Non-Interventional Retrospective Study On The Impact Of Breast Cancer Recurrence In Women In Kauh

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Abstract

Background: Breast cancer recurrence poses significant challenges to patient outcomes, and understanding its impact is crucial for improving care strategies. This study investigated the demographic, clinical, and treatment characteristics associated with breast cancer recurrence in women treated at King Abdulaziz University Hospital (KAUH) over 20 years (2003–2023).

Methods: A non-interventional retrospective study reviewed medical records of women diagnosed with recurrent breast cancer at KAUH. Data were collected from the surgery unit database and electronic patient records, including demographics, lab results, mammogram findings, receptor statuses, and treatment details. Descriptive and analytical statistics were applied to assess recurrence factors and treatment impacts.

Results: The study included 193 women with a mean age of 50.26 ± 20.41 years. Half of the participants (50.2%) were Saudi nationals. The most common clinical presentation was a right breast mass (41.4%), followed by a left breast mass (34.2%). Invasive ductal carcinoma was diagnosed in 74.6% of cases. Estrogen receptor positivity was found in 71% of participants, progesterone receptor positivity in 48.3%, and HER2 positivity in 35.2%. Surgical interventions were predominantly mastectomies, accounting for 53.4% of cases. Lymph node involvement was absent in 45.6% of participants, and 50.3% had no lympho-vascular invasion. Many patients did not undergo neoadjuvant chemotherapy (43.5%) or radiotherapy (49.7%). Cancer recurrence was reported in 20.7% of participants, with the most common recurrence period being within 2 to 3 years.

Conclusion: The findings highlight the high recurrence rate in breast cancer patients at KAUH despite varied treatment strategies. Incomplete data on essential treatments such as chemotherapy and radiotherapy suggest the need for improved documentation and follow-up to enhance patient care. Future studies should focus on identifying predictors of recurrence to inform personalized treatment approaches.

Keywords: breast cancer recurrence, non-interventional study, KAUH, invasive ductal carcinoma, treatment outcomes

INTRODUCTION

The increasing prevalence of breast cancer is a pressing issue in public health on a worldwide scale [1]. In 2018, there were 2,088,849 instances of breast cancer, with an incidence rate of 11.6%, and 626,679 deaths, with a mortality rate of 6.6% [2]. This makes breast cancer the most frequent cancer among women globally. With a 14.6% incidence rate and a 1.48% fatality rate in 2019, breast cancer is the most frequent cancer among women in Saudi Arabia, according to a comprehensive study [1]. The United States has a 90.6% 5-year survival rate for

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breast cancer, according to the National Cancer Institute's Surveillance, Epidemiology and End Results Program [3]. Contrarily, a 5-year survival rate of 72% for breast cancer in Saudi Arabia was reported by Aseafan et al. [4]. One of the most essential predictive agents for the fate of breast cancer is the tumor's features [5]. Breast cancer patients are more likely to have progression, mortality, and metastasis if their tumors are larger than 2 cm, include axillary nodes, have negative estrogen receptors (ER) and progesterone receptors (PR), and have a high grade [5]. Age is also known to be an essential predictive factor for breast cancer [6]. This is because younger women are more likely to have more aggressive subtypes of the disease.

Several studies have reported various breast cancer prognostic variables. However, almost half of the patients with this disease still do not have any known risk factors beyond their gender and age [7]. Hence, breast cancer is a complex illness with a wide range of possible manifestations and consequences [8]. On the other hand, genetic alterations have greatly improved breast cancer patients' quality of life and survival rate in the last 20 years by revealing patient severity, prognostic variables, and effective therapeutic drugs. Breast cancer risk factors include mutations in BCRA1/2, HER2, EGFR, c-Myc, and RAS genes [9]. A panel that evaluates risk stratification for breast cancer based on changes in many genes has recently been developed thanks to breakthroughs in sequencing technology [10]. To determine the best course of treatment for patients, it is necessary to conduct a thorough evaluation of the tumor's histopathology, hormone receptor (ER/PR) and epidermal growth factor receptor 2 (HER2/Neu) expression pattern, genomic and transcriptomic profiling, and molecular subtypes of breast cancer [8]. These individual variations significantly impact the patient's prognosis and treatment choices. Further complicating efforts to identify shared risk markers for breast cancer development is the inherent heterogeneity among breast cancer patients themselves [11].

