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Original article

Barriers to Early Diagnosis of Breast Cancer and Their Impact on Stage at Presentation: A Cross-Sectional Study from Tobruk, Libya

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Breast Cancer, Delayed Diagnosis, Late-Stage Presentation, Libya, Early Detection.

ABSTRACT

Breast cancer remains a leading cause of cancer-related mortality among women globally, with particularly poor outcomes in low- and middle-income countries where delayed diagnosis is common. This study investigates the impact of delayed diagnosis on disease stage and treatment outcomes among women with breast cancer in Tobruk City, Eastern Libya. A cross-sectional study was conducted at Tobruk Medical Centre from January 2018 to January 2021, involving 107 patients with newly diagnosed breast cancer. Data were collected using structured questionnaires covering demographic characteristics, clinical history, and tumor features. Delayed diagnosis was categorized according to patient, provider, and health system factors. Statistical analysis was performed using EPI Info version 7.2 and SPSS version 23. The majority of patients (75.7%) experienced a delay of more than three months before seeking diagnosis, with a mean delay of nine months. Significant associations with prolonged patient delay were observed among women aged ≥42 years (85.9%, p=0.0001), married women (80.7%, p=0.0243), illiterate women (82.7%, p=0.0406), rural residents (88.7%, p=0.0002), and those living >30 km from health facilities (84.5%, p=0.0029). Late-stage diagnosis (stage III/IV) was observed in 66.4% of patients and was significantly associated with delays exceeding three months (84.5%, p=0.0028). The most common reasons for delayed presentation included lack of awareness of early symptoms (83.2%), financial constraints (71.0%), use of traditional/spiritual treatments (67.3%), and lack of trust in healthcare providers (64.5%). Breast self-examination practice was low (12.1%), with most abnormalities detected accidentally (67.3%). Delayed diagnosis of breast cancer is highly prevalent in Eastern Libya, with substantial consequences for disease stage at presentation. Addressing this issue requires comprehensive public awareness campaigns, improved access to healthcare facilities in rural areas, and educational initiatives promoting breast self-examination and early help-seeking behaviors.

Introduction

Breast cancer represents a major global health challenge, particularly affecting women across all socioeconomic strata. The disease burden is disproportionately distributed, with Africa experiencing the highest breast cancer mortality rates worldwide, and incidence continuing to rise across the continent [1, 2]. Alarmingly, nearly half of all breast cancer cases and deaths occur in low- and middle-income countries (LMICs), where healthcare systems face substantial resource constraints [3]. Early detection remains the cornerstone of improved breast cancer outcomes, as timely diagnosis significantly enhances survival rates and reduces mortality. However, healthcare systems in LMICs struggle to manage the growing burden due to multiple interconnected factors, including limited community awareness, inadequate diagnostic infrastructure, and insufficient treatment services [4,5].

In high-income countries, breast cancer is frequently diagnosed at early stages with favorable prognoses, in stark contrast to the situation observed across much of Africa [6]. Delayed diagnosis in breast cancer can be attributed to both patient-related and health system-related factors. Two comprehensive systematic reviews conducted in Africa identified consistent barriers to timely diagnosis, including limited knowledge of disease, misinterpretation of symptoms, reliance on traditional medicine, lack of trust in healthcare systems, and poor access to care [7, 8]. In sub-Saharan Africa, the interval between symptom recognition and initial healthcare presentation ranges from less than three months to over six months. Contributing factors include low educational attainment, poor breast cancer awareness, unfamiliarity with early detection methods, the presence of painless symptoms that are not perceived as serious, fear of diagnosis or treatment consequences, financial limitations, and geographic barriers to healthcare access [9].

Understanding the patterns and determinants of delayed diagnosis is essential for developing targeted interventions to reduce the burden of advanced-stage breast cancer. This study aims to investigate how delayed diagnosis affects disease stage and treatment outcomes among women with breast cancer in Tobruk City, Eastern Libya, providing evidence to inform local and regional strategies for early detection.

