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Hospital-Based Evaluation of Breast Cancer Incidence in Kabul, Afghanistan

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ABSTRACT

Background: Breast cancer, a prevalent and metastatic disease characterized by abnormal cell growth in breast ducts, constitutes 25% of global invasive cancer cases, impacting one in eight women. In 2020, there were 2.3 million new cases and 685,000 deaths attributed to breast cancer, with higher rates in developed countries and increasing global incidence.

Method: A retrospective case series was conducted on 1,147 breast cancer patients treated at Jamhuriat Hospital, Afghanistan between 2021 and 2022. Data on demographics, tumor type, laterality, marital status, residence, and socioeconomic status were extracted from medical records. Statistical analysis was performed using SPSS, with significance set at $P<0.05$.

Results: Invasive ductal carcinoma was the most frequently diagnosed type (77.5%). The overall mortality rate among patients was approximately 1.05%. Among women, breast cancer was more often found in the left breast, while in men, cases were evenly distributed. The largest age group was 31–45 yr (44%), and women represented 97% of all cases. Statistical analysis showed no significant association between marital status and cancer type ($P=0.27$). However, significant associations were observed between cancer type and both residential location ($P<0.05$) and socioeconomic status ($P=0.04$).

Conclusion: This study highlights the predominance of invasive ductal carcinoma among breast cancer cases at a major Afghan hospital and reveals significant associations between cancer type and both socioeconomic status and geographic location. These findings emphasize the need for enhanced awareness, early detection efforts, and equitable healthcare access, particularly for underserved groups in Afghanistan.

Keywords: Breast cancer, Age, Gender, Cancer type, Socioeconomic status, Cancer topography

Introduction

Breast cancer is a malignancy characterized by the uncontrolled growth of cells in the breast ducts, with the potential to metastasize to various organs, including the liver, bones, lungs, and brain. It poses a significant threat to both men and women, with women being 100 times more likely to develop breast cancer than men. Projections indicate a rising

mortality rate and increased cancer-related challenges in the future (1). According to the American Cancer Society statistics, approximately one in every eight women will face breast cancer, making it the most prevalent cancer type among women worldwide (2). In 2020, over 2.3 million new cases and 685,000 deaths from breast cancer were reported globally (3).

Breast cancer is influenced by a variety of genetic and environmental factors (2). It develops through the gradual accumulation of genetic and epigenetic changes (4). Key risk factors of breast cancer include age, obesity, alcohol consumption, and exposure to estrogen (5). Having a family history of breast cancer is the strongest risk factor, with around 20% of cases linked to specific predisposing genes (5, 6). Eight specific genes have been identified as associated with a significantly increased risk of breast cancer, with about half of familial cases resulting from inherited mutations in tumor suppressor genes that play a crucial role in maintaining genome integrity (5,7).

Breast cancer is a global concern, affecting women in every country. However, its prevalence and impact vary significantly between countries (8). In developing countries like Afghanistan, the situation is particularly severe. Two-thirds of cancer-related deaths will occur in developing countries due to limited accessibility to healthcare services (1). The impact of cancer, both in terms of mortality and its economic burden, is particularly pronounced in countries facing economic hardships (1,9). Afghanistan, categorized as a low- to intermediate-income country, faces a rising number of cancer-related deaths. The absence of a centralized cancer patient registration office and limited healthcare coverage nationwide further hinders efforts to gather accurate and extensive cancer-related data in developing nations.

Afghanistan faces severe problems with late referrals, delayed diagnoses, and advanced stages of breast cancer (10). In 2018, the WHO estimates suggest that nearly 20,000 women in Afghanistan were diagnosed with various types of cancer, with 7,000 of these being breast cancer cases, making it the most prevalent type (11). Statistics about cancer in Afghanistan are limited. A critical challenge in addressing breast cancer is the lack of digital patient data systems in hospitals, leading to incomplete and inaccurate data collection. This data deficiency complicates efforts to obtain comprehensive and reliable information.

