



## ASSESSMENT OF DRUG UTILISATION IN PATIENTS ATTENDING A DAYCARE CHEMOTHERAPY UNIT

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### ABSTRACT

**Background:** Cancer being the second leading cause of death globally, the treatment decision for cancer makes it a complex procedure. Due to its side effects and expense, selection of the appropriate drug has always been a challenge. Studies like drug utilization helps in keeping a check on rational use of these drugs by assuring maximum benefit and minimum risk. **Objectives:** The main objective was to assess the drug utilization of anticancer drug along with nutritional assessment and ADR severity. **Methods:** The observational study was conducted on subjects with cancer who satisfied the inclusion and exclusion criteria identified from the oncology department. The subjects were explained about the purpose of the study and consent was obtained. **Results:** Out of 137 anti-cancer drugs prescribed for 80 patients, the class of platinum derivatives were prescribed the most (34.53%) followed by taxanes (19.42%) and monoclonal antibodies (17.27%). The least commonly prescribed drugs were targeted drugs (3.60%). All the subjects included in the study were assessed for severity of adverse drug reaction using Hartwig and Seigel severity scale. Out of 5 severity levels, only two of them were observed in these 80 subjects. The distribution of PG-SGA stages were analyzed and it was observed that majority of them belonged to stage C (78.57%) which is classified as malnourished, followed by stage A (22.86%) classified as well-nourished and stage B (12.86%) classified as moderately nourished. **Conclusion:** In our study we observed that platinum derivatives were the most commonly prescribed class of drugs compared to others, whereas, targeted drugs were less preferred.

**KEYWORDS:** Cancer, drug utilization, adverse drug reaction, Nutrition.

### INTRODUCTION

Cancer is the uncontrolled growth and spread of cells and it can affect almost any part of the body. These cancerous cells invade surrounding tissue and can metastasize to distant sites. Most of the cancers can be prevented by avoiding exposure to common risk factors, such as tobacco smoke, alcohol.<sup>[1]</sup> A large number of cancer cases can be cured by surgery, radiotherapy or chemotherapy, especially if they are detected early.<sup>[2]</sup> Statistics in India shows an estimated number of people with the disease is around 2.25 million. Cancers of oral cavity and lungs are accounted for over 25% of cancer deaths in males and cancer of breast and oral cavity account for 25% cancers in females. Cancer trends in India have contributed to 5.0% of the total DALYs and 8.3% of total number of deaths in 2016. An increase of 90.9% and 112.8% for deaths, from 1990. Breast cancer accounts for 14% of all cancers and is the most common amongst the women in India.<sup>[3]</sup>

WHO defines DUR (drug utilisation review) as the marketing, distribution, prescription and use of drugs in a

society with special emphasis on the resulting medical and social consequences. DUR is also known as DUE (drug utilisation evaluation). Drug utilization researches facilitates the rational use of drugs in population. It gives an idea regarding DUE is drug- or disease-specific and can be structured rational drug use which is very important when it comes to cancer chemotherapy patient. The studies done for DUR using aggregate data or health facility indicators may indicate that there is under- or over-consumption of medicines, and qualitative studies may indicate why certain health staff and patients behave the way they do. So that it will assess the actual process of prescribing, dispensing or administering a drug (indications, dose, drug interactions, etc.). Drug price can induce a challenge in patients. By inappropriate drug use (under-use, overuse or misuse) the optimal benefits of drug therapy in patient care may not be achieved. It may also lead to increased cost of medical care, antimicrobial resistance, adverse effects and patient mortality. The choice of therapy depends upon patient factors, tumour factors and treatment factors.<sup>[4]</sup>

An adverse drug reaction (ADR) is outlined by World Health Organization (WHO) as “any response to a drug that is toxic, unplanned and happens at doses employed in man for prophylaxis, diagnosis or therapy”. Worldwide, ADRs accounted for 10% of hospital admissions and 6% of hospitalized patients suffer from ADRs. The commonly used drugs for chemotherapy in our patients were the combination regimen using cisplatin, cyclophosphamide, paclitaxel and <sup>[5]</sup>-FU for the treatment of cancers common in this region such as those that affect the lungs, esophagus and lymphomas. Carboplatin, oxaliplatin, docetaxel and doxorubicin were the other drugs used for the treatment of cancers of the breast, cervix, ovary, uterus, stomach, rectum and colon. There are a number of scales used worldwide to assess the severity of adverse drug reactions caused due to chemotherapy and radiation. Scales namely WHO-UMC causality assessment scale, Naranjo Algorithm- ADR probability assessment scale, Hartwig and Siegel, Karch and Lasagna.<sup>[6]</sup>

