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Adverse Drug Reactions of Nonsteroidal Anti-Inflammatorydrugs in Tertiary Care Hospital

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Abstract
Background : *In India use of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) is on a larger scale. It has been documented in several International and National studies that NSAIDs cause significant rise in the gastrointestinal adverse reactions.*
Aims and Objectives: *The main aim of this study is to identify the incidence of the adverse drug reactions of the non-steroidal anti-inflammatory drugs and to assess the percentage & severity of the adverse reactions.*
Patients and Methods : *A prospective Observational study was carried out in SVRR VT.Hospital,Tirupati.Total 200 patients of age between 18-60 years group fulfilling the inclusion criteria were enrolled for the study.This study will be carried out on patients who were prescribed Non-Steroidal Anti-Inflammatory Drugs for the past 1 year to observe the risks of adverse drug reactions.The severity of ADRs was categorized in to mild, moderate and severe using ADRseverity assessment scale of Hartwing and Siegle All ADRs their causative drug and therapeutic consequences were noted. outcome was assessed on all the follow-up days.The results will be analyzed using means, proportions, t-test (unpaired), ANOVA test and chi-square test.*
Results :*.. The study found that females, elderly patients are some of the risk factors. Maximum ADRs are mild to moderate in nature and no serious or severe reaction developed after prescribing NSAIDs which is the positive point.*
Conclusion: *Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) are widely prescribed drugs. Monitoring of adverse drug reaction is an important tool to prevent the damage to a system like gastrointestinal, cardiovascular and derangement of kidney and liver functions.Fixed dose combinations of NSAIDs are used less which goes in favour of rational prescribing practice.Forty to sixty years of age , female sex are the main risk factors for causing ADRsIn more than fifty percent of the patients, gastro protective agents have been used and rest of the patients in whom gastro protective agents are not used, they have suffered from the gastrointestinal symptoms. It suggests that guidelines for prescribing NSAIDs are necessary to follow.Maximum ADRs are mild to moderate in nature and no serious or severe reaction developed after prescribing NSAIDs which is the positive point.*
Keywords: *Adverse drug reactions,NSAIDs,Fixed dose combinations,Gastro protective agents.*

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I. Introduction

Adverse Drug Reactions (ADRs) have been regarded as major public health problem. Adverse drug reactions have been creating headlines over the last forty years since theThalidomide tragedy. The adverse reactions profiles of many NSAIDs have proved to be unacceptable. Over the last 20 years, 18 NSAIDs have been withdrawn from the market or their clinical studies have been terminated because of unexpected toxicity(1).

The occurrence of ADR is a price that our patients have to pay for the great benefits that have been produced by modern medicines and which we anticipate will continue to be produced in the future. Adverse drug reactions may also result in diminished quality of life, increased physician visits, hospitalizations, and even death. In addition, they result in increased health care costs. The numerous medications, multiple chronic medical problems, and frequent acute illnesses experienced by the patients put them at increased risk for ADRs and makes detection more difficult. Therefore, there is a need to monitor the safety of the drug after it has been released for general use. The Non Steroidal Anti-Inflammatory Drugs (NSAIDs) possess anti –inflammatory, analgesic and anti-pyretic activities .Their use is constantly expanding and the search for more efficacious and better tolerated compounds is still being pursued. More than 100 NSAIDs are marketed world wide(2). In India, over 15 NSAIDs and their formulations (about 400) are marketed, resulting in enormous exposure of patients to this group of drugs and their associated risks(3).It has been reported that unauthorized handling of drugs and self-medication is on the increase worldwide with particular reference to Asia and Africa(4).In India, a variety of

NSAID combinations are available, as over the counter (OTC) products and are widely misused and abused[5]. The credulous patient then has to pay for the doctors' fees in terms of extra cost and extra adverse effects. The outcome of self-medication and possible ADRs are dependent on the quality of drug information given by the drug suppliers and the extent of use. Fever and pain are usually the early symptoms of most of diseases. To cure and controls of these symptoms, NSAIDs have taken place in a large scale. To minimize the expenditure and hazards to consult with the physician and many more reasons people use to consume NASIDs by his/her own will throughout the world[6].

