

A Prospective Observational Study on the Prescription Pattern of Anticancer Drugs and Adverse Reactions of Chemotherapy in Patients with Breast Cancer

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ABSTRACT

Background: Every hospital should conduct a periodic study of prescription patterns as a potential tool for determining the function of pharmaceuticals in society.

Objective: The study's primary goals were to evaluate prescription patterns and frequent adverse reactions in individuals undergoing breast cancer chemotherapy.

Materials and methods: At the American Oncology Institute in Guntur, a prospective observational study was carried out. The breast cancer patients who met the inclusion criteria underwent a six-month period of purposive sampling in a daycare centre. Information about the patient's demographics, recommended medications, and adverse responses was gathered using a standard data collection form.

Results: The study included 230 patients with breast cancer who, according to the study, were found to be in the 50–60-year age range. Of the 230 patients, 117 had left breast cancer and 113 had right breast cancer; 226 of the patients were female and 4 were male. The most frequently used chemotherapeutic agent was cyclophosphamide (26%), which was followed by docetaxel (19%) and Adriamycin (14%). Adriamycin + Cyclophosphamide was the most frequently suggested regimen, followed by Docetaxel + Carboplatin + Trastuzumab. The most often reported ADR was nausea, which was

followed by alopecia, fatigue, vomiting, and skin rashes.

Conclusion: The medication most frequently prescribed was cyclophosphamide. ADR incidence was highest when cyclophosphamide and Adriamycin were used. Despite receiving prophylactic antiemetic medication, the majority of patients experienced nausea and vomiting. This suggests that more steps should be taken to prevent emesis, as these adverse drug reactions (ADRs) associated with antineoplastic medicines are typically avoidable.

Keywords: breast cancer, prescription medications, anti-cancer drugs, breast cancer therapy, adverse effects.

INTRODUCTION

Breast cancer is a condition when the breast's cells grow abnormally. Although it is more common in women, men can still develop breast cancer. Approximately 1 in 100 males will get a breast cancer diagnosis. Breast cancer is the most frequent cancer globally, accounting for 12.5% of all new cases reported

each year. In 2020, breast cancer killed 685 000 lives worldwide. Breast cancer occurs more frequently than once per million in developed nations. The mortality rate from

breast cancer is higher in low- and middle-income nations than in developing countries, where it is less than 200 per million. These differences can be attributed to inadequate health care facilities, late-stage diagnosis, and lack of awareness of breast cancer signs and symptoms. A study conducted in 2020 found that 1,78,000 new cases of breast cancer were reported in India.

Chemotherapy, which involves using cytotoxic chemicals to kill cancer cells, is one of the main treatments for many forms of cancer. Generally, it functions by preventing the cancer cells from proliferating, dividing, and dividing again. It can be used to reduce a tumor before surgery, or it can be used after surgery to remove any cancer cells that are still present and stop cancer from coming back.

A method to evaluate prescription drug use is by investigating at prescription patterns. It is employed to examine the anticancer medications and pharmacological classes being administered for treatment. It is employed to assess the continuous treatment's effectiveness and safety. Due to the development of newer medications and a greater understanding of the underlying pathophysiology of cancer, the prescription pattern for anticancer treatments has changed dramatically in recent years. Any undesirable or unintentional reaction to a medication used in chemotherapy that happens at normal dosages for cancer prophylaxis and treatment is referred to as an adverse drug reaction. Compared to all other drug classes, antineoplastic medications appear to be responsible for the majority of adverse drug reactions. By substituting the target drug with an appropriate substitute or altering the drug dose schedule, the identification of ADRs may aid in limiting the harm.

This study aims to analyse treatment, gather data on the number of patients exposed to a specific drug or class of drugs, provide patterns of drug consumption, and examine the most often prescribed chemotherapy agents as well as the incidence of adverse

reactions. Therefore, the purpose of the current study was to examine both chemotherapeutic agent prescription pattern and adverse reactions occurred in breast cancer patients.

MATERIALS & METHODS

To evaluate the drugs prescription pattern and adverse reactions in breast cancer patients, a prospective observational study based in a hospital was designed. The study was carried out at the American Oncology Institute's Guntur day care center, which is part of the medical oncology department. There was a six-month timeframe for data gathering. Using a specially created data collecting form, the information was gathered from the hospital's inpatient prescription records.

