RISK FACTORS OF BREAST CANCER AMONG YOUNG WOMEN IN SULAIMANI GOVERNORATE: A HOSPITAL-BASED CASE-CONTROL STUDY

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ABSTRACT

Background

Breast cancer is the most common type of cancer in women throughout the world. Although uncommon, breast cancer is the leading cause of cancer death in young women.

Objective

To assess risk factors among young Kurdish women ≤ 40 in Sulaimani governorate.

Materials and Methods

A hospital-based, retrospective case-control study was conducted in two selected Sulaimani Hospitals, Hiwa Cancer Hospital and Breast Diseases Center, from January 1st, 2015, to December 31st, 2021. Eligible cases included those women ≤ 40 years of age, Kurdish nationality, histopathologically confirmed breast cancer, and random selection of a control group with no evidence of breast cancer of matched age. Data on reproductive characteristics were collected through a standardized questionnaire for both cases and controls.

Results

The participants' mean age was 32.23 years (SD ±3.98) and 34.55 years (SD ±5.99) for cases and controls, respectively. The results of multinomial logistic regression revealed that menarche at 12-14 years of age (OR= 2.33, 95% CI:1.41 - 3.86), low level of education (OR primary= 2.16, 95% CI:1.32 - 3.53), living in urban areas (OR= 2.75, 95% CI:1.87 - 4.05), unemployment (OR= 2.73, 95% CI:1.34 - 5.53), nulliparity (OR= 1.76, 95% CI:1.1 - 2.83), physical inactivity (OR nil= 5.03, 95% CI:1.09 - 23.3), and some dietary items as (red meat, chicken meat, fish meat) increased the odds of developing BC.

Conclusion

Nulliparity, early age at menarche, physical inactivity, and dietary patterns should be given priority during the assessment of breast cancer risk among young Kurdish-Iraqi women.

Keywords: *Breast cancer, young women, case-control studies, risk factors.*

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INTRODUCTION

Breast cancer is a significant health burden for women, and it is the leading cause of cancer death in both developed and developing countries. Breast cancer incidence is increasing at a quicker pace in developing countries, according to recent global cancer statistics [(1)]. According to breast cancer statistics in 2022, the lifetime risk of acquiring breast cancer is 13%, or one in every eight women, and 3% (1 in 39) will die from it [(2)].

Breast cancer roughly affected 2.1 million women in 2018, accounting for 11.6% of all malignant neoplasms in women, according to Global Cancer Incidence, Mortality and Prevalence (GLOBOCAN) data [(3)]. It is prevalent in women in their sixties. However, between 6 and 10% of cases occur in women less than 45 years of age in developed countries, and this percentage (together with the mortality rate) is roughly twice that in less-developed countries, 20% (7% vs. 14%, respectively) [(4)]. Internationally, across 185 countries, the breast cancer incidence rate in young vs older women +40 was (45.6% vs 51.5%), and the mortality rate in young vs older women was (81.7% vs 35.6%), respectively [(5)]. Among Iraqi women, the age-specific incidence rate of breast cancer in young women ≤ 40 years increased from 26.8 per 100,000 in 2000 to 35.1 per 100,000 in 2019 [(6)].

Many agents have been implicated as factors that influence breast cancer risk in a younger female population. Breast cancer is often familial in adolescent and young adult women (AYAs). A high proportion of breast cancer patients younger than 40 carry a BRCA1/BRCA2 mutation. Early menarche, oral contraceptives, anovulatory infertility, and late parity after the age of 30 are hormonal factors that raise the risk of breast cancer in AYAs. High alcohol consumption, smoking, radiation exposure, and a young age at which BC runs in the family are additional common risk factors. Obesity as a postmenopausal risk factor, in general, might be protective in younger women. Furthermore, multiparity, a protective factor in postmenopausal females, is a risk factor for women of childbearing age due to the temporary rise in risk in the first year after giving birth [(7)].

Aim of the study

This study aims to determine some of the various risk factors for breast cancer among young Kurdish women in the Sulaimani governorate.

MATERIALS AND METHODS

An observational retrospective case-control study was performed to identify risk factors of breast cancer in young women ≤ 40 years of age in Sulaimani governorate, the Kurdistan region of Iraq, from January 1st, 2015, to December 31st, 2021. A study population of 440 women (220 cases and 220 controls) was recruited into this study using a convenient sampling technique. Cases consisted of women whose breast cancers were histologically confirmed, and their data were collected from Hiwa Cancer Hospital. Controls were selected from female visitors of the Breast Diseases Center who did not have a history of breast cancer at enrollment. Eligible cases included those women ≤ 40 years of age, Kurdish nationality, histopathologically confirmed breast cancer, and random selection of a control group with no evidence of breast cancer of matched age. Breast cancer patients diagnosed after 40 years of age, male, deceased patients, other ethnic groups, and female patients not within the city limits of Sulaimani governorate were excluded.

