Prescription Analysis of Drugs used in cancer Patients in Tertiary Care Hospital-A Prospective Observational Study

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KEYWORDS

Breast Cancer, Chemotherapeutic cycle, Doxorubicin,Cyclophosphamide,5-Flurouracil

ABSTRACT

Introduction: Breast cancer is the most common cancer in women in India and accounts for 14% of all cancers .1,62,438 new cases have been registered every year. Drug utilization study (DUS) has emerged as a viable tool for evaluating various health-care systems, including cancer. Drug utilisation patterns are monitored to optimise treatment efficacy, offer feedback to prescribers to ensure sensible medication usage, and reduce adverse drug responses. Medication utilisation research's ultimate purpose is to determine whether or not drug therapy is sensible.

Aim: To study drug utilization pattern of drugs used in breast cancer patients. To identify the commonly prescribed drugs for breast cancer patients. To study the proportionate of drugs used in each class.

Methodology: The present Study was conducted in Oncology Department in Krishna Hospital & Krishna Institute of Medical Sciences, KVV, Karad. Patients diagnosed with Breast cancer and fulfils inclusion and exclusion criteria were included in the study. Demographic profile (name, age, address, contact number), Weight, Height ,Profession, Income Status, List of drugs prescribed in each cycle.

Results: We have included 160 patients. Mean Age of patients was 55 years. Cyclophosphamide was received by 110 patients first 4 cycles followed by 50 patients for 5th and 6th cycle. 40 patients received Cyclophosphamide and doxorubicin for first 4 cycles followed by 4 cycles of Paclitaxel regimen. 4 cycles of 4FCD f/b 2CD regimen was received by 30 patients. Cyclophosphamide was received by 110 patients and doxorubicin was received by 115 patients. For concomitant medication dexamethasone, granisantron, pantoprazole etc. was received by 160 patients. Average No of Drug prescribed per prescription is 7.80

Conclusion: The most commonly utilized chemotherapeutic agent is doxorubicin (71.87%) and least is 5 Flurouracil (18.75%). Average No of Drug prescribed per prescription is 7.80.Average Number of chemotherapeutic agents used is 1.59.

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Introduction

Every year, about 11,57,294 new cancer patients are recorded in the India. Estimated number of individuals living with cancer around India is approximately 2.25 million[1] .Every year 7,84,821 cancer-related deaths are reported India. Breast cancer is the most common cancer in women in India and accounts for 14% of all cancers .[2,3]1,62,438 new cases have been registered every year.[1] In India, incidence rates begin to grow in the early forties and peak between the ages of 50 and 64. Breast cancer affects one out of every 28 women at some point in their lives.[1] In urban regions, one in every 22 women will have breast cancer throughout her lifetime, whereas in rural areas, one in every 60 women will develop breast cancer.[4]

Cancer is a serious burden and hazard to society around the world. Chemotherapeutic chemicals come in a variety of forms and are used to treat cancer at various stages. Inappropriate drug use can also result in higher medical costs, side effects, and patient mortality.[5]

Because optimal advantages of pharmacological therapies in patient care may not be attained due to underuse, overuse, or abuse of the pharmaceuticals, drug use for the treatment of diseases is a complicated procedure. As a result, in recent years, Drug utilization study (DUS) has emerged as a viable tool for evaluating various health-care systems, including cancer. The review of anticancer medication use is required since their irrational use has resulted in a substantial health problem in modern medical practice. The WHO defines drug utilisation as "the marketing, distribution, prescription, and use of pharmaceuticals in a society with a particular emphasis on the medical and social repercussion.[6] Drug utilisation research encourages people to take medications responsibility. Drug utilisation patterns are monitored to optimise treatment efficacy, offer feedback to prescribers to ensure sensible medication usage, and reduce adverse drug responses. Medication utilisation research's ultimate purpose is to determine whether or not drug therapy is sensible.

An essential technique for determining the role of medications is the prescribing trend. Consequently, it's essential to assess and keep an eye on the prescription patterns for supportive care and anticancer medications. Core prescription indicators were created by the World Health Organization (WHO) to assess the characteristics associated with polypharmacy, antibiotic use, medications given from the National List Essential Medicine (NLEM) and the WHO Model List of Essential Medicines.[7]

The most effective class of chemotherapy regimens for individuals with breast cancer is comprised of taxanes and anthracyclines [8]. Medications classified as anthracyclines include epirubicine and doxorubicin. Likewise, taxanes possess either paclitaxel or docetaxel. Furthermore, these medications are typically administered in conjunction with other medications such as cyclophosphamide and fluorouracil. Additionally, over the past few years, individuals with breast cancer have been managed with an increasing usage of targeted therapy, a new generation of cancer treatment. Several medications, including as laptinib, bevacizumab, pertuzumab, and trastuzumab, are used in targeted therapy. These medications for targeted therapy are typically used in addition to conventional chemotherapy medications.