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Patients and Methods

Study Design, Area, and Population

This cross-sectional study was conducted at Tobruk Medical Centre in Eastern Libya between January 2018 and January 2021. The hospital serves a catchment population exceeding 300,000 individuals and provides comprehensive cancer care services, including diagnostic evaluation, surgical intervention, and chemotherapy for breast cancer patients. The study included 107 newly diagnosed breast cancer patients who presented during the study period.

Sample Size, Measurements, and Data Collection Procedures

All newly diagnosed breast cancer patients who consented to participate were enrolled consecutively. Data were collected using structured questionnaires administered through face-to-face interviews. The questionnaire captured: Introductory and demographic information: age, residence, marital status, educational level, occupation, and distance to health facility. Patient history: menopausal status, family history of breast cancer, history of previous breast problems, comorbidities, and breast self-examination practice. Tumor characteristics: presenting symptoms, method of symptom detection, reasons for late presentation, axillary lymph node status, metastatic status, tumor type, tumor size, grade, and stage. Treatment information: treatment modalities received. Delayed diagnosis was categorized into three types: Patient delay: time from symptom recognition to first healthcare consultation. Provider delay: time from first consultation to diagnosis. Health system delay: systemic barriers affecting timely diagnosis. For the purpose of this analysis, patient delay exceeding 90 days (three months) was classified as prolonged delay.

Data Processing and Analysis Procedures

Data were coded and entered into EPI Info version 7.2, then exported to SPSS version 23 for statistical analysis. Descriptive statistics were employed to characterize the demographic, socioeconomic, and clinical profiles of study participants using frequencies, percentages, and summary measures. Associations between patient characteristics and delay status were assessed using chi-square tests, with statistical significance set at $p < 0.05$.

Results

Socio-Demographic Characteristics of Breast Cancer Patients

(Table 1) presents the socio-demographic characteristics of the 107 breast cancer patients included in this study.

Table 1. Socio-Demographic Characteristics of Breast Cancer Patients (N=107)

Characteristic	Category	Frequency (n)	Percentage (%)
Age Group	>42 years	78	72.9
	≤42 years	29	27.1
Residence	Rural	62	57.9
	Urban	45	42.1
Marital Status	Married	83	77.6
	Single	24	22.4
Educational Status	Illiterate	52	48.6
	Primary education	41	38.3
	Secondary education and above	14	13.1
Occupational Status	Homemaker	64	59.8
	Government employee	31	28.9
	Other occupations	12	11.3
Distance to Health Facility	>30 km	71	66.4
	≤30 km	36	33.6

Clinical Characteristics of Breast Cancer Patients

(Table 2) summarizes the clinical characteristics of the study population.

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Table 2. Clinical Characteristics of Breast Cancer Patients (N=107)

Characteristic	Category	Frequency (n)	Percentage (%)
Menopausal Status	Pre-menopausal	63	58.9
	Menopausal	16	14.9
	Post-menopausal	28	26.2
Family History of Breast Cancer	No	78	72.9
	Yes	29	27.1
History of Breast Problems	No	61	57.0
	Yes	46	43.0
Breast Self-Examination Practice	No	94	87.9
	Yes	13	12.1
History of Comorbidities	No	94	87.9
	Yes	13	12.1
Use of Traditional Treatment	Yes	94	87.9
	No	13	12.1

Presenting Symptoms and Detection Methods

(Table 3) shows the presenting chief complaints reported by patients, while Table 4 presents the methods by which breast abnormalities were detected.

Table 3. Presenting Chief Complaints of Breast Cancer Patients (N=107)

Chief Complaint	Frequency (n)	Percentage (%)
Breast lump	98	91.6
Axillary lump	9	8.4
Painful ulcer	43	40.2
Other complaints (nipple retraction, discharge, skin changes)	6	5.6

Note: Multiple symptoms were present in some patients.

Table 4. Method of Detection of Breast Abnormalities (N=107)

Detection Method	Frequency (n)	Percentage (%)
Accidental detection	72	67.3
Detection during breastfeeding	20	18.7
Breast self-examination	8	7.5
Discharge or pain	7	6.5

Reasons for Late Presentation

(Table 5) presents the multiple reasons cited by patients for delayed presentation to healthcare facilities.