Due to studies examining recurrence rates in various demographics, groups of patients, or periods, there are inconsistent estimates of incidence rates given in literature, making it very difficult to forecast the risk of breast cancer progression [11]. Patients with breast cancer have been the subject of several studies that have looked at potential risk factors for advancement, with varying degrees of observed progression [12–13]. At the 10-year mark, over 20% of women whose breast cancer was ER-positive (ER+) in its early stages have disease progression [14]. Young age, inherited obesity, high-grade malignancy, big tumor size, and negative ER and PR are some of the risk factors for the advancement of breast cancer that have been established in the literature [13–14]. In addition, research has shown that certain treatment variables affect progression risk, such as non-adherence to endocrine medication and postponement of adjuvant chemoradiation [11,14]. Westerners and Asians made up the bulk of the subjects in earlier research. When it comes to breast cancer development in Middle Eastern populations, there is a lack of evidence on both the molecular and clinical aspects [15]. This study aimed to explore the risk factors contributing to breast cancer recurrence, identify critical factors essential in managing at-risk patients, and investigate emerging therapies designed to prevent recurrence. Understanding these aspects is crucial for improving patient outcomes and developing targeted strategies for managing and reducing breast cancer recurrence.

METHODS

Study Design: This study was a non-interventional retrospective study aimed at analyzing the impact of breast cancer recurrence in women. The research focused on reviewing patient records from King Abdulaziz University Hospital (KAUH) over 20 years, from 2003 to 2023.

Study Setting

The study was conducted at King Abdulaziz University Hospital (KAUH), a tertiary care center that provided comprehensive care for breast cancer patients, including diagnosis, treatment, and follow-up.

Population

The study population consisted of female patients who had been diagnosed with recurrent breast cancer at KAUH between 2003 and 2023.

Sample Size and Sampling Technique

The study employed a total population sampling technique, including all patients diagnosed with recurrent breast cancer within the specified period. The number of eligible cases in the hospital records determined the sample size.

Eligibility Criteria

Inclusion Criteria: Patients diagnosed with recurrent breast cancer at KAUH between 2003 and 2023.

Exclusion Criteria: Patients with non-recurrent breast cancer and those with incomplete laboratory data were excluded from the study.

Data Collection

Co-investigators retrospectively collected data from the KAUH surgery unit. The primary sources included the surgery unit database, electronic patient records (Phoenix/VIDA), laboratory notes, and follow-up records. Data collected encompassed patients' demographic information, lab results, mammogram findings, pathological margins, gene studies, complete blood counts (CBC), hormonal receptor statuses, and details of previous treatments.

Instruments

Data were extracted using predefined forms that captured relevant clinical, pathological, and treatment-related information. The electronic records system (Phoenix/VIDA) were systematically accessed and used to retrieve patient data.

Statistical Analysis

Data were analyzed using SPSS software. Descriptive statistics were used to summarize the data and analytical statistics, specifically the Independent T-test, was applied to compare means between groups. The analysis focused on identifying significant factors associated with breast cancer recurrence and assessing the impact of various treatments and patient demographics.

Ethical Consideration

Ethical approval was obtained from the Institutional Review Board (IRB) at King Abdulaziz University. Due to the study's retrospective nature, informed consent was waived, and patient confidentiality was strictly maintained. All data was anonymized, and records were securely stored in compliance with KAUH's data retention policy, ensuring that records from 2003 to 2023 were preserved and protected. Participants identified as having incomplete data were excluded from the study without any follow-up.

RESULTS

The study included 193 women whose ages ranged from 28 to 89 years. The mean age among study participants was 50.26 + 20.41 years, with a median age of 52. Half of the study participants were Saudi (n=97, 50.2%) (Figure 1). Cases were attended from 2007 to 2022, peaking in 2016 (Figure 2).

