To determine frequency of distribution of breast carcinoma patients based on American Joint Committee on Cancer (AJCC) Staging of Breast Cancer (8th Edition): A Single Centre experience

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Abstract

Objective: To determine frequency of distribution of breast carcinoma patients presenting to our centre based on American Joint Committee on Cancer (AJCC) staging system for breast cancer (8th edition).

Study design: Cross sectional

Study duration: 12 months (January 2019 to December 2019).

Study settings: Radiology Department Kuwait Teaching Hospital ,KPK.

Material and methods: A sample size of 164 patients was calculated by WHO, non-probability consecutive sampling was used. Ethical approval was taken from hospital. Consent forms were taken from all participants. Only biopsy proven case were included in our study. Patient having initial presentation and those coming for restaging after surgery/chemotherapy were included in study group. Data was analyzed using SPSS version 24.

Results: Total 164 breast cancer women were included in study. Mean age of patients was 45.6±1.7SD. Among all the patient 164(100%), 72(43.9%) had no lesion, 36(22%) had T1, 15(9.1%) had T2, 10(6.1%) had T3, 2(1.2%) had T4a and 29(17.7%) had T4b, 80(48.8%) had no lymph node, 55(33.5%) had N1, 9(5.5%) had N2, 2(1.2%) had N3a, 8(4.9%) had N3b, 10(6.1%) had N3c, 91(55.5%) had M0 and 73(44.5%) had M1.The lesions were further categorized into stage groups. Majority of patients were in stage IV (45.1%).

Conclusion: Breast cancer is a common life-threatening cancer in Pakistani Women. TNM classification is an effective classification system of breast cancer. Early diagnosis and multidisciplinary therapy leads to improvement of prognosis in breast cancer staging.

Key words: American Joint Committee breast staging, Breast cancer, biopsy

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Introduction

Breast cancer is leading cause of mortality in womenMargot New SEER Report Documents High Risk of Second Cancers in Cancer Survivors. Oncology Times. 2007;29(5):8. . In last two decades, breast cancer is attributed as most frequently diagnosed life threatening cancer in women. Various histopathological sub types have been described. (Abu-Rezq, 2004). Breast cancer accounts for 10.4% of all the cancers among women, worldwide(Lynn C. Hartmann, 2005). An estimated 519,000 deaths occur as a result of breast cancer in 2004 (Eberl et al., 2005). Literature reported that breast cancer is 100 time more prone to occur in females than males. Rate of breast cancer can be as high as 19.33

McTiernan. Behavioral risk factor in breast cancer: Can risk be modified? The Oncologist. 2003;8(4):326–33. DOI: https://doi.org/10.3122/jabfm.18.3.211McTiernan. Behavioral risk factor in breast cancer: Can risk be modified? The Oncologist. 2003;8(4):326–33. DOI: https://doi.org/10.3122/jabfm.18.3.211Literature reported various histopathological sub types of breast cancer, showing association with multiple familial syndromes and previous radiation exposure. (Smith et al., 2008). According to site breast cancer is divided as non-invasive (confined the ducts, not invading surrounding connective or fatty tissues of breast) and invasive breast cancer (cells breaks through ducts and invade surrounding connective or fatty tissue). Frequently occurring breast cancer sub types are lobular carcinoma in situ and ductal carcinoma in situ. Medullary, mucinous and tubular carcinoma are relatively lesser in occurrence. Causes of breast cancer include significant family history, hormonal changes, life style, dietary changes and genetic and environmental causes (Tanaka T., Decuzzi P., Cristofanilli M., Sakamoto J. M., Tasciotti V., Robertson F. M., Ferrari M. Nanotechnology for breast cancer therapy. Biomed Microdevices. 2009;11(2):49–63.

