

A Systematic Review on Prescription Pattern of Breast Cancer in Indian Hospitals

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ABSTRACT— Background: In India, breast cancer stands as the most prevalent cancer among women, with an increasing incidence and notable differences in treatment approaches. It is essential to comprehend the trends in chemotherapy and supportive care prescriptions to enhance patient outcomes.

Objective: This systematic review aims to evaluate the prescribing patterns of chemotherapeutic and supportive drugs in Indian hospitals, examining adherence to treatment protocols and identifying obstacles in breast cancer management.

Material and Methods: A thorough literature review was performed, encompassing peer-reviewed studies published from 2017 to 2024. The review included studies that addressed chemotherapy regimens, hormonal and targeted therapies, adverse drug reactions (ADRs), and compliance with treatment guidelines. Data from the selected studies were analyzed to uncover trends in prescribing practices.

Results: The most frequently prescribed chemotherapeutic agents were Cyclophosphamide (77-92%) and Doxorubicin (68.57-79.1%), with 5-Fluorouracil (18.75-44.29%) also being commonly utilized. The ACT regimen (Adriamycin, Cyclophosphamide, Taxanes) and the combination of Cyclophosphamide and Doxorubicin were the predominant treatment protocols. Supportive medications, including Dexamethasone (61.2%) and Ondansetron (50.8%), were widely used to alleviate chemotherapy-related toxicities. Despite a strong adherence to established guidelines, challenges such as delays in treatment initiation, non-compliance, and incomplete chemotherapy—especially in rural areas—remain prevalent.

Conclusion: This study reveals a notable consistency in chemotherapy choices across Indian hospitals, in line with international treatment guidelines. However, variations in prescribing practices are influenced by institutional disparities, resource constraints, and patient-related factors. It is crucial to address issues of non-compliance and treatment discontinuation to enhance breast cancer management and improve patient outcomes in India.

I. INTRODUCTION

Breast cancer ranks among the foremost causes of cancer-related mortality in women globally, with India experiencing a consistent rise in its incidence over recent decades.[1] It stands as the most prevalent cancer among Indian women, with a considerable proportion of cases identified at advanced stages due to delayed diagnosis and insufficient awareness. As the incidence of breast cancer continues to escalate, it is essential to comprehend the prescribing trends of chemotherapeutic and supportive medications to enhance treatment efficacy and patient outcomes.[2,6]

Breast cancer treatment typically involves a multidisciplinary approach, combining surgical procedures, chemotherapy, radiation therapy, hormonal treatments, and targeted therapies. The selection of treatment regimens is determined by various factors, including the stage of the tumor, receptor status, patient comorbidities, and institutional protocols. In India, healthcare facilities adhere to treatment guidelines derived from international standards, such as those established by the National Comprehensive Cancer Network (NCCN) and the European Society for Medical Oncology (ESMO), in addition to national guidelines from the National Cancer Grid.. Nonetheless, discrepancies in prescribing practices are noted, influenced by variations in hospital resources, physician preferences, and the availability of medications.[3,4]

Chemotherapy serves as the foundation of breast cancer treatment, with agents such as Cyclophosphamide, Doxorubicin, and 5-Fluorouracil being commonly utilized. Hormonal therapies, including Tamoxifen and Aromatase inhibitors, are administered to patients with estrogen receptor (ER)-positive tumors, while HER2-targeted therapy using Trastuzumab is reserved for HER2-

positive cases. Supportive care medications, such as antiemetics, corticosteroids, and growth factors, are crucial in alleviating the toxicities associated with chemotherapy.[5]

This systematic review seeks to examine the prescribing patterns for breast cancer treatment in Indian hospitals, assessing the commonly utilized medications, adherence to established treatment protocols, and the occurrence of adverse drug reactions. The results will offer valuable insights into current clinical practices and identify potential areas for enhancement.[6,7,8,9]

II. MATERIALS AND METHODS

A comprehensive literature review was carried out, focusing on peer-reviewed articles published in both Indian and international journals. Research papers were sourced from various databases, including PubMed, Scopus, Google Scholar, and Indian medical journals. The search utilized specific keywords, including "breast cancer prescription patterns," "chemotherapy practices in Indian hospitals," "adherence to breast cancer treatment," and "adverse drug reactions associated with breast cancer therapy."

