RESEARCH ARTICLE

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Risk Factors Associated with Breast Cancer among Women in Iraq: A Case-Control Study

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Abstract

Background: Breast cancer is the most common malignant among females in Al-Najf, Iraq, the aim of the study was to identify risk factors associated with breast cancer. **Methods:** A hospital-based case-control study was conducted by enrolled 100 women with breast cancer and 200 non-malignant women selected randomly by using purposive sampling methods in the National Hospital for Cancer Therapy in AL-Najaf Province. Data was collected by questionnaire form through direct interview, which consisted of four parts (sociodemographic variables, clinical variables, reproductive variables, behavior and lifestyle variables). Questionnaire form was reviewed by a panel of experts from different specialists for checking validity, while reliability was checked by Cronbach's alpha, and the result was (0.8). Risk factors were estimated descriptively using percentages and odd ratios with their correlated 95% confidence interval (CI). The predictors of the occurrence of breast cancer were determined using logistic regression to estimate unadjusted association and adjusted association. **Result:** Breast cancer risk was found to be increased in women with age after 40 years and elderly especially ≥60 years (OR: 10.18, 95% CI: 4.1388,25.048), illiterate women (OR: 2.24, 95% CI: 1.06, 4.73), living in low economic status (OR: 2.87, 95% CI: 1.31,6.27), smoking (2.634, 95% CI: 1.021,6.792), women who bottle-feed their children (OR: 2.16, 95% CI: 1.01,4.61), eating backed and processed food (P: <0.001), overweight and obese women (OR: 1.875, 95% CI: 0.208, 16.88) and (OR: 4.062, 95%CI: 0.463, 35.64), previous abortion (OR: 1.08, 95% CI: 0.64,1.83), women who didn't perform routine self-examination (P: 0.05), women who didn't have information about it (P: 0.041), women who didn't visit health facilities for breast examination (P: <0.001). **Conclusion:** The majority of participants had at least one risk factor for Breast cancer and had low knowledge; consequently, emphasize the role of breast cancer early detection program in healthcare facilities, regular training of doctors and healthcare professionals who work in the program with respects of updates. Elevating women's awareness regarding Breast cancer risk factors, lifestyle modification, importance of early detection, self-examination, and regular visits to healthcare facilities for routine breast examinations through educational campaigns, sharing health messages by using social media and healthcare professionals, also by sharing educational materials like posters. Community campaigns for detecting women at high risk for Breast cancer to give them special attention according to their risk profile. Further high-quality research in genetic concern, environmental factors, and our daily diet.

Keywords: Breast cancer- Risk factor- Iraq- Al-Najaf

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Introduction

Breast cancer (BC) is the most common type of cancer around the world and the second leading cause of women's death around the world after lung cancer [1]. It occurs both in men and women, but with more incidence in women than men with a ratio of 1:100 [2]. In 2018, globally, the incidence of BC was about 2.1 million (24.2%) new cases with 627,000 (15%) deaths. More than half of the BC incidence and 60% of deaths occur in low- and middle-income countries (LMICs) [3, 4].

In 2020, about 2.3 million (11.7%) new cases were reported, with 685,000 deaths [5]. According to WHO In 2022, there were 2.3 million women diagnosed with breast cancer and 670 000 deaths globally. It is the most common type of cancer in 157 countries out of 185 around the world [6]. According to the Global Cancer Observatory estimates, BC incidence will increase to be about 46% by 2046 [7]. Among the Iraqi population, BC ranked as the top cancer in women and the second leading cause of mortality after cardiovascular diseases. Between 2000 and 2009, BC rates were found to be constant, but new statistics were reported by the Iraqi Cancer Registry, which detected that since 2009 there has been an increase in BC rates, especially in women older than 50s [8].

According to the Annual Report of the Iraqi Cancer Registry in 2020, 2021, and 2022, BC was reported as the top cancer among females in Iraq (34.35%,

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30.99/100,000 FP), (35.02%, 34.87/100,000 FP), and (35.9%, 39.2/100,000 FP), respectively. About Al-Najaf governorate a dramatic increase in BC incidence over these years (33.25%, 33.52/100,000 FP) in 2020, (46.88%, 36.96/100,000 FP) in 2021, while in 2022 (33%, 45.9/100,000 FP) [9-11].

Moreover, the age-related incidence rate in Iraq was found to be greater than that in Turkey, Iran, Saudi Arabia, and Bahrain, while less than in Jordan and Kuwait [12].

