Clinicopathological Parameters Of Breast Invasive Ductal Cell Carcinoma In Baquba Teaching Hospital

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Abstract

Background: Breast cancer constitute the most common malignancy in females worldwide and it is a major reason of cancer-related deaths for women in Iraq. **Patient and methods:** This is a descriptive cross sectional study of 68 patients with mammary ductal adenocarcinoma conducted in cancer treatment center in Baquba teaching hospital for the period August 2024-March 2025. All patients underwent modified radical mastectomy or breast conserving surgery. The clinical and pathological parameters for all patients were registered. **Results:** Out of 68 patients with mammary ductal adenocarcinoma, 67 (98.53%) patients were females and 1(1.47%) patient was male. The median age of having mammary ductal adenocarcinoma is 53 (53±12.557). Most common type of ductal adenocarcinoma is of no special type constituting 94.12%, while 2.94% were of colloid subtypes and 1.47% each for medullary and tubular subtypes. The most common histological grade is poorly differentiated (57.35%), followed by being moderately differentiated (38.24%). The least histological grade was well differentiated (4.41%). The majority of patients were having a tumour sized 2-5 cm in diameter, while the least have tumour sized less than 2 cm. About 92.65% of patients were having their axillary lymph node involved by malignancy. The majority of patients (67.65%) were having stage II disease, followed by stage III (17.64%). Stage I and IV were the least constituting 7.35% each. With regard to hormone receptor status, 61.76% were estrogen receptor positive, (41.18%) were progesterone receptor positive and (33.82%) express HER2 receptor. **Conclusion:** This study revealed that the incidence of breast cancer was higher within the fifth decade of age. Tumor sized 2‑5 cm in diameter constitute the majority of the patients. The majority had positive axillary lymph node metastasis. Most cases were detected as having stage II disease. The hormone receptor status was mainly ER positive.

Keywords: Breast cancer, Ductal adenocarcinoma

Introduction

Incidence

Breast cancer (BC) is the commonest malignancy that is found in women across the world. It is the fifth leading cause of death due to malignancy in the world. [1, 2]

The registered new cases of breast globally in 2020 reached 2,261,419 cases, with a rate of death 6.9% which is equivalent of 684,996 deaths. It is responsible for 25% of new cancer cases in women globally.[3,4]

Number of new cases and related deaths has significantly increased throughout the last few decades, including that in Asian countries.

The number reached 158,939 new cases of breast cancer in Southeast Asia, with related 58,670 deaths from the disease.[5]

Breast cancer is also a major cause of death in Iraqi women, accounting for about one-third of all cases of cancer that were registered in 2019. [6,7]

Sulaymaniyah, an Iraqi province was having the highest incidence of BC between 2006 and 2014. Breast cancer was also found to be the most frequent malignancy in Basra, Iraq, in 2017.[8]

The incidence rate of newly registered cases of breast cancer rises significantly in Iraq from (52.00/100,000) in 2000 to (91.66/100,000) in 2019. Many factors contribute to the etiology of BC, of interest is having a genetic predisposition for the disease or having a high-risk factors.[9] The risk factors for BC include: advanced age, early menarche, late menopause, having first full-term pregnancy after the age of 35, chronic use of oral contraceptives, high body mass index, lack of exercise, low physical activity, and exposure to high doses of radiation early in life.[10]

Molecular subtypes

The molecular subtype of BC (tumor phenotype) in patients with BC differs depending upon the gene expression profiles and can be classified as: **luminal A** epithelial/estrogen and progesterone receptor (ER and PR) positive; **luminal B** epithelial/estrogen positive with PR and HER2 being either positive or negative; HER2 enriched (ER –ve, PR –ve and HER2 +ve) and; triple negative.[11]

