

## Original Article

## Potential Risk Factors for Breast Carcinoma in Patients Presented in a Tertiary Care Hospital

Muhammad Zain Qamar,<sup>1</sup> Muhammad Ifran Fazal,<sup>1</sup> Huria Asghar,<sup>1</sup> Maha Naseem,<sup>2</sup>  
Faiza Qamar,<sup>1</sup> Muhammad Siddique<sup>1</sup>

<sup>1</sup>Mayo Hospital, Lahore, <sup>2</sup>Central Park Hospital, Lahore

### Abstract

**Objective:** The purpose of this case-control study was to examine the different risk factors for breast carcinoma in Pakistani females.

**Methods:** This study employs a case-control design intended to investigate the elements that raise the likelihood of breast carcinoma risk in Pakistani females. A total of 300 participants, consisting of 165 patients with breast carcinoma and 135 controls who are age-matched, were chosen to take part in the study at Mayo Hospital in Lahore, Pakistan.

**Results:** In addition, several risk factors were discovered to be linked to a higher likelihood of developing breast carcinoma in Pakistani females, including an elevated body mass index (BMI) exceeding 25 kg/m<sup>2</sup> (OR = 1.57; OR = 1.60, 95% CI: 1.26-1.90), being unmarried (OR = 2.03; 95% CI, 1.26-2.03), not engaging in breastfeeding, smoking (current or past), insufficient physical activity, and being in the post-menopausal stage were identified as factors associated with the outcome (95% CI, 1.69-2.44). On the other hand, increased parity was found to lower breast carcinoma risk. Furthermore, the study established that the right breast was affected in a higher proportion of cases (58.1%) compared to other breast complications (22.8%).

**Conclusion:** In conclusion, this study highlights the various sociodemographic, reproductive, and lifestyle-related factors that are linked to breast carcinoma among females in Pakistan. These findings can aid in the development of preventative measures and awareness campaigns aimed at decreasing the rate of occurrence of breast carcinoma within this particular group.

**Keywords:** Case-control study, Breast carcinoma, Risk factors, lifestyle, socio-demographic, Pakistan, and reproductive health.

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**Corresponding Author:** Dr. Muhammad Zain Qamar

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### Introduction

Cancer remains a significant health concern in various regions worldwide, being a primary cause of mortality in economically developed countries and the second leading cause in developing nations.<sup>1</sup> Breast cancer, accounting for 23% of all cancer cases<sup>2</sup> remains a prevalent form of malignancy among women, with its incidence continuing to rise globally.<sup>2,3</sup>

Breast cancer rates are particularly high in Pakistan compared to other Asian countries,<sup>4</sup> accounting for approximately 34.6% of all cancers affecting women in the region<sup>5,6</sup> with an annual age-standardized rate of 69.1 according to the Karachi Cancer Registry, which is comparable to rates seen in North America and Europe.<sup>5</sup> Breast cancer in Asian countries generally affects women

**Email:** [qamarzain79@gmail.com](mailto:qamarzain79@gmail.com)

between the ages of 40-50, while in Western nations the incidence typically occurs in women aged 60-70.<sup>7</sup>

Genetic and environmental factors play a complex role in the development of breast cancer.<sup>8</sup> Multiple factors, all of which work together to increase the likelihood of developing breast cancer<sup>9</sup>, also play a role in the variability of the disease's onset<sup>10</sup>. Because the mechanism of differential susceptibility has not been fully investigated, the prevention of breast cancer is complicated. Women who have a family history of breast cancer and those who give birth later in life are among the groups at greater risk than others, women who take long-term exogenous hormones and overweight individuals.<sup>11</sup>

According to reference<sup>12</sup> in developing countries like Pakistan, where population-based cancer registries are

lacking, it is critical to look into any variables that might make it more likely for local females to develop breast carcinoma. To ascertain how socio-demographic, life-style, and reproductive risk variables relate to the prevalence of cancer of the breast among females in Pakistan, this research was conducted at Mayo Hospital, Lahore. 300 competitors overall, including 165 patients with breast carcinoma and 135 controls who were age-matched, were evaluated using a specially designed survey. The study found several risk factors, such as a BMI greater than 25 kg/m<sup>2</sup>, unmarried marital status, inability to breastfeed, smoking, inactivity, and postmenopausal status, were significantly related to breast carcinoma risk among Pakistani females. These findings can be utilized to develop preventative measures and raise awareness to reduce the prevalence of breast cancer in an understudied population.

Furthermore, in Pakistan, detecting and treating breast carcinoma at an early stage presents difficulties. This can be attributed to a lack of awareness, limited access to screening facilities, and socioeconomic constraints. It is essential to recognize the risk factors for carcinoma of the breast in order to advance understanding and develop effective preventive measures.

The purpose of this case-control study was to examine the different risk factors for breast carcinoma in Pakistani females. The research included 135 age-matched healthy participants and 165 breast carcinoma patients (control subjects), making a total of 300 participants. The study was carried out at Mayo Hospital in Lahore, Pakistan, which is one of the largest tertiary care hospitals in the country.

