

## Clinical Presentation of Sudanese Patients with Breast Cancer

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### Abstract

**Background:** Breast cancer with advanced stages at a young age is a significant new challenge in Sudan. The purpose of this study was to determine the most common presentations of breast cancer patients in western Sudan. **Methodology:** For this retrospective descriptive investigation, materials for 183 breast cancer patients were obtained from two histopathology centers (Kordofan histopathology center and El-Obeid International Hospital). A full coverage sample was collected, spanning from January 2019 to May 2024. All data pertaining to the patient's essential identifying, clinical, and histological data were gathered. **Results:** This study looked at 183 breast cancer patients (177 (96.7%) women and 6 (3.3%) men). Their ages ranged from 20 to 90, with a mean  $\pm$  standard deviation of  $50.78 \pm 13.6$  years. The majority of participants were aged 41-50 years, followed by  $\geq 61$  and 51-60 years, with 50/183 (27%), 43 (23%), and 35 (19%), respectively. For clinical appearance, the most common skin change was unremarkable, followed by ulcerated skin change, which accounted for 127/183 (69%) and 48 (26%) respectively. **Conclusion:** Breast cancer with advanced stages upon presentation is common in Sudan. The majority of patients presented at a younger age and had distinct initial manifestations.

**Keywords:** Breast cancer, clinical presentation, histopathology, Sudan.

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## INTRODUCTION

Breast cancer is the most prevalent cancer among women and is the second greatest cause of death for women globally [1, 2]. According to a recent research by the International Agency for Research on Cancer (IARC), the worldwide occurrence of breast cancer in females is 11.6%.

Several risk factors have been identified as potential causes of breast cancer, including hormonal factors, genetic factors such as BRCA1 and BRCA2, lifestyle choices, reproductive factors, age, and environmental factors [4].

Increased risk for breast cancer may be indicated by factors such as endogenous estrogen exposure, proliferative benign breast disease, breast density, and family history. Screening mammography can help diagnose breast cancer at an early stage, leading to a reduction in breast cancer-related deaths. However, the overall advantages of screening mammography may differ depending on a person's age. Evaluating a patient's specific breast cancer risk can help inform decisions about breast cancer screening. Adopting healthy practices can potentially lower the risk of breast cancer for all women. Certain women who have a higher likelihood of developing breast cancer may find it

advantageous to take drugs that can help reduce their risk. The utilization of screening measures is not optimum, particularly among women who do not have health insurance [5].

The majority of women with breast cancer who have symptoms experience a very short period of time between when they notice symptoms and when they receive a diagnosis. However, a significant minority of women have a longer period of time between symptom recognition and diagnosis. Unusual manifestations (including symptoms other than a lump in the breast) may be the cause. The most common occurrence (83%) was the presence of a lump in the breast, followed by other breast symptoms such as nipple abnormalities (7%) and breast discomfort (6%). Non-breast symptoms, such as back pain (1%) and weight loss (0.3%), were less frequently reported.

A higher percentage of women experiencing symptoms other than a breast lump, as well as those experiencing both a lump and other symptoms, waited 90 days or more before seeking medical assistance, in comparison to those with only a breast lump (15% and 20% versus 7% respectively). The results of the quantile regression analysis showed that even after controlling for age and ethnicity, there were still significant disparities in the patient interval. However, for the majority of women, there was not much variance in the primary care interval.

Among females in Sudan, breast cancer is the most common kind of cancer. The incidence rate of breast cancer was 3.9 incidences per 100,000 female individuals. The spatial analysis identified the States of Nile River, Northern, Red Sea, White Nile, Northern, and Southern Kordofan in Sudan as high-risk locations for breast cancer [7]. As a result of the lack of screening and early detection programs, the majority of patients reported with advanced stages of the disease. The current work aims to determine the most prevalent symptoms and manifestations of breast cancer in the western Sudan, where there is a lack of clear diagnostic recommendations for the disease in rural areas.

## MATERIALS AND METHODS

This study is a retrospective descriptive analysis that involved retrieving materials from 183 breast cancer patients. The materials were obtained from two institutes that provide histopathology services, namely the Kordofan histopathology center and the El-Obeid

International hospital. The sample included comprehensive coverage of data, encompassing samples from January 2019 to May 2024. Obtained data includes patient's key identity data, clinical information, and histopathology data.

### Statistical Analysis

The collected data was organized into a datasheet and subsequently inputted into a computer software program (SPSS) for analysis. The analysis involved determining frequencies, cross-tabulations, and proportions.