Breast cancer is usually first identified with classic symptoms as lump found in armpit , breast lump, pain and discharge from nipples, scaly and inverted nipple skin, persistent tenderness and breast discomfort. Breast self- exam (BSE) cannot be stressed upon enough for its high yield and early recognisation. (Bae SY, Jung SP, Jung ES et *al.* Clinical characteristics and prognosis of pregnancy associated breast cancer: Poor survival of luminal b subtype. Oncology 2018; 95(3): 163–9

Breast cancer is diagnosed with biopsy of nodule (detected through palpitation and mammogram). After diagnosis, breast cancer is staged from 0-IV. Stage 0 tumour is carcinoma in situ, stage I tumour is < 2 centimetres in diameter, Stage IIA and Stage II B tumour are > 2 centimetres and < or equal to 5 centimetres and tumour spread is to 3 lymph nodes, stage IIIC has spread to up to 9 lymph nodes, stage IV (Metastatic cancer) tumour has spread to distant organs regardless of size. TNM is latest classification system of breast cancer introduced by American Joint Committee on Cancer (AJCC), which involves anatomical staging on the basis of extent of primary tumor (T), lymph nodes regional status (N), metastasis status (M).A newer approach was added in 8th edition namely prognostic classification side by side with TNM staging in which histopathological grading and immunohistochemical examination of the tumor were taken into account namely, estrogen receptor and progesteron receptor positivity to name a few . (Chuang et al., 2018). Management of breast cancer namely surgery, radiation therapy, chemotherapy and nanotechnology depend upon both TNM and prognostic staging in breast cancer. Recent approaches like gene therapy, oncogenes inactivation, augmentation of tumor suppresser genes, cell target suicide, chemo protection approach, virus mediated oncolytic and immunomodulation are also in play in recent times. In Pakistan, limited data is available on TNM classification of breast cancer. In our present study we aim review TNM staging of breast cancer in our facility.

Material and Methods

A cross sectional study was conducted at Radiology department Kuwait Teaching Hospital, KPK. Study duration was 12 months (January 2019 to December 2019). A sample size of 164 patients was calculated using WHO calculator with prevalence 30% 95% confidence interval and 7% significance. Non probability consecutive sampling was used for patient's selection. Ethical approval was taken from all study participants. Consents forms were got signed by all patients before study conduction. Patients with age greater than 18 years and women diagnosed with breast cancer using biopsy and under treatment for breast cancer were included. Staging of breast cancer was done on post contrast CT using The American Joint Committee on Cancer (AJCC) staging system for breast cancer (8th edition) TNM classification system. Data on tumor characteristics, and stages was collected. SPSS version 24 was used for analysis of study. Frequency and percentages were calculated for qualitative data. Mean± Standard deviation or descriptive characteristics were calculated for quantitative variables

Results

Total 164 breast cancer women were included in study. Mean age of patients was 45.6±1.7SD. Majority of patients were in age group 41-50 years 58(35.4%) following 51-60 years 50(30.5%), 31-40 years 18(11%), 61-70 years 17(10.4%), 21-30 years 14(8.5%), 10-20 years 4(2.4%) and 71-80 years 3(1.8%). Among all the patients breast lesion was present in 89(54.3%) cases .75(45.7%) patients did not have any lesion. These were the patients who had

undergone surgery and chemotherapy. Out of the group of patients who did present with breast lesion, 79(48.2%) had spiculated margins, 10(6.1%) had well defined margins which was an unusual presentation for malignant breast masses. Satellite nodules were found in 26(15.9%) patients while 138(84.1%) did not have any satellite nodule either on same side or in contralateral breast. Calcification was found in 8(4.9%) cases. All of these proved to be invasive ductal carcinoma patients on histopathology. In our study we documented different radiological landmarks which could upgrade local staging of the tumour and hence change its surgical operability, decision regarding pre-operative chemotherapy and prognosis. These include overlying skin involvement, nipple retraction, underlying pectoralis major muscle involvement and chest wall muscle involvement. Skin involvement was found in 57(34.8%).Out of these at least 9(6.1%) patients were those who showed persistent residual breast skin thickening despite partial mastectomy and chemotherapy. Pectoralis major muscle involvement was reported in 21(12.8%).These patients were labelled T4 disease. Contralateral breast involvement was found in 6(3.7%) patients in the form of satellite nodules. Ipsilateral axillary involvement was reported in 55(33.5%) patients. Contralateral lymph nodes were involved in 14(8.5%) patients. Infra clavicular lymph nodes were involved in 2(1.2%) patients. Supraclavicular lymph nodes were involved in 6(3.7%) patients. Distant metastasis was found in 97 patients which formed 66.4% of total study group. Pulmonary metastasis were present in 37(22.6%), absent in 122(74.4%) and in determinant nodules were present in 5(3%) patients. Hepatic metastasis were present in 29(17.7%) and absent in 135(82.3%). Bony metastasis was found in 22(13.4%) and absent in 142(86.6%). Omental metastasis was present in 4(2.4%) patients and absent in 160(97.6%) patients. Brain metastasis were present in 5(3%) and absent in 159(97%) patients. Distribution of our study group according to Tumor ,Node and Metastatis classification is represented in Table 1.

