

**Drug utilization review of anticancer drugs in cancer outpatient department of the Government Medical College, Aurangabad****M. D. Kulkarni<sup>1\*</sup>, Samra A. Hussaini<sup>1</sup>, S. L. Padwal<sup>2</sup>, P. N. Khandelwal<sup>1</sup>, S. M. Doifode<sup>1</sup>, P. P. More<sup>1</sup>**

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**ABSTRACT**

**Background:** To study drug utilization of anticancer drugs in cancer outpatient department (OPD) of Government Medical College, Aurangabad.

**Methods:** Five hundred and twelve prescription records were screened and analyzed as per the study parameters from cancer OPD of Government Medical College and Hospital, Aurangabad. Commonly used anticancer drugs were recorded; furthermore, different types of carcinomas were noted.

**Results:** Age group of patients was in between 30 and 70, 267 were females and 245 were male patients. The most common type of carcinoma was carcinoma of the breast (17.9%). Carboplatin was the most commonly used anticancer drug (26.56%). The average number of anticancer drugs received per patient was three.

**Conclusion:** WHO suggested drug utilization studies are needed in every health care setting. For a developing country like India, National Drug Policy and Drugs and Therapeutic Committee are a must.

**Keywords:** Outpatient department, Cancer, Chemotherapy, Prescription analysis

**INTRODUCTION**

Now a days, drug utilization studies (DUS) are used as a potential tool in the evaluation of healthcare systems. DUS are powerful exploratory tools to ascertain the role of drugs in society. They create a sound sociomedical and health economic basis for healthcare decision-making.<sup>1</sup>

Drug utilization research is defined as a marketing, distribution, prescription, and the use of drugs in a society with a special emphasis on the resulting medical, social, and economic consequences.<sup>2</sup> It is important to realize that inappropriate use of drugs represents a potential hazard to the patients and an unnecessary expense.<sup>3</sup> This necessitates a periodic review of the pattern of drug utilization to ensure safe and effective treatment.

Drug utilization research may provide insight into the following aspects of drug use and drug prescribing.<sup>4</sup>

1. Pattern of use: extent and profiles of drug use and trends in drug use and cost over time.
2. Quality of use: quality indices of drug use may include choice of drug, drug cost, drug dosage (Awareness of inter individual variation in dose requirement and age dependence), drug interaction awareness, adverse drug reaction awareness, proportion of patients being aware/unaware of the cost/benefit of the treatment etc.
3. Determinants of use: user characteristics (e.g. socio-demographic parameters, attitude towards drugs), prescribers characteristics (e.g. specialty, education, and factors influencing therapeutic decisions), and

drug characteristics (e.g., Therapeutic properties, affordability).

4. Outcome of use: benefits and adverse effects and economic consequences.

Drug utilization research also provides insight into the efficiency of drug use, i.e., whether a certain drug provides value for money. Drug utilization research can thus help to set priorities for the rational allocation of healthcare budgets.<sup>4</sup> This decision-making about budget is important for government institutes, since Deputy Director of Health Services (DDHS) (Maharashtra Government) is running one program for cancer patients, that is, Jiwan dai Yojna for poor patients who are below the poverty line in Maharashtra state. Financial aid for drugs is provided by DDHS. Hence, considering all above background, this study has been undertaken in cancer hospital of Government Medical College, Aurangabad.

### *Aims and objectives*

To study the drug utilization pattern of anticancer drugs and to study the incidence of various carcinomas in cancer hospital of Government Medical College and Hospital, Aurangabad.

### **METHODS**

Study design: retrospective, observational, cross-sectional study.

Study population: all patients' data from the medical drug store record were collected between the period January 2012 and September 2012. Accordingly, a sample of n=512 prescriptions of either sex was randomly selected for prescription review and analysis.