The process in which food is taken in and used by the body for growth, to keep the body healthy, and replace tissue is known as nutrition. Eating the right food before, after and during the treatment can facilitate the patient feel better, and keep a healthy weight, maintain strength, keep body tissue healthy, at the same time reduce effects throughout the treatment.<sup>[7]</sup> There are several scales that can be used to evaluate the nutritional status in subjects, in which few of them are; NRS-2002 (Nutritional Risk Screening), SGA (Subjective Global Assessment), SCRINIO (SCREEnIng the Nutritional status In Oncology), VAS (Visual Analog Scale) can be used. The most widely used one especially for evaluating nutritional assessment patients receiving chemotherapy is Patient-Generated Subjective Assessment (PG-SGA) scale that measures patient’s weight, intake, symptoms, functional status, disease state, metabolic stress and nutritional physical examination.<sup>[8]</sup>

## MATERIALS AND METHODS

The study was conducted at ESIC Medical College and Post Graduate Institute of Medical Sciences and Research & Model Hospital, Rajajinagar, which is a 500 bedded multispecialty tertiary care teaching hospital with state of art facilities for patients.

### Study design

This was an observational study over three months.

### Sample size

A total of 80 patients visiting Oncology day care chemotherapy unit, satisfying inclusion and exclusion criteria during the data collection period were included in the study.

### Inclusion criteria

- Subjects who are 18 years and above of age.
- Subjects who come in to the day care to receive chemotherapy for cancer

- Subjects who are willing to participate in the study and sign the written informed consent.

### Exclusion criteria

- Subjects admitted in departments other than oncology department.
- Subjects who are pregnant.
- Subjects receiving chemotherapy in ward other than day care unit.
- Subjects who are too ill to answer the questions.

### Study tools

- **Self-designed Case report forms:** It consists of all the information regarding the patient’s medication history as well as the current medication regimen.
- **PG SGA (patient generated –subjective global assessment):** It is an International scale used for the assessment of nutritional status in oncologic subjects and other chronic conditions.
- **ADR severity assessment scale (modified HARTWIG and SIEGEL) questionnaire:** This describes the intensity of ADR in grading mild, moderate, severe.

### Study procedure

The observational study will be conducted on subjects with cancer who satisfy the inclusion and exclusion criteria identified from the oncology department. The subjects will be explained about the purpose of the study and consent shall be obtained. The case report form consists of questions related to the economic status of the subjects as well as their expenditure details for cancer treatment. The subject’s previous medication history is recorded as well. Subjects will be observed for any ADR during the chemotherapy and will be recorded.