Approval was granted from the Ethical Committee of the College of Medicine, University of Sulaimani, with permission from the directorate of Health-Sulaimani along with Hiwa Cancer Hospital and Breast Diseases Treatment Center directorates. Informed consent was obtained from the participants by explaining the study purpose, confidentiality issue, and their right to stop during data collection.

Data entry and statistical analysis were performed using a computer-based SPSS program (IBM® SPSS® Statistical Package for the Social Sciences, version 21). Chi-square tests were used to compare the categorical data between case and control groups concerning different variables. The statistical significance of the difference in mean between both groups was assessed using an independent sample t-test. Multinomial logistic regression was performed to find the odds ratio and its 95% confidence interval for variables thought to be risky to measure the risk for each of these variables and their significance. *P* values of ≤ 0.05 were used as a cut-off point for the significance of statistical tests.

RESULTS

A total of 220 women with breast cancer and 220 controls were studied. The participants' ages ranged from 18 to 40 years old. The cases and controls were comparable in terms of age groups, and the mean ages of cases and controls were 32.23 (± 3.98) and 34.55 (± 5.99) years, respectively (P =0.16). The frequency of the 10-year age group was calculated; the age distribution revealed a peak at 30-to 40 years of age (P <0.001) (Table 1; Figure 1). The mean BMI of case and control groups were 29.01 (± 4.86) and 28.76 (± 5.44), respectively (Table 2). In this study, the majority of cases, 176 (80.0%) and controls, 151 (68.6%), reached their menarche at 12-14 years of age, and this was seen as statistically significant (P =0.005) (Table 3). Nineteen (8.6%) of cases and 37 (16.8%) of controls had a positive medical history (P =0.01). 219 (49.8%) of both case and control groups were found within ACR C mammographic density (described as scattered fibroglandular tissue and heterogeneously dense, respectively) (Table 4). The odds of developing BC among women with ACR D breast density type on mammography were 1.66 times higher than those with ACR B breast density type (OR= 1.66, 95% CI: 0.59 - 4.65).

Table 1. Socio-demographic characteristics of participants (N=440: Case=220 and Control=220).

Characteristics		Study group		Total	*P* value
		Control n (%)	Case n (%)	N (%)	
Age (yrs.)	Mean ± SD	34.55 **± 5.99**	32.23 **± 3.98**	34.89 **± 5.09**	0.16
	18-29	47 (21.4)	19 (8.6)	66 (15.0)	< 0.001
	30-40	173 (78.6)	201 (91.4)	374 (85.0)	
Age of marriage (yrs.)	Unmarried	41 (18.6)	25 (11.4)	66 (15)	0.01
	< 18	30 (13.6)	24 (10.9)	54 (12.3)	
	18-24	110 (50)	105 (47.7)	215 (48.9)	
	25-30	26 (11.8)	54 (25.5)	80 (18.2)	
	> 30	13 (5.9)	12 (5.5)	25 (5.7)	
Residency	Urban	147 (66.8)	93 (42.3)	240 (54.5)	< 0.001
	Rural	73 (33.2)	127 (57.7)	200 (45.5)	
Socioeconomic	Low	39 (17.7)	62 (28.2)	101 (23.0)	0.01
	Middle	181 (82.3)	158 (71.8)	339 (77.0)	
Level of education	Illiterate and read and write	37 (16.8)	48 (21.8)	85 (19.3)	0.01
	Primary	83 (37.7)	53 (24.1)	136 (30.9)	
	Secondary & preparatory	47 (21.4)	46 (20.9)	93 (21.1)	
	Institute & university	53 (24.1)	73 (33.2)	126 (28.6)	
Occupation	Housewife	142 (64.5)	138 (62.7)	280 (63.6)	0.02
	Employed	47 (21.4)	66 (30.0)	113 (25.7)	
	Unemployed	31 (14.1)	16 (7.3)	47 (10.7)	

N: Total number of participants, n: Sample size, *P* value: Probability value, SD: Standard deviation

Table 2. Behavioral characteristics of participants (N=440: Case=220 and Control=220).