Table 1: Frequency distribution of Tumor-Nodes and Metastasis

Tumor (T)		**Nodule (N)**		**Metastasis**	
Nil	72(43.9%)	Nil	80(48.8%)	M0	91(55.5%)
T1	36(22%)	N1	55(33.5%)		
T2	15(9.1%)	N2	9(5.5%)		
T3	10(6.1%)	N3a	2(1.2%)	M1	73(44.5%)
T4a	2(1.2%)	N3b	8(4.9%)		
T4b	29(17.7%)	N3c	10(6.1%)		

Among all the patient 164(100%), 72(43.9%) had no lesion, 36(22%) had T1, 15(9.1%) had T2, 10(6.1%) had T3, 2(1.2%) had T4a and 29(17.7%) had T4b, 80(48.8%) had no lymph node, 55(33.5%) had N1, 9(5.5%) had N2, 2(1.2%) had N3a, 8(4.9%) had N3b, 10(6.1%) had N3c, 91(55.5%) had M0 and 73(44.5%) had M1 as shown in table 1. Based on this TNM 14(8.5%) patients were in stage 0, 26(15.9%) in stage 1, 5(3%) in stage 2a, 8(4.9%) in stage 2b, 3(1.8%) in stage 3a, 14(8.5%) in stage 3b, 12(7.3%) in stage 3c, 74(45.1%) in stage 4 and 8(4.9%) had disease free status as shown in figure 1.

