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Prescription Pattern of Analgesics for Pain Relief in Post-Operative Orthopedic Patients in Tch

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ABSTRACT

Pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. Uncontrolled pain is a major impediment to post-operative functional recovery and is a persistent problem. Older adults who undergo lower extremity orthopaedic surgery (e.g., hip and knee arthroplasty, hip fracture repair) experience intense post-operative pain and are at risk for sub-optimal analgesic therapy. Higher pain levels following lower extremity orthopaedic surgery have been associated with increased lengths of stay, increased complications, delays in ambulation, impaired functional recovery, and increased suffering.

Aim: This main aim of the study is to assess the intensity of pain in patients in orthopaedic unit; and to describe the analgesia plan and drugs used.

Objectives:

1. Prescribing trends of analgesics in postoperative orthopaedic patients.
2. Assessing the intensity and relief of pain in postoperative orthopaedic patients.
3. Tolerability assessment by monitoring the incidence of adverse events.

Methodology:

A total of 155 patients were included in this hospital based prospective, observational study conducted in orthopaedic department at Lalitha Super Specialty Hospital. Patients were included based on inclusion and exclusion criteria, and reviewed daily to study the effect of analgesic drugs in post-operative patients. The data was collected on the patient profile form. Pain assessment was done once a day, during immediate postoperative (IPO) period- until 24 hours after surgery; 1st postoperative period (1stPO) - from 24 to 48 hours after surgery; and 2nd postoperative (2ndPO) period - from 48 to 72 hours after surgery in these patients was done through Visual Analog Scale (VAS), Verbal pain intensity scale, 0 – 10 numeric pain intensity scale and faces scale.

Results:

Mean average of 1st PO, 2nd PO and 3rd PO results were assessed. Paired t-test was conducted to assess the comparison of pain relief according to age for the patients 50 years (1st PO – 8.07±0.97, 2nd PO – 6±1.46 and 3rd PO – 3.5±1.23). Based on these findings, Severity of pain is more in >50 years group (7.82), than in < 50years group at first post-operative period (8.07). But the mean 2nd PO period pain was decreased similarly in both groups (3.5). Pain assessment score was also done in combination of analgesics. Based on P value obtained, Tramadol + Aceclofenac combination was found to be effective.

Conclusion:

The study, analgesics prescribing pattern and assessing the intensity and relief of pain in postoperative orthopaedic patients concluded that the rational use of analgesics had decreased the pain on 3rd postoperative day.

Key words: Aceclofenac, diclofenac, tramadol, pain intensity scales, fractures.

INTRODUCTION

Pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. The ability to experience pain is critical for survival because it informs the body of real or potential injury (e.g., touching a hot stove). The body is then able to respond to the threat and protect itself from further injury (e.g., refraining from touching or removing the hand from the hot stove). Pain is a hallmark of many chronic conditions, affecting more than 25% of Americans over the age of 20 years. The most common types of pain include low back pain, headache, and joint pain. Many people think that pain is a natural part of growing older, and up to 60% of people believe that pain is just something you have to live with chronic pain is reported more often in women than men, and in non-

Hispanic white patients compared with other races and ethnicities.

Painful impulses are generated at the nociceptor, with voltage-gated sodium channels initiating the action potentials. Voltage gated calcium channels are responsible for allowing calcium influx to the presynaptic terminal, causing neurotransmitter release. The message is then transmitted to the spinal cord via two primary afferent nerve types: myelinated A fibres and unmyelinated C fibres. The A fibres are responsible for rapidly conducting impulses associated with thermal and mechanical stimuli. Transmission of signals along A fibres results in sharp or stabbing sensations that alert the patient to an injury (also called "first pain"). This produces reflex signals, such as musculoskeletal withdrawal, to prevent further injury.
The EAAs then stimulate the postsynaptic receptors and the electrical signals stimulate second-order neurons in the CNS. The postsynaptic *α*-amino-3-hydroxy-5methyl-4-isoxazoleproprionate (AMPA) receptors are sodium channel– mediated, and are responsible for the first pain mentioned previously. *N*-methyl-d-aspartate (NMDA) receptor channels allow both sodium and calcium passage. Usually, a magnesium ion holds the channels closed; however, when there is sustained firing from the primary afferents, the magnesium ion is displaced.

METHODOLOGY
Study Site: The study was conducted at Lalitha super specialties hospital. Guntur.
Study Design: A hospital based prospective, observational study was carried out in postoperative patients in orthopaedics department.
Sample Size: A total of 155 patients from the inpatient ward of department of orthopaedics who were prescribed with analgesic drugs after major or minor surgery those who fulfilled the exclusion and inclusion criteria were selected for the study.
Study Duration: The study was conducted over a period of 6months from September 2024 to February 2025.
Study Criteria: The study will be carried out by considering the following criteria:

Inclusion criteria:
1. All the patients admitted in the orthopaedics ward with musculoskeletal disorder and indication of analgesic therapy in post-operative patients.
2. All the patients above 18years age of either sex.

Exclusion criteria:
1. Patient not indicated for analgesic therapy.
2. Pre-operative patients
3. Patients below 18years of age.
4. Patients with history of liver and kidney damage, cardiovascular disease, acid peptic disease.
5. Pregnant and lactating mothers.
6. Patients requiring emergency treatment or in ICU.

Source of Data:
The patient demographical data, clinical data, therapeutics data and various all the necessary and relevant data were collected from in-patient progress records, treatment charts, laboratory data reports and patient history record.

Study Procedure:
All the patients admitted in orthopaedics ward were reviewed daily to study the effect of analgesics drugs in post-operative patients. Those patients who met the study criteria were enrolled into the study. An informed consent was taken from each patient before enrolling them into the study. The data was collected on the patient profile form (Annexure-I). The patient's demographic data, current medications, laboratory investigation, past medical and medication history was collected from the patient's progress record, treatment chart, laboratory reports and patient history record. Pain assessment in post-operative patients was done through Visual Analog Scale (VAS), verbal pain intensity scale, 0-10 numeric pain intensity scale and FACES scale. The assessment of post-operative patients was performed once a day, during each of the following three periods analysed in this study: immediate postoperative (IPO) period - until 24 hours after surgery; 1st postoperative period (1st PO) - from 24 to 48 hours after surgery; and 2nd post-operative (2nd PO) period - from 48 to 72 hours after surgery.

Data Analysis:
All the data was subjected to analysis in order to assess the effect of analgesics drugs in postoperative patients. The data was analysed and the percentage values were calculated by using pain scales, the nature and extent of use of each drug were also determined.

Ethical committee approval:
The study will be conducted at Lalitha super specialities hospital, Guntur after obtaining ethical clearance from the institutional ethical committee approval no- **AMRMCP/LSSH/02** All the patient data and protocol used in the present study were review approved by institutional ethical committee (IEC) under committee for the purpose of inclusion criteria will be monitored and data will be collected during respective study period. For this study protocol (patient demographic details, questionaries

forms) was prepared and submitted to the institutional ethical committee approval carried out project work.

Statistical Analysis:
The values are expressed as Frequencies, averages/mean, standard deviation and percentage were obtained using Paired t test and ANOVA. The values are found significant at (p>0

RESULTS
The present prospective, observational study was carried at orthopaedics department Lalitha super specialties hospital, for a period of 6 months. A total of 155 patient case records were collected and were analysed for demographic data (age & gender), prescribing patterns (total number drugs per prescription, classes of drugs in prescription & analgesic prescribing pattern) and pain relief.