Following an analysis of their prescriptions, the following information was noted demographics, diagnosis, quantity of medications prescribed, mode of administration, frequency of dosage, length of prescription, and prescription by brand or generic name. Patients were asked, via a pre-made, standardized proforma, if there had been any adverse drug reactions during the previous cycle of chemotherapy.

Microsoft Excel was used to enter the data (Windows 10, Version 2021). Descriptive statistics like frequencies and percentages were used to analyse the gathered data on demographic and clinical factors, and the results were displayed in tables and figures. The demographic profile, clinical profile, prescription pattern, and adverse reactions were interpreted using descriptive statistics namely frequencies and percentage.

RESULTS

S.no	Gender	No. of patients	Percentage (%)
1	Males	04	2%
2	Females	226	98%

Table 1: Gender Wise Distribution

within the population under research. Of the 230 patients that were part of the study, 4 (2%) were men and 226 (98%) were females.

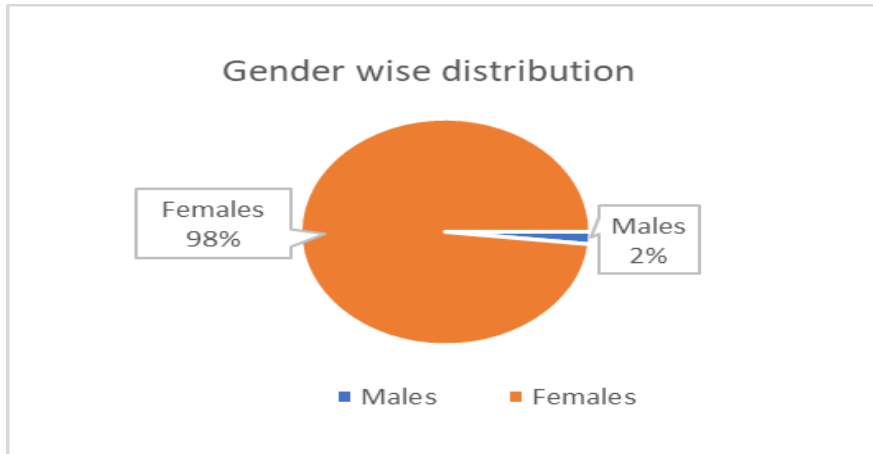


Fig 1: Gender wise distribution

When the distribution pattern of breast cancer patients was examined for gender, the results showed that women were more likely than men to get breast cancer.

Age group	21-30	31-40	41-50	51-60	61-70	71-80	81-90	Total
No. of patients	1	17	68	82	50	11	1	230
Percentage (%)	0.434	7.391	29.565	35.652	21.739	4.782	0.434	99.99%

Table 2: Age wise distribution of patients

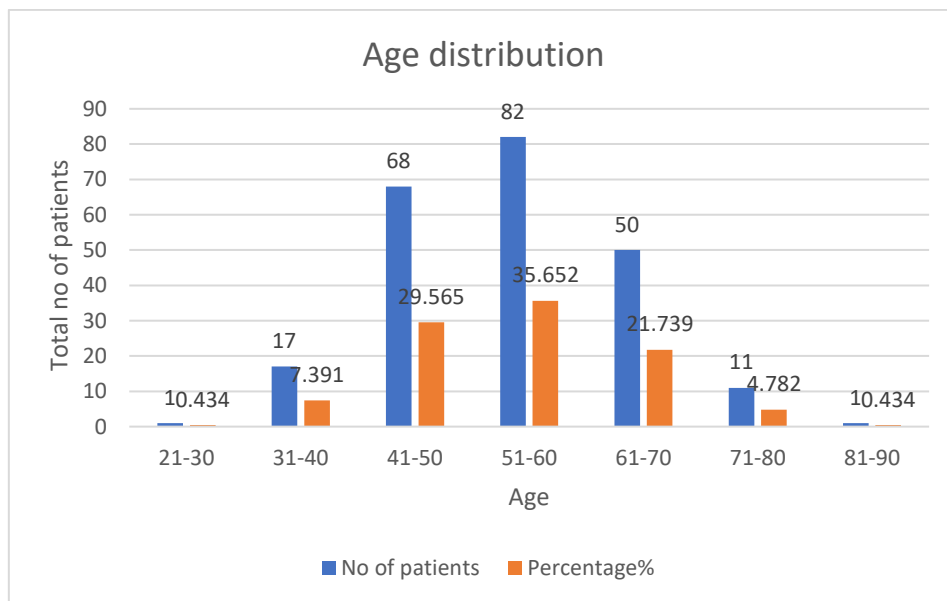


Fig 2: Age group wise distribution

Out of 230 individuals, it was discovered that the majority of breast cancer cases (n = 82) occurred in the age range of 51–60. 35.76%.