Efficacy of NSAIDs has been documented in a number of clinical disorders, including osteoarthritis, rheumatoid arthritis, ankylosing spondylitis, gout, dysmenorrhea, dental pain and headache[7]. Predominantly used in the management of rheumatological conditions, NSAIDs are drugs of choice in the treatment of inflammatory arthropathies. NSAIDs have a wide range of adverse effects, including gastrointestinal (GI) disorders (from minor dyspepsia through to major ulcers, bleeding and perforation),kidney effects (leading to a variety of problems, such as increased blood pressure or heart failure) and cardiovascular effects[8,9&10].
There are clinically important differences in the efficacy and safety between the different NSAIDs[11], if there are differences, which are the ones, that are more effective and associated with fewer adverse effects, and[12]which are the effective therapeutic approaches that could reduce the adverse effects of NSAIDs. Finally, an algorithm is proposed while delineates a general decision-making tree to select the most appropriate analgesic for an individual patient based on the evidence reviewed.

II. patients and methods

A prospective Observational study was conducted in S.V.R.R Government General Hospital, Tirupati on 200 patients of age between 18-60 years group for a period of one year.

Ethical Clearance: The study was conducted after approval by the Scientific committee and Institutional Ethics Committee, Sri Venkateswara Medical College, Tirupati.. All the Patients participating in the study were explained clearly about the purpose and nature of the study in the language they can understand and written informed consent of the patients was taken before their enrolment in the study .They were encouraged to ask questions to clarify any doubts.

Inclusion Criteria:
1. Patients aged between 18-60 years.
2. Patients of either sex.
3. Patients who were prescribed NSAIDs for the past one year.

Exclusion Criteria:
1. Patients below 18 years of age.
2. Patients above 60 years of age.
3. H/O kidney, liver& acid-peptic disease.
4. H/O Pregnancy & lactation.
5. H/O Allergy to NSAIDs.
6. H/O Bronchial asthma & Diabetes mellitus.

III. Methodology

This study will be carried out on 200 patients who were prescribed Non-Steroidal Anti-Inflammatory Drugs for the past 1 year to observe the risks of adverse drug reactions. All the patients are enrolled after getting their written & Informed consent. Information regarding demographic data, medical condition of the patient will be collected initially .Usage pattern of NSAIDs included with name of drug [NSAID],dose ,route, frequency of administration, duration of treatment, and related conditions are noted. Simultaneously other necessary lab reports are also recorded. All the patients are followed up for 6 months with one month interval to check any adverse reactions, any abnormal values in laboratory investigations including hematological tests [White blood count, Total count, Differential count, Absolute eosinophil count] and biochemical tests [i.e Sr. electrolytes, blood sugar, Liver functional tests, Renal function tests] to evaluate the outcome & further analyzed in relation to age, sex, type of drug & system wise distribution of adverse drug reactions.

Procedure: Data of all 200 patients were analyzed for following parameters.

- Age and sex wise distribution, Frequency of out-patient and In-patients according to the departments.
- All the reported ADRs were analysed for the following parameters:

i) Frequency of patients developing ADRs
ii) Age and Sex distribution of reported ADRs
iii)System wise distribution of ADRs
iv) Severity of ADRs using Hartwing and Siegle scale.

Severity of ADRs:
The severity of ADRs was categorized in to mild, moderate and severe using ADR severity assessment scale of Hartwing and Siegle .
Outcome: All ADRs their causative drug and therapeutic consequences were noted. outcome was assessed on all the follow-up days.
Statistical analysis:
Statistical analysis was done using Microsoft excel and SPSS software version 14.0.The results will be analyzed using means, proportions, t-test (unpaired), ANOVA test and chi-square test.

Results

3.1. Demographic profile:

Table – 3.1a: Age and Department wise distribution

Age in Years	Department		Total N (%)
	Medicine N (%)	Orthopaedic N(%)	
18 – 30	15 (15)	11 (11)	26 (13)
31 – 40	28 (28)	27 (11)	55 (27.5)
41 – 50	36 (36)	40 (40)	76 (38)
51 – 60	21 (21)	22 (22)	43 (21.5)
Total	**100 (100)**	**100 (100)**	**200 (100)**

The results depict that patients are in age group of 41-50 years(76, 38%), and lowest number of patients(26,13%) are in the age group of 18-30 years.

Table- 3.1b: Gender and Department wise distribution

Department	Male N (%)	Female N (%)	Total N (%)
Medicine	42 (42)	58 (58)	100 (100)
Orthopaedics	44 (44)	56 (56)	100 (100)
Total	86 (43)	114 (57)	200 (100)

The results depict that females are 114(57%) and males are 86(43%). Out of 100 patients of medicine department 58(58%) are female and 42(42%)are male. Out of100 patients of orthopaedic department 56(56%) are females and 44(44%) are males.

