CODEN (USA): IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

Available online at: http://www.iajps.com *Research Article*

ASSESSMENT OF ADVERSE DRUG REACTION IN CANCER PATIENTS IN A CANCER CARE CENTER

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Abstract:

The study is the assessment of Adverse drug reaction in a Cancer Care Center. We have conducted the prospective study to analyse the ADR The study population consisted of 178 patients in total. Among them 59% (n=105) of the patients were females. On classifying the patients based on age 33.15% (n=59) of the patients were of age group 60-69. From the total prescription 37.64% (n=67) of the diagnosis was concerned with the reproductive system and in 28.65% (n=51) of the cases the site of tumor was the cervix. As a part of the chemotherapy the patients were prescribed with various classes of anti-cancerous agents. About 67.97% (n=121) alkylating agents were preferred. And most frequently used anti-cancer drug was 5-FU. In 23.59% (n=42) of patients with a combination cisplatin + 5-FU was prescribed. 34.83% (n= 62) of patients had been prescribed with quinolones and 19.66% (n=35) of cases were given with ofloxacin. The prescriptions contained drugs other than anti-cancer agents like nutritional supplements. 35.39% (n=63) of the prescriptions were prescribed with Iron supplements. On classifying the ADRs found according to Wills & Brown classification of ADR assessment, 45.89% of the ADRs were of Type A(Augmented reaction) the chemotherapeutic drugs have a narrow therapeutic index and the dosage needed to achieve a therapeutic response usually proves toxic to the body's rapidly proliferating cells. Early modifications in dosage regimen of chemotherapeutic agents may minimize the hazardous ADRs. Through pharmacist intervention in the adjustment of dosage regimen and supportive care maximum benefits can be gained by the patients because supportive care improves patient comfort and improves quality of life.

Keywords: ADR, Pharmacist Intervention, Supportive care.

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Please cite this article in press as Immanuel Jebastine et al, ***Assessment of Adverse Drug Reaction in Cancer Patients In A Cancer Care Center,*** *Indo Am. J. Pharm. Sci, 2015; 2(12).*

INTRODUCTION:

The WHO defines an "Adverse Drug Reaction" as any response to a drug which is noxious and unintended and which occurs at doses normally used in man for prophylaxis, diagnosis or therapy of disease or for the modification of physiologic function". Thus this definition excludes overdose (either accidental or intentional), drug abuse, and treatment failure and drug administration errors. The term 'adverse drug reaction' and 'adverse drug event is not synonymous. Adverse Drug Reactions (ADRS) are types of Adverse Drug Events (ADES). ADES include ADRS, medication errors and other drug-related problems.

The WHO definition of "adverse drug event" is an untoward medical occurrence that may present during treatment with a pharmaceutical product but which does not necessarily have a casual relationship with the treatment [1].

Pharmacovigilance is an integral part of drug therapy. Still, it is not widely practiced in Indian hospitals. in various studies, adverse drug reactions have been implicated as a leading cause of considerable morbidity and mortality. The incidence of Adverse Drug Reactions (ADR) varies with studies which show incidences ranging from as low as 0.15% to as high as 30%. elderly and hospitalized patients are reported to be more susceptible to ADRS than the adult population (16.6% *vs.* 4.1%). indian reports on ADR monitoring have been very few. this may be because ADR monitoring is still evolving here. after decades of hibernation, the need for an efficient pharmacovigilance programme was felt, the result of which was the institution of national pharmacovigilance programme in november 2004. under this programme, the central drugs standards control organization, new delhi officiates as the central co-ordinating body under which two zonal; five regional and 24 peripheral centres have been established. the objective of this programme is to create awareness among the health professionals on ADR monitoring and to encourage a reporting culture [2].

Hospital-based ADR monitoring and reporting programmes aim to identify and quantify the risks associated with the use of drugs. This information may be useful in identifying and minimizing preventable ADRS while generally enhancing the knowledge of the prescribers to deal with ADRS more efficiently. The participation of pharmacists in national pharmacovigilance programmes is not a common feature. The pharmacist's involvement in such programmes is seen only in some countries. In india, clinical pharmacy is still evolving and hence, pharmacist's involvement in such activities has been low. The aim of the present study was to undertake ADR monitoring in a government hospital where a clinical pharmacy programme is well established. The primary objectives included monitoring and documenting ADRs and evaluating them according to set criteria. The secondary objective was to analyze the cost burden involved in managing ADRs [3].