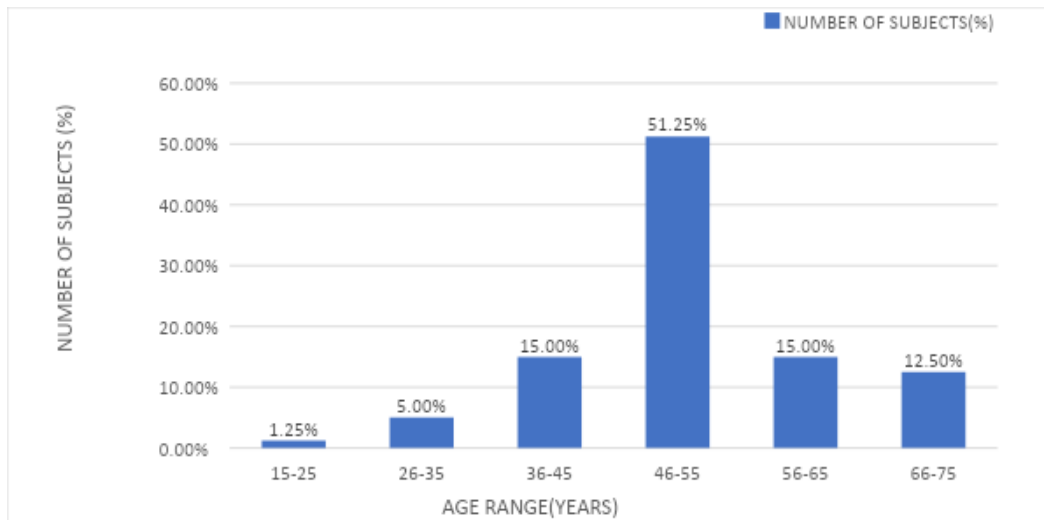
### Statistical analysis

The data collected was analyzed and interpreted to assess the drug utilisation, adverse effects and nutritional status of cancer patients. The categorical variables were presented using appropriate graphical and tabular presentations and continuous variables presented as mean  $\pm$  standard deviation. Percentage calculations were performed wherever applicable.

## RESULTS

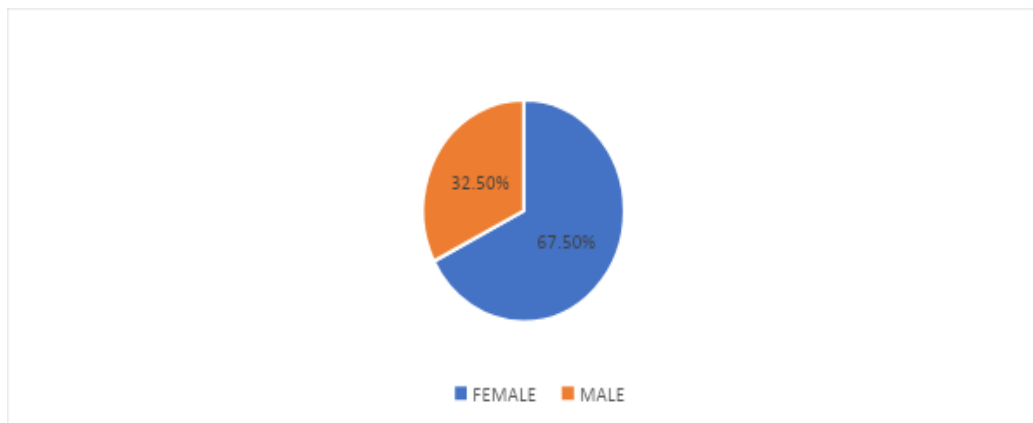
The study was conducted over a period of one and a half months from January 1<sup>st</sup> to February 20<sup>th</sup>, which included 80 patients visiting the day care oncology department of ESI-MC PGIMSR & MH, Rajaji nagar, Bangalore.

Subjects were categorized based on the age (shown in Figure 1). The highest number of subjects included in the study belonged to the 46-55 years age group (41, 48%) followed by 26–35 and 56-65 age groups (4, 15%). The mean age of the study population was found to be 58 $\pm$ 10.28 years.



**Figure 1: Distribution of subjects by age.**

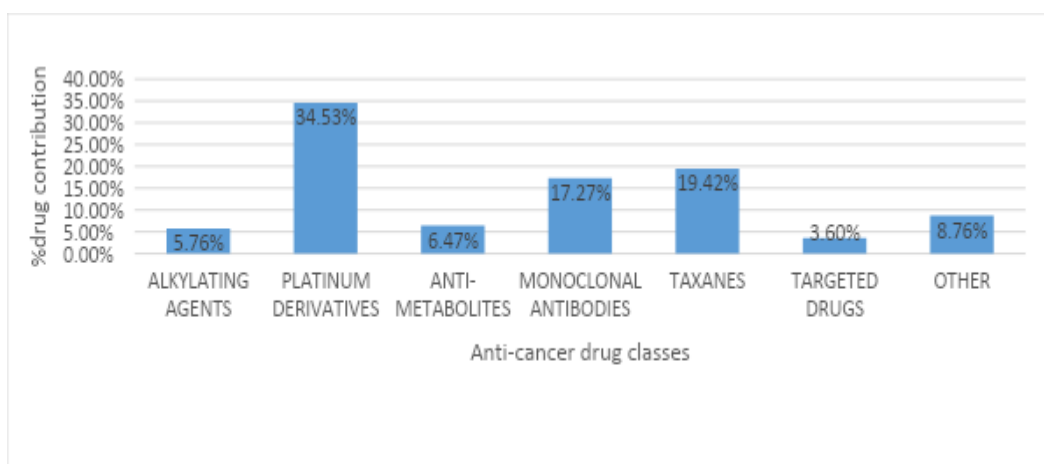
Majority of the subjects included in the study were females (54, 67.50%) followed by males (26, 32.50%) as shown in Figure 2.