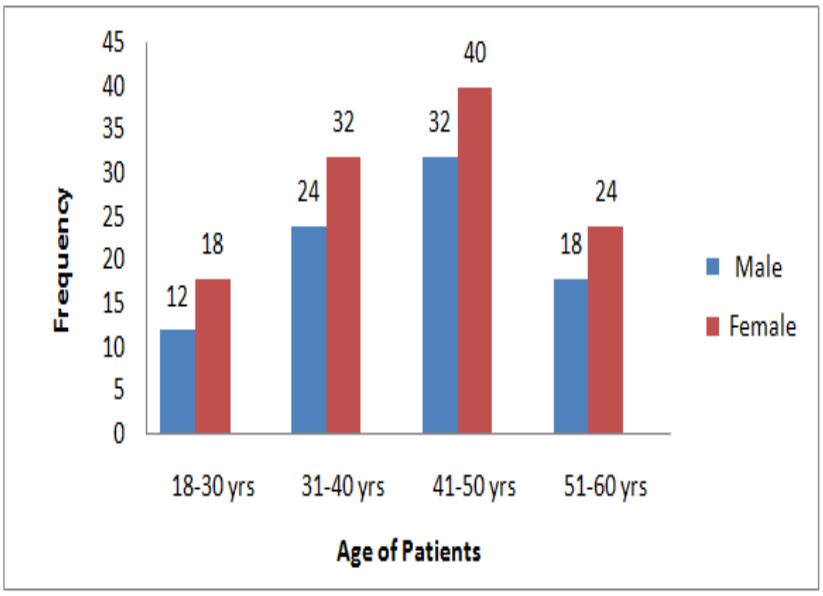

Figure – 3.1a: Bar chart representation of Age and Gender Distribution

The results depict that, males are 86 and females are 114. Out of 86 male patients; 12(13.9%) are in the age group of 18-30 years, 24 (27.9%) are in the age group of 31-40 years, 32 (37.2%) are in the age group of 41-50 years, 18 (20.9%) are in the age group of 51-60 years. Out of 114 female patients; 18(15.7%) are in the age group of 18-30 years, 32 (28.0%) are in the age group of 31-40 years,40(35.0%) are in the age group of 41-50 years, 24 (21.0%) are in the age group of 51-60 years.

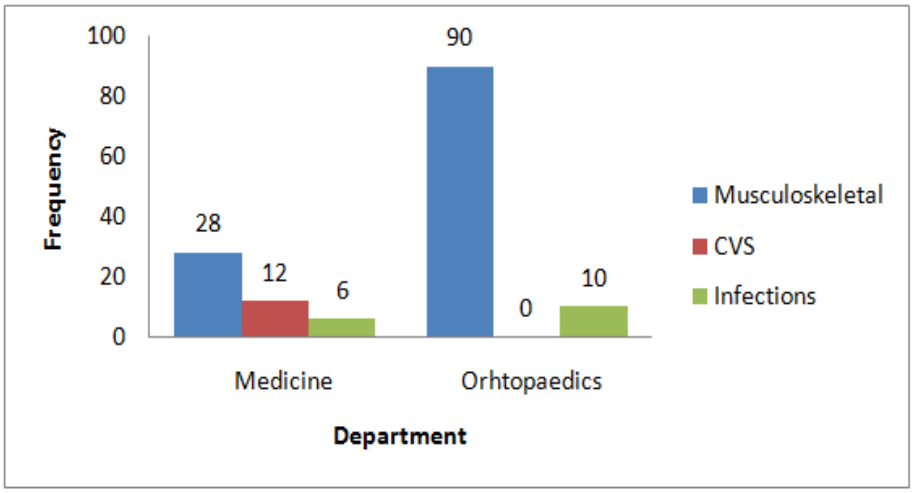

Figure -3.1b: Bar chart representation of Diseases / Conditions Prevalence

The results depict that, In medicine department 28(28%) patients are suffering from musculoskeletal system related disorders, 12(12%) are suffering from cardiovascular disorders and 60(60%) are suffering from various infections. 100 patients who are in orthopedics department, 90(90%) are suffering from musculoskeletal disorders 10(10%) are suffering from infections.

Table -3.1c: Co-morbid Conditions

No. of Diseases	No. of Patient	Percent
One	163	81.5%
Two / more	37	18.5%
Total	**200**	**100.0%**

The results depict that, 163(81.5%) are suffering from one disease, 37(18.5%) patients are suffering from more than one disease simultaneously.