Epidemiology of ADRs

The frequency of ADRs in the general population is unknown. However, the reported rates of new occurrences for ADRs are noted for selected patient populations. A meta-analysis of 39 prospective studies reported an overall incidence of serious ADRs in hospitalized patients of 6.7% and of fatal ADRs of 0.32%. The fatality rate makes ADRs the fourth to sixth leading cause of death in the United States. Another meta-analysis of 36 studies indicated that approximately *5%* of hospital admissions are due to ADRs. The costs of ADRs are estimated to be $1.56-$4 billion in direct hospital costs per year in the United States [4-7].

The epidemiology of ADRs in Indian population is not known only few studies is carried out. A recent study from All India Institute of Medical Sciences (AIIMS), New Delhi in which both inpatients and outpatient where included, indicate that 22.3% of patients experienced adverse drug reactions. A vast majority of these were dose dependent and potentially preventable.

The ADRs were classified according to the Wills & Brown classification [8]

Type A: augmented reactions

Type A reactions are dose related actions of a medicine upon the human body, which could have been predicted based upon a knowledge of the mode of action and pharmacology of a drug or excipient. These reactions can only occur while the subject is still receiving the preparation and improve partially or completely when the causative agent is withdrawn or the dose reduced.

Type B: bugs reactions

These are adverse reactions that rely upon promoting the growth of certain microorganisms. These type B reactions are pharmacologically predictable events, but they are not type A according to the definition used in the preceding section, since the direct and principal pharmacological action is on the bodies of microorganism rather than on the human body. Examples include sugar-containing medicines promoting dental caries, antibiotics causing overgrowth of resistant bacterial species in the intestine, broad spectrum antibiotics causing oral thrush and over use of one agent stimulating the development of resistance among a specific species of microorganism rendering further use of the agent ineffective.

Note then an infection arising as a result of drug-induced immune-suppression would not be a type B reaction. The primary adverse event in such a case would be suppression of the human immune system, which is usually a type A reaction. Infections arising as a result of this would be a secondary event.

Type C: chemical reactions

A number of adverse reactions depend upon the chemical nature of a drug or excipient rather than pharmacological properties. They are all basically forms of chemical irritation, which makes it likely that, when exposed to the preparation, most people could experience a similar reaction. The severity of a type C reaction is more a function of concentration of the offending substance than dose. Typical side-effects in this category include extravasations reactions, phlebitis, pain at the site of an injection owing to the irritant action of a drug or excipient, acid or alkali burns, contact (irritant) dermatitis and gastrointestinal mucosa damage caused by local irritant action.

Type D: delivery reactions

A variety of adverse reactions occur as a specific consequence of the method of drug delivery. These reactions do not depend upon the chemical or pharmacological properties of the constituents of the preparation, but occur because of the physical nature of the formulation and/or the method of administration. These reactions will be heterogeneous. Methods of delivery vary and so the specific nature of the adverse reactions must also vary.

The unifying characteristic is that, if the method of delivery is changed, the adverse reaction will cease to occur. Examples include inflammation or fibrosis around implants, particles in injections causing thrombosis or blood vessel occlusion, a tablet lodging in the throat, inhaling the 'dust cap' of an inhaler, cough after using a dry powder inhaler, infections at the site of an injection (owing to the opening of a port of entry for bacteria) and infections due to contamination of injection solution with microorganisms.

Type E: exit reactions

These are known as withdrawal reactions, and are a manifestation of physical dependence. It is only possible for them to occur after administration of the medicine has ceased or the dose suddenly reduced. Unlike all other adverse reactions, which typically worsen if the causative agent is continued, reintroduction of the drug will actually ameliorate symptoms. The likelihood of a reaction is linked more to duration of administration than dose. In addition, although these reactions are pharmacologically predictable to an extent, the development of withdrawal reactions is not universal. Many patients do not experience them despite continuous high dose exposure.

Type F: familial reaction

Certain adverse drug reactions occur only in susceptible individuals with genetically determined, inherited metabolic disorders. Some of the more common familial disorders include phenyl ketonuria, glucose 6-phosphate dehydrogenase deficiency; esterase inhibitor deficiency, porphyria and sickle cell anaemia. These reactions must not be confused with those that occur because of the normal variation in ability to metabolize a drug among the population. For example, up to 10% of the population of the western world are deficient in CYP 2D6. However, this does not make them liable to suffer unique adverse effects compared with the rest of the population.

Type U: unclassified reactions

Some ADRs have a mechanism that is not understood and these must remain unclassified until more is known about them. This may necessitate the introduction of new adverse reaction categories in the future. Examples include drug induced taste disturbance, muscular adverse effects of Simavastatin, and nausea and vomiting after a gaseous general anaesthetic.