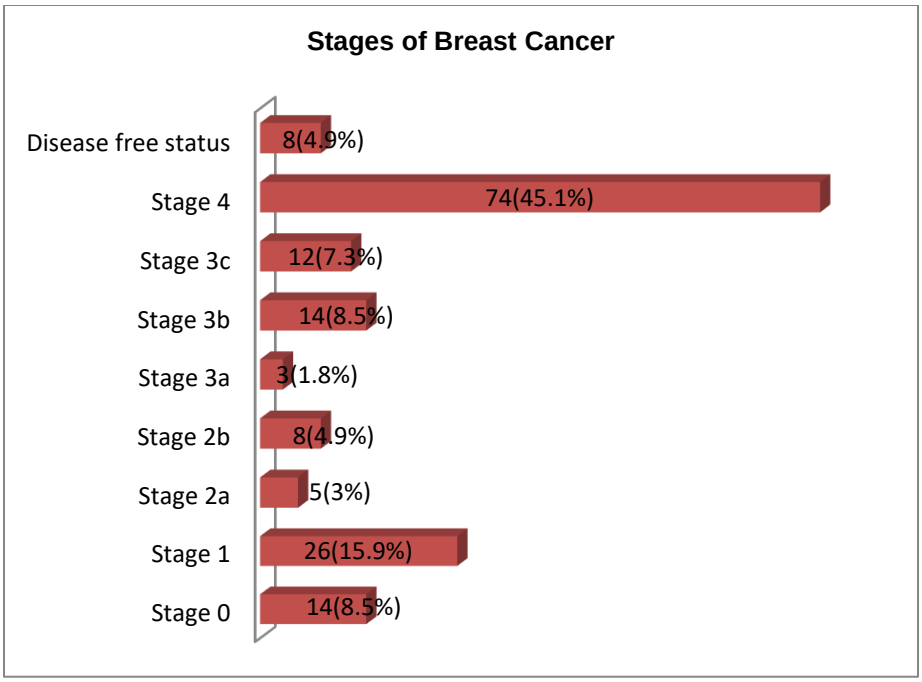

Figure 1: Stages of breast Cancer

Out of all patients 110(67.1%) had undergone mastectomy or partial mastectomy whereas 54(32.9%) had not no surgical procedure done. Chemotherapy was done in 119(72.6%) patients whereas 45(27.4%) had received no chemotherapy.

Stratification of TNM staging according to patient's history of chemotherapy was done and is shown in table 2

Table 2: Stratification of TNM classification according to Chemotherapy

Tumor (T)	**Chemotherapy**		**Total**
	Not Done	**Done**	
No lesion	10(6.1%)	62(37.8%)	72(43.9%)
T1	7(4.3%)	29(17.7%)	36(22%)
T2	4(2.4%)	11(6.7%)	15(9.1%)
T3	8(4.9%)	2(1.2%)	10(6.1%)
T4a	0(0%)	2(1.2%)	2(1.2%)
T4b	16(9.8%)	13(7.9%)	29(17.7%)
Lymph Nodes (N)			
No lymph nodule	12(7.3%)	68(41.5%)	80(48.8%)
N1	21(12.8%)	34(20.7%)	55(33.5%)
N2	2(1.2%)	7(4.3%)	9(5.5%)
N3a	2(1.2%)	0(0%)	2(1.2%)
N3b	4(2.4%)	4(2.4%)	8(4.9%)
N3c	4(2.4%)	6(3.7%)	10(6.1%)
Metastasis (M)			

M_0	30(17.7%)	61(37.2%)	91(54.9%)
M_1	15(9.8%)	58(35.4%)	73(45.1%)
Total	45(27.4%)	119(72.6%)	164(100%)

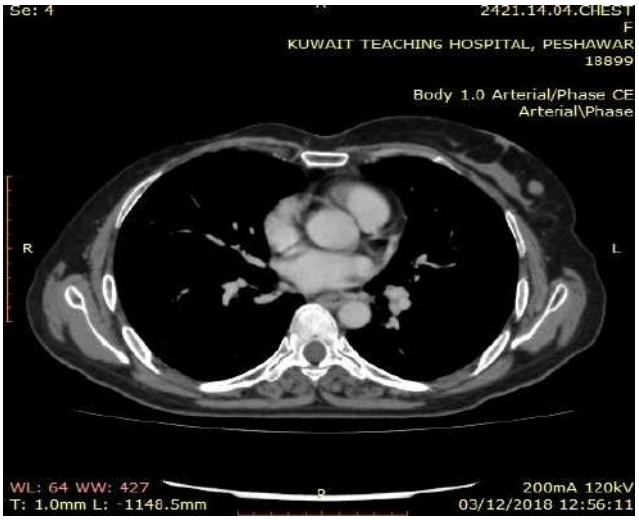

Figure 1. Radical right mastectomy has been done with recurrent satellite nodule in left breast.

