



# Prescription Pattern Analysis and Adverse Drug Reaction Monitoring of Anticancer Drugs in A Tertiary Care Teaching Hospital

Dr. V. Srinivasan<sup>1\*</sup>

<sup>1\*</sup>Associate Professor,  
Department of Pharmacology,  
Saveetha Medical College and Hospital, Chennai

Dr. R. Priya<sup>2</sup>

<sup>2</sup>Principal Investigator, IC Bio,  
IC Bio Tower, Vidyanarayapura, Bangalore

Dr. J. Thirunavukkarasu<sup>3</sup>

<sup>3</sup>Professor & HOD,  
Department of Pharmacology,  
Saveetha Medical College and Hospital, Chennai.

\*Corresponding Author

Name: Dr. Srinivasan Vengadassalopathy

## ABSTRACT

9592

To Evaluate the Drug Prescription Pattern in Medical Oncology Out-Patient Department in a Tertiary Care Teaching Hospital. A total of 383 prescriptions were analyzed, this study can give a better approach on financial grounds regarding the yearly procurement of medicines for the Tertiary care teaching hospital and how far the prescribing Pattern fulfills WHO Prescribing core Indicator for Drug Utilization studies and to assess how many drugs prescribed Comes under the National list of Essential Medicine (NLEM). This study would provide us a valuable information for good evidence-based practice and facilitate appropriateness of drugs. The assessment of WHO core indicators helps in bridging the gap between the patients and the care takers, even to minimize the cost of burden to the patient. Drug utilization studies helps to understand how drugs are being used. It not only describes the drug prevalence and incidence and also the extent of drug used at a certain moment and in a certain area. The extent of rational or irrational drug use can only be determined by observing the pattern of use by performing the regular audits and also by comparing the use of local drug at national and international levels.

**KEYWORDS:** Cancer Chemotherapy, Prescription Pattern Analysis

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## INTRODUCTION

The current cancer scenario in India is projected to increase to 29.8 million in 2025

from 26.7 million in 2021. The North India has incidence of 2,408 patients per 100,000 and the Northeast has 2,177 per 100,000. (Menon,



*et al.*, 2017). According to the report by the Indian Council for Medical Research (ICMR) nearly seven cancers accounted for more than 40% of the total disease burden: lung (10.6%), breast (10.5%), oesophagus (5.8%), mouth (5.7%), stomach (5.2%), liver (4.6%) and cervix uteri (4.3%) (Prinja and Gupta, 2021)

The Prescription must be clear and understandable and most benefit for the patient. The Prescription focus on the diagnostic awareness and therapeutic proficiency of the physician with directions for prosperity of the patient's health. The Proper drug utilization studies are important aid to evaluate whether drugs are rationally used in terms of efficacy, safety, suitability and economic aspects at all levels in the chain of drug utilization. (Wettermarket *et al.*, 2019).

The Drug utilization plays a significant role in serving the health care system to understand, and improve the prescribing habit and usage of medications. Lots of studies in India suggests that the prescribing of drugs in generic name have been switched to branded names and prescribing out of National essential drug list (NELM). Thus the rational prescribing habit can be determined with the help of conducting prescription audit and the results of such studies helps in improving the quality of rational drug use in a health care.

(Patil *et al.*, 2019).

The objective of drug utilization research is to facilitate the rational use of drugs in particular populations. Without the knowledge on how a drug is been prescribed and used, it is difficult to initiate a discussion on rational use of drug and to take measures to change the prescribing habits. Therefore, the rational use of drug for a patient is by a prescription of a well -documented drug for a right indication in an optimal dose and at an affordable price. Irrational use occurs when one of these conditions are not met. (Ritika *et al.*, 2013)

## **MATERIALS AND METHODS**

This observational, prospective study was conducted in the outpatient setup of the Department of Medical Oncology, Saveetha Medical College Hospital, a tertiary healthcare hospital at Thandalam, Chennai, India. The study was conducted between Jan 2019 to Jan 2020 over a span of 12 months. After getting prior approval from Institute Ethical Committee (IEC) [ SMC/ IEC/ 2020/11/ 232] in the medical oncology outpatient department, the

prescription was collected which were prescribed by the medical oncologist from Monday to Friday (5 days of the week), from 9:00 Am to 1:30 Pm after getting prior permission from the Professor and HOD of the Department of Pharmacology and Medical oncology. A total of 383 prescriptions which prescribed were collected on daily basis. The prescriptions were used as primary tool to transcribe the data in the case report form designed for this study. The prescription was collected from the patient's parent or guardian to enter the data and returned back to them. Inclusion Criteria was 1) Prescription of patients who are recently diagnosed or known case of cancer of either sex attending Medical Oncology outpatient department. 2) All patients aged between 19 - 70 yrs who were prescribed cancer chemotherapy were included. Exclusion Criteria was 1) All Children' s below 18 years. 2) Pregnant and lactating mothers. 3) Patients diagnosed as having carcinoma who requires only surgical intervention, radiotherapy or other modality of management. 4) Those who were not willing to share their data for the study were excluded.