In most developing nations, the distribution of BC has increased in recent decades due to changes in lifestyle. BC are multifactorial diseases ether nonmodifiable, which include aging, early age of menarche, late age of menopause, genetic factors, reproductive hormones, infertility, history of other malignancy or modifiable factors, which include smoking, alcohol consumption, sedentary lifestyle, uncontrolled weight, either overweight or obesity, unhealthy diet, socioeconomic status, postmenopausal hormonal replacement therapy, and breast feeding [13, 7].

Understanding the risk factor of the disease is an important step in developing preventive strategies, including screening programs and educational programs, also modifying lifestyles; all those reflect reducing mortality and morbidity in BC and reducing long treatment courses and economic benefits [3, 7].

This study attempts to find out some of the various risk factors of breast cancer among a sample of women in Al-Najaf governorate.

Materials and Methods

The Study Design and Study Setting

A hospital-based case-control analytic study was conducted. This study was carried out at the National Hospital for Oncology and Hematology in AL-Najaf Province, one of the most important hospitals of cancer in Euphrates Center established in 2015, to collect the cases who attended for treatment after being confirmed with breast cancer and the control (a healthy woman from BC) at the same time in the waiting room who were attending with their relatives for treatment. Data collection started from 15th January 2024– 7th May 2024.

Sampling techniques and sample size

A non-probability purposive sample was used to collect 100 breast cancer women as a case group and 200 nonmalignant women as control group, the sample size was determined according the ratio (1 case: 2 control). Also since the age group is a risk factor we don't match in the study.

Selection Criteria

a. Inclusion Criteria: Women who have malignant according to diagnosis take from the case sheet as a case, from different age groups either married or non-married. And women without breast cancer as a control, from different age groups married and non-married women.

b. Exclusion criteria: women with general health status made them unwilling to participate, also women who unlike to participate.

Pilot Study

The pilot study was carried out at Al-Sadr Teaching Hospital during a month. It was conducted on 12 patients. Was performed to stabilize the questionnaire according to the current research environment. The sample of the pilot study was excluded from the present study sample. The Study Reliability checked by Cronbach's alpha and the result were (0.8).

The Study Tools and Data Collection

a. A closed-ended questionnaire by face-to-face direct interview consisted of four parts (demographic variables, clinical variables, reproductive variables, behavior and lifestyle variables).

b. Review of the medical records that helped for giving the information about date of medical diagnosis.

For control, the same questionnaire was used.

The Study Validity

The research tool was reviewed by a panel of experts from different doctors; statistics: all experts reviewed the questionnaire, and certain modifications were made for some items to be more acceptable.

The Study Statistical System

Descriptive statistics using SPSS (version 25), including frequencies and percentages. Continuous variables were summarized as means and standard deviations (SD). The chi-square test was used to evaluate the significant factors associated with BC risk. Predictors of the occurrence of BC were determined using logistic regression to eliminate the role of confounding factors. estimate unadjusted association (predictors considered separately) and adjusted association (predictors considered together). Finally, odds ratios (OR) at correlated 95% CI were calculated to rule out chance; p-value<0.05 was considered a statistically significant association. The body mass index was calculated by (WHO) formula as weight (kg)/height^2 (m^2).

Study limitation

Many of the participants from both groups are old age and since it is a case-control study recall bias is possible. To minimize bias, let women take enough time to respond and ask questions in simple language. About selection bias, the cases are chosen after checking their medical records.

Results

The result of the current study is based on the analysis of data obtained from 100 women as a case group and 200 women as a control group.

Table 1 shows the sociodemographic risk factor. The mean ±SD for the control group were (37.66±12.4) years, and for the case group were (48.84±10.8) years. Increasing age showed a significant association with increased risk of breast cancer, especially for women older than sixty years (OR: 10.18, 95%CI: 4.1388, 25.048). Rural areas with a significant association (OR: 0.48, 95%CI: 0.277, 0.8371). Illiterate women significant association to accumulate BC risk (OR: 2.24, 95%CI: 1.06, 4.73). Not enough socio-

