

Prevalence and Association of Obesity with Breast Cancer

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ABSTRACT

Background: Breast Cancer is one of the leading causes of death worldwide. Pakistan alone has the highest rate of Breast Cancer than any other Asian country as approximately 90000 new cases are diagnosed every year out of which 40000 die Obesity is also a critical public health problem growing with every passing year in Pakistan and worldwide. Research studies are being conducted worldwide regarding the relation between the two problems.

Objective: The objective of this study is to determine the prevalence of obesity in breast cancer patients in a tertiary care hospital in Karachi, Pakistan.

Methods: BMI is used as a screening tool for overweight and obesity. According to World Health Organization, a body mass index (BMI) over 25 is considered overweight, and over 30 is obese.

A retrospective analysis of 262 patients diagnosed with Breast Cancer during 2019 and 2020 was performed. Patients' hospital records in Oncology were reviewed. The weight in kilograms and height in centimeters of patients were reviewed. Their BMI was calculated and recorded using the SPSS system.

Results: The median BMI was 28.25 kg/m² with an interquartile range of 25.15 - 31.99 kg/m². Nearly 80% of the study participants had body mass index higher than normal levels (n=203, 77.5%) and out of them approximately half were overweight (n=104, 51.2%) and the remaining were obese (n=99, 48.7%).

Conclusion: We conclude from our study that body mass index is positively correlated with breast cancer occurrence and thus the proportion of females having BMI \geq 25 was significantly higher among patients.

Keywords: Prevalence, obesity, breast cancer, adiposity, body mass index.

INTRODUCTION

Obesity is a growing problem of the world and has tripled since 1975 when it was first outlined as a risk factor for breast cancer by Abe *et al.* According to WHO, in 2016, 1.9 billion adults around the world were overweight, of whom 650 million had obesity—triple the number in 1975 [1, 2]. According to the report published by GLOBOCAN based on cancer incidence and mortality produced by the International Agency for Research on Cancer, in 2018 2.09 million new breast cancer cases were diagnosed worldwide, and 0.62 million women died from breast cancer. This contributed to 24.2% of cancer incidence and 15.0% of cancer mortality in the female population [3].

Breast cancer is the most common cancer among women and one of the most important causes of death among them [4]. Breast Cancer and obesity, thus happen to be two emerging health problems of the world. Furthermore, obesity has been shown to have an impact on the prognosis of breast cancer and may also increase the risk of complications while undergoing surgery and radiation [5]. Understanding the effect of adiposity has hence been very important in recent times. BMI is a measure of body fat based on height and weight that

applies to adult men and women. Research suggests that BMI is an important predictor of cancer risk: One of them is The UK Million Women study that showed that increasing BMI is associated with a significant increase in the risk of cancer [6].

OBJECTIVE

To determine the prevalence of obesity in Breast Cancer patients.

PATIENTS AND METHODS

A retrospective analysis of 262 patients diagnosed with Breast Cancer during 2019 and 2020 was performed. Patients' hospital records in Oncology were reviewed. The weight in kilograms and height in centimeters of patients were reviewed. Their BMI was calculated and recorded using the SPSS system.

RESULTS

The study included 262 patients diagnosed with breast cancer who visited the Oncology OPD during the years 2019 and 2020. The age of the patients was in the range between 23 and 88 years. The average age of patients was 51.12 \pm 12.76 years. Most of the patients belonged to the age group of 30-59 years (n=184, 70.2%). Out of these, 99 (37.8%) patients belonged to the age group of 30-49 years and 85 (32.4%) patients belonged to the age group of 50-59 years. About a quarter of the participants were in the age group of 60 and above

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(n=66, 25.2%) whereas few belonged to the age group ≤ 29 years (n=12, 4.6%).

The median BMI was 28.25 kg/m² with an interquartile range of 25.15 - 31.99 kg/m². Nearly 80% of the study participants had body mass index higher than normal levels (n=203, 77.5%) and out of them approximately half were overweight (n=104, 51.2%) and the remaining were obese (n=99, 48.7%).

Fig. (1) is depicting the frequencies of different BMI levels according to age groups. There was a significant association of body mass index with age ($p=0.040$). Frequency of overweight among participants with age group <30 years (n=5, 41.7%), 30-49 years (n=42, 42.4%) and 50-59 (n=37, 43.5%) years was approximately same which was significantly higher than the frequency of overweight in elderly patients (n=20, 30.3%). The proportion of patients with obesity was nearly the same in age groups of 30-49 years (n=37, 37.4%), 50-59 years (n=35, 41.2%) and ≥ 60 years (n=26, 39.4%) but it was significantly higher than proportion of obese patients in the age group of <30 years (n=6, 8.3%).

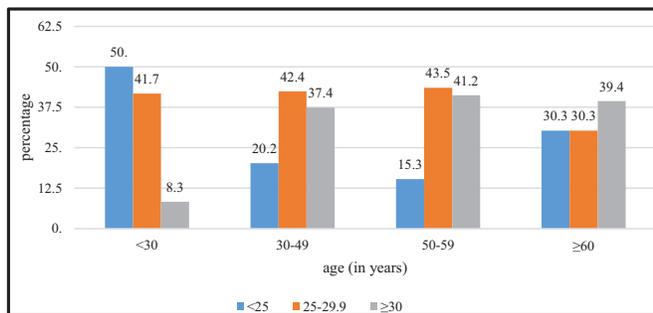


Fig. (1): Frequency of different levels of body mass index according to age groups.

