ORIGINAL ARTICLE

Potential risk factors for women in the development of breast cancer: a retrospective observational study

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Abstract

Background and aim: Breast cancer is the most prevalent type of cancer diagnosed in women. Multiple risk factors are responsible for this disease which can be preventable if picked earlier. The current research study aimed to evaluate potential risk factors that are associated with the breast cancer

Material and Methods: This research was a retrospective, observational study conducted in the Department of Surgery, Hamdard University Hospital, Karachi from June 2018 to June 2021. All patients coming under the inclusion criteria were registered after taking informed consent. Descriptive statistics were calculated with frequency and percentages assessed for each variable.

Results: Post-menopausal status was found in 58.1% of patients, with 47.3% with a history of breast abscess drainage and 9.1% with a gynecological history of polycystic ovary disease. 25% of patients had a past medical history of hypertension. 33.8% of patients had tobacco addiction whereas their partners were more addicted to smoke (64.9%) but were also tobacco addicts (40.5%) when compared. 25.7% of individuals had a family history of breast cancer.

Conclusion: The current study's outcomes revealed that various factors are involved in influencing the incidence of breast cancer, among these the important ones that are seen in this research are post-menopausal status, polycystic ovarian disease, and benign breast disease, as well as many other factors such as tobacco addiction, hypertension, and family history.

Keywords: Breast cancer, risk factors, post-menopausal, hypertension, tobacco, smoking

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Introduction:

Cancer is among the major death causes across the globe.[1,2] In 2008, the lives of eight million individuals were claimed by malicious cancer, which has a high-level expectancy of 11 million by the year 2030.[3] Carcinogenesis can occur in any cell, tissue, or organ, resulting in pathological changes that lead to a wide range of malignancies. Apoptosis evasion, an unlimited division capacity, improved vasculature, production of its neoplastic cells, and tolerance of anti-growth stimuli, as well as the ability to metastasis, are some of the primary processes that allow it to advance.[4] Carcinogenesis is a complex process fueled by both hereditary and environmental factors. Each year, the incidence of cancer-related fatalities rises alarmingly, making this one of the world's top causes of mortality. However, a substantial proportion of malignancies do not necessarily have to prove fatal, they severely reduce the quality of living and necessitate higher overall expenditures.[5]

Breast cancer is the leading cause of cancer and mortality in women.[6] It is a disease of complex nature[7] caused by a variety of events. Aside from fact that the disease is established across the world, there is significant variation in incidence, fatality, and survival rates related to it among regions, that could have a relation to diverse factors including population distribution, lifestyles, biological predispositions, and

atmosphere.[8] Risk factors' variety has increased the prevalence of breast cancer, which escalates day after day.[9] Though testing people can lessen breast cancerillness burden, it has negatives such as adverse reactions, misdiagnosis, and financial stress. Classification of women can be done depending on risk factors affiliated with their breast cancer, which can be helpful to improvise to build tailored breast cancer screening programs and risk-free procedures.[10] As per the GLOBOCAN 2020 data, breast cancer is amongst the most frequently spotted malignancies and fifth leading cancer-related losses, with an expectancyof 2.3 million new cases annually.[11] Breast cancer deaths are much more common in transitory regions (Caribbean, Western Africa, Melanesia, and Micronesia/Polynesia) than in progressed countries (West Europe, Australia, New Zealand, North America, and North Europe), with an estimated incidence of about 88% greater.[5] Numerous methods, such as basic preventative practices and screening programs, are critical in terms of lowering breast cancer incidence rates and implementing early treatment.[5] The Breast Health Global Initiative (BHGI) currently oversees developing appropriate recommendations and procedures to give the best possible breast cancer prevention internationally.[12] Malignant cancers leadtocausing disability in women, WHO accounts Disability-Adjusted Life Years (DALYs) in 107.8 million, out of which 19.6 million are attributed to breast cancer.[13] Breast cancer is prevalently diagnosed cancer in women nationwide, amid new cases of 2.26 million that were expected in 2020[14] [95% UI, 2.24 to 2.79 million]. In the USA, breast cancer expects to make up about 29% of new cancer cases in women.[15] In accordance with 2018 GLOBOCAN information, breast cancers' age-standardized incidence rates (ASIR) are highly and favorably related to Human Development Index (HDI).[16] According to data from 2020, the ASIR was highest in countries with a very high HDI (75.6 per 100,000), and it was over 20 percentage points lower in medium or low HDI nations (27.8 per 100,000 and 36.1 per 100,000, respectively).[16] Breast cancer is not only the most common type of cancer but also the commonest cause of cancer death in women around the world. Breast cancer claimed lives of 684,996 people worldwide (95%) at age-adjusted rate of 13.6 per 100,000.[16] Even though industrialized regions had the greatest incidence rates, Africa and Asia accounted for a total death rate of 63 percent in 2020.[17] A lot of females who belonged to developed nations had more chances of survival; however, females living in low-income and middle-income nations did not havethe same fate.[18] Globally, the mortality-to-incidence ratio (MIR) of breast cancer in 2020 was 0.30 displaying a 5-year survival rate representation.[16] In places with good healthcare facilities (Hong Kong, Turkey, Singapore), the 5-year survival rate for breast cancer was 75.4% for localized and 89.6% for regional. The survival rates for localized and regional breast cancer for developing nations (India, Costa Rica, Philippines, Thailand, Saudi Arabia) were 76.3 percent and 47.4 percent, respectively.[19]

