

# Prescribing Pattern of Analgesics in a Tertiary Care Hospital

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**Abstract:** Pain is the most common symptom prompting patients to seek medical attention and is reported by more than 80% of individuals who visit their primary care provider. The lowering of pain thus is an important part of the perception of cure and the overall well-being of the patient. As a result, analgesic prescribing as an adjunct to therapy is widely practiced. Pain assessment is the corner stone to optimal pain management. For diagnosing pain, pain scales are used. These scales are developed in order to allow the patient to accurately describe their pain. Irrational prescription of drugs is a common incidence in medical practice. The study of prescribing pattern is a significant constituent of medical audit which helps in monitoring, evaluating and building required modifications in the prescribing practices to attain a rational and cost effective medical care. The ultimate goal of this drug utilization research is to evaluate the prescribing pattern of analgesics in a tertiary care hospital. The study were carried over six months. On the basis of inclusion and exclusion criteria, 330 patients were selected from the IPD over a period of 6 months for the present study. The study shows that, anti ulcer drugs were prescribed along with analgesics to reduce the Gastric complications. The result shows that, paracetamol and diclofenac were the most commonly prescribed analgesic. Minimum number of patients were treated by newly marketed analgesics. The use of analgesics depends upon the severity of pain. In mild pain, single analgesics are commonly used where as two or more analgesics are used in moderate and severe pain. The study summarizes that, the cost of therapy can be reduced by changing of prescription of drugs in brand name to Generic name, also this plays an important role in Rational use of Drug (Proper dispensing of drugs, Cost, safety and efficacy). Pain assessment should be practiced by using pain intensity scales, so that right choice of analgesics can be prescribed according to the intensity of pain.

**Key words :** Prescribing pattern, analgesics, pain.

## INTRODUCTION

Pain is the most common symptom prompting patients to seek medical attention and is reported by more than 80% of individuals who visit their primary care provider.<sup>1</sup> Despite the frequency of pain symptoms, individuals often do not obtain satisfactory relief of pain. This has led to recent initiatives in health care to make pain the fifth vital sign, thus making pain assessment equally important as obtaining a patient's temperature, pulse, blood pressure, and respiratory rate.<sup>2</sup>

According to International Association for the Study of Pain, it is "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage". Furthermore "Pain is always subjective. Each individual learns the application of the word through experiences related to injury in early life".<sup>3</sup>

A wide range of disease conditions involves pain and fever as symptoms. From the very beginning of human civilization, man has been trying to find the way of controlling these symptoms and maintaining good health. As a result, analgesic prescribing as an

adjunct to therapy is widely practiced. The lowering of pain thus is an important part of the perception of cure and the overall well-being of the patient.<sup>1</sup>

Pain assessment is the corner stone to optimal pain management. Pain assessment moves away from pure physical estimation of pain and includes psychological, social, spiritual and cultural dimensions. Pain can influence all areas of a person's life including sleep, thought, emotion, and activities of daily living. Successful pain management is an attainable goal for the greater part of patients with acute or chronic pain. However, achievement of that goal may be not easy,<sup>2</sup> mainly when the pain is severe and chronic in nature.<sup>2</sup>

Analgesics are defined as the drugs that relieves pain without blocking nerve impulse conduction or markedly altering sensory function.<sup>4</sup> Based on the type of relieving action, they are classified into two. Opioids inhibits pain impulses by acting on pain receptors. They can be used for short or long-term relief of pain, mainly by prescription, but bears a risk of drug addiction. Non opioids, used for short term relief and modest pain, are accessible without prescription. They act by inhibiting synthesis of prostaglandins which are the molecules involved in the peripheral perception of pain.<sup>4</sup>

It is well known that patient response to different analgesics can be greatly uneven. A particular analgesic dose that produces successful pain relief in one patient may generate bearable adverse effects and insufficient pain control in another person.<sup>2</sup>

Since there is no correct objective markers for pain, the patients are the only ones to describe the intensity and quality of their pain.<sup>2</sup> Patients self report is the most reliable measure of pain intensity as there are no biological markers of pain. Easily understandable simply worded questions and tools are the most effective, as older adults mostly encounter various factors, including sensory deficits and cognitive impairments.<sup>5</sup>

