

To Determine the Frequency of Different Grades of Breast Cancer in Obese Women

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Abstract

Objective: To determine the frequency of different grades of breast cancer in obese women.

Method: This descriptive cross sectional study, carried out in the department of General Surgery Nishtar Medical College, Multan from 2nd August 2021 to 1st February 2022. A total of 94 obese women with breast carcinoma and age 30-70 years were included. Patients who were already taking chemotherapy or operated for breast carcinoma were not included in this study. Informed consent was taken from each patient. The tumor grade was recorded after biopsy/ FNACs per-operational definition. All this information (age, duration of lump, height, weight, BMI, menopausal status, marital status, family h/o breast cancer, hormone replacement therapy and tumour grade was recorded by the researcher on a pre-designed proforma.

Results: Patients between 30 to 70 years were included in this study with mean age of 49.35 ± 10.88 years. Most of the patients 50 (53.19%) were 30 to 50 years of age. In this study, we have found the grade 1 in 16 (17.02%) obese women, grade 2 in 57 (60.64%) women and grade 3 in 21 (22.34%) obese women.

Conclusion: This study concluded that most frequent grade of breast carcinoma in obese women is grade 2 followed by stage 3 and 1 respectively.

Keywords: Breast cancer, obese, grade.

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Introduction

Of the most common malignancies of women, carcinoma of the breast is one the most common malignancy, affecting approximately about 1.4 million women of the total population of the world in 2008 and leading to approximately 0.45 million deaths each year.¹ There have been significant advancement in the management of breast cancer during the last decade; with 5 year survival rate of 89.3 % and 10 year survival rate of 78.8% in the Chinese patients.² Breast cancer usually represents as adynamic and a complex disease. There are many prognostic factors to stage the breast

carcinoma such as size of tumor, nodal status, histological grading, ER, PR & HER-2 neu receptor status and hematogenous spread.³

Carcinoma of the breast remains as the most prevalent cause of morbidity and mortality in women worldwide. Prevalence of breast carcinoma is 23% among all the cancers in women.⁴ Advanced age is the major risk factor of breast carcinoma in women. As per recent studies, around half of patients with breast cancer presents after their 6th decade of life.⁵ Mostly women die of breast carcinoma over the age of 65 due to advanced disease and poor prognosis.⁶

Long-term estrogen exposure is the only well-established risk factor among obese women for breast carcinoma as it is related to the initiation and progression of tumor.^{7,8} The levels of free estrogen are inversely related to the levels of sex hormone binding globulin (SHBG). In case of breast carcinoma, the levels of SHBG were found low.⁹ Peripheral aromatization of androgens to

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estrogen is the most common cause of increase estrogen production in post-menopausal women.¹⁰

Obesity is the bad prognostic risk factor of breast carcinoma among postmenopausal women.^{11,12} Obesity (BMI $>30\text{kg/m}^2$) has negative affects on disease free survival period after diagnosis of breast carcinoma.¹³ As compared to non-obese patients, obese patients tend to have advanced age, larger tumor size and poor nodal status.¹⁴ According to a research, percentages of breast carcinoma in the obese pre-menopausal women were found to be 12.1% in grade 1, 68.2% in grade 2 and 19.7% in grade 3 and in obese post-menopausal women, the ratios were 17.3% in grade 1, 61.2% in grade 2 and 21.4% in grade 3.¹⁵ While another study shows the proportion of 57.6 of grade 1 or grade 2 and proportion of 42.4 of grade 3 of CA breast.¹⁶

Obesity is becoming a major health concern worldwide due to its rapidly increased prevalence among the population. Multiple complications and comorbidities are the main concerns regarding the management and treatment plan of breast cancer in the obese patients. Although there is no direct relation between BMI and clinical management of breast cancer but as per recent studies, the measures against weight control should be prioritized before conducting any appropriate interventions. As per today, there is no available local study available on this topic, so I have decided to conduct this study to determine the frequency of different grades of breast cancer in obese women in local population. My study will going to be a promising addition to the existing literature and will be helpful in reducing the mortality and morbidity rates among the obese breast carcinoma patients by providing an empirical approaches and strategical plans regarding management of these specific patients.

Material & Methods

Study design was Descriptive, Cross-sectional study. Study was conducted at Deptt. Of General Surgery, Nishtar Hospital Multan. This study was carried out from 2nd August 2021 to 1st February 2022. The calculated sample size is 94 with 5% level of significance, 10% margin of error and taking expected percentage of grade 3 in obese patients as 42.4%. Sampling technique is Non-probability, consecutive sampling. Inclusion Criteria is (a) Women with breast carcinoma (as per-operational definition) (b) Obese women (as per-operational definition) (c)

Age 30-70 years and exclusion criteria is (a) Patients already operated for breast carcinoma (b) Patients taking chemotherapy for breast carcinoma.