Participants sought medical care for various presentations, the most frequent being right breast mass (n= 80, 41.4%). Other presentations included left breast mass/lesion (n= 66, 34.2%) and bilateral breast masses (n= 8, 4.1%). Pain was present among 30 participants (15.5%), and nipple discharge was present among 12 cases (6.2%).

The histopathological examination revealed invasive ductal carcinoma among 144 cases (74.6%). Participants' Grade and Stages are described in Figure 3.

Among study participants, 13.5% were negative for estrogen, 15.5% had no data, and 71% were positive. Regarding progesterone, 30.6% were negative, 21.1% had no data, and 48.3% were positive. The HER status showed 44.6% were negative, 20.2% had no data, and 35.2% were positive. In the case of DCIS, 17.1% were negative, 27.5% had no data, and 55.4% had DCIS. The cumulative percentages reflect the total coverage of each diagnostic category across the sample.

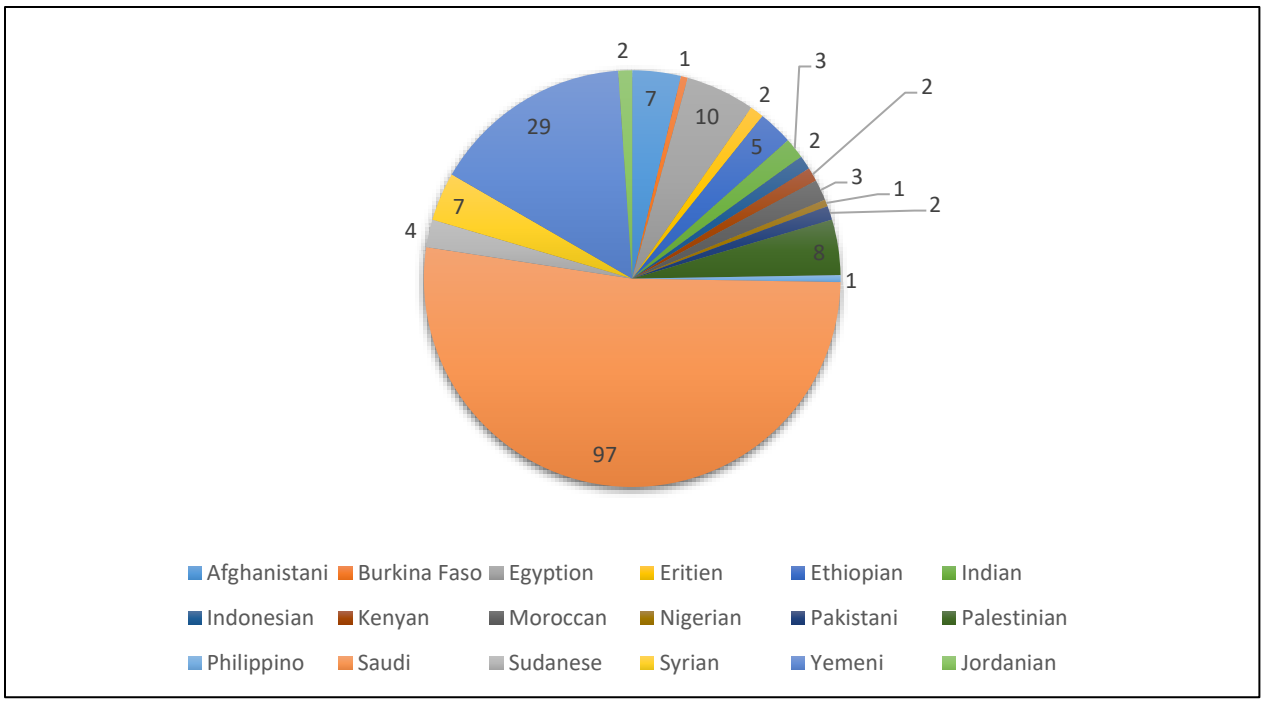

Figure 1: Distribution of study participants based on nationality

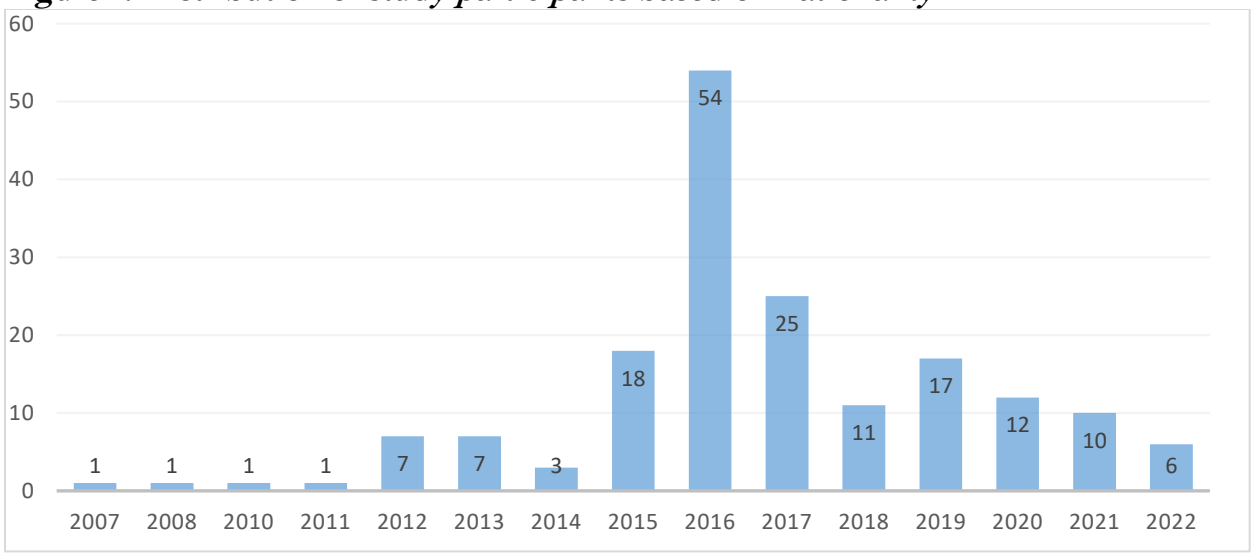

Figure 2: Distribution of study participants based on year of presentation

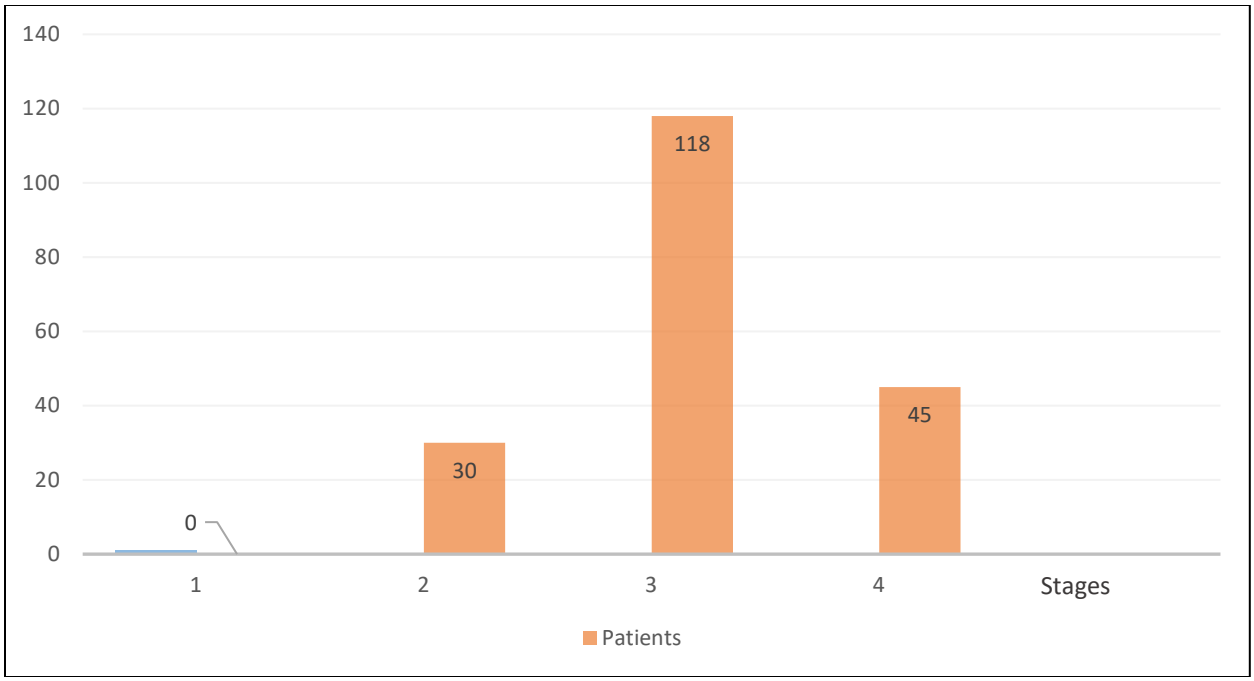

Figure 3: Number of patients with their stages of breast cancer

The surgery types are broken down into different surgical procedures, showing that most cases had mastectomies (53.4%). The cumulative percentage shows a gradual increase, indicating the variety of surgical interventions performed, with each entry contributing to the overall dataset of 193 procedures.