BASED ON AGE:

Tab no -4: based on age

SNO	Age in years	Number of patients (n=155)	Percentage (%)
1	<30	79	50.9
2	31-40	20	12.9
3	41-50	17	10.9
4	51-60	20	12.9
5	>60	19	12.2

Table:4 shows the age wise distribution of post operative patients in orthopaedics ward. The mean age of the patient population was found to be 45.05 ± 17.9. Majority of the patients were between the age group<30 years and the least are at 41-50 age

Group.

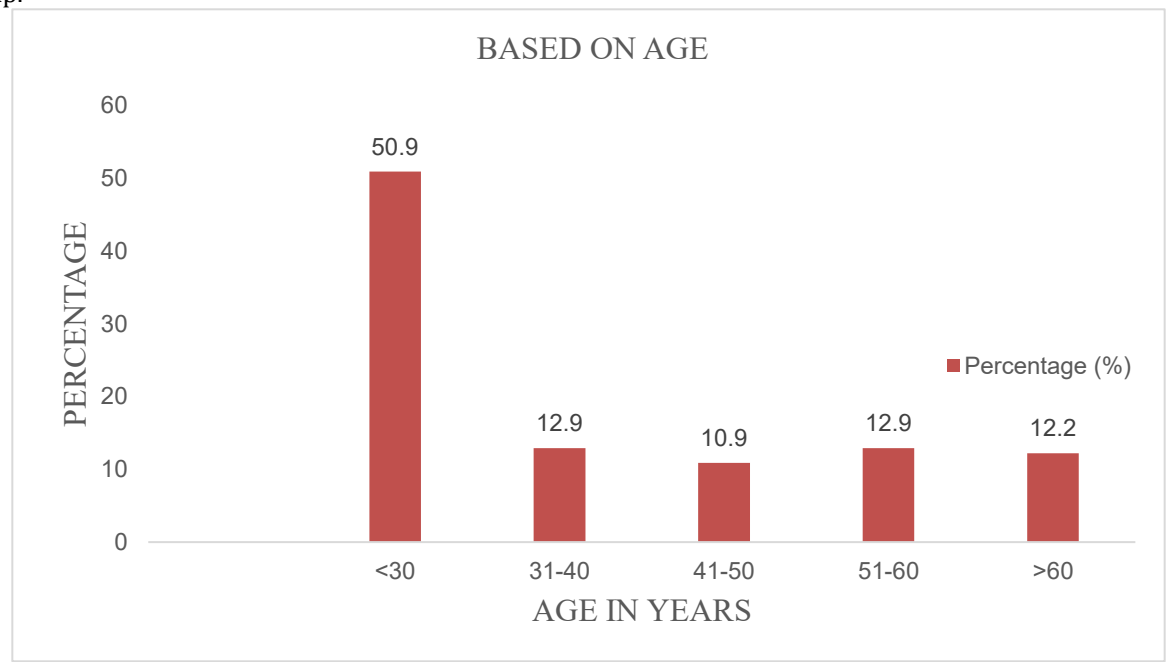

Figure- 6: Age in years

BASED ON GENDER:

Tab no-5: based on gender

SNO	Gender	Number of patients (n=155)	Percentage (%)
1	Male	105	67.74
2	Female	50	32.25

Out of 155 patients in this study 67.74% were males and 32.25% are females respectively. The largest proportions of patients in this study were males.

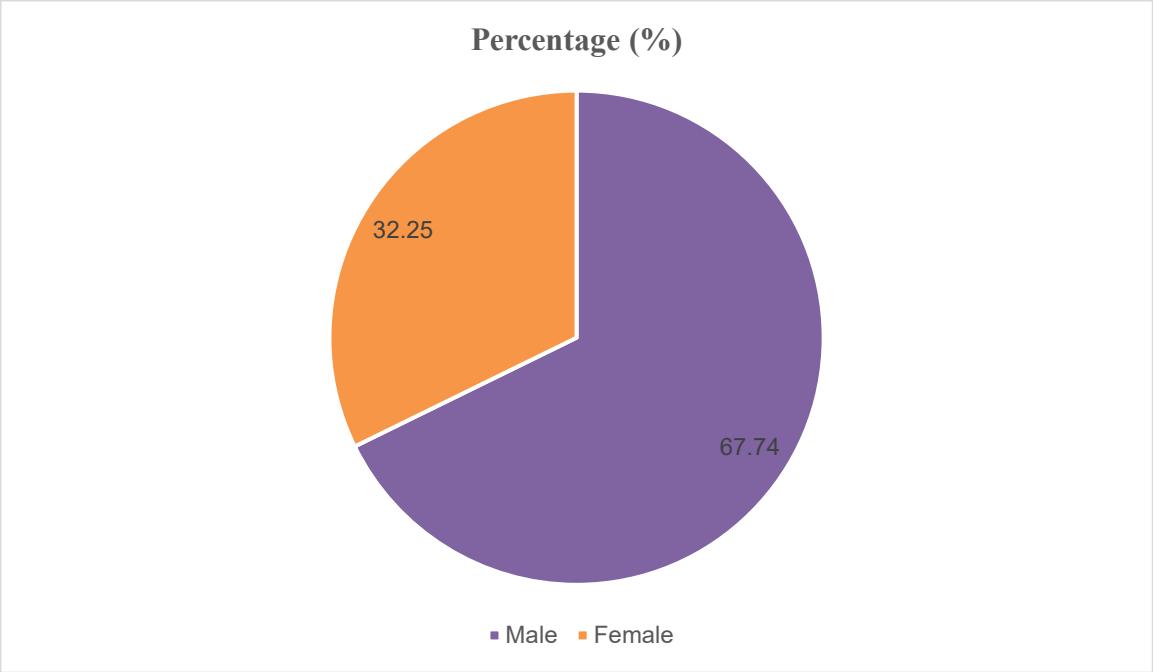

Figure -7: based on gender

DISEASE WISE STUDY POPULATION:

Tab no -6: DISEASE WISE STUDY POPULATION

SNO	Diagnosis	Male (n=105)	Female (n=50)	Total (n=155)	Percentage (%)
1	Hum or fracture	20	5	25	16.12
2	Femur fracture	10	25	35	22.58
3	Radius & ulnar	4	6	10	6.45
4	Tibia & fibula	15	0	15	9.67
5	Clavicle fracture	10	0	10	6.45
6	Clavicle rib fracture	6	6	12	7.74
7	Knee joint	15	5	20	12.90
8	Supracondylar	7	0	7	4.51
9	Meta tarsal fracture	0	9	9	5.80
10	Wrist joint fracture	0	6	6	3.87
11	Hemi arthroplasty	0	6	6	3.87

The table no 6 shows that based on disease wise study population. Femur fracture shows more percentage (22.58%) than other diagnosis.