For diagnosing pain, pain scales are used. These scales are developed in order to allow the patient to accurately describe their pain. According to Rhonda Graham, accepted scales of pain are: Numeric Rating Scale (NRS), the Verbal Descriptor Scale (VDS) and the Faces Pain Scale-Revised (FPS-R) or Wong-Baker Faces Pain Rating.<sup>6</sup>

Irrational prescription of drugs is a common incidence in medical practice. The study of prescribing pattern is a significant constituent of medical audit which helps in monitoring, evaluating and building required modifications in the prescribing practices to attain a rational and cost effective medical care. Auditing of prescriptions forms is an important part of drug utilization studies. The abuse of these agents

leads to increased incidence of adverse effects, emergence of resistant strains and increase in cost of therapy.<sup>7</sup>

In developed countries, the interest in the economic aspects of analgesia applied during therapy period is recent and has been concentrated on high cost treatments, especially in view of the use of new technologies in the management of discomfort.<sup>8</sup>

Drug utilization evaluation is a one time study to evaluate appropriateness of drug therapy. The intention is to recognize whether current patterns of prescribing, dispensing and use of drug therapy are reliable with criteria and standards. These criteria and standards demonstrate the drug therapy is effective, safe, appropriate, and cost effective and support optimal patient outcome.<sup>9</sup>

The ultimate goal of this drug utilization research is to evaluate the prescribing pattern of analgesics in a tertiary care hospital.<sup>1</sup> In spite of considerable improvements in the availability and control of drugs in hospitals, rational drug use is still a world wide problem.<sup>10</sup>

## MATERIALS AND METHODS

The study was a prospective observational study and conducted at a tertiary care hospital at erode, TAMIL NADU, INDIA. The study were carried over six months. Designing a Performa for data collection. Collecting the case histories of the patient treated with analgesics in inpatient departments. Analyzing the prescriptions and categories it into varieties based on analgesics prescribed, type of pain disorders and other patient's related factors and concluding it.

## RESULTS AND DISCUSSION

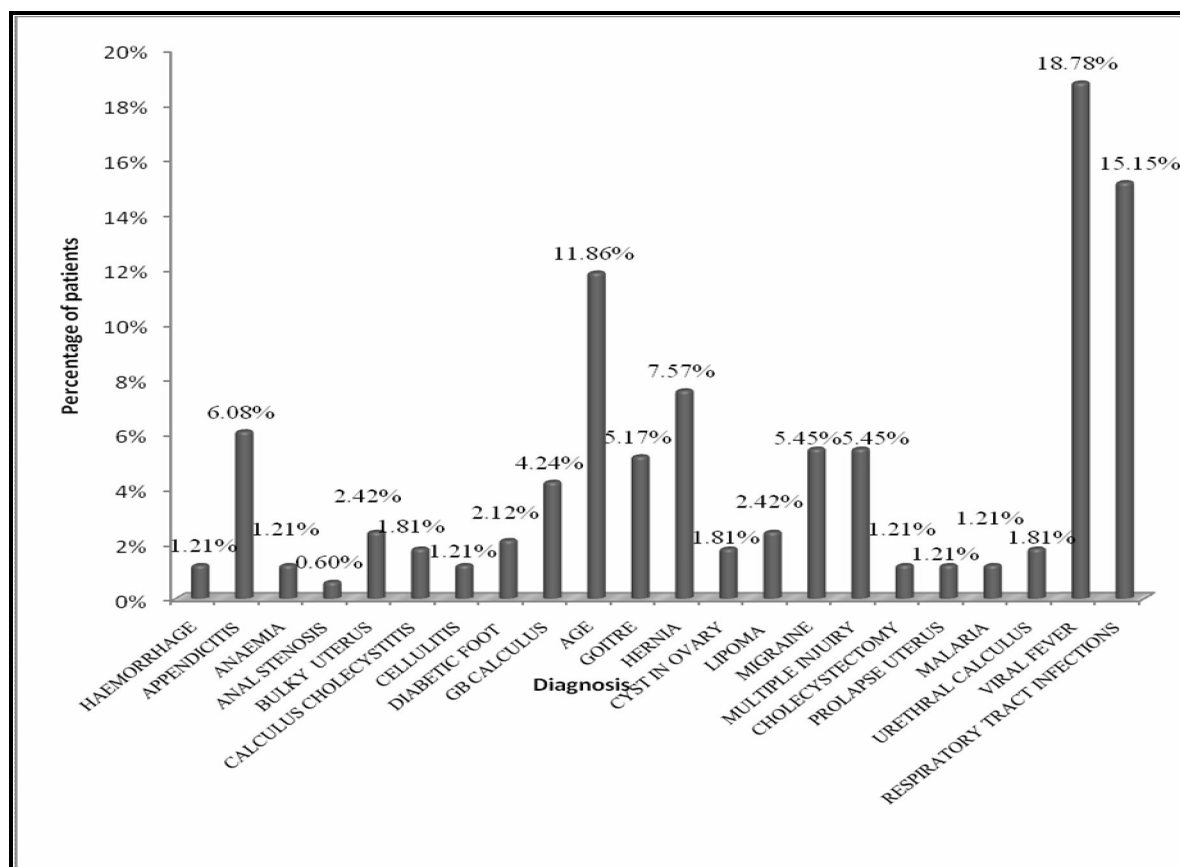
On the basis of inclusion and exclusion criteria, 330 patients were selected from the IPD over a period of 6 months for the present study. Among the 330 patients, 158 were male and 172 were female. The highest number of patients were in the age group 30-40 years and the lowest percentage was geriatric patients, more than 70 years old.