Characteristics		Study group		Total N (%)	*P* value
		Control n (%)	Case n (%)		
BMI	Mean ± SD	28.76 ± 5.44	29.01 ± 4.86	28.89 ± 5.16	0.61
	Normal (< 25)	51 (23.2)	49 (22.3)	100 (22.7)	0.98
	Overweight (25 - 29.99)	79 (35.9)	77 (35.0)	156 (35.5)	
	Obese (30 - 39.9)	85 (38.6)	88 (40.0)	173 (39.3)	
	Morbid obesity (> 40)	5 (2.3)	6 (2.7)	11 (2.5)	
Dairy products intake	≥ 1 time/day	22 (10.0)	41 (18.6)	63 (14.3)	< 0.001
	1-3 times/week	117 (53.2)	91 (41.4)	208 (47.3)	
	4-6 times/week	46 (20.9)	69 (31.4)	115 (26.1)	
	Rarely or never	35 (15.9)	19 (8.6)	54 (12.3)	
Vegetables intake	Once/day	48 (21.8)	49 (22.3)	97 (22.0)	0.03
	> 1 time/day	69 (31.4)	96 (43.6)	165 (37.5)	
	1-3 times/week	75 (34.1)	55 (25.0)	130 (29.5)	
	1-3 times/month	28 (12.7)	20 (9.1)	48 (10.9)	
Exercise	Nil	167 (75.9)	168 (76.4)	335 (76.1)	0.07
	Low	42 (19.1)	50 (22.7)	92 (20.9)	
	Moderate	10 (4.5)	2 (0.9)	12 (2.7)	
	High	1 (0.5)	0 (0)	1 (0.2)	

Table 3. Reproductive and family history characteristics (N=440: Case=220 and Control=220).

Characteristics		Study group		Total N (%)	*P* value
		Control n (%)	Case n (%)		
Age at menarche (yrs.)	< 12	13 (5.9)	16 (7.3)	29 (6.6)	0.005
	12-14	151 (68.6)	176 (80.0)	327 (74.3)	
	≥ 15	56 (25.5)	28 (12.7)	84 (19.1)	
Parity	Nulliparous	55 (25.0)	35 (15.9)	90 (20.5)	0.02
	Parous	165 (75.0)	185 (84.1)	350 (79.5)	
Age at first live birth (yrs.)	None	56 (25.5)	36 (16.4)	92 (20.9)	0.04
	< 30	143 (65.0)	166 (75.5)	309 (70.2)	
	≥ 30	21 (9.5)	18 (8.2)	39 (8.9)	
Number of children	None	56 (25.5)	36 (16.4)	92 (20.9)	0.09
	One	14 (6.4)	19 (8.6)	33 (7.5)	
	Two-Four	135 (61.4)	153 (69.5)	288 (65.5)	
	> Four	15 (6.8)	12 (5.5)	27 (6.1)	
Breastfeeding	Yes	159 (72.3)	177 (80.5)	336 (76.4)	0.04
	No	61 (27.7)	43 (19.5)	104 (23.6)	
Family history of breast cancer	Yes	47(21.4)	54(24.5)	101 (23.0)	0.43
	No	173 (78.6)	166 (75.5)	339 (77.0)	
Family history of other cancers (1 case of ovarian cancer)	Yes	48 (21.8)	51 (23.2)	99 (22.5)	0.73
	No	172 (78.2)	169 (76.8)	341 (77.5)	

Table 4. Medical history, breast-related, and breast density characteristics

Characteristics		Study group		Total N (%)	*P* value
		Control n (%)	Case (%)		
Medical history (DM, HT, heart disease, hypo & hyperthyroidism)	Yes	37 (16.8)	19 (8.6)	56 (12.7)	0.01
	No	183 (83.2)	201 (91.4)	384 (87.3)	
History of benign breast disease	Yes	98 (44.5)	28 (12.7)	126 (28.6)	< 0.001
	No	122 (55.5)	192 (87.3)	314 (71.4)	
Breast density type on mammography (BI-RADS)	ACR B	13 (5.9)	37 (16.8)	50 (11.4)	< 0.001
	ACR C	69 (31.4)	150 (68.2)	219 (49.8)	
	ACR D	7 (3.2)	33 (15.0)	40 (9.1)	
	None	131 (59.5)	0 (0)	131 (29.8)	

BI-RADS: Breast Imaging Reporting and Data System, ACR: American College of Radiology, DM: Diabetes mellitus, HT: Hypertension

