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Research paper

Breast cancer screening during the Syrian crisis: A cross-sectional study

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Keywords

Breast cancer, Syria, breast cancer screening, breast self-examination, healthcare inaccessibility

Summary

Introduction. *Although breast cancer has a lower incidence in developing countries, mortality rates are higher, mainly due to delay in diagnosis and the poor diagnostic and therapeutic capacities. Although screening tests have been available for quite a long time, delayed and advanced presentation is still common, especially in developing countries. The decade-long Syrian crisis has severely crippled the healthcare system and depleted the already-limited capacities of the healthcare services, which under prioritized the care provided to unurgent cases like breast cancer. This study aimed to investigate the practices of breast cancer screening among breast cancer patients.*

Methods. *A cross-sectional study conducted in Al-Beiruni Hospital at Damascus University in 2019, through personal interviews using a structured questionnaire.*

Results. *The sample consisted of 519 patients with breast cancer. One-hundred twenty (23.2%) of them reported undergoing one or more of the different screening methods at least once every six months prior to diagnosis. Several factors had a statistically significant association with the probability of undergoing or performing screening methods including living in large cities, having fewer children, having a full-time or part-time job, and the level of education. Patients who reported having a relative diagnosed previously with breast cancer or any other malignancies were also more likely to screen themselves. Inaccessibility to healthcare services, which was exaggerated by the armed conflicts, had a significant association with less practicing of the screening methods too (OR: 0.4 [0.3-0.7]).*

Conclusion. *The Syrian war and its direct and indirect consequences negatively affected screening practices of breast cancer.*

Introduction

Breast cancer (BC) is the leading cause of cancer mortality in women and the main cause of cancer-related death in developing countries [1, 2]. BC incidence is slightly lower in developing countries compared with the western world, which can be attributed in part to the lower prevalence of known risk factors [2], more common protective factors (i.e. breastfeeding) [3, 4], as well as the inability to afford the costly screening programs [5]. Many factors are responsible for the bad course of BC in developing countries such as late presentation, lack of homogenous screening density around the country and the difference in quality of medical services between rural and urban areas [6-8].

Although breast cancer screening (BCS) methods have apparently increased the incidence of BC in developed countries, they helped to reduce mortality and improve the quality of life [9-11]. Nevertheless, many BC patients still present with an advanced disease rather than through screening programs worldwide [12, 13], and more frequently in developing countries [14]. In addition, controversy continues due to the lack of evidence supporting the extension of the valid screening recommendations from the rich countries to poorer ones [5]. Therefore, early detection has been an active area of research in developed countries and an area of urgent need for investigation in low-income countries like Syria [8].

The decade-long Syrian crisis has severely crippled the healthcare system and depleted the already-limited capacities of the healthcare services. Over half of the healthcare facilities became out of service before 2016 [15], and the situation became even worse over time due to tools evacuation and programmed destruction. Therefore, the war caused prioritization of the most urgent cases like war-related injuries and decreased the investment in improving the management and screening programs of unurgent cases like malignancies and chronic diseases [15,16]. However, cancer centers in the main cities continued to offer services despite drugs shortage and the reducing number of oncologists and healthcare personnel. A recent survey-based study on doctors, unveiled the disrupted oncology care especially

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in conflict zones, and suggested an important role for the awareness of patients and their screening practices to mitigate the lack of healthcare accessibility [16]. The aim of this study is to investigate the practices of BCS among Syrian patients and to discover their association with different demographic factors.

Methods

Patients

This cross-sectional study was conducted in Al-Beiruni Hospital, the leading Syrian cancer center affiliated with Damascus University. Data collection took place in the period between August and December 2019, and only patients with a diagnosis of BC were recruited. Patients with neurological or psychiatric illnesses that hinder the data collecting process were excluded. Patients were approached in the waiting area of the BC clinic or department and were interviewed by one of four senior medical students at Damascus University. Data collectors were all trained on the tool of measurement and frequent meetings were held to discuss difficulties confronted during data collection. Interviews lasted for 10-20 minutes and a paper survey was filled out during the interview by the interviewer.