The bulk of those with breast carcinoma were found to be in their 40s and 50s, according to the study's results, which is in line with the average age at which the disease first manifests itself in other Asian nations. The study also established that a higher BMI, unmarried marital status, inability to breastfeed, smoking, inactivity, and postmenopausal status were significantly related to breast carcinoma risk amongst the study population. Conversely, increased parity was established to protect against breast carcinoma.

The establishment of efficient early detection and prevention strategies for the occurrence of breast cancer among females in Pakistan may be significantly impacted by these results. Public health campaigns and awareness programs can be developed to educate females about the importance of regular exercise, a balanced diet, maintaining a healthy lifestyle, and quitting smoking. Healthcare professionals can also promote the benefits of breastfeeding and encourage females to seek early detection through regular screening for breast carcinoma.

## Methods

### Sampling and participants

The Mohammad Ali Jinnah University (Departmental Scientific Committee of the Capital University of Science and Technology) approved the study's case-control design, which was meant to be based on the population. Data were gathered from cancer of the breast patients whose diagnoses had been verified by histology using a standard and organized questionnaire. The subjects were chosen from a variety of locations, such as the IRNUM (Institute of Radiotherapy and Nuclear Medicine) in Peshawar, the DHQ (District Head Quarter Hospital) in Rawalpindi, the NORI (Atomic Medicine Oncology and Radiology Institute) in Islamabad, and outlying Pakistani villages.

Before the interview, each participant provided informed consent. The study included 300 histologically confirmed cases of breast carcinoma and 245 control subjects. By looking up hospital records, asking specific questions, and noting each participant's death date and if they were still alive or not, the vital state of each participant was determined.

Qualitative data is presented in frequency and percentages while quantitative data is presented in mean  $\pm$  Standard deviation (SD).

### Results

The study included 245 controls and 300 histologically confirmed breast carcinoma cases, with the cases having a relatively younger mean age of 50.58 compared to the controls' mean age of 54.78. The participant's weight and height were recorded to calculate their BMI, with the cases having a slightly higher mean BMI of 26.07 compared to the controls' mean BMI of 25.05. A significant proportion of patients had four or more children (16.88%), were not married (46.53%), and breastfed their children (39.98%). The majority of patients were nonsmokers (88.85%) and physically active (67.93%). Over ½ of the breast carcinoma patients were postmenopausal females (52.26%).

Table 1 presents the medical characteristics of breast carcinoma patients, with the majority of cases located in the right breast (58.08%), followed by the left breast (33.20%), and both breasts (8.72%). Neoadjuvant therapy was administered to 67.37% of individuals with breast carcinoma before the primary treatment, and mastectomy was a treatment option for 17.45% of patients.

### Discussion

The particular kind of cancer determines the style of treatment for breast carcinoma, as not all cancers have the same prognosis. Efforts have been made to differentiate between aggressive and non-aggressive tumors<sup>13</sup> In

**Table 1:** Classification of Breast carcinoma Cases Based on Clinical and Pathological Characteristics

Patient's pathologic characteristics	Number	Percentage
<b>Affected Breast</b>		
Left Breast	99	33.2
Right Breast	174	58.08
Bilateral	26	8.72
<b>Medical Treatment</b>		
Radiotherapy	55	18.58
Chemotherapy	202	67.37
Both	42	14.05
<b>Surgery Status</b>		
Mastectomy	52	17.45
Lumpectomy	97	32.39
No	150	50.16
<b>Disease Stage</b>		
Local	176	58.72
Locally Advanced	117	39.24
Distant	5	1.94
<b>Other Complications</b>		
Cancer + (Diabetes, Hypertension, or Other Conditions)	68	22.78
No	231	77.22
<b>familial History</b>		
No	205	68.33
Yes	95	31.66

1904, Steinthal, a German physician suggested dividing breast carcinoma into three prognostic stages. These stages include Stage I for smaller tumors confined to the breast tissue only, Stage II for tumors of larger size involving lymph nodes in the axillary region, and Stage III for tumors that have spread to surrounding tissues. In this study, it was found that 58.72 percent of cases were locally spread, 39.34 percent were locally progressive, and 1.94 percent had distant metastasis.<sup>14</sup>

Genetic factors can affect the likelihood of getting breast carcinoma, and those who have relatives with a history of the condition are twice as likely to do so, especially if a close relative has been diagnosed. In this study, 31.66% of patients had family history of a blood relative who had been diagnosed with any type of cancer, most commonly cancer of breast. Additionally, 22.70 percent of patients had diabetes or high blood pressure.

