ORIGINAL ARTICLE

A Prospective Study of Drug Utilization Pattern in Patients from Orthopaedic Department in a Tertiary Care Teaching Hospital

Kajal K Valand[1], Sunil Piruwa[2], Pankaj K Chaudhary[3,*]

[1]Department of Pharmacology, Banas Medical College and Research Institute, Palanpur, Gujarat, INDIA.
[2]Department of TB and Chest, GMC, Azamgarh, Uttar Pradesh, INDIA.
[3]Department of Pharmacology, GMC, Azamgarh, Uttar Pradesh, INDIA.

ABSTRACT

Introduction: Drug utilization research was defined by WHO in 1977 as the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequence. Our objective of this study was to observe drug utilization pattern in patients from Orthopedic department IPD and OPD (Indoor and Outdoor Patients) in a teaching hospital. **Materials and Methods:** This was a prospective and observational study conducted on 100 Patients case file where study in orthopedic department IPD and OPD (Indoor and Outdoor Patients) of Dhiraj Hospital, Smt. Bhikhiben Kanjibhai Shah Medical Institute and Research Centre, Vadodara. **Results:** In our study a total of 100 Patients undergoing treatment with different kinds of drugs and it was observed that 58 numbers of patients (58%) were Male whereas 42 number of patients (42%) were female. 23% were diagnosed with pain in knee. It was noted that Maximum patients affected with co-morbidity were Diabetes Mellitus (53.33%). Total 230 (30.74%) drugs were prescribed with Generic name and 518 (69.25%) drugs were prescribed with Brand name. Ranitidine was most commonly prescribed drug i.e., in 74 patients (20.49%). The total average cost of drug treatment for IPD patients was Rs. 114261.07; Average cost per prescription for IPD patients was Rs. 1565.22. Average cost per prescription for OPD patients was Rs. 28120. 3. Average cost per prescription for OPD patients was Rs. 1041.49. **Conclusion:** Rational use of medicines is important in achieving standard healthcare services. Information on drug use research allows clinician to compare their approach to treat certain diseases. Therefore, current research work was useful to observe the prescribing pattern of drugs used in orthopedic department.

Keywords: Pain, Osteoarthritis, Fixed dose combination, Essential Medicines.

Article Information

Received: 01-05-2023;
Revised : 28-05-2023;
Accepted: 12-06-2023.

Correspondence

Pankaj K Chaudhary
Assistant Professor,
Department of Pharmacology, GMC,
Azamgarh, Uttar Pradesh, INDIA.
Email: chaudharypankaj847@gmail.com

INTRODUCTION

The development for concepts of therapeutic formularies and essential drugs lists is important for studying drug utilization.[1] In establishing a selected list of drugs one need to be guided, not only by epidemiological statistics and scientific considerations but also by current patterns of drug usage that is likely to reflect what the community wants and needs.[1] The development of drug utilization research was initiated in Northern Europe and the United Kingdom in the mid- 1960s.[2]

Drug Utilization Research (DUR) was defined by WHO in 1977 as the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequence.[3] The main goal of DUR is to assess whether drug therapy is rational or not and to achieve this goal, methods for auditing drug therapy towards rationality are necessary. DUR is divided into descriptive and analytical studies. Emphasis of descriptive studies is to describe patterns of drug utilization and to identify problems deserving more detailed studies while analytical studies links data

Access this article online

Website: www.jcramonline.com

DOI: 10.5530/jcram.3.2.6

Quick Response code

on drug utilization to figures on morbidity and outcome of treatment as well as quality of care with the goal of assessing whether drug therapy is rational or not.[4]

DUR is also an important part of pharmacoepidemiology as it describes the extent, nature and determinants of drug exposure. The difference between these two terms has become less sharp, and hence is used interchangeably. They can be used to estimate patients exposed to specified drugs within a given specified time period. Such estimates may refer to all drug users, irrespective of the fact when they started to use the drug (prevalence), or focus on patients who started to use the drug within the selected period (incidence).[4]

In developing countries, financial resources and affordability of the patients is scarce, hence implementation of rational use of medicines and assessment of drug utilization is vital for clinical, economic, and educational purposes.[5] For an individual patient, the rational use of a drug implies with well documented prescription in a rational manner to get correct information at an affordable price. DUR studies conducted in the inpatient settings are effective tools for evaluating prescribing trends, efficiency and cost effectiveness of hospital formularies.