The data collected from the prescriptions were analyzed by the following Prescribers core indicators:

1. Average no. of drugs per prescription
2. No. of drugs prescribed by generic name
3. No. of encounters with an antibiotics prescribed
4. No. of encounters with an injection prescribed
5. No. of drugs prescribed from Essential Drug List (EDL)
6. Age and sex wise distribution of patients.
7. Pattern of cancer distribution among patients.
8. Drug prescription pattern.
9. No. of Drugs prescribed in various formulations
10. Adverse drug reactions among patients

This study gives a better approach on financial grounds regarding the yearly procurement of medicines for the Tertiary care teaching hospital and how far the prescribing Pattern fulfils WHO Prescribing core Indicator for Drug Utilization studies and to assess how far the drugs prescribed adhere with the National Essential Drug List (NLEM). Also the Adverse Drug Reaction profile identification of the cancer chemotherapy drugs helps us to establish a validated data for causality assessment and also the safety of the patient. (Shahet *et al.*, 2021)

## **RESULTS**

A total of 383 prescriptions were analyzed, which



have complete information as per inclusion criteria. Total no of drugs was found to be 4596 out of the 383 prescriptions. Baseline characteristics were almost similar. The results were analyzed using SPSS software; the results are expressed in descriptive statistics. Demographic data are categorical variables and patient’s baseline characteristics were expressed

using descriptive statistics to assess difference in any between them. Mean was provided for categorical data. The appropriate data were collected in a specially designed Performa, which contained patients’ information. System wise distribution of drugs were also expressed.

**Table 1: Age Wise Distribution of Patients**

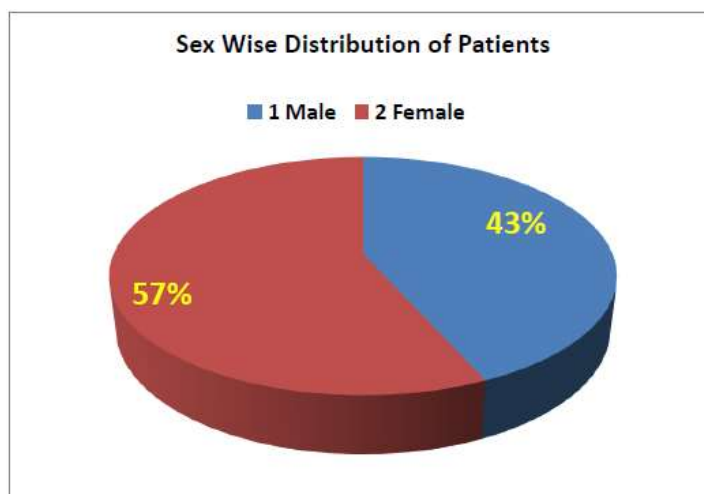
Age	No. ofPatients
19-30 Yrs	32
31-50 Yrs	110
41-60 Yrs	147
61-70 Yrs	94

**Table 2: Gender Wise Distribution**

Sex	No. ofpatients
Male	166
Female	217
Total	383

9594

**Figure1: Sex Wise Distribution of Patients**



**Table 3: Different Dosage Formulations**

S.No	Formulations	Number
1	Capsule	1151
2	Syrup	339
3	Tablets	625
4	Injections	2481