**Figure 2: Distribution of subjects by gender.**

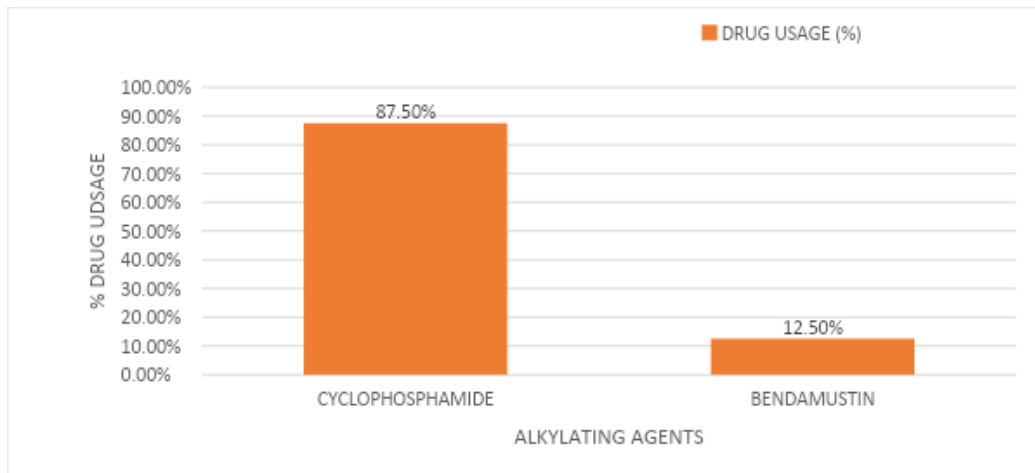
Out of 137 anti-cancer drugs prescribed for 80 patients, the class of platinum derivatives were prescribed the most (48, 34.53%) followed by taxanes (27, 19.42%) and

monoclonal antibodies (24, 17.27%). The least commonly prescribed drugs were targeted drugs (5, 3.60%).



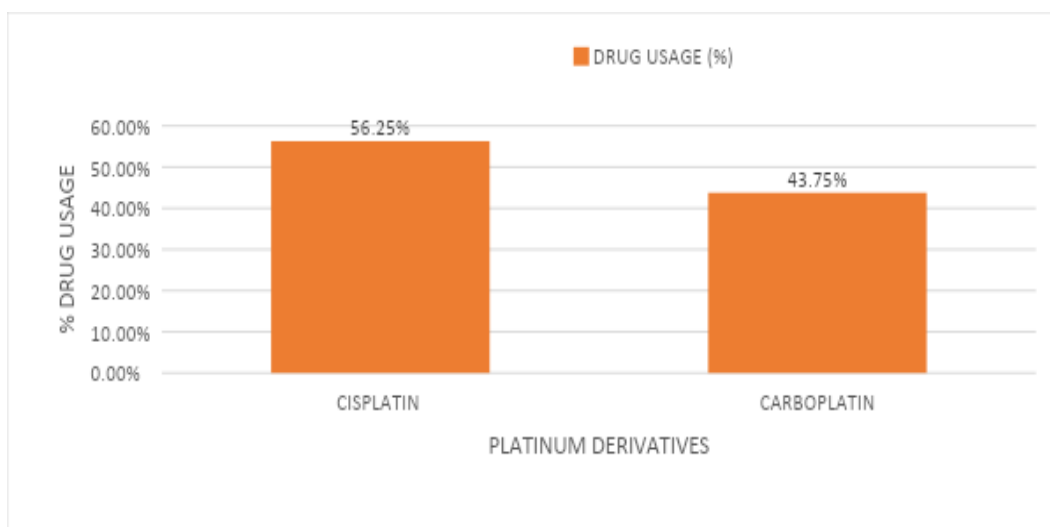
**Figure 3: Percentage usage of each class of anti-cancer drugs.**