Predisposing factors

There are many factors that can predispose to the occurrence of adverse drug reactions in a patient. Patients who have one or more of the following predisposing factors are at high risk of developing ADR. The proportion of all patients developing ADR is still very small[1].

Polypharmacy, Multiple and intercurrent diseases, Age, Drug characteristics, Gender, Race and genetics.

METHODOLOGY:

- The study on adverse drug reactions monitoring were carried out in a Cancer Care Center, Erode District, Tamilnadu. It is customary that every project work carried out by a Pharmacist is to be informed to all the physicians, surgeons and other healthcare professionals of the Cancer Care Center for the approval. Study was carried out in 178 patients.

Inclusion criteria

- Cancer patients above the age of 18 years.
  - Patients of both genders.

Exclusion criteria

- Pregnant women and lactating mother
- Patients those who are not willing to give the consent
- HIV positive patients.
- Psychiatric patients

- A separate data entry format (Proforma) was designed. The Proforma contains the details such as Patient's name, Age, Sex, Address, Phone, IP No., D.O.A, Occupation, Social History, Family History, Past medical History, Associated History, Past Medication history, Physical Examination, lab investigations, Diagnosis, treatment chart, frequency of administration (FOA), duration of treatment and route of administration (ROA) and ADR chart. The Proforma format is given in the Appendix for the reference.

Proforma 1- Patient consent form
Proforma 2- Patient details form
Proforma 3- ADR report form

RESULTS:

In our study we have selected 178 cases prospectively from the Cancer Care Center, Erode District, and Tamilnadu in the period of 6 months. We calculated the total number of male and female patients.

Gender Wise Distribution

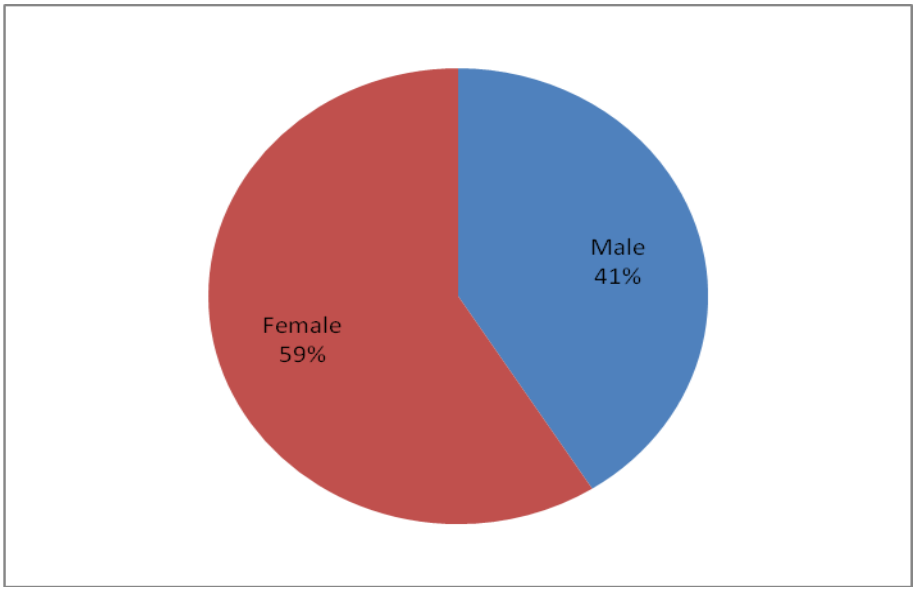

Fig 1: shows that Females are more affected Than Males. Among Which Females are with 59% and Males with 41%.

