

Original article

Histopathological Spectrum of Breast Malignancies: A Retrospective Study at Tobruk Medical Center, Tobruk, Libya

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Email: rihab.absaat@tu.edu.ly**Keywords:***Histopathology, Breast malignancies, Retrospective study, Tobruk Medical Centre.***ABSTRACT**

Breast cancer is the most common malignancy among women globally, and its incidence is rising, especially in developing countries. Histopathological study stands as the definitive method for diagnosis confirmation, subtype classification, and prognosis evaluation. This study aims to classify breast cancer cases based on histopathological type and tumor grade, and to correlate these findings with patients' age. A retrospective analytic- observational study was conducted in Tobruk Medical Centre using histopathological reports of all breast tissue specimens (lumpectomies, mastectomies, and biopsies), with confirmed diagnosis of malignancy in 32 patients. Data on patients' age, sex, site of lesion, size of tumor, type of malignancy, and tumor grade were collected and analyzed using SPSS 25. The mean age of the patients was 47.3 ± 9.9 years (range: 29 -63 years), with the highest proportion of cases in our hospital-based sample observed in the age groups (40–49) and (50–59) years. Regarding the histopathological profile, invasive ductal carcinoma was the most frequently reported type, accounting for 75 % of the cases. In terms of tumor differentiation, Grade II was the most common, accounting for 93.3 %. Statistical analysis revealed a non-significant correlation between patient age and both histopathological type and tumor grade ($p > 0.05$) for each. In conclusion, breast malignancy was frequently observed among younger age groups in our study population, with more than 56% of our cases diagnosed before the age of 50 years, while invasive ductal carcinoma IDC was the most common malignant subtype, and most cases presented as T2 and moderately differentiated breast cancer. Hence, these findings highlight the need for promoting early screening and improving histopathological diagnostic tools and management services in Libya.

Introduction

Breast cancer is the most common malignancy among women globally, and its incidence is rising, especially in developing countries with approximately 2.3 million new cases each year. Incidence varies widely, from 40 per 100,000 in parts of Asia and Africa to more than 80 per 100,000 in affluent regions such as Australia and Western Europe [1,2]. Breast malignancy was the most common cancer in women in 164 countries out of 186 in 2024, and caused an estimated 694 000 deaths worldwide in the same year [3]. The burden of breast cancer in women, estimated by global incidence, mortality, and economic costs, is substantial and on the increase [4].

The Libyan breast cancer incidence was evaluated as 18.8 to 20.7 per 100,000 female individuals according to previous studies, but the precise number of cancer cases diagnosed annually in Libya is unknown since a complete registry has not yet been established in the majority of regions [5]. Compared to Western countries, breast cancer in North Africa is characterized by advanced stage at presentation, an earlier age, and more aggressive subtypes [6]. Approximately 80% of breast cancers occur in women with no specific risk factors other than age [3].

Histopathological study stands as the definitive method for diagnosis confirmation, subtype classification, and prognosis evaluation, including tumor grading by the Nottingham system [1]. In worldwide data, invasive ductal carcinoma accounts for 70-92% of cases, followed by less common forms like lobular (5-10%), mucinous, and metaplastic carcinomas [7]. Patients with breast cancer have a 5-year survival rate of about 90%. However, a patient's likelihood of surviving 5 years declines to 20% once it metastasizes [8]. Multiple prognostic factors have been described; those in standard use today include axillary lymph node metastases. Tumor size at presentation is another strong predictor of outcome. In addition to histologic subtype, ER and PR status, and histologic grade, which is a major determinant of disease recurrence and overall survival [9].

Studying the histopathological spectrum helps in understanding the relative frequency of different breast malignant types, grades, and associated features in a given population.

Methods

Hospital-based observational retrospective study of 32 cases. Histopathological reports of malignant breast lesions were retrieved from the histopathology department at Tobruk Medical Center during the period (2014-2020)

Inclusion criteria of research subjects

Histopathological reports of all breast tissue specimens (lumpectomies, mastectomies, and biopsies), with confirmed diagnosis of malignancy.

Exclusion criteria of research subjects

Incomplete records

Required research information/data

Patient's age, sex, site of lesion, size of tumor, type of malignancy, and tumor grade.

