negative perception of the durability of cancer detected early and of the efficacy of the screening tests.
- As observed from daily practice in the local community, many of the women diagnosed with BC and referred for more advanced screening procedures, such as mammograms and biopsies, refused to continue with the required final diagnosis.
- Such behavior usually generates a lot of questions as to whether these women are aware of BC, its risk factors, and its screening methods.
- Detecting BC at an early stage remains the most essential step for BC control; however, Yemeni women are diagnosed at advanced stages of the disease, which eventually leads to poor prognosis.
- Mammography was noted to be a rare practice by this group, and thus it is lower than global and regional reports.
- The highest reported barrier to the performance of all screening methods was "not having health problems," which is a misconception that needs to be corrected among this group of women.
- Lack of information or being afraid of the results is another reported barrier to practicing screening among women in this community.
- Primary health care clinics should play a pivotal role in strengthening awareness about breast health and BC prevention behaviors among the female population.

Disclosure

The authors declare no competing interests.

References

1. WHO. *WHO position paper on mammography screening*. World Health Organization; 2014.
2. Forouzanfar MH, Liu P, Roth GA, et al. Global burden of hypertension and systolic blood pressure of at least 110 to 115 mm Hg, 1990-2015. *JAMA* 2017; 317:165-82.
3. Ferlay J, Soerjomataram I, Ervik M. GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11 [Internet], Available at: http://globocan.iarc.fr 2013. Accessed: August, 2017.
4. Olowokere AE, Onibokun AC, Oluwatosin AO. Breast cancer knowledge and screening practices among women in selected rural communities of Nigeria. *J Public Health Epidemiol* 2012; 4:238-45.
5. Siegel R, Ma J, Zou Z, Jemal A. Cancer statistics, 2014. *CA Cancer J Clin* 2014; 64:9-29.
6. Tessmer MS, Anderson KC. AACR Cancer Progress Report 2016: Improving Lives Through Research. *Clin Cancer Res* 2016; 22:4759.
7. Azaiza F, Cohen M. Health beliefs and rates of breast cancer screening among Arab women. *J Women's Health* 2006; 15:520-30.
8. Ferlay J, Soerjomataram I, Dikshit R, et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. *Int J Cancer* 2015; 136:E359-86.
9. El-Zaemey S, Nagi N, Fritschi L, Heyworth J. Breast cancer among Yemeni women using the National Oncology Centre Registry 2004−2010. *Cancer Epidemiol* 2012; 36:249-53.
10. BaSaleem HO, Bawazir AA, Moore M, Abdulla K. Five years cancer incidence in Aden Cancer Registry, Yemen. *Asian Pac J Cancer Prev* 2010; 11:507-11.
11. HCR. *Hadhramout Cancer Report*. Mukalla: Hadhramout Organization for Cancer Control; 2012.
12. Donnelly TT, Hwang J. Breast cancer screening interventions for Arabic women: a literature review. *J Immigr Minor Health* 2015; 17:925-39.
13. Baron-Epel O, Friedman N, Lernau O. Reducing disparities in mammography-use in a multicultural population in Israel. *Int J Equity Health* 2009; 8:19.
14. Bener A, El Ayoubi HR, Moore MA, Basha B, Joseph S, Chouchane L. Do we need to maximise the breast cancer screening awareness? Experience with an endogamous society with high fertility. *Asian Pac J Cancer Prev* 2009; 10:599-604.
15. Ahmad M, Al-Gamal E, Othman A, Nasrallah E. *Knowledge, attitudes and practices towards cancer prevention and care in Jordan. Report*. Amman, Jordan: King Hussein Institute for Biotechnology and Cancer (KHIBC); 2011.
16. Bawazir AA. Deaths, DALY and other related measures of breast cancer in Yemeni women: Findings of the Global Burden of Disease Study (1990−2010). *J Cancer Res Pract* 2017; 4:14-8.
17. Stewart B, Wild CP. World cancer report 2014. Lyon, France: International Agency for Research on Cancer, WHO, Available at: http://www.thehealthwell.info/node/725845 2014. Accessed: June, 2017.
18. Shrivastava S, Shrivastava PS, Ramasamy J. Self-breast examination: a tool for early diagnosis of breast cancer. *Am J Public Health Res* 2013; 1:135-9.
19. Downing A, Prakash K, Gilthorpe M, Mikeljevic J, Forman D. Socioeconomic background in relation to stage at diagnosis, treatment and survival in women with breast cancer. *Br J Cancer* 2007; 96:836-40.
20. Lantz PM, Mujahid M, Schwartz K, et al. The influence of race, ethnicity, and individual socioeconomic factors on breast cancer stage at diagnosis. *Am J Public Health* 2006; 96:2173-8.
21. Kearney AJ, Murray M. Commentary-evidence against breast self examination is not conclusive: What policymakers and health professionals need to know. *J Public Health Pol* 2006; 27:282-92.
22. Tu S-P, Reisch LM, Taplin SH, Kreuter W, Elmore JG, Legge Muilenburg J. Breast self-examination: self-reported frequency, quality, and associated outcomes. *J Cancer Edu* 2006; 21:175-81.
23. Yousuf SA, Al Amoudi SM, Nicolas W, Banjar HE, Salem SM. Do Saudi nurses in primary health care centres have breast cancer knowledge to promote breast cancer awareness? *Asian Pac J Cancer Prev* 2012; 13:4459-64.
24. Ahmed BA. Awareness and practice of breast cancer and breast-self examination among university students in Yemen. *Asian Pac J Cancer Prev* 2010; 11:101-5.
25. Tavafian SS, Hasani L, Aghamolaei T, Zare S, Gregory D. Prediction of breast self-examination in a sample of Iranian women: an application of the Health Belief Model. *BMC women's health* 2009; 9:37.
26. ACS. Breast Cancer: Facts & Figures 2017-2018. Atlanta: American Cancer Society, Available at: https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/breast-cancer-facts-and-figures/breast-cancer-facts-and-figures-2017-2018.pdf 2017. Accessed: March, 2018.
27. Biesheuvel C, Weige S, Heindel W. Mammography screening: evidence, history and current practice in Germany and other European countries. *Breast Care* 2011; 6:104-9.
28. Antill YC, Reynolds J, Young MA, et al. Screening behavior in women at increased familial risk for breast cancer. *Fam Cancer* 2006; 5:359-68.
29. Hassoun Y, Dbouk H, Aldin ES, Nasser Z, Nahleh Z, Tfayli A. Barriers to mammography screening: How to overcome them. *Middle East J Cancer* 2015; 6:243-51.