Among the alkylating agents were prescribed, followed by bendamustin (1, 12.50%). cyclophosphamide was most prescribed (7, 87.50%)

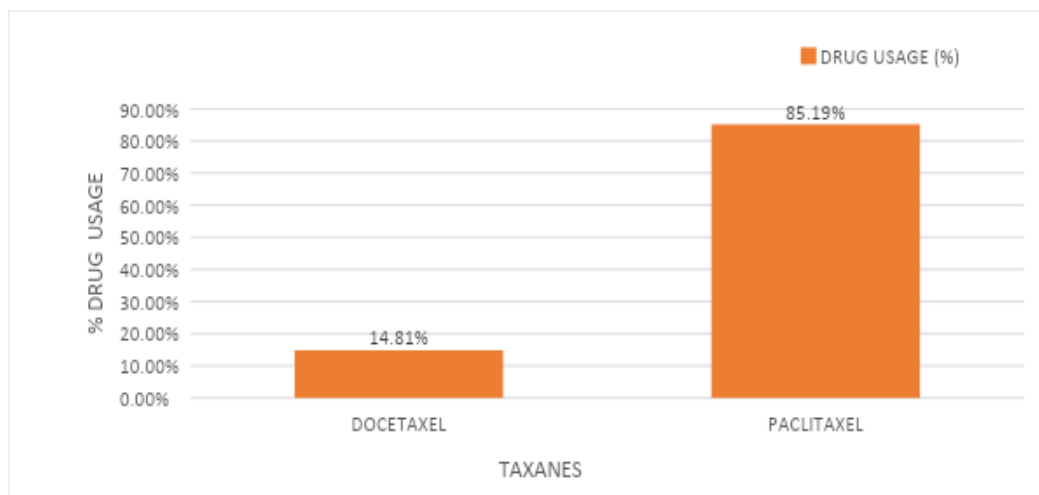


**Figure 4: Distribution based on usage of alkylating agents.**

Among Platinum derivatives the most commonly prescribed drug in was cisplatin (27, 56.25%) followed by carboplatin (21, 43.75%).

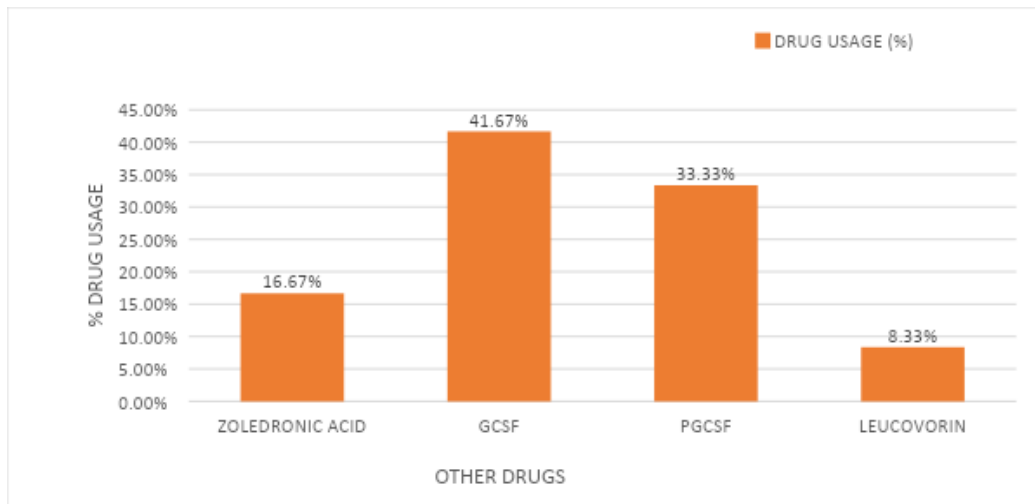


**Figure 5: Distribution based on usage of platinum derivatives Among taxanes, Paclitaxel (23, 85.19%) was most commonly prescribed followed by Docetaxel (4, 14.81%).**



**Figure 6: Distribution of subjects based on usage of taxanes.**

Among 12 other drugs prescribed, GCSF (5, 41.67%) was common followed by PGCSF (4, 33.33%), Zoledronic acid (2, 16.67%) and Leucovorin (1, 8.33%) respectively.

