



## RESEARCH ARTICLE

### PRESCRIPTION PATTERN OF ANTICANCER MEDICATIONS IN BREAST CANCER TREATMENT AT KORLE BU TEACHING HOSPITAL (KBTH)

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#### ABSTRACT

**Background:** The prescription patterns of anticancer medications used in treating breast cancer in Korle Bu Teaching Hospital have been examined in this study to comprehensively analyze the trends, efficacy, and outcomes of the different therapeutic regimens for treating breast cancer. A retrospective cross-sectional design is used to evaluate the adherence of KBTH to national and international oncology treatment guidelines by looking at what and how all types or combinations of chemotherapy agents are being prescribed over six months, from July 2021 to December 2021. This study was carried out after a similar one at Komfo Anokye Teaching Hospital, a tertiary hospital in Ghana. **Materials and Methods:** Ninety-nine breast cancer patients served as the study population, forming a diverse cross-section of the demographic and disease stage diversity found at KBTH. Prescribed anticancer medications with dosages and stages of breast cancer when given were extracted from the hospital's electronic Logistics and Health Information Management System (LHIMS). **Results:** This analysis showed a high adherence to standard chemotherapy protocols, and the most common regimen consisted of Adriamycin, Cyclophosphamide, and Paclitaxel. The study also showed that there was an appalling incidence of late-stage (mostly stage IIIb) cancer diagnosis among patients. As side effects such as fatigue, nausea, and alopecia become universal, there is a need to improve supportive care and appropriate management measures to decrease the adverse effects of chemotherapy on patients' quality of life. **Conclusion:** While KBTH has shown strong adherence to the chemotherapy protocols for breast cancer treatment, it remains an inadequate treatment given that many patients presented at a late stage and treatment-related side effects are difficult to manage

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## INTRODUCTION

According to a worldwide estimate of the International Agency for Research on Cancer (IARC) report on the global burden of cancer, breast cancer was confirmed in 2.3 million women in 2020. This number was higher than the number of new cases of lung cancer. In 2020, breast cancer caused about 685,000 deaths: it was the most common cause of cancer death in women (the fifth most common cause globally) (International Agency for Research on Cancer, 2021). Breast cancer is not only the most common cancer among women but also the most

cancer accounts for most cancer deaths among Ghanaian women, as more than 60 percent of them report late or initiate breast cancer treatment late (1). Breast cancer is becoming a global public health problem gradually because it is increasingly affecting a lot more women. This menace is directed at women of all socio-economic levels. The age range of 25 to 75 years and the median age of incidence of 45 years have been reported by (2). While rates of breast cancer mortality in developed countries historically were higher, findings indicate that deaths from breast cancer in African women are much higher due to late presentation and diagnosis

(1, 2). However, breast cancer survival rates are highly disparate, from 80% in high-income countries, 60% in middle-income countries, and 40% in low-income countries.

Breast cancer survival (3) requires early detection and reporting to the hospital for treatment. Most breast cancer cases can be cured promptly with appropriate treatment. Hospital. (1). Nevertheless, breast cancer developing resistance can lead to treatment failures and disease progression. (4). There are even some complications where the cancer spreads to other parts of the body, such as the bone (5). Patients with malignancies/neoplasms are given essential anticancer medications. (6). Concerns about affordability, availability, and selection of anticancer medications are increasing in sub-Saharan Africa for patients at different stages of breast cancer. (7). The choice of anticancer medication contributes to the effect and outcome of chemotherapy. However, selecting drugs can be a seemingly challenging process since the medicines may not be used appropriately, and the goal of the therapy may not be achieved. (8). However, this can increase the cost of chemotherapy, have adverse drug reactions, and result in death. Management of cancer patients, however, is costly, where anticancer agents cover the most significant cost. This tends to drain patients' (and sometimes their relative's) pockets in the complex African and Ghanaian economic contexts, leaving them without the anticancer medications needed for treatment. The standard of care given to patients visiting hospitals elsewhere in the country must be generally the same. This study, therefore, tries to evaluate the current prescribing and use pattern of anti-breast cancer medications at the Department of Surgery/Oncology, Korle Bu Teaching Hospital (to be followed by a study at Komfo Anokye Teaching Hospital, another tertiary hospital in Ghana)