S. No	Type of breast cancer	No. of patients	Percentage (%)
1	Right breast cancer	113	49%
2	Left breast cancer	117	51%

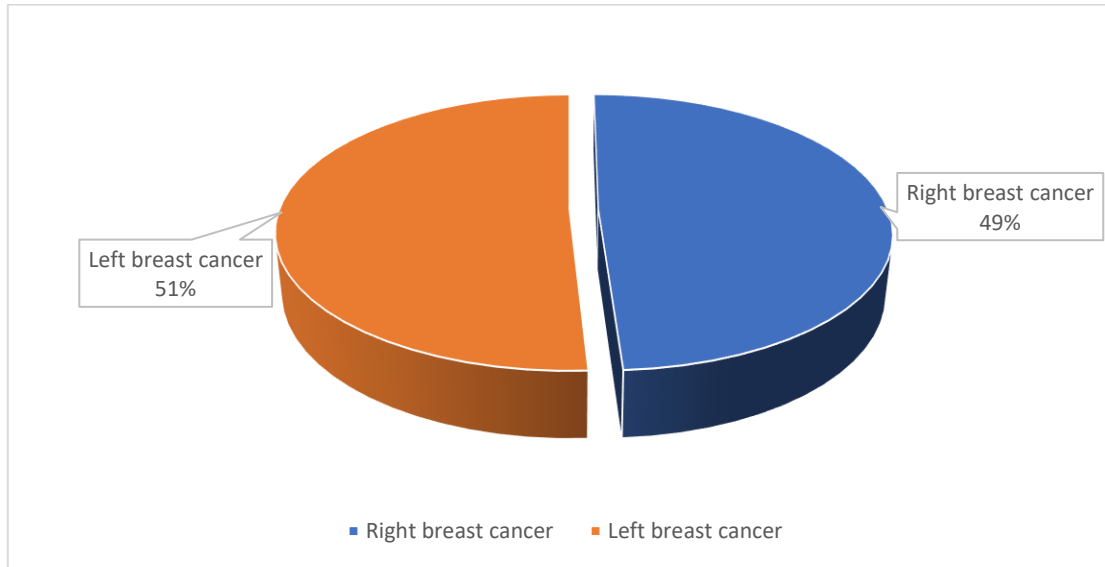


Table 3 & Fig 3: Type of breast cancer

Within the 230 patients It is known that 113 patients have been diagnosed with right breast cancer and 117 patients with left breast cancer.