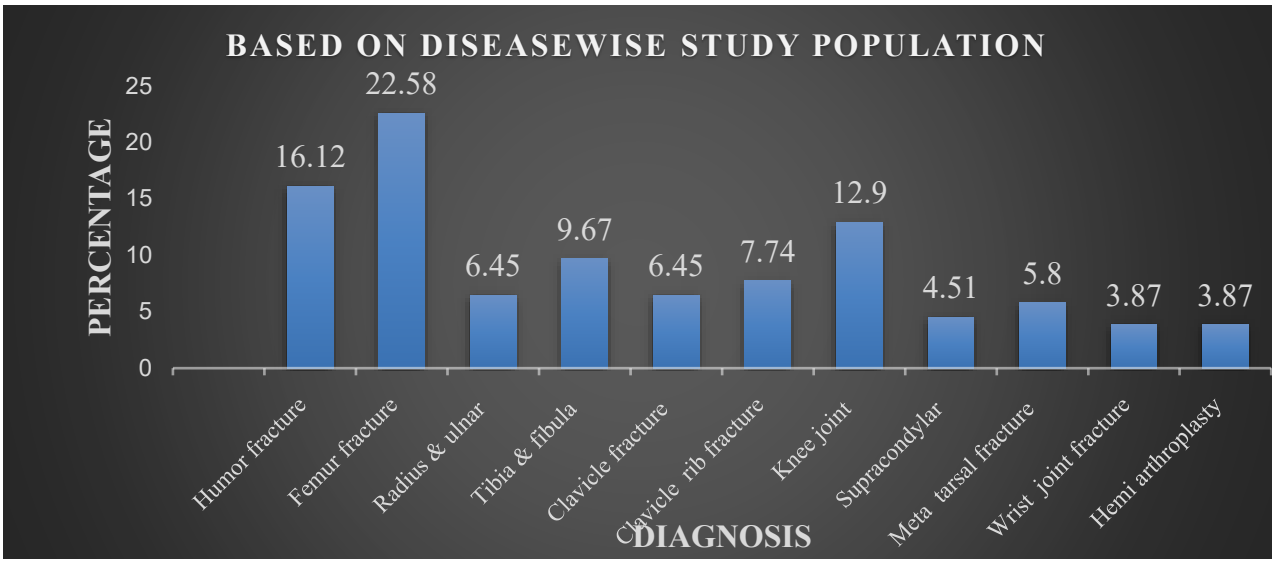

Figure -8: based on disease wise study population

Bar diagram representing disease wise study population.

AGE GROUP WISE DISTRIBUTION IN STUDY SUBJECTS:

Tab no- 7: age group wise distribution

Diagnosis	<30	31-40	41-50	51-60	>60	Percentage (%)
Hum or fracture	1	3	2	0	1	11.6
Femur fracture	7	1	13	2	6	31.6
Radius & ulnar	0	1	0	1	1	5
Fibula & tibia	4	3	0	2	3	20
Clavicle fracture	0	0	0	2	0	3
Clavicle rib fracture	0	0	0	1	1	3
Knee joint	4	2	1	1	1	15
Supracondylar	1	0	0	0	0	1.6
Meta tarsal fracture	1	2	0	0	0	5
Wrist joint fracture	0	0	0	1	0	1.6
Hemi arthroplasty	0	0	0	1	0	1.6

Table 7: age group wise distribution

This table shows <30 age group were more in femur fracture, 31-40 age group were hum or and tibia fibula, 41-50 were femur fracture, 51-60 were similar femur fracture and clavicle fracture.

CLASSES OF DRUGS PRESCRIBED:

Tab no-8: classes of drugs prescribed

SNO	Class	No of drugs prescribed (n=1054)	Percentage (%)
1	Analgesics	350	33.20
2	Antibiotics	105	9.96
3	Anti-Inflammatory Agents	90	8.53
4	Anti-Ulcer Agent	120	11.3
5	Vitamins	120	11.3
6	Calcium supplement	110	10.4
7	Insulin	60	5.69
8	Anti-histamines	40	3.79
9	Laxatives	25	2.371
10	Others	34	3.22

This table shows the different classes of drugs prescribed to the study population during post-operative period. It includes Analgesics (33.20%), Antibiotics (9.96%), and Antiulcer (11.3%), anti-inflammatory agents (8.58%) and others (3.32%).

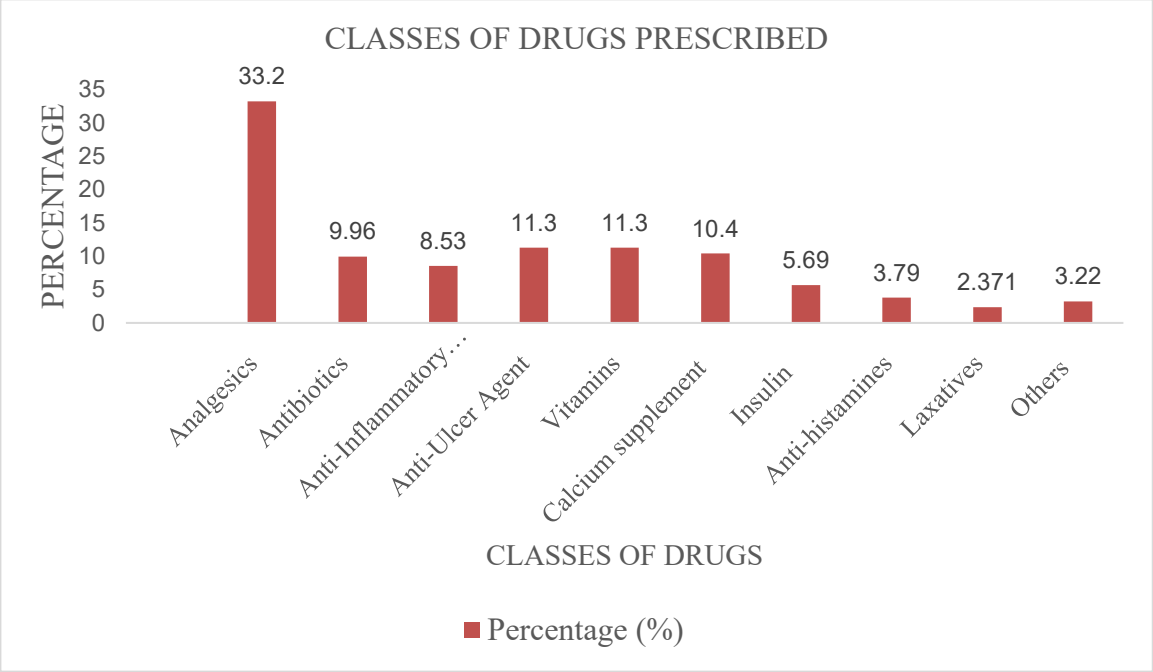

Figure-9: classes of drugs prescribed

CLASSES OF NON OPIOD PRESCRIPTION:

Tab no -9: classes of non-opioid prescription

SNO	Non opioids	No. of drugs (n = 350)	Percentage (%)
1	NSAIDS	170	48.57
2	Acetaminophen	80	22.85

Out of 155 prescription 48.57% NSAIDS, 28.57% Non-opioids and 22.85% Paracetamol were given shown in table.