Worldwide, there are some guidelines for the management of all types of cancer, and different countries have adopted various strategies for the treatment of cancer in hospitalized and non-hospitalized patients. Although these guidelines exist for the management of cancer, for example, breast cancer, they are not adhered to strictly and/or they are different in most health facilities around the world, especially Ghana. (9). Such steps may have some consequences for the therapy, including reducing disease progression. Therefore, this study aims to assess Ghana's situation using tertiary health facilities. These institutions have a very defined system, well-trained surgeons, and experienced staff with the required competencies and infrastructures to offer tertiary advanced quality healthcare services. The first tertiary health care facility in this country that provides quality service to indigenes and foreign patients is KBTH. In this study, we assessed the effects of prescription patterns of anti-breast cancer medications on managing breast cancer at Korle-Bu Teaching Hospitals as a way of investigating the various anticancer agents used to manage breast cancer. This was done to find the average number of anticancer medications used in breast cancer management at KBTH and to know the type of breast cancer medication regimens used. We will assess the number of cycles of breast cancer medication regimen used in the management of the breast disease process at the KBTH.

## MATERIALS AND METHODS

**Methodology of the Study:** The study of prescription patterns of anticancer medication in breast cancer treatment at Korle Bu Teaching Hospital (KBTH) used a hospital-based

retrospective cross-sectional study design. It included study design, study sites, data collection, and statistical analysis.

**Study Design:** The methodology was a retrospective cross-sectional study that analyzed the existing data collected during the targeted period. This design was ideal for determining prescription patterns at a given interval and did not require follow-up with patients; the study had negligible resources and time requirements while maximizing historical data for a total analysis.

**Study Site:** The study was done at KorleBu Teaching Hospital (KBTH) in Accra, Ghana. The location for this study was an important consideration because of the high volume of breast cancer cases and the role that KBTH plays in the practices and treatment modalities throughout the region. This country's first tertiary health care facility provides quality service to indigenes and foreign patients. It is bounded to the south by the Korle Gono Township, to the east by Korle Lagoon, to the west by Mamprobi Township, and to the north by Lartebikorshie Township. The Korle-Bu Teaching Hospital has a 2000-bed capacity and admits about 250 patients /day with an average daily attendance of 1500 patients. Up to now, the largest department in KBTH is the Department of Surgery. It has a 612-bed capacity and above 860 staff strength.

Ten units, including General Surgery, Plastic Surgery, Trauma and Orthopedic Surgery, Urology, Neurosurgery, Cardiothoracic Surgery, Paediatric Surgery, Ophthalmology, Dental Surgery, and Ear, Nose, and Throat Surgery are currently available in the department. The surgical issues of breast, colorectal, hernia, vascular, and hepatic-pancreatic-biliary are managed by the General Surgery unit. The clinics run daily outpatient clinics in all of its units. The department also operates a 24-hour emergency and accident service. In the surgical outpatient department, 81,833 cases on average are attended yearly, of which 8,749 are admitted. For 2017 and 2018, breast cancer ranks highest in surgical admissions in the top ten causes. In 2017 and 2018, there were 358 and 445 total breast cancer patients on admission, a 24.3 percent increase (Korle-Bu Teaching Hospital, 2017, 2018).

**Study Period:** Data was collected from July 1, 2021, to December 30, 2021. The six-month selection period was timed to capture new data and reflect the current prescribing practices and the ease of access to administrative and health records. To compare the results, this study was carried out after a similar one at Komfo Anokye Teaching Hospital, another tertiary hospital.