3.**2. Analysis of NSAIDs used:**

Table – 3.2a: Use of NSAIDs

Sr.No.	Name of Drug	No. of Prescriptions	Percentage
1	Aceclofenac	18	10.11%
2	Diclofenac	26	14.60%
3	Ibuprofen	38	21.34%
4	Indomethacin	5	2.80%
5	Paracetamol	80	44.94%
6	Piroxicam	8	4.49%
7	Etoricoxib	3	1.68%
Total		**178**	**100%**

The results depict that, Paracetamol was the largest number of prescribed drug (80, 44.94%). The second largest prescribed drug was Ibuprofen (38 patients), leaving Diclofenac (26) and Aceclofenac (18) third and fourth number of frequently prescribed drugs respectively. Minimal prescriptions were found of Piroxicam and Indomethacin, 8 (4.49%) and 5 (2.80%) respectively. During analysis Etoricoxib prescriptions was3 (1.68%%).

Table – 3.2b: Age wise distribution of combinations of NSAIDs

Combinations	Age in years				Total N (%)
	18-30 N (%)	31-40 N (%)	41-50 N (%)	51-60 N (%)	
Aceclofenac +Paracetamol	0 (0)	1(14.2)	0 (0)	1(20)	2(9.09)
Diclofenac + Paracetamol	1(33.3)	3(42.8)	2(28.5)	2(40)	8(36.36)
Diclofenac + Paracetamol + Serratiopeptidase	0 (0)	0 (0)	2(28.5)	1(20)	3(13.63)
Ibuprofen + Paracetamol	1(33.3)	2(28.5)	3(42.8)	1(20)	7(31.81)
Diclofenac + Dicyclomine	1(33.3)	1(14.2)	0 (0)	0 (0)	2 (9.09)
Total	**3(100)**	**7(100)**	**7(100)**	**5(100)**	**22(100)**

Out of 22 patients, maximum combinations (7 combinations)are prescribed in age group 41-50 years,31-40 years, the second highest (5 combinations)are in age group of 51-60 years. Minimum (3 combinations) are prescribed in age group of 18-30 years. .

3.3. Use of gastro protective agents:

Table- 3.3a: Age wise distribution of Gastro protective agents

Age	Gastro protective agents		Total (%)
	Not Prescribe (%)	Precribe (%)	
18-30	6 (66.66)	3 (33.33)	**9 (100)**
31-40	18 (42.85)	24 (57.14)	**42 (100)**
41-50	46 (52.87)	41 (47.12)	**87 (100)**
51-60	37 (61.29)	25 (38.70)	**62 (100)**
Total	**107 (53.5)**	**93 (46.5)**	**200 (100)**

Chi χ^2 – 29.25, p value < 0.0001

The results depict that, 93 (46.5%) patients received gastro protective agents while 107(53.5%) did not received gastro protective agents. In the age group 18-30 years 3 (33.33%) received gastro protective agents out of 9 patients. 24 (57.14%) patients received in the age group 31-40 years& 18 (42.85%) did not received gastro protective agents. Patients in the age group of 41-50 years received gastro protective agents are 41(47.12%) while 46 (52.87%) patients did not received gastro protective agents. In the age group of 51-60 years of age, 25(38.70%) received &37(61.29%) did not received gastro protective agents.

Table – 3.3b: Sex wise distribution of Gastro protective agents

Sex	Gastro protective agents		Total (%)
	Not Prescribe (%)	Prescribe (%)	
Male	45 (52.32)	41 (47.67)	86 (100)
Female	62 (54.38)	52 (45.61)	114 (100)
Total	**107 (53.5)**	**93 (46.5)**	**200 (100)**

Chi χ^2 –0.002, p value < 0.967

The results depict that, 41(47.67%) males received and 45 (52.32%) males did not received gastro protective agents. 52(45.61%) female patients received and62(54.38%) patients did not received gastro protective agents.

3.4. Analysis of Adverse Drug Reactions (ADRs):

Table -3.4a: Department wise distribution of ADRs

Department	ADR		Total N (%)
	No N (%)	Yes N (%)	
Orthopaedic	72 (72)	28 (28)	100 (100)
Medicine	80 (80)	20 (20)	100 (100)
Total	**152 (76)**	**48 (24)**	**200 (100)**

Chi χ^2 – 43.984, p value < 0.0001

The results depict that, Out of 100 Medicine patients 20 (20%) developed ADR & 80 (80%) patients did not suffer from any ADR. In Orthopedic department, 28(28%) patients observed ADR and 72(72%) patients did not suffer from any ADR.