Questionnaire

The questionnaire consisted of three sections. The first asked about demographic information including: age, address, occupation, educational qualification, and healthcare services accessibility. The second inquired about BCS methods such as breast self-examination (BSE), clinical breast examination (CBE), and mammography as well as the frequency of applying these methods. In this section, patients were also asked about the source of information about BCS. The third section included questions about patients' medical and family history such as personal history of BC or benign breast diseases, and family history of malignancies. The questionnaire was in Arabic, which is the mother language for all participants. The final version of the questionnaire was first piloted by different data collaborators on 25 patients from different social, educational, and financial backgrounds to confirm that they can tolerate the time required and answer the questions free of interrater variability and without concern regarding consistency and structure.

Informed Consent and Ethical Approval

Data collaborators explained to the patients about the study and its measures and aims before the interviews, and participation in the interviews was voluntary. Assurance of the confidentiality of the data was also conveyed to the patients and a verbal informed consent was taken from them for the aim of publishing the anonymous data. The interviews were done in a private room near the waiting area of the BC clinic. This study was approved by the local ethical committee of the hospital and the Syrian Association of Medical Oncology.

Data analysis

Data collaborators entered survey data from the paper questionnaires into an electronic Google form. Data were later imported into Microsoft Excel 365 version 2011 (Build 13426.20404; year 2020) and analyzed using the Statistical Package for the Social Sciences version 23.0 (SPSS Inc., Chicago, IL, United States). Medians and interquartile ranges were used to represent continuous data, while counts and percentages were used for categorical data. Chi-square and Fisher's exact tests were used to assess the association between practicing BCS and demographic and history data. An alpha value of 0.05 was used to determine the threshold of statistical significance. Additionally, a binary logistic regression model was created to investigate the independently associated predictors of BCS performance.

Results

Demographic data

We interviewed 519 female BC patients, who were diagnosed between 2011 and 2019, but the median was 2018. Their ages at diagnoses ranged from 25 to 87, however, the ages at the point of data collection were between 27 and 88. Three-hundred-eighty-five (74.2%) patients were married, 411 (79.2%) lived in private apartments with their children, and 222 (42.8%) of them resided in the seven major cities (referred to as urban in this study). About a third (33.5%) of the participants had more than four children, while less than a fifth (17.5%) had no children at all. The most common work type was domestic work (74.4%), and only 105 (20.3%) patients had full- or part-time jobs. Smokers constituted 73 (14.1%) of the sample but negative smoking was the most common (44.5%). Almost a third (35.6%) of the patients did not have enough income to cover their needs, and only 7 (1.3%) could earn enough money for savings (Table I).

BCS practices

Most of the patients in our sample (76.9%) had not performed BCS by the time of the diagnosis. BSE was the most frequent screening method, and it was practiced by 120 patients (23.2%). Whereas imaging and CBE were rarely performed. The most reported source of information was different media outlets including social media (81.7%; Table II).

Factors affecting BCS

Patients who reported possible healthcare accessibility had a higher percentage of screening practice (25.4%) than their counterparts (11%; P = 0.004). Similarly, patients from urban areas (28.4%) performed screening more than those who lived in rural areas (19.2%; P = 0.016). Although, age groups, body mass index (BMI), marital and financial status did not reach a statistically significant association with BCS, patients with one to three children (29.2%) were more likely to

Tab. I. Demographic Data.