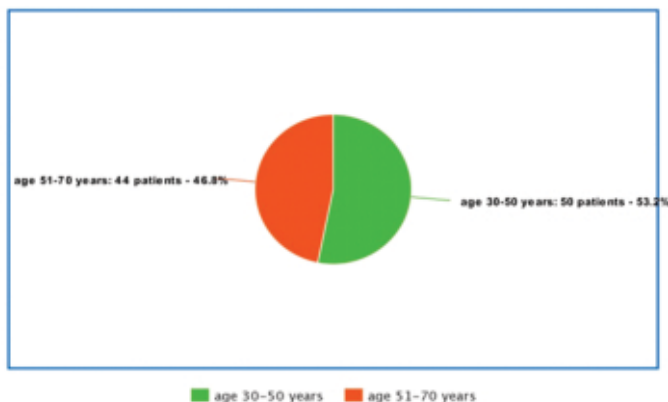
All women who presented with lump in breast >3 months duration and proved to be breast cancer on FNAC (pleomorphic cells with hyperchromasia, increased nuclear to cytoplasmic ratio ($>1:1$) and irregular nuclear contours that have breached the basement membrane) were included. BMI was calculated by following formula. $\text{BMI} = \text{weight in kgs} / \text{height in meters}^2$. Weight is measured by weight machine & height is measured by audiometer & 30 was to be considered as obese and <30 as non-obese. tumor grading was assessed according to Scarf-Bloom-Richardson grading system¹⁷ for breast carcinoma as follows on microscopy of biopsy/FNAC; cancer cells with mitotic rate of $<10\%$, small nuclei, and are arranged in tubular pattern. cancer cells with mitotic rate of $10\%-50\%$, small nuclei, pleomorphism and arranged in solid clusters. cancer cells with sheets and solid nests and are highly pleomorphic with bizarre cells and mitotic rate of $<50\%$. This study was reviewed by ethical review committee of Nishtar medical university and Hospital Multan and after approval from the committee, all those 94 patients who were completing the inclusion criteria were admitted to the Department of General Surgery, Nishtar Hospital, Multan. All of the patients were informed about the study and consent was taken from them. The tumor grade was recorded after biopsy/FNAC as per-operational definition. All this information (age of the patient, duration of breast lump, height, weight, BMI, pre-menopausal and post-menopausal status, married or un married, family history of breast cancer (yes/no), HRT (yes/no) & tumor grade was recorded by the researcher on a pre-designed proforma (Annexure).

Data that was collected via pre-designed proforma was analysed by SPSS version 20.0. Age, duration of lump and BMI were presented as mean and standard deviation. Married or unmarried, positive or negative family history of breast cancer, menopausal status and tumor grade (1/2/3) were presented as frequency and percentage.

Effect modifiers like age, duration of lump, BMI, marital status, family h/o breast cancer and menopausal status were addressed through stratification of data. Post-stratification chi square was applied to see their effect on tumor grade and p-value ≤ 0.05 was taken as significant.

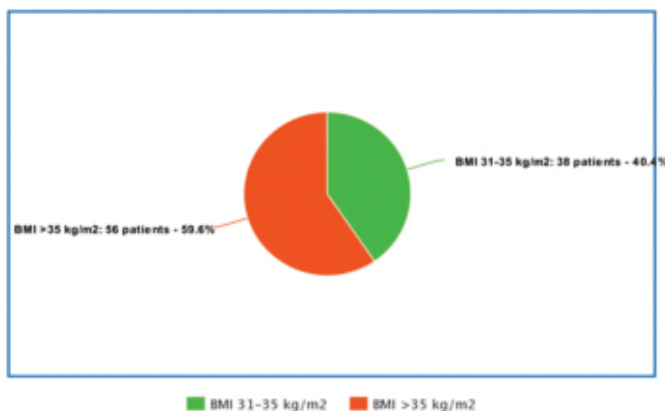
Results

Patients having age between 30 to 70 years were included in this study with mean age of 49.35 ± 10.88 years. 50 patients (53.19%) were having age of 30 to 50 years as shown in Table II. Mean BMI was $36.03 \pm 2.46 \text{ kg/m}^2$ (Table III). In this study, I have found the grade 1 in 16 (17.02%) obese women, grade 2 in 57 (60.64%) women and grade 3 in 21 (22.34%) obese women. Different grades of breast cancer were stratified according to age and BMI.