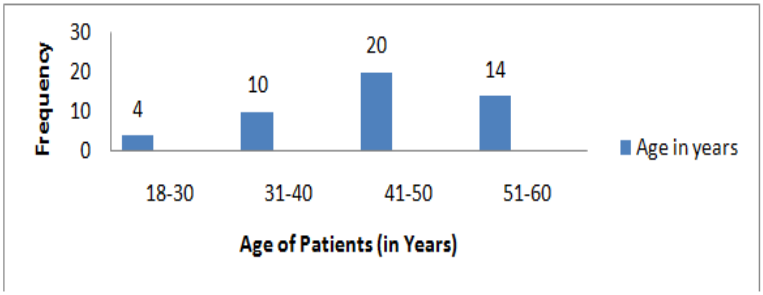

Figure- 3.4a: Bar chart representation of Age wise distribution of ADRs

Chi χ^2 – 59.980, p value < 0.0001

The results depict that, In the age group 18-30 years, ADRs occurred in 4(17.39%)patients, rest of 19 patients did not experience ADR .In the age group of 31-40 years 10 (25%)patients suffered from ADR & 30 (75%) did not have ADR. 20 (25.64%) patients developed ADR in the age group 41-50 years. In the age group of 51-60 years 14(23.72%) patients developed ADR.

Table – 3.4b: Sex wise distribution of ADRs

Sex	ADR		Total N (%)
	No N (%)	Yes N (%)	
Male	68 (79.06)	18 (20.93)	86 (100)
Female	82 (71.92)	32 (28.06)	114 (100)
Total	**152 (76)**	**48 (24)**	**200 (100)**

Chi χ^2 – 10.069, p value < 0.002

The results depict that, 18(20.93%) male patients suffered from ADR & the rest 68 (79.06%) male patients did not suffer. 32(28.06%) female patients suffered from ADR & remaining of 82(71.92%) female patients did not.

Table – 3.4c: System wise distribution of ADRs

Affected system	Patients	Percent
Gastro Intestinal system	**24**	
Gastritis	12	25
Diarrhoea	3	6.25
Vomiting	3	6.25
Constipation	1	2.08
Nausea	3	6.25
Decreased appetite	2	4.16
Cardio Vascular system	**10**	
Increased B.P	5	10.41
Palpitation	5	10.41
Respiratory system	**2**	
Breathlessness	2	4.16
Liver	**3**	
Hepatotoxicity	3	6.25
Kidney	**3**	
Increased creatinine	0	
Decreased urination	3	6.25
Central Nervous system	**3**	
Headache	2	4.16
Giddiness	1	2.08
Skin	**1**	
Urticaria	1	2.08
Electrolyte imbalance	**1**	
Oedema	1	2.08
Blood	**1**	
Anaemia	1	2.08
Total	**48**	**100**

The results depict that, out of 48ADRs, 24(50%) ADRs are related to Gastrointestinal system followed by Cardiovascular system (10,20.8%). The other affected systems are Central Nervous System (3,6.25%) and Respiratory system (2, 4.16%). Liver, Kidney, Skin and Heamatological are observed in 3, 3, 1 and 1 patients respectively. One patient developed edema.

b: Age wise distribution of symptoms of ADRs

Name	Age				Total N (%)
	18-30	31-40	41-50	51-60	
Gastritis	3	3	4	2	24 (50)
Diarrhoea	0	1	1	1	
Vomiting	0	0	2	1	
Constipation	0	0	1	0	
Nausea	0	2	1	0	
Decreased appetite	0	0	1	1	
Increased B.P	0	1	1	3	10 (20.8)
Palpitation	0	1	2	2	
Breathlessness	0	0	1	1	2 (4.16)
Headache	1	1	0	0	3 (6.25)
Giddiness	0	0	0	1	
Oedema	0	0	1	0	1 (2.08)

Anaemia	0	0	1	0	1 (2.08)
Hepatotoxicity	0	1	1	1	3 (6.25)
Increased creatinine	0	0	0	0	3 (6.25)
Decreased urination	0	0	2	1	
Urticaria	0	0	1	0	1 (2.08)
Total	**4**	**10**	**20**	**14**	**48 (100)**

The results depict that, In age group of 18-30 years the major adverse effect was gastritis followed by headache. In age group of 31-40 years the major adverse effect was gastritis, nausea and headache. In age group of 41-50 years the most common adverse effect was again gastritis followed by palpitation and hepato toxicity. In age group of 51-60 years the most prevailing adverse effect was gastritis, followed by increased B.P, palpitation, hepato toxicity and decreased urination.