Over the previous three decades, the incidence and death rates of breast cancer have risen. Because of the heightened hormonal stimulation, the female gender is one of the key variables linked to an increased risk of breast cancer.[5] Women have breast cells different from men (with low estrogen concentration) very much sensitive to hormones (particularly progesterone and estrogen) and any changes disrupting the balance.[5] A vast number of accumulation and alternations in cells andthe carcinogenesis process starts in response to exposure of potential carcinogens with time.[5] A prominent cause is the history of family members who had dealt with breast cancer that has been linked to an elevated risk of developing breast cancer.[5] Elevated breast cancer risk is being strongly linked with several gene mutations.[5] BRCA1 (on chromosome no. 17) and BRCA2 (on chromosome no. 13) are being identified as two important genes with great penetrance.[5] Disparities in race and ethnicity continue to be prevalent among breast cancer patients; however, the causes underlying this phenomenon remain unknown.[5] Numerous studies have found a strong link between endogenous hormone exposure—particularly estrogen and progesterone—and an increased

Table 1: Patients' baseline features

Variables	Frequency	Percentage (%)
Marital status		
Married	102	68.9%
Unmarried	28	18.9%
Divorced	12	8.1%
Widows	6	4.1%
Occupation		
Housewives	112	75.7%
Service	19	12.8%
Student	5	3.4%
Self-employed	3	2.0%
Others	9	6.8%
Menopausal status		
Post-menopausal	86	58.1%
Pre-menopausal	30	20.3%
Amenorrhea	27	18.2%
Not known	5	3.4%
Hysterectomy and oophorectomy status		
No	124	83.8%
Yes	24	16.2%

risk of breast cancer in females.[5] Considering a possible initiation of carcinogenic occurrences in the breast microenvironment, certain occurrences of events for instance first menstruation, pregnancy, nursing, and menopause, as well as concurrent hormonal imbalance and duration, are critical.[5] Enhanced progesterone and decreased estrogen levels, as well as insulin, insulin-like growth factor-1 (IGF-1), cortisol, corticotropin-releasing factor, the human chorionic gonadotropin, androgens, and the IGF-1 binding protein levels outside of the range of physiology, show a protective effect against carcinogenesis of the breast during pre-eclampsia.[5] Tobacco carcinogens are delivered to breast tissue, increasing the likelihood of genetic alterations and that of suppressive proteins (p53 in particular).[5] The current research study aimed to evaluate potential risk factors that are associated with breast cancer.

Material and Methods:

Research design and setting: This observational and retrospective study was conducted in the Department of Surgery, Hamdard University Hospital, Karachi from June 2018 to June 2021.

Sample technique: Non probability sampling technique was applied with prioritized inclusion and exclusion criteria

Sample size estimation: All patients fulfilling the inclusion criteria in the designated time duration were included.

Sample selection:

Inclusion criteria: We include all females above 18 years of age diagnosed with breast cancer on histopathology were included. Those who were willing to participate, whether literate or illiterate

Exclusion Criteria:We exclude all the patients who were not willing to participate in the study were excluded.

Data collection procedure:

After getting approval from the Institutional Review Board, all patients coming under the inclusion criteria were registered after taking informed consent. A proforma was made to collect the required details before data entry. It included sociodemographic details (age, weight, age of menarche, gravidity, parity, breastfeeding duration, marital status, and occupation), menopausal status, uterine and ovarian status, benign breast and gynecological abnormalities, comorbidities, diet, addictions, passive smoking, hormonal use, and family members history of breast cancer.

Data Analysis: Study data were recorded and reviewed in SPSS v. 24 withdescriptive statistics calculated asthe frequency with their percentages for each variable.

Results:

A total of 148 patients were included in this study, where 68.9% were married and 75.7% were housewives. Post-menopausal status was found in 58.1% of patients with 83.1% having no prior surgical history for oophorectomy and hysterectomy. Details are entailed in Table 1.

Table 2 appraised the history of breast disease

Table 2: Breast cancer, gynecological and comorbidities history

Variables	Frequency	Percentage (%)
Status of benign breast disease		
Breast pain (Pre-menstrual) history	31	21.0%
Drainage of breast abscess history	70	47.3%
Benign breast disease history	2	1.4%
Earlier FNAC history of breast lesion	14	9.5%
Excision history of breast lump	11	7.4%
Nipple discharge history	20	13.5%
Gynecological history		
Abnormal uterine bleeding	13	8.7%
Polycystic ovary disease	14	9.4%
Endometriosis	2	1.4%
Fibroid uterus	12	8.1%
Comorbidities		
Diabetes mellitus	30	20.3%
Hypertension	37	25%
Obesity	22	14.8%
Thyroid disorders	17	11.5%
Ovarian cancer	2	1.4%
Other cancers	3	2.0%

Table 3: History of addictions and familial cancer history

Variables	Frequency	Percentage (%)
Addictions		
Smoking	10	6.7
Tobacco chewing	50	33.8
Partner addictions		
Smoking	96	64.9
Tobacco chewing	60	40.5
Familial cancer history		
Familial history of breast cancer	38	25.7
Endometrial and other cancers history in the family	15	10.1

with 47.3% having a history of breast abscess drainage and 9.1% with a gynecological history of polycystic ovary disease. There were 25% of patients with a past medical history of hypertension while only 1.4% were suffering from ovarian cancer.

