

DRUG USE AT ORTHOPAEDIC OUT-PATIENT DEPARTMENTAaroahi Vyas*¹, Aanal Patel¹, Aarya Nair¹, Abigail Abraham¹, Sandipkumar Bhatt² and Bimal Modi³¹Pharm D Graduate, Department of Pharmacology and Pharmacy Practice, K.B. Institute of Pharmaceutical Education and Research, Gandhinagar, Gujarat, India.²Assistant Professor, Department of Pharmacology and Pharmacy Practice, K.B Institute of Pharmaceutical Education and Research, Gandhinagar, Gujarat, India.³Head of the Orthopedic Department, Department of Orthopedics, GMERS Hospital, Gandhinagar, Gujarat, India.***Corresponding Author: Aaroahi Vyas**

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ABSTRACT

Objective: The objective of this study is to assess and evaluate the drug use and prescription pattern in Orthopaedic OPD in relationship with patient demographics variables and drug used. **Material and Methods:** This study was conducted in the Orthopaedic OPD of tertiary care hospital from Nov18 to Mar19. Out of 18,000 patients who visited OPD, only data of 1003 prescriptions were randomly collected based on the selection criteria. The details like subjects' demographics and prescribed drugs were recorded in the pre-designed data collection form. The prescribed drugs were assessed based on WHO core prescribing indicators with respect to the formulary and non-formulary medication. **Result:** Total of 1003 prescriptions was collected and analyzed. Pain in hands, legs, hip and back was most commonly encountered and was generally treated using various NSAIDs with or without specific therapies like antibiotics and gastro-protectants. In comparison with WHO core prescribing indicators, average of 4-5 drugs was encountered per each prescription, drugs prescribed by generic name were 99.48%, and prescriptions encountered with antibiotics and injectable were 5.68% and 1.09 %. Drugs prescribed from the hospital formulary were 92.57%, of which Tab. Diclofenac was the commonly prescribed and from non-formulary were 7.4%. Prescriptions containing drugs prescribed with fixed dose combination were 235 in number. **Conclusion:** NSAIDs are the most commonly prescribed drug followed by gastro-protectants. The drugs prescribed from formulary by generic name were high and rational.

KEYWORDS: Drug Use Evaluation, NSAIDs, Orthopaedic OPD, Tertiary care Hospital, WHO core prescribing indicators.

INTRODUCTION

Drug use is a complex process. Uncertainties in diagnosis, treatment and medication adherence may contribute to wide variation in the way drugs are used for any given condition. In any country, a large number of socio-cultural factors contribute to the way drugs are used. In India, these socio-cultural factors include National Drug Policy, literacy, and poverty, use of multiple health care systems etc. The complexity of drug use means that optimal benefits of drug therapy in patient care may not be achieved because of under use, overuse (or) misuse of drugs.^[1] To make drug use more compliant and acceptable, the World Health Organization (WHO) and the National Health Policy of India have emphasized that essential drugs should be prescribed by generic names.^[2] The development of drug utilization (DU) research was initiated in Northern Europe and the United Kingdom in the mid-1960s as WHO European Drug Utilization Research Group (DURG).^[3] Drug use evaluation is an ongoing, systematic, criteria-based

program of medicine evaluations that helps to ensure an appropriate medicine use.^[4]

The drug use evaluation is designed to:

- Review drug use and /or prescribing patterns
- Provide feedback of results to clinician and other relevant groups
- Develop criteria and standards, which describe optimal drug use.^[1]

The aim of the studies done on prescribing pattern is to facilitate the rational use of drugs for patients and analysing the prescriptions against the standards and providing accurate data to formulate local guidelines for judicious drug use.^[3,5] The assessment of drug utilization is important for clinical, educational and pharmacoeconomic purposes. Monitoring of prescriptions and studies on drug utilization could identify the associated problems and create awareness for the rational use of drugs.^[6] Rational drug prescribing has been defined by

WHO as patients receiving “medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, and the lowest cost to them and their community.”^[7] Rational use of drugs is possible only when the process of prescribing is followed appropriately by eligible prescribers.^[2] The recent changes in the drug prescribing pattern, increased concern over adverse drug reactions and escalation in the drug pricing have increased the importance of drug utilization studies.^[8] Periodic evaluation of drug utilization patterns needs to be done to enable suitable modifications in the prescriptions of drugs to increase the therapeutic benefit and decrease the adverse effects.^[9]