Age Wise Distribution

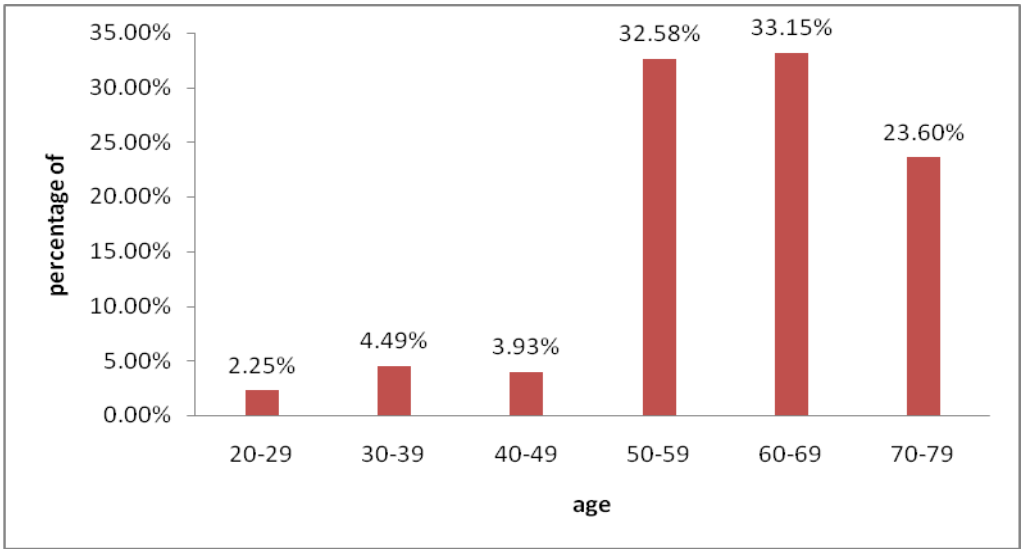

Fig 2: Shows That Age Group between (60-69) was Found To Be Highest With 33.15% and the Less Cases Were Found in Age Group Between (20-29) which Is 2.25%.

SOCIO-ECONOMIC STATUS OF PATIENTS

Table 1: Socio-Economic Status of Patients Collected

S. No	Socio-Economic Status		No. of Patients	Percentage
1	Marital status	Married	143	80.33
		Unmarried	35	19.66
2	Place of living	Rural	162	91.01
		Urban	16	08.98
3	Family expenses	Upper middle	16	29.77
		Lower middle	53	8.98
		Poor	109	61.23
4	Educational status	Illiterate	101	56.74
		Basic Education (can read/write)	50	28.08
		Graduate/ Higher	27	15.16
5	Occupation	Unemployed	7	3.93
		Technical	22	12.35
		Housewife	91	51.12
		Farmer	31	17.42
		Professional	27	15.16
6	Smoking	Never	8	10.95
		Ex smoker	56	76.71
		Current smoker	9	12.32
7.	Other forms of tobacco	Never	29	27.62
		Ex- users	52	49.52
		current	24	22.85

Smoking and other forms of tobacco is the most important preventable causes of cancer in the world, causing more than 4 in 5 of lung cancer which has one of the lowest survival rates of all cancers. It also increases the risk of over a dozen other cancers including mouth, larynx, pharynx, nose & sinuses, oesophagus, liver, pancreas and almost all organs. Years of research has proven that smoking greatly increases the risk of cancer and smokers are on average much more likely to get cancer than non-smokers.

Stage Wise Distribution of Study Population in Our Hospital

During the study period, out of 178 cases, stage wise cancer classification was done and depicted in table no: 2 and fig no: 3

Table 2: Stage Wise Distribution of Study Population.

S. No	Stages of cancer	No of patients	Percentage
1	Stage-1	44	24.7
2	Stage-2	59	33.14
3	Stage-3	48	26.9
4	Stage-4	27	15.16

In this Tab no: 2 it was observed that 24.70% of patients was undergoing stage-1 type of cancer, 33.10% of patients in stage- 2, 26.90% of patients in stage-3 and 15.10% in stage4. From which the stage 2 is observed to be the highest (33.14%). From the above table it was observed that 59 patients were undergoing stage-2 type of cancer which was found to be the highest and stage-4 is lowest with 27 patients.

System Wise Cancer Classification

From the 178 cases were classified according to the systems prevalent with cancer and the total no is given in graphically in fig no: 3.

From the fig no: 3 it is noted that 20.79% patients was affected in the endocrine system, 3.37% in excretory, 37.64% in reproductive system, 14.04% in respiratory system, 17.42% in GI tract and 6.74% patients with other type of cancer.

The most commonly prescribed class of anticancer drugs in our hospital was tabulated in table no: 3. There are a variety of classes of drugs that are frequently used for the cancer patients depending upon the type of cancer. But in our hospital the alkylating agents were mostly prescribed (67.9%) in the study population.