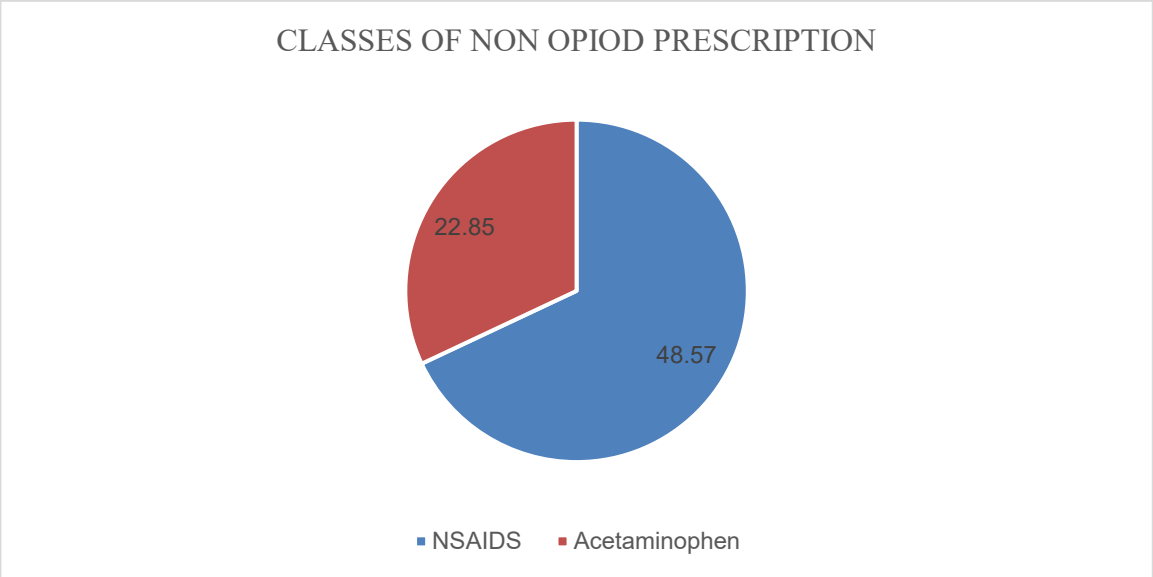

Figure 10: classes of non-opioid prescription

PRESCRIBING PATTERN OF INDIVIDUAL ANALGESICS:

Tab no-10: prescribing pattern of individual analgesics

SNO	Drugs	Male	Female	Total	Percentage (%)
1	Tramadol	51	49	100	28.57
2	NSAIDS	100	70	170	48.57
3	Acetaminophen	50	30	80	22.85

Out of 155 prescriptions, NSAIDS was the most commonly prescribed analgesic (48.57%), Tramadol (28.57%) and Paracetamol (22.85%) in our study population. The pattern of usage of analgesics in orthopaedic department is presented in this table

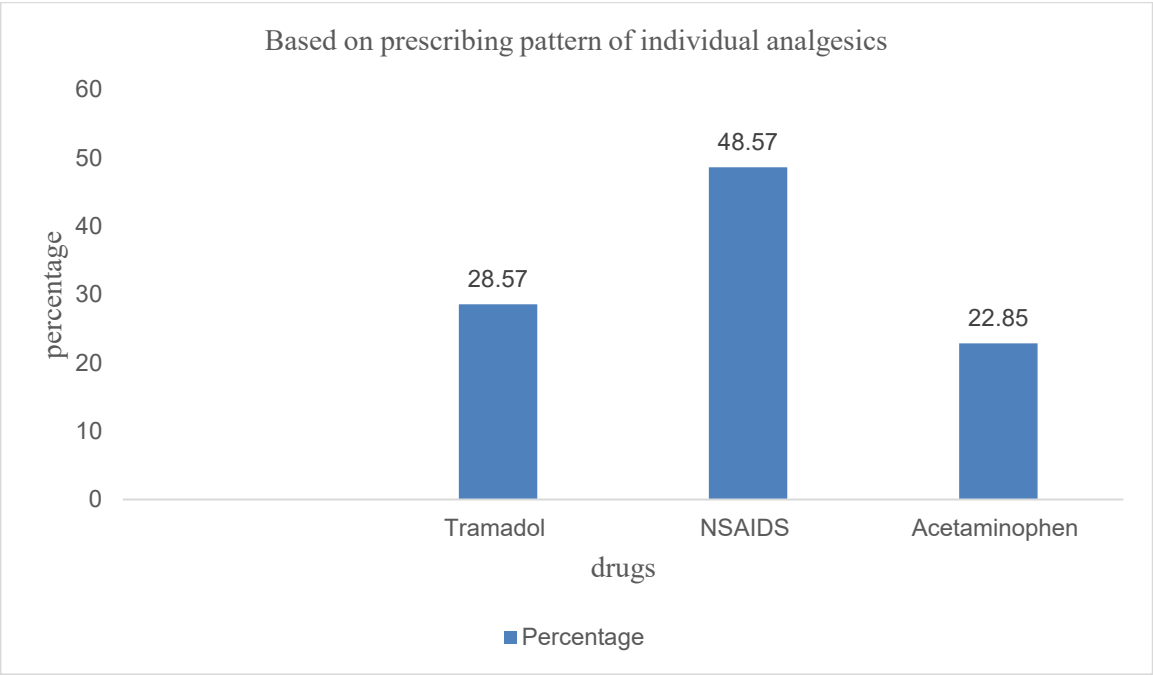

Figure 11: based on prescribing pattern of individual analgesics

PATTERN OF ANALGESICS IN USAGE COMBINATIONS:

Tab no-11: pattern of analgesics in usage combinations

SNO	Name of the analgesic combination	Male	Female	Total n = 82	Percentage (%)
1	Diclofenac + Aceclofenac	5	15	20	24.39
2	Aceclofenac + tramadol	11	19	30	36.5
3	Tramadol + Paracetamol	4	5	9	10.97
4	Diclofenac + tramadol	6	1	7	8.53
5	Aceclofenac + Paracetamol	3	0	3	3.65
6	Aceclofenac + tramadol + diclofenac	0	3	3	3.65
7	Aceclofenac + diclofenac+ Paracetamol	5	5	10	12.19

36.5% were Aceclofenac + tramadol, 10.97 were Tramadol + Paracetamol, 24.39% were Diclofenac + Aceclofenac, 8.53% were Diclofenac + tramadol, 12.19% were Aceclofenac + diclofenac+ Paracetamol, 3.65 % were both Aceclofenac + Paracetamol and Aceclofenac + tramadol + Paracetamol.

