

Identification of Risk Factor For Breast Cancer Among Female Patients in The Holy City of Karbala (Descriptive Study)

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Abstract

Background: Among women, breast cancer stands as the second most common cause of death from cancer. Globally, its prevention continues to pose a serious challenge. However, early detection remains one of the most promising methods to control and reduce the burden of this disease. **Objectives:** This study aims to identify the risk factors associated with breast cancer among women in the Holy City of Karbala. The anticipated findings are intended to contribute to the development of public health strategies focused on early detection, prevention, and risk reduction, tailored to the specific needs and context of the local population. **Materials and methods:** A descriptive cross-sectional study was conducted on 103 women diagnosed with breast cancer in Karbala Governorate, Iraq, between July 2023 and June 2024. Data were obtained from the Al-Hussein Oncology Center (Al-Amal Building), Al-Hussein Hospital, and selected private clinics in Karbala. The questionnaire included socio-demographic information and potential risk factors such as age at diagnosis, age at menarche, menopausal status, number of children, age at first childbirth, breastfeeding practices, family history of breast cancer, hormonal disorders, hormonal use, dietary habits, and smoking. Ethical approval was obtained, and verbal consent was secured from all participants. **Results:** The majority of participants were under the age of 45, with a considerable proportion experiencing early menarche (before age 12). Nearly half of the women were still menstruating, and most had between 5 to 6 children. The majority had their first childbirth between the ages of 21 and 29. Notably, a significant percentage reported a history of hormonal use, fast food consumption, and smoking. While 28.2% had a positive family history of breast cancer, 26.2% also reported hormonal disorders. These findings suggest the presence of several lifestyle and reproductive risk factors among the sampled population of women in Karbala. **Conclusion:** The study suggests that lifestyle-related factors such as hormonal use, fast food intake, and smoking may contribute significantly to breast cancer among women in Karbala. Most participants had no family history, and many were diagnosed at a young or reproductive age. These findings underscore the need for further local research to better understand and address the specific risk factors affecting women in this region.

Introduction

Breast cancer stands as the most commonly identified malignancy in women and continues to be a major contributor to cancer-related mortality worldwide. According to the World Health Organization (WHO), around 2.3 million new cases were diagnosed in 2022, accounting for approximately 24.5% of all cancers in women worldwide [1]. The overall incidence is rising steadily due to changes in reproductive behavior, diet, physical inactivity, and environmental influences [2]. In the Middle East and North Africa (MENA) region, there has been a substantial rise in breast cancer rates over the past decades. Data indicate that between 1990 and 2019, the number of breast cancer cases increased by more than 380%, with age-standardized prevalence rates rising from 178 to 333 per 100,000 women [3]. Iraq, including Karbala, is among the countries facing a growing burden, with an estimated incidence of 40 per 100,000 women [4]. Moreover, due to late-stage diagnoses and barriers to healthcare access, the region experiences higher mortality rates—around 17 per 100,000 women [5]. Key risk factors for breast cancer can be categorized into modifiable and non-modifiable types. Age is a prominent non-modifiable factor, with risk increasing notably after the age of 40 [6]. A family history of breast cancer in first- or second-degree relatives doubling the likelihood and second degree relative nearly doubling [7]. Hormonal and reproductive factors also play major roles: early onset of menstruation, late menopause, and nulliparity extend estrogen exposure, heightening the risk. In contrast, full-term pregnancies and breastfeeding offer protective effects [8,9]. Lifestyle behaviors such as smoking have been shown to increase breast cancer risk, particularly among premenopausal women [10] and frequent consumption of fast food have also been linked to higher likelihood of breast cancer [11].