DISCUSSION

Detection of the risk factors for breast cancer is imperative for devising prevention strategies. Although the prevalence of breast cancer among young women is deficient, young age is a poor prognostic factor for breast cancer treatment. Early detection is, therefore, crucial in this age range [8]. We decided to assign 40 years as the cut-off age limit for our study since most of the literature refers to women ≤ 40 years "young women" in developed countries [9]. In addition to being the most critical cancer in Iraq, other characteristics warrant stepping up control efforts, including the tendency for this disease to affect younger women, the apparent rise in incidence rates, and the prevalence of advanced stages at presentation linked to more aggressive tumour behaviour resulting in higher mortality rates [10]. Out of 2631 patients diagnosed with breast cancer at Hiwa Cancer Hospital between 2015 and 2021, 22% of patients with BC were aged ≤ 40 years, and this is similar to that reported by an Indonesian study [11].

In the United States, about 7% of breast cancer cases were diagnosed among women younger than 40 [12], while the prevalence rate in Asia reached 26% [13]. Results of the current work revealed that the breast cancer incidence rate was significantly higher among women living in urban areas than those in rural areas, which is in agreement with the findings of another study conducted by Fazel et al. 2019 [14]. Causes for such variations may include diagnostic bias, as women in urban areas may have easier access to healthcare resources [15], and the observed variations are most likely mainly attributable to different risk factors present in urban vs. rural areas [16].

It has been perceived that breast cancer is more common in females with high socioeconomic status (SES) [17]; this has an indirect relationship as significant risk factors such as nulliparity, late age at first birth (yet we found no association between age at first live birth and BC, which could be due to the small sample size of our study). Late age at menopause may be in part responsible for this positive relationship because these characteristics are more frequent in women of high-income groups. Moreover, a sedentary lifestyle and high-fat diet, including a non-vegetarian diet, are more common in high SES, which directly or indirectly affects a female's body habitus and menstrual characteristics [18]. The majority of the cases and controls had a middle socioeconomic status, 158 (71.8%) and 181 (82.3%), respectively; this is similar to the results of a previous Iraqi study [19] and were mainly housewives. Our study showed no increased risk of BC in women with middle SES. Being unemployed is a risk factor for having a low income, which is one of the main barriers to the early detection of breast cancer. In addition, the cost of diagnostic procedures is a problem in breast cancer prevention [20].

Thereby, we found that low SES, low level of education (illiterate and read and write primary, secondary, and preparatory school levels), and unemployment were found to be risk factors for developing breast cancer in our study. These findings are in accord with a study conducted by Fei et al. [21]. Although statistically non-significant in the multinomial logistic regression analysis, this research found that overweight or those with BMI over 25 kg/m^2 correlated with an increased risk of breast cancer compared to those with low BMI. The association of being overweight with the risk of breast cancer in premenopausal women is evaluated in many studies, but the results are controversial. Some studies found an inverse association between higher BMI and the risk of breast cancer [22], whereas others found a positive association [23]; this is contrary to the positive correlation between BMI and BC risk in postmenopausal women. Though premenopausal women with a higher BMI indeed had a lower risk of having BC, a high BMI will raise a person's lifetime cumulative risk of developing BC [24]. The mechanism underlying this effect is unknown and of limited evidence, although it has been proposed that obesity promotes ovarian suppression, leading to decreasing levels of circulating estradiol [25].

In the past, it was widely believed that there was no correlation between physical activity and premenopausal BC risk following large-scale prospective cohort studies, such as a study by Rockhill et al., which reported no association [26]. However, more recent data disprove these findings. Independent meta-analyses [27, 28] evaluating the effect of physical activity on premenopausal BC have agreed that physical activity significantly reduces the risk of premenopausal BC development. Likely explanations include that physical activity increases basal metabolism, enhances tissue oxygenation, and decreases weight. Controlling weight lowers body fats, insulin resistance, and, ultimately, insulin levels. Physical inactivity causes chronic inflammation and increases the levels of growth-promoting hormones [29]. All these changes are related to cancer. Our study found that physical inactivity significantly contributed to increased risk of BC (OR= 5.03, 95% CI: 1.09 - 23.3, P= 0.03).