**Study Population and Sample Size:** Breast cancer patients admitted to the Department of Surgery who satisfied the inclusion criteria were recruited.

$$n = \frac{(z)^2 * (p)(q)}{(d)^2}$$

$$n = \frac{(1.96)^2 * (0.187)(0.813)}{(0.05)^2}$$

$$n = 99$$

where

n = sample size (99)

$z = 95\%$  confidence level (1.96)

$p =$  proportion of cancer patients who have breast cancer in Ghana (0.187)

$q =$  proportion of cancer patients who do not have breast cancer in Ghana (0.813)

$d =$  accepted margin of error (0.05)

### Inclusion and Exclusion Criteria

#### Inclusion Criteria

- Patients diagnosed with breast cancer.
- Patients who received chemotherapy as part of their treatment regimen during the study period.
- Exclusion Criteria:
- Patients who did not receive chemotherapy.
- Records that were incomplete or had missing data regarding the treatment.

**Data Collection Technique:** To collect data, a specially designed questionnaire was developed to extract information systematically from the hospital's electronic medical record system (Logistics and Health Information Management System—LHIMS). In the data collection form, we captured much information about the different types of anticancer medications prescribed, dosages, frequency of administration, duration of therapy, and patient demographics such as age, gender, and stage of cancer.

**Statistical Analysis and Data Processing:** The extracted data were first entered into Microsoft Excel 2016, cleaned, and sorted out. Then, to ensure the accuracy, completeness, and consistency of the data entered, we proceeded to perform subsequent statistical analysis using STATA version 15.0.

It is primarily a descriptive analysis followed by using statistics to describe the patient's demographic behaviour as well as the patterns of prescription. The data was described with frequencies and percentages, and bar charts were used to show the frequency of each anticancer medication prescribed for each stage of breast cancer. The data was also looked at to analyze the patterns between the stages of cancer and how the prescription patterns varied.

**Ethical Considerations:** The Ethics and Protocol Review Committee of KBTH approved the conduct of this study. All data is anonymized and kept strictly confidential. Data collection obtained ethical approval before collection and procured procedures to minimize any harm that may have occurred to the participants.

## RESULTS

The data collected from 99 breast cancer patients treated at Korle Bu Teaching Hospital during the six-month study period has been analyzed in detail. Demographic characteristics, prescription patterns, and use of certain anticancer medications are among the factors examined.

**Demographic Characteristics of Patient:** The analysis of patient demographics revealed that a large majority (97.02%)

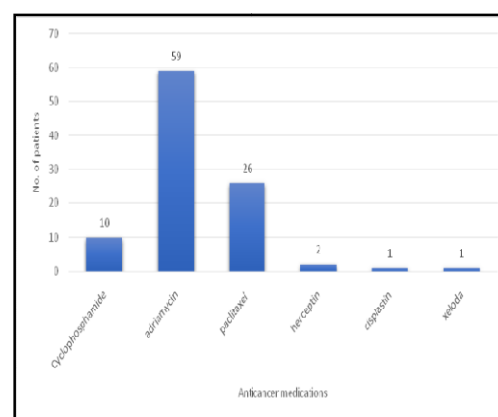
of these patients were female, consistent with the usually higher prevalence of breast cancer among women globally.

**Table 1. Demographic characteristics of patients**

Variable	Number	Percentage (%)
<b>Sex</b>		
Male	2	2.0
Female	96	97.0
Transgender	1	1.0
<b>Age</b>		
31 – 40	23	22.77
41 – 50	32	31.68
51 – 60	28	27.72
61 – 70	12	11.88
> 70	4	3.96
<b>Diagnosis</b>		
Right breast cancer	43	43.4
Left breast cancer	52	96.0
Bilateral breast cancer	4	100.0
<b>Stage of cancer</b>		
IIa	6	6.1
IIb	11	17.2
III	15	32.2
IIb	44	76.8
IV	7	83.8
IV	16	100.0

Then, the age group distribution from the study population indicated that the largest age group was 41 to 50, which accounted for 31.68 percent of the study population. This data supports the fact that at KBTH, breast cancer is most prevalent among older women.