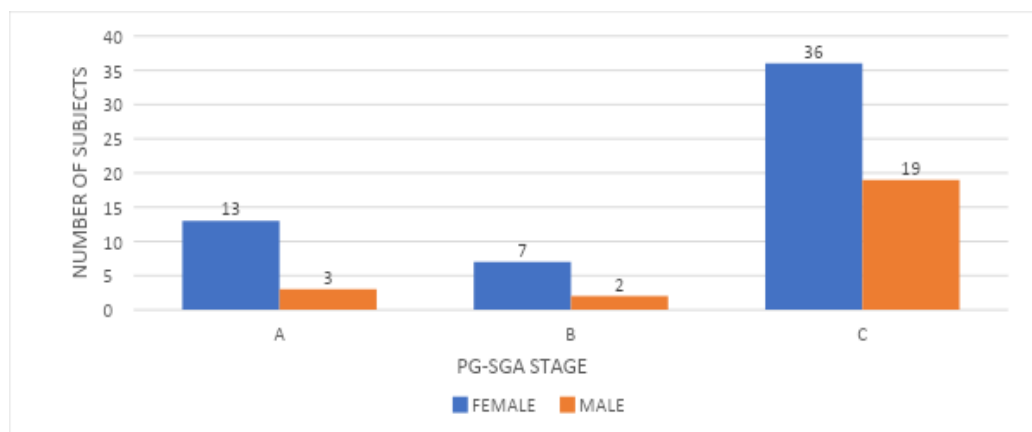


**Figure 7: Distribution of subjects based on usage of other drugs.**

### Nutritional assessment

All the subjects included in the study were assessed for nutritional status using PG-SGA scale which helped in categorising them into 3 stages, stage A, Stage B, and Stage C. The distribution of stages among these subjects were analysed and it was observed that majority of them belonged to stage C (55, 78.57%) which is classified as

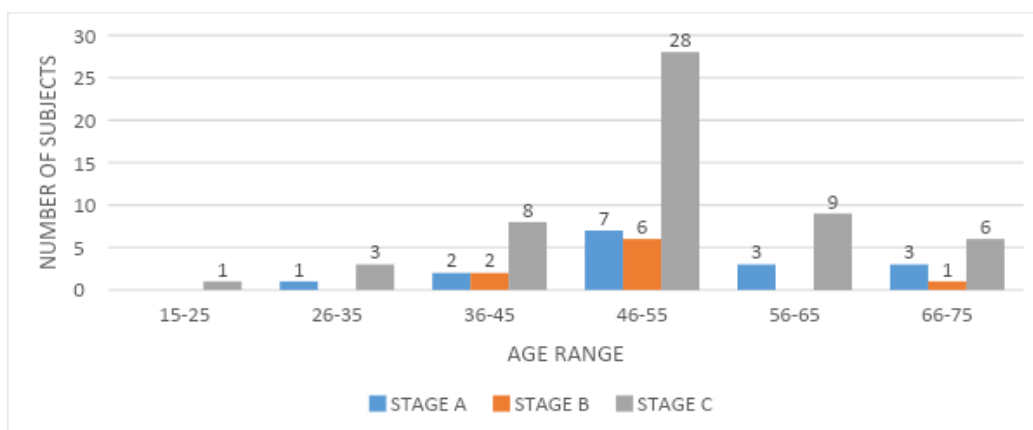
malnourished, followed by stage A (22.86%) classified as well-nourished and stage B (16, 12.86%) classified as moderately nourished. The distribution of the stages among each gender was also analysed. It was therefore revealed that, the most common stage seen in female and male gender was stage C (36 and 19) followed by stage A and Stage B (13, 3 AND 7, 2 respectively).