Orthopaedic is a branch of surgery broadly concerned with the skeletal system which also includes various disorders related to bones, tendons, ligaments etc.^[10] Orthopaedic Outpatient Department (OPD) have an important role in health sector.^[11] The prescribing pattern in Orthopaedics needs to be regularly monitored since most of the drugs prescribed carry untoward adverse effects. Earlier research conducted with similar objectives has revealed that drugs commonly prescribed in Orthopaedics department were non-steroidal anti-inflammatory drugs (NSAIDs), antibiotics, and ulcer protective. Studies have shown that NSAIDs prescribed in Orthopaedics are associated with increased risk of hospitalization and death from gastrointestinal bleeding and perforation. The excessive use of these drugs may result in serious adverse events diminishing their pharmacological effect. A prescription-based survey is considered one of the most effective methods to assess and evaluate the prescribing attitude of physicians and dispensing practice.^[12]

In Orthopaedic departments studies are carried mainly on surgical procedures. Very rarely any studies on drug distribution type are planned. Because of communication gap between nonclinical pharmacologists and clinical surgical Orthopaedic consultants, who are mostly interested in surgery and have less time also for drug discussions on rational therapy, very rarely such studies are conducted.^[13] Several studies of prescription patterns in the outpatient Orthopaedic department are available, but data on drug utilization pattern in Orthopaedic outpatients are scarce.^[12] Hence, the presented study was obtained to evaluate prescribing pattern in Orthopaedic Out-patient Department with WHO core prescribing indicators to promote rational use of drugs.

MATERIALS AND METHOD

The presented Observational and Cross-sectional study was carried out at Orthopaedic Out-patient Department of GMERS Civil Hospital, Gandhinagar. The duration of this study was of six months, in which the first 4 months [November 2018 – February 2019] was data collection period and the remaining was used for Data analysis and report generation. As per WHO minimum 600 sample

size are required, in our study; till the end of data collection period, we collected 1003 prescription with the 1:1 ratio of patient and prescription.

Inclusion criteria: All the prescriptions (including surgical and prosthetic) of individual patients who visited the OPD for the treatment of joint pain, fracture, arthritis, etc.

Exclusion criteria: Patients admitted in the Orthopaedic Ward, Medication order with no medicine for referred patient from other department only for opinion.

Once the prescription complied with the inclusion criteria, data was collected by reviewing the prescription of individual patient and transcribed in prepared data collection form. For the evaluation of drug use pattern WHO drug use indicators were used.

WHO Drug Use Indicators were used to determine drug use

Prescribing indicators^[34]

1. Average number of medicines per encounter (N drugs).
2. Percentage of generic prescribed medicines (% generics).
3. Percentage of encounters with an antibiotic prescribed (% antibiotics).
4. Percentage of encounters with an injection prescribed (% injections).
5. Percentage of prescribed medicines in the WHO essential medicines list (% EML)

Data was treated and analysed by using word of Ms Office, window, Microsoft window-8. Data is presented as number, frequency and mean descriptive statistics, Standard Deviation and Chi-square test. After the completion of the study, the researcher will retain the data for five years at K. B. Institute of Pharmaceutical Education & Research, Gandhinagar.

RESULT

At the end of data collection period, we collected 1003 prescriptions of individual patients, out of which 518 prescriptions were of male subjects and 485 prescriptions were of female subjects. The age wise and gender wise distribution of the subjects visiting Orthopaedic OPD at GMERS Hospital, Gandhinagar are in [Table – 1].

Table 1: Age wise and Gender wise distribution of the subjects visiting Orthopaedic OPD.

Age Range (Years)	Male Subjects (N)	Female Subjects (N)	Total	Percentage (%)
0 – 20	26	56	82	8.18
21 – 40	151	169	320	31.90
41 -60	210	187	397	39.58
61 – 80	96	103	199	19.84
81 – 100	02	03	05	0.50
TOTAL	485	518	1003	100

* N is the total number of Prescriptions or total number of Patients

Prescriptions of male subjects within the age group of 41-60 years were reported more and prescriptions of female subjects within the age group of 21-40 years and 61-80 years were higher.

Majority of the drugs prescribed was indicated to treat the complaints relating to the conditions in **Table – 2**.

Table 2: Frequency Distribution of prescription based on Diagnosis.

Diagnosis	Percentage (%)
Hand injury and hand pain	23
Arthritis	3
Osteoarthritis	3
Spondylitis	4
Hip and Back pain	22
Leg injury and leg pain	37
Fractures	5
Others	2

Apart from leg injuries and pain, hand injuries and pain and arthritis, frozen shoulder and fractures of different bones were also noted during the study span. Most commonly, fractures of radius bone, metatarsal bone, ankle bone fracture and hip fracture were reported. Other diagnosis like Osteomyelitis, Baker's cyst, and vitamin B12 deficiency leading to tingling sensation of hands and legs were reported in very low frequency as 2%.