Around 33.8% of patients had tobacco addiction whereas their partners were more addicted to smoke (64.9%), but they were in more numbers for tobacco addiction (40.5%) when compared. 25.7% of individuals had a familial history of breast cancer. Table 3. encapsulates all these details.

Discussion:

The current research study aimed to evaluate potential risk factors that are associated with breast cancer. The findings suggested that more post-menopausal females suffer from breast cancer with no previous surgical history of oophorectomy or hysterectomy. The drainage of breast abscess was a sign more commonly seen in benign breast disease patients. Polycystic ovary disease was the most prevalent gynecological condition found although abnormal uterine bleeding and uterine fibroid were also frequently seen in many patients. Hypertension was the comorbidity that was found in most patients. Tobacco addiction was also seen in numbers among patients and their spouses. Additionally, breast cancer also inflicted the patients' family and thereforea profound familial breast cancer history was seen. Overall, the risk factors that were abundantly seen in the present research were post-menopausal status, polycystic ovary disease, hypertension, tobacco addiction, and the presence of breast cancer in family history.

There were many studies in which patients suffering from polycystic ovary syndrome (PCOS) had a correlation with breast cancer. A retrospective cohort study performed in China noticed an increased risk of breast cancer in PCOS patients who also had hypertension.[20] Baron et al., and Kim et al., also studied the positive relation of PCOS patients and the risk of breast cancer which were in correspondence to our study[21,22] Furthermore, hypertension was also seen as a possible risk factor for breast cancer as seen in our study that it was the most prevalent comorbidity noticed. A study in Sweden found that nationwide female patients who were hypertensive were at risk of developing breast cancer.[23] Another study investigated that hypertensive women have an increased risk of breast cancer since both diseases share several similar risk factors.[24] Diabetes was the second most common comorbidity in the current study (20%) which shows that it does have a role in the development of breast cancer. Studies indicated that diabetes in post-menopausal women with in-

creased BMI was associated as a risk factor for breast cancer.[25] In France, 30.8% of patients who were treated for breast cancer were tobacco addicts.[26] This is consistent with our study where 33.8% of patients were habitually consuming tobacco. In the current study, most of the partners of patients were smoke addicts (64.9%) which could also result in breast cancer. Evidence from previously done studies supports this narrative and states that passive smoking done by partners can be a relevant risk factor for breast cancer.[27] Literature shows that family history particularly an affected sister, mother or male relative, early-onset, and bilateral disease all are known risk factors.[28]

Multiple studies reported results that were incongruent with our research. For instance, active smoking in patients was seen to be linked more to developing breast cancer than passive smoking.[29] In our study post-menopausal women were more prevalent with benign breast disease. The opposite was found in research conducted in 2017, showing that postmenopausal females suffering from benign breast disease were at low risk of developing breast cancer.[30] Overall risk can be defined by both modifying and non-modifying risk variables, with familial risk being one of the most important non-modifying risk factors. As a result, health care providers should analyze breast cancer's intrinsic and inherited risk by a thorough family medical history, to discuss modifiable options regarding this prior risk. Personal concerns and advantages should be discussed with women's healthcare and hormonal formulations, and some other modifiable concerns as well as iatrogenic and non-modifiable personal risk factors should be considered. To provide tailored counsel to young women who want to reduce their own BC risk, a better knowledge of the connections between genetic and controllable factors will be critical.

Limitations were present in the current study. This was only a single-center study that might not have covered the representation of breast cancer patients from other hospitals. The research was performed with the application of a non-probability sampling technique and a retrospective observational study design, which could have resulted in selection biasedness. Some studies accompanied data of weight, height, and BMI, to provide more clarity in identifying the risk factors, as well as genetic factors, were also identified. If the present research studied the mentioned variables, that could have provided a more in-depth exploration of the results with a more so thorough detection of possible risk factors associated with breast cancer.

Conclusion:
The impact of cancer all over the globe is massive. Risk factors and epidemiology characteristics relative to breast cancer were explored in this study. The current study's outcomes revealed that various factors are involved in influencing the incidence of breast cancer, among these the important ones that are seen in this research are postmenopausal status, polycystic ovarian disease, and benign breast disease, as well as many other factors such as tobacco addiction, hypertension, and family history.

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Role and contribution of authors:
Rabbia Zubair, collected the data, references and wrote the article.

Lubna Habib, criticaly review the article and made final changes.

Ali Haider, collected the references and helped in introduction and discussion writing.

Uzair Yaqoob, collected the data, and helped in introduction writing.

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