These risk factors are especially relevant in transitioning societies like Iraq, where dietary and activity patterns are shifting. Timely detection continues to be a fundamental strategy in managing and reducing the burden of breast cancer. In countries like Saudi Arabia, early-stage detection has led to survival rates above 95%, whereas over half of patients are still diagnosed at advanced stages (5). Awareness campaigns and national screening programs, such as those implemented in Jordan, have proven effective in improving early detection and lowering mortality [12]. Despite these advancements, Iraq still suffers from limited screening infrastructure, low public awareness, and social barriers that prevent timely medical consultation, especially in provinces like Karbala [4,13]. Evaluating individual risk profiles including age, menarche and menopause timing, age at first childbirth, number of children, breastfeeding, hormonal disorders or medication use, smoking, and diet can help tailor prevention strategies to local needs. This study aims to investigate the prevalence and distribution of demographic, reproductive, hormonal, and behavioral risk factors among women diagnosed with breast cancer in Karbala. Identifying the most common contributing factors can help support public health efforts toward education, early detection, and prevention.

Patients and Methods

Materials and Methods

This cross-sectional study included 103 women diagnosed with breast cancer. Data were collected through face-to-face interviews at Al-Hussein Oncology Center (Al-Amal Building), Al-Hussein Hospital, and selected private clinics in Karbala, Iraq, from July 2023 to June 2024. The questionnaire covered socio-demographic details and potential risk factors such as age, age at menarche, menopausal status, number of children, age at first childbirth, breastfeeding duration, family history of breast cancer, hormonal disorders, hormone use, dietary habits, and smoking.

Inclusion and Exclusion Criteria

Inclusion Criteria:

The study included female patients who were diagnosed with breast cancer and attended Al-Hussein Oncology Center (Al-Amal Building), Al-Hussein Hospital, or selected private clinics within Karbala Governorate between July 2023 and June 2024. Only patients who were residents of Karbala provided verbal informed consent after receiving an explanation of the study's objectives were included.

Exclusion Criteria:

The following patients were excluded from the study: Those who declined to participate or did not provide verbal informed consent and women residing outside Karbala Governorate and Cases with an unconfirmed diagnosis of breast cancer, Patients with mental or cognitive impairments that could interfere with effective communication or accurate completion of the interview and questionnaire

Data Collection:

Data were collected through direct face-to-face interviews with breast cancer patients at Al-Amal Center for Oncology (Al-Hussein Hospital), Al-Hussein Hospital, and selected private clinics in Karbala, Iraq, between July 2023 and June 2024. The study included 103 female patients diagnosed with breast cancer. A structured questionnaire was administered to gather detailed information on socio-demographic characteristics and established and probable breast cancer risk factors. These included age, age at menarche, menopausal status, parity (number of children), age at first childbirth, breastfeeding duration, family history of breast cancer, hormonal disorders, hormonal use, dietary habits (including fast food consumption), and smoking status.

Ethical approval

Ethical approval was obtained from the ethics committee of the college of Medicine, university of Karbala. Additionally, verbal consent was secured from each participant prior to administering the questionnaire

Statistical analysis

The collected data was entered to excel sheet then into (SPSS version 23) statistical package for doing statistical analysis. The continuous variables were expressed by mean and standard deviation (SD), while the qualitative data were expressed by number and percentage.

Results

Table 1: Sociodemographic characteristics of breast cancer patients

variable	sub-group	Frequency	Percentage
Age Group / years	< 40	16	15.5
	41-50	36	35
	51-59	27	26.2
	60-69	22	21.4
	70	2	1.9
	Total	103	100
Min-Max=31-76	mean± SD= 49.82±10.33		
	<12	24	23.3
Menarche age / years	Dec-15	45	43.7
	≥16	34	33
	Total	103	100
Menopause age/ years	Still menstruation	50	48.5
	≤ 45	19	18.4
	46-50	24	23.3
	51-55	8	7.8
	≥56	2	1.9
	Total	103	100
Parity (no. of children)	None	11	10.7
	1-Feb	11	10.7
	3-Apr	19	18.4
	5-Jun	37	35.9
	≥7	25	24.3
	Total	103	100
Age at first life birth/years	≤ 20	33	32
	21-29	49	47.6
	≥30	10	9.7
	Total	92	89.3
	Unmarried	11	10.7