During the study, it was observed that the commonest clinical indications for prescribing analgesics in the hospital were viral fever (18.78%) followed by RTI (15.15%) and AGE (11.86%) presented in figure 1. Haemorrhage, anaemia, cellulitis, cholecystectomy, prolapsed uterus and malaria was the least diagnosed indication (1.21%).

Out of 330 prescriptions reviewed, a total of 652 analgesics were prescribed. Diclofenac was the most commonly prescribed among the analgesics (23.32%). Vlahovic palcevski V *et al*<sup>11</sup> studies reported that diclofenac was the most often prescribed

NSAID in Croatia and Sweden which supports this study.

**Figure : 1 Clinical indications wise Distribution among study population**



The distribution of drugs prescribed according to the diagnosis were presented in Table 1. Diclofenac was most often prescribed for appendicitis (15), followed by AGE (12). RTI constituted around 7 of the total diclofenac. For malaria and cellulitis, it was given for 2 patients.

Paracetamol was found 22.31% among prescribed analgesics. Mostly it was given for viral fever (50). Paracetamol was prescribed 20 times for RTI followed by AGE (14). 4 analgesics containing paracetamol were prescribed for the indication written as migraine. Mohammed A. Al Homrany<sup>12</sup> et al said that the use of Paracetamol in Bronchial asthma (BA) and COPD or its co-prescription with drugs for BA could not be justified in light of recent evidence that it can reduce lung function and exacerbate BA and COPD.

Around 21.90% of ibuprofen+paracetamol combination were given among total analgesics. Around 16 of the analgesics given for appendicitis were in the form of ibuprofen+paracetamol. For the

indications such as viral fever, AGE and anal stenosis, 3 ibuprofen+paracetamol combinations were given.

Paracetamol+mefenamic acid was found in 10.34% of total analgesics. About 23 analgesics containing paracetamol+mefenamic acid were given for the indication RTI. Around 2 analgesics were given in the form of Paracetamol+mefenamic acid for malaria.

Tramadol was found to be given in 6.08% of total analgesics. Tramadol was mainly prescribed for appendicitis (6). For malaria, AGE, haemorrhage, anal stenosis, diabetic foot and GB calculus 2 analgesics in the form of Tramadol was prescribed.

Around 4.9% of Nimesulide were given among total analgesics. About 14 analgesic containing nimesulide was given for the indication viral fever followed by AGE (6). For migraine and GB calculus, around 2 analgesics in the form of tramadol was prescribed.