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs), antimicrobial agents, and corticosteroids are prescribed as long-term therapy in department of Orthopedics and hence irrational use of these drugs can increases mortality and morbidity owing to adverse effects. There is variety of drugs that are used in patients attending orthopaedic department which may lead to the problem of irrational prescription. Hence, there is always scope for continuous research to identify more effective and safer drug utilization pattern of different class of drugs for patients attending orthopaedic department. Hence, the present study was designed to evaluate the drug utilization pattern in patient from orthopedic department in tertiary care rural teaching hospital.

AIMS AND OBJECTIVES

Aims

To observe and study drug utilization pattern in patients from orthopedic department IPD and OPD in a rural teaching hospital.

Objectives

1. To study the demographic detail of patients from orthopedic department.
2. To observe and record the diagnosis of condition in patients from orthopedic department.
3. To study the co-morbid condition of the patient of orthopedic department.
4. To study pattern of overall utilization of prescribed drugs in IPD and OPD patients in orthopedic department.
5. To study the pattern of medicine prescribed in patients from orthopedic department IPD and OPD based on essential medicine list.
6. To study the frequency of prescribing fixed dose combination of orthopedic department.
7. To study the practice of prescribing trends of medicine by brand and generic name.

MATERIALS AND METHODS

The Present prospective and observational study was conducted in OPD and IPD of Department of Orthopaedics from Dhiraj Hospital, a rural teaching tertiary care hospital, attached to Smt. B. K. Shah Medical Institute and Research Centre, Vadodara.

Time scale of study

The present study was initiated after the approval from SVIEC through Approval letter no SV1EC/ON/MEDI /BNPGI9/D20072 dated 17th September 2020. The study was done till the sample size of 100 patients was achieved. Source of data Patients case record files of orthopaedic department (indoor and outdoor patient of Dhiraj Hospital). During the study the enrolled patients were followed for occurrence of ADR and later on it was reported to ADRs monitoring center by filling up Suspected ADR reporting form.

Inclusion criteria

The Patients in orthopedic department (IPD and OPD) of both sex and age group were included who were willing to give the written information consent.

Exclusion criteria

Patients who were not willing to sign the inform consent.

Study Procedure

A written Informed Consent Form (ICF) was obtained from all Patients or their Legally Accepted Representatives (LAG) in the language they understand following which Patients were serially enrolled as per inclusion criteria. The patients were assured about the confidentiality of the information. A specially designed data entry format was used to enter all the information pertaining to the patient such as patient's age, gender, occupation, Family history, past history, Diagnosis, associated co-morbidities, suggested diagnostic test from clinician and drug therapy given were recorded in

a Case Record Form (CRF) the information of which were obtained from patient case files.

All details about the drugs usage e.g.: Dose, duration, type of dosage form used, frequency of drug administration and the cost of the drugs prescribed were recorded in CRF. The records pertaining to the daily dosage form were also obtained from the case files. The data was collected during regular visit to OPD and IPD from the Department and then prescriptions were individually screened to assess the prescribing pattern of drugs used in orthopaedics department.

The costs of the drugs used were assessed by analyzing the prescribed drugs with Generic name and Brand name. Literature survey was carried out regarding the different aspects that should be considered while doing a study based on drug utilization of different class of drugs. These include various drug utilization studies, prescribing patterns, identifying the adverse effects, and cost comparison studies. The literature supporting the study was gathered from various journals.

Statistical Analysis

This was a prospective and observational study and after completion of the study, data were collected and analyzed using student's *t* test and chi-square test and checked the significancy of the above test. *p* value ≤ 0.05 was considered significant.