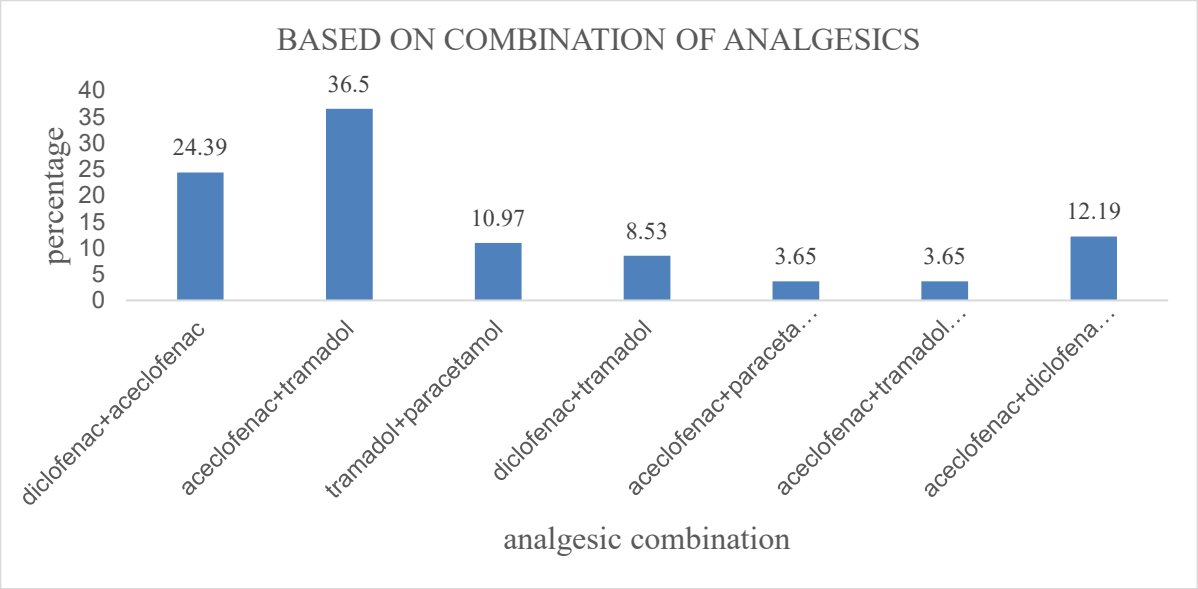

Figure 12: based on combination of drugs

ROUTES OF ANDMINSTRARION:

Tab no-12: routes of administration

SNO	Route	Male	Female	Total (n = 155)	Percentage (%)
1	Intravenous	29	11	40	25.80
2	Oral	65	15	80	51.61
3	IV + oral	24	11	35	22.58

Out of 155 patients 51.61% of analgesics were prescribed by oral route, 25.80% by IV route and 22.58%by IV and oral route as shown in table.

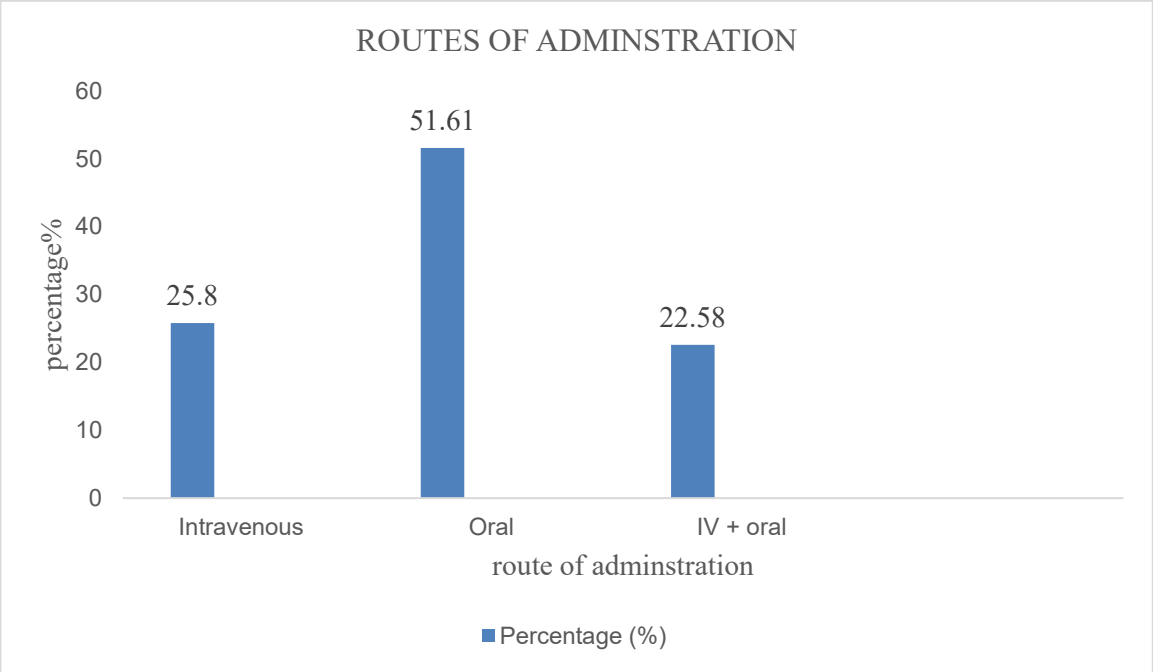

Figure 13: routes of administration

Oral route was the most commonly route of administration (51%), followed by IV (25%) alone and combination of oral and IV (22%) in the study population. The pattern of route of administration analgesics in orthopaedic department is presented in this figure.

MONTHLY WISE STUDY POPULATION:

Tab no- 13: monthly wise study population

S. no	Month	No of patient admitted (n=155)	Percentage (%)
1	September	30	19.35
2	October	25	16.12
3	November	28	18.06
4	December	24	15.48
5	January	27	17.41
6	February	21	3

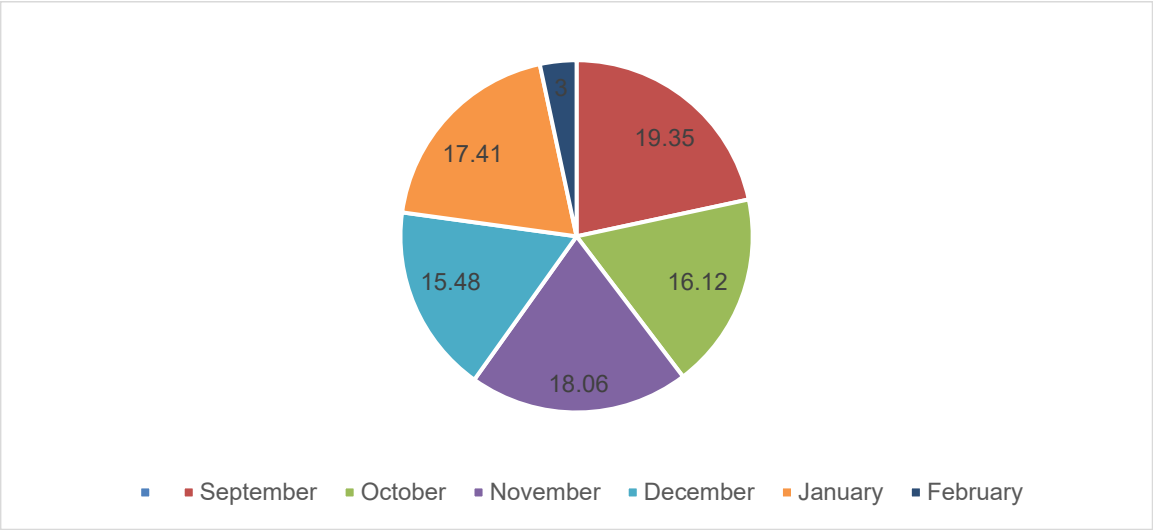

Figure 14: monthly wise study population

Here the graph shows that monthly wise study population out of 155 patients in September (19.35%) October (16.2%) November (18.06) December (15.48%) January (17.41%)
February (3%).