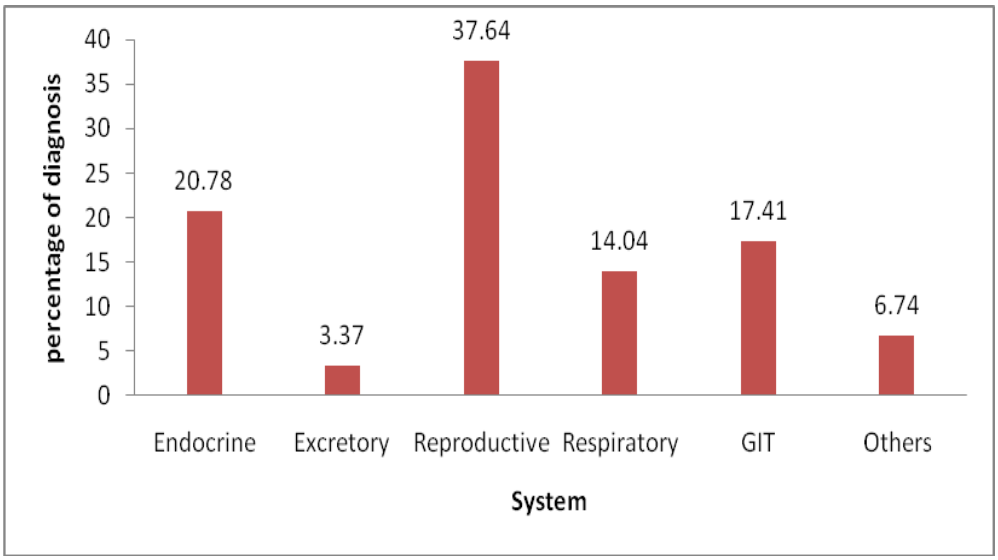

Fig 3: System Wise Cancer Classification in Percentage

Table 3: Most Commonly Prescribed Class of Anti-Cancer Drugs

S.No	Class of drug	Total no of drugs	Percentage
1	Alkylating agents	121	67.9%
2	Antimetabolites	87	48.8%
3	Anthracycline	25	14.04%
4	Antimicrotubular	13	7.3%
5	Immunosuppresents	12	6.74%
6	Vinca alkaloids	12	6.74%
7	Estrogen receptor antagonist	8	4.49%
8	Tyrosine gyrase inhibitor	7	3.93%
9	Antibiotic	7	3.93%
10	Antimitotic	6	3.37%
11	Tetracyclines	5	2.80%

Table 4: Mostly Used Anti- Cancer Drug Combination.

S.No	Disease	Combination	No of Patients	Percentage
1	Breast cancer	Cyclophosphamide+doxorubacin + 5 FU	24	13.4
2	Cervix cancer	CDDP+ 5FU	42	23.5
3	Ovarian cancer	Paclitaxel+ CDDP	3	1.6
		CDDP+ vinblastin+ mitomycin	2	1.12
4	Tongue	CDDP+ 5-FU	5	2.8
5	Oropharynx	CDDP+ 5-FU	2	1.12
		CDDP+ 5-FU+ gemcitabine	4	2.24

The most commonly used anti-cancer drug combination in our hospital was CDDP+ 5FU and is given in about 23.5% of patients.

Most Commonly Used Class of Antibiotics for Cancer Patients

Here we had listed out 8 classes of most commonly used class of antibiotics in the prescriptions and the list is illustrated in table no: 5

From the table 5shown it was found that no. of antibiotics used in the prescriptions was quinolones with 62 in number which is found to be the highest.

Table 5: Most Commonly Used Class of Antibiotics for Cancer Patients

S.No	Drug classification	Total no of antibiotics	Percentage
1	Quinolones	62	34.8
2	Cephalosporins	39	21.9
3	Aminoglycosides	28	15.7
4	Nitroimidazoles	27	15.2
5	Pencillines	18	10.11
6	Macrolide antibiotics	7	3.9
7	Lincosamide antibiotic	3	1.6
8	Beta lactum antibiotic	1	0.56