### *Procedure*

After obtaining permission from the Head of Department of Pharmacology, drug store in charge, and concerned oncologist, all patients' data from the medical drug store record were collected between the period January 2012 and September 2012. The prescriptions and drug utilization study records were collected from medical drug store of Government Medical College and Hospital, Aurangabad.

The total of 512 patients' records were collected and reviewed and analyzed for type of carcinoma and use of anticancer drugs.

Following parameters were studied.

1. Type of carcinoma and its incidence.
2. Number of male and female patients.
3. Percentage of use of different anticancer drugs.
4. Number of anticancer drugs prescribed to each patient.

Statistical analysis is done by simple observational percentage analysis.

### **RESULTS**

Data of n=512 patients were analyzed as per study parameters. Age group of patients was between 30 and 70 years. Of 512 patients, female patients were 267 in number and males were 245. The most common type of carcinoma was carcinoma of the breast, 92 patients (17.9%) were recorded of the same. The second common was carcinoma of cervix 80 (15.6%) patients.

Carboplatin was the most commonly used drug, 136 patients (26.56%) received carboplatin. Paclitaxel was the second commonly used drug and 133 (25.97%) patients received it.

The average number of anticancer drugs received per patient were three, 202 (39.4%) patients received two drugs, 170 (33.2%) received single drug, 104 (20.3%) received three drugs, 30 (5.85%) received four drugs, 6 (1.17%) patients received five drugs.

Percentage of different drugs used and the occurrence of different carcinomas are shown in Figures 1 and 2. Figure 2 shows the following values:

1. Breast cancer: 17.96
2. Oral cavity carcinoma: 18.9

Buccal mucosa	23
Tongue	43
Tonsil	10
Pyriiform fossa	12
Post pharyngeal wall	6
Palate	1
Lip	1
Oropharynx	1

3. Carcinomas of the gastrointestinal tract: 14.4%

Esophagus	25
Stomach	9
Duodenum	1
Pancreas	4
Gall bladder	3
Colon	13
Rectum	11
Anal canal	1

4. Carcinomas of the genitourinary tract: 23.6%

Cervix	80
Ovary	27
Endometrium	2
Vault of vagina	3
Prostate	1

Testis	2
Penis	1
Renal cell carcinoma	2
Wilmstumor	2

5. Respiratory tract: 8%

Nasopharynx	5
Vocal cord	7
Areepiglottic fold	3
Valeccula	1
Epiglottis	2
Bronchus	2
Lung	20

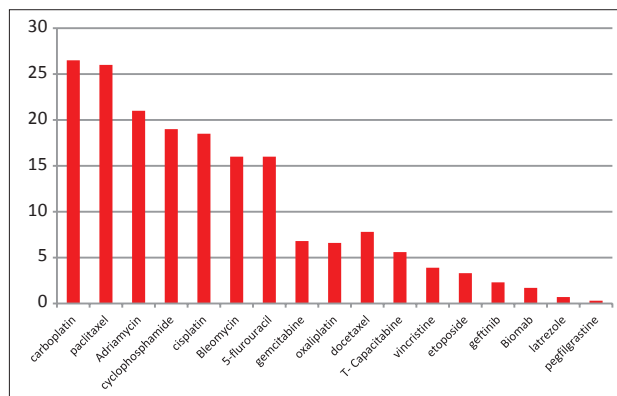
6. Other carcinomas: 16.9%

Leukemia	11
Lymphoma	18
Retinoblastoma	2
Bone tumors	6
Brain neoplasm	1
Soft tissue sarcoma	4
Secondaries	14
Submandibular	1
Parotid tumor	1
Bone marrow tumor	3
Squamous cell carcinoma of the skin	19
Mandibular carcinoma	1
Anaplastic tumors	1
Adenocarcinoma of skin	2
PNET	1