Table 1. Socio-Demographic Risk Factors among Women in Control and Case Groups

Variables	Controls n (%)	Cases n (%)	Unadjusted OR (95% CI)	P Value	Adjusted OR (95% CI)	P Value
Age group (Years)						
<40	112 (86.2)	18 (13.8)	Ref.			
40-<50	52 (58.4)	37 (41.6)	4.42 (2.30612,8.499747)	<0.001*	-	-
50-<60	25 (48.1)	27 (51.9)	6.72 (3.21479,14.0470)	<0.001*	-	-
≥60	11 (37.9)	18 (62.1)	10.18 (4.1388,25.048)	<0.001*	-	-
(mean ±SD) 37.66±12.4 48.84±10.8						
Residence						
Rural Area	37 (53.6)	32 (46.4)	Ref.			
Urban Area	163 (70.6)	68 (29.4)	.48 (0.277, 0.8371)	0.01*	_	_
Educational level						
Institute or higher	38 (70.4)	16 (29.6)	Ref.			
Secondary	43 (69.4)	19 (30.6)	1.04 (0.4736,2.3248)	0.905	_	_
Primary or less	82 (73.2)	30 (26.8)	0.86 (.423,1.78)	0.701	_	_
Illiterate	37 (51.4)	35 (48.6)	2.24 (1.06, 4.73)	0.033*	_	_
Economic status						
Enough	26 (60.5)	17 (39.5)	Ref.			
Enough to some extent	149 (80.5)	36 (19.5)	.36 (.181,0.752)	0.006*	_	_
not Enough	25 (34.7)	47 (65.3)	2.87 (1.31,6.27)	0.006*	_	_
The work						
Employee	37 (72.5)	14 (27.5)	Ref.			
House wife	163 (56.5)	86 (34.5)	1.39 (.714,2.71)	0.329	_	_
Social status						
Married	158 (68.1)	74 (31.9)	Ref.			
Unmarried or widowed	42 (61.8)	26 (38.2)	1.322 (.754,2.318)	0.33	_	_
Smoking						
Not smoke	62 (64.6)	34 (35.4)	Ref.			
Passive	129 (70.9)	53 (29.1)	.749 (.443,1.268)	0.282	_	_
Active	9 (40.9)	13 (59.1)	2.634 (1.021,6.792)	0.045*	_	_

n, frequency %; *, Statistically significant at P- value ≤ 0.05; OR, Odds ratio; CI, Confidence interval; Ref. is OR (1:00) /comparison group, SD is standard deviations.

economic status with (OR: 2.87, 95%CI: 1.31, 6.27). Housewives had a significant association with (OR: 1.39, 95%CI: 0.714, 2.71). Unmarried or widowed are with (OR: 1.322, 95%CI: 0.754,2.318). Active smokers (OR: 2.634, 95%CI: 1.021, 6.792).

Table 2 revealed the clinical risk factors among women in both groups. Hormonal replacement therapy with (OR: 2.261, 95%CI: 0.912, 5.608). Perform X-ray examinations with (AOR: 0.139, 95%CI: 0.033, 0.582). Blood group with no significant difference. Regarding family history of breast cancer P value calculated by the Chi-square test (0.101). While family history with other malignancies no significant association (OR: 0.725, 95%CI: 0.41, 1.27).

Table 3 Observed the reproductive risk factors. Menarche age with no significant difference (OR: 1.06, 95%CI: 0.57, 1.98). Age of menopause with significant association (OR: 3.125, 95%CI: 1.26, 7.73). Pregnancies, with a P value calculated by the chi-square test (0.103). Parity with a significant link (OR: 2.137, 95%CI: 1.04, 4.37). Previous abortion with no significant difference (OR: 1.08, 95%CI: 0.64, 1.83). The way of last child delivery no significant association (OR: 0.79, 95%CI: 0.45, 1.40). About spacing between married and first pregnancy, P value was calculated by the chi-square test (0.325). Use of treatment to get pregnant, with no significant difference (OR: 0.81, 95%CI:0.44, 1.49). And about spacing between pregnancies, with no significant difference P value by the chi-square test (0.139). Table 4 represented the behavior and lifestyle risk factors. Use of contraceptive, with no significant difference (OR: 0.826, 95%CI: 0.490, 1.39). Children's feeding type, had a significant difference (OR: 2.16, 95%CI: 1.01, 4.61). Breast self-examination before getting ill with a significant P value calculated by the chi-square test (0.051). Visit a health facility for regular breast checking before getting ill had little chances of getting breast cancer (AOR: 0.025, 95%CI: 0.002, 0.331). Cases with information about breast cancer before being infected are more protective (OR: 0.605, 95%CI: 0.373, 0.981). Most of cases eating daily diet full with natural food had significant difference with (OR: 0.059, 95%CI: 0.012, 0.292). Obesity with (OR: 4.062, 95%CI: 0.463, 35.64).