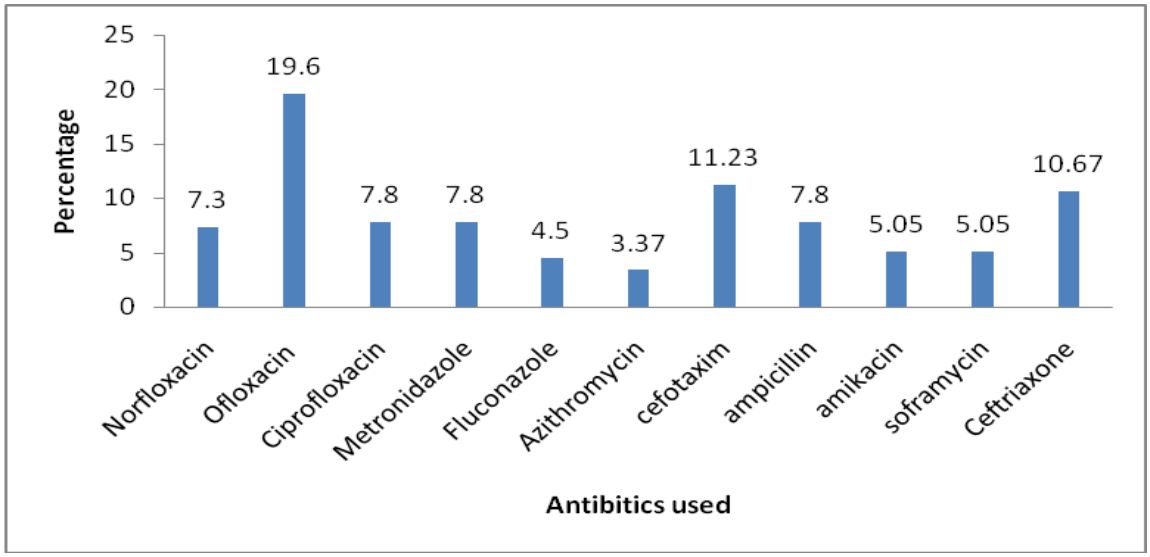

Fig 4: Percentages of Most Commonly Used Antibiotics

From which oflaxacin is frequently used i.e. 19.6% then cefotaxim with 11.23%, then ceftriaxone 10.6%, ciprofloxacin 7.8%, metronidazole with 7.8% are the next widely used drug in the list.

List of Nutritional Supplements Used For Cancer Patients

Here we have prepared a list of 6 nutritional supplements given to the patient along with cancer drugs and the percentage details of the supportive drug is given in table no: 6.

From the table 6 shown it was found that iron supplements are mostly used in the prescription with 63 in number.

The fig no: 5 shows that the $5HT_3$-RA is mostly used in prescriptions is about 65.7%, which include the drugs like ondanserton, ultracet, emeset etc.

Table 6: List of Nutritional Supplements Used For Oncology Patients

S.No	Nutritional supplements	Total no	Percentage of drug
1	Multi vitamin	59	33.14
2	BCT	57	32.02
3	Ca supplements	12	6.74
4	Zinc	4	2.27
5	Magnesium sulphate	6	3.37
6	Iron supplements	63	35.39