Table : 1 Prescribing frequency of Analgesic according to Diagnosis

DIAGNOSIS	IBUPROFEN+PAR ACETAMOL	IBUPROFEN	PARACETAMOL	PARACETAMOL+ MEFENAMIC ACID	MEFENAMIC ACID	TRAMADOL	NAPROXEN SODIUM	DICLOFENAC	NIMESULIDE	KETROLAC	TOTAL	PERCENTAGE
Haemorrhage	4	-	-	-	-	2	-	-	-	-	6	1.22%
Appendicitis	16	-	4	3	-	6	-	15	-	-	44	8.92%
Anaemia	4	-	-	-	-	-	-	-	-	-	4	0.81%
Anal stenosis	3	-	-	1	-	2	-	-	-	-	6	1.22%
Bulky uterus	8	-	-	-	-	-	-	8	-	-	16	3.24%
Cholecystitis	4	2	-	4	-	4	-	4	-	-	18	3.65%
Cellulitis	2	-	-	-	-	-	-	2	-	-	4	0.81%
Diabetic foot	-	-	5	-	-	2	-	4	-	-	11	2.23%
GB calculus	4	-	-	7	-	2	-	8	2	-	23	4.66%
AGE	3	4	14	-	4	2	3	12	6	3	51	10.34%
Goitre	6	-	-	-	-	-	2	4	-	9	21	4.26%
Hernia	8	5	5	-	-	4	-	6	-	-	28	5.67%
Cyst in ovary	4	-	2	-	-	-	-	6	-	-	12	2.43%
Lipoma	9	-	-	-	-	-	-	6	-	-	15	3.04%
Migraine	10	-	4	-	-	-	-	8	2	-	24	4.86%
Multiple Injury	8	-	-	7	-	4	4	5	-	-	28	5.67%
Cholecystectomy	-	-	-	-	-	-	-	4	-	2	6	1.22%
Prolapse uterus	4	-	2	-	-	-	-	4	-	-	10	2.02%
Malaria	2	-	2	2	-	2	-	2	-	-	10	2.02%
Urethral calculus	-	2	2	4	-	-	-	6	-	-	14	2.84%
Viral fever	3	-	50	-	-	-	-	4	14	-	71	14.40%
RTI	6	-	20	23	9	-	6	7	-	-	71	14.40%

Naproxen sodium was found 3.04% among prescribed analgesics. Naproxen sodium was mainly prescribed for RTI (6) followed by the indication multiple injury (4).

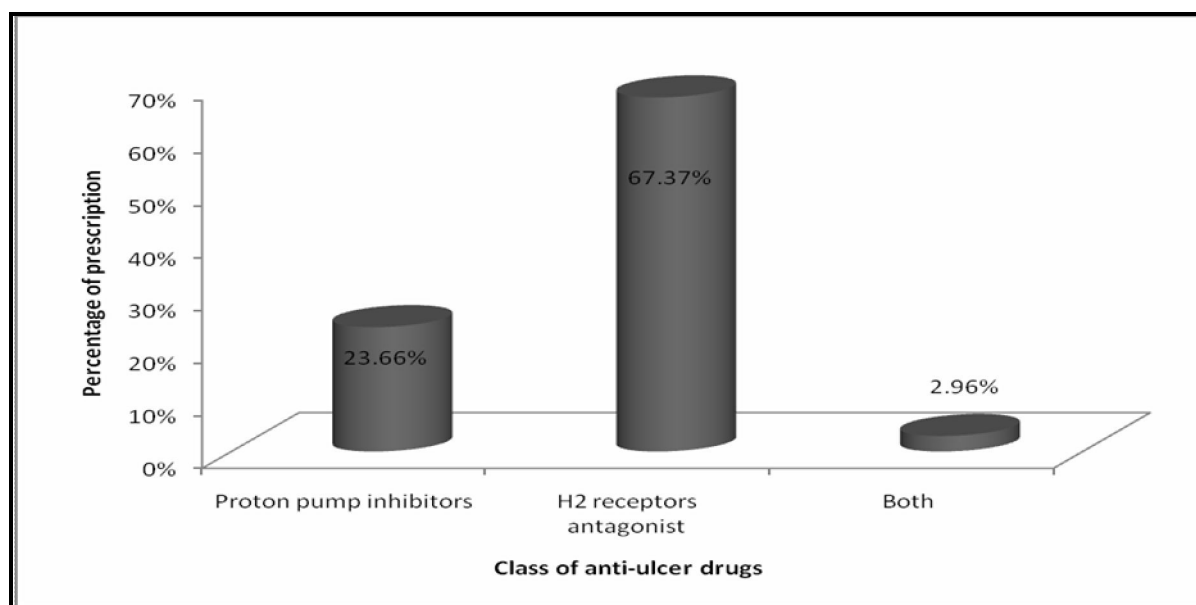
Ketrolac was found to be given in 2.84% of total analgesics. About 9 analgesic containing ketrolac was given for the indication goitre followed by the

indication AGE (3). For cholecystectomy, around 2 analgesic in the form of ketrolac was prescribed.