Inclusion Criteria: Studies conducted in Indian hospitals focusing on breast cancer prescription patterns, observational, prospective, or retrospective studies analyzing chemotherapy regimens and supportive drugs, studies published between 2017 and 2024, research that discusses adherence to national and international guidelines for breast cancer treatment.

Exclusion Criteria: Studies conducted outside India, case reports, letters to editors, and studies with insufficient data articles not published in peer-reviewed journals.

Data from selected studies were extracted and categorized based on prescribed drugs, treatment regimens, ADRs, and adherence to guidelines. A qualitative synthesis of findings was performed to identify trends in prescribing behavior across different hospitals.

III. RESULT

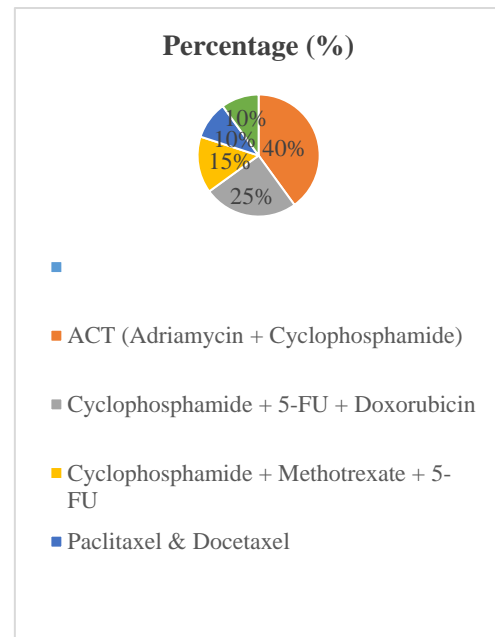


Fig 1: Pie chart illustrating the prescription patterns of breast cancer treatment in Indian hospitals.

Commonly Prescribed Chemotherapy Regimens: An analysis of selected studies reveals that Cyclophosphamide, Doxorubicin, and 5-Fluorouracil (5-FU) are the predominant chemotherapeutic agents utilized in Indian hospitals. The Adriamycin and Cyclophosphamide (ACT) regimen, often followed by Paclitaxel, is particularly favored. Additional frequently prescribed regimens include Cyclophosphamide + 5-FU + Doxorubicin, Cyclophosphamide + Methotrexate + 5-FU, and Paclitaxel and Docetaxel for HER2-positive cases.

Table 1: Result findings.

Patient Demographics	<ul style="list-style-type: none"> - Majority aged 50-69 years - 100% female patients - Many were post-menopausal
Common BC Types & Stages	<ul style="list-style-type: none"> - Ductal infiltrating (46.3%) and ductal invasive (35.8%) were the most common types - The majority of cases were in Stages III (53.2%) and 25.9%.
Receptor Status	<ul style="list-style-type: none"> - Oestrogen-positive (18.4%) - Progesterone-positive (16.4%) - HER2-positive (6.5%) - Some studies found triple-negative and HER2+ tumors to be common
Most Used Chemotherapy	<ul style="list-style-type: none"> - Cyclophosphamide (77-92%) - Doxorubicin (68.57-79.1%) - 5-Fluorouracil (18.75-44.29%) - Paclitaxel and carboplatin also

Agents	used but less frequently
Chemotherapy Strategies	- Adjuvant chemotherapy (78.1%) is more common than neoadjuvant (13-16.9%)
Common Supportive Medications	- Dexamethasone (61.2%) - Ondansetron (50.8%) - Palonosetron (32.8%) - Pantoprazole (25.4%) - PEG-filgrastim (16.9%) - Promethazine (53.3%)
Adverse Drug Reactions (ADRs)	- Most common: Nausea, vomiting, alopecia, blackened nails - Highest ADRs with Cyclophosphamide + Doxorubicin + 5-FU - 60.11% ADRs were preventable - 74.15% ADRs were mild (level 1 severity)
Compliance & Treatment Improvements	- 80-85% compliance in drug selection - 74-82.3% compliance in dosing - 63.5-86.9% compliance in administration - Increased 75–92% compliance with chemotherapy-induced nausea and vomiting (CINV) management
Challenges in BC Treatment	- Delayed treatment initiation (median delay: 11 days) - Non-compliance & incomplete chemotherapy in rural settings - Poor follow-up & lack of receptor status testing (only 41.4% tested for ER, PR, HER2 status)

Hormone Therapy and Targeted Therapy: For patients diagnosed with estrogen receptor (ER)-positive breast cancer, Tamoxifen and Aromatase inhibitors (such as Anastrozole and Letrozole) are commonly administered. Patients with HER2-positive breast cancer benefit from Trastuzumab therapy, which is frequently combined with other chemotherapeutic agents.