Data Analysis

Data analysis was conducted using SPSS version 25. Variables were presented as frequencies, percentages, and mean $\pm$ standard deviation (SD). Fisher's exact test was used to compare the distribution of tumor grades across different age categories; The level of significance was considered as a p-value of <0.05 . An independent-samples t-test was performed to compare mean age between the two histopathological tumor types. A p-value of <0.05 was considered statistically significant.

RESULTS

The study included 32 patients diagnosed with breast malignancies. The mean age of patients was 47.3 ± 9.9 years, with an age range of 29 to 63 years.

Table 1. Demographic Characteristics of Patients (n = 32).

AGE GROUP	Frequency	Percent	Valid Percent	Cumulative Percent
20-29	1	3.1	3.1	3.1
30-39	6	18.8	18.8	21.9
40-49	11	34.4	34.4	56.3
50-59	11	34.4	34.4	90.6
>60	3	9.4	9.4	100
TOTAL	32	100	100	

In the current study, most of the breast cancers (n = 19/32; 59.4%) occurred in the right breast, followed by the left breast (n = 12/32; 37.5%).

Table 2. Laterality of Breast Malignancies.

Site of Lesion	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	RIGHT BREAST	19	59.4	61.3
	LEFT BREAST	12	37.5	38.7
	Total	31	96.9	100.0
Missing	System	1	3.1	
Total		32	100.0	

The most common histopathological type was invasive ductal carcinoma, accounting for 75% of cases.

Table 3. Histopathological Types of Breast Malignancies.

Histopathological types	Frequency	Percent	Valid Percent	Cumulative Percent
IDC	24	75.0	75.0	75.0
ILC	1	3.1	3.1	78.1
IMC	3	9.4	9.4	87.5
DCIS	3	9.4	9.4	96.9
SQ.CC	1	3.1	3.1	100.0
Total	32	100.0	100.0	

The cases were graded using the Nottingham grading system. Among the 32 cases, grade II was the most prevalent (n = 28/30; 93.3%), while grades I and III each accounted for 3.3% of the cases.

Table 4. Histological Grade Distribution.

Histological Grade	Frequency (n)	Percentage (%)	Valid Percent(%)	Cumulative Percent
GRADE I	1	3.1	3.3	3.3
GRADE II	28	87.5	93.3	96.7
GRADE III	1	3.1	3.3	100.0
Total	30	93.8	100.0	
Missing	2	6.3		
Total	32	100		

"The mean age distribution did not differ significantly between patients diagnosed with IDC and those with other tumor types (p > .05)."

Table 5. Age Distribution According to Histopathological Type.

Histopathological Type	Number of Cases (n)	Mean Age $\pm$ SD	Minimum Age	Maximum Age	p value
Invasive ductal carcinoma	24	47.9 $\pm$ 6.6	37	63	0.16
Other types	8	43.2 $\pm$ 11.3	29	60	0.30

Association Between Histological Grade and Age Group: p -value of 0.724; (p > 0.05) means no significant statistical association between age groups (<50 years vs. $\geq$ 50 years) and tumor grades (Grade I, II, and III).

Table 6. Association Between Histological Grade and Age Group

Age Group (years)	Grade I n (%)	Grade II n (%)	Grade III n (%)	Total	p - value
<50 years	1	15	0	16	0.724
$\geq$ 50 years	0	13	1	14	

The most common tumor size category observed in our study cohort was >2 cm; $\leq$ 5 cm or T2, accounting for 50% (n=16) of the total cases. Followed by T1 or tumor size of $\leq$ 2 cm, accounting for 34.4% (n=11).

Table 7. Tumor Size at time of presentation.

Tumor Size Category	Frequency	Percent	Valid Percent	Cumulative Percent
$\leq$ 2 cm	11	34.4	34.4	34.4
>2 cm; $\leq$ 5 cm	16	50.0	50.0	84.4
>5 cm	5	15.6	15.6	100.0
Total	32	100.0	100.0	

Discussion

Breast cancer remains the most common cancer affecting women worldwide and represents a major public health challenge, particularly in developing countries where late presentation and management in addition to limited screening programs[2]. The current retrospective study evaluated the histopathological spectrum of breast malignancies diagnosed at Tobruk Medical Centre over the study period and also evaluated the size and grade of the tumor at the time of presentation. In addition, it correlated histopathological subtypes with the patient's age.