AIM AND OBJECTIVES

Aim

- To study drug utilization pattern of drugs used in breast cancer patients.

Objectives:

To identify the commonly prescribed drugs for breast cancer patients.

To study the proportionate of drugs used in each class.

MATERIALS AND METHODS

The present Study was conducted in Oncology Department in Krishna Hospital & Krishna Institute of Medical Sciences, KVV, Karad after taking the approval from Institutional Ethics committee (IEC). Study was conducted between August 2022 to April 2024. This was an prospective, observational study involving 160 newly diagnosed patients with Breast cancer according to inclusion and exclusion criteria. Institutional ethics committee (IEC) approval was taken prior to the initiation of the study vide letter No. (359/2021-2022) dt 08.07.2022. Written informed consent was taken before enrolling patient into study. Study protocol and informed consent form (ICF) were also approved by the ethics committee.

In India, about 90.09% breast cancer patients who have received chemotherapy experienced at least one adverse drug events.(9)

So the Incidence of ADE (p)=90.09%.

q = 100-p = 100-90.09 = 9.91%

n= 4pq/ L2

n = 4 x 90.09 x 9.91/52

n=143

Considering 10% drop out from study. Adding 10 percentage of patient. n = 143 + 10% n=157 Minimum we have to include 157 patients. So we included 160 patients.

❖ **Inclusion Criteria**

- Women diagnosed with breast cancer (Stage -1 to 4) aged between 18 to 80 years and advised chemotherapy.

❖ **Exclusion Criteria**

- Patients Suffering from other malignancies along with breast cancer.

After getting the approval from Institutional Ethics Committee (IEC) study was started. Patients diagnosed with Breast cancer and fulfils inclusion and exclusion criteria were included in the study. Informed consent of patient was taken before including in the study. Following data were recorded in patient information sheet. Demographic profile (name, age, address, contact number), Weight, Height ,Profession, Income Status, List of drugs prescribed in each cycle.

OBSERVATION AND RESULTS

Table No.1: Age wise Distribution of Patients.

Sr No.	Age Group(Years)	No. of Patients
1	18-50	58(36%)
2	51-65	60 (37.25%)
3	66-80	42 (26.75%)