S. No	Type of therapy	No. of patients	Percentage (%)
1	Monotherapy	51	22
2	Combination therapy	179	78

Table 5: Type of therapy

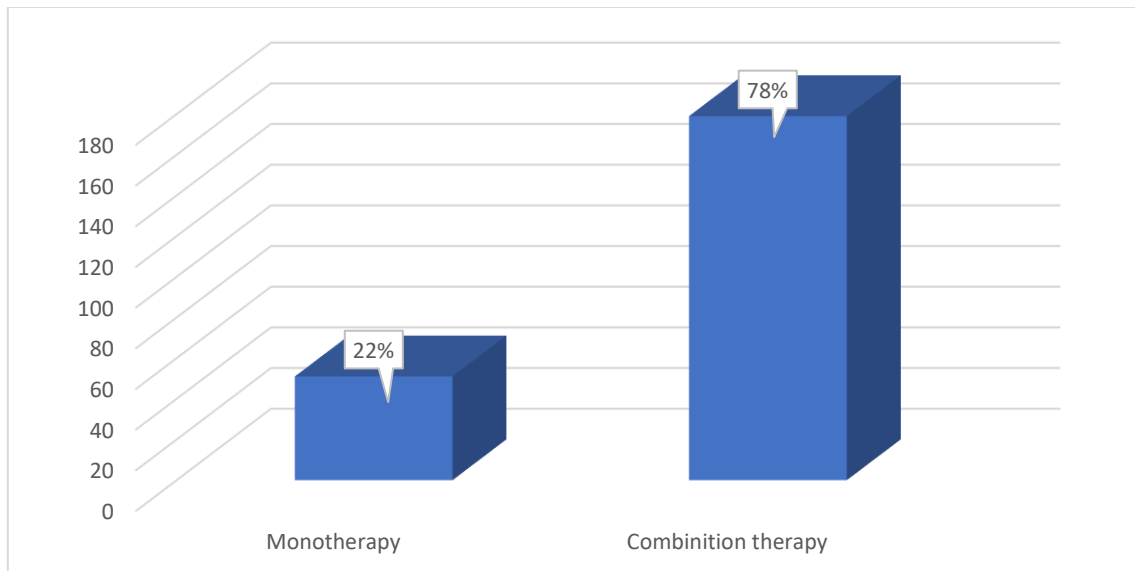


Fig 4: Type of therapy

Among the 230 patients in this study, 51 patients (22.1%) received monotherapy, and 179 individuals received it. Combination therapy (77.9%).

S. No	Drug name	No. of patients	Percentage (%)
1	Adriamycin	1	2
2	Cisplatin	1	2
3	Epirubicin	2	4
4	Oxaliplatin	2	4
5	Fluorouracil	2	4
6	Vinorelbine	3	6
7	Carboplatin	4	8
8	Gemcitabine	6	12

9	Paclitaxel	11	21
10	Docetaxel	19	37
	Total	51	100%

Table 5: Monotherapy prescribed drugs

The majority of prescribed monotherapeutic drugs, such as docetaxel, are frequently administered to 19 (37.25%) p shown in Table 8, the most often administered anti-cancer medications are cyclophosphamide n = 117 (25.82%) and docetaxel n = 85

(18.76%), followed by Adriamycin for 63 people (13.90%), vinorelbine n = 7 (1.54%), cisplatin n = 3 (0.66%), and oxaliplatin n = 2 (0.44%) for fewer patients in addition to paclitaxel (n = 11; 21.56%); and carboplatin (n = 4; 7.84%)