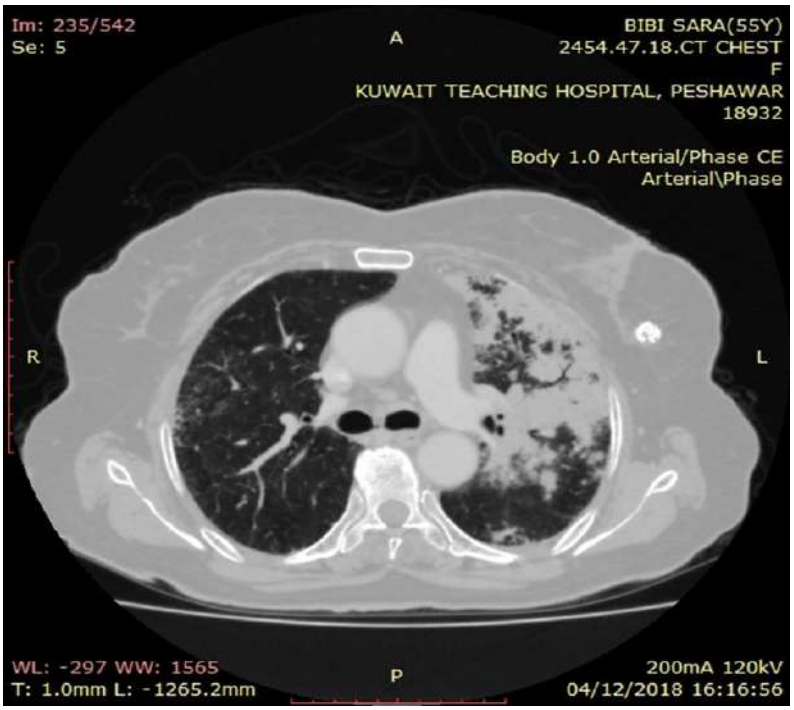

Figure 2. Post-Radiotherapy consolidation in left lung. Post-Radiotherapy benign neo-calcification is evident in left breast mass.

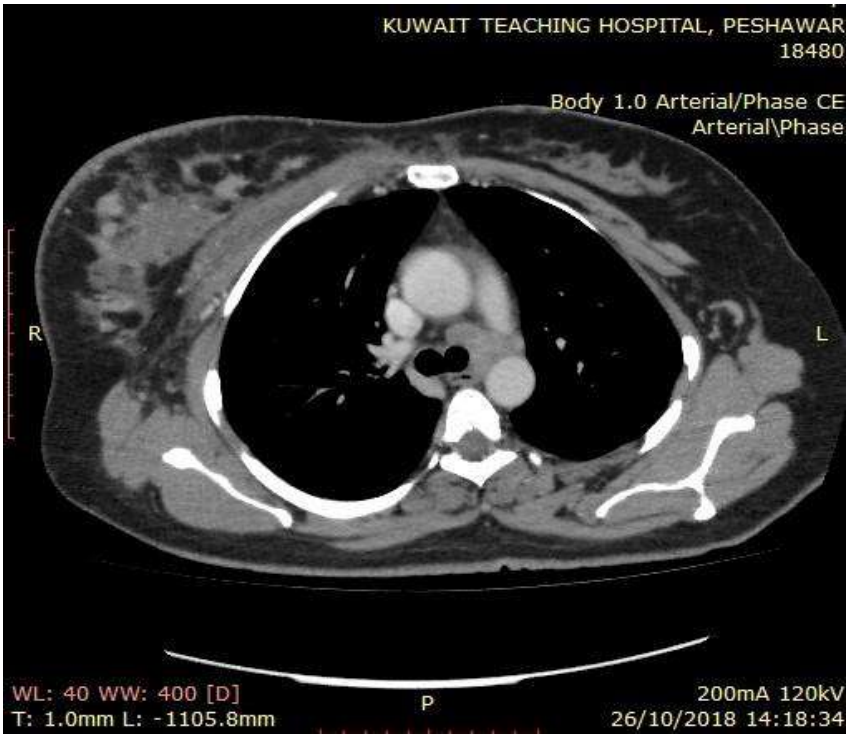

Figure 3. Inflammatory right breast carcinoma with smaller ipsilateral breast satellite nodules

