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Original Research Article

A prospective observational study on the use of analgesics in a tertiary care hospital

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ABSTRACT

Aims and Objectives: To evaluate drugs used for the management of pain based on assessment scale Pain Assessment and Documentation Tool (PADT) to assess the effectiveness of pain management, compare the pharmacological pain management with WHO pain ladder and check the presence of any possible Adverse drug reaction (Naranjo scale) and drug interactions (Micromedex).
Subjects and Methods: This was a prospective study carried out in Department of General Medicine at a tertiary care teaching hospital for about 6 months. All the admitted patients who are treated with analgesics and co-analgesics were included.
Results: Out of Total 150 study population which contain 89 female patients (59.3%) and 61 male patients (40.6%). The analgesics prescribed during the study population are Paracetamol, Diclofenac, Tramadol, Naproxen Pregabalin, Amitriptyline, Gabapentin. Analgesics prescribed as monotherapy and combination therapy. Which shows that monotherapy was found to be most common in 89 patients(59.30%) followed by dual therapy in 61 patients (40.6%) the monotherapy is prescribed as Paracetamol, Diclofenac, Tramadol, Naproxen, Gabapentin, Pregabalin, Carbamazepine and dual therapy is prescribed as paracetamol+ tramadol and paracetamol + diclofenac are mostly prescribed.
Conclusion: The result from the present study shows that analgesics most commonly used in the treatment of pain are paracetamol, diclofenac, and tramadol. Paracetamol is most frequently used the drug in monotherapy and combination therapy, paracetamol+ tramadol, paracetamol + diclofenac are the drugs preferred in combination. For the neuropathic pain and diabetic neuropathy, depression, sleep disturbance Amitriptyline, gabapentin, and pregabalin are used. Paracetamol is the most preferred drugs in mild to moderate pain. The study shows that prescription pattern in the treatment of pain in accordance with WHO pain ladder.

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INTRODUCTION

The International Association for the Study of Pain defines pain as "an Unpleasant sensory and Emotional Experience associated with actual or potential tissue damage or described in terms of such damage" This definition recognizes pain as a subjective experience with both psychological and sensory components. It also recognizes that tissue damage does not need to be present for pain to be experienced. Pain has been categorized in a variety of different ways, nociceptive pain versus neuropathic pain (NP). Nociceptive pain results from activity in neural pathways caused by actual tissue damage or potentially tissue-damaging stimuli. Examples of nociceptive pain include pain after surgery, arthritis pain, mechanical low back pain, and pain associated with sports injuries. Three common conditions that are often associated with acute and chronic NP are painful diabetic peripheral neuropathy (DPN), painful post-herpetic neuralgia (PHN), and

cancer. In contrast, NP is chronic pain that is initiated by nervous system lesions or dysfunction and can be maintained by a number of different mechanisms. For example, excess stimulation of nociceptive pathways or damage to inhibitory pathways can alter the balance between painful and nonpainful sensory inputs so that pain results in the absence of nociceptor stimulation (Chen et al., 2004).

Thus, NP may be present without any readily demonstrable physical findings (Dworkin et al., 2003). Nociceptive is the sensory nervous system response to certain harmful or potentially harmful stimuli. In nociception, intense chemical (e.g., chili powder in the eyes), mechanical (e.g., cutting, crushing) or thermal (heat and cold) stimulation of sensory nerve cells called nociceptors produces a signal that travels along a chain of nerve fibers via the spinal cord to the brain. Potentially damaging mechanical, thermal, and chemical stimuli are detected by nerve endings called nociceptor, which is found in the skin, on internal surfaces such as the periosteum, joint surfaces, and in some internal organs. The concentration of nociceptors varies throughout the body, they are found in greater numbers in the skin than in deep internal surfaces. Some nociceptors are unspecialized free nerve endings that have their cell bodies outside the spinal column in the dorsal root ganglia. Nociceptors are categorized according to the axons which travel from the receptors to the spinal cord or brain. Nociceptors have a certain threshold; that is, they require a minimum intensity of stimulation before they trigger a signal. Once this threshold is reached a signal is passed along the axon of the neuron into the spinal cord. In some conditions, excitation of pain fibers becomes greater as the pain stimulus continues, leading to a condition called hyperalgesia. Nociceptive pain is either somatic (arising from skin, bone, joints, muscle, connective tissue) or Visceral (arising from the internal organ (large intestine). Stimulation of free nerve ending (Nociceptor) leads to the sensation of pain. These receptors found in both visceral and somatic structures are activated by mechanical thermal and chemical impulses (Dipro et al., 2002).