	Count	Percentage		Count	Percentage
Gender			**Education level of the patient**		
Female	519	100	Illiterate	99	19.1
Year of diagnosis	2018*	2017-2019†	Primary education (6-9 years)	239	46
Age at diagnosis	48*	41-55†	Secondary education (12 years)	63	12.1
Age at the time of the study	50*	43-57†	Higher education (university or higher education institutes)	118	22.7
Weight (n = 231)	72*	64-82†	**Work status**		
Height (n = 214)	160.5*	158-165†	Part-time job (< 5 hours/day)	47	9.1
BSA (n = 214)	1.76*	1.67-1.88†	Full-time job	58	11.2
BMI (n = 212)			Housewife	367	70.7
Normal Weight	59	27.8	Unable to work	11	2.1
Obese	77	36.3	Retired	36	6.9
Overweight	71	33.5	**Work type**		
Underweight	5	2.4	Educational	42	8.1
Housing unit			Physical	42	8.1
Shelter (internally displaced)	3	0.6	Office work	49	9.4
Private house (living alone)	13	2.5	Domestic	386	74.4
Private house (with children)	411	79.2	**Smoking**		
Private house (grand family)	60	11.6	Smoker	73	14.1
Shared house	32	6.2	Smoked earlier	31	6.0
Residency			Negative smoker	231	44.5
Urban (living in the seven major Syrian cities§)	222	42.8	Smoking period (n = 104)	11*	5-25†
Rural (living in smaller cities or rural areas)	297	57.2	**Financial status**		
Marital status			Enough for needs and savings	7	1.3
Widow	70	13.5	Enough for basic needs	327	63.0
Single	48	9.2	Not enough for basic needs	185	35.6
Married	385	74.2	**Consanguinity among parent**		
Divorced	16	3.1	Found	174	33.5
Number of children			**Diagnosed psychiatric diseases**		
None	91	17.5	Depression	18	3.5
One	19	3.7	Anxiety	3	0.6
Two	47	9.1	Schizophrenia	2	0.4
Three	95	18.3	Other diseases	2	0.4
Four	93	17.9	**Psychiatric drugs**		
More than four	174	33.5	Chronic drugs	20	3.9

* Median; † Interquartile range; § Damascus, Damascus suburbs, Aleppo, Homs, Latakia, Hama, and Tartus.

Tab. II. Breast cancer screening methods.

	Count	Percentage
Frequency of BSE screening		
Once per week	58	11.2
Once per month	39	7.5
Once every six months	23	4.4
Never	399	76.9
Type of screening		
Self-examination	120	23.2
Clinical Breast examination	4	0.8
Mammogram or Ultrasound	15	2.9
Source of advice about screening (n = 120)		
Medical professionals	10	8.3
Parents, neighbors, or friends	12	10
Social networks and media	98	81.7

undergo screening in comparison to patients who have more (19.5%; P = 0.025). On the other hand, patients who have a full- or part-time job (40%) had a higher percentage of BCS than housewives and retired patients (18.8%; P < 0.001). The level of education of patients (P < 0.001), their spouses (P < 0.001) and fathers (P = 0.001) had statistically significant associations with screening performance as well (Table III).

BCS practices happened more frequently in the group of patients who reported a family history of malignancy (28.9%; P = 0.011), and the same held true for patients with a family history of BC in particular (31.3%; P = 0.002). On the contrary, personal medical histories did not have any significant association with BCS (Table IV).

A binary logistic regression model was created

Tab. III. Breast cancer screening practice and its association with different demographic factors.

	Total	Practicing BCS	Percentage	Odds ratio	CI (95%)	P value
Age at the time of the study						
27-42	126	21	16.7	-	-	0.120*
43-50	142	41	28.9			
51-57	127	31	24.4			
58-88	124	27	21.8			
BMI (n = 212)						
Normal range	59	16	27.1	1.1	0.6-2.1	0.862†
Over- or under-weight	153	39	25.5			
Residency						
Urban	222	63	28.4	1.7	1.1-2.5	0.016†‡
Rural	297	57	19.2			
Healthcare services accessibility						
Difficult	82	9	11	0.4	0.2-0.7	0.004†‡
Possible	437	111	25.4			
Housing unit						
Private with children	411	96	23.4	1.1	0.6-1.8	0.898†
Other accommodation options	108	24	22.2			
Financial status						
Not enough for the basic needs	185	35	18.9	0.7	0.4-1.1	0.103
Enough for the basic needs with/without savings	334	85	25.4			
Marital status						
Married	385	88	22.9	0.9	0.6-1.5	0.813†
Other options	134	32	23.9			
Children (n = 428)						
One to three	161	47	29.2	1.7	1.1-2.7	0.025†‡
More than three	267	52	19.5			
Work						
Full-time or part-time job	105	42	40	2.9	1.8-4.6	< 0.001†‡
Housewife or retired	414	78	18.8			
Education level (patient)						
Illiterate	99	11	11.1			< 0.001*‡
Primary education	239	33	13.8			
Secondary and higher education	181	76	42	4.8§	3.1-7.7§	
Education level (husband)						
Illiterate	116	17	14.7			< 0.001*‡
Primary education	236	43	18.2			
Secondary and higher education	167	60	35.9	2.7§	1.8-4.2§	
Education level (father)						
Illiterate	284	50	17.6			0.001*‡
Primary education	191	52	27.2			
Secondary and higher education	44	18	40.9	2.5§	1.3-4.8§	
Education level (mother)						
Illiterate	378	79	20.9			0.144*
Primary education	131	38	29			
Secondary and higher education	10	3	30	1.4§	0.4-5.6§	
Smoking						
Never smoked / negative smoking	415	88	21.2	0.6	0.4-1.0	0.050*
Smoker (currently or previously)	104	32	30.8			