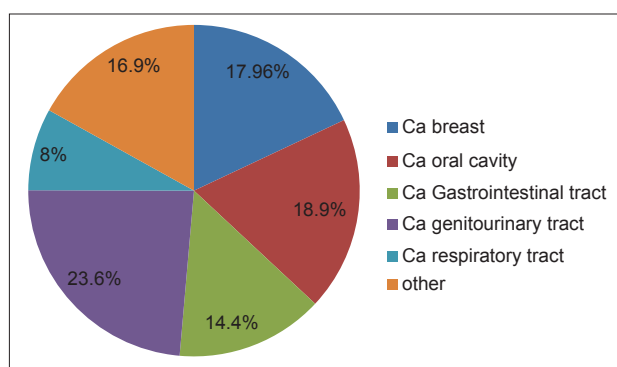
**DISCUSSION**

The principal aim of drug utilization research is to facilitate the rational use of drugs in populations. For the individual patient, rational use of a drug implies the prescription of a well-documented drug in an optimal dose on the right indication, with the correct information and at an affordable price. Without the knowledge on how drugs are being prescribed and used, it is difficult to initiate a discussion on rational drug use and to suggest measures to change prescribing habits for the better. Information on the past performance of prescribers is the linchpin of any auditing system.<sup>4</sup>

The prescriptions of the patients from cancer outpatient department were studied. For poor patients (Those who are below the poverty line) diagnosed with carcinoma, DDHS (Maharashtra) was running one program, i.e., Jiwan Dai Yojna. Under this yojna, DDHS used to provide funds up to 1.5 lac rupees per patient for chemotherapy of these patients. In GMCH Aurangabad, this program was started in 2007. Hence, use of anticancer drugs in this institute is



**Figure 1: Various anticancers drugs used in cancer patients. On Y axis percentage of patients, On X axis different anticancer drugs.**



**Figure 2: Incidence of various cancers.**

not dependent on drug store supply, government purchases, the different drugs which are available on rate contract basis for government institutes etc., but oncologists from this institute they decide different drugs which are to be used. Hence, specific regimens are followed for specific patients, depending upon the type of carcinoma, stage of it and metastasis. In the month of December 2013 Rajiv Gandhi Jiwan dai Yojna was started, and it replaced the old Jiwan dai Yojna for BPL patients.

Present study shows that the incidence of carcinoma is high in females as compared to that in males (267 females vs. 245 males), Imran et al. also found that the incidence of carcinoma in females is more than that of males and has written about it in his research article.<sup>5</sup> Furthermore, similar findings are reported in research communication by Ramnath Takier et al.<sup>6</sup>

There are more than 200 different types of carcinomas; incidence of different carcinomas is different for different countries depending upon their socioeconomic and ethnic aspects. As far as India is concerned, in males lungs, stomach, liver, oral cancers are common with lung cancer being predominant. In females cervix, breast, stomach, lungs, oral cavity are the most common types of carcinomas in decreasing order.<sup>5</sup> Present study shows that in females carcinoma of the breast is the most common type, carcinoma

of the cervix is the second common type, Ramnath Takier also reported the same.<sup>6</sup> In males, carcinoma of the tongue is the most common type; furthermore, other common types are carcinoma of esophagus, lungs, stomach. Present study shows that the carcinoma of the genitourinary tract is the most common type of carcinoma among the studied population (24%) other common carcinomas are carcinoma of the oral cavity (19%), carcinoma breast 18%, gastrointestinal carcinoma 14.4%, respiratory carcinoma 8%. Site specific commonest type of carcinoma from studied population is the carcinoma of the breast (92 patients 18%). Similar findings are also reported by Sbrata Sinha.<sup>7</sup>