Table –3.4e: Causal NSAIDs

Drug	Prescribe	No. of ADR	Percent
Aceclofenac	18	1	5.55
Diclofenac	26	9	34.61
Etoricoxib	3	1	33.33
Ibuprofen	38	9	23.68
Indomethacin	5	2	40.00
Paracetamol	80	8	10.00
Piroxicam	8	4	50.00
Combinations	22	14	63.63
Total	200	48	24

The results depict that, out of 48 patients who suffered from ADR, 34 patients suffered due to either single NSAIDs, remaining 14 patients suffered due to the combinations of NSIADs. The maximum causative drug was Diclofenac (34.61%). The following sequences of causative drugs are found to be Ibuprofen (23.68 %), Paracetamol (10.00 %), Piroxicam (50.00 %), Indomethacin(40.00 %), Aceclofenac (5.55%) and Etoricoxib (33.33%).

Table – 3.4f: Causal Combinations

Combinations	**Prescribed**	**No. of ADR**	**Percentage**
Aceclofenac + Paracetamol	2	1	50
Diclofenac + Paracetamol	8	8	100
Diclofenac + Paracetamo + Serratiopeptidase	3	0	0
Ibuprofen + Paracetamol	7	4	57.14
Diclofenac + Dicyclomine	2	1	50
Total	**22**	**14**	**63.63**

The results depict that, the maximum prescriptions (22) contained combinations of Diclofenac + Paracetamol constituting of 8patients (100%) who suffered ADR. The descending order of the prescribed combinations are Iburpofen +Paracetamol , Aceclofenac + Paracetamol and Diclofenac + Dicyclomine depicting 4 (57.14 %), 1 (50%) and 1 (50%) patients suffered from ADR. Three patients received combinations of Paracetamol + Diclofenac +Serratio peptidase, none of them are observed to be suffering from ADR.

Table – 3.4g: Onset of ADR

Day	**Total N (%)**
1 – 3 days	22 (45.83)
4 – 7 days	16 (33.33)
8 – 30 days	10 (20.84)
Total	**48 (100)**

The results depict that,22(45.83%) patients developed ADRs within 3 days, 16 (33.33%) developed after 4-7 days and 10 (20.84%) patients developed after 8-30 days after the start of therapy.

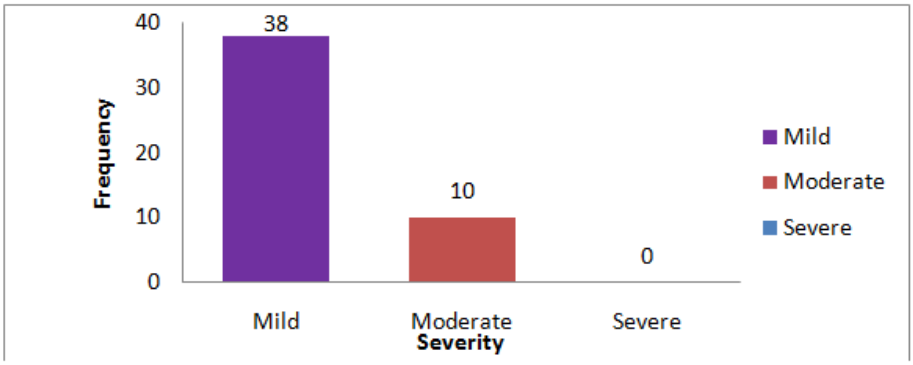

Figure – 3.4b: Bar chart representation of Severity of ADR

The results depict that, 38 (79%) were mild ADRs. In 10 (21%) cases it was moderate in nature.

3.5 Outcome of ADR:

It shows 12 (25%) patients have been cured, 30 (62.5%) patients have been relieved and in 6 (12.5%) patients condition remained same.