Around 2.63% of ibuprofen were given among total analgesics. About 5 analgesic in the form of ibuprofen was given for the indication hernia followed by AGE (4). For cholecystitis and urethral calculus, around 2 analgesics in the form of ibuprofen was prescribed.

**Table : 2** Age wise prescribing frequency of Analgesics

DRUG	< 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	TOTAL
IBUPROFEN+PARACETAMOL	9	5	7	20	29	10	14	14	-	108
IBUPROFEN	13	-	-	-	-	-	-	-	-	13
PARACETAMOL	14	8	14	18	16	15	8	9	8	110
PARACETAMOL+MEFENAMIC ACID	4	-	2	6	6	12	9	8	4	51
MEFENAMIC ACID	-	6	6	1	-	-	-	-	-	13
TRAMADOL	-	-	2	3	6	7	8	-	4	30
NAPROXEN NA	-	1	1	1	2	6	4	-	-	15
DICLOFENAC	-	-	12	26	24	18	17	18	-	115
NIMESULIDE	10	8	4	-	2	-	-	-	-	24
KETROLAC	-	-	-	-	3	2	-	9	-	14

**Figure : 2** Types of Anti-ulcer drugs prescribed with analgesics

Concerning the analgesics, Paul AD<sup>13</sup> et al and Seager JM<sup>14</sup> et al have reported that ibuprofen was the most often prescribed NSAID which represents a deviation from our study. Also Henry D<sup>14</sup> et al and Turner C<sup>15</sup> et al reported that, ibuprofen is supposed to be the safest NSAID concerning GI complications. But it has been said that the use of ibuprofen for gastritis and AGE could not be justified as the drug is a gastrointestinal irritant and if such patients need an anti pyretic ,paracetamol should be the first choice.

Mefenamic acid was prescribed 2.63% among the total analgesics. It was mainly prescribed for the indication RTI (9) followed AGE(4).

From the study we can summarize that diclofenac was most commonly used analgesic, this may be due to its efficacy when compared to others. The similar work was seen in the study conducted by Rauniar G P.<sup>16</sup>

The age distribution of drugs prescribed is presented in Table 2. In an age group below 5, paracetamol was the analgesic which was mainly prescribed (14) followed by ibuprofen (13) and nimesulide (10).

The age between 5 to 10 were mainly prescribed by paracetamol and nimesulide (8). Naproxen sodium were the analgesics which were prescribed least in number (1).

The use of Nimesulide in patients of age below 12 could not be justified because Drug And Therapeutic Advisory Board (DTAB) under Drug Control General Of India (DCGI) had banned the use of Nimesulide at an age upto 12.<sup>17</sup>

At an age group of 10 to 20, paracetamol was mainly prescribed (14) followed by diclofenac (12). Naproxen sodium was only prescribed for one patient.

The age group between 20 to 30 were mainly prescribed by diclofenac (26) followed by ibuprofen+paracetamol (20).

In an age of 30 to 40, ibuprofen+paracetamol combination were mainly prescribed (29) followed by diclofenac (24). Around 3 ketrolac was prescribed followed by nimesulide and naproxen sodium (2).

The age between 40 to 50 were mainly prescribed by diclofenac (18) followed by paracetamol (15). Ketrolac was only prescribed for 2 time.

At an age group of 50 to 60, diclofenac was mainly prescribed (17), followed by ibuprofen+paracetamol combination (14).

The age group between 60 to 70 were mainly prescribed by diclofenac (18) followed by a

combination of ibuprofen+paracetamol (14), paracetamol and ketrolac (9). Paracetamol+mefenamic acid was only prescribed for 8 patients.