Figure 1 shows the sources of information regarding breast cancer in the two groups. The top channels for

Table 2. Clinical Risk Factors among Women in Control and Case Groups

Variables	Controls n (%)	Cases n (%)	Unadjusted OR (95% CI)	P Value	Adjusted OR (95% CI)	P Value
hormonal replacement therapy						
No	78 (53.1)	69 (46.9)	Ref.			
Yes	8 (33.3)	16 (66.7)	2.261 (0.912,5.608)	0.078	_	_
x-ray examination						
No	55 (50)	55 (50)	Ref.			
Yes	145 (76.3)	45 (23.7)	0.31 (0.18,0.51)	<0.001*	0.139 (0.033,0.582)	0.007*
Blood group						
A	28 (82.4)	6 (17.6)	Ref.			
AB	6 (50)	6 (50)	4.66 (1.112,19.58)	4.667	_	_
B	21 (65.6)	11 (34.4)	2.44 (0.778,7.677)	2.444	_	_
O	54 (66.7)	27 (33.3)	2.33 (0.862,6.314)	2.333	_	_
Unknown	91 (64.5)	50 (35.5)	_	_	_	_
Family history						
No	159 (69.1)	71 (30.9)	_	0.101[a]	_	_
Yes	41 (58.6)	29 (41.4)	_		_	_
Family history of other malignant tumors						
No	144 (64.9)	78 (35.1)	Ref.			
Yes	56 (71.8)	22 (28.2)	0.725 (0.41,1.27)	0.265	_	_

n, frequency %; *, Statistically significant at P- value ≤ 0.05; OR, Odds ratio; CI, Confidence interval; Ref. is OR (1:00) /comparison group, [a], P- value calculated by Chi-squared test.

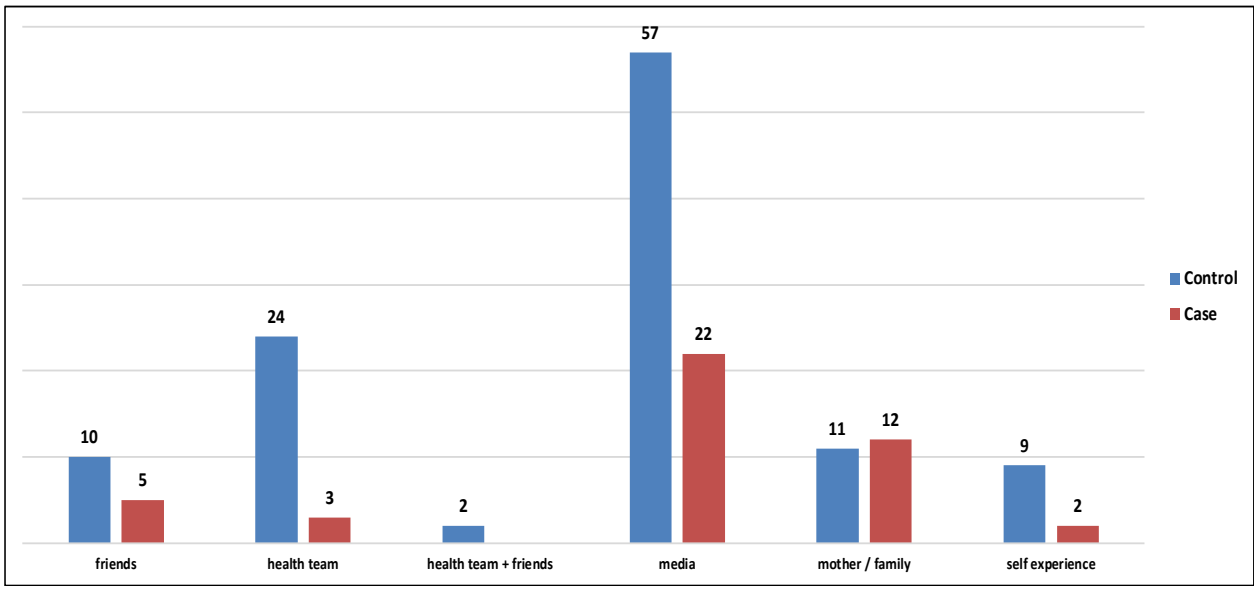
getting the information in the two groups are media, followed by the health team, followed by family members.