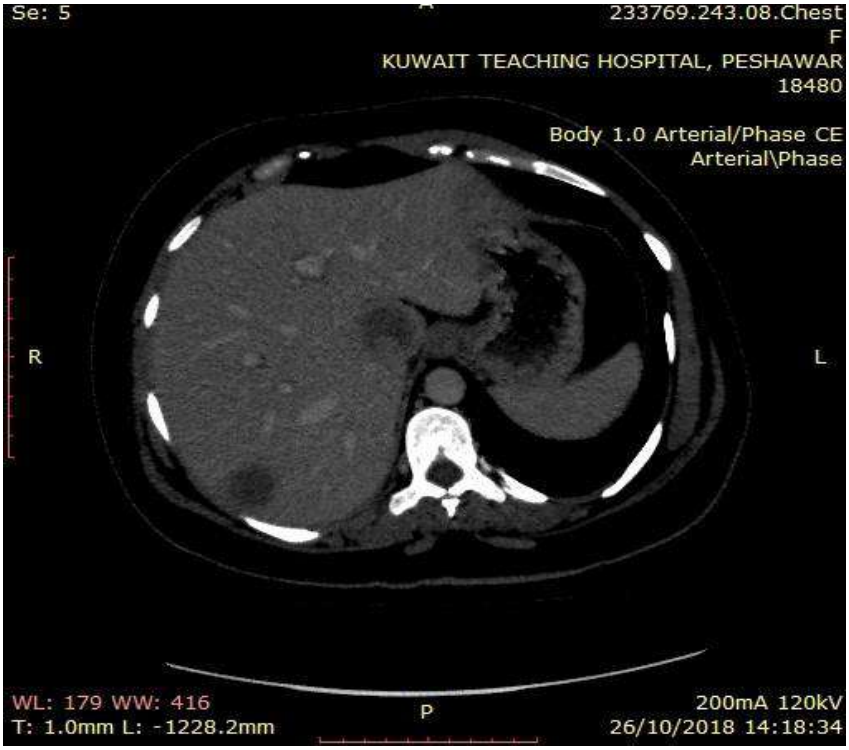

Figure 4. Same patient, hepatic hypo dense metastatic deposit.

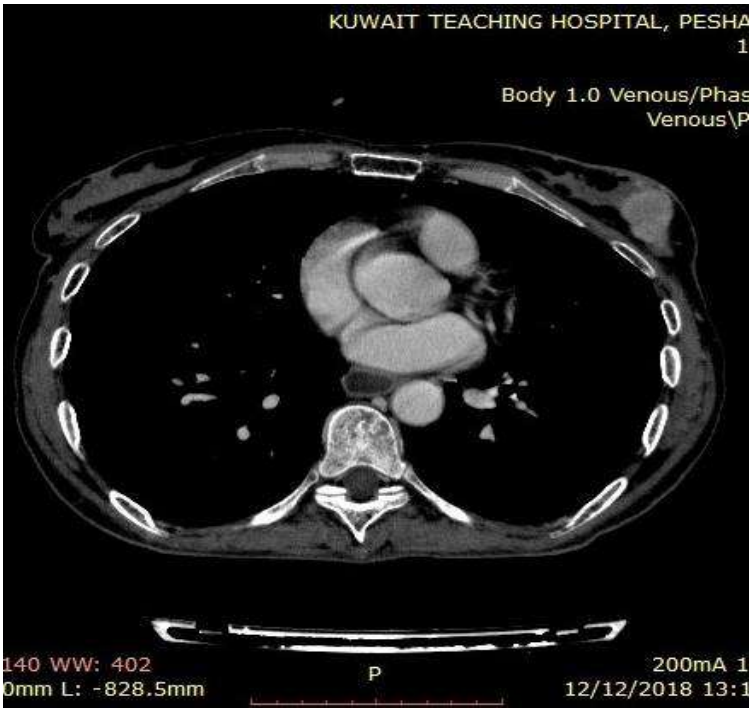

Figure 5. Recurrent left breast mass in a previously operated patient.

