Study of types of analgesics prescribed for pain management in adult population of twin cities of Pakistan

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A B S T R A C T

Pain is the leading cause of mortality worldwide justifying the rapidly growing demand for safe and effective pain management. Unrelieved pain exerts a negative influence on physical and mental health. It has been consistently identified as the most common reason for seeking medical attention that includes the prescribing of analgesics to the community. This study aims to check the current practice of prescribing analgesics to find the prevalence of frequent use of analgesics in twin cities of Pakistan. 300 medical prescriptions were collected by random sampling method containing different types of analgesics from different hospitals of twin cities. 300 medical prescriptions contain 31.65% of analgesics out of which 30.09% were opioid analgesics and 69.90% were non-opioid analgesics. The most prevalent age group that received analgesics was between 18-25 years (n=51, 17%) and most commonly prescribed to females than males. The most commonly prescribed analgesic was Paracetamol (n=78, 18.4%), Paracetamol + Tramadol HCl (n=73, 17.3%), Diclofenac (n=56, 13.3%), Tramadol HCl (n=45, 10.6%). The results shows that 42-50 year age group takes more opioid analgesics (n=19) whereas the use of non-opioid analgesics was common in the 18-25 year age group (n=55). It is concluded that proper attention must be paid to the rational usage of analgesics as these are not endowed and governed with specific reasoning by the healthcare practitioner. Patients are receiving more than two analgesics per encounter. Most of the medicines are being prescribed without mentioning proper indications, age, and gender in the prescriptions.

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INTRODUCTION

Pain, the fifth vital sign, is one of those symptomatic reasons for which the patient is seeking medical help (Hargreaves and Abbott, 2005; Nair et al., 2009). It is characterized by unpleasant experiences and its intensity varies from person to person (Ehikhamenor *et al.*, 2012; Nair *et al.*, 2009). Effective pain management is a significant goal for any medical practitioner treating patients, experiencing surgery, or any other health-related problem (Garimella and Cellini, 2013). Pain is managed by different methods like acupuncture, surgery, hypnosis but drug therapy remains the most effective method (Ehikhamenor et al., 2012). Drug therapy includes non-narcotic (opioids) analgesics and narcotic (NSAIDs and paracetamol) analgesics which can reduce and alter the pain sensations (Aslam et al., 2010; Hargreaves and Abbott, 2005). The choice of analgesics is governed by World Health Organization three-step PAIN LADDER which classifies analgesics according to the use in pain management i.e. Mild pain (non-opioid analgesics), Moderate (weak opioids), and Severe (strong opioid) (!!! INVALID CITATION !!! (Klepstad et al., 2005; Sarzi-Puttini et al., 2012; Whittaker, 2011)).

Non-steroidal anti-inflammatory drugs (NSAIDs) are classified into selective and non-selective cyclooxygenase (COX) inhibitors which can be used in traditional disease treatment (Aslam et al.,

2010; Kundu and Fulton, 2002). Housekeeping COX-1 maintains physiological functions whereas COX-2 maintains pathological functions (Mathews, 2000; Morita, 2002). Most of the NSAIDs lie in the category of over the counter drugs which includes paracetamol, mefenamic acid, diclofenac, naproxen that reduce fever and inflammation (!!! INVALID CITATION !!! (Hargreaves and Abbott, 2005, Schug and Manopas, 2007, Carter et al., 2014, Porteous et al., 2005)). NSAIDs can also harm the gastrointestinal and cardiovascular system by inhibiting the COX enzymes (Peterson, 2005). Traditionally, opioid analgesics were used for chronic pain management. Opioid analgesics are classified based on pain intensity, receptor interaction, and can be used in the treatment of burn, post-operative, and cancer pain (Cherny, 1996; Cowan et al., 2003). Besides the usage of opioid analgesics, there are some side effects related to its long-term use like medication dependence, psychological sequence changes, and decline in physical activities. Besides analgesics uses, there is a massive increase in errors of prescribing analgesics (polypharmacy of analgesics) that can contribute to potential adverse effects and sub-therapeutic outcomes (Smith and Lesar, 2011).