Graph No.1:Age wise Distribution of Patients

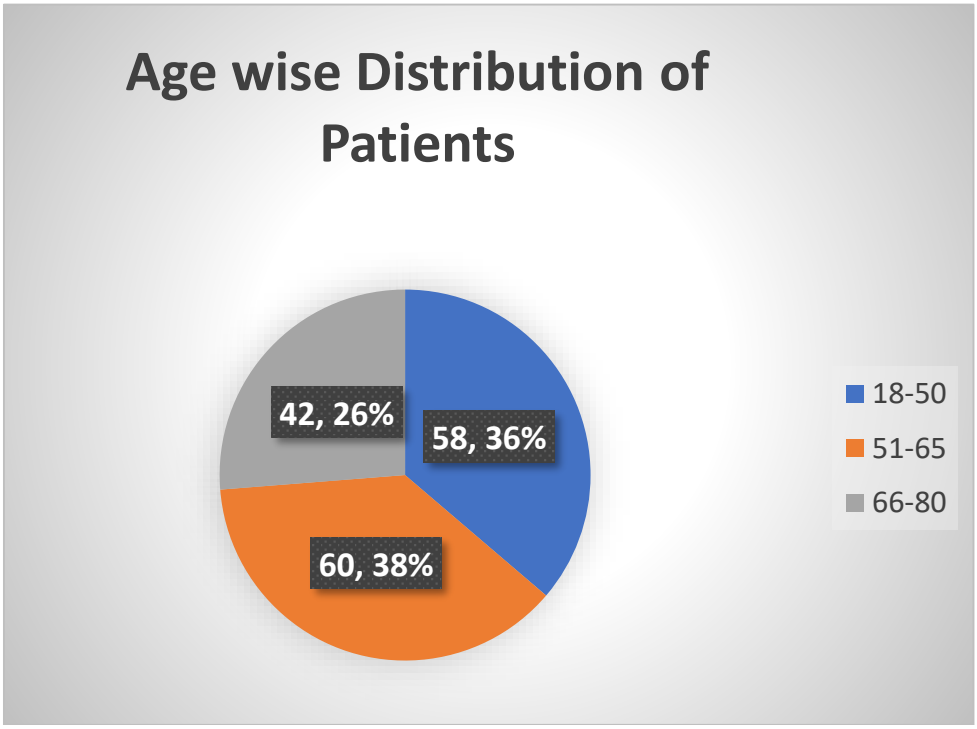
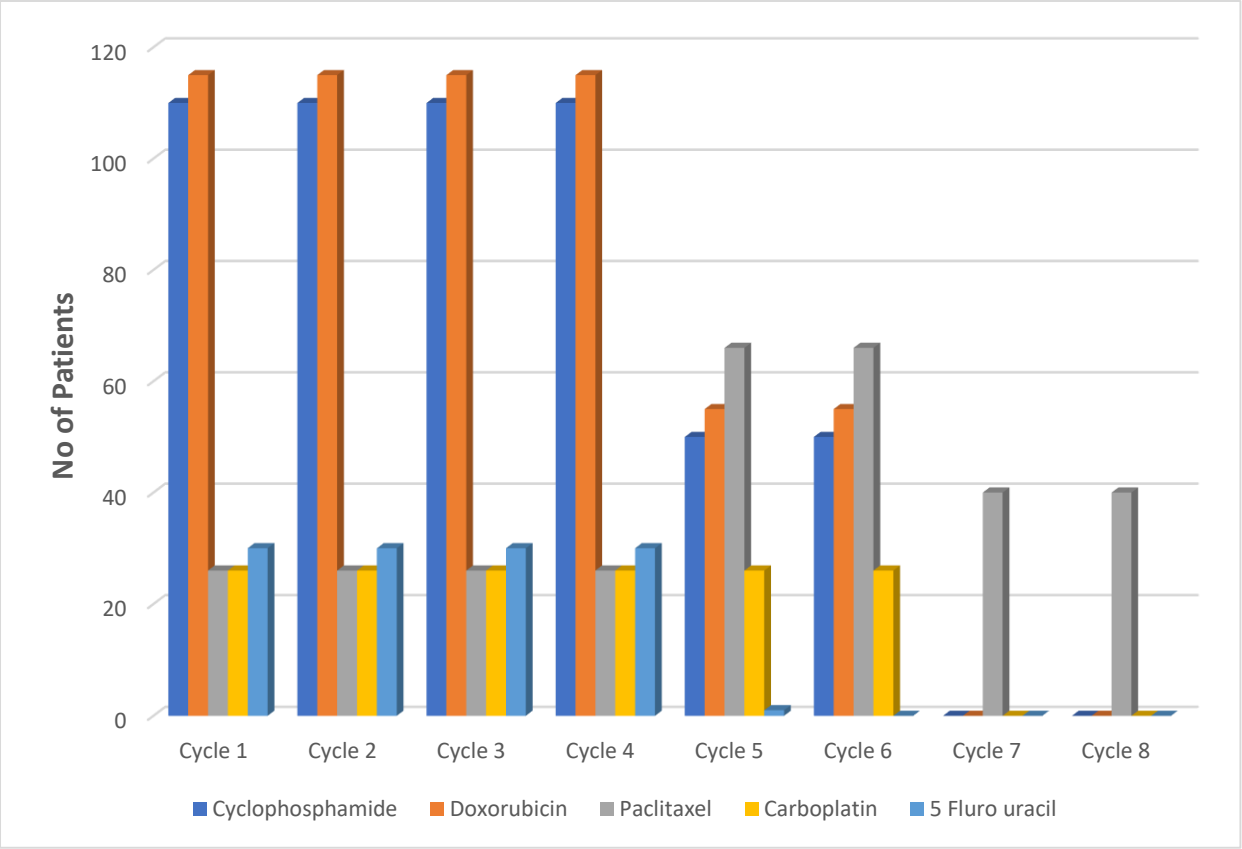


Table No.2: Cycle wise Drug Utilization Pattern of Chemotherapeutic Drugs

Name of Drugs	Number of Patients							
	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 8
Cyclophosphamide	110	110	110	110	50	50	0	0
Doxorubicin	115	115	115	115	55	55	0	0
Paclitaxel	26	26	26	26	66	66	40	40
Carboplatin	26	26	26	26	26	26	0	0
5 Fluro uracil	30	30	30	30	1	0	0	0

Trastuzumab	12	12	12	12	28	28	0	0
Tamoxifen	20	20	20	20	30	30	0	0
Letrozole	18	18	18	18	25	25	0	0