For the treatment of cancer, various modalities such as surgery, chemotherapy, radiation therapy, immunotherapy, and monoclonal antibody therapy are used. The choice of therapy depends on the location and grade of the tumor, the stage of the disease, and the general state of the patient. Chemotherapy refers to the antineoplastic drugs used to treat cancer or the combination of these drugs into a cytotoxic standardized treatment regimen. The various types of chemotherapy include combined modality called combination chemotherapy. The fundamental principle of combination chemotherapy is that different drugs act through different cytotoxic mechanisms. Due to the ability of cytotoxic agents to kill cells, their actions are not specific to tumor cells only and also damage normal cells. As a result, they can produce significant side effects in patients or others exposed. The most cytotoxic drugs are potentially hazardous substances being mutagenic, teratogenic, or carcinogenic. These substances may also cause secondary neoplasm in patients undergoing treatment. Extreme care must, therefore, be taken in handling and administrating of such products.<sup>8</sup>

Following is the classification of anticancer drugs:<sup>9</sup>

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Polyfunctional alkylating agents</li> <li>• Mechanism of action</li> <li>• Drug resistance</li> <li>• Pharmacological Effects</li> <li>• Nitrosoureas</li> <li>• Other alkylating drugs</li> <li>• Procarbazine (matulane)</li> <li>• Dacarbazine (DTIC)</li> <li>• Altretamine (Hexalen)</li> <li>• Cisplatin cisplatin (Platinol)</li> <li>• Alkylating agent toxicity</li> <li>• Antimetabolites</li> <li>• Methotrexate</li> </ul> | <ul style="list-style-type: none"> <li>• Antibiotics</li> <li>• Anthracyclines</li> <li>• Doxorubicin (Adriamycin, Rubex, Doxil)</li> <li>• Daunorubicin (DaunoXome)</li> <li>• Dactinomycin (Cosmegen)</li> <li>• Idarubicin (Idamycin)</li> <li>• Plicamycin (Mithramycin)</li> <li>• Mitomycin (Mutamycin)</li> <li>• Bleomycin (Blenoxane)</li> <li>• Hormonal agents</li> <li>• Introduction</li> <li>• Tamoxifen (Nolvadex)</li> </ul> |
|---|--|

- Purine antagonists
  - Mercaptopurine (6-MP)
  - Thioguanine (6-TG)
  - Fludarabine phosphate
  - Cladribine (Leustatin)
  - Pentostatin (Nipent)
- Pyrimidine antagonists
  - Fluorouracil (5-FU)
  - Cytarabine (ARA-C)
  - Azacitidine
- Plant alkaloids
  - Vinblastine (Velban)
  - Vincristine (Oncovin)
  - Etoposide (VP-16, VePe-sid)
  - Teniposide (Vumon)
  - Topotecan (Hycamtin)
  - Irinotecan (Camptosar)
  - Paclitaxel (Taxol)
  - Docetaxel (Taxotere)
- Flutamide (Eulexin)
- Gonadotropin-releasing hormone agonists
  - (Leuprolide and Goserelin [Zoladex])
- Aromatase inhibitors
  - Aminoglutethimide
  - Anastrozole (Arimidex)
- Miscellaneous anticancer drugs
  - Amsacrine
  - Hydroxyurea (Hydrea)
  - Asparaginase (El-spar)
  - Mitoxantrone (Novantrone)
  - Mitotane
  - Retinoic acid derivatives
  - Bone marrow growth factors
  - Amifostine

From the studied population, the anticancer drug which was most commonly used is injection carboplatin, the second most common drug that was used is injection paclitaxel, and other drugs that were frequently used are injection adriamycin, cyclophosphamide, cisplatin, and 5-fluorouracil. Oncologist is using more injectable drugs than oral formulations. For chemotherapy-induced adverse reactions, they are using drugs such as ondansetron, domperidone, prednisolone, and analgesics which they are using are tramadol and diclofenac.

## CONCLUSION

From the present study, we can conclude that prevalence of carcinoma is more in females than males. Carcinoma of breast and cervix are common types, carboplatiin is the commonly used anticancer drug, and the average no of anticancer drugs used per patient is three.

WHO suggested DUS are needed in every health care setting. For a developing country like India, National drug policy and drugs and therapeutic committee are a must. The present study also throws some light on Rajiv Gandhi Jiwandai Yojna.

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