Out of 4312 prescribed drugs, 3992 were prescribed from formulary drug list and 320 drugs were prescribed from non-formulary drug list. Analgesics or NSAIDs were the most commonly prescribed drug. Analgesics prescribed from the formulary were about 32.59% [1301/3992] and analgesics from non-formulary were 53.44% [171/320]. Second most highly prescribed drug from hospital formulary list or essential drug list was Gastro-protectants or Anti-ulcer drugs which was 23.47% [937/3992] and from non-formulary were 10.31% [33/320]. Followed by Tab. Diclofenac is Tab. Famotidine from the category of gastro - protectants, which is prescribed by 23.12% [932/3992].

Nutritional supplements were prescribed by 19% [758/3992] from formulary drug list and by 7.5% [24/320] from non-formulary. Antibiotics are the least prescribed drugs in both formulary and non-formulary. Antibiotics prescribed from formulary and non-

formulary are [1.25%] and [2.81%], respectively. Tab. Cefixime is the most widely recommended drug to treat the infections related to bones and Tab. Cefixime is prescribed by 0.60% [24/3992].

Other categories of drugs prescribed from both formulary drug list and non-formulary were illustrated as [23.69%] and [25.94%] respectively. Medications like Tab. Calcium, Inj. Triamcinolone, and Tab. Cetirizine, etc. were prescribed from formulary drug list while medications like Tab. Pregalrx [Pregabalin], Tab. Vertin, Tab. Dexamethasone etc. were prescribed from pharmacies other than hospital (Non-formulary).

Chi-square test was used to analyse the association between age and total number of the subjects enrolled and total drugs used. Total number of medicines prescribed when compared to male and female subjects was found to be non-significant (Chi-square statistics is 2.55 and the p-value is 0.63).

Analysis for poly- pharmacy according to WHO core prescribing indicators showed an average of 4-5 drugs were encountered per each prescription. Number of prescriptions with 4 and 5 drugs per encounter were 366 (36.49%) and 359 (35.79%).

Prescriptions containing combinational drugs were 23.72%. Most commonly prescribed combinational drugs were Tab. MPNT (Methylcobalamine + Nortryptiline), Tab. Mickey KT (Ketoprofen + Thiocholchicoside) and Tab. Aceclofenac + Thiocholchicoside.

Numbers of drugs prescribed by generic name were 99.48 % whereas 0.5 % drugs were prescribed by their respective Brands.

Chart – 1 The percentage wise distribution of drugs by formulation found in the prescriptions.

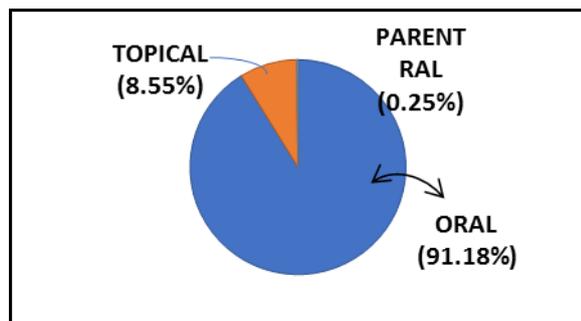


Chart – 1: Distribution of prescribed drugs by formulations.

Table 3: WHO Core Prescribing Indicators.

Prescribing Indicators Assessed	N and Percentage (%)
Average number of drugs per encounter	4 – 5 drugs
Percentage of encounters with an antibiotic prescribed	5.68
Percentage of encounters with an injection prescribed	1.09
Percentage of drugs prescribed from essential medicines list	92.57
Percentage of drugs prescribed by generic name	99.48

*N is the total number

DISCUSSION

Rational use of drugs plays a key role in promoting human health and well-being.^[8] Our study was conducted in orthopaedic out-patient department to assess and evaluate the drug usage and prescribing pattern in accordance with patient's demographics variables using the WHO core prescribing indicators. The prescribing indicators of the WHO were developed to measure the extent of polypharmacy, tendency to prescribe drugs by generic names and proportions of antibiotics and injections used.^[2]

Prescriptions within the age group of 41-60 years were in high ratio, followed by the prescriptions of age ranging between 21-40 years. Male patients attending Orthopaedic OPD were more due to degenerative process, age and their vulnerability. Similar result was obtained from the study conducted by *Abhilash et al., 2018* which showed that the majority were male and the maximum number of patients were in the age group of 40-60 years and the common indication for hospitalization was fractures, tendon damage, and disc prolapse which can be manifestation of lifestyle or the physiological age-related.^[12] Another study on prescribing pattern and drug utilization at orthopaedic department from Madhya Pradesh explained by *Baghel R et al., 2018* that gender distribution of male patients (447 out of 611) were found more than females (164), this may be due to male dominance in society, as they are involved in outdoor activities and are earning members of the family, thus they are more exposed to trauma.^[14]

Most commonly diagnosed illness were injuries of legs and hands, pain in hands and legs followed by fractures, arthritis and spondylitis, while other diagnosis such as

The maximum prescribed form were of oral formulations (tablets and capsules) followed by topical and parenteral formulations.