Table 2: Distribution of breastfeeding practice among female breast cancer patients in Karbala

variable	sub-group	Frequency	Percentage
Breast feeding practice	No breastfeeding	17	18.5
	6 months	21	22.8
	12 months	10	10.9
	18 months	20	21.7
	24 months	24	26.1
	Total	92	100.0
	unmarried	11	10.7

Table 3: Distribution of family history of breast cancer among female breast cancer patients in Karbala

Variable	Sub-group	Frequency	Percentage
Family history of breast cancer	No	74	71.8
	Yes	29	28.2
	Total	103	100.0

Table 4: Distribution of PCOS Among female breast cancer patients in Karbala

Variable	Sub-group	Frequency	Percentage
Hormonal disorder (PCOS)	No	76	73.8
	Yes	27	26.2
	Total	103	100.0

Table 5: Distribution of use of COCP and HRT Among female breast cancer patients in Karbala

Variable	Sub-group	Frequency	Percentage
Hormonal use (COCP, HRT)	No	51	49.5
	Yes	52	50.5
	Total	103	100.0

Table 6: Distribution of Fast-food consumption Among female breast cancer patients in Karbala

Variable	Sub-group	Frequency	Percentage
Fast food	No	25	24.3
	Yes	78	75.7
	Total	103	100.0

Table 7: Smoking (active and passive) Among female breast cancer patients in Karbala

Variable	Sub-group	Frequency	Percentage
Smoking	No	50	48.5
	Yes	53	51.5
	Total	103	100.0

In this study, the average age was 49.82 ± 10.33 years, with a notable proportion of cases 15.5% (16) occurring in women younger than 40. The most affected age group was 41–50 years, representing 35.0% of the total sample. In the current study, early menarche (<12 years) was reported by 23.3% (24), while 43.7% (45) experienced menarche between ages 12 and 15, and 33.0% (34) had late menarche (≥ 16 years).

In terms of menopausal status, at the time of the study, 48% (50) were still having periods. Of the individuals who had reached menopause, 18.4% (19) had done so prior to the age of 45, 23.3% (24) between the ages of 46 and 50, 7.8% (8) between the ages of 51 and 55, and a tiny percentage (1.9%, 2) after the age of 56. In terms of parity, the majority 35.9% (37) had five to six children, while 24% (25) had seven or more. Three to four children made up a smaller group 18.4% (19). Remarkably, 10.7% (11) were nulliparous, whilst 10.7% (11) had one or two children. The majority 47.6% (49) of the 92 women who had given birth had their first child between the ages of 21 and 29. Furthermore, just 9.7% (10) had their first childbirth at age 30 or older, while 32.0% (33) gave birth before the age of 20. 10.7% (11) of participants had missing age at first birth data. Table (1)

When it came to nursing, 21.7% (20) were nursed for 18 months, whereas 26% (24) did so for 24 months. Twenty-two percent (21) reported breastfeeding for six months, and 10.9 percent (10) reported breastfeeding for a full year. Interestingly, 18% (17) of moms did not ever breastfeed. For 10.7% (11), breastfeeding data were lacking. Table (2)

While the majority of individuals 73.8% (76) reported no family history of breast cancer, 26.2% (27) reported a history. Table (3)

In reference to hormonal problems, 26.2% (27) had suffered from a hormonal disorder, whereas 73.8% (76) had no history of hormonal imbalances. Table (4)

Regarding hormone use, the sample was split almost evenly: 50.5% (52) reported using hormonal drugs or therapies in the past or present, whereas 49.5% (51) reported not using any hormonal treatments. Table (5)

While 24.3% of individuals (25) did not often eat fast food, the majority of participants 75.7% (78) reported doing so. Table (6)

Lastly, there was a nearly equal distribution of smoking prevalence, with 51.5% (53) identifying as smokers and 48.5% (50) as nonsmokers, suggesting a significant. Table (7)

Discussion:

The relatively high proportion of women over the age of 45 in our study suggests that breast cancer may be more prevalent among older women in our population. This contrasts with the South Asian study, which reported a larger proportion of cases occurring in younger women. Such discrepancies may be attributed to differences in genetic predisposition, access to healthcare services, or population demographics. Further research that includes precise data on age at diagnosis is essential to better understand potential trends in the onset of breast cancer in this context [14].