In an age group of 70 to 80, paracetamol was mainly prescribed (8) followed by ketrolac and a combination of paracetamol+mefenamic acid (4). In this age group the prescription of acetaminophen is high which may be helpful to reduce serious gastric complications.<sup>12</sup>

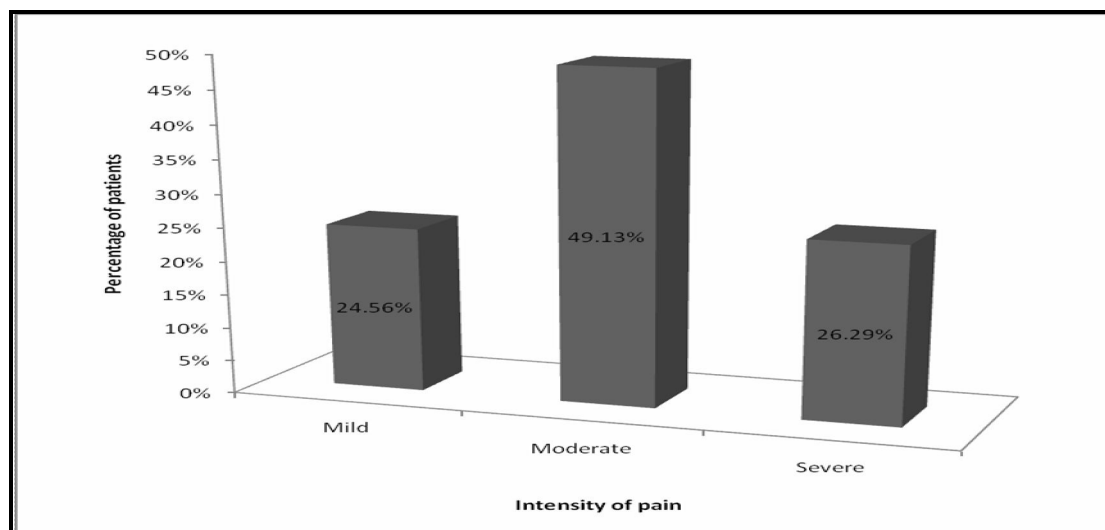
In all prescriptions containing age, paracetamol was prescribed for all age groups. Diclofenac was not prescribed exclusively for elderly and age upto 10. The other NSAIDs were mostly prescribed for adults and none for children below one year of age which shows similar to the study of Mohammed A. Al Homrany.<sup>12</sup>

When considering the mode of prescribing of analgesics, the percentages of drugs prescribed in generic names in the hospital were 10.34% which was low compared to the brand name prescribing (89.66%) shown in Table 3. The percentages of drugs prescribed in generic names were determined because generic prescription has got special importance for rational use of drug as regards to cost, safety and efficacy by permitting the identification of the products by its scientific names (Ara and Chowdhury, 2001).<sup>18</sup>

**Table : 3 Methods of Prescribing Pattern of Analgesics**

Prescribing pattern	Number of drugs	Percentage
Analgesics prescribed in Generic name	51	10.34%
Analgesics prescribed in Brand name	442	89.66%
Total	493	100%

**Figure : 3 Pain Intensity based on Pain scale**



Moreover, generic drugs by allowing the recognition of the products by its scientific names provides easier for the prescribers, dispenser and users to choose between many alternative competing in terms of quality, price or convenience. It has been founded that generic prescribing percentages were less in hospital compared to the brand name prescribing. Though the practice of generic name was found to be very low previously in a teaching hospital (Ali and Chowdhury, 1993).<sup>19</sup> As analgesics are sold in the market in trade name, therefore prescribers do not have much option in this opinion. Pressure from pharmaceutical companies may be one of the reasons for writing trade name. It was observed that in Cyprus, 20% of drugs were prescribed as generic (WHO Report, 1993).

According to the class of analgesics prescribed, it may be understood that aryl acetic acid derivatives are mainly used for the treatment of pain (23.32%) followed by para amino phenol derivative (22.31%). Around 6.08% of synthetic opioids are prescribed followed by propionic acid derivatives (5.68%). Preferential COX-2 inhibitors are used around 4.90% followed by pyrrolo pyrrole derivative (2.84%). Only 2.63% of anthranilic acid derivative were used which constitute the least number of prescribed class. From the above data, we can conclude that mainly non opioid drugs are used for pain treatment than opioid drugs. The only opioid drug used comes under synthetic opioids which is tramadol.

In the study, when considering the analgesics used for therapy, around 48.48% of patients were prescribed with single analgesics and the rest contributed the combination analgesics (51.52%).

According to the analgesics used for therapeutic regimen, single analgesics were prescribed in 48.48% of the cases. Around 34.84% cases were prescribed by two analgesics followed by three analgesics (11.21%) and four analgesics (5.45%). Study of Mohammed A. Al Homrany et al<sup>12</sup> said that the combination of more than one systemic NSAID is also an inappropriate practice, while it may be reasonable to combine a topical agent with a systemic one.