Luminal A tumors are associated with the most favorable prognosis because expression of hormone receptors is predictive of a favorable response to hormonal therapy. The presence of both

receptors (ER, PR) in a tumor is associated with 80% chance of responding to hormone blockade. Luminal B tend to have higher grade and more aggressive features than luminal A breast cancers.HER2-enriched breast cancers produce excess HER2 and do not express hormone receptors (ER,PR). These cancers tend to grow and spread more aggressively than other breast cancers and are associated with poorer short-term prognosis compared to ER+ breast cancers. However, the recent widespread use of targeted therapies (as trastuzumab and Pertuzumab) for HER2-positive cancers has reversed much of the adverse prognostic impact of HER2 overexpression, with up to 40% of women achieving a pathologic complete response to combination chemotherapy and targeted anti-HER2 therapies.[12]

Triple negative (Basal like) tumors are more biologically aggressive and are typically characterized by the lack of the ER, PR and HER2 receptor. These cancers are often found in premenopausal women, those with a BRCA1 gene mutation, and are nearly two times more common in black women than white women in US. Triple negative breast cancers have a poorer short-term prognosis than other breast cancer types, in part because there are currently no targeted therapies for these tumors. However, a proportion of these tumors are very chemosensitive, exhibiting a pathologic complete response in up to a third of patients.[12]

Breast cancer pathology

Breast cancer can be divided into numerous subtypes according to histological morphologies, as well as biological and molecular characteristics. Breast cancer may arise from the epithelium of the duct system anywhere from the nipple end of major lactiferous ducts to the terminal duct unit which is in the breast lobule. It may be entirely in situ or may be invasive cancer. The degree of differentiation of the tumour is usually described by three grades — well differentiated, moderately or poorly differentiated. Ductal carcinoma of no special type (or called not otherwise specified) is the most common variant, but lobular carcinoma occurs in up to 10 per cent of cases. Rarer histo-logical variants, usually carrying a better prognosis, include colloid (mucinous) carcinoma whose cells produce abundant mucin, medullary carcinoma with solid sheets of large cells often associated with a marked lymphocytic reaction and tubular carcinoma which is associated with the best prognosis.

Invasive lobular carcinoma is commonly multi-focal and/or bilateral and papillary carcinoma. [13]
Inflammatory carcinoma is a fortunately rare, highly aggressive cancer which presents as a painful, swollen breast, which is warm with cutaneous oedema. This is due to blockage of the subdermal lymphatics with carcinoma cells. Inflammatory cancer usually involves at least one-third of the breast and may mimic a breast abscess. A biopsy will confirm the diagnosis and show undifferentiated carcinoma cells. [13]
In situ carcinoma is preinvasive cancer which has not breached the epithelial basement membrane. In situ carcinoma may be ductal (DCIS) or lobular (LCIS), the latter often multifocal and bilateral. Both are markers for the later development of invasive cancer which will go on to develop in at least 20 percent of cases. Expert pathological review is required in all cases. Bilateral mammogram is performed to determine the extent of the insitu CA and to exclude second CA. [13]

Patients and Method:

This is a descriptive cross sectional study of 68 patients with mammary ductal adenocarcinoma conducted in Baquba teaching hospital for the period August 2024-March 2025. All patients underwent modified radical mastectomy or breast conserving surgery. The clinical and pathological parameters for all patients were registered. The clinical parameters included the age and gender. Pathological parameters included the size of the mass, ductal carcinoma subtypes (tubular, mucinous, medullary, and inflammatory), presence of axillary lymph node involvement on histopathological examination in patients underwent mastectomy or breast conserving surgery.

Tissue samples (core biopsy, excisional biopsy, wide local excision or mastectomy) were preserved in 10% formalin and underwent a series of tissue processing, then putting them in paraffin blocks. A multiple 5µm thickness cut section then obtained from the paraffin block using microtome cutter. Then the sections were put in a water bath and heated at 40°C, then carried on slides to be stained with Hematoxylin and Eosin (H&E). [14]

The clinical (demographic) and the pathological characteristics information about the age ER, PR, and HER-2, were gained by reviewing patient's medical records and/or pathologic reports in cancer treatment center in Baquba teaching hospital.