Table 5. Patient-Reported Reasons for Late Presentation (Multiple Responses Allowed) (N=107)

Reason for Late Presentation	Frequency (n)	Percentage (%)
Lack of awareness about early symptoms	89	83.2
Financial problems	76	71.0
Use of traditional/spiritual treatments	72	87.9
Lack of trust in healthcare personnel	69	64.5
Related symptoms with other medical problems	42	39.3
The belief that breast cancer had no medical treatment	31	29.0
Fear of surgery or loss of breast	12	11.2

Note: Multiple reasons were reported by each patient.

Tumor Characteristics

(Table 6) presents the histopathological and clinical tumor characteristics of the study population.

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Table 6. Tumor Characteristics of Breast Cancer Patients (N=107)

Characteristic	Category	Frequency (n)	Percentage (%)
Axillary Lymph Node Status	Positive	94	87.9
	Negative	13	12.1
Tumor Metastases	No metastases	92	86.0
	Metastases present	15	14.0
Type of Tumor	Invasive ductal carcinoma	88	82.2
	Invasive lobular carcinoma	11	10.3
	Other (medullary, mucinous, metaplastic)	8	7.5
Tumor Size	≥5 cm	62	58.0
	>5 cm	45	42.0
Tumor Grade	Grade I	9	8.4
	Grade II	55	51.4
	Grade III	43	40.2

Tumor Stage at Diagnosis

(Table 7) shows the distribution of tumor stages at diagnosis. The overall magnitude of late-stage diagnosis (stage III and IV) was 66.4%.

Table 7. Tumor Stage at Diagnosis (N=107)

Tumor Stage	Frequency (n)	Percentage (%)
Stage I	13	12.1
Stage II	23	21.5
Stage III	52	48.6
Stage IV	19	17.8
Total Late Stage (III + IV)	71	66.4

Treatment Received

(Table 8) presents the treatment modalities received by breast cancer patients.

Table 8. Treatment Received by Breast Cancer Patients (N=107)

Treatment	Frequency (n)	Percentage (%)
Any treatment received	104	97.2
No treatment received	3	2.8

Table 9. Types of Treatment Received by Breast Cancer Patients (N=107)

Treatment Type	Frequency (n)	Percentage (%)
Surgery	99	92.5
Chemotherapy	85	79.4
Hormonal therapy	79	73.8
Radiotherapy and other systemic treatments	13	12.1

Note: Patients may have received multiple treatment modalities.

Patient Delay Analysis

Among the 107 patients for whom complete delay data were available, 75.7% experienced prolonged patient delay exceeding 90 days (three months). The mean patient delay was nine months, ranging from three weeks to three years. (Table 10) presents the factors associated with prolonged patient delay.

Table 10. Factors Associated with Prolonged Patient Delay (>90 Days)

Characteristic	Category	Prolonged Delay (n/N)	Percentage (%)	p-value
Age Group	≥42 years	67/78	85.9	0.0001
	<42 years	14/29	48.3	
Marital Status	Married	67/83	80.7	0.0243
	Single	14/24	58.3	
Educational Status	Illiterate	43/52	82.7	0.0406

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	Primary education	31/41	75.6	
	Secondary education and above	7/14	50.0	
Residence	Rural	55/62	88.7	0.0002
	Urban	26/45	57.8	
Distance to Health Facility	>30 km	60/71	84.5	0.0029
	≤30 km	21/36	58.3	
History of Breast Problems	No	51/61	83.6	0.0281
	Yes	30/46	65.2	
Family History	No	65/78	83.3	0.0025
	Yes	16/29	55.2	
Comorbidities	No	59/67	88.1	0.0001
	Yes	22/40	55.0	
Tumor Stage	Late (III/IV)	60/71	84.5	0.0028
	Early (I/II)	21/36	58.3	

Discussion

This study provides critical insights into the challenges of early breast cancer diagnosis in Eastern Libya, revealing that delayed presentation is not merely a problem but the norm among affected women. The finding that 75.7% of patients waited more than three months before seeking diagnosis, with an average delay of nine months, aligns with patterns observed across sub-Saharan Africa, where delays ranging from less than three to over six months have been documented [9, 10]. This consistent pattern across African settings underscores the need for regionally coordinated approaches to early detection. The strong association between prolonged patient delay and advanced disease stage (84.5% of late-stage patients experienced delay >3 months) highlights the clinical consequences of delayed presentation. Late-stage diagnosis (stage III/IV) was observed in two-thirds of patients, representing a missed opportunity for less intensive treatment and improved outcomes. This pattern reflects the reality that when patients present late, curative treatment options become limited, and the burden of care intensifies for both patients and health systems [5].