**Figure 8: Distribution of subjects based on stage and nutrition.**

Nutritional status among each age group of the subjects was analysed and it showed that 46-55 was the most

common age group in which Stage C had the highest number of subjects (28).

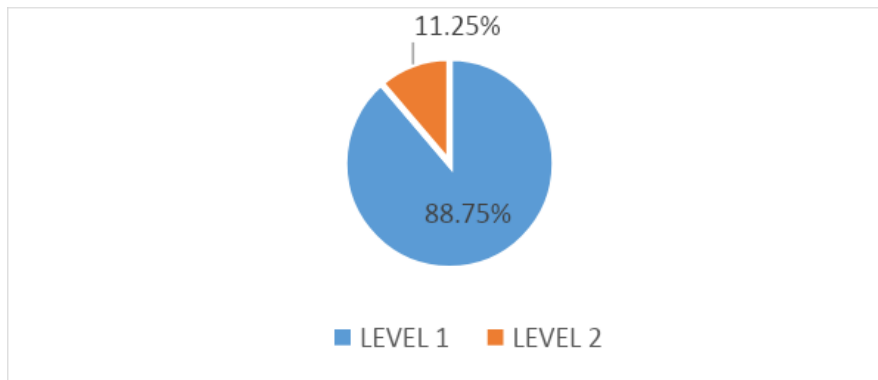


**Figure 9: Number of subjects in each PG-SGA stag.**

### ADR Severity

All the subjects included in the study were assessed for severity of ADR using Hartwig and seigel severity scale. Out of 5 severity levels, only two of them were observed

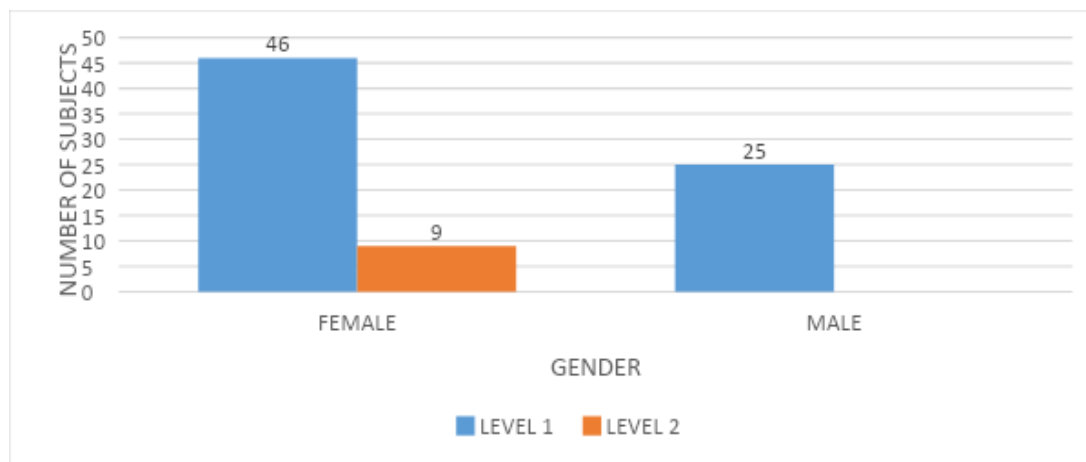
in these 80 subjects. Based on severity scores 71(88.75%) of the subjects had LEVEL 1 severity and 9 (11.25%) of them had LEVEL2severity.



**Figure 10: Percentage of patients in each ADR severity level.**

Distribution of different levels of ADR severity among each gender were analysed and level 1 was majorly seen

in women(46) and then men (25), whereas, level 2 was only seen in women.



**Figure 11: Distribution based on ADR severity.**

### DISCUSSION

This study was conducted in the out-patient chemotherapy ward of Department of oncology, in ESI-MC PGIMSR & MH, Rajajinagar, Bengaluru. A total of 80 patients were enrolled in the study based on inclusion and exclusion criteria.