**The Prescription Patterns of anticancer medications:** According to the study, the mean number of anticancer medications per patient was three. Adriamycin, Cyclophosphamide, and Paclitaxel were the most commonly prescribed medications, as they are used in breast cancer chemotherapy regimens.



**Figure 1. Anticancer medications prescribed for the management of breast cancer at KBTH**

**Table 2. Therapeutic classes of anticancer medications**

Therapeutic class	Anticancer agent	Frequency	Total
Alkylating agent	Cyclophosphamide	10	11
	Cisplatin	1	
Anthracycline antibiotic	Adriamycin	59	59
Antimetabolite	Capecitabine	1	1
Antimicrotubule agent	Paclitaxel	26	26
Monoclonal antibody	Herceptin	2	2

Figure 1 shows the anti-cancer medicines prescribed for respective cancer stages” in the relevant section of the text in the results. Most of the anticancer medications prescribed belonged to the alkylating agents (n=11), antimicrotubule agents (n=26), and anthracycline antibiotics (n=59) groups, while the least prescribed were the monoclonal-based antibody (n=2) (Table 2).

**Cancer Stage:** Anticancer Medications: The data also presented medication prescriptions by cancer stage. Indeed, Stage IIIb was predominant, with a high frequency of prescriptions, indicating that this stage of cancer undergoes vigorous treatment through chemotherapy.

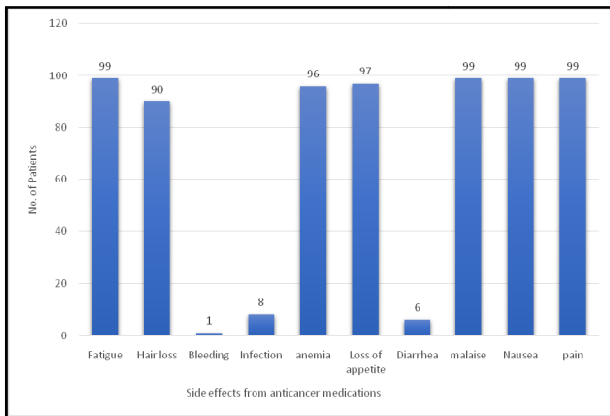


Figure 2. Cancer Stage and the Anticancer Medications Prescribed

Figure 2 depicts the number of medicines prescribed for respective cancer stages and the emphasis on aggressive treatment in the later stages.

**Anticancer medications prescribed at various stages of breast cancer:** Different medications were prescribed for varying stages of breast cancer. Adriamycin, cyclophosphamide, and paclitaxel were commonly prescribed at all stages of breast cancer. Cisplatin and gemcitabine were only prescribed for stages IIIc and IIIb breast cancer, respectively (Figure 3).

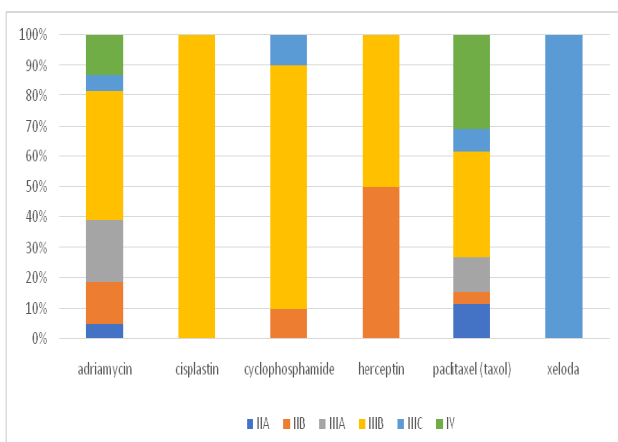


Figure 3. Symptoms in Common Experienced By Patients

**Reported Side Effects:** The study noted that all patients experienced at least one side effect from anticancer medication, with fatigue, nausea, and alopecia being the most common. This suggests that effective management of chemotherapy side effects can improve the patient’s quality of life during chemotherapy treatment. Figure 3 shows some

commonly reported side effects, such as fatigue, hair loss, bleeding, infections, anemia, loss of appetite, diarrhea, malaise, nausea, and pain.