The current study revealed that the majority of cases (n = 18/32; 56.3%) were diagnosed in women below 50 years old, only one case reported before the age of thirty (29 years) and diagnosed as invasive medullary carcinoma (IMC). The mean age of patients diagnosed with breast cancer was 47.3 $\pm$ 9.9 years, which was in accordance with the Arabic average as reported by the Saudi Arabia Cancer Incidence Report; the mean age of breast cancer patients in Saudi Arabia is 49 years, whereas in the USA, the mean age of patients is 61 years[10].

Our study found that the majority of cases occurred in the (40-49) and (50-59) age groups. This finding is comparable to several regional and international studies which reported that breast cancer commonly affects women in the fourth and fifth decades of life (between 40 and 60 years of age) in developing countries[4,10], highlighting the relatively younger age at time of presentation in Middle Eastern and South Asian populations compared to Western countries.

In the current study, the majority of breast cancer (n = 19/32; 59.4%) occurred in the right breast, followed by the left breast (n = 12/32; 37.5%), and no malignant cases were bilateral. This finding aligns with a study conducted in Addis

Ababa reported that the right breast was the most involved side. In contrast to our study, studies conducted in western Libya, Egypt, and Saudi Arabia reported that the left breast was the most commonly involved side[8,10,12].

Invasive ductal carcinoma (IDC) was the most common histopathological type of carcinoma in our study, accounting for 75% of cases, (n = 24/32; 75%), This observation is consistent with the global literatures, where IDC represents about 70–80% of all breast malignancies[10,11,13]. Studies conducted in Libya, and Saudi Arabia similarly demonstrated that IDC is the predominant breast cancer subtype[8,10]. The high prevalence of IDC may be related to its aggressive biological behavior and its overall higher incidence compared with other histological types.

The second most common histopathological subtypes in the current study were invasive medullary carcinoma (IMC) and ductal carcinoma in situ (DCIS) each accounted for (n=3/32;9.4%). Only one case was reported as Invasive lobular carcinoma represents (n=1/32). One case was diagnosed with primary squamous cell carcinoma (Sq.cc) (n=1/32), 59 years old postmenopausal patient, presented with a right breast mass of about 2.5cm in size. squamous cell carcinoma is a rare very aggressive tumor with poor prognosis and accounts for less than 0.1% of all breast malignancies[14].

In our study, among the 32 malignant cases (2 missing cases), grade II was the most prevalent at time of presentation (n = 28/30; 93.3%), while grades I and III accounted for 3.3% each. Half of the cases (n = 15/30; 50%) diagnosed before the age of 50 years were grade II. Grade II tumors usually indicate intermediate biological aggressiveness and may reflect delayed presentation and diagnosis. Higher-grade malignancies are often associated with increased metastatic potential and poorer prognosis [8,12]. Similar findings have been documented in several studies where moderately differentiated tumors predominated [12].

Regarding the correlation between patient age and both histopathological types and tumor grades (Grade I, II, and III), there was no significant statistical association (p-value > 0.05), indicating that the observed distribution of histopathological types/tumor grades across the age categories does not differ from random expectations. This finding is consistent with a recent study conducted by Khan et al. [15], which also demonstrated that no significant statistical association between patient age and the histological grade of breast cancer (p = 0.237). Furthermore, Albrektsen et al. [16] reported that the distribution of primary histopathological types is independent of the patient's age. Collectively, these findings suggest that while age is a critical factor for tumor incidence, the histopathological type and tumor differentiation are likely determined by internal molecular signaling and genetic factors.

Conclusion

This study demonstrated that breast malignancy cases in our hospital-based sample were predominantly observed among younger age groups. More than 56% of the cases were diagnosed in women younger than 50 years. Our study also revealed that invasive ductal carcinoma IDC was the most common malignant subtype, and most cases presented as T2 and moderately differentiated (Grade II) breast cancer. Hence, these findings highlight the need for regular breast cancer awareness programs, promoting early screening, and improving histopathological diagnostic tools and management services are essential steps toward reducing disease burden and improving patient outcomes in Libya.

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Ethical Approval

Ethical approval for this retrospective study was obtained from the University of Tobruk Ethics Committee (No: 009.H.26.01, Date: [09/Apr/2026]. Informed consent was waived due to the retrospective design.

Conflicts of Interest

The authors declares no conflicts of interest.

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