### Ethical consideration

Consent was received from the authorities at Kordofan histopathology center and El-Obeid International hospital to access the sample.

### Ethical Approval:

The protocol of this study was approved from the Human Ethics committee at Prof Medical Research consultancy center. Approval Number: 0010/MRCC.6/24.

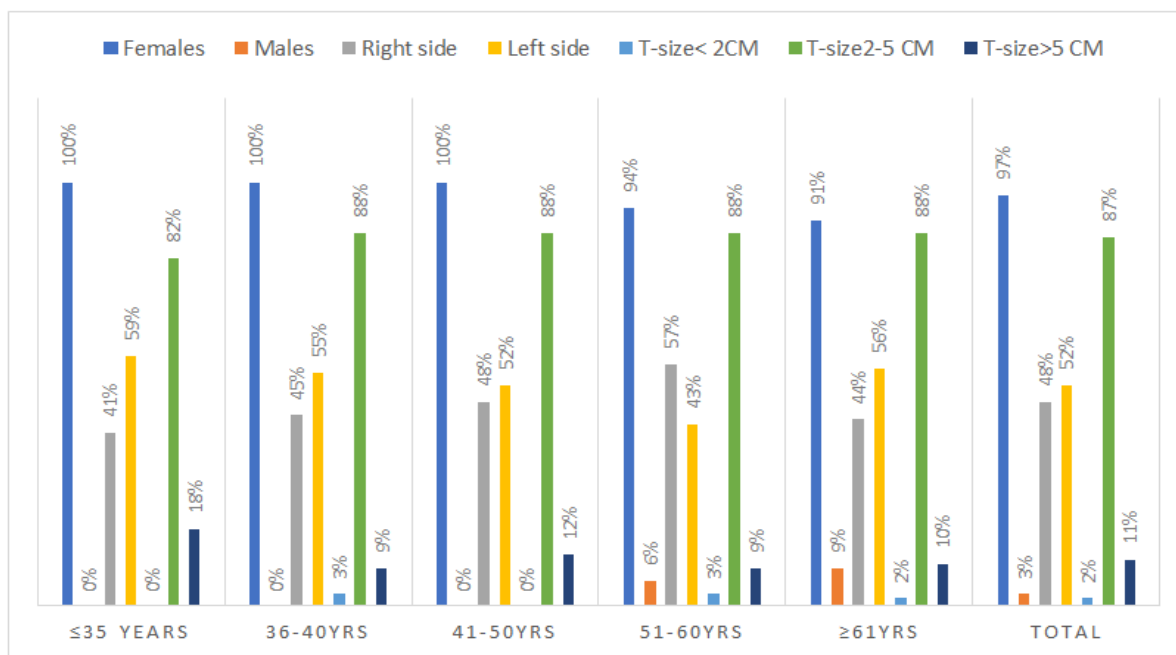
## RESULTS

This study examined a total of 183 individuals diagnosed with breast cancer, consisting of 177 females (96.7%) and 6 males (3.3%). The ages of the individuals range from 20 to 90 years, with an average of 50.78 years and a standard deviation of 13.6 years. The majority of participants fell within the age range of 41-50 years, followed by those aged 61 years or more and 51-60 years, accounting for 27% (50 out of 183), 23% (43 out of 183), and 19% (35 out of 183) correspondingly. Among the group of 6 guys, 67% (4 out of 6) were aged 61 years or older, while the remaining 33% (2 out of 6) were aged between 51 and 60 years. Out of the total of 183 individuals, the majority (95/183, 51%) had lesions on the left side, while the remaining 86 (49%) had lesions on the right side. The allocation of patients according to the location of their lesions was very consistent across various age groups. Nevertheless, when computing the ratios within complete age cohorts, several discrepancies in the proportions become apparent. Approximately 87% of the patients, specifically 160 out of 183, had lesion sizes ranging from 2 to 5 cm. The remaining 11% of patients, totaling 20 individuals, had lesion sizes greater than 5 cm. The average tumor size at the time of diagnosis, together with the standard deviation, was  $4.97 \pm 1.76$  cm. The size of the tumors ranged from 1.00 to 14.5 cm, as shown in Table 1 and Figure 1.