Table 3. Stages and anticancer medications prescribed at KBTH for breast cancer patients

Variables	Hospital (n, %)
<b>Stage of Cancer</b>	
Ila	6 (6.06)
Iib	11 (11.11)
In	15 (15.15)
IIIb	44 (44.44)
IIIc	7 (7.07)
IV	16 (16.16)
<b>Anticancer medications</b>	
Adriamycin	83 (26.60)
Cyclophosphamide	81 (25.96)
Paclitaxel	87 (27.88)
Herceptin	40 (12.82)
Docetaxel	0 (0.00)
5-fluorouracil	11 (3.53)
Tamoxifen	3 (0.96)
Anastrozole	3 (0.96)
Capecitabine	2 (0.64)
Methotrexate	0 (0.00)
Goserelin	0 (0.00)
Carboplatin	0 (0.00)
Cisplatin	1 (0.32)
Gemcitabine	1 (0.32)

## DISCUSSION

The study results and implications for prescription patterns of anticancer drugs in breast cancer management are discussed. These patterns are contrasted with earlier studies and established guidelines, and these practices are critically analyzed to determine their potential for affecting patient outcomes.

This study involved the extraction of data from LHIMS of breast cancer patients at KBTH in Ghana. Patients in this study were predominantly females, which supports the assertion from a survey conducted in India, which indicated that approximately 12.5% of women and 0.001% of men develop breast cancer throughout their lifetime (10). Most patients were 41 and 50, with a mean age of  $50.09 \pm 11.36$  years. The latter is similar to a study conducted in British Columbia, where the average of patients was 58 years (11). However, most patients in a study conducted in Rwanda were aged above 50 years (12).

American Joint Committee on Cancer, seventh edition, defines stage I to II as early-stage disease, stage IIIa to IIIb as locally advanced disease, and stage IIIc to IV as metastatic disease (13). 44% of the patients had stage IB breast cancer, which is considered locally advanced. This is comparable to a study by O’Neil et al. (2018), which indicated that almost half of the participants (44.1%) had a locally advanced disease (12). This high prevalence of stage IIIb cancer in this study, however, is a concerning issue in that many of these patients are already presenting with advanced disease. This is consistent with a trend observed in other parts of Africa, where this trend hints at possible flaws in early detection and public health education. Like at KBTH, Banegas et al. (2012) report that late-stage presentation is common in low-resource settings due to insufficient screening and awareness (2). By improving early detection strategies, this trend might move toward earlier

stages where treatment is more often successful at less intensity (2). The similarities between the data from KBTH, which shows heavy use of Adriamycin, Cyclophosphamide, and Paclitaxel, as an essential finding and as conforming to international guidelines that recommend these drugs as a means to treat breast cancer. This concordance indicates that KBTH is following worldwide recognized oncological protocols, a prerequisite for breast cancer treatment's effectiveness. Studies by Waks and Winer (2019) have shown the importance of alignment in improving patient survival and reducing recurrence (6).

Consistent with the multi-drug approach recommended in the literature for treating breast cancer effectively, the finding is that the majority of prescriptions are a combination of three drugs. Here, we aim to develop this approach to apply to various stages of the cancer cell growth cycle to improve treatment efficacy but potentially restrain the development of resistance. Denduluri et al. (2018) support the use of combined regimens and note that drugs such as Paclitaxel and Adriamycin, which also were prominent in the KBTH data, are beneficial (8). The intense nature of chemotherapy regimens used and the need for supportive care are indicated in the universal report of side effects such as fatigue, nausea, and alopecia made by the study population. Since these side effects are directly related to the patient's adherence to treatment and quality of life, managing them is essential. Fisusi and Akala (2019) outline protocols innovative ways to eliminate these adverse effects through targeted drug delivery systems or better symptom management protocols in their research. (14), which may be applied at KBTH. The implications of this study should be used to support future practice at KBTH and similar institutions. Healthcare providers must be educated and trained to keep abreast of current chemotherapy protocols and management strategies for side effects. The study also underscores the role of enhanced public health promotion in improving earlier breast cancer detection and enhancing outcomes. In particular, this discussion showed that, although KBTH prescription practice for breast cancer chemotherapy aligns with international standards, there exist challenges, especially in early cancer detection and side effect management. Improving patient outcomes and improving the overall utilization of breast cancer treatment in Ghana requires addressing these challenges.