Results

Table 1: The distribution of breast ductal adenocarcinoma according to the sex.

Sex	Frequency	Percentage (%)
Male	1	1.47
Female	67	98.53
Total	68	100

Out of 68 patients with mammary ductal adenocarcinoma, 66 (98.53%) patients were females and 1(1.47%) patient was male.

Table 2: Distribution of mammary ductal adenocarcinoma among different age groups.

Age group (years)	Frequency	Percentage (%)
30-39	6	8.82
40-49	18	26.47
50-59	24	35.29
60-69	9	13.24
70-79	6	8.82
80-89	5	7.35
Total	68	100

Table 2 shows that 6 (8.82%) patients were in the age group 30-39 years, 18 (26.47%) patients were in the age group 40-49 years, 24 (35.29%) patients were in the age group 50-59 years, 9 (13.24%) patients were in the age group 60-69 years, 6 (8.82%) patients were in the age group 70-79 years and 5 (7.35%) patients were in the age group 80-89. The mean age was 53±12.557

Table 3: Distribution of different subtypes of ductal adenocarcinoma among the studied patients.

Histopathological type of ductal adenocarcinoma	Frequency	Percentage (%)
No special type	64	94.12
Colloid	2	2.94
Medullary	1	1.47
Tubular	1	1.47
Total	68	100

Table 3 shows that the most common type of ductal adenocarcinoma is of no special type constituting 94.12% (64 patients), while 2.94% (2 patients) were of colloid subtypes and 1.47% (1 patient) each for medullary and tubular subtypes.