**Table 1: Distribution of patients by age, lesion site and tumor size**

Variable	≤35 years	36-40	41-50	51-60	≥61	Total
<b>Sex</b>						
Females	22	33	50	33	39	177
Males	0	0	0	2	4	6
Total	22	33	50	35	43	183

Variable	≤35 years	36-40	41-50	51-60	≥61	Total
<b>Lesion site</b>						
Right	9	15	23	20	19	86
Left	13	18	25	15	24	95
Total	22	33	48	35	43	181
<b>Tumor size</b>						
< 2CM	0	1	0	1	1	3
2-5 CM	18	29	44	31	38	160
>5 CM	4	3	6	3	4	20
Total	22	33	50	35	43	183



**Figure 1: Description of the patients by age, lesion site and tumor size**

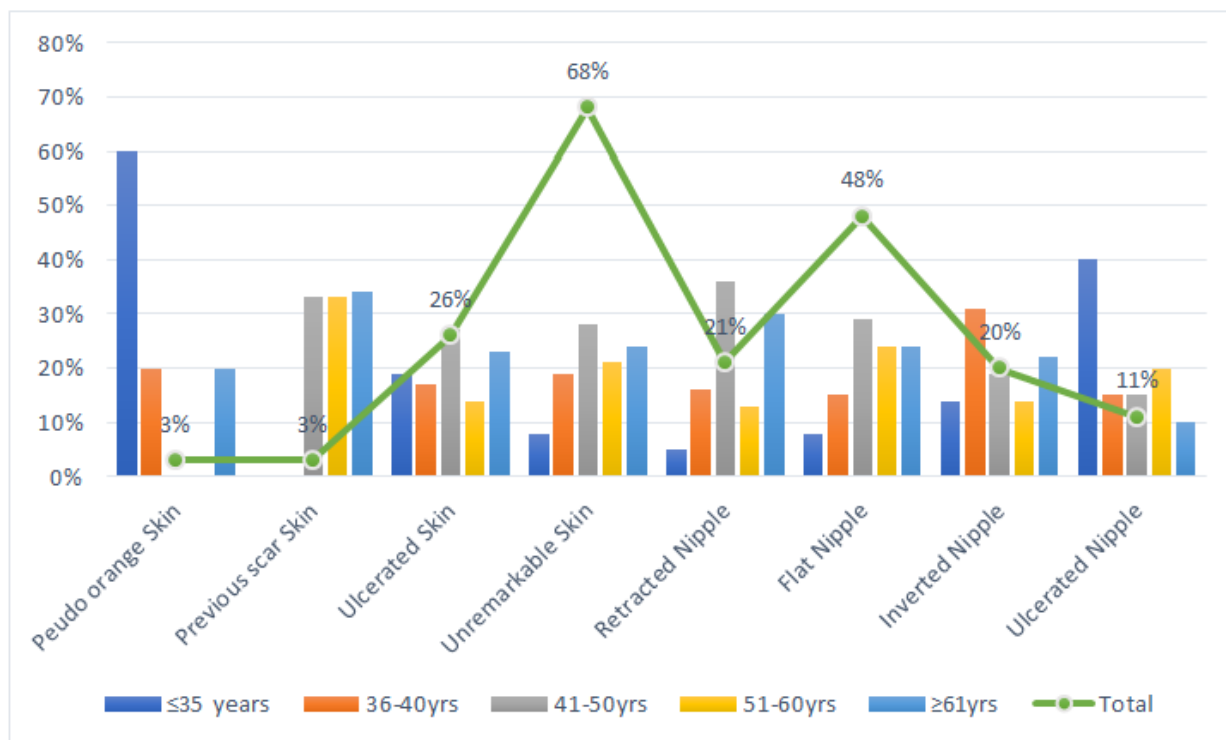
The most common clinical presentation involved unremarkable skin changes, followed by ulcerated skin changes, accounting for 127 out of 183 cases (69%) and 48 cases (26%) respectively. The majority of patients with normal skin alterations were between the ages of 41 and 50, followed by those aged 61 and above, and 51 to 60 years, accounting for 36 out of 127 (28%), 30 (24%), and 27 (21%) respectively. The majority of individuals with ulcerated skin alterations

were in the age group of 41-50 years, followed by those aged 61 years or more and those aged 35 years or younger, accounting for 27%, 22%, and 18% respectively, per capita.

The study found that out of a total of 183 nipple modifications, 88 (48%) were flat, 39 (21%) were retracted, 36 (19.6%) were inverted, and 20 (11%) were ulcerated, as shown in Table 2 and Figure 2.