Lymphovascular invasions are the reflection of cancer in the lymphatics and vasculars. 45.6% of patients had no axillary lymph node metastasis. A significant portion of the population (50.3%) reported no invasion, while 17.1% had valid responses for lymphovascular involvement. Vascular involvement (16.1%) reflects the spread of this condition across the cohort.

Based on the collected data, many cases did not undergo neoadjuvant chemotherapy (43.5%), while 19.7% of participants received chemotherapy. Smaller percentages indicated either no treatment or a positive response to chemotherapy, giving this sample an overall distribution of neoadjuvant chemotherapy. The data shows that 34.7% of participants did not undergo adjuvant chemotherapy, while 35.2% received it. A smaller portion (10.9%) reported no adjuvant chemotherapy with stage 1 breast cancer, indicating that chemotherapy as a part of post-surgical cancer treatment was expected but not universal in this sample.

In addition, 49.7% of cases did not receive radiotherapy, while 23.3% explicitly reported no radiotherapy. Only 8.8% of participants received radiotherapy, indicating that this treatment modality was less frequently utilized than chemotherapy.

The hormonal treatment reveals that more than half of the cases (54.9%) did not receive hormonal therapy, while 18.7% explicitly did not undergo it. A smaller portion (7.8%) received hormonal treatment, suggesting limited use of this therapy in the sample.