Adverse Drug Reactions (ADR) and Supportive Therapy: Common adverse drug reactions include nausea, vomiting, hair loss, darkening of nails, fatigue, and neuropathy. To alleviate chemotherapy-induced toxicities, supportive medications such as Ondansetron and Palonosetron (antiemetics),

Dexamethasone (a corticosteroid), and Peg-Filgrastim (a growth factor) are employed.

Compliance with Guidelines: The majority of studies indicate a high level of adherence to established treatment protocols, including those outlined by the WHO Essential Drug List and the National Cancer Grid. Nonetheless, variations in prescribing practices arise due to institutional differences, often influenced by the availability of medications and economic factors.

IV. DISCUSSION

Breast cancer (BC) continues to be one of the most common cancers impacting women globally. The treatment of BC encompasses a multifaceted approach that includes chemotherapy, targeted therapies, and supportive care, all designed to enhance patient survival rates and overall quality of life.

One essential part of treating breast cancer is chemotherapy, particularly in cases that are aggressive or progressed. Both studies identified cyclophosphamide and doxorubicin as the most commonly administered chemotherapeutic agents. 92% of the cases in the current study used cyclophosphamide, and 79.1% used doxorubicin.

Basini J, et.al, identifies Cyclophosphamide, Doxorubicin, and 5-FU as the main chemotherapeutic agents. The ACT regimen, which includes Adriamycin, Cyclophosphamide, and Taxanes, is the most commonly prescribed treatment in both studies. In my research, the use of Trastuzumab (10.6%) was not emphasized in Jyothi Basini's findings, indicating a divergence in treatment patterns for HER2+ patients.[10]

In contrast, Khadela A.'s, et.al, research noted cyclophosphamide usage at 77% and doxorubicin at 68.57%. Additionally, 5-fluorouracil was frequently prescribed in both studies, with a slightly higher rate in Khadela A.'s study (44.29%) compared to the current study (37.8%). Paclitaxel and carboplatin were less commonly used in both investigations.[11]

Sharma A, et.al, in comparison to our research, underscore the significance of Cyclophosphamide, Doxorubicin, and 5-FU as the main chemotherapeutic agents, with ACT being a frequently utilized regimen. In contrast, Paclitaxel and carboplatin were administered less often.[12]

Shah A, et.al, study compared to our study indicated that Cyclophosphamide and Doxorubicin as primary chemotherapeutic agents, with ACT (Adriamycin, Cyclophosphamide, Taxanes) as a common regimen.[13]

Renuka L. Kadam, et.al, study also indicates that Cyclophosphamide and Doxorubicin as the most prescribed agents, followed by 5-Fluorouracil (5-FU).[14]

Nene M, et.al, in contrast to our research, highlight Cyclophosphamide and Doxorubicin as the main agents in chemotherapy. The regimens of ACT and Cyclophosphamide combined with Doxorubicin are frequently employed. Paclitaxel is administered in subsequent cycles; however, issues such as non-compliance and incomplete treatment persist, particularly in rural areas.[15]

The similarities in chemotherapy selections indicate a general adherence to established breast cancer treatment guidelines, although variations in drug combinations and dosing may arise due to institutional practices and individual patient considerations.

V. CONCLUSION

This systematic review examines the prescribing trends for breast cancer treatment in Indian hospitals. The results reveal that Cyclophosphamide, Doxorubicin, and 5-FU continue to serve as the foundational elements of chemotherapy, while hormone and targeted therapies are consistent with established guidelines. Although there is a strong adherence to evidence-based practices, discrepancies arise due to variations in hospital resources and physician preferences.

The analysis of prescription trends across various studies consistently identifies Cyclophosphamide and Doxorubicin as the main chemotherapeutic agents, with the ACT regimen (Adriamycin, Cyclophosphamide, Taxanes) and the combination of Cyclophosphamide and Doxorubicin being the most commonly utilized. 5-Fluorouracil is frequently prescribed as well, although its application can differ. Paclitaxel is generally introduced in the later stages of treatment, while the implementation of HER2-targeted therapies such as Trastuzumab varies. Despite the existence of

standardized treatment protocols, challenges such as non-compliance, incomplete treatment, and delays in starting therapy persist, especially in rural areas.

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