**Table 2: Distribution of patients by age, skin and nipple changes**

Variable	≤35 years	36-40	41-50	51-60	≥61	Total
<b>Skin changes</b>						
Pseudo orange	3	1	0	0	1	5
Previous scar	0	0	1	1	1	3
Ulcerated	9	8	13	7	11	48
Unremarkable	10	24	36	27	30	127
Total	22	33	50	35	43	183
<b>Nipple changes</b>						
Retracted	2	6	14	5	12	39
Flat	7	13	26	21	21	88
Inverted	5	11	7	5	8	36
Ulcerated	8	3	3	4	2	20
Total	22	33	50	35	43	183



**Figure 2: Description of patients by age, skin and nipple changes**

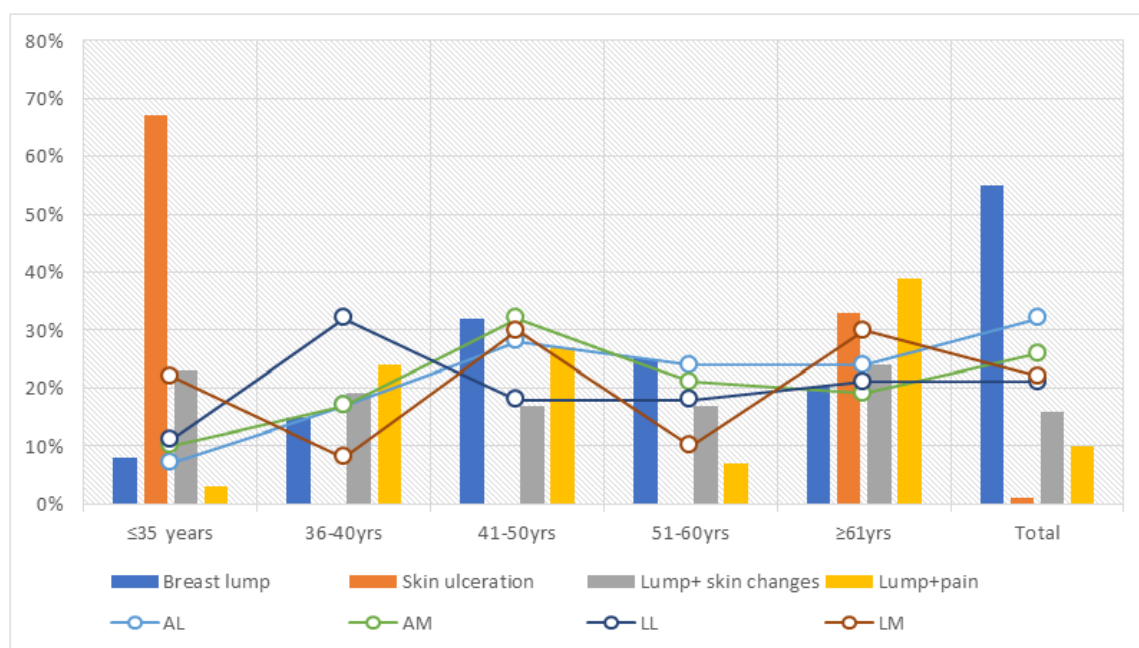
Table 3 and Figure 3 provide a concise overview of the distribution of the study individuals based on their age, lesion characteristic, and tumor quadrant. The most frequent presentation was a breast lump, followed by a lump with skin changes and a lump with discomfort, accounting for 95 out of 174 cases (54.5%), 47 cases (27%), and 29 cases (16.6%), respectively. The majority of patients in the age group of 35 years or younger had both a lump and skin alterations,

accounting for 50% of the total. Conversely, patients in the other age groups predominantly presented with a breast lump, as shown in Table 3 & Figure 3. In relation to tumor quadrant, the majority of patients exhibited Anteriolateral quadrant, followed by Anteriomedial and Lower Medial quadrants, accounting for 58 out of 183 patients (32%), 47 patients (26%), and 40 patients (22%), respectively, as shown in Table 3 and Figure 3.

**Table 3: Distribution of patients by age, lesion features, and tumor quadrant**

Variable	≤35 years	36-40	41-50	51-60	≥61	Total
<b>Lesion Features</b>						
Breast lump	8	14	30	24	19	95
Skin ulceration	2	0	0	0	1	3
Lump+ skin changes	11	9	8	8	11	47
Lump+pain	1	7	8	2	11	29
Total	22	30	46	34	42	174
<b>Tumor quadrant</b>						
AL	4	10	16	14	14	58
AM	5	8	15	10	9	47
LL	4	12	7	7	8	38
LM	9	3	12	4	12	40
Total	22	33	50	35	43	183

AL:Anteriolateral – AM: Anteriomedial. – LL: Lower Lateral. – LM: Lower Medial.