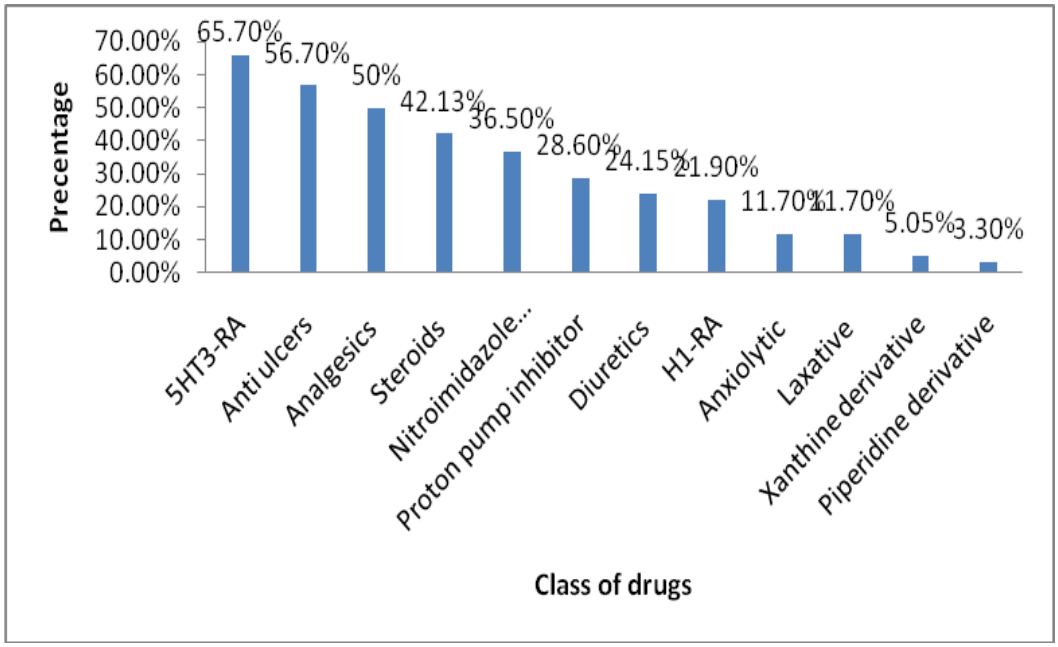

Fig: 5 Class of Supportive Drugs Most Commonly Used For Cancer Patient

Table 7: Most Commonly Used Supportive Care to the Cancer Patients

S.No	Drugs used	Dose	Freq	Numbers	Percentage
1	Ranitidine	75mg	Bid	87	48.8
2	Dexamethasone	1.5mg	Od	53	29.7
3	Omeprazole	20mg	Od	51	28.6
4	Ondansetron	0.15mg/kg	Before chemo	50	28.08
5	Metronidazole	250mg	Tid	39	21.9
6	Perinorm	---	---	37	20.7
7	Avil	----	---	35	19.6
8	Ketanov	10mg	Bid	35	19.6
9	Diclofenac	50mg	q12hrs	26	14.6
10	Flagyl	250mg	Tid	26	14.6
11	Wysolone	10mg	Od	23	12.35
12	Voveran	50mg	Bid	22	12.9
13	Lasix	40mg	Od	22	12.9
14	Dulcolex	30mg	Od	21	11.7
15	Anxit	0.25mg	Od	21	11.7
16	Mannitol	20mg/ml	Od	21	11.7
17	Emeset	4mg	Bid	16	8.9
18	Ultracet	---	Bid	14	7.8
19	Derphilline	10mg	Bd	9	5.05
20	Gelusil	---	Bid	8	4.49
21	Loperamide	4mg	Od	6	3.37
22	Sucralfate	10ml	---	6	3.37
23	Fortwin	30mg/ml	Od	5	2.8
24	Phenergan	25mg	Bd	5	2.8

From tab no: 7 it was observed that Ranitidine, Dexamethasone and Omeprazole are commonly used in Cancer Care Center.

Co morbidities Prevalent with Cancer

Out of 178 patients studied the comorbidity prevalent with cancer was noted and is depicted in table no: 8. From the table 8 it was observed that cancer prevalent with diabetes + hypertension was found to be more, in about 21 patients.

Table 8: Comorbidites Prevalent With Cancer

S.No	Disease	No of Patients	Percentage
1	COPD	7	3.93
2	Diabetes	18	10.11
3	Diabetes+ hypertension	21	11.79
4	Bronchial asthma	6	3.37
5	Hypertension	8	4.49
6	Rheumatoid arthritis	3	1.68
7	Tuberculosis	4	2.24
8	Others	13	7.30

Total Number of ADRS Observed In Cancer Patients in Cancer Care Center

In our study we have selected 178 cases and here we reported the ADR occurring patients and the No. of ADR occurred in the patients and is give in table no: 9.

From the table 9 it was observed that in female patients more no. of ADRs was found with 315 ADRs.

Type and Gender Wise Distribution of Adverse Drug Reactions

Table no: 10 shows the type and gender wise distribution of adverse drug reactions in 178 cases.

Table 9: Total Number of ADR Observed In Cancer Patients

S. No	Gender	No of ADRs Occurred	Percentage of ADRs
1	Male	197	38.47%
2	Female	315	61.53%
Total		512	100

Table 10: Type and Gender Wise Distribution of Adverse Drug Reactions

S.No	ADRs found		Female	Male	Total
1	Nausea & vomiting		58	29	87
2	Alopecia		37	22	59
3	Diarrhoea		21	16	37
4	Constipation		23	9	32
5	Anaemia		19	10	29
6	Pain	Head ache	8	3	24
		Musculoskeletal pain	5	3	
		Injection site pain	3	2	
7	Anorexia		13	11	24
8	Hyperpigmentation		15	9	24
9	Fatigue		8	15	23
10	GI ulceration		7	15	22
11	Skin rash		12	9	21
12	Nail damage		11	8	19
13	Abdominal discomfort		12	5	17
14	Stomatitis		11	5	16
15	Thrombocytopenia		8	3	11
16	Local inflammination/oedema		5	4	9
17	Leucopenia		6	3	9
18	Dermatitis		5	4	9
19	Fever		4	4	8
20	Amenorrhoea		8	-	8
21	Anaphylaxis		4	3	7
22	Neutropenia		4	2	6
23	Erythema		4	2	6
24	Peripheral neuropathy		2	-	2
25	Myelosuppresion		2	1	3

From table no:10 it is found that nausea and vomiting is the most commonly observed ADR in 87 patients followed by alopecia in 59 patients.