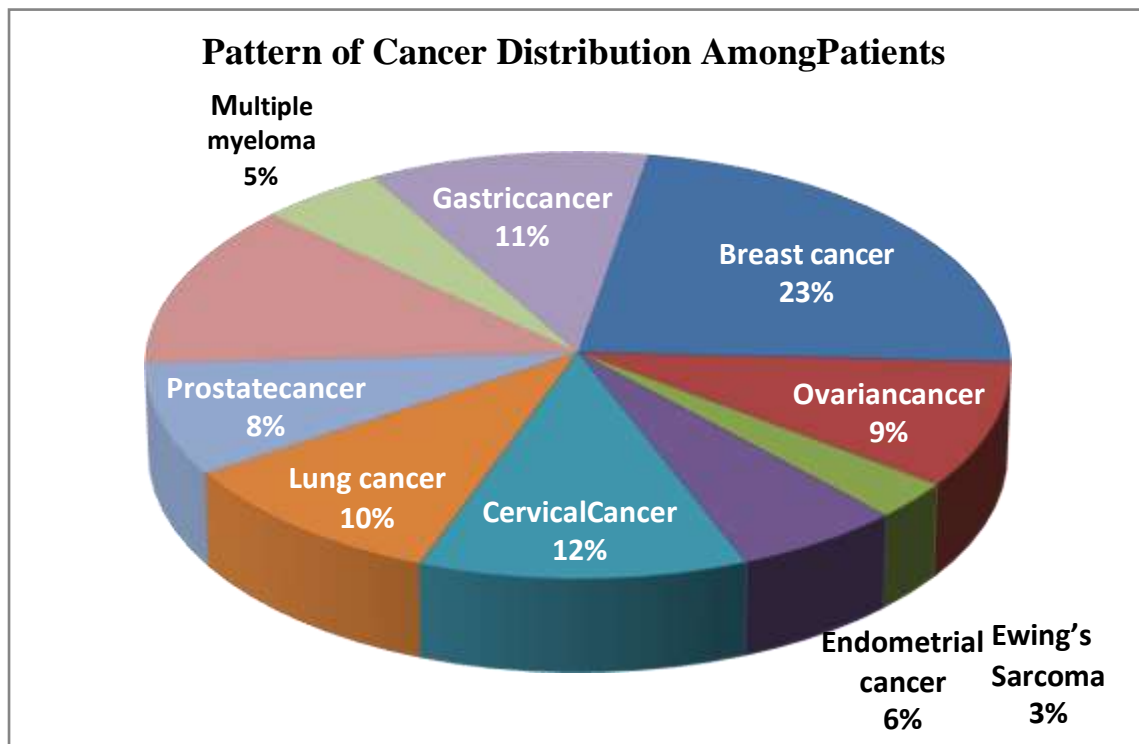
Total	4596
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**Table 4: Percentage of Injections**

S.No.	Injections / Drugs	No. of prescriptions	Percentage %
1	Other drugs	2115	46%
2	Injections	2481	54%

9595

**Figure2: Pattern of Cancer Distribution Among Patients**



**Table 5: Average Drugs per Prescription**

Average drugs per Prescription =  $\frac{\text{Total number of drugs}}{\text{Total number of Prescriptions}}$

Total number of drugs = 4596  
 Total number of Prescriptions = 383  
 Average drugs per Prescription = 12 drugs per Prescription



**Table 6: Percentage of Drugs Prescribed by Generic Name**

$$= \frac{\text{Total number of drugs in generic name} \times 100}{\text{Total number of drugs}}$$

Total number of drugs = 4596

Total number of drugs in generic name = 3269

Percentage of drugs Prescribed by generic name = 71.1 % of drugs

**Table 7: Percentage of encounters in which antibiotic prescribed**

$$= \frac{\text{Total number antibiotics prescribed} \times 100}{\text{Total number of Prescriptions}}$$

Total number of antibiotics prescribed = 635

Total number of Prescriptions = 383

Percentage of encounters in which antibiotic prescribed = 16.57 % of drugs

9596

**Table 8: Percentage of drugs Prescribed from NELM**

$$\frac{\text{Total number of drugs from EDLX}}{\text{Total number of drugs}} \times 100$$

Total number of drugs = 4596

Total number of drugs prescribed from Essential drug list = 1473

Percentage of drugs prescribed from NELM = 32.04 % of drugs

**Figure 3: Adverse Drug Reactions among Patients**

**DISCUSSION**

**Sex wise distribution:**

In this study the demographic data showed male patients 166 (43 %) and female patients 217 (57%) among 383 patients as summarized in (Table 2). There is predominance of female than male population in our study (Figure 1). This data is similar with the findings of various study which was done previously, like (Aggarwal *et al.*, 2018) and (Pentareddy *et al.*, 2015). Since both the studies shows females showing higher incidence of cancer than male. A study done by (Bajracharya *et al.*, 2006) shows greater predisposition of cancer in females especially cervical cancer, ovarian cancer and the breast cancer.