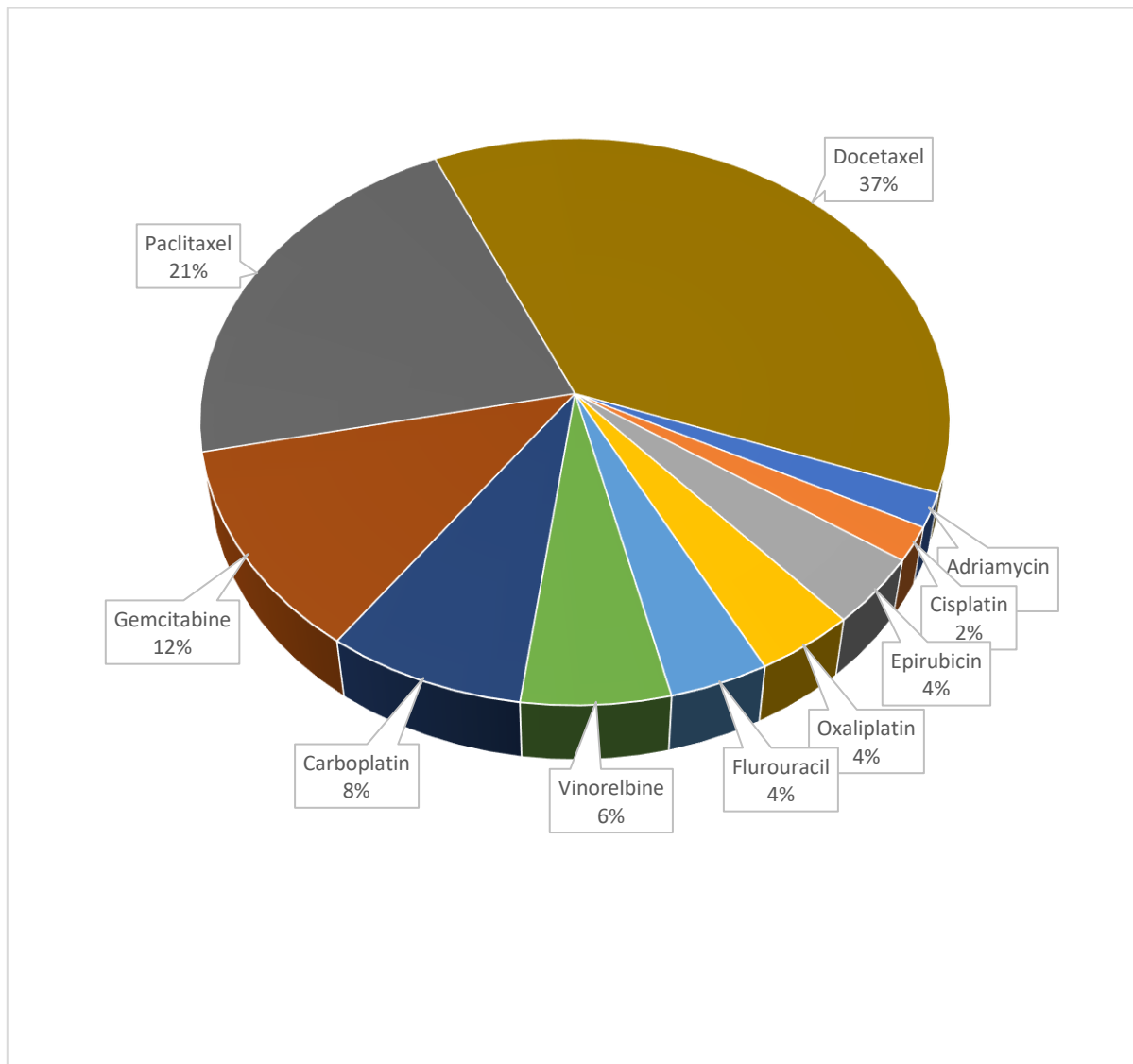


Fig 5: Drugs prescribed for monotherapy

S. No	Regimen	No. of patients	Percentage (%)
1	Adriamycin + Cyclophosphamide	61	34
2	Docetaxel + Carboplatin + Trastuzumab	27	15
3	Docetaxel + Cyclophosphamide	26	15
4	Cyclophosphamide + Methotrexate + Fluorouracil	13	7
5	Epirubicin + Cyclophosphamide	12	7
6	Docetaxel + Trastuzumab	7	4
7	Paclitaxel + Carboplatin	7	4
8	Gemcitabine + Carboplatin	4	2
9	Vinorelbine + Trastuzumab	4	2

10	Docetaxel + Cyclophosphamide + Trastuzumab	3	2
11	Gemcitabine + Cisplatin	3	2
12	Epirubicin + Cyclophosphamide + Fluorouracil	2	2
13	Docetaxel + Carboplatin	2	2
14	Paclitaxel + Trastuzumab	2	2
15	Gemcitabine + Trastuzumab	2	2
16	Adriamycin + Cyclophosphamide + Paclitaxel	1	1
17	Gemcitabine + Carboplatin + Trastuzumab	1	1
18	Carboplatin + Trastuzumab	1	1
19	Gemcitabine + Docetaxel	1	1
	Total	179	100%

Table 6: Regimens prescribed for breast cancer patients/ Drugs prescribed for combination therapy

The various chemotherapy regimens used by the research subjects are displayed in Fig. 6. The commonly prescribed combination was Adriamycin + Cyclophosphamide (AC) n =

61 (34.8%), followed by Docetaxel + Carboplatin + Trastuzumab (TCH) n = 27 (15.9%)