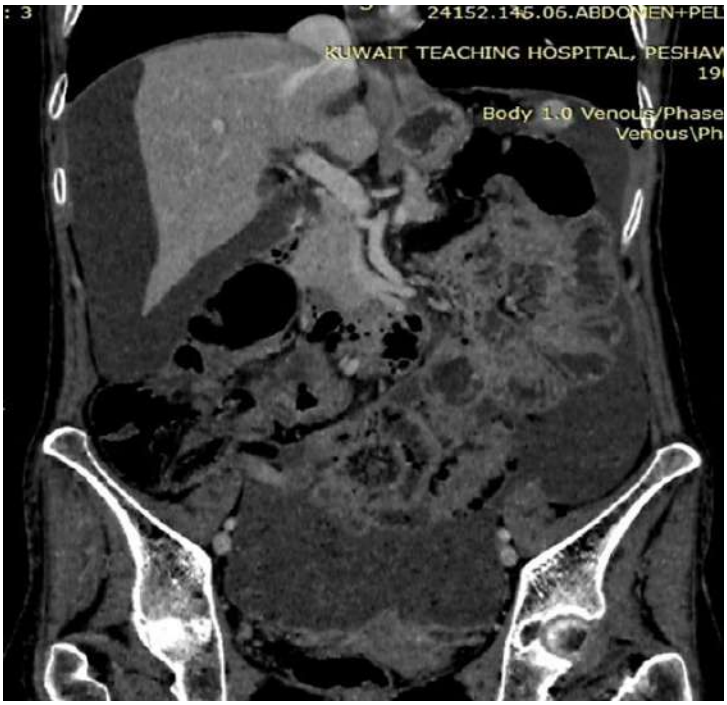

Figure 6. Associated large ascites is also seen.

Discussion

Breast cancer is very common diseases in Pakistan. An estimated 1/9 women is suffering with breast cancer in Pakistan due to poor health and socio-economic conditions(Baulies et al., 2015). Total 164 patients were included in present study. Majority of patients were in age group 41-50 years (35.4%). Spitale et al reported that age is an effective predictor of breast cancer in women (Spitale et al., 2009). Azim et al reported that >40% of breast cancer patients were in age >60 years [13]13(Azim et al., 2012). However, Langer et al reported that estimated risk of developing breast cancer among women is 1/53 before 49 years of age [14](Langer et al., 2014)

In present study a number of tumor characteristics namely stellate spiculated borders, overlying skin thickening, nipple retraction and underlying pectoralis major involvement were studied and their there frequency documented. We noted that there was positive association between skin thickening/involvement and pectoralis major muscle involvement and N and M staging. (p=0.000) .These also happen to be the markers used for upstaging T3 to T4.

A similar study reported that T and N stage are important prognostic indicators in breast cancer overall survival. However, T stage is found to be an independent prognostic indicator in multivariate analysis (Frédéric Amant, Sibylle Loibl, Patrick Neven et al., 12 C.E.).

In present study, majority of patients were in stage 4, 74(45.1%). Peccatori et al reported that 58.9% women were diagnosed with ≥IIB advanced stage cancer. Advanced breast cancer leads to pain, breast symptoms and role functioning (p<0.05). Breast cancer is associated with health related quality of life[16] (Peccatori et al., 2013). Ruiz et al reported that survival rate of breast cancer was 96.84%, 96.16% and 70.48% at stage I, stage II and Stage III of breast cancer respectively17[17] (Ruiz R, Herrero C, 2017). Robbins et al reported that Brazilian women were more prone to have breast cancer advance stage as compare to other women18 (Robbins et al., 2011). Another study reported that majority of patients were diagnosed with advance breast cancer 58% (Ayyappan et al., 2010). These findings were contestant with North American data ranges 40-44% at stage II-IV [19](Ye et al., 2017)

Declarations:

Limitation: Small sample size and conduction of study at one hospital limits generalisability

Author's Contribution:

Dr Sidrah Saeed conceived the idea , helped in collection of data and in acquisition, analysis and interpretation of data and drafting.
Dr Zeenat Adil revised the data critically .
Dr Abdul Majid gave final approval of the version to be published
Dr Mahnoor Rehman helped in collection of data and its acquisition.

Conflict Of Interest:

There is no conflict of interest for declaration.

Conclusion:

Breast cancer is a common life-threatening cancer in Pakistani Women. TNM classification is an effective and latest classification system of breast cancer. Early diagnosis and multidisciplinary therapy leads to prognosis improvement in breast cancer staging.

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