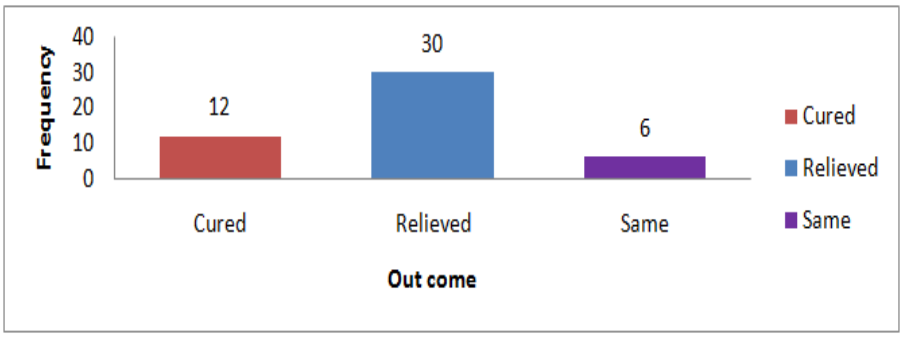

Figure- 3.5a: Bar chart representation of Outcome of ADR

Table -3.5a: Univariate analysis of significant factors associated with ADR

Study parameters	Variables categories	ADR				Chi-Square Tests		
		No		Yes				
		Number	N%	Number	N%	Chi-Square	df	Sig.
Department	Medicine	80	80	20	20	43.98	2	0.0001
	Orthopaedics	72	72	28	28			
Age	18-30	19	82.60	4	17.39	59.98	5	0.0001
	31-40	30	75	10	25			
	41-50	58	74.35	20	25.64			
	51-60	45	76.27	14	23.72			
Gender	Male	68	79.06	18	20.93	10.07	1	0.0015
	Female	82	71.92	32	28.06			
Gastro protective agents	Not prescribe	72	67.28	35	32.71	29.25	4	0.0001
	Prescribe	82	88.17	11	11.82			
Co-Morbid conditions	One disease	148	90.79	15	9.20	18.76	1	0.0001
	Two/more	29	54.05	8	21.62			

Table – 3.5b: Sensitivity & Specifici

Observed		Predicted ADR		Percentage
		No	Yes	
ADR	No	148	4	97.3
	Yes	26	22	45.8
	Total	79	21	89.6

ty of variables determined ADRs.

Table – 3.5c: Multivariate analysis of significant factors associated with ADR by logistic regression

Variable	Adjusted Odd ratio	p value	95% CI	
			Lower	Upper
Age	1.03	0.0001	1.01	1.04
Gender				
Male	1 (Reference)			
Female	1.51	0.054	1.0	2.30
Gastro protective agents				
Yes	1 (Reference)			
No	71.47	0.0001	31.90	160.10

IV. Discussion

The present study was conducted with an objective eof evaluating the incidence of the adverse drug reactions (ADRs) of the Non-Steroidal Anti-Inflammatory Drugs during therapeutic interventions in a tertiary care teaching hospital. Data of total 200 patients was collected from various inpatient and outpatient departments of the S.V.R.R Government General Hospital, Tirupati. Out of these 200 patients, 100 were taken from Medicine and Orthopaedic inpatient departments and 100 from Medicine and Orthopaedic outpatient departments.
Data was collected from patients who were prescribed NSAIDs. All the data was recorded systematically in a preformed data sheet and statistical analysis was carried out by using SPSS (Statistical Package for the Social Sciences) software.

All the collected data was analyzed mainly for following major parameters:
1. Demographic profile
2. Analysis of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) used
3. Use of Gastroprotective agents
4. Analysis of adverse drug reactions (ADRs).
5. Analysis of outcome of ADRs

Adverse Drug Reactions of NSAIDs

Medicine can cure or control the disease on one hand but on the other hand they can also cause disease by producing adverse drug reactions (ADRs). Although, many ADRs were mild and disappear when the drug is stopped or the dose is reduced, others were more serious and require frequent hospital visits or hospitalization.
Non Steroidal Anti Inflammatory Drugs were implicated in 21%- 25% of all adverse drug reactions, with the most commonly reported effects being GI irritation[(13)].NSAIDs increase the relative risk of gastrointestinal haemorrhage by approximately3-fold,although estimations as high as 10-fold have been reported in the literature. In this study, the incidence rate of ADR was 24

Non Steroidal Anti-inflammatory drug (NSAIDs)and ADRs:

In this study it was observed that, out of 48 patients who suffered from ADR, 34 patients suffered due to either single NSAIDs, remaining 14 patients suffered due to the combinations of NSIADS. Total 7 drugs were prescribed, out of which, it was observed that the maximum causative drug was Diclofenac (34.61%). The following sequences of causative drugs were found to be Ibuprofen (23.68 %), Paracetamol (10.00 %), Piroxicam (50.00 %), Indomethacin (40.00 %), Aceclofenac (5.55%) and Etoricoxib (33.33%). The combination of prescriptions represented ADR in 14 patients. (Table 6.15) Total 7 NSAIDs are responsible for development of ADRs in this study. Diclofenac,Ibuprofen, Paracetamol, Piroxicam, Etoricoxib, Indomethacin and Aceclofenac were found to be top seven causal NSAIDs.