As infectious diseases come under control, the focus in healthcare has shifted to cancer prevention and treatment. However, lifestyle changes, variations in dietary habits, increased average life expectancy, and demographic shifts have led to an increase in cancer cases (12). Effective cancer control policies and research in developed countries often depend on having accurate data on cancer rates and statistics.

Healthcare systems in developing countries, including Afghanistan, often prioritize infectious diseases, malnutrition, and maternal and child health. As a result, they tend to neglect cancer data collection and analysis. Afghanistan's healthcare infrastructure lacks the necessary modern technology, expertise, and resources to effectively manage the complexities involved in cancer diagnosis, treatment, and management. There are only three governmental centers that diagnose cancer: Jamhuriat Hospital in Kabul and hospitals in Herat and Balkh. The Ministry of Public Health in Afghanistan acknowledges the difficulty to collect accurate statistical data on cancer, often relying on the WHO statistics. Research on breast cancer in Afghanistan is vital due to the lack of comprehensive data, the challenges associated with healthcare infrastructure, and

the increasing incidence of cancer. There is an urgent need for accurate statistics, awareness campaigns, and tailored interventions to help mitigate the impact of breast cancer in the country (13). In Afghanistan, cancer services are currently classified as secondary services, and providing them in remote areas is impossible due to insufficient funding and limited capacity.

We aimed to use data from Jamhuriat Hospital in Kabul to highlight the specific challenges and characteristics of breast cancer cases in Afghanistan.

Materials and Methods

Study Population

This quantitative, retrospective case series study was conducted in the Oncology department of Jamhuriat Hospital in Kabul during 2021-2022. The study focuses on all patients diagnosed with breast cancer who sought treatment at Jamhuriat Hospital during this period. Using a census sampling method, the study included all recorded breast cancer cases from that period to achieve comprehensive insights into the specific challenges and characteristics of breast cancer cases in Afghanistan.

Data collection

Data for this study was sourced from the hospital's records of breast cancer cases. A predefined checklist was used for data collection, covering demographic information (marital status, age, gender, economic status, occupation, and place of residence), cancer topography (right or left breast), cancer type (including ductal carcinoma, ductal carcinoma in situ, triple-negative, inflammatory, phyllodes tumor, metastatic, mucinous neoplasm, Paget's disease of the breast, invasive lobular carcinoma, and invasive ductal carcinoma), and mortality rates (including cause-specific mortality). Consultations with healthcare staff were conducted to ensure the accuracy and completeness of the data.

Inclusion and exclusion criteria

Inclusion criteria: all breast cancer cases recorded at Jamhuriat Hospital during 2021 and 2022.

Exclusion criteria: Exclusion criteria for the study included cases recorded outside the designated time frame, other types of cancer, and accidental injuries or non-cancerous diseases. These criteria ensured that the study focused solely on breast cancer cases within the specified period.

Ethical consideration

This study received formal ethical approval from the Kabul University of Medical Sciences, ensuring compliance with ethical research standards. Since the study was retrospective and relied solely on hospital records, there was no direct patient interaction. To protect patient confidentiality and maintain data anonymity: All patient records were de-identified before analysis, ensuring that no personally identifiable information was included. Data was stored on a secure, password-protected system, accessible only to authorized researchers. Results were presented in aggregated form, preventing the identification of individual cases. The study was conducted in collaboration with Jamhuriat Hospital and Kabul University of Medical Sciences, adhering to ethical guidelines for medical research.

Statistical analysis

The collected data was compiled and analyzed using MS Excel, SPSS ver. 24 (IBM Corp., Armonk, NY, USA) and R software. Descriptive statistics summarized the demographic and clinical characteristics of the patients. Frequency distributions and percentages were used for categorical

variables, while means and standard deviations were calculated for continuous variables. Inferential analysis involved the use of the Chi-square test to examine associations between categorical variables, such as breast cancer type and socioeconomic status. For contingency tables with expected cell counts less than 5, Fisher's Exact Test was used when appropriate. *P*-values were calculated and reported in the Results and Abstract sections to determine the statistical significance of the observed associations. Tables and graphs created in MS Excel visually represent the data and highlight key findings.