Neuropathic pain was originally defined by the International Association for the Study of Pain (Merskey, 1994), in 1994, as "pain initiated or caused by a primary lesion or dysfunction in the nervous system" (Merskey et al., 1994).

Analgesics are defined as the drugs that relieve pain without blocking nerve impulse conduction or markedly altering sensory function.

Pain assessment of pain is the cornerstone to optimal pain management. 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. 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 (Merskey, 1994).

The aim of the present study was to assess the current trends in prescribing pattern of Analgesics drugs in the treatment of Pain Management. Our study aims to evaluate the use of drugs/medication in the management of pain (neuropathic and nociceptive), which includes evaluating the prescribing pattern of analgesics, effectiveness of treatment, ADE, drug interactions, demographic & disease pattern and comparing the treatment with WHO pain ladder and IASP guidelines. This study will eventually contribute to the promotion of optimal and rational therapy thereby improving patient's quality of life.

SUBJECT AND METHODS

The study was conducted in the Department of General Medicine, Osmania General Hospital, Hyderabad, T.S., India. A hospital-based prospective, observational study was approved by Institutional Ethics Committee (MCP/PD/PR/14) carried out on the total of 150 patients. The study was carried out for a period of 6 months. The data was collected by using the Patients profile, Demographic data, Patients medical history, Patients physical and laboratory examination, Patients vital data, Assessment of pain, Adverse drug event.

A total of 150 patients from the General Medicine and Orthopedics' Department of a teaching hospital (Osmania General Hospital) who was prescribed analgesics and those who fulfilled the exclusion and inclusion criteria were selected for the study.

Study criteria

Patients of either sex and patients with acute pain and chronic pain were included in the study.

However, patient who are not willing to participate in the study, comatose patients, alcoholics, pregnant women's, patients less than 18 years, postoperative patient, cancer pain were excluded from the study.

RESULTS

This prospective study was conducted in General Medicine department of a tertiary care, teaching hospital for the study period of 6 months. During the study period, 150 patients were recruited as per the inclusion criteria. Demographic details are depicted in the tables and figures below.

Demographic profile

Table 1. Distribution of subjects based on gender.

Demographic Profile	Total	Percentage
Total Sample Size	150	100%
Female	89	59.3%
Male	61	40.6%

The results reveal that out of 150 patients (100%) which included 61 male patients (40.6%) and 89 female patients (59.3%).

Table 2. Distribution of specialty wise analgesic utilization in study population.

Departments	Total No. of Patients	Percentage
General medicine	61	40.67%
Orthopaedics	89	59.33%
Total	150	100%

The results shows that among the departments, analgesics prescribed in orthopaedics was found to be most common with 89 patients (59.33%) followed by general medicine department with 61patients (40.7%).

Table 3. Distribution of subjects based on age in the study population.

Age	Total No. Of Patients	Percentage
18-20	14	9.3%
20-30	32	21.3%
31-40	27	18%
41-50	43	28.6%
51-60	19	12.6%
61-70	10	6.7%
71-80	5	3.3%
80-90	0	0%
90-100	0	0%
TOTAL	150	

The results shows that the most common analgesics prescribed were between the age group 41-50 yrs with 43 patients (28.6%) followed by age group 20-30 in 32 patients (21.3%).

Out of 150 patients the mean age were found to be 44.62 with standard (sd) deviation + (or)-14.4.

Table 4. Distribution in duration of analgesics therapy in the study population.

Duration of therapy	Total no. of patients	Percentage
1-5 Days	45	30%
5-10 Days	21	14%
10-15 Days	54	36%
Greater than 15 Days	30	20%
Total	150	100%

The results shows that among the analgesics prescribed in the study population with a duration of 10-15 days was found to be most common in 54 patients(36%) followed by 1-5 days in 45 Patients (30%).