RESULTS

The present research study was prospective observational type. Total 100 number of patients (*n*=100) were recruited based on the methodology and selection criteria. The tools of data collection were patients case files data (*n*=100) from Department of Orthopaedics, IPD (*n*=73) and OPD (*n*=27) (indoor and outdoor patients) of Smt. BK Shah Medical Institute and Research Centre, Dhiraj Hospital, A Rural Teaching Tertiary Care Hospital. Following result was recorded during the study period duration of 12 months i.e., from September 2020 to September 2021.

Our study result revealed that 58 numbers of patients (58%) were Male whereas 42 numbers of patients (42%) were female.

Out of 100 Patients it was seen that 46 number of patients (46%) were in the age group of 41-60, 35 number of patients (35%) were in the Age group of 21- 30 while Patients with age group of 80 and above was 3 (3%) as shown in Table 1. Gender wise Age group distribution of IPD and OPD patients in orthopedic department was analyzed and it was found that chi-square test (χ^2) was 2.011, Degrees of freedom (d.f.) was 3 and *p* value was 0.3258 which indicates that there was no association between age group and gender.

During the study Period on analyzing different types of diagnosis it was observed that out of 100 number of patients, i.e., 23 (23%) were diagnosed with pain in knee, 20 number of patients (20%) with Pain in upper limb, 10 number of patients (10%) with fracture while 5 number of patients (5%) cases were diagnosed as osteoarthritis which was least no of diagnosed cases as depicted in Table 2. Gender wise distribution of Diagnosis of Patients was found (χ^2) was 3.148, d.f. was 4 and p value was 0.2020 which indicates that there was no association between age group and gender.

In our study on analyzing co-morbidities of study population, it was noted 08 patients (53.33%) were affected with Diabetes Mellitus (DM), 05 patients (33.33%) with Hypertension (HTN) while 01 patients (6.66%) had Tuberculosis (TB) and Epilepsy which was least no. of co-morbid conditions as depicted as Table 3. Gender wise distribution of co- morbid conditions of IPD and OPD patients in orthopedic department student's *t*–test value was 0.965 and p value was 0.481 which indicated that there was no association between age group and gender.

In our study out of 100 patients diagnosed with different types of clinical conditions the study reports revealed that overall utilization of single drugs were 356 numbers of drugs (47.59%) which were prescribed for treating pain and other conditions. Amongst 356 number of drugs, Ranitidine was most prescribed drug which appeared to be prescribed in 74 number of drugs (20.49%) encounters, Folic acid in 69 number of

Table 1: Gender wise Age group distribution of patients (*n*=100).

Age group (years)	Patients		Total no. of patients (%)
	Male (%) (*n*=58)	Female (%) (*n*=42)	
1- 20	7(12.06)	2(4.76)	9(09.00)
21-30	23(39.65)	12(28.57)	35(35.00)
41-60	23(39.65)	23(54.76)	46(46.00)
61-80	04(6.89)	03(7.14)	07(07.00)
81 and above	01(1.72)	02(4.76)	03(03.00)
Total	58(100)	42(100)	100(100)
Grand Total (%)	**58**	**42**	**100**

Note: *p* value < 0.05 = Significant, *p* < 0.001 = Highly Significant, *p* < 0.0001 = Very Highly Significant.

Table 2: Gender wise distribution of Diagnosis of Patients (*n*=100).

Sl. No.	Diagnosis	Patients		Total no of patients
		Male (%)	Female (%)	(%)
		(*n*=56)	(*n*=44)	(*n*=100)
1.	Fracture	06 (10.71)	04 (09.09)	10 (10.00)
2.	Pain in knee	15 (26.78)	08 (18.18)	23 (23.00)
3.	Pain in hip	08 (14.28)	08 (18.18)	16 (16.00)
4.	Low back Pain	03 (05.35)	04 (09.09)	07 (07.00)
5.	Osteoarthritis	01 (01.78)	04 (09.09)	05 (05.00)
6.	Pain in upper limb	12 (21.42)	08 (18.18)	20 (20.00)
7.	Pain in lower limb	11 (19.64)	08 (18.18)	19 (19.00)
	Total	56 (100)	44 (100)	100 (100)
	Grand Total (%)	**56**	**44**	**100**

Note: p value < 0.05 = Significant, p < 0.001 = Highly Significant, p < 0.0001 = Very Highly Significant.