Results

Demographic Characteristics

The study included 1,147 participants, with an average age of 44 yr and a standard deviation of 12.2. The participants were predominantly female (1,114 or 97%), while 33 (3%) were male. Among them, most were married (1,067 or 93%), and 80 (7%) were single. Most participants (95.6%) were classified as having a poor economic status, while 4.4% were considered average, and none fell into the good category. Further, diagnosis showed ten types of breast cancer, with ductal carcinoma being the most prevalent (889 cases) and Paget's disease the least common (0.1% of cases) (Supplementary Table 1 and Figures 1,2).

Table 1: Demographic characteristics

Variables	*Variables*	*Frequency*	*% or SD*
Age (yr)	Lowest	13	
	Average	44	12.2
	Highest	85	
Occupation	Housewife	1099	95.81
	Teacher	16	1.4
	Free job	7	0.61
	Unemployed	22	1.92
	Doctor	2	0.17
	Manager	1	0.09
Gender	Male	33	3
	Female	1114	97
Marital Status	Married	1067	93
	Single	80	7
Cancer type	Ductal carcinoma	889	77.5
	Ductal carcinoma in situ	8	0.7
	Triple-negative	4	0.3
	Inflammatory	22	1.9
	Phyllodes tumor	15	1.3
	Metastatic	133	11.6
	Mucinous neoplasm	11	1
	Paget's disease of the breast	1	0.1
	Invasive lobular carcinoma	14	1.2
	Invasive ductal carcinoma	50	4.4
Breast cancer by Topography	Right	483	42.1
	Left	563	49.1
	Right and left	59	5.1
	Right breast with axilla	20	1.7
	Left breast with axilla	22	1.9
Socioeconomic status	Poor	1096	95.55
	Average	51	4.45
	Good	0	0

The distinction between Ductal carcinoma and Invasive ductal carcinoma in Tables 1 and 3 is clarified based on histological definitions: Ductal carcinoma: Cancer confined within the ducts. Invasive ductal carcinoma: Cancer that has spread beyond the ducts into surrounding tissue.

In women, the cancer was more often found in the left breast (548 cases), while in men, the distribution between both breasts was equal (Table 2).

Table 2: Topography of the breast cancer according to Gender

Topography of breast cancer	***Gender***	
	Female	Male
Right breast	486	15
Left breast	530	15
Bilateral	58	1
Right breast with axilla	18	2
Left breast with axilla	22	0
Total	1114	33

During 2021-2022, Jamhuriat hospital in Afghanistan treated 1,147 breast cancer cases. This study analyzed patients from eight administrative zones: Central Eastern Zone (Kabul, Logar, and Panjshir), Eastern Zone (Nangarhar, Laghman, Kunar, and Nuristan), Southeastern Zone (Paktia, Khost, Paktika, and Ghazni), Southern Zone (Kandahar, Urozgan, Zabul, Helmand, and Nimruz), Central Western Zone (Bamyan, Parwan, Daykundi, and Maidan Wardak), Western Zone (Herat, Badghis, Farah, and Ghor), Northern Zone (Balkh, Samangan, Sar-e-Pul, Jawzjan, and Faryab) and Northeastern Zone (Kunduz, Takhar, Baghlan, and Badakhshan). This study examined the distribution of patients' residences within these zones (Figure 1). Further, Table 3 illustrates the distribution of breast cancer types between patients based on their marital status.