Discussion

The breast cancer incidence has increased spontaneously over the years, and this continuing rise of incidence imposes on us the necessity of continuous work to develop effective prevention strategies.

Age is an important risk factor; breast cancer risk increases with age [8]. In the current study, the mean±SD age of cases was (48.84±10.8) years and for control was (37.66±12.4) years. This finding was agreed upon the study in Jordan [14], which detected the age mean±SD of cases was (49.2±10.2) years while the age mean of the control was (45.9±10.9) years. Most cases belong to the age group ≥60 years, and the risk of BC is increasing after forty years, so increasing age is a significant risk factor for breast cancer. This result is similar to what had been reported by a study in Iraq [8] that noted increasing age are positive risk factors for BC.

Regarding rural-urban distribution, a higher percentage of cases were in rural areas, and a significant difference was noted. That could be due to the low educational level of women living in rural areas or due to difficulty in accessing health institutions to get the necessary diagnostic



Figrue 1. Sources of Information Regarding Breast Cancer among Control and Cases Groups

Table 3. Reproductive Risk Factors among women in Control and Case Groups

Variables	Controls n (%)	Cases n (%)	Unadjusted OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Age of menarche						
<12 year	38 (67.9)	18 (32.1)	Ref.			
12 year or more	162 (66.4)	82 (33.6)	1.06 (0.57,1.98)	0.834	_	_
Age of menopause						
>50 year	15 (55.6)	12 (44.4)	Ref.			
50 year or less	22 (28.6)	55 (71.4)	3.125 (1.26,7.73)	0.014*	_	_
Gravidity						
0	40 (75.5)	13 (24.5)	_	0.103a	_	_
1-2	25 (71.4)	10 (28.6)	_		_	_
3-4	43 (72.9)	16 (27.1)	_		-	-
≥5	92 (60.1)	61 (39.9)	_		_	_
Parity						
0	44 (77.2)	13 (22.8)	Ref.			
1-2	33 (68.8)	15 (31.3)	1.53 (.64,3.66)	0.331	_	_
3-4	47 (66.2)	24 (33.8)	1.72 (.78,3.80)	0.175	_	_
≥5	76 (61.3)	48 (38.7)	2.137 (1.04,4.37)	0.038*	_	_
Previous abortion						
No	83 (65.9)	43 (34.1)	Ref.			
Yes	78 (63.9)	44 (36.1)	1.08 (0.64,1.83)	0.749	_	_
The way of last child delivery						
Normal delivery	103 (62.8)	61 (37.2)	Ref.			
Caesarean section	55 (67.9)	26 (32.1)	0.79 (.45,1.40)	0.433	_	_
Spacing between married and first pregnancy						
<1 year	111 (66.9)	55 (33.1)	_	0.325a	_	_
>1 year	49 (60.5)	32 (39.5)	_		_	_
Use treatment for get pregnancy						
No	125 (63.1)	73 (36.9)	Ref.			
Yes	42 (67.7)	20 (32.3)	0.81 (.44,1.49)	0.509	_	_
Spacing between pregnancies						
<2 year	42 (58.3)	30 (41.7)	_	0.139a	_	_
2-3 year	60 (61.2)	38 (38.8)	_		_	_
>3 year	41 (74.5)	14 (25.5)	_		_	_

n, frequency %; *, Statistically significant at P- value ≤ 0.05; OR, Odds ratio; CI, Confidence interval; Ref. is OR (1:00) /comparison group, [a], P- value calculated by Chi-squared test.

services to confirm the condition. Was supported by a study from Addis Ababa, Ethiopia [3], which detected a significant association between living in a rural area and the risk of BC. However, different from a study in Iran [15] that showed no significant relationship between BC and residence.

Regarding educational status, most cases are illiterate, and there is a significant association between low educational status and risk of BC. In agreement with another study in Iraq [8]. That could be due to the huge changes that occurred after 2003, and many students leave school to work or get married. This will reflect on their whole life, including their lifestyle and health status.

Highest percentage of cases in comparation to the control group with not enough economic status, the risk of BC is increasing by twofold with low socio-economic status, which is one of the major obstacles in the early detection of BC. In addition, the cost of diagnostic procedures is a challenge in BC treatment and prevention. These results matched a study in Saudi Arabia [16], which detected those women with low monthly income are at higher risk.