Univariate analysis of significant factors associated with ADR:

The analysis related to the different department shows that total 100 patients from the orthopaedic department, 72(72%) patients did not suffer from ADRs, while in 28(28%) patients ADRs were observed. It is further observed that 20(20%) patients suffered from ADRs from the total of 100 patients from medicine department .When the results were subjected to statistical analysis by applying chi-square test of association, the p- value found to be less than 0.0001 ($\chi^2 = 43.98$, $p < 0.0001$). The second variable studied was Age. While analyzing association between age and ADRs, it was found that in the age group of 18-30 years, 4(17.39%) patients found with ADRs. Ten (25%) patients in the age group of 31-40years, developed ADRs. In the age group of 41 – 50 years, 20(25.64%) patients suffered from ADRs. Fourteen (23.72%) patients of ADRs were from the age group of 51-60 years. When the results were subjected to statistical analysis by applying chi-square test of association, the p value found to be less than 0.0001 ($\chi^2 = 59.98$, $p < 0.0001$).

Gender was taken as another dependent variable to see the effect of ADRs. In the study, total 86 male patients received NSAIDs, from that 18 (20.93%) patients developed ADRs. Females patient who received NSAIDs were more than male patients who received NSAIDs. Out of 114 female patients, 32(28.06%) developed ADRs. When the results were subjected to statistical analysis by applying chi-square test of association, the p- value found to be less than 0.001 ($\chi^2 = 10.07$, $p < 0.001$).Out of 107 patients, 35(32.71%) developed ADRs, who did not receive gastro protective agents. Among 93 patients who received gastro protective agents 11(11.82%) patients developed symptoms of ADRs. When the results were subjected to statistical analysis by applying chi-square test of association, the p- value found to be less than 0.0001 ($\chi^2 = 29.25$, $p < 0.0001$).

Out of 200 patients, maximum (163 patients) were suffering from one disease, rest of them (37 patients) were suffering from either two or more co-morbid conditions. Among 163 patients, 15 (9.20%) developed ADRs. Among 37 patients who suffered from two or more co-morbid conditions, 8 (21.62%) of them developed ADRs. When the results were subjected to statistical analysis by applying chi-square test of association, the p- value found to be less than 0.0001 ($\chi^2 = 18.76$, $p < 0.0001$).(Table 6.20)

Multivariate Analysis Of Significant Factors Associated With ADR By Logistic Regression:

In this study it was observed that age is taken as continuous variable. For each unit increase in age (i.e. 1 year) the odd of getting ADR increased. It suggests that odds of getting ADR are 1.03 times more as the age increases. (Adjusted odd ratio = 1.03, 95% CI = 1.01 – 1.04, p value < 0.001). While analysing the gender, male has taken as a reference & the female has taken as continuous variable. It shows the odds of getting ADR 1.67 times more in female as compared to male. (Adjusted odd ratio = 1.51, 95% CI = 1.0 – 2.30, p value< 0.054) While analysing influence of gastro-protective agents on ADRs, results shows that odds of getting ADRs due to not taking these agents are maximum (i.e.71.47) times more than taking these agents.(Adjusted odd ratio = 71.47, 95% CI = 31.90 – 160.10, p value< 0.0001). (Table 6.22)

V. Conclusion

Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) are widely prescribed drugs. Monitoring of adverse drug reaction is an important tool to prevent the damage to a system like gastrointestinal, cardiovascular and derangement of kidney and liver functions. Fixed dose combinations of NSAIDs are used less which goes in favour of rational prescribing practice. Forty to sixty years of age , female sex are the main risk factors for causing ADRs In more than fifty percent of the patients, gastro protective agents have been used and rest of the patients in whom gastro protective agents are not used, they have suffered from the gastrointestinal symptoms. It suggests that guidelines for prescribing NSAIDs are necessary to follow. Maximum ADRs are mild to moderate in nature and no serious or severe reaction developed after prescribing NSAIDs which is the positive point.

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