A 2020 meta-analysis confirmed that each year younger at menarche corresponds to a 5% increase in breast cancer risk, with early onset (<12 years) linked to more aggressive tumor subtypes and poorer prognosis [15]. In this study, early menarche (<12 years) occurred in 23.3% of participants, average menarche (12–15 years) in 43.7%, and late menarche (≥ 16 years) in 33.0%. This distribution underscores the heterogeneity of menarche timing within this breast cancer cohort. Recent evidence from Breast Cancer Research (2024) supports the notion that early menarche may influence tumor biology, associated with higher proliferation indices and recurrent disease risk [16]. Conversely, delayed menarche appears to modestly reduce lifetime estrogen exposure and lower risk, though the magnitude of effect varies across populations and hormonal subtypes.

In the present study, approximately half of the women diagnosed with breast cancer were still menstruating at the time of diagnosis (48.5%), while the remaining 51.5% had already entered menopause. This near-equal distribution indicates that breast cancer in this sample was not confined to postmenopausal women, and a substantial proportion of cases occurred during the premenopausal phase. These findings align with recent global reports indicating a noticeable rise in premenopausal breast cancer incidence, likely linked to shifting reproductive behaviors and increasing prevalence of more aggressive tumor subtypes, such as triple-negative, among younger women [17]. Conversely, breast cancers diagnosed after menopause are more often hormone receptor-positive and linked to cumulative lifetime estrogen exposure [18]. This highlights the importance of considering menopausal status in both risk assessment and treatment planning.

In the present study, a considerable proportion of breast cancer patients were multiparous, with 35.9% having 5–6 children and 24.3% having seven or more.

Higher parity has been associated with a protective effect against breast cancer, particularly hormone receptor-positive subtypes. However, the current findings suggest that high parity may not confer this benefit uniformly. This observation is supported by the study which analyzed data from over 158,000 women within the Korean Breast Cancer Society database. The authors reported that women with high parity, particularly those under 50 years of age, demonstrated a higher prevalence of biologically aggressive subtypes, such as triple-negative and HER2-positive breast cancers, which are associated with poorer outcomes [19]. These findings underscore the complexity of reproductive risk factors and highlight the need for context-specific investigations, particularly in regions like Karbala, where cultural and demographic patterns may influence breast cancer presentation.

In this study, the majority of breast cancer patients had their first childbirth between the ages of 21 and 29. This finding contrasts with previous research suggesting that early childbirth,

particularly before the age of 20, may reduce the risk of breast cancer. For instance, the National Cancer Institute highlights that an early first full-term pregnancy is considered a protective factor against breast cancer [20]. The discrepancy might be attributed to the fact that our study sample consists exclusively of women already diagnosed with breast cancer. Additionally, variations in environmental, genetic, and reproductive factors specific to the population studied could also explain the difference.

Our study showed that most participants breastfed for various durations, with 26% breastfeeding for 24 months. This suggests a possible protective role of extended breastfeeding against breast cancer. However, a recent meta-analysis reported a modest 4.3% reduction in breast cancer risk with breastfeeding for 12 months or more[21]. Differences between our findings and the meta-analysis could be due to variations in study design, sample size, or population characteristics. While our results indicate a trend toward protection, the meta-analysis highlights the broader impact of prolonged breastfeeding on reducing breast cancer risk.

The findings of the present study indicate that a substantial proportion of breast cancer patients (71.8%) reported no family history of the disease, suggesting a limited contribution of hereditary factors within this cohort. Conversely, a recent investigation conducted in the Middle East demonstrated a significant correlation between familial history and elevated breast cancer risk [22]. The observed divergence may be attributed to genetic heterogeneity, methodological differences, or potential underreporting of family history among the study population. These results underscore the necessity of contextualizing breast cancer risk assessments according to regional and population-specific characteristics.