Common Types and Severity of ADR's Found in Our Hospital

Table 11: Common Types and Severity of ADRs Found In Our Hospital

S.No	ADR	Frequency n=512	Percentage %	Low severity N	High severity
1	Nausea,vomiting	87	16.99	79	8
2	Alopecia	59	11.52	52	7
3	Stomatitis	16	3.12	13	3
4	Leucopenia	9	1.75	8	1
5	Thrombocytopenia	11	2.14	9	2
6	GI ulceration	22	4.29	18	4
7	Neutropenia	6	1.17	5	1
8	Diarrhoea	37	7.22	29	8
9	Hyper pigmentation	24	4.68	15	9
10	Skin rash	21	4.10	17	4
11	Nail damage	19	3.71	17	2
12	Amenorrhoea	8	1.56	7	1
13	Abdominal discomfort	17	3.32	10	7
14	Anorexia	24	4.68	22	2
15	Anemia	29	5.66	23	6
16	Dermatitis	9	1.75	7	3
17	Anaphylaxs	7	1.36	7	0
18	Pain	24	4.68	21	3
19	Local inflammation/oedema	9	1.75	8	1
20	Fatigue	23	4.49	21	2
21	Erythema	6	1.17	6	0
22	Peripheral neuropathy	2	0.39	2	0
23	Myelosuppression	3	0.58	3	0
24	Constipation	33	6.44	29	4
25	Fever	8	1.56	5	3

Classification and assessment of ADR

Classification was done according to Wills & Brown method. According to this study there are mainly 5 reactions of ADR occurring in patients. Type A- augmented reactions occurred with 235 in number i.e. 45.89% with the maximum in number compared to other reaction. Whereas Type C- chemical reaction was 184 in number i.e. 35.93%, Type H- hypersensitivity reaction with 76 in number i.e. 14.84%, Type B-bugs reactions with 8 in number patients i.e. 1.56%, Type D- delivery reaction with 5 in number i.e. 0.97% respectively. These reactions are given in table no: 12

Table 12: Classification and Assessment of ADR

S.No	Types Of Reaction	No. of ADRs in percentage
1	Type A- Augmented reactions	45.89%
2	Type B- Bugs reactions	1.56%
3	Type C- Chemical reactions	35.93%
4	Type D- Delivery reactions	0.97%
5	Type E- Exit reactions	-
6.	Type F- Familial reactions	-
7	Type G- Genotoxicity reactions	-
8	Type H- Hypersensitivity reactions	14.84%
9.	Type U- Unclassified reactions	-

Table 13: Changes Brought In the Drug Regimen Due To Pharmacist Intervention

S.No	Drug name	Dose	Freq
1	ranitidine	150mg	bid
2	dexamethasone	3mg	od
3	omeprazole	40mg	od
4	metronidazole	500mg	Tid
5	diclofenac	100mg	q12hrs
6	wysolone	20mg	od
7	lasix	40mg	q8hrs
8	dulcolax	30mg	od
9	anxit	0.5mg	od
10	emeset	4mg	tid
11	gelusil	---	tid
12	lopermide	8mg	od
13	sucrulfate	10ml	tid

Pharmacist Intervention in Management of ADR's in Cancer Patients

A pharmacy intervention is defined as any action by a pharmacist that directly results in a change in patient's management or therapy. Opportunities for the interventions arise during various clinical pharmacy activities including medication history interview, medication chart review, therapeutic drug monitoring, provision of drug information and ward round participation.

With the professional rapport with the physician and the clinical pharmacist adequate adjustment were made in the dosage and frequency of supportive therapy since supportive care is regarded as the care that get the maximum benefit for the patient and the caretakers to cope up with the treatment. The use of newer antiemetic agents significantly decreased the incidence of nausea and vomiting thought they have failed to present this completely. In the current study in major of cases the dose of anti-emetics was increased in order to manage this ADR. Pharmacist intervention had led to increased patient compliance with patient counseling and moral support. Not many but few good interventions have helped to improve the patient condition and quality of life.

CONCLUSION:

The prescriptions contained drugs other than anti-cancer agents like nutritional supplements. 35.39% (n=63) of the prescriptions were prescribed with Iron supplements. Other than the nutritional supplements and anti-cancer agents supportive therapy was also given. In which 65.7% (n=117) of $5HT_3$-RA class of drugs were prescribed. And 48.8% (n=87) of the prescription contained ranitidine and dexamethazone 29.7% (n=53). From the total study population 10.11% of the patients had diabetes mellitus as co-morbid disease.61.53% of ADRs were observed in female patients. 48.88% of the patients had nausea and vomiting as ADR and in 90.80% (n=79) of patients it was low severity. On classifying the ADRs found according to Wills & Brown classification of ADR assessment, 45.89% of the ADRs were of Type A (Augmented reaction)

From the study it is concluded that chemotherapeutic drugs have a narrow therapeutic index and the dosage needed to achieve a therapeutic response usually proves toxic to the body's rapidly proliferating cells. Early modifications in dosage regimen of chemotherapeutic agents may minimize the hazardous ADRs. Through pharmacist intervention in the adjustment of dosage regimen and supportive care maximum benefits can be gained by the patients because supportive care improves patient comfort and improves quality of life

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