Strong associations between a number of variables and cancer of the breast were found by the research. Females

between the ages of 40 and 69 had a higher chance of developing breast carcinoma, which was significantly influenced by age. In particular, people who were in their 40s, 50s, and 60s showed a higher chance. According to a positive correlation among the basal metabolic index and breast carcinoma, obesity are found to be substantially linked to an increased risk of breast carcinoma.<sup>15</sup> For a specific set of females, those who had a BMI of 25 or higher had a 1.5 times greater risk of developing breast carcinoma. Additionally, the chance of breast carcinoma was more than twice as high for single females as it was for married ones.<sup>16</sup> Compared to parous females, females with no children and females who were not breastfeeding were at greater risk, and as parity increased, the risk decreased. Oral contraceptive use has been shown to be significantly linked to an increased chance of breast carcinoma. Oral contraceptive use and smoking have been found to be strongly associated with the chance of developing breast carcinoma. Furthermore, the risk of getting breast carcinoma was 1.27 times higher in physically inactive people than in physically active people. Patients who had gone through menopause had a disease risk that was approximately 1.34 times higher. During the study, 269 individuals were censored out of a group of 1238 patients. The median survival time was determined to be 33 months (95% CI: 28-34) for the remaining patients.

In Pakistan, breast carcinoma is prevalent among females<sup>5</sup> and its incidence rate is comparatively higher than in other Asian nations. This highlights the need for preventive strategies to control the soaring rate of breast cancer in the country. According to studies, a higher proportion of people are diagnosed with breast carcinoma prior to the age of 50, which is a key factor in the disease's onset. The age range of the study's participants was 29 to 87, with a mean age of 51.4010.40. This age range is consistent with that of previous research on Iranian and Pakistani females.<sup>17</sup> Compared to white females in the US, who are typically identified with breast carcinoma at 61 years of age, Pakistani females are diagnosed almost 10 years earlier, at 51.4 years. Further research is required to decide the underlying causes for this early occurrence of breast carcinoma among Pakistani females.

The precision of breast cancer screening can also be impacted by being overweight or obese. Mammography, the main way of detecting breast carcinoma, is less accurate in females with a higher BMI due to the increased density of breast tissue

Numerous studies have suggested that smoking may intensification the risk of breast carcinoma, particularly in females who have not yet reached menopause, even though the link among cigarette smoking and the likelihood of developing cancer of the breast might not have been as widely recognized as it is for other types of

cancer.<sup>18</sup> Smoking may influence the levels of hormones like progesterone and oestrogen, which are known have a role in the growth of breast carcinoma, providing one possible explanation for this association. To completely understand the link between smoking and the risk of breast carcinoma, more research is necessary. Regardless, quitting smoking and taking measures to boost physical activity can be a crucial step for individuals in decreasing their likelihood of developing breast carcinoma and other non-communicable ailments.<sup>19</sup>

In Pakistani females, there is a positive correlation among risk of breast carcinoma and physical inactivity (OR = 1.73, 95% confidence interval CI = 1.44 to 2.12). Physical exercise and breast carcinoma risk are linked through a number of complex molecular mechanisms. Menstrual cycle, BMI, immune system, and hormones are just a limited number of the variables that can impact a person's risk of getting breast carcinoma; all of these variables are affected by physical exercise.<sup>20</sup> The chance of obesity, which is a standalone risk factor for developing breast carcinoma, rises with inactivity. Furthermore, a have reported a negative relationship amongst physical activity and obesity.<sup>21</sup>

Breastfeeding and other forms of reproduction have been presented to reduce the chance of developing breast carcinoma.<sup>22</sup> While parous females have a lower chance of developing breast carcinoma, the study showed that the percentage of full-term pregnancy guarding against breast carcinoma declines with increasing parity. As a result, the relationship between these factors is complicated.<sup>23</sup> Additionally, other studies have discovered a constant correlation between breast-feeding and having breast carcinoma, with an odds ratio of 0.55.<sup>24</sup>

Additional investigation is required to identify the specific processes through which breastfeeding mitigates risk of developing breast carcinoma. It can be believed that occurrence of pregnancy and breastfeeding can lower a woman's overall exposure to endogenous hormones as they can reduce the frequency of menstrual cycles. Breastfeeding and pregnancy have been shown to have a direct impact on breast cell division and growth, with divided cells being more resilient to transformation into cancerous cells.<sup>25,26</sup> Females' reproductive health has undergone a change thanks to the availability of oral contraceptives.<sup>27</sup> yet there is limited research on the link between breast carcinoma and oral contraceptives. While a found no evidence of this association in previous studies<sup>28</sup> our study discovered a link between using oral contraceptives and getting breast carcinoma. This supports other studies that found females who utilized oral contraceptives have a greater risk of breast carcinoma Oral contraceptives have various hormonal effects on breast tissue, including the stimulation of mitotic activity or the induction of protective anovulation.<sup>29</sup>

Estrogens are related to the progression and formation of breast carcinoma and have both indirect and direct proliferative effects on human breast carcinoma cells.

As females age, the probability of developing cancer increases, but menopause itself is not a direct risk factor for cancers. The ovaries in females produce steroid hormones during their reproductive years that have the potential to influence breast development and function.<sup>9,14</sup>

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