Graph No.2: Cycle wise Drug Utilization Pattern of Chemotherapeutic Drugs



In the study,110 patients received first 4 cycles followed by 50 patients received cyclophosphamide for 5th and 6th cycle, Doxorubicin was received by 115 patients for first 4 cycle and 55 patients received it for next 2 cycle. Paclitaxel was received by 26 patients for first 4 cycle and 66 patients received it for next 2 cycle and 40 patients received it for 7th and 8th cycle. Carboplatin was received by 26 patients for 6 cycles.5 fluorouracil was received by 30 patients for first 4 cycles and only 1 patient received it for 5th cycle.12 patients received Trastuzumab for first 4 cycles followed by 28 Patients received trastuzumab for 5th and 6th cycle.20 Patients received tamoxifen for 1st 4 Cycles and 30 patients received for 5th and 6th cycle. 18 Patients received letrozole for 1st 4 cycles and 25 Patients received for 5th and 6th cycle

Table No.3: Regimenwise Drug Utilization Pattern

Types of Regimens	Number of Patients
4 Cycles of FCD+2 Cycles of CD	30
6 Cycles of CD	20
4 Cycles of CD + 4 Cycles of Paclitaxel	40
4 Cycles of CD f/b 2 HT+2 cycles of Trastuzumab	20
4 CD f/b 2 RT + 6cycles of Trastuzumab	05
6(D+HT) + 6 cycles of Trastuzumab	07
6 Cycles of paclitaxel + Carboplatin	26
6(HT)	12

F-5 Flurouracil C-Cyclophosphamide D- Doxorubicin HT-Hormonal Therapy

RT-Radiotherapy

Table No.4: Drug Utilization Pattern of Chemotherapeutic Agents

Sr. No.	Drug	No. of Patients
1	**Cyclophosphamide**	110 (68.75%)
2	**Doxorubicin**	115(71.87 %)
3	**Carboplatin**	26 (16.25%)
4	**Paclitaxel**	66 (41.25 %)
5	**5-Flurouracil**	30 (18.75%)
6	**Trastuzumab**	28 (17.5%)
7	**Tamoxifen**	30 (18.75 %)
8	**Letrozole**	25 (15.62 %)

Table No. 5: Drug utilization pattern of other Adjuvant Drugs

Sr No.	Drug	No. of Patients
1	**Inj. Dexamethasone**	160 (100%)
2	**Inj. Granisantron**	160 (100%)
3	**Inj. Pantoprazole**	160 (100%)
4	**T. MVBC**	144 (80%)
5	**Inj. Vit B12**	48 (30%)
6	**MESNA**	2 (1.2%)
7	**Inj. Philgrastim**	30 (18.75%)
8	**Inj. Zolendric Acid**	10 (6.25%)
9	**Pheniramine maleate**	12 (7.5%)

Table No.6: WHO Prescribing Indicators:

Sr. No.	Prescribing Indicators	No of Drugs
1	**Total No of Prescription Analysed**	1040
2	**Total No of Drugs Prescribed**	7973
3	**Total number of chemotherapeutic drugs prescribed**	1623
4	**Total number of concomitant drugs prescribed**	5980
5	**Total number of hormonal drugs prescribed**	262
6	**Total number of targeted therapies prescribed**	108
7	**Average number of drugs per prescription**	7.68
8	**Average number of chemotherapeutic drugs per prescription**	1.59
9	**Average number of concomitant drugs per prescription**	5.75
10	**Average number of hormonal drugs per prescription**	0.25

11	**Average number of targeted therapies per prescription**	0.10

Discussion

In Recent years there are significant advancements in the management of breast cancer patients, which has a favourable impact on patient care and quality of life. Drug utilization study (DUS) is one of the method for ensuring responsible drug use.[10]

DUS is a comprehensive assessment of drug use that will support patients in using their prescriptions sensibly, especially when considering the potential negative effects on their health, their communities, and their finances. DUS has been applied globally to provide medication access for all. Healthcare decision makers can be informed about the overall drug consumption by gender, age group, and comorbidities through analysis of medication utilization and expense.

According to our study mean age of patient suffering from breast cancer is 55 years which is comparable to Bander Balkhi et al.[10] but it is more than Shah et al.[11] in which it was 40-49 years.

In our study we observed following drug utilization pattern, 68.75% patients received Cyclophosphamide. It is lesser than Renuka et al.[12] in which it was 77.14% and higher than Shah et al. in that it was 32.26%. Doxorubicin was given in 71.87% patients in our study which is higher than with Renuka et al.[12] in which it was 68.57% and also higher than Shah et al.[11] in which it was 29.55% Doxorubicin is given to highest number of patients in our study next to this is cyclophosphamide. In most of the studies these two drugs are given in maximum number of breast cancer patients. In our study 5 flurouracil was given to 18.75% of patients. According to Renuka et al.[12] it was given to 44.29% and it was lower than Shah et al. in that it was 31.66%. Paclitaxel from taxans group given which was given to 41.25% in our study but in study by Renuka et al.[13] two types of taxans are given i.e. docetaxel and Paclitaxel which was in combine given to the 27.15% of patients which is lower than our study and also by Shah et al. it was 4.5% it was lesser than our study.