Korle Bu Teaching Hospital (KBTH) has offered one of the few studies examining prescription patterns of anticancer to breast cancer patients in the developing world during the study conducted at this central health facility in Ghana, including how it adheres to national and international treatment guidelines. What was discovered through this research is the kinds of medications they've been prescribed, how they've been used, and what stage of breast cancer they have been present. However, this information is also helpful in assessing the quality of breast care delivered at KBTH and may be used to identify areas where improvements might be made. Although prescription patterns at KBTH don't fully mirror global oncological standards, they correlate very well with the use of Adriamycin, Cyclophosphamide, and Paclitaxel. Because they are effective in treating breast cancer, and in particular the neoadjuvant and adjuvant settings, these medications are endorsed by international oncology guidelines. The frequent use of these drugs emphasizes that KBTH is determined to implement the best evidence-based, routine treatment protocols. The critical area of concern is highlighted by the fact

that advanced-stage breast cancer at presentation is prevalent, predominantly stage IIIb. Several factors, including, but not limited to, lack of access to early screening programs, population unawareness of primary information, and potentially socioeconomic barriers that deter early healthcare engagement may have contributed to its late-stage diagnosis achievement at KBTH. The trend is similar to the experience in much of Africa, where late presentation is a common dilemma with significant downstream implications for treatment outcomes. Early detection is and will remain a problem, and we need urgent strategies to engage patients in the healthcare system earlier in their disease course. For instance, public health campaigns to increase breast cancer awareness, availability of affordable screening programs, and bringing breast cancer screening into the primary healthcare service are some of these which could be implemented in one way or the other. Furthermore, the side effects from the patients' chemotherapy regimens affected almost all patients, with fatigue, nausea, and hair loss being the most reported. This finding underscores the need for symptom management and supportive care to be incorporated into treatment protocols. These side effects need to be managed not only to improve the patient's quality of life but also to improve the patient's compliance with prescribed treatment regimens. For patients undergoing chemotherapy, these protocols could greatly benefit the development of protocols for routine assessment and management of chemotherapy-related side effects. These findings are broad and vital. Healthcare providers at KBTH and similar institutions have a clear direction right from the outset: vigilance on evidence-based guidelines for chemotherapy and ongoing improvements in supportive care practices. The data offers a call to arms to policymakers to strengthen national cancer control programs, particularly in areas of early detection and public education that show promise in addressing the increasing burden of late-stage diagnosis. Future research should attempt to probe deeper into why breast cancer is diagnosed so late in Ghana — especially with qualitative studies of patient, provider, and systemic factors. Longitudinal studies could contribute insights into outcomes over the longer term for the prevalent KBTH prescription patterns observed and thus refine or even personalize chemotherapy protocols to better fit the patient population.

## CONCLUSION

This study notes the strengths and weaknesses of treating breast cancer at Korle Bu Teaching Hospital. KBTH has solid evidence-based treatment protocol by adhering to the set chemotherapy. Nevertheless, late-stage presentation and the treatment-related side effects represent opportunities for significant improvements in patient care. To address these challenges, everyone contributes, from hospital administration to healthcare providers, policymakers, and our community. Strengthening screening programs, increasing public awareness, and creating a better patient support system are key to improving breast cancer outcomes in Ghana. Cancer care is likely to see improvements in the survival rate and quality of life for patients by productive research collaborations and developing policies for public healthcare.

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