Table 5. Distribution of analgesic prescribed as monotherapy and combination therapy in the study population.

Therapy	Total No. of Patients	Percentage
Monotherapy	89	59.30%
Combination therapy (or)dual therapy	61	40.66%
Total	150	100%

The results shows that among the analgesics prescribed in the study population mono therapy was found to be most common in 89 patients (59.30%) followed by dual therapy in 61 patients (40.66%).

Table 6. Distribution of potential drug interactions in study population.

Interactions	No. of patients	Percentage of interactions
No Interactions	62	41.3%
Minor	38	25.3%
Significant	50	33.3%
Major	0	0%

The results shows that among the analgesics prescribed in the study population no interactions was found in majority of patients 62 (41.3%) followed by significant interactions in 50 patients (33.3%) and major interactions in 0 patients (0%).

Table 7. Distribution of subjects based on pain intensity scale in the study population.

Pain	Numbers	Patients	Percentage	Quality of Pain
Mild to moderate	1– 5	86	57.4%	Aching, crampin, tingling
Moderate to severe	5– 9	64	42.66%	Shooting dragging
Worst pain	10	0	0%	Sharp, intense, radiating

The results shows that among the study population mild to moderate pain (57.40%) is maximum followed with moderate to severe pain in (42.7%) patients.

World Health Organisation (WHO) analgesic ladder

The pharmacotherapy of analgesics in Osmania General Hospital were found to be in accordance with WHO analgesic ladder pattern
In our study:

Step 1- Treatment given in 76 patient's prescription (50.6%)

Step 2- Treatment given in 40 patient's prescription (26.7%)