The prescriptions containing additional drugs to prevent the adverse effects of analgesics in the hospital were 71.51%. Of them, H<sub>2</sub> blockers prescribed in the hospital were 67.37% (figure 2). On the other hand, proton pump inhibitors prescribed in the hospital were 23.66%. Around 2.96% of both the combinations were prescribed. H<sub>2</sub> blockers were the drugs used maximally to prevent adverse effects in the hospital. Moreover, Rahman<sup>1</sup> et al founded that the proton pump inhibitors were the drugs used maximally to prevent adverse effects in hospital at dhaka reflects

against our study. Lapne KL et al<sup>20</sup> taught that the use of NSAIDs is associated with a substantial increase in the risk of Gastro intestinal bleeding.

Based on the response of patient towards the pain scale questionnaire, around 70.30% of patients responded to the query followed by 29.69% of un-responded patients. Of them 49.13% of patients were suffering from moderate pain followed by 26.29% of severe pain. Around 24.56% of patients were suffered from mild pain (Figure 3).

When mild pain is considered, around 85 number of analgesics were prescribed for 57 patients. About 45.88% of prescribed analgesics constitutes paracetamol followed by 32.94% of diclofenac and 10.58% of naproxen sodium. Around 5.88% of Mefenamic acid was prescribed followed by 4.72% of Ibuprofen. Paracetamol was mainly prescribed for mild pain which shows the effectiveness of paracetamol.

Around 170 analgesic drugs were prescribed for moderate pain in 114 patients, which constituted around 32.82% of Ibuprofen+paracetamol followed by 37.64% of Diclofenac and combination of Paracetamol+mefenamic acid (17.05%). Around 4.14% of ketorolac and 2.35 % of Ibuprofen was prescribed. For moderate pain combination drugs were more effective in our study.

Based on the drugs used for severe pain, a total of 93 analgesics were prescribed for 61 patients. A Combination of ibuprofen+paracetamol constituted 29.06% followed by Tramadol (27.95%) and Nimesulide (23.65%). Around 13.97% of Paracetamol+mefenamic acid and 5.37% of ketorolac was prescribed. In the study, a combination of non opiate drugs were prescribed for severe pain accompanied by a single synthetic narcotics. No other opioid. were used for severe pain.

## **CONCLUSION**

Pain is the most commonly experienced symptom among male and female, it may vary from one study to another study and depends up on the activities of the selected patients. The pain may occur as an associated disease with the major diseases like renal failure, heart failure and other body system failure. The drugs for the relief of pain were prescribed during all patient visits more often than any other therapeutic class.

The study shows that, anti ulcer drugs were prescribed along with analgesics to reduce the Gastric complications. The analgesic use were minimal and one analgesic were used in maximum number of cases. Physicians give more importance for non-opioid drugs because of its less adverse effects.

The result shows that, paracetamol and diclofenac were the most commonly prescribed analgesic, it may be due to its lesser side effects and their effectiveness when compared to others.

Minimum number of patients were treated by newly marketed analgesics. It suggests that choice of newly emerged drugs should be considered, so that better results in pain therapy can be achieved.

For reducing the cost of therapy, the prescription of drugs in brand name could be changed to Generic name, also this plays an important role in Rational use of Drug (Proper dispensing of drugs, Cost, safety and efficacy). The use of analgesics depends upon the severity of pain. In mild pain, single analgesics are commonly used where as two or more analgesics are used in moderate and severe pain.

Pain assessment should be practiced by using pain intensity scales , so that right choice of analgesics

can be prescribed according to the intensity of pain. The pain scale is also not perfectly complete and correct one, because the datas are collected only by the replay to the questions asked to the patients, the answer may be correct or not. It depends upon the patients interest, time, physical and psychological conditions.

In this study, a very few number of diseases and patients were selected. By selecting more number of cases, the results may be vary. Most of the pain occurs as symptom of diseases, it commonly occurs in out patients. The out patients are not included in the study. The study patients are selected from various departments of hospital, so the study is not a completely perfect one.

Although there are scopes for improvement of rational prescribing by introducing appropriate educational interventions, these may be considered as an effort to improve quality of health care.

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