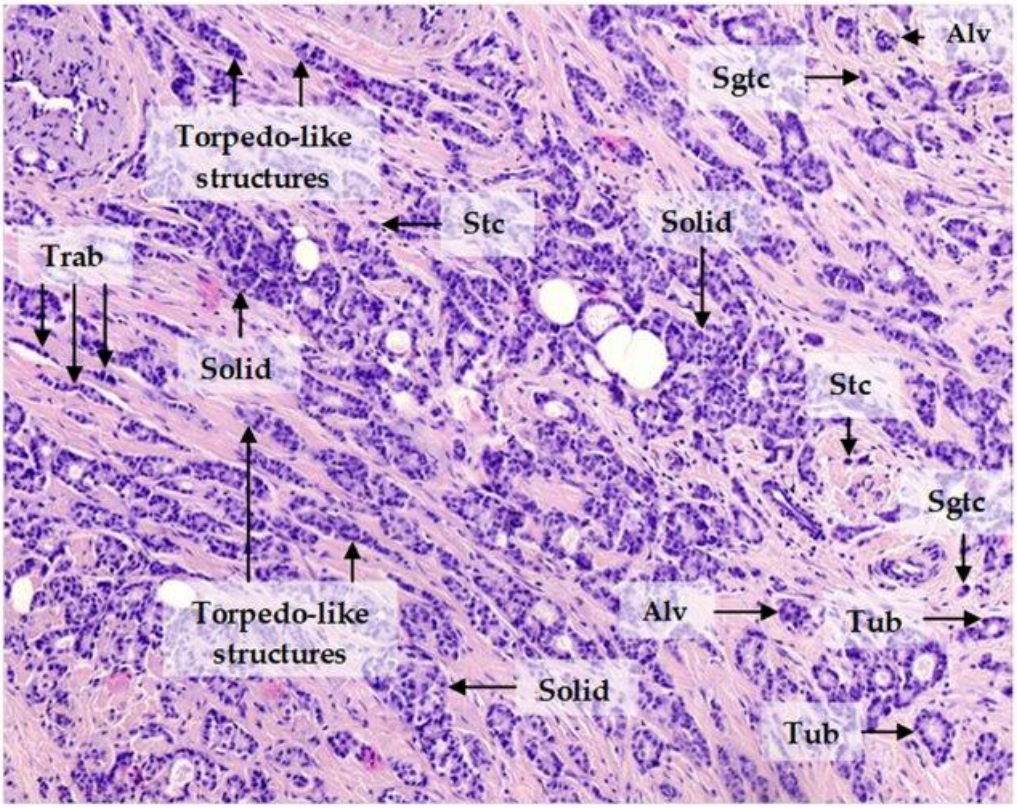


Figure 1: Invasive breast carcinoma of no special type. The invasive component of the tumor is heterogeneous and represented by tubular (Tub), alveolar (Alv), solid, trabecular (Trab), and torpedo-like structures, as well as discrete groups of tumor cells including small groups of two to five tumor cells (Sgtc) and single tumor cells (Stc). Hematoxylin and eosin staining, 200× magnification.