Additionally, the data shows that a large portion (44.6%) of participants did not receive Herceptin, with 17.6% having undergone the therapy. There is a notable variance in the duration of treatment, ranging from 1 to 8 years, reflecting differing lengths of Herceptin use within the group.

The recurrence highlights that 20.7% of participants had breast cancer recurrence. At the same time, a small percentage had recurrence over a range of years, with the most common period being within 2 to 3 years (8.8%).

DISCUSSION

The high recurrence rate of 20.7% observed in this study highlights the ongoing challenge of breast cancer recurrence, even with comprehensive treatment strategies such as surgery, chemotherapy, and radiotherapy. Invasive ductal carcinoma, which accounted for 79.6% of cases, is known to be more aggressive, contributing to a higher likelihood of recurrence. Although the majority of patients were estrogen receptor-positive (67.3%) and progesterone receptor-positive (49.0%), the lack of significant predictors of recurrence, such as hormonal receptor status, suggests that additional factors, including tumor biology, patient comorbidities, and treatment adherence, may play a role in determining long-term outcomes. Furthermore, the substantial gap in data availability on neoadjuvant chemotherapy and radiotherapy (53.1% and 57.1%, respectively) raises concerns about the quality of follow-up care and documentation, potentially obscuring key insights into recurrence patterns.