* Chi square test; † Fisher exact test; ‡ Significant at the level of 0.05; §These odds ratios were calculated against the other two classes of the question (illiterate and primary education) combined.

for the significantly associated variables, namely, residence, work, number of children, smoking habits, healthcare accessibility, financial status, family history of malignancies and education of the patient, her husband and father. This model had a Nagelkerke R square of (20%; $P < 0.001$), a sensitivity of (23.3%), and a specificity of (94.2%). The model revealed that receiving secondary or higher education and having

Tab. IV. Breast cancer screening practice and its association with different personal and familial histories.

	Total	Practicing BCS	Percentage	Odds ratio	CI (95%)	P value*
Personal history of benign breast disease						
Yes	74	21	28.4	1.4	0.8-2.4	0.297
No	445	99	22.2			
Personal history of breast malignancies						
Yes	18	4	22.2	0.9	0.3-2.9	1.000
No	501	116	23.2			
Personal history of other malignancies						
Yes	1	0	0	-	-	1.000
No	518	120	23.2			
Family history of benign breast disease						
Yes	46	12	26.1	1.2	0.6-2.4	0.587
No	473	108	22.8			
Family history of breast malignancies						
Yes	179	56	31.3	2.0	1.3-3.0	0.002†
No	340	64	18.8			
Family history of malignancies						
Yes	211	61	28.9	1.7	1.1-2.6	0.011†
No	308	59	19.2			

* Fisher's exact test; † Significant at the level of 0.05l

Tab. V. A binary logistic regression model of demographic and medical history predictors of BCS performance.

	B	S.E.*	Wald	P value	OR†	CI (95%)
Residing in urban areas	0.26	0.23	1.32	0.251	1.3	0.8-2.0
Having less than four children	0.05	0.24	0.04	0.849	1.0	0.6-1.7
Secondary or higher education (patient)	1.11	0.3	14.23	< 0.001§	3.0	1.7-5.4
Secondary or higher education (husband)	0.19	0.26	0.51	0.475	1.2	0.7-2.0
Secondary or higher education (father)	0.31	0.36	0.71	0.400	1.4	0.7-2.8
Having a full-time or part-time job	0.42	0.28	2.25	0.134	1.5	0.9-2.7
Smoking currently or previously	0.44	0.27	2.63	0.105	1.6	0.9-2.6
Sufficient financial status	0.07	0.26	0.06	0.801	1.1	0.6-1.8
Possible healthcare accessibility	0.59	0.4	2.19	0.139	1.8	0.8-3.9
Family history of malignancies	0.37	0.23	2.52	0.113	1.4	0.9-2.3
Family history of breast cancer	0.5	0.23	4.62	0.032§	1.6	1.0-2.6

* Standard error; † (exp(B)); § Significant at the level of 0.05l

a family history of breast cancer had a significant association with BCS practices independently from the other predictors (Table V).

Discussion

To our knowledge, this is the first study to investigate BCS performance by BC patients in Syria. It was found that the rate of screening performance was low, and multiple factors that are thought to be related to the Syrian crisis (i.e., education and healthcare accessibility) had a significant impact on the practice of BCS.