Fig. (2) depicts that 77.5 percent of the total breast cancer patients had a BMI ≥ 25 and 22.5 percent of patients had a BMI ≤ 25 .

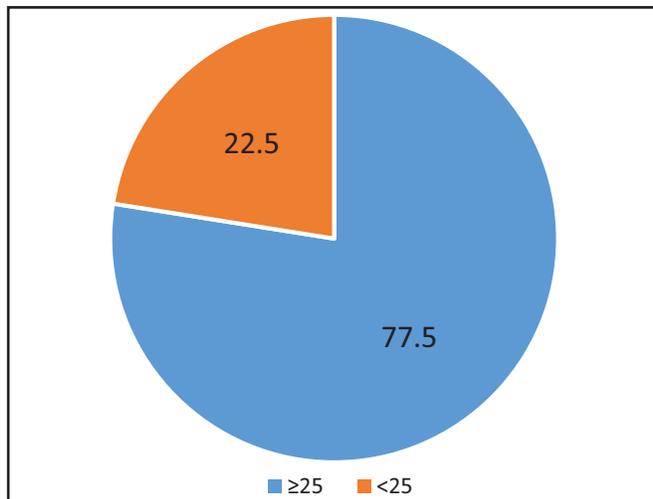


Fig. (2): Pie chart showing the percentages of Breast Cancer patients with BMI ≤ 25 and ≥ 25 .

DISCUSSION

A recent population-based cohort study of 2.3 million adolescents in Israel stated that adolescent obesity is linked to midlife cancer risk in both men and women. This emphasizes the need to tackle obesity in early life. Around two-thirds of cancer cases cannot be prevented by lifestyle and diet changes and modifications. Hence for the cases that can be prevented, prevention schemes should be designed to decrease cancer incidence and mortality [7].

According to the results of our study, the frequency of breast cancer is higher in patients who have elevated Body Mass Index (BMI) levels. In line with the hypothesis stated above, a positive correlation was found between obesity and breast cancer. Our findings are quite comparable to previous researches suggesting a positive association between excess body weight and the risk of several adult cancers, including breast cancer [8, 9].

Over 80% of our participants had BMI ≥ 25 kg/m². Our findings regarding the role of having a BMI ≥ 25 kg/m² concerning breast cancer add more evidence to the work by Raisa Bano *et al.* who found overweight and obese females to be 1.5 times more likely to develop breast cancer [10].

The highest proportion of obese (BMI ≥ 30 kg/m²) patients were found to be in the postmenopausal age group. A study by Andrew *et al.* also found a positive correlation between obesity and postmenopausal breast cancer [11]. Furthermore, a study conducted by John Hopper *et al.* showed that the greater a woman's familial risk, the greater the influence of BMI on her absolute postmenopausal breast cancer risk [12]. Louis Chow *et al.* conducted a study that also reported that increased BMI at diagnosis was positively correlated with the risk of breast cancer among postmenopausal women [13].

The lowest percentage of obese patients was found to be in the age group of ≤ 29 years. This finding may contribute to the conclusions of the study by Minouk *et al.* suggesting an inverse relation between obesity and breast cancer at younger ages [14]. In another study, Park *et al.* also found an inverse relation between obesity and breast cancer in the premenopausal age group [15]. The results might suggest that patients developing breast cancer under 30 years of age may be better informed and health-conscious compared to women in higher age groups, therefore contributing least to our findings out of the four age groups. However, a study conducted by Laudio D *et al.* has shown that obesity is also a risk factor among premenopausal women [16]. Furthermore, a meta-analysis conducted in Asia has confirmed obesity as a risk factor for breast cancer in premenopausal women [17].

The percentage of overweight (BMI ≥ 25 kg/m²) patients was significantly high in all age groups. A plausible

explanation to the role of increased BMI in breast cancer may be attributed to the underlying molecular mechanisms of the effect of leptin inactivation of various oncogenic pathways, as concluded by Sánchez-Jiménez *et al.* [18]. Moreover, Blucher *et al.* have proposed that extracellular lipids may act as constituents for oncogenic lipid signaling molecules [19].

Our results oppose the findings of a study by R K McNee which showed obesity does not influence breast cancer incidence. However, McNee *et al.* concluded an effect on tumor recurrence in less advanced disease. This study also showed that tumors greater than 5cm occurred significantly more often in obese patients [20].

Significant research has been conducted on increased BMI as a risk factor for developing breast cancer in the western world [11, 16, 21]. In our part of the world, not many studies have been conducted solely regarding the prevalence of obesity or being overweight among breast cancer patients. In our study among 262 patients, 203 (77.5%) patients had a BMI higher than normal levels. This signifies the impact of obesity as a risk factor in our population.

Our study was constrained by the fact that control cases were not taken into account. Further research must be conducted among the general population to establish a correlation between BMI and the incidence of breast cancer. Other studies should take into account the impact of increased BMI on developing breast cancer in younger age groups as our results displayed a significant number of patients who were not overweight in the age group of ≤ 29 years.

CONCLUSION

We conclude from our study that body mass index is positively correlated with breast cancer occurrence and thus the proportion of females having BMI ≥ 25 kg/m² was significantly higher among patients.

ETHICS APPROVAL

For this type of study formal consent is not required.

CONSENT FOR PUBLICATION

Not applicable.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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None

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