MONOTHERAPY VS COMBINATION THERAPY:

Tab no-14: monotherapy vs combination therapy

SNO	Therapy	Total	Percentage (%)
1	Monotherapy	70	45.1
2	Combination therapy	85	54.83

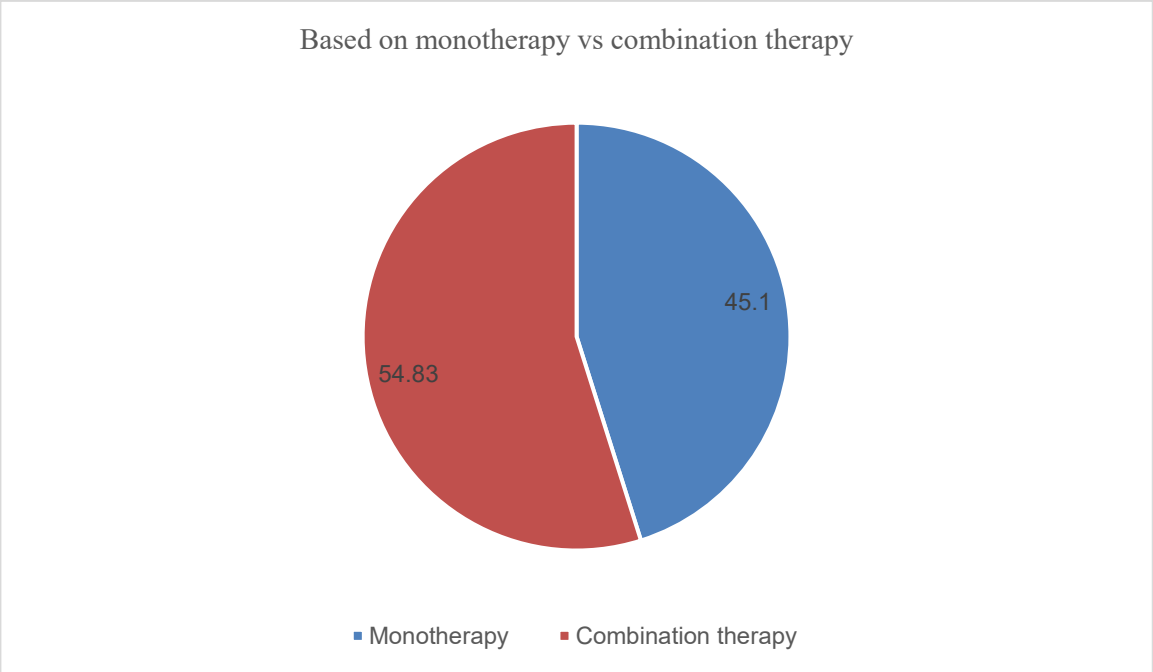

Figure 15 monotherapy vs combination therapy

Here the pie chart shows that combination therapy (54.83%) is more effective than monotherapy (45.1%) in post operative orthopaedic patient

Assessing pain intensity using scales:

Mean average for pain scale:

Tab no- 15: assessing pain intensity using scales

SNO	Pain scales	1st PO	2nd PO	3rd OP
1	Verbal intensity	6.4±1.52	4.36±1.24	2.76±1.1
2	Visual analogue scale	81.48±7.65	67.1±11.09	44.1±14.5
3	Numerical intensity scale	7.88±1.15	5.5±1.14	3.5±1.2
4	Face scale	7.4±1.65	5.2±1.17	3.03±1.38

1. **Verbal pain scale:**

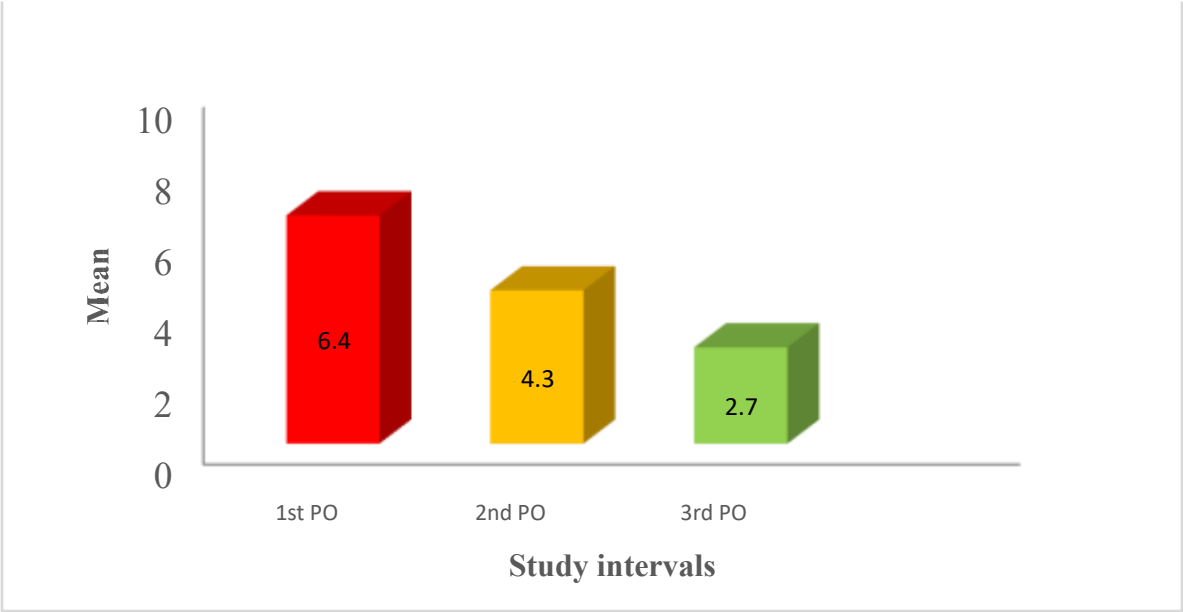

Figure – 16 : Verbal scale mean

2. Mean for visual analogue scale

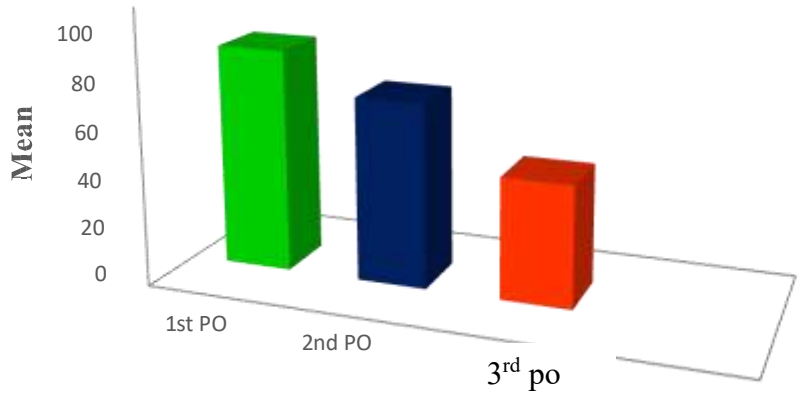

Figure- 17: Visual analogue scale mean

3. 0-10 Numeric Intensity Pain Scale:

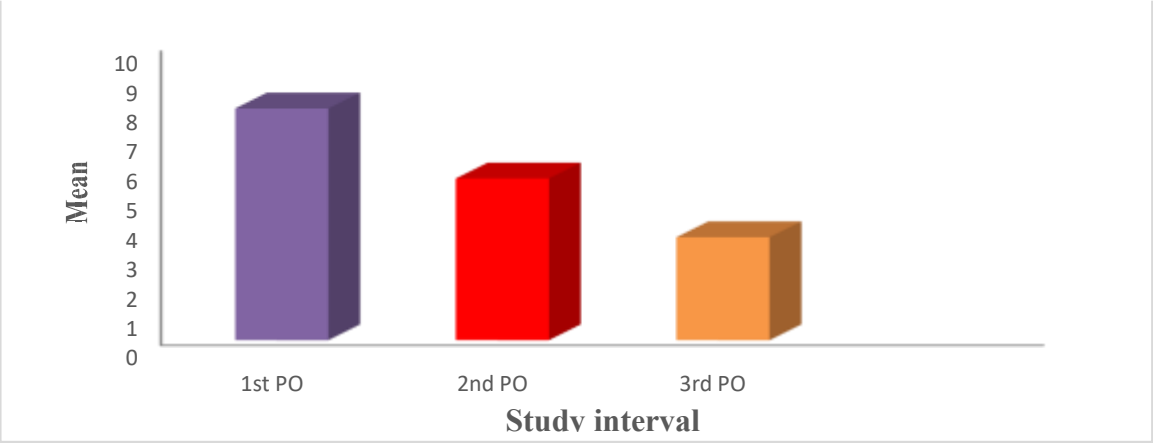

FIGURE-18: Mean for Numeric Pain scale

5.4.4 Faces Scale

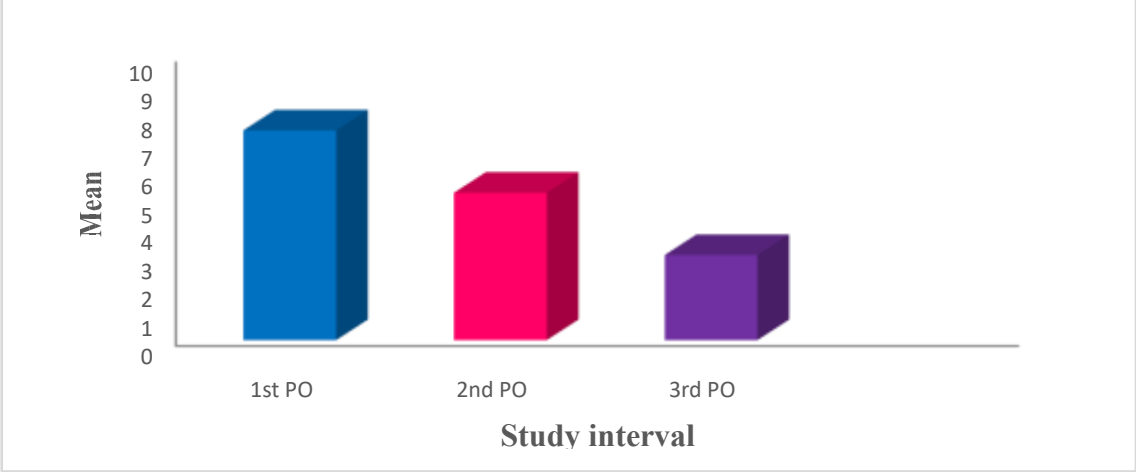

Figure 19 faces scale

Calculation of mean for 4scales:

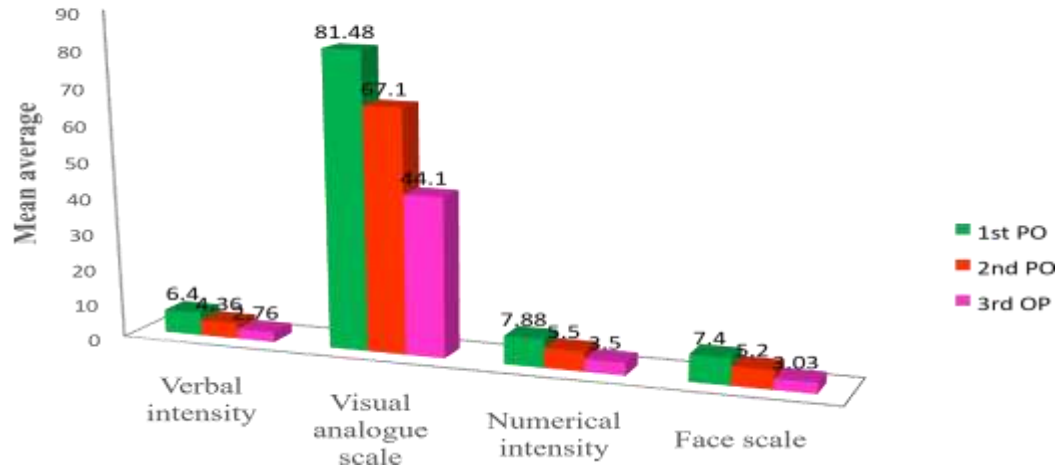

Figure 20 – Bar diagram of four scales intervals means

The mean pain score for the four scales in the study periods are 1st PO, 2ND PO, and 3rd PO shown in figure

1. Comparison of pain relief according to age

Tab no- 16: Comparison of Pain Relief According to Age

SNO	Age	1st PO	2nd PO	3rd PO
1	<50	7.82 1.24	5.73 1.48	3.55 1.39
2	>50	8.07 0.97	6 1.46	3.5 1.23

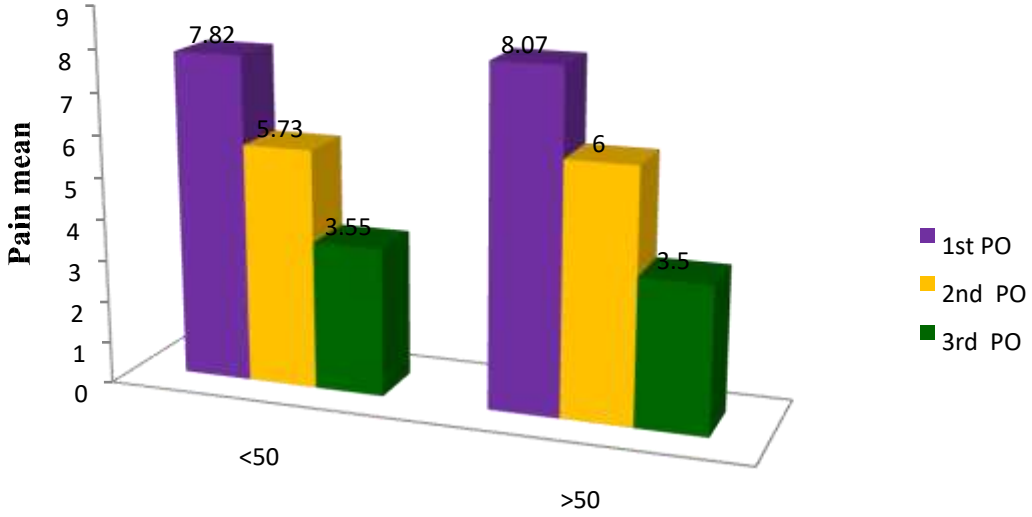

Figure 21: comparison of pain relief according to age

Mean 1st PO period pain and mean 3rdPO period pain was compared in patients with <50 years and > 50years patients. Severity of pain is more in >50 years group (7.82), than in < 50years group 1st PO period (8.07). But the mean 3rd PO period pain was decreased similarly in both groups (3.5) shown in figure.