step 3 - Treatment given in zero patients prescriptions

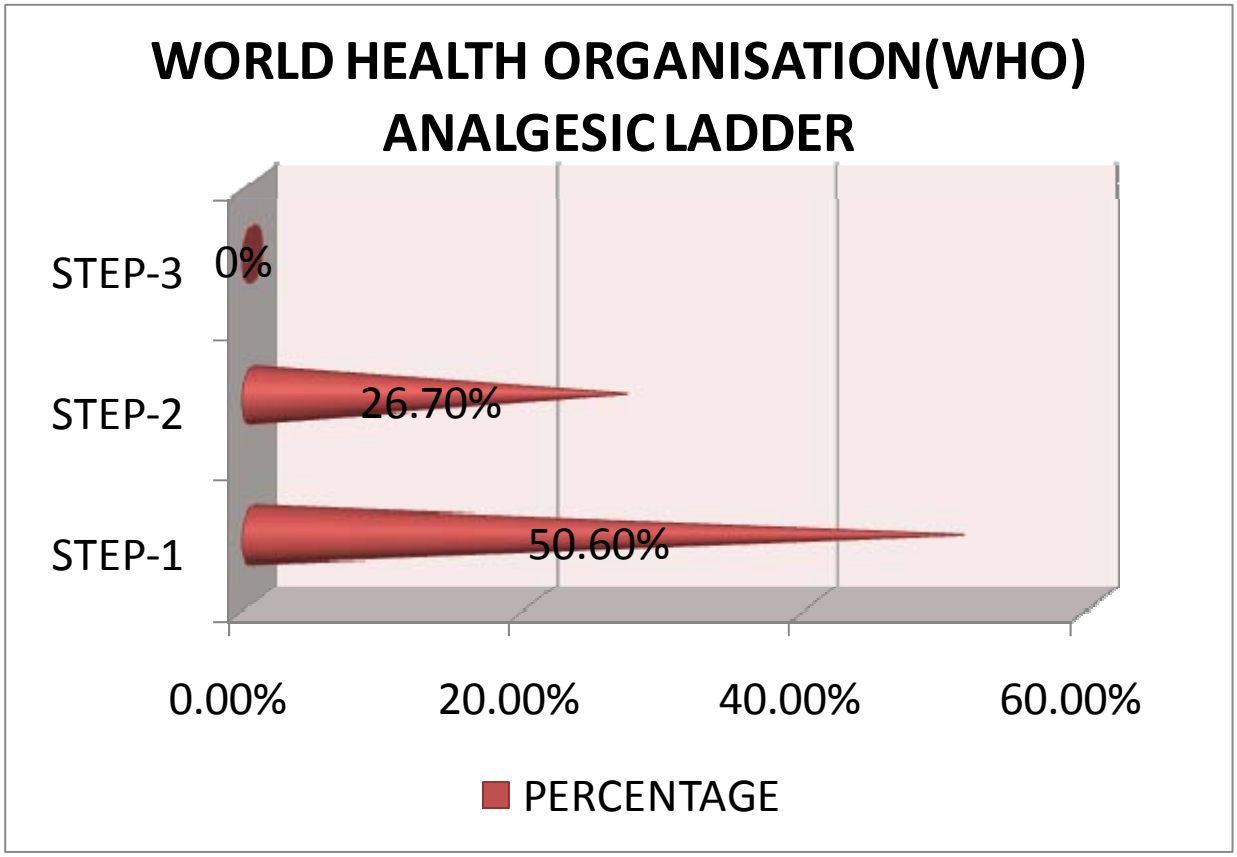

Figure 1. Step 1- Treatment given to 76 patient's (50.6%); Step 2- Treatment given to 40 patient's (26.7%).

DISCUSSION

This prospective study was conducted in General medicine department of a tertiary care teaching hospital for about 6 months. The present study was initiated to evaluate the drugs used in management of pain, to determine the number and pattern of drugs used for the pharmacological treatment of pain, to assess the effectiveness of pain management based on assessment scale (PADT), to compare the pharmacological pain management with WHO pain ladder, to observe the demographic and disease pattern of patients, to check the presence of any possible Adverse drug reactions (Naranjo scale) and to check the presence of drug interactions (Micromedex).

Out of total study population of 150 patient 89 were female patients (42.6%) and 61 were male patients (57.3%). In another similar study showed that number of females is more than males with a mean age of 53.7 yrs. Women's are more likely than men's to report a wide range of chronic pain conditions including musculoskeletal and arthritic pain conditions, common forms of headache, temporomandibular disorders, irritable bowel syndrome, and fibromyalgia (Alam et al., 2012).

Based on the aged group the analgesics prescribed in the study population were between the age group of 41-50 years in 43 patients (28.6%) are maximum followed by age group of 20-30 yrs in 32 patients (21.3%).

Pain consists of both sensory and affective (emotional) components. Opioid analgesics are unique in that they can reduce both the aspects of the pain experience,

especially the affective component (Bertolini et al., 2002). In contrast, non-opioid steroidal and non-steroidal analgesic drugs have no significant effect on the emotional aspects of pain and will be more effective in relieving inflammation associated sensory component by inhibiting the synthesis of pro inflammatory sensitizers like prostaglandin, cytokines etc. The pharmacodynamics and pharmacokinetics features of analgesics can be affected by the impact of complexities like frailty and cognition in older age group. The elderly subjects are more sensitive to therapeutic doses of opioids than younger. Because age-related changes in pain processing occur in older patients including suprathreshold pain responses may make it difficult to modulate respond to nociceptive input (McLachlan, et al., 2011).

The analgesics prescribed during the study population were paracetamol, diclofenac, tramadol, naproxen, pregabalin, amitriptyline, gabapentien, fluoxetine, methyl ergot amine, baclofen, carbamazepine, benzocaine.

The present study shows that paracetamol was found to be most common followed by diclofenac. Diclofenac and Paracetamol were the most commonly prescribed analgesic; it may due to its lesser side effects and their effectiveness when compared to others (Kumarasingam et al., 2014; Alam et al., 2012; Ahmed Tabish et al., 2012).

The route of administration of analgesics shows that among the analgesics prescribed in the study population oral formulations were found to most common in 106 patients (70.7%) followed by injectables in 43 patients (28.7%), shows that this route was used only in the initial acute condition the least prescribed route was topical (0.67%) (Maheshwari et al., 2014).