There is still no scientific consensus regarding the link between cigarette smoking and BC risk [30]. Most research, however, agrees that if there is a risk associated with smoking, it is more prominent in premenopausal (than postmenopausal) women [31]. It is interesting to note that passive smoking may carry a higher risk of BC than active smoking. Theoretically, active smoking produces an anti-estrogenic effect that may partially counteract exposure to carcinogens linked with smoking. Passive smoking exposes one to carcinogenic substances and increases the risk of breast cancer since the smoke from the incandescent tip of a cigarette contains 4X more toxic concentrates (such as N-nitrosamines, benzenes, carbon monoxide, carbon dioxide, and ammonia) [32]. We found no association between active smoking (OR=1.00, 95% CI: 0.62 - 16.09, P value= 1.00) and passive smoking (OR=1.02, 95% CI: 0.67 - 1.57, P value= 0.91) with BC, respectively.

The outcomes of observational studies on diet were discordant. Despite several observational studies of fruit and vegetable consumption, no benefit was seen in reducing breast cancer risk in both premenopausal and postmenopausal women [33]. In contrast, the Nurses' Health study revealed nearly a 50% greater risk of breast cancer in premenopausal women who consume a high animal fat diet but not in women on a high vegetable fat diet [34]. The globally accepted definition of an unhealthy dietary pattern includes a high content of refined grains, potatoes, sweets, high-fat food, coffee, black tea, soft drinks, dressing, sauce, mayonnaise, red meat, and processed foods [35]. This study revealed that in women who consumed red meat more than once a week, the risk of BC was 3.81 times higher than those who consumed less (OR $\geq$ 2 times/week vs. yearly or never= 3.81, 95% CI: 1.35 - 10.80, P value= 0.01). Previous studies on BC also supported these findings. For example, a recently published meta-analysis on premenopausal women showed a significant positive link between red meat consumption and the risk of BC in young women [36]. However, a recent meta-analysis on three cohorts, three nested case-control, and two clinical trial studies has demonstrated that processed meat is associated with a higher risk of BC but not red meat [37].

In line with this study, we also found an increased risk of BC with consumption of fast foods (OR 2 times/week vs. yearly or never= 1.22, 95% CI: 0.47 - 3.19, P value= 0.68), though the association was statistically non-significant. Following multinomial logistic regression analysis, fish intake was also associated with an increased risk of BC (OR $\geq$ 1 time/week vs. yearly or never= 2.47, 95% CI: 1.05 - 5.78, P value= 0.04). These studies confirm our findings [38, 39]. The hypotheses for this mechanism include that fish might be contaminated with water-absorbed heavy metals and pesticides, which have estrogenic effects. In the absence of estrogens, these metals and compounds activate estrogen receptors and increase the risk of BC. Also, cooking fish at high temperatures can produce heterocyclic aromatic amines similar to red meat and can cause BC [40]. According to the widely accepted concept of healthy dietary patterns, fish is a prudent/healthy diet element. An increased risk of BC with fish intake can raise concerns about fish remaining a healthy food [35].

Vegetables and fruits are potentially listed as healthy foods for the prevention of not only cardiovascular and inflammatory diseases but also cancer. The World Cancer Research Foundation recommends increasing the intake of fruits and vegetables for cancer prevention. Many studies demonstrated the anti-BC effect of vegetables and fruits [38]. Although the association for fruit intake was statistically non-significant, our study supports those studies. In our study, the intake of dairy products decreased the risk of BC. Several studies support these findings, but some others contradict them.

A meta-analysis showed that dairy consumption is inversely associated with BC development, especially low-fat dairy products [41]. Another study, however, found that high-fat dairy products increased the risk of BC [34]. The likely explanations include that high-fat content is estrogenic, dairy products containing carcinogenic contaminants (such as pesticides), and growth factors such as insulin-like growth factor I (IGF-I). Human studies have not confirmed the link between high-fat dairy products and cancer that has been shown in animal studies [42]. There was a significant correlation between the age of marriage and the risk of breast cancer (P =0.01); though statistically non-significant in the multinomial logistic regression analysis, marriage at a younger age (< 18 years vs. > 30 years) was associated with a lower risk of breast cancer (OR= 0.87, 95% CI: 0.34 - 2.24); this is in line with a study carried out by Ghiasvand et al. who suggested that getting married at a younger age has a protective role on the risk of BC [43]. Early age at menarche seemed to be related to a higher risk of breast cancer. One explanation for this association is that women with earlier age at menarche are exposed to endogenous estrogens for a more extended period [44]. We observed a significant correlation between young breast cancer and early age at menarche with a P-value of 0.005.