Regarding the demographics of the sample, only seven patients (1.3%) had enough income for savings, and this is in line with the recent report, which showed that more than 83% of the population live below the upper poverty line due to the detrimental effects of the crisis on the Syrian economy [17]. Illiteracy on the other hand was reported by 19.1% of the sample, which is not surprisingly about 10% lower than the illiteracy rate of Syrian adult females in the latest nationwide statistics published in 2004 [18]. Participants of this study also reported a slightly higher percentage of employment than the rate of the whole population [19]. Lastly, the sample was nearly equally distributed between urban and rural areas. Hence, it could be stated that the sample is relatively representative of the Syrian BC patients.

Rates of BCS reported by the interviewed patients were lower than in other developing countries like Ghana, Jordan and Iran [20-22]. Rates of BSE in particular

were lower than what was reported in Iraq, where the comparable healthcare system had also been crippled by war to some extent [20], but higher than reported in Qatar [23], where there is apparently more dependence on CBE and mammography most likely due to affluence and availability of resources. Regarding the source of information about BCS, a Jordanian study reported that 65% of its participants received information regarding BSE from Health-care workers [24]. In contrast, less than a tenth of the patients who perform screening in this study reported getting information about it from physicians. This was probably a result of the deterioration of the healthcare system and the inaccessibility of medical services in some Syrian regions during the crisis. In that regard, a study reported that the scarcity of physicians, hence, the hard access to them, put the media at the top of health-related information resources [22]. In Iran, where health care facilities were more accessible without current conflicts, a systematic review concluded that healthcare professionals were the most reported provider of information regarding BCS followed by media outlets [25].

In terms of healthcare accessibility, the decade-long war in Syria had disastrous ramifications on the healthcare system. The destruction of medical facilities, killings of healthcare providers and the severe shortage of drugs and medical equipment caused a dramatic decline in the quality of medical services [26]. Moreover, almost half the physicians in Syria escaped the country which exaggerated the deficiency of medical services [26, 27]. As a result, only half the hospitals in some areas are properly working. Meanwhile the rest are either partly working, not working or cannot be reached, which led to the negligence and delay of treatment for noncritical cases [28]. Consequently, several besieged areas were left with no accredited oncologist or access to oncology treatment modalities, causing referral of patients to other areas or even towards other countries [16]. Many patients were also exposed to medical errors due to the treatment by an underqualified doctor [16]. The results of the current study were in line with these reports because patients who reported having possible access to healthcare applied BCS twice the rate of those who reported lack of healthcare accessibility. Wu et al. also confirmed these findings when they concluded that the BCS rises with the availability of specialized healthcare providers and medical tools for checkups [29].

On another level, this study found that urban areas have significantly higher rates of BCS, a result shared by other studies [29,30]. Wu et al. attributed this result to disparities in the financial status [29]. Secondly, patients in rural areas in Syria had to face dangerous and unreliable commute to access hardly reachable healthcare facilities [28]. Furthermore, prophylactic screening modalities were only reported in the capital Damascus [16]. In addition to that, the religious and conservative climate that prevails in rural regions could restrain BCS, where some women, especially in Muslim communities, might refuse to be examined by a male doctor to avoid any embarrassment or stigma of being diagnosed with BC, which could lead in some cases to divorce or being estranged by their families [31]. The unavailability of female healthcare workers and the embarrassment of the examination were reported as obstacles to BCS in Egypt by almost 40% of the participants [32]. Saudi women also renounced the idea of being screened by a male doctor and were more inclined to undergo screening if female professionals were available [33]. Lastly, it was found that women living in rural areas were more likely to lack awareness regarding BC [34,35], and that their information on BSE practice was more likely to be inadequate [36] in comparison to those who lived in urban areas. So, since the most powerful factor of BSE performance was possessing awareness about it [37], then the lack of information could justify the low performance of BCS and especially BSE in this study.