Out of 1003 subjects enrolled for the study, 51 subjects were advised for dressings, suture removal, applying B/K slab, Crepe Bandage and plastering.

Table 3 Drug use pattern in Orthopaedic OPD according to WHO prescribing indicators.

Osteomyelitis, Baker's cyst, and vitamin B12 deficiency leading to tingling sensation of hands and legs were also reported in our study. A study done in West Bengal by *Kumar et al. 2018*, reported that majority of the patients came from 18-30 years of age group. 38.5% of patients had a history of trauma. Low back pain is the common problem among patients attended Orthopaedic OPD.^[15]

An average of 4.2 drugs was encountered per prescription which is higher than that of the WHO standards. The similar result was found as 4.8 drugs per encounter in a study conducted at orthopaedic inpatients department of a tertiary care hospital by *Sushma Muraraiiah et al., 2014*^[5] Number of medicine and its dosage are individualized and covers spectrums of factors. Therefore, it is point of look at the number of prescriptions to satisfy patient. NSAIDs are the most widely prescribed class of medications worldwide and commonly used over the counter, having a wide range of adverse effects, especially gastrointestinal toxicity and heart burn. To minimize such adverse effects, gastro-protectants like H₂ receptor blockers and proton pump inhibitors (PPI) are co-prescribed and administered along with NSAIDs. In our study, the most commonly and frequently used class of drug is NSAIDS (T. Diclofenac), followed by Gastro-protectants (T. Famotidine) and nutritional supplements. Similarly, a study done by *Abhishek S et al., 2017* on prescribing trends in orthopaedics concluded that NSAIDs were the most routinely prescribed drugs 1113/2288 (49%) and this class is commonly prescribed in orthopaedics as they are widely used in the management of pain and inflammation.^[3]

The most commonly prescribed antibiotics were from the class of cephalosporin (Tab. Cefexime) in our study due to its availability and effectiveness in hospital. The

antibiotics use in this study was observed to be 5.68% which is very lower in comparison with the study done on the antibiotics prescribing pattern in hospital out-patients of Dhaka, Bangladesh by **Seheli Sejuti Bithi *et al.*, 2014.**^[16]

In our study, the percentage of prescriptions with an injection was only 1.09%, which is acceptable according to the recommendations of the WHO. The less use of injectables is preferred which reduces the chances of virus transmission, sepsis, tissue toxicities, local irritation and reduces the cost of therapy.^[2]

Combinational drugs are one of the strategies to reduce the number of drugs prescribed and improve medication compliance. Our study suggests that the use of combinational drugs is 23.72%. The percentage of encounters with combinational drugs was less in prescriptions with single drug compared to prescriptions with multiple drugs. Study by **Syed Ilyas and Shehnaz *et al.*, 2014** has shown that the use of Fixed Dose Combinations was found to be (17.7%) which is lower than our result.^[7]

Prescribing drugs by generic name, promote the rational use of drugs regarding safety, efficacy, and cost by permitting the identification of the products by its scientific names.^[9] In our study, 4290 drugs were prescribed by their Generic name which is [99.48%] out of 4312 total number of drugs whereas, 22 [0.5%] drugs were prescribed by their Brand names.

In our study, the maximum number of drugs was prescribed as oral formulations, which was observed as 91.18%, followed by topical and parental formulations. A study done in Orthopaedic out-patient by **Kishore *et al.*, 2017** showed that prescriptions with oral formulation were 94 %, parental formulation were 4% and topical formulation were 2%.^[10]

According to WHO standards, drugs prescribed from EDL (Essential Drug List) or hospital formulary drug list should be 100%.^[2] while, the percentage of drugs prescribed from EDL in our study was observed to be 92.57% which is a bit lower than the standard. Another study by **Patil *et al.*, 2015** shows the percentage of drugs prescribed from EDL as 52.3% which is very low in comparison to WHO standard. Prescription of drugs from the hospital formulary can reduce the economic burden to the patients.^[2]

CONCLUSION

The drug use at orthopaedic out-patient department at GMERS hospital is in accordance to guideline and WHO Prescribing Indicators. Low risk traditional NSAIDS were commonly prescribed drugs; Diclofenac was frequently prescribed medicine among NSAIDS, Gastro-protective agents also co-prescribed along with the analgesic. Drugs prescribed with generic name were high and satisfactory, which may help in cost minimization,

but an average number of drugs per prescription were high and not meeting the criteria of WHO prescribing indicators. Such prescribing practice will prove to be very valuable in making the drug therapy safer and rational.

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