**Figure 3: Description of patients by age, lesion features, and tumor quadrant**

## DISCUSSION

While breast cancer is the most prevalent form of cancer in women globally, its occurrence in Sudan is particularly worrying. The nation characterized by limited healthcare resources and ongoing violent conflict saw a significant prevalence of many types of cancer, with a special emphasis on breast cancer. Most breast cancer patients typically appear with advanced stages of the illness at a relatively early age. Therefore, our ongoing inquiry aims to evaluate the typical manifestations of this particular group of patients in Sudan.

The results of the present investigation revealed that, in addition to the breast lump, the majority of patients exhibited a lump together with alterations in the skin. Several skin alterations have been documented as being linked to neoplastic or paraneoplastic cutaneous dermatoses. The alteration of the skin is a common occurrence when presenting with metastatic cutaneous breast masses. The predominant paraneoplastic cutaneous signs that indicate the presence of breast cancer are erythema gyratum repens, acquired ichthyosis, dermatomyositis, multicentric reticulohistiocytosis, and hypertrichosis lanuginosa acquisita. Mammary Paget's disease and Cowden syndrome typically have dermatologic manifestations. The presence of these skin manifestations plays a crucial role in diagnosing both new and recurring cases of breast cancer [8].

In this study, around 17% of the patients experienced pain in the lump. Prior publications have reported that discomfort is typically observed in less than 20% of breast cancer patients.

Out of the 1972 women who experienced breast pain, the occurrence of breast cancer was 0.4%, while each of the three other clinical groups had a breast cancer incidence of approximately 5%. Referring to the presence of a 'breast lump', the odds ratio (OR) for women who were referred with breast pain and were found to have breast cancer was 0.05 (95% confidence interval = 0.02 to 0.09,  $P < 0.001$ ) [9].

Regarding tumor quadrant, the majority of instances were observed in the anterior-lateral (AL) quadrant, with the anterior-medial (AM) quadrant being the second most common location. Breast cancer most frequently occurs in the upper outer quadrant, followed by the upper inner quadrant. The lower outer and lower inner quadrants are the third most prevalent sites for breast cancer [10]. Patients with cancers located in the inner or both quadrants had a poorer 5-year disease-free survival (DFS) rate compared to those with tumors in the outer quadrant (67.7% vs. 83.4%, respectively; hazard ratio [HR]=1.941,  $p=0.034$ ). Furthermore, a nodal ratio greater than 25% was found to be an independent and unfavorable prognostic predictor for disease-free survival (hazard ratio = 3.276;  $p < 0.001$ ) [11].

Approximately 87.4% of the patients included in this study exhibited tumor sizes ranging from 2 to 5 cm, whereas approximately 11% had tumor sizes beyond 5 cm. This indicates that the majority of people who come in for medical attention have reached a stage of the disease that is between mild and advanced. These factors could be ascribed to the lack of screening and early detection initiatives. The size of a tumor is a crucial factor in determining the appropriate treatment approach, influencing the decision-making process over whether to proceed with breast surgery or administer neoadjuvant



chemotherapy. Imaging techniques are crucial in assessing the size of breast tumors during the diagnosis [12]. The incidence of advanced-stage diagnosis (72.9%) among breast cancer patients seen in this study closely aligns with the findings of earlier studies conducted in Nigeria and other developing nations. A study conducted in East Africa revealed that 70.4% of the breast cancer patients observed presented at an advanced stage [13, 14].

The results of the present investigation indicated that a significant proportion of patients were under the age of 45. While the risk of breast cancer (BC) does grow with age, it is worth noting that BC in younger women tends to be more aggressive and has a higher mortality rate compared to older women. We analyze the genetic makeup of breast cancers in women of a younger age group. Breast cancers (BCs) in young women have been found to be linked to reduced survival rates and more aggressive genomic characteristics. These characteristics include mutations in TP53 and BRCA1, as well as amplifications in ERBB2 and CDK12 [15]. Overall, it can be concluded that there is a high incidence of advanced stage breast cancer in Sudan. The majority of individuals exhibited apparent early symptoms at a younger age.

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