In the present study, a notable majority of breast cancer patients (73.8%) reported no history of hormonal disorders such as menstrual irregularities or polycystic ovary syndrome (PCOS), while only 26.2% reported such conditions. This finding aligns with evidence from a systematic review and meta-analysis, which concluded that women with PCOS did not have a statistically significant increase in the risk of developing breast cancer when compared to the general population. Their pooled analysis demonstrated that the odds ratio for breast cancer in women with PCOS was not significantly higher than in controls, suggesting a weak or non-significant association between hormonal disorders and breast cancer incidence [23].

The findings of the current study indicate that hormonal use is associated with an increased risk of breast cancer, with 50.5% of participants reporting hormonal use. This result aligns with recent evidence from a large-scale cohort study conducted by Oxford University, which demonstrated that all types of hormonal contraceptives, including progestogen-only methods, are linked to an elevated breast cancer risk. Specifically, the Oxford study reported a 20% to 30% increased risk among users of hormonal contraceptives compared to non-users, with a 32% higher risk observed in users of progestogen-releasing intrauterine devices [24]. These consistent findings underscore the significance of hormonal exposure as a contributing factor to breast cancer development and support the need for careful evaluation of hormonal therapies in breast cancer prevention strategies.

The results indicated that a majority of participants frequently consumed fast food, suggesting a potential link between unhealthy dietary habits and an increased risk of breast cancer. This observation is supported by a recent case-control study from Iran, which found that high intake of processed and ultra-processed foods is associated with a greater risk of breast cancer, particularly among premenopausal women. These findings emphasize the importance of adopting healthy eating patterns to reduce breast cancer risk, especially in younger women who may be more vulnerable to dietary influences [25].

The present study found that approximately 48.5% of participants reported smoking, indicating a potential association between tobacco use and breast cancer risk. This aligns with findings from a recent meta-analysis, which reported that both active and passive smoking are associated with an increased risk of breast cancer in women, particularly among premenopausal individuals. The study also observed that the risk escalates with the duration and intensity of smoking, suggesting a dose-response relationship. These results underscore the importance of smoking cessation programs as a preventive measure against breast cancer [26].

Limitations:

1. Limited Sample Size and Scope:

The study's findings may not be representative of the entire Iraqi population, as data were collected from a relatively small group of women in Karbala.

2. Potential Interviewer and Social Desirability Bias:

Face-to-face data collection may have influenced participants to provide socially acceptable responses rather than fully accurate or honest answers.

3. Cultural and Logistical Challenges:

Some participants may have been hesitant to fully engage in the study due to personal or cultural discomfort with discussing health-related topics, which may have affected participation and data quality.

4. Exclusion of Certain Risk Factors:

The study did not explore all possible contributors to breast cancer risk, such as detailed genetic factors, occupational exposures, or environmental influences.

5. Reliance on Self-Reported Information:

Some data, such as personal and family medical history, were based on participants' recall, which could lead to memory-related inaccuracies and affect the reliability of the results.

Conclusion:

1. Most participants were diagnosed at reproductive age.
2. Lifestyle factors—such as hormonal use, smoking, and fast food—were frequently reported.
3. Family history played a minor role in most cases.
4. The findings suggest a strong influence of modifiable risk factors.
5. Emphasis should be placed on public health efforts targeting behavioral change.

Recommendations :

1. Enhance Women's Health Awareness: Launch targeted educational campaigns to increase women's understanding of breast cancer risk factors, especially those related to lifestyle and behavior.
2. Promote Healthy Lifestyle Practices: Encourage balanced diets, regular physical activity, weight control, and smoking cessation through community-based health programs.
3. Educate on Hormonal Risk Factors: Provide clear information regarding the potential risks of hormonal therapies and contraceptives, helping women make informed health decisions.
4. Community Engagement and Outreach: Collaborate with schools, universities, health centers, and civil society organizations to deliver consistent and culturally sensitive health education.

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