Analgesics are most commonly used in second or third-degree burns (60%), lower extremity fractures (31%), and the lowest ratio (20%) is found to be used in the emergency department (Selbst and Clark, 1990) and for arthritis (67%), followed by spinal diseases (9%), fractures (5%), and other inflammatory diseases (4%), sprain (4%) (Lee et al., 2011). In the Danish population, mostly female, diclofenac, and ibuprofen were the most used NSAIDs while celecoxib and rofecoxib were found to be the most frequently used COX-2 inhibitors (Fosbøl et al., 2008). In a study of the Norwegian HUNT3 population, paracetamol prevalence is 40% followed by 19% NSAIDs and 8% Aspirin (Dale et al., 2015). In the US, the ratio of opioid analgesics use is higher than other analgesics. The use of opioid analgesics is high in females especially in older females because of chronic non-cancer pain (Musculoskeletal pain, arthritic pain) as they are more sensitive towards pain (Campbell et al., 2010; Levy et al., 2015). A study in Lahore, Pakistan shows that 98% of students use analgesics for headache and dysmenorrhea in the case of females while paracetamol (46%) and aspirin (18%) are the most common analgesics (Tahir et al., 2011). In Karachi Pakistan, a study was conducted on 1000 prescriptions to determine various variables, prescribing frequency, and prescribing errors (Aslam et al., 2010).

As prescription writing is the pillar of treatment but still the practice of irrational prescribing has become a major problem in developing countries (Araghi et al., 2016). Irrational prescribing and medication errors are due to errors in prescribing such as an error in dose, omission of age, gender, dosage form, wrong method of administration due to which patient is seeking medical help (Araghi et al., 2016). The risk of polypharmacy becomes high in elder patients that can lead to an increased mortality rate. The various number of medications are associated with negative health outcomes (Hajjar et al., 2007). A survey was conducted in Nsukka, Nigeria to determine the frequency of irrational prescribing, 305 prescriptions were analyzed out of which 97.1% were analgesics, and 53% of analgesics were prescribed irrationally whereas 80% of prescriptions include prescribing errors which concludes that a large number of drugs were prescribed irrationally (Audax and Muro, 2019; Builders et al., 2011).

This study aims to determine the prevalence of the most commonly prescribed analgesics in the twin cities of Pakistan. The objective includes the investigation of prescribing errors in the prescriptions written by the medical practitioner.

MATERIALS AND METHODS
Study Protocol
A six-month survey was conducted from November 2019-April 2020 for the collection of prescriptions containing analgesics from twin cities of Pakistan. The total strength of the prescription collected by random sampling method was 300. This study was approved by the ethical committee of Yusra Institute of Pharmaceutical Sciences (YIPS), Islamabad headed by professors of YIPS. Informed consent was taken from the patient. They were informed that their personal information will be kept confidential and were provided with all the pertinent information.

Data Collection
Prescriptions of the adult age group (18-50 years) were collected from different hospitals (private and government). Some prescriptions were also collected from the different pharmacies by health care personnel when patients came to visit the pharmacy and collection of data were done with consent. Prescriptions of opioid analgesics were collected from the pharmacies that maintained a register of opioids to keep the patient record. The age groups were further divided into 4 different sub-group i.e. 18-25 years, 26-33 years, 34-41 years, and 42-50 years. This study includes two major parts that consist of demographical data such as gender, age, and medication profile such as diagnosis, the average number of drugs and analgesics prescribed per encounter, frequency of analgesics prescribed per encounter. Patients were excluded from the study if they were not willing to give their information. Pediatric prescriptions and patients of age above 50 were excluded from this study.

Statistical Analysis
All the data was analyzed using IBM SPSS statistics version

22.0. The graphs are plotted by using Microsoft Excel Worksheet.

RESULTS
Demographical Analysis
Age Group Distribution
The most prevalent age groups that received analgesics were between 18-25 years (n=51, 17%) followed by 42-50 years (n=45, 15%),26-33 years (n=40, 14%) and 43-41 years (n=32, 10.6%) (p=1.00) (Table 1).