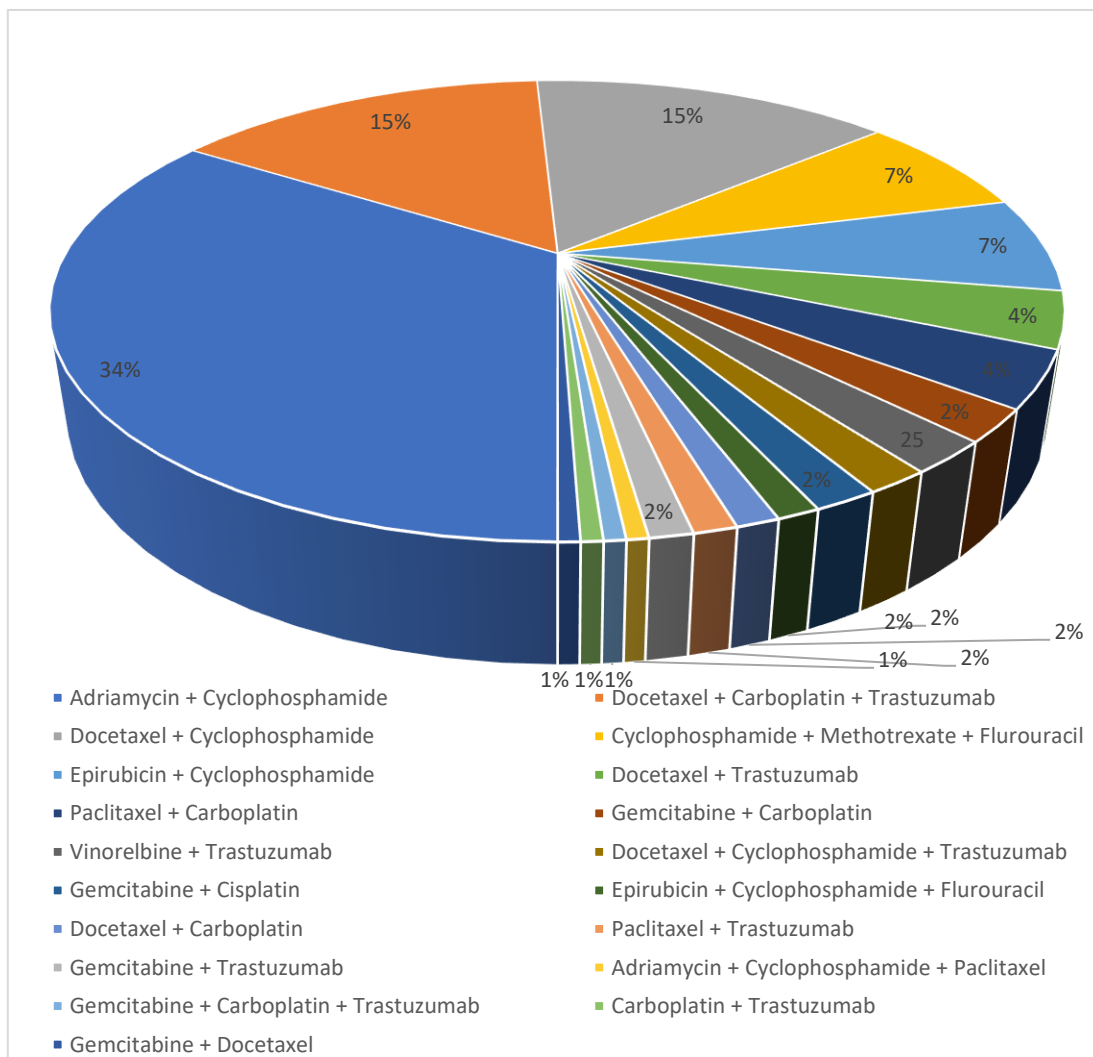


Fig 6: Regimens prescribed for breast cancer patients/ Drugs prescribed for combination therapy

S. No	Drugs prescribed	No. of patients (n)	Percentage (%)
1	CYCLOPHOSPHAMIDE	117	26
2	CARBOPLATIN	46	10
3	CISPLATIN	3	1
4	OXALIPLATIN	2	0
5	METHOTREXATE	13	3
6	FLUOROURACIL	17	4

7	GEMCITABINE	17	4
8	VINORELBINE	7	1
9	DOCETAXEL	85	19
10	PACLITAXEL	21	5
11	ADRIAMYCIN	63	14
12	EPIRUBICIN	16	3
13	TRASTUZUMAB	46	10
	Total	453	100%