Speciality wise distribution of analgesic shows that among the departments, analgesics prescribed in orthopaedics were found to be most common in 89 patients (59.33%) followed by general medicine department in 61 patients (40.67%). The commonest indications for attending the orthopaedics OPD were low back ache and spondylosis and osteoarthritis and most commonly prescribed medicine is diclofenac and paracetamol. Duration of analgesics therapy shows that among the analgesics prescribed in the study population duration of therapy 10-15 days was found to be most common in 54 patients (36%) followed by 1-5 days in 45 patients (30%) .

Analgesics prescribed as mono therapy and combination therapy, mono therapy was found to be most common in 89 patients (59.30%) followed by dual therapy in 61 patients (40.6%). The monotherapy is prescribed as paracetamol in 32 patients (21.3%), diclofenac in 26 patients (17.3%) followed by tramadol in 21 patients (14%) dual therapy is prescribed as paracetamol+tramadol in 24 patients (14%) and paracetamol+diclofenac in 12 patients (8%) were prescribed.

In the present study, when considering the analgesics used for therapy, around 59.30% of patients were prescribed with single analgesics and the rest contributed for the combination analgesics 40.6%. Diclofenac has been chosen both as mono and in combination with other drugs. As it is a nonselective COX inhibitor it will be effective in relieving inflammation induced moderate and severe pain. But being a selective COX-3 inhibitor Paracetamol is said to have more antipyretic effect than analgesic effect .Nonopioid drugs have been shown to produce lesser side effects than opioid drugs. In present study majority of the patients using analgesics were as mono therapy 59% and approximate 40.6% of patients were on dual therapy.

The other drugs which have been prescribed are Tramadol (26.6%) in total no of patient it is an opioid pain medication used to treat moderate to severe pain. It has two different mechanisms. First it bind to μ-opioid receptor and second it inhibit the reuptake of serotonin and nonepinephrine .And the other drugs which have been prescribed are naproxen which is more frequently used in orthipedic department for severe pain it is given. And the other drugs prescribed for the neuropathic pain are Pregabalin, Amitriptyline, Gabapentien, Fluoxetine, Clonazepam Carbamazipine. Different condition for which the neuropathic drugs have been used in different condition are carbamazepine for trigeminal neuralgia, gabapentein and pregabalin for diabetic neuropathy and central neuropathic pain. And antidepressants like amitriptyline and selective serotonin reuptake inhibitor they are clinical rationale for using antidepressants in the management of chronic pain may also include treatment of co morbid depression and sleep disturbance as well as reduction of pain intensity.

Based on pain intensity scale ratings in study population Shows that among the study population mild to moderate intensity was found to be most common in 86 patients(57.6%) followed by moderate to severe intensity in 64 patients (42.66%). Paracetamol was mainly prescribed for mild pain and tramadol followed by diclofenac. And for severe pain combination drugs like paracetamol +diclofenac and paracetamol+ tramadol were used. Depending on the severity of pain and the improvement after initiating the treatment doses of the analgesic drugs were adjusted and treatment was modified by addition of analgesics or replacement of one analgesic with

another depending on patients clinical condition study showed an association between strength of analgesic and intensity of pain. More intense pain resulted in a stronger drug. In addition to NSAIDs anticonvulsants and TCAs (Tricyclic Antidepressants) were prescribed to treat neuropathic pain. Fixed drug combination of tramadol and paracetamol was frequently used to mild and moderate pain.

CONCLUSION

The result from the present study shows that analgesics most commonly used in treatment of pain are paracetamol, diclofenac and tramadol. Paracetamol is the most frequently used drug in both monotherapy and combination therapy. Paracetamol+ tramadol and parecetamol + diclofenac are the drugs preferred in combination. For the neuropathic pain and diabetic neuropathy, depression, sleep disturbance Amitriptylin, gabapentin and pregabalin are used.

Assessment of pain plays a vital role in the appropriate management and relief of pain. The Pain intensity scale was used to determine the appropriateness of the treatment for the management of pain depending on mild, moderate and severe. Paracetamol is the most preferred drugs in mild to moderate pain. The study shows that prescription pattern in treatment of pain is accordance with WHO pain ladder.

CONFLICT OF INTEREST

None declared.

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