Picture 1: Age Distribution of Patients (n=94).

Mean \pm SD = 49.35 ± 10.88 years



Picture 2: Distribution of Patients According to BMI (n=94).

Mean \pm SD = $36.03 \pm 2.46 \text{ kg/m}^2$

Discussion

Obesity affects approximately 13% of the world population.¹⁷ In developed countries, such as the USA obesity affects >36% of adult population.¹⁸ As a lot of research studies has been done and are of conclusion that diabetes and heart diseases have very well association with obesity, but association of breast cancer with obesity is not very well understood as a lot work and studies

Table 1: Frequency of different grades of breast cancer in obese women

Grades of breast cancer	Frequency (%)	
	Yes	No
1	16 (17.02%)	78 (82.98%)
2	57 (60.64%)	37 (39.36%)
3	21 (22.34%)	73 (77.66%)

Table 2: Stratification of different grades of breast cancer with respect to age.

		30-50 years (n=50)	51-70 years (n=44)	P-value
1	Yes	09	07	0.788
	No	41	37	
2	Yes	30	27	0.893
	No	20	17	
3	Yes	11	10	0.933
	No	39	34	

Table 3: Stratification of different grades of breast cancer with respect to BMI.

		31-35 kg/m ² (n=38)	>35 kg/m ² (n=56)	P-value
1	Yes	03	13	0.052
	No	35	43	
2	Yes	23	34	0.985
	No	15	22	
3	Yes	12	09	0.076
	No	26	47	

has been done in the recent past and further work needs to be done to reach the conclusion and to affect the clinical approach to the patients regarding this association.^{19,20} Recent studies have shown that obesity and overweight patients have significant risks of having cancers like carcinoma of esophagus, stomach, thyroid, pancreas, uterus, breast, ovaries, colorectal carcinoma and multiple myeloma.²⁵ Adipose tissue which is abundant in obese individuals produces certain factors like inflammatory cytokines and mediators that helps in the invasion of carcinoma and its metastasis.^{21,22} As we know that carcinoma of the breast is the most frequent carcinoma in women in the world. In developed countries the second most frequent cause of cancer related deaths is carcinoma of the breast. It is necessary to understand the association of obesity with carcinoma of breast so that awareness can be started at public level.²³

I have conducted this study to determine and assess the frequency of different grades of carcinoma of breast in obese women. Mean age of this study was $49.35 \pm$

10.88 years having age range between 30-70 years. 53.19% (50) of the patients were having age between 30 to 50 years of age. As per results of this study the grade 1 was found in 16 (17.02%) obese women, grade 2 in 57 (60.64%) obese women and grade 3 in 21 (22.34%) obese women. In previous study, breast cancer grade in obese pre-menopausal women was found to be grade 1 as 12.1%, grade 2 as 68.2% and grade 3 as 19.7%. The same author has found the breast cancer grade in obese post-menopausal women as grade 1 in 17.3%, grade 2 in 61.2% and grade 3 in 21.4%.¹⁵ In another study, breast cancer grade in obese women was found to be grade 1/grade 2 as 57.6% and grade 3 as 42.4%.¹⁶ In another study it was observed that there is significant risk of invasive breast carcinoma in patients who were overweight or obese as compared to normal weight women. Of obese patient's risk was greatest for patients that have obesity grade ≥ 2 ($BMI > 35\text{kg/m}^2$). In patients with $BMI > 35\text{kg/m}^2$, biopsy of their specimen showed strong association with ER/PR + breast cancer. There is also association of large size tumor, positive lymph nodes, regional/ distant metastasis and deaths after breast carcinoma in patients with $BMI > 35\text{kg/m}^2$.²⁴

It is observed in recent studies worldwide that the post-menopausal use of Hormonal therapy has effects on relationship between obesity and breast cancer with the understanding that Hormonal therapy obscures the hazardous effects of obesity over the carcinoma of the breast particularly in relation to their effects on circulating hormonal levels.

Conclusion

After analyzing the results of this study it concludes that grade 2 is the most common grade of breast cancer in obese women followed by stage 3 and stage 1 respectively. So we recommend that there must be public awareness programs on national and regional levels to create awareness among public regarding the association of obesity with breast cancers and to also maintain a healthy life style. This will also help the treating clinicians to counsel the patients regarding the risks of obesity with breast cancer and how to reduce morbidity and mortality associated with it.

Conflict of Interest

None

Funding Source

None

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Authors Contribution

MA: Conceptualization of Project

MA: Data Collection

AHJ: Literature Search

HK: Statistical Analysis

UHQ: Drafting, Revision

UHQ: Writing of Manuscript