This study found that patients' level of education, as well as the one of their spouses and fathers all had significant positive associations with performing BCS. Other studies also emphasized this positive association with the performance of BCS [23], and BSE [20, 35]. However, financial status did not affect the probability of performing BCS in our sample, which might be due to the fact that screening tests are available for free in community hospitals in Syria. This is in contrast with previous research in Saudi Arabia and Qatar that found high income to be a significant predictor of BCS performance despite the availability of free medical services in the country [23, 33]. However, the high income might have coincided with high education in these studies. A study in Egypt reported that high medical expenses were found as a considerable hindrance to seeking screening, in addition to difficulties in commute towards healthcare facilities [32]. Hence, even when medical care is available for free, people in developing countries still face other economic difficulties that need to be considered.

This study is in agreement with the outcomes of other studies which found that employed women have higher rates of BSE practice than their counterparts [20, 38, 39]. A possible explanation could be that most occupations require an educational certificate, hence, most job holders were educated. It might also be attributed to the fact that employment increased participants' chances of getting informed about screening. However, reports also indicate that time shortage is an important obstacle that hinders performing BCS [33] and BSE [40], which means that employment could also play a negative role in screening.

Having a family history of BC specifically and other malignancies generally were found to be significant indicators for performing BCS in this study. This could be caused by the emotional impact of witnessing the agony of a relative, or because this brought awareness and knowledge about the disease into the family. Other studies report the same findings for BSE [20, 39, 41, 42]. However, Abdel-Aziz et al. did not reach statistical significance in the association between a family history of BC and BCS performance. This is

most likely due to the cultural suppression of such topics in Saudi Arabia [33]. A remarkable observation was also found by Mamdouh et al. who found that the presence of breast cancer in the family affected the perspective of participants who stated fewer barriers to BCS [32].

In light of what was discussed in this paper, it was found that the most effective measures in the direction of promoting BCS among women in Syria are to implement multilayered interventions that aim to increase the knowledge and practice of BCS in Syrian women, especially the inexpensive personal methods that do not necessitate improving healthcare facilities [16]. Population-based campaigns should be launched with the aim of raising women's knowledge regarding BC [6], and the method of BSE as an easy and costless way of screening. These campaigns should focus on illiterate and unemployed women especially in the rural areas, who might be the most vulnerable. Secondly, increasing the numbers of female physicians might mitigate the factor of shyness, making it more comfortable for women to raise concerns and accept BCS programs [31, 33]. Interestingly, mammography campaigns could result in over-diagnosis of BC, which in turn will reduce the resources distributed for treatment in a developing country where shortage of resources already exists [5], and will result in imposing unjustified economic and emotional strain on an exhausted population. Therefore, to make a real change in the BC death rates in these countries, it is better to start with promoting a healthier lifestyle and enhancing management modalities [5]. This could be specifically true for a war-torn country like Syria, which is left with a drained healthcare system and a critical need for resources. Lastly, with the impaired healthcare system it might be more efficient to make use of the different media outlets to spread knowledge about BC and BCS. Although the sample of this study included patients who reported lack of access to healthcare services, this might not be representative of the true lack of accessibility nation-wide, because refugees and internally displaced populations in shelters are less likely to present to our center. However, since Al-Beiruni is a community hospital that provides oncology care for free, the sample should be representative of the Syrian BC patients excluding these two categories. On the other hand, this is a retrospective study that might be susceptible to recall bias due to the time gap between the diagnosis and the time of the interview. However, self-reported BCS practices are more likely to be overreported, which might reflect even a lower prevalence of these screening practices.

Conclusion

Screening practices of breast cancer in the Syrian population are less common in comparison to countries with comparable populations and healthcare systems. The lack of healthcare accessibility, residing in rural areas, illiteracy, being unemployed, having more children, bad financial status and not having any family history of malignancies were associated with fewer breast cancer screening practices.

Availability of data and materials

The dataset supporting the conclusions of this article is available and can be shared upon request.

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Conflict of interest statement

Authors have no competing interests to declare.

Authors' contributions

SH and IH planned for the project and obtained the ethical approval. MB, ZB, and YA collected the data. IH did the data analysis. SH, IH, and DAS wrote the manuscript. MS critically revised the article. All authors revised and approved the final version of the article.

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