Most of the women with BC were housewives, result in contrast with Iranian study [15] and Ethiopian study [13], which could be due to the difference in chances of employment between the study areas. In Iraq because of the low chance of employment in general and low chances of work for women, so most of the women don't work and stay home until they get married; that reflects the reason for their low income. About marital status, most of the women in the case group are unmarried or widows, and these women have an increased risk for BC, but with no significant association (P value: 0.330). Result similarly with an Iranian meta-analysis study [5], which involved fourteen studies in this concern; these studies found the same result.

Table 4. Behavior and Lifestyle Risk Factors among Women in Control and Case Groups

Variables	Controls n (%)	Cases n (%)	Unadjusted OR (95% CI)	P Value	Adjusted OR (95% CI)	P Value
Use of contraceptives						
No	78 (63.4)	45 (36.6)	Ref.			
Yes	86 (67.7)	41 (32.3)	0.826 (.490,1.39)	0.474	_	_
Child feeding type						
Breast feeding	108 (67.1)	53 (32.9)	Ref.			
Mixed feeding	33 (66)	17 (34)	1.04 (.53,2.05)	0.887	_	_
Bottle feeding	16 (48.5)	17 (51.5)	2.16 (1.01,4.61)	0.046*	_	_
The feeding on						
Both of them	114 (63.7)	65 (36.3)	Ref.			
Left breast	13 (72.2)	5 (27.8)	0.675 (0.230,1.977)	0.042*	_	_
Right breast	14 (63.6)	8 (36.4)	1.002 (0.399,2.516)	0.01*	_	_
Self-examination for breast cancer						
No	148 (63.8)	84 (36.2)	_	0.051[a]	_	_
Yes	52 (76.5)	16 (23.5)	_		_	_
Visit (health center, hospital) for breast examination before getting ill						
No	135 (60)	90 (40)	Ref.			
Yes	65 (86.7)	10 (13.3)	0.231 (0.113,0.473)	<0.001*	0.025 (0.002,0.331)	0.005*
Have any information about breast cancer before getting ill						
No	87 (60.8)	56 (39.2)	Ref.			
Yes	113 (72)	44 (28)	0.605 (0.373,0.981)	0.605	_	_
Nutritional kind						
Natural	17 (19.5)	70 (80.5)	Ref.			
Packet food	183 (85.9)	30 (14.1)	0.04 (0.021,0.077)	<0.001*	0.059 (0.012,0.292)	0.001*
BMI Group						
<18.5	5 (83.3)	1 (16.7)	Ref.			
18.5-24.9	51 (83.6)	10 (16.4)	0.980 (0.103,9.316)	0.986	_	_
25-29.9	64 (72.7)	24 (27.3)	1.875 (0.208,16.88)	0.575	_	_
≥30	80 (55.2)	65 (44.8)	4.062 (0.463,35.64)	0.206	_	_

n, frequency %; *, Statistically significant at P- value ≤ 0.05; OR, Odds ratio; CI, Confidence interval; Ref. is OR (1:00) /comparison group, [a], P- value calculated by Chi-squared test, BMI Body Mass Index.

Active smoker women are at higher risk of BC by two folds than nonsmoker women; this result matches a study in Lebanon [17], which detected women who are smoking are at higher risk for BC. While different from a study in Iran [15] that shows no significant relation between direct smoking and risk of BC, they explained that difference according to the small numbers of smokers in their study.

About the use of hormonal replacement therapy (66.7%) of cases using HRT and these women at risk for developing BC by 2.26 times (P value: 0.073), supported by an Iranian meta-analysis study [18], which included five studies, their result was using HRT increasing the risk by five folds but no significant association. Regarding the previous history of x-ray examination, it's appeared with a negative effect for developing BC with unadjusted (OR: 0.31, 95% CI 0.18-0.51), as with another study in Northern Iran [7] and a meta-analysis of four papers [5], which detected the same results.

The obtained results, showed no significant association between blood group and risk of developing BC. This is consistent with some studies, including a Saudi Arabia meta-analysis study containing twenty-five papers [19], and an Iranian study [20]. Which found the same results.

Our result determines no significant association between family history and family history of other malignant tumors with risk of BC. This result could be due to the small number of patients with a family history of BC or other malignant tumors in the studied sample, or this difference may be explained by the presence of other factors that affect both the cases and control groups. Some studies support our results: Jordanian study [14] and Iraqi study [8].