Combination of analgesics:

Tab no 17: combination of analgesics

SNO	Intervals	Diclofenac + Aceclofenac	Aceclofenac + Tramadol	Paracetamol + Tramadol	Diclofenac + Tramadol
1	1st post-operative period until 24 hours after surgery	8.16 ± 1.6	7.5 ± 1.35	8.28	7.6 ± 1.14
2	2nd post-operative period (From 24 to 48 hours after surgery)	5 ± 1.89	5 ± 2	6.4 ± 1.12	5.8 ± 0.44
3	3rd post-operative period (From 48 to 72 hours after surgery)	3.33 ± 1.34	3.2 ± 1.39	3.8 ± 1.46	3 ± 0.9

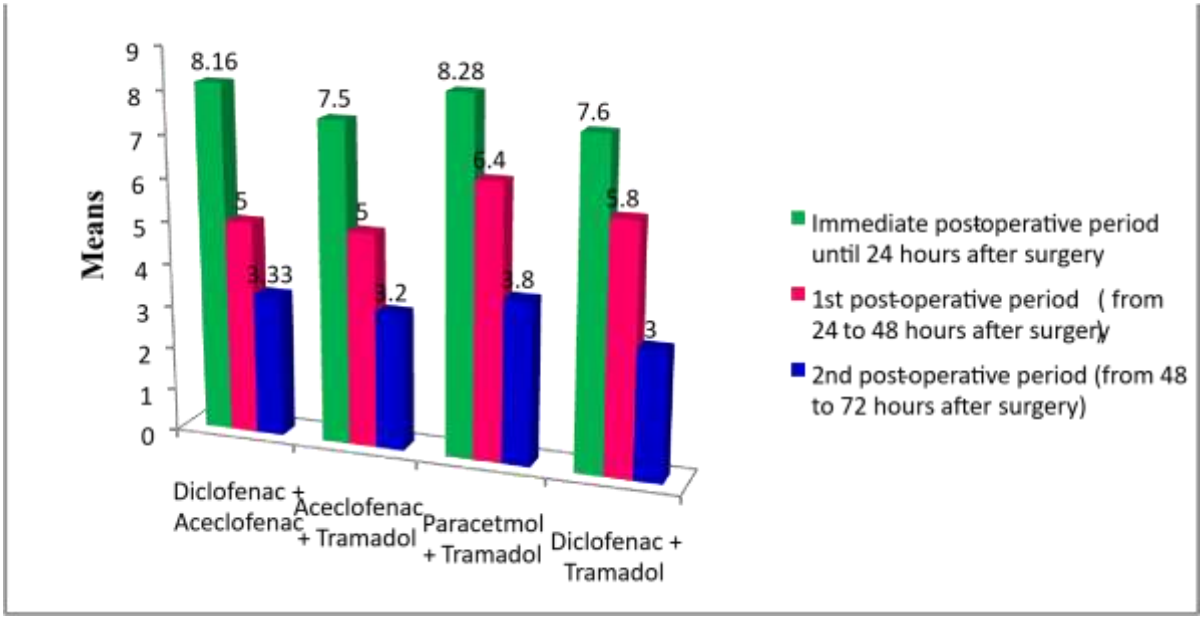

Figure 22: combination analgesics

Comparison of three scales according to time intervals:

Tab no :18 comparison of three scales according to time intervals

SNO	Intervals	P value
1	1st PO (24 hrs after surgery)	0.0000007
2	2nd PO (48 hrs after surgery)	0.000002
3	3rd PO (72 hrs after surgery)	0.003308

DISCUSSION

The assessment of prescribing pattern is an important tool for clinical, educational and economic purpose. Prescribing trends assessment aim to provide the feedback to the prescriber and to create awareness about rational use of medicines. In this prospective observational study, the mean age of the patient population was found to be 45.05 ± 17.9 where, majority of the patients were between the age group< 30 years and the largest proportion of study patients were males, which is similar to study conducted by Sumana Sen et al. [Sumana Sen et al.,2013] The largest proportions of patients in this study were males who are affected with common fractures and other musculoskeletal conditions and is in agreement with the report published by ICMR that the incidence of Musculo skeletal conditions is more in males above 60 years of are irrespective of BMD. [Sharma R et al., 2012]. Fractures are among the most common orthopaedic problems, and about 6.8 million people seek medical care attention for fracture in India and most common indication for prescribing diclofenac was fractures. [Mathew G et at., 2008, Raut A et al., 2013]. The incidence of surgery due to fractures is high in our study subjects at 61.1% which is due to road traffic accidents is similar to the study conducted by Thomas et al where the incidence of road traffic accidents fracture is 68.3%. [Thomas V et al., 2013].

In our study the average number of drugs per prescription was 3.2307%. The mean number of drugs prescribed was slightly higher than that reported in a previous study, [Shankar P et al., 2001] but other hospital-based studies in India reported 3-5 drugs per prescription which was justified in this study. [Kutty K et al., 2002, Sharma S et al., 1990] It is preferable to keep the number of drugs per prescription as low as possible since higher figures lead to increased risk of drug interactions, adverse effects and increased cost to the patient. Hence, this study showed a remarkable restraint on prescribing and an awareness to avoid polypharmacy and irrational drug combinations.

In the present study, 51.61% of analgesics were prescribed as oral, 22.58% as IV or oral and 25% of the analgesic drugs were intravenous. When all the four scales were assessed in patients to find out the optimum pain assessment scale that can be used in post-operative orthopaedic patients, three scales (verbal pain intensity scale, numeric pain intensity scale and faces scale) are found to have similar results without any statistically significant differences. But the four scales cannot be used since

the measuring variables are differed which is similar to study [fonts KB et al.,2007].

This study reveals that the average cost of treatment per patient was Rs. 2151.72 INR whereas 23.81% cost shared by the patients. These differences in mean cost of total drugs in this study in comparison with other studies [Jhaveri B et al., 2014, Shankar P et al., 2010] may be due to variation in type and severity of the admitted patient, indications for the admission, different prescribing pattern, or inflation in the price of medications.

This Study was conducted to analyse analgesic prescribing patterns and to assess the intensity and relief of pain in postoperative patients for a period of 6months in Orthopaedic Department, LALITHA SUPER SPECALITIES Hospital. A total of 155 post-operative patients of age greater than 18years were included in this study and their case records were collected and analysed for demographic data (age & gender), prescribing patterns (total number drugs per prescription, classes of drugs in prescription & analgesic prescribing pattern) and pain relief.

CONCLUSION

The study, analgesics prescribing pattern and assessing the intensity and relief of pain in postoperative orthopaedic patients concluded that developing and implementing standardized pain management protocols can reduce variability and improve patient outcomes. The use of multimodal analgesia, combining opioids, NSAIDs, and acetaminophen, was common in post-operative orthopaedic patients. NSAIDs and acetaminophen were often used as adjuncts to opioids, highlighting the importance of multimodal analgesia. the rational use of analgesics had decreased the pain on 3rd postoperative day.

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