Table 7: Drugs prescribed

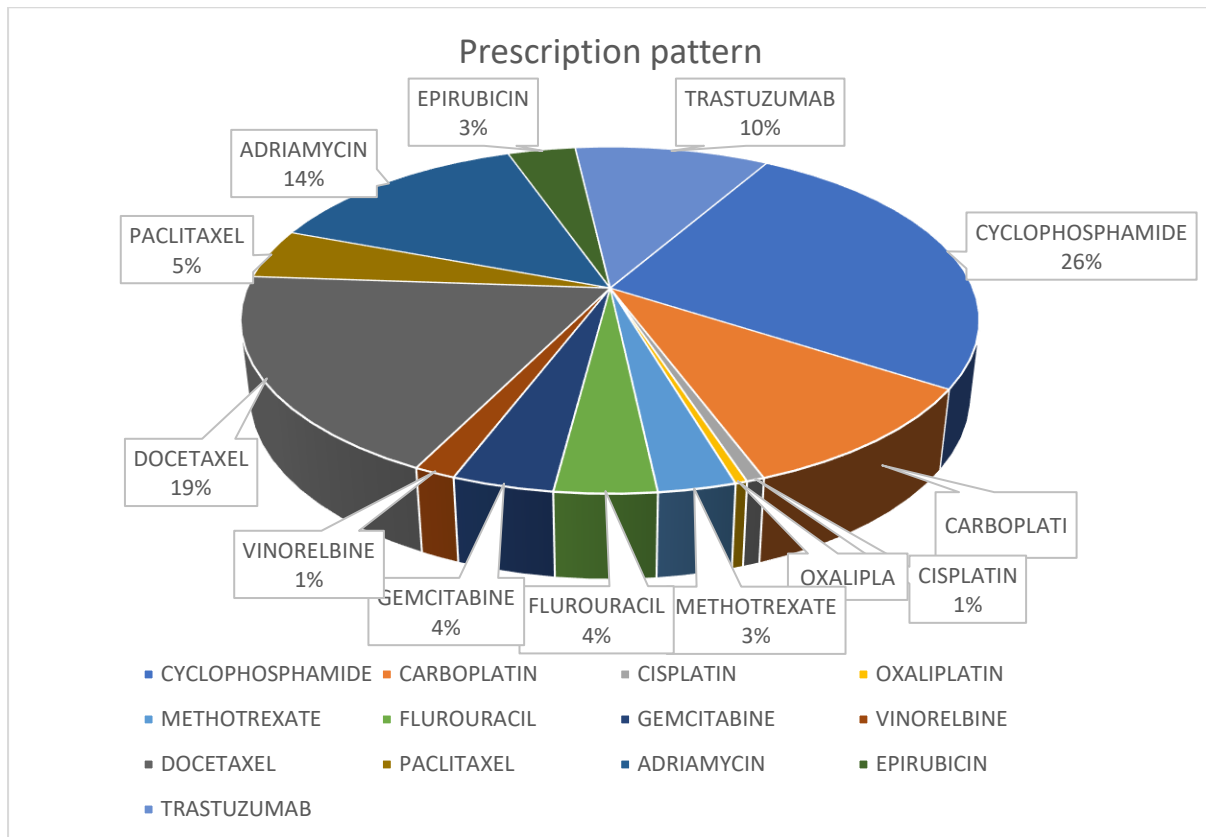


Fig 7: Prescription pattern of anticancer drugs for breast cancer patients

As shown in Table, the most often administered anti-cancer medications are cyclophosphamide n = 117 (25.82%) and docetaxel n = 85 (18.76%), followed by

Adriamycin for 63 people (13.90%), vinorelbine n = 7 (1.54%), cisplatin n = 3 (0.66%), and oxaliplatin n = 2 (0.44%) for fewer patients

S.NO	Adverse Reactions	No. of patients (n)	Percentage (%)
1	Nausea	120	20.547
2	Alopecia	104	17.808
3	Fatigue	71	12.157
4	Vomiting	66	11.301
5	Skin rashes	56	9.584
6	Diarrhea	40	6.849
7	Nail changes	37	6.335
8	Dizziness	30	5.136
9	Headache	26	4.452
10	Fever	23	3.938
11	Anemia	21	3.595
12	Anorexia	18	3.082
13	Constipation	16	2.739
14	Weight loss	8	1.369
15	leukopenia	4	0.684
16	Swelling of face	2	0.342
17	Back pain	2	0.342