Most of the subjects included in the study were females (54, 67.50%) and belonged to the age group of 46-55 (41, 51.25%) followed by 26-35 and 56-65 years (4, 15%) with a mean age of  $58 \pm 10.28$ . This is contrast to the study performed by *Asmatanzeem et al*, wherein only 45.13% of the study subjects were females. Although the mean age was similar in both the studies (53.86 years).<sup>[9]</sup>

The study showed that out of 137 anti-cancer drugs prescribed for 80 patients, drugs from class of platinum derivatives were prescribed the most (48, 34.53%) followed by taxanes (27, 19.42%) and monoclonal antibodies (24, 17.27%). The least commonly prescribed drug were from the class of targeted drugs (5,

3.6%) Among platinum derivatives the most commonly prescribed drug was cisplatin (27, 56.25%) followed by carboplatin (21, 43.75%) which is similar to study conducted by *Asmatanzeem et.al*, in which most common class of cytotoxic agents prescribed was platinum compounds (64.58%). Amongst the platinum analogues, the most commonly used drug was cisplatin that comprised 24.46%, followed by carboplatin and oxaliplatin which formed 20.65% and 5.43% respectively. In this present study, the most commonly prescribed anti-metabolite was gemcitabine 55.56% (5). After antimetabolites, taxanes were the most common drug prescribed. Among taxanes, Paclitaxel (23,85.19%) was most commonly prescribed followed by Docetaxel (4,14.81%). The most commonly used monoclonal antibodies were Trastuzumab (15, 62.50%).<sup>[9]</sup>

Assessment of nutritional status was done using PG-SGA scale, which categorised the subjects into 3 stages stage A, B and C. The subjects were analysed and it was observed that majority of them belonged to stage C (55, 78.57%)

which is classified as malnourished, followed by stage A (22.86%) classified as well-nourished and stage B (16, 12.86%) classified as moderately nourished. This data was found to be similar to the study performed by *Ushasree Das et al.* which concluded 11.67% of all cases were well-nourished (PG-SGA category-A). 48.33% of cases were at risk of malnutrition showed moderate malnutrition (PG- SGA Category-B), whereas 40% of the study population were severely malnourished (PG-SGA category- C).<sup>[39]</sup> Elderly people are more prone to malnutrition because of their dietary intake problems. The subjects who were in the later stage of cancer were severely malnourished and it this could be due to the effect of the cancer site.<sup>[10]</sup>

All the subjects included in the study were assessed for severity of ADR using Modified Hartwig and seigel severity scale. The scale defines level 1 and 2 as mild severity, level 3 and 4 as moderate and level 5 as severe. Out of 5 severity levels, only two of them were observed in these 80 subjects. Based on severity scores 71(88.75%) of the subjects had level 1 mild severity and 9 (11.25%) of them had level 2 severity which was contradictory to the study performed by *Sharma PK et al.* where the total subjects (164) showed mild level 1 severity(54.45%). Distribution of different levels of ADR severity among each gender were also analysed and level 1 severity was seen in both women (46, 57.5%) and then men (25, 31.25%). Whereas, level 2 was only seen in women.<sup>[11]</sup>

## CONCLUSION

On drug utilization assessment, it was seen that platinum derivatives were the most commonly prescribed class of anti-cancer drugs, in which cisplatin specifically was contributing to the highest percentage. Targeted drugs such as Bortezomib and Carfilozomib were the least prescribed among all classes. Considering its benefits, targeted drugs could be used more often to avoid most of the side effects and improve the patients' health status. The most commonly observed cancer was Breast followed by cancer in gynecological site and Head and Neck cancer.

Malnourishment being most commonly seen in the cancer patients is usually ignored. Patient's seems to believe that weight loss is inevitable in their diseased state. More than half of the patients we observed were malnourished, which is alarming. This could have been avoided through proper guidance and counselling regarding maintenance of their diet and providing essential supplements. Regular monitoring of their nutritional status can also prevent their severely malnourishment.

Most of the discomfort experienced by the cancer patients is not due to the disease itself, but the treatment side effects. By careful ADR monitoring, their incidence can be decreased. It was observed that severity of the ADR experienced by the patients in this study was mostly Level 1 followed by Level 2, both of which are manageable and can be kept in control with proper monitoring.

## ACKNOWLEDGEMENT

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