This study also underscores the need for more robust data collection and long-term monitoring of breast cancer patients to understand recurrence risks and treatment effectiveness better. Despite advancements in breast cancer management, the recurrence rate remains significant, emphasizing the importance of individualized treatment plans that consider not only tumor characteristics but also patient-specific factors such as genetic predispositions and lifestyle. The incomplete data on necessary treatment modalities like hormonal therapy and Herceptin (64.3% and 66.3% missing, respectively) further indicates a gap in patient care that could be addressed through systematic improvements in hospital record-keeping and patient follow-up. Future research should focus on identifying precise biomarkers and other predictors that could guide targeted therapies and reduce recurrence risk, ultimately improving survival rates for breast cancer patients.

According to local research, the median age at diagnosis rose from 47 years in 2004 to 50 years in 2013, 2014, and 2016 [16], which aligns with the findings of the age group of 41-60 years [15]. We found that breast cancer was more likely in middle-aged patients between the ages of 30 and 59, which can be further supported by another Saudi cohort research which had similar findings [17]. There is still debate on whether age at diagnosis is a prognostic factor. One of the most critical and paradoxical factors in breast cancer is age. Both the likelihood of developing breast cancer and the possibility of the disease's progression may be influenced by aging [18]. New evidence has highlighted young age as a robust indicator of breast cancer advancement and its affect on its course [19]. According to research, patients in the 20–40 age bracket had a decreased progression likelihood compared to those in older age brackets [15]. A protective factor against the development of breast cancer in the population was being young. These results contradict those of other studies that looked at age as a predictor of outcome [20, 21]. An independent risk factor for breast cancer advancement is age, according to a meta-analysis research [22]. The study also found that younger patients had a higher risk of progression rate. Contrarily, new research that focuses on breast cancer patients in their later years discovered that patients between the ages of 75 and 79 had a higher chance of advancement compared to patients between the ages of 70 and 74 [18]. This conclusion might be because breast tumors of various ages and genetic alterations have distinct selection and

treatment responses [18]. Younger people are more resistant to specific treatments than older people, which might lead to a division [23]. However, this discovery is yet to be confirmed or refuted by more considerable and in-depth research.

Consistent with previous research, hormone receptor involvement was shown to be the most critical risk factor for progression in this study's sample. Our results demonstrated that PR hormone receptor-expressing individuals had a more rapid development of breast cancer. Hormone receptor expression was favorably expressed in 69% of patients under 40 years old and 78.2% of patients 40 years and older in another Saudi Arabian investigation that looked at data from 1986 to 2002 [15, 24]. The results are consistent with previous research that has linked elevated levels of positive hormone receptors to invasive breast cancer [25–27]. Patients with negative PRs were more likely to have progression than those with positive PRs, even after accounting for other demographic and clinical variables [15]. The link between PR and the advancement of breast cancer has been the subject of contradictory results in prior research [28–29]. Therefore, a large-scale focus study is required to determine how PR works independently. In breast cancer, doctors would be better able to decide which node-negative patients might benefit from adjuvant treatment if they could find predictors and prognostic variables linked to the primary tumor's tendency to develop or spread.

CONCLUSION

The study highlights the diverse clinical presentations and treatment approaches among 193 women diagnosed with breast cancer. Most cases involved invasive ductal carcinoma, with the majority presenting with right or left breast masses. The findings reveal a high proportion of estrogen and progesterone positivity, while HER status and lymph node involvement showed mixed outcomes. Surgical intervention, particularly mastectomies, was the most common treatment, with chemotherapy and radiotherapy use being reported less frequently. Lymphovascular invasion and recurrence rates were relatively low, while hormonal therapy and Herceptin usage showed considerable variation. The data emphasizes the complexity of breast cancer management and underscores the need for tailored treatment strategies.

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