Geographic factors emerged as powerful determinants of delay, with rural residents nearly twice as likely to delay care compared to urban residents, and women living more than 30 km from health facilities experiencing significantly longer delays. These findings are consistent with studies from other African countries [8,10] and reflect the compounding effects of transportation barriers, limited healthcare infrastructure in rural areas, and the absence of decentralized cancer diagnostic services. For women in remote communities, the journey to diagnosis involves not only physical distance but also the accumulation of lost income, family responsibilities, and repeated travel for consultations and investigations. Educational status demonstrated a gradient effect on delay, with illiterate women having significantly higher delay rates than those with primary education, who in turn had higher rates than women with secondary or higher education. This pattern suggests that literacy enables women to access and process health information, understand disease risks, and navigate healthcare systems more effectively. The inability to read educational materials such as brochures and leaflets represents a substantial barrier to breast cancer awareness in this population [8, 10].

The finding that women without a previous history of breast problems experienced longer delays highlights the importance of symptom interpretation in help-seeking behavior. Women with painless breast lumps—the most common presentation in this study—may not perceive their symptoms as serious, delaying consultation until symptoms progress or become painful. This observation aligns with the concept of "symptom appraisal," where individuals' interpretation of bodily changes significantly influences their decision to seek care [9, 10]. Similarly, the absence of a family history of breast cancer was associated with longer delay, suggesting that women with affected relatives may have heightened awareness and earlier help-seeking. The extremely low rate of breast self-examination practice (12.1%) and the predominance of accidental detection of breast abnormalities (67.3%) represent critical missed opportunities for earlier diagnosis. Breast self-examination, when properly taught and practiced, can serve as a gateway to early detection, particularly in settings where organized screening programs are unavailable [5].

The finding that only 7.5% of women detected their abnormality through self-examination contrasts sharply with the potential for this simple, cost-free method to facilitate earlier diagnosis. This gap points to the urgent need for community-based education on breast awareness and self-examination techniques. The reasons cited for delayed presentation reflect a complex interplay of cognitive, cultural, and structural barriers. Lack of awareness of early symptoms (83.2%) represents the most commonly cited reason, indicating fundamental gaps in breast cancer knowledge across the community. The high proportion of women reporting financial problems (71.0%) and use of traditional/spiritual treatments (67.3%) suggests

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that economic constraints and cultural beliefs intersect to shape healthcare-seeking pathways. For many women, traditional healers may represent the first point of contact, with biomedical care sought only after symptoms progress or traditional treatments fail. Similarly, lack of trust in healthcare personnel (64.5%) points to the need for strengthening patient-provider relationships and rebuilding confidence in the healthcare system. The clinical profile of patients in this study—with predominance of invasive ductal carcinoma, large tumor sizes (≥5 cm in 58%), and high rates of axillary lymph node involvement (87.9%)—reflects the consequences of delayed diagnosis. These tumor characteristics are associated with poorer prognosis and more intensive treatment requirements. The finding that 14% of patients already had distant metastases at diagnosis represents a particularly concerning outcome, as metastatic breast cancer is generally considered incurable with current treatment approaches [1, 5].

Conclusions

This study demonstrates that delayed diagnosis of breast cancer is highly prevalent among women in Eastern Libya, with profound consequences for disease stage at presentation and treatment outcomes. The majority of women present with advanced-stage disease after experiencing prolonged delays, most commonly due to lack of awareness, financial constraints, reliance on traditional treatments, and geographic barriers to care. Rural residence, low educational status, and absence of previous breast problems emerged as key risk factors for delay.

Conflict of interest. Nil

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