Table 3: Distribution of breast cancer types among married and single patients

Types of breast cancer	***Marital status***	
	Married	Single
Ductal carcinoma	826	63
Ductal carcinoma in situ	7	1
Triple-negative breast cancer	4	0
Inflammatory breast cancer	20	2
Phyllodes tumor	13	2
Metastatic breast cancer	128	5
Mucinous neoplasm	9	2
Paget's disease of the breast	1	0
Invasive lobular carcinoma	12	2
Invasive ductal carcinoma	47	3
Total	1067	80

The percentage distribution of breast cancer cases according to different zones of living. The highest proportion of cases is observed in the central east zone, accounting for 39% of the total. This is followed by the east zone with 16%, while both the south east zone and north east zone each contribute 13%. The north zone holds 11% of the cases. Smaller proportions are seen in the south zone (3%), central west zone (2%), and west zone (3%). The chart highlights a significant disparity in the prevalence of breast cancer across different geographic zones, with the central east zone showing a notably higher rate compared to others.

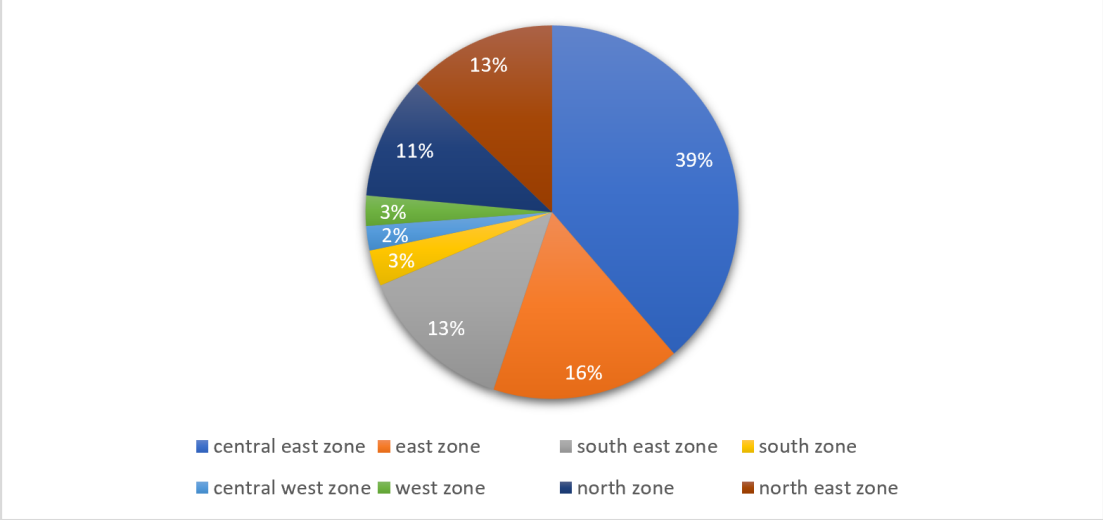

Figure 1: Distribution of breast cancer cases by residential zones

Mortality from Breast Cancer

Out of all breast cancer cases diagnosed at Jamhuriat Hospital from 2021 to 2022, only 12 patients passed away and were recorded in the hospital's database. Among these 12 patients, 11 were female, and only 1 was male.

Association between various demographic variables and cancer type

Based on the Chi-square test results, there is no significant association between marital status and cancer type (P=0.27). Marital status does not appear to influence the type of breast cancer among patients in this study. In contrast, both the location of the breast cancer (P<0.05) and socioeconomic status (SES) (P=0.04) show significant associations with cancer type (Tables 4, 5).

Table 4: Result of chi-square tests for association between demographic variables and cancer type

Variable	*P-value*
Marital status and cancer type	0.27
Breast cancer location and cancer type	<0.05
SES and cancer type	0.04

Table presents the results of Chi-Square tests assessing the associations between various demographic variables (marital status, location, socioeconomic status) and cancer type among patients. A p-value of less than 0.05 indicates a statistically significant association.

Table 5: Age Distribution Table

Age Group (yr)	*Frequency*	*Percentage (%)*
≤30	72	6.3
31-45	507	44.3
46-60	389	34.0
>60	179	15.4
Total	1147	100

Discussion

This retrospective study analyzed breast cancer cases at Jamhuriat Hospital in Kabul over two years. Most patients (97%) were female, with a mean age of 44 yr, and the majority were diagnosed with invasive ductal carcinoma (77.5%). A significant link was found between low socioeconomic status (SES) and breast cancer type, with IDC being more common among poorer patients (95.6% of the sample). These findings reflect broader trends in low- and middle-income countries, where limited healthcare access and low awareness contribute to late diagnoses and higher risk, especially among less educated women and housewives (14).