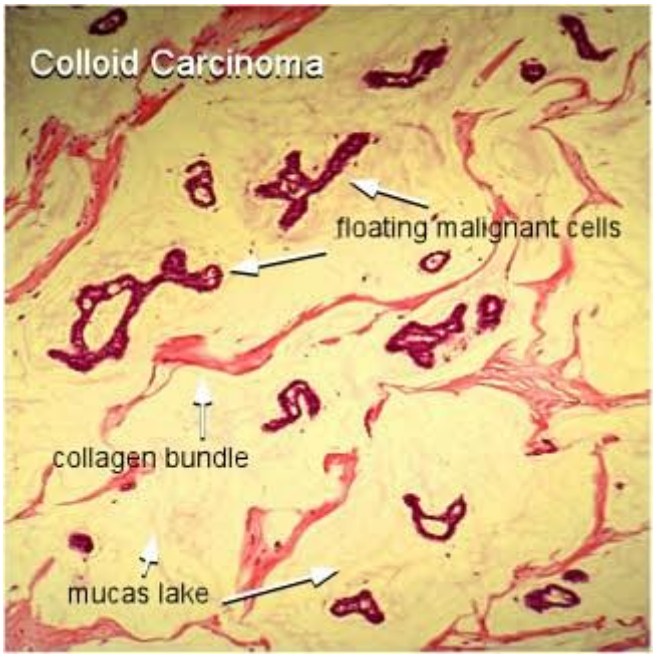


Figure 2: Colloid ductal adenocarcinoma of the breast



Figure 3: Tubular ductal adenocarcinoma of the breast

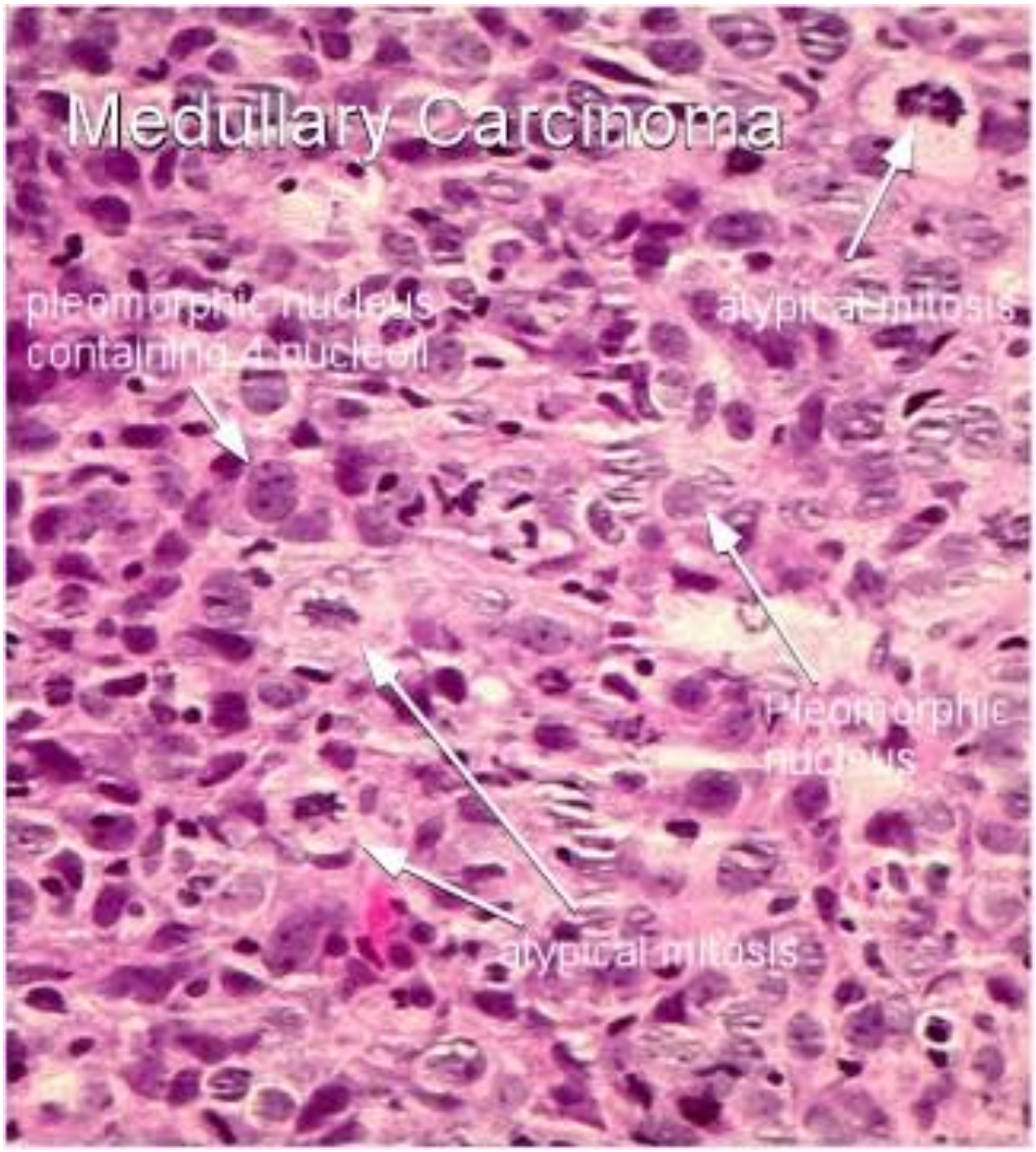


Figure 4: Medullary ductal adenocarcinoma of the breast

Table 4: Distribution of histological grading of ductal adenocarcinoma among the studied patients.

Histological grade	Frequency	Percentage (%)
Well differentiated (grade I)	3	4.41
Moderately differentiated (grade II)	26	38.24
Poorly differentiated (grade III)	39	57.35
Total	68	100

Table 4 shows that the most common histological grade in patients with mammary ductal adenocarcinoma is poorly differentiated (57.35%), followed by being moderately differentiated (38.24%). The least histological grade was well differentiated (4.41%).