**Age wise distribution:**

With regards to age wise distribution of the cancer population, the total data collected was ranging from 19 till 70 yrs. Maximum number of patients around 147 (38.3 %) were in the age group of 41 to 60 yrs. The patients in the age group of 31 yrs to 50 yrs, were 24.5%

and the patients in the age group of 61 yrs to 70 yrs, were 8.3% (Table 1). Highest number of patients was seen in the age group between 41 - 60 years. These results are similar to a study done by (Pentareddy *et al.*, 2015). The majority number of patients was in the age group of 40 to 60 yrs. and in another study by (Dave *et al.*, 2014) shows the age wise distribution of patients, Majority of patients were in the age group of 41 to 70 years.

**Drugs per prescription:**

The total no. of drugs calculated from 383 prescriptions is 4596 drugs. Here the average number of drugs per prescription is 12 among 383 prescriptions (Table 5). As per WHO database, based on 35 studies done on different countries, the average mean number of drugs per prescriptions is around 2.3. A similar study done by (Aggarwal *et al.*, 2018) on drug utilization study and adverse drug reaction in cancer patients undergoing chemotherapy in a tertiary care hospital, the drugs per prescription were around 9.18 ± 2.74. In another study done



by(Kumar, *et al.*, 2018) on drug utilization study and cost effectiveness of anticancer drugs usage in a hospital which the average number of drugs per prescription 12.22. We can come to a conclusion from the above said studies that the results are similar to our study (Table 4).

### Occurrence of Injections:

The occurrence of injections in this study was around 54 % of the total formulations prescribed (Table 4). The percentage of chemotherapy injections prescribed were 100 % (Table 3) which is similar to a study done by (Mathew *et al.*, 2019).

### Pattern of Cancer Distribution among Patients:

Out of these 383 prescriptions analysed during the study period. Different types and proportion of each cancer were represented in (Figure 2). Breast cancer (23.2 %) was found to be the most prominent cancer followed by Cervical Cancer (11.7%), Ovarian cancer (9.7%), Ewing's Sarcoma (2.9%), Endometrial cancer (6.0%), Lung cancer (10.2%), Prostate cancer (8.6%), Testicular cancer (12.8%), Multiple myeloma (5.0%), Gastric cancer (11.2%). A similar study done by (Pentareddy *et al.*, 2015) on prescription pattern of anticancer drugs in a tertiary care hospital showed similar pattern of cancer distribution with predominance of breast cancer followed by cervical cancer.

### Generic Names:

Prescribing medicines by Generic names can reduce the cost of the drug treatment and rationalize the drug therapy. In our study Average number of drugs prescribed by Generic Name is 3269 (71.1 %) among 4596 drugs (Table 6). In a study done by (Aggarwal *et al.*, 2018) showed Percentage of drugs prescribed by generic name around 69.9 % and from the above-mentioned study it's very obvious that our study had similar results.

### Antibiotic per Prescription:

In our study the Percentage of Antibiotics per prescription is 635 (16.57 %) as shown in (Table 7). Both of these studies had similar results like this study.

### National Essential Drug list :

In our study Average number of drugs prescribed from National Essential Drug List (2015) is 32.04 % of 1473 drugs (Table 8) . A study done by (Aggarwal *et al.*, 2018) study showed 32.35 % of essential medicine list.

### Adverse Drug Reaction Monitoring of Cancer Patients

The incidence of Nausea & Vomiting 274 (71.54%) was the predominant adverse drug reaction seen among 383 patients followed by Hair Loss 178 (46.4%) and loss of appetite 169 (44.13 %). Thrombocytopenia is seen in 147 (38.3%) (Figure 3). Similar results are found in the study done by (Aggarwal *et al.*, 2018) with nausea vomiting being highest side effect. In another study done by (Wahlan *et al.*, 2017) on adverse drug reactions due to cancer chemotherapy in a tertiary care teaching hospital shows higher incidence of nausea and hair loss as the adverse drug reaction.

### CONCLUSION

9597

The goal of achieving rational use of medicines is not just rely upon choosing the right medicines, right dose but also, they must be used in the most appropriate manner. From this study the results can be interpreted by prescribers & authorities of the institute to review the Drug Therapeutic Committee policy periodically. The analysis of ADRs associated with the cancer chemotherapy gives a comprehension about the causality, severity of the ADRs. The study provides baseline data to carrying out further therapeutic audit with more parameters of analysis which in turn will provide regular feedback to researchers and prescribe. This study inputs would improve the quality of service provided by the tertiary health care system. This study would provide us a valuable information for good evidence-based practice and facilitate appropriateness of drugs. The WHO core indicators help in bridging the gap between the patients and the care takers, even to minimize the cost of burden to the patient.

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