Urban patients were more likely to present with IDC than rural patients, possibly due to better access to diagnostic services in urban centers. Our geographical data revealed that 38.4% of cases were from the central-eastern zone, likely due to population density and proximity to major hospitals, followed by other provinces with lower representation. The low percentage of cases from the western zone may reflect either better access to healthcare or underreporting.

Importantly, marital status was not found to be significantly associated with cancer type. While previous versions of the manuscript suggested a possible link, our actual statistical analysis does not support this. We have corrected this interpretation to align with the data. Although some studies have explored the psychosocial effects of marital status on cancer prognosis and healthcare access, our findings do not indicate a direct association with the type of breast cancer.

The age distribution of cases peaked in the 31–45 age group, which accounted for the largest portion of diagnoses. However, this reflects the age distribution among our hospital-based sample and not population-level incidence rates. Epidemiological data from both high- and low-income countries consistently show that breast cancer incidence increases with age, peaking post-menopause. Therefore, our findings should not be interpreted as population-based age-specific incidence. Regarding laterality, most female patients presented with cancer in the left breast, while male patients (3% of the sample) had an equal distribution between the two breasts. Most female patients were housewives, and although a prior version of the text suggested no link between occupation or socioeconomic status and breast cancer incidence, we have corrected this to clarify that our study does not measure incidence but describes associations within a diagnosed sample.

Comparing our findings with previous regional studies, a 2018 study in Peshawar

also reported that 96.5% of patients were women, which aligns with our data (15). However, socioeconomic distributions differ. For instance, Karachi study reported a more diverse SES profile, likely due to broader economic stratification compared to Afghanistan's widespread poverty (16). Our findings also align with studies from Lahore and Iran, which identify ductal carcinoma as the most common type (17, 19). Differences in age distribution and case severity between studies may stem from variations in healthcare access and referral patterns (17). While some studies suggest menopause as a high-risk period (17, 19), we observed the highest number of diagnoses between ages 31 and 45. This may reflect care-seeking patterns, demographic characteristics, or diagnostic capacity rather than a true epidemiological peak. Low mortality figures in our dataset are likely due to underreporting or loss to follow-up, a limitation also noted in other developing-country studies.

Limitations

This study has several limitations. As a retrospective, single-center case series, it is subject to selection bias and cannot be generalized to the broader Afghan population. Data completeness varied across patient records, and key variables such as cancer stage, histological grade, and receptor status were not uniformly available. Our hospital-based sample reflects only those who presented for care and does not capture undiagnosed or unreported cases, particularly in rural areas. Additionally, given the lack of national cancer registry data, comparisons with national incidence or prevalence remain limited. Future research should include multi-center, prospective studies with standardized data collection and broader geographic coverage to better understand breast cancer patterns in Afghanistan.

Conclusion

Statistical analysis revealed significant associations between breast cancer type and both socioeconomic status (SES) and geographic location ($P<0.05$), with IDC more frequently diagnosed among lower SES groups and among patients from urban areas. These associations may be influenced by disparities in diagnostic access, healthcare utilization, and patient awareness, rather than biological variation in cancer type. The study did not evaluate associations with occupation, and no significant association was found between marital status and cancer type. We did not examine breast cancer incidence in the general population, but rather the distribution of cancer types among already diagnosed cases. These results underscore the need for improved breast cancer awareness, early detection strategies, and equitable access to diagnostic and treatment services, particularly for underserved populations in Afghanistan. Future research should include larger, population-based studies that incorporate staging, prognostic markers, and survival data to build a more comprehensive understanding of breast cancer patterns and outcomes in the region.

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Conflict of Interest

We all declare that there is no conflict of interest in this research.

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