Gender distribution
The female patients taking analgesics were observed to be greater than male patients (female: n=138, 46%, male: n=120, 40%) (p=1.00) (Table 2).

Table 1: Age group distribution.

Age group	No. of patients	Percentage %
18-25 years	51	17
26-33 years	42	14
34-41 years	32	10.6
42-50 years	45	15

Table 2: Gender distribution.

Gender	Frequency	Percentage %
Female	138	46
Male	120	40

Medication Profile
Medication profile includes the diagnosis of disease, frequency of analgesics prescribed, the average number of analgesics prescribed per encounter. The detail of all the indicators are given below:

Diagnosis
The tabulated data shows that the most frequently occurring diseases due to which patients visited the hospitals were arthralgia (n=20, 6.6%), arthritis and fever (n=14, 4.6%), abdominal pain (n=12, 4%), sciatica (n=11, 3.6%), headache/ migraine (n=4, 1.3%), chest pain (n=4, 1.3), typhoid (n=2, 0.6%) and others (Table 3).

Analgesics Prescribed
A total of 1333 drugs were prescribed in 300 prescriptions out of which 422 drugs (31.65%) belonged to analgesia groups. 127 drugs (30.09%) were opioid analgesics and 295 (69.90%) were non-opioid analgesics. The average number of drugs per encounter was 4.44. The average number of analgesics per encounter is 1.41.

Table 3 Most frequently occurring diseases.

Disease	No. of prescriptions	Percentage %
Arthritis	14	4.6
Arthralgia	20	6.6
Fever	14	4.6
Typhoid	2	0.6
Sciatica	11	3.6
Headache/ Migraine	4	1.3
Abdominal pain	12	4
Chest pain	4	1.3
Sore throat	10	3.3
Hernia	3	1
Shoulder pain	9	3
Back pain	8	2.6
Others	41	13.6

Frequency of Analgesics

The most frequently prescribed analgesics was paracetamol (n=78, 18.4%), Paracetamol + Tramadol HCl (n=73, 17.3%), Diclofenac (n=56, 13.3%), Tramadol HCl (n=45, 10.6%) (Table. 4). The probability of the data was P=0-1 in results which shows that probability of data lies within range. Out of 422 analgesics, about 30% analgesics were prescribed in combination such as paracetamol+ tramadol HCl, Paracetamol+ orphenadrine citrate, Tramadol HCL+ aceclofenac, Paracetamol+ caffeine+thioridazine, Ibuprofen+pseudoephed-rine, etc.

Frequency of Prescribing Analgesics According to Age Groups

When the frequency of analgesics was compared to age group, it shows that 42-50 year age group takes more opioid analgesics (n=19) whereas the use of non-opioid analgesics was common in the 18-25 year age group (n=55) (Table 5). With the increase in age, the use of opioid analgesics increased whereas the use of non-opioid analgesics decreased.

Medication Errors

Besides all these results, it was concluded that most of the prescriptions contain prescribing errors. In 42 prescriptions, the prescriber did not mention the gender of the patient (n=42, 14%), About 130 prescriptions did not have age mentioned on it (n=130, 43%). In 148 prescriptions, the prescriber did not mention the proper indications, and drugs were prescribed without indication (n=148, 49.3%) (Figure 1).

Table 4. Frequency of commonly prescribed analgesics.

Analgesics	Frequency	Percentage%
Aceclofenac	9	2.1
Paracetamol	78	18.4
Tramadol HCl	45	10.6
Ibuprofen	25	5.9
Tramadol +Aceclofenac	1	0.3
Paracetamol+ Thioridazine+ Caffeine	5	1.7
Diclofenac	56	13.3
Naproxen sodium	16	3.8
Lornoxicam	3	0.7
Paracetamol+ tramadol	73	17.3
Etoricoxib	4	0.9
Paracetamol+ orphenadrine citrate	40	9.5
Meloxicam	4	0.9
Acetylsalicylic acid	5	1.2
Diclofenac+ misoprostol	3	0.7
Mefenamic acid	6	1.4
Nalbuphine	8	1.9
Ibuprofen+ pseudoephedrine	5	1.2
Diclofenac diethylamine		
	7	2.3
Celecoxib	9	2.1
Flurbiprofen	1	0.2
Piroxicam	8	1.9
Ketorolac	5	1.2
Nimesulide	4	0.9
Ketoprofen	1	0.2