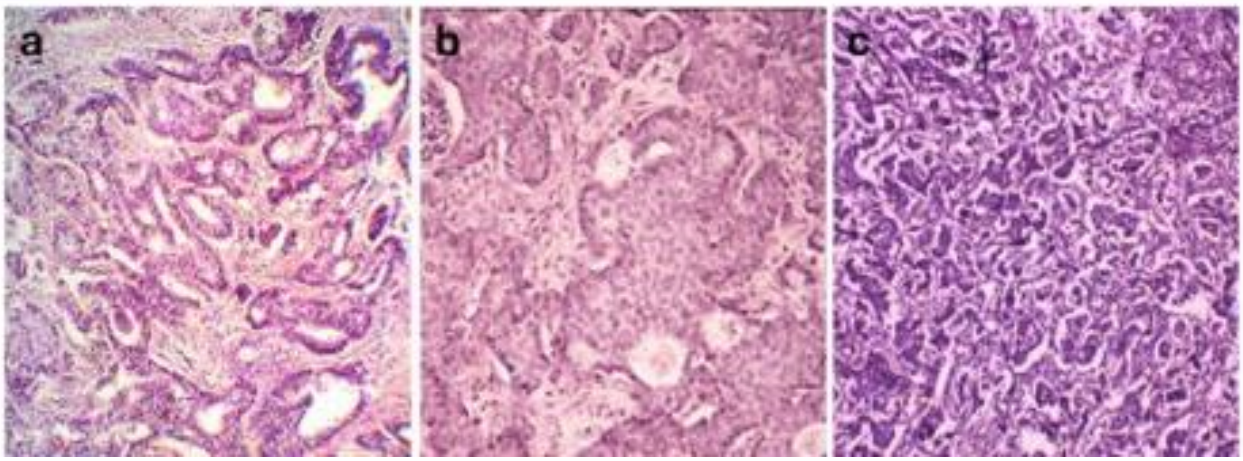


Figure 5: Invasive ductal carcinoma of varying degrees of differentiation by Scarff-Bloom-Richardson. **a**-well-differentiated carcinoma, **b**-moderately differentiated carcinoma, **c**-poorly differentiated carcinoma. Staining with hematoxylin and eosin. Magnification ×100

Table 5: Distribution of the patients according to the size of the tumour

Tumour size (cm)	Frequency	Percentage (%)
< 2	11	16.18
2-5	42	61.76
> 5	15	22.06

Table 5 shows that the majority of patients were having a tumour sized 2-5 cm in diameter, while the least have tumour sized less than 2 cm.

Table 6: Distribution of the patients according to axillary lymph node involvement by malignancy

Lymph node involvement status	Frequency	Percentage (%)
Positive	63	92.65
Negative	5	7.35

Table 6 shows that 92.65% of patients were having axillary lymph node involvement by the malignancy, while only 7.35% of patients were negative for axillary metastasis.

Table 7: Distribution of the patients according to the stage of the disease

Stage	Frequency	Percentage (%)
I	5	**7.35**
II	46	**67.65**
III	12	**17.64**
IV	5	**7.35**
Total	68	**100**

Table 7 shows that the majority of patients (67.65%) were having stage II disease, followed by stage III (17.64%). Stage I and IV were the least constituting only 7.35 each.

Table 8: Distribution of ER and PR status and HER2 expression among the studied patients

Receptor status	Positive Frequency (%)	Negative Frequency (%)	Total
Estrogen receptor (ER)	42 (61.76)	26 (38.24)	68
Progesterone receptor (PR)	28 (41.18)	40 (58.82)	68
HER2	23 (33.82)	45 (66.18)	68

Table 8 shows that out of 68 patients, 42 (61.76%) were estrogen receptor positive, 28 (41.18%) were progesterone receptor positive and 23 (33.82%) express HER2 receptor.

Discussion:

This study revealed that 98.53% of patients was females and 1.47% patient was male. This in concordance with that of Marcelo Antonini *et al*. who Identified that 94.2 % of patients were female and only 1.7% were males. [15]

On the other hand Raghdah *et al*. showed in their study that 91.11% of patients were female, while 8.89% were male. [16]

This study showed that the median age of having mammary ductal adenocarcinoma is 53 (53±12.557). This finding is in concordance with these of Fadhil *et al.* who found that the median age of having breast cancer was 52.0±8.96 years **[17]** and that of R. A. Abood who found it to be 50. **[18]**

On the other hand, Farra *et al.* found the median age of having the disease at was 47.2±10.4 years. **[18]** Ali Ghalib *et al*. also recorded that the median age of breast cancer in Iraqi Kurdish women patients was 47.52 years **[20]**.