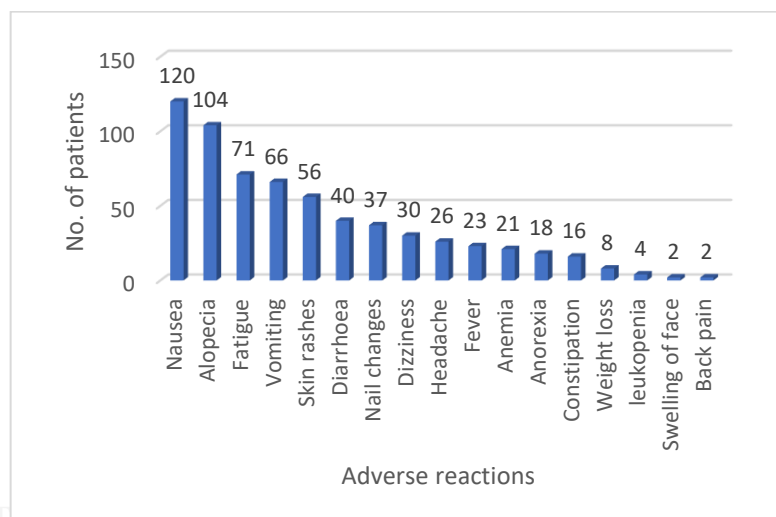


Table 8 & Fig 8: Adverse Reactions of Chemotherapy

The most frequent adverse responses among chemotherapy patients were alopecia and nausea, which were recorded by 20.547% and 17.808% of the patients, respectively. Fatigue was reported by 12.157% of the patients, and vomiting was reported by 11.301% of the patients. It was discovered that the most rarely reported adverse medication reactions were facial swelling and back pain. The findings of Basavanna et al., which showed that 18.33% of patients experienced alopecia and 25.83% of patients suffered nausea and vomiting, support this. Table 7 indicates that the most probable cause of the adverse medication responses was cyclophosphamide, which was followed by Adriamycin and docetaxel. Concurrent with this study was one by Basavanna et al., who discovered that 36.66% of patients receiving cyclophosphamide had experienced one or more adverse events.

DISCUSSION

The purpose of the research was to evaluate the prescription pattern and typical side effects in patients undergoing breast cancer chemotherapy. The study was conducted over a six-month period, from June 2023 to December 2023, in the medical oncology department of the American Oncology Institute (AOI) in Guntur.

Demographics Almost all of the 230 cases that were reviewed were found to be female (98%) compared to male (2%). The age

group with the highest percentage of patients was 51–60 years old, whereas the age group with the lowest percentage was 21–30 years old. Furthermore, 113 patients (or 49%) and 117 patients (or 51%) of the 230 patients had been diagnosed with right breast cancer and left breast cancer, respectively. The Manichavasagam et al. study provided support for this one. His research Out of all the patients examined, he reported that 54.5% were female. He also discovered that the age group least impacted was 18 to 30. According to his research, breast cancer is more common among women. Prescription pattern Out of the 230 participants in the study, all of the patients had received chemotherapy for their breast cancer. According to the table:7. In the earlier study, cyclophosphamide was the most commonly administered medication for breast cancer (26%), whilst oxaliplatin (0.4%) was the least prescribed medication. This conclusion was consistent with a study by Adhikari et al. that found doxorubicin (12%) to be the second most established agent after docetaxel when it came to chemotherapy for breast cancer. The study also found that cyclophosphamide (20%) was the most often used medicine for this purpose.

Adverse reactions According to Table 8, nausea was the most frequent adverse medication reaction reported by chemotherapy patients (20.54%), followed by alopecia (17.8%). Whereas fatigue was

also reported by 12.15% of the patients. It was shown that the least common adverse medication reactions were leukopenia and back pain. The findings of Chopra et al., which showed that 20.5% of patients experienced alopecia and 25.5% of patients suffered nausea and vomiting, support this. As seen in Table 8, cyclophosphamide was the most frequent medicine to cause adverse drug reactions in the patients, with docetaxel coming in second. Concurrent with this study was one by Saini, VK, et al., who discovered that 85.4% of patients receiving cyclophosphamide had experienced one or more adverse events.

CONCLUSION

One of the main causes of death worldwide is cancer. The majority of cases of breast cancer occur in women. The demographic features are examined in the current study. In the study, the male-to-female ratio was also tracked. Throughout the study, the common adverse medication responses and the prescription pattern for breast cancer were observed.

When compared to male patients, female patients made up the majority of the patient population in our study. Lies between the 51–60 age range.

Patients with both right and left breast cancer are included in the study. Cyclophosphamide was the most frequently prescribed medication for breast cancer, followed by Adriamycin and docetaxel.

The main reason Adriamycin + Cyclophosphamide is indicated for breast cancer is that Adriamycin inhibits the growth of damaged cancer cells, while Cyclophosphamide prevents cancer cells from proliferating.

During the study, the majority of the patients reported ADRs. Nausea and alopecia are the most frequent ADRs. With regard to ADR, cyclophosphamide is the main medication. These ADRs fall into the expected and probable categories.

ADRs are frequently overlooked and underreported, which has a negative impact on patients' quality of life. Therefore, it's

critical to identify the pattern of adverse reactions to drugs (ADRs) associated with anticancer medications in order to improve patient outcomes and lower hospitalization costs associated with ADRs in cancer patients.

Declaration by Authors

Ethical Approval: Approved

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Conflict of Interest: The authors declare no conflict of interest.

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