For Hormonal therapy 18.75% of patients received Tamoxifen.It is almost comparable with Shah et al[12] in which it was given to 16.33% of the patient. It is even almost comparable with Bander Balkhi et al.[13] in which it was 17%.In our study Letrozole was given to 15.62% of the patients. It is much lesser than Shah et al.[11] in which it was 25.66%. But it was almost comparable with Bander Balkhi et al in which it was 15%.[12]

For targeted therapy in our study Trastuzumab was given to around 17.5% of patients. This result is comparable to Bander Balkhi et al.[12] in which it was 17%.

When we studied DUS as per different cycles of chemotherapy, doxorubicin was used in 71.87% patients in first 4 cycles and in next 2 cycles (cycle 5 and 6) 34.38% patients received this drug.(Table No.3) In first 4 cycles 22.5% patients received paclitaxel while in cycle 5 and 6, 41.25% patients received it. In 18.75% paclitaxel is continued for cycle 7 and 8 also. In all 6 cycles carboplatin was given to 22.5% patients. 5-flurouracil was given in 18.75% patients in first 4 cycles and only 1 patient in cycle 5. We found trastuzumab was given only in 8.1%

patients for first 4 cycles while in cycle 5 and cycle 6 17.5% patients received these drugs more in numbers as compared to first 4 cycles.

The percentage of giving tamoxifen in first 4 cycles was 9.3% while it is 18.75% in cycle 5 and 6.Letrozole which is one more hormonal therapy given for 8.1% patients in first 4 cycles and 15.63% in next 2 cycles. Hormonal therapy is given for palliative purpose or as an adjuvant therapy.[13]

Such cyclewise drug utilization analysis of drugs was not done in of the previous study, we have done it first time, therefore we could not compare these values with other studies. We thought such analysis will also provide very valuable information for clinicians as well as researchers.

Along with these chemotherapeutic agents, some adjuvant drugs are also used to ameliorate adverse effects. Therefore, we also studied DUS of these drugs. In our study Dexamethasone was received by 100% of patients as concomitant medicine. It is much higher than Shah et al.[11] in which it was 32.74%. It is also higher than the Anima Rout et al.[15] in which it was 88.4%.In our study for antiemetic purpose granisetron was given to 100%.But in the study Anima rout et al.[14] ondansetron was preferred and given in 96%. While in study by Shah et al.[11] granisetron was given in 11.4% and Ondansetron was 2.29%, thus here both the antiemetics were given. 100% of patients received pantoprazole (proton pump inhibitor) as acid reducing agent in our study. But in study by Anima rout et al.[14] 76% of patients receive ranitidine (H2 blocker). In our study pheniramine was received by 7.5% of patients. It is much lesser than Anima rout et al.[14] in which it was received by 27% of patients. We observed 18.75% of patients received Filgrastim. It is lower than the study Diriba et al.[15] in which it was given to 28.8% of patients. We found around 29.3% of patients receive antibiotics. It is higher than Diriba et al.[15] in which it was 11.6% of patients. In our study ceftriaxone and cefpodoxime was given.

In our study Average total drugs per prescription was 7.80 which is not comparable with Shah et al.[11] it is 11.37. While average number of chemotherapeutic drugs per prescription was 1.59 which is not matched with Shah et al.[11] it is 2.25 In our study average number of concomitant drugs per prescription was 5.25 which is not comparable with Shah et al.[11] it is 8.62.

Most of the patients received anthracycline based regimen(65.62%) of patients. This finding is comparable with Shah et al.[11], Balkhi et al.[10] and Van herk et al.[16] In our study, 12 patients had received only hormonal therapy it might be due to old age and refusal to take chemotherapy.

CONCLUSION

Average age of patient suffering from breast cancer is 55 years. From our study, we found that cyclophosphamide and doxorubicin were most commonly used chemotherapeutic drugs in patients with breast cancer. The most utilized chemotherapeutic agent is doxorubicin (71.87%) and least is 5 Flurouracil (18.75%)This will provide the local clinical practice data and help in promoting rational drug use. Average No of Drug prescribed per prescription is 7.80.Average Number of chemotherapeutic agents used is 1.59.

Limitations: We could not follow the patients during their improved and disease free period.

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