It is well known that the risk for breast cancer increases with age. Despite that, women between 50‑69 years are mostly affected by the disease in our study (35.29%). Also our study revealed that the age group least affected is 30-39 years (8.82). Esmael Besufikad Belachew *et al*. showed that the most frequently affected by breast cancer is 45–59 (26.2%) and the least age group is 15–29 (15.3%).**[21]**

Our study showed that the most common type of ductal adenocarcinoma is of no special type constituting 94.12%, while 2.94% were of colloid subtypes and 1.47% each for medullary and tubular subtypes. Ahmed Mjali *et al*. found also that the most common histopathological type was ductal adenocarcinoma of no special type (91.85%), followed by colloid (mucinous) subtype (2.72%), and the least common was medullary subtype (0.45%).[22]

Britta Weigelta *et al*. also recorded that invasive ductal carcinoma of no special type as (80%), colloid (<2%), pure tubular carcinoma (<2%) and medullary (<1%). [23]

Our study showed that the most common histological grade in patients with mammary ductal adenocarcinoma is poorly differentiated (57.35%), followed by being moderately differentiated (38.24%). The least histological grade was well differentiated (4.41%). These results are in concordance with that of Meike Rachmawati *et al*. Who also showed that the most frequent recorded grade is poorly differentiated (45%) followed by moderately differentiated (32%) followed by being well differentiated (2%). [24] Peter F Rambau *et al*. also recorded the same results; poorly differentiated (64%), moderately differentiated (20.7%) and well differentiated (4.3%). [25] On the other hand Sae Rom Chung *et al*. found moderately differentiated to be the most frequent histological grade (61.3%), followed by being poorly differentiated (31.9%) and last well differentiated (6.9%). [26]

This study showed that the majority of patients were having a tumour sized 2-5 cm in diameter, while the least have tumour sized less than 2 cm. Raghdah *et al*. also identified that the majority of patients were having their tumours sized 2-5cm (51.11%) and the least sized less than 2cm (15.56%).[16]

Our results are also in accordance with that of M. Fadhil *et al*. who found that the majority of patients have their breast masses >2.2cm (77.87), while masses ≤2.2 cm constitute (22.22%). [17]
On the other hand, Sae Rom Chung *et al*. recorded malignant breast masses sized <2 cm being the most common (66.5%), followed by tumours sized 2-5 cm (31.3%); the least recorded size was >5 cm (2.2%). [26]

Our study showed that 92.65% of patients were having their axillary lymph node involved by malignancy, while only 7.35% of patients were negative for axillary metastasis. This is in accordance with that of Liang Zhang *et al*. who found that 90.7%, while 9.3% were negative for lymph node metastases.[27] Our results disagree with that of M. Fadhil *et al*. who reported positive axillary metastases in 49.9% and negative in 51.1%.[17]

This study shows that the majority of patients (67.65%) were having stage II disease, followed by stage III (17.64%). Stage I and IV were the least constituting only 7.35 each. Our results are different from that of Raghdah *et al*. which revealed that the majority of patients are within stage III (42.22%), followed by stage II (26.76%) and the least are those with stage I (2.22%).[16]

Peter F Rambau *et al*. also showed in their study that stage III constitute the majority (64%), followed by stage II (20.7%), stageVI (10.7%) and the least are those with stage I (4.4%). [25]

The higher percentage of stage II in our study can be explained by the early detection of the disease due to presence of breast clinics throughout each government of the country which cost free for the examiner doctors and all necessary imaging and laboratory investigation.

This study shows that (61.76%) were estrogen receptor positive, (41.18%) were progesterone receptor positive and (33.82%) express HER2 receptor.

Our results with regard to hormone receptor status are agreed with Raghdah *et al*. who showed in their study that estrogen receptor status constitute the majority (46.67%), followed by progesterone receptor (42.22%), and the least is HER2 receptor status (22.22%).[16]

In contrast, our results are disagreed with these of M. Fadhil *et al*. who showed in their study that positivity for progesterone receptors constitute the largest percentage (44.44%), followed by estrogen receptors (37.7%), but agree with the same study with regard to the percentage of patients who express positive for, for HER2 receptors(31.1%). [17]

Conclusion: This study revealed that the incidence of breast cancer was higher within the fifth decade of age. Tumor sized 2‑5 cm in diameter constitute the majority of the patients. The majority had positive axillary lymph node metastasis. Most cases were detected as having stage II disease. The hormone receptor status was mainly ER positive.

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