Discussion and Conclusion

The present study concludes that females are taking more analgesics. Similar results have been observed in a study conducted previously (Campbell et al., 2010). Paracetamol is the most commonly prescribed analgesic in the twin cities of Pakistan as well as in the Norwegian population (Dale et al., 2015). As concerned with the adult age group (18-50 years), the study concludes that analgesics are mostly used in the 18-25 age group but previous studies show that patients with age group 50-70 take more analgesics (Bjerrum et al., 1998). In previous research

studies, it has been shown that most of the drugs are prescribed irrationally and contain about 80% of prescribing errors (Audax and Muro, 2019). The present study concludes that about 49.3% of prescriptions contain prescribing errors. It is concluded that with the increase in age, the use of opioid analgesics increased whereas the use of non-opioid analgesics decreased.

Table 5: Types of analgesics prescribed in different age groups.

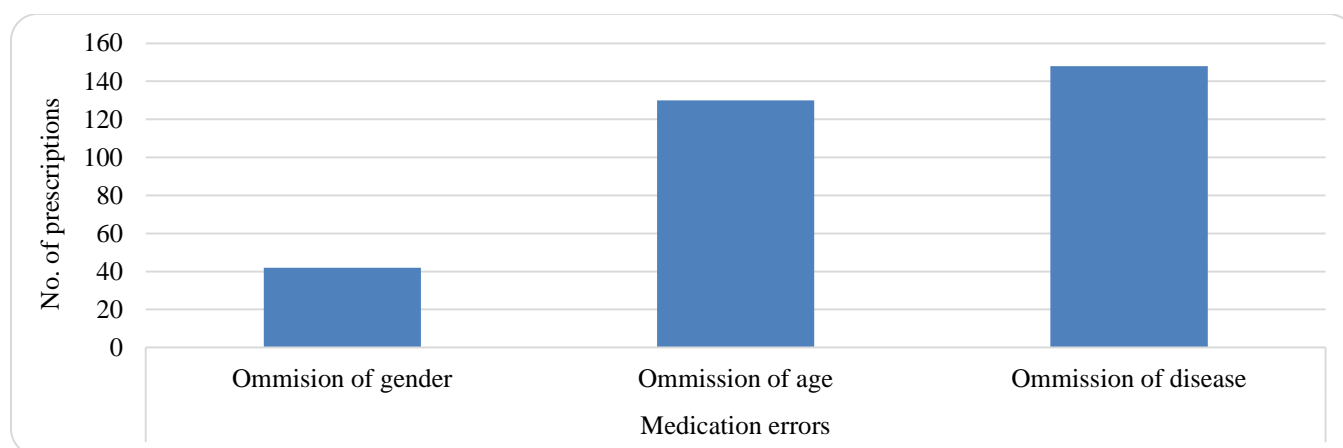| Age groups	No. of opioids analgesic prescribed	No. of non-opioid analgesics prescribed
18-25	7	55
26-33	14	50
34-41	14	28
42-50	19	44

Figure 1: List of medication errors in prescriptions.

The risk of polypharmacy increases which leads to many kinds of prescribing and medication errors. For example, signs and implications are missing in 49.3% of prescriptions while gender and age are not mentioned in 14% and 43% of prescriptions respectively which shows omission of errors.

FUTURE PERSPECTIVE
Drug interaction associated with analgesics can be determined as many prescriptions have polypharmacy in it. Various types of interactions such as analgesic-analgesic interaction, analgesic interaction with other prescribed classes of drugs can also be determined to evaluate whether the drugs are rationally prescribed according to the indication mentioned or not.

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