In this study, early onset of menarche was found to be associated with a higher risk of BC, which is consistent with findings of another study [45]; this is in contrast to findings of a study where younger age at menarche did not increase breast cancer risk for both pre-and postmenopausal women [46]. In our study, though statistically non-significant, 17.5% of the females had irregular cycles (OR= 0.71, 95% CI: 0.43 - 1.16, P value= 0.17), which decreased the risk of breast cancer. This result aligns with other studies [47, 48] but is unlike a study conducted by S.K. Abedalrahman et al. [49], where menstrual irregularity was associated with an increased risk of BC.

The lifetime risk of acquiring breast cancer is reduced by younger age at first full-term pregnancy (first live birth). The higher degree of terminal differentiation of mammary epithelial cells at first birth, which increases the epithelium's ability to metabolize carcinogens and repair DNA damage, is a reasonable explanation for the protective effect [50]. Most studies [51, 52] but not all [53] have shown an association between age at first pregnancy and breast cancer. We also found no association between age at first live birth and BC.

Our study is by most studies reporting that nulliparous women have an increased risk of BC [54] and that multiparity had an inverse association with breast cancer risk and appeared to be protective. Most other epidemiologic studies have similarly demonstrated this protective effect of parity [43]. Research has shown that there was a 3% reduction in premenopausal breast cancer risk for each full-term pregnancy, whereas the reduction reached 12% in postmenopausal women [52]. Despite the protective role of parity, studies have revealed that for women aged less than 35 years, early childbearing and multiparity are risk factors owing to a short-term elevation in breast cancer risk for several months immediately following birth [55]. Regarding breastfeeding, we found a protective effect of breastfeeding against BC, which is in agreement with a study estimating a 4.7% risk reduction in developing breast cancer every 12 months of breastfeeding [56].

Similarly, most studies on the relationship between BC and breastfeeding inferred that those with a history of breastfeeding had a decreased BC risk and that the longer the duration of lactation, the lower the risk of BC [56, 57]. Researchers have shown that the potential mechanisms by which breastfeeding protects against breast cancer include: (Delaying ovulation, accelerating breast differentiation, or altering the hormonal environment of the breast) or directly by excretion of carcinogenic agents [58]. There is limited literature specific to young women regarding studies on the history of abortion.

Our study is in line with studies [59, 60] that have found no increased risk with history of abortion (OR two-four abortions= 0.527, 95% CI: 0.29 - 0.96, P value= 0.04), yet we found history of more than four abortions increased the odds of developing BC (though statistically non-significant). Our results do not support a study that found that induced abortion or miscarriage increases the risk of BC in young women [61]. Also, in our study, no association was observed between breast cancer and taking oral contraceptives (OR= 1.04, 95% CI: 0.71 - 1.51, P value= 0.85), which supports the findings of a study conducted by Laamiri FZ et al. [45]. There is a slight increase of BC risk in young women of childbearing age using OCs, in comparison to the extensive use of contraceptives in older women leading to a significant number of cases [62]. The association between having a history of a medical condition and BC was statistically significant. Nevertheless, no increased risk of BC was seen in this study.

A large population-based study demonstrated that women with a history of common medical conditions do not seem to be at an increased risk of BC at a young age [63]. This study is based on the findings of previous studies, which suggested that having a history of breast cancer among relatives could increase the risk of BC [38, 64]. However, the association was statistically non-significant (OR= 1.20, 95% CI: 0.77 - 1.87, P value= 0.43). In contrast to some previous studies [65, 66], we found no increased risk of BC in women with benign breast disease (P <0.001) and a history of breast biopsy (P= 0.004). This finding is likely to be due to the small number of women who had a previous biopsy and benign breast disease. An additional finding of our study is that high or increased mammographic breast density was a risk factor for developing breast cancer (though the association was statistically non-significant), and this is in agreement with other studies showing that high mammographic density is a risk factor for breast cancer at all ages [67].

In conclusion, our study detected that multiparity and lactation were protective factors. Fish consumption was found to be a risk factor for breast cancer. We suggest women eat more vegetables and fruits and breastfeed their babies. Young women with early menarche between ≤ 12 and 14 years of age should be offered screening starting at the age of 35 as part of the national program for early detection of breast cancer and recommending effective interventions to embark upon lifestyle risk factors.

Limitations Of The Study

This hospital-based retrospective case-control study has some likely biases, such as selection biases (non-response bias, hospital admission bias, exclusion bias) and information bias (interview bias, recall bias, and reporting bias). The study's limited sample size and sampling technique may have an effect on its strength and generalizability, and the missing data limited the analysis of our study.

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Conflicts Of Interest

None Declared

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