Our result regarding age of menarche and age of menopause demonstrated that there is no relationship between how long women are exposed to estrogen and progesterone during their productive lives and the risk of developing BC; that could be there is no real association between reproductive hormone and the risk of BC or could be due to a specific property of the studied sample. Our result determines no significant difference regarding the age of menarche (OR: 1.06, CI: 0.57, 1.98) (P value: 0.834). In line with a study in Jeddah, Saudi Arabia [21] and India [22]. About threefold risky for BC (OR: 3.125, 95% CI: 1.26, 7.73) and significant P value (0.014) of BC

women with age of menopause fifty years or less. Three studies in a meta-analysis study [5] show that women with age less than fifty years are 2.03 times more likely to develop BC (OR: 2.03, 95% CI: 0.77, 5.34).

Regarding gravidity and parity, we found that 39.9% of cases have five or more pregnancies with no significant by Chi-square (P value 0.103), while parity most of cases have five or more children with a threefold risk for BC (OR: 2.137, 95%CI: 1.04, 4.37) and (P value: 0.038). This result determines there is no effect of nulliparous to develop BC. Similarly with a Nigerian study [23] of thirty-eight articles about the relation between parity and BC risk shared that "the result of 15 studies found no significant association between parity and risk of breast cancer that could be due to recent studies suggesting that the role of parity may be modified by estrogen receptor (ER) status and menopausal status.".

The majority of BC women had previous abortions with no effect on developing BC (OR: 1.08, 95% CI: 0.64, 1.83) and (P value: 0.749), similar to the Indian study [24], which shows no association between history of abortion and risk of BC. Regarding the method of last child delivery, no significant association was determined; likewise, a study in Tabriz, Iran [25], they found that "the type of child delivery doesn't influence the risk of breast cancer in mothers.".

Our study found there is no significant difference in regard whether the women get any treatment to be pregnant and spacing between pregnancies (P value 0.509) and (P value: 0.139), respectively. A Mexican cohort study [26] detected that a short pregnancy interval is associated with a risk of BC. This difference could be due to the studied sample size not being sufficient to study this variable.

Bottle feeding is a significant risk factor for developing BC (OR: 2.16, 95% CI: 1.01, 4.61), and (P value: 0.046), while breast feeding is a protective measure for BC, and the chances of being infected are slightly equal for both sides. This result agrees with many studies, one of them an Iranian meta-analysis study enrolled eight studies that found same result [5]. Also, in line with an American study [27], which obtained breastfeeding decreased the risk of hormone receptor-negative BC.

Most women didn't practice breast self-examination before getting ill, with a significant difference between the two groups by the chi-square test (P value: 0.051). That reflects the necessity of self-examination for early detection and a better result from treatment. The result likewise with Jordin study [14], which found a significant difference (P value: 0.02).

Regarding BC awareness majority of women didn't perform a routine visit to health facilities for checking before getting ill, and according to adjusted odds ration a significant difference between cases and control which play a preventive measure against developing BC (AOR: 0.025, 95%CI: 0.002,0.331), and (P value: 0.005), and majority of women didn't have an information about the disease before getting ill, with no significant difference, while about source of information the main source were the social media for both cases and controls that reflect the effect of social media these days and the necessity of using these platform to share the correct health information by health care professional. This result agrees with the Saudi Arabia study [16], which detected the same result about BC awareness.

About the nutritional pattern, we found there is a significant difference between the two groups, but with a low risk of eating mixed food of backed and processed food. This result disagreed with a study in Ethiopia [3]; they found the effect of backed food and drink had a high risk for developing BC. This could be due to the effect of other factors in the study sample. In the same way the association between body mass index and risk of BC, women with BMI (≥25) are at higher risk for developing BC, with no statistical significance, supported by the hypothesis "Body mass index (BMI)>25.0 kg/m(^{2}), waist size >85 cm, and hip size >100 cm are risk factors of breast cancer" [28]. This in line with another result in India [29] and an Iranian mate-analysis study [5] of three enrolled studies.

Author Contribution Statement

Farah Mohammed Hassan: Concept, Literature search, Data acquisition, interpretation of data, writing statistical components, Presentation of result in tables, Manuscript preparation and editing.

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Ethics approval and consent to participate

Study approval was granted by Ministry of Health Al-Najaf Directorate, also oral approval from all participants were granted before collecting their responses.

Availability of data

The data supporting this study's findings are available from the corresponding author upon reasonable request.

Conflicts of Interest

None.

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