Table 3: Gender wise distribution of co- morbid conditions of IPD and OPD patients in orthopedic department (*n*=100).

Co-Morbid Conditions	Patients		Total no. of patients (%) (*n*=15)
	Male (%) (*n*=08)	Female (%) (*n*=07)	
Hypertension (HTN)	03 (37.5)	2 (28.57)	05 (33.33)
Diabetes Mellitus (DM)	04 (50.00)	04 (57.14)	08 (53.33)
Epilepsy	00 (00.00)	01 (14.28)	01 (6.66)
Tuberculosis (TB)	01 (12.5)	00 (00.00)	01 (6.66)
Total (%)	08 (100)	07 (100)	15 (100)
Grand Total (%)	**53.33**	**46.67**	**100**

Note: p value < 0.05 = Significant, p < 0.001 = Highly Significant, p < 0.0001 = Very Highly Significant.

drugs (19.11%) encounters, Paracetamol in 38 number of drugs (10.52%) encounters while many drugs were prescribed in single encounters as depicted in Table 4.

In our study out of 100 patients diagnosed with different types of clinical conditions the study reports revealed that (35.07%) drugs were prescribed for treating pain and other conditions belonged to Essential medicine list. Amongst 263 essential medicine, Ranitidine was most prescribed drug which appeared to be prescribed in 74 encounters, folic acid in 69 encounters, paracetamol in 38 encounters while many drugs were prescribed in single encounters as shown in Table 5.

In our study out of 100 patients diagnosed with different types of clinical conditions the study reports revealed that overall utilization of Fixed Dose Combination drugs (FDCs) were 392 number of drugs (52.40%) which were prescribed for treating pain and other conditions, Amongst 392 number of FDCs drugs Multivitamin was most prescribed drug which appeared to be prescribed in 82 number of drugs (20.81%) encounters, Vitamin C and Zinc in 66 number of drugs (16.75%) encounters, Calcium and Vitamin D3 in 65 number of drugs (16.49%) encounters while many drugs were prescribed in single encounters as shown in Table 6.

During the study period, out of 100 patients prescribed with different types of drugs the study reports revealed that a total 748 number of drugs were prescribed for treating various clinical condition out of which 230 number of prescribed drugs (30.74%) were prescribed with Generic name and 518 number of prescribed drugs (69.25%) drugs were prescribed with Brand name as represented as shown in Table 7. Gender wise distribution of prescribed drugs by Generic Name/ Brand Name was found (χ^2) was 1.758, d.f. was 2 and p value was 0.0210 which was statistically significant and shows an association between generic and brand name with gender.

DISCUSSION

In practice orthopedic infection is primarily treated empirically while the main aim is to treat as specifically as possible. The priority of the clinician is to provide the right medicine to the right people at the right time which can be ensured by adhering to the WHO recommendation on the rational drug policies. Evaluation of drug utilization pattern is an important tool for clinical, economic and educational purposes which can provide feedback and develop alertness about the rational use of medications. Drug utilization studies provide useful insights on current prescribing practices.[6] This study shows the positive impact in identification and resolution of drugs and their adverse effects. This study describes general trends of use of drugs in both IPD and OPD of Orthopedics Department.

Table 4: Gender wise overall utilization of prescribed drugs in IPD and OPD patients in Orthopedic department (*n*=100).

Sl. No.	Class of Drugs	Drugs Used by patients	Gender wise Patients		Total (%)
			Male (%) (*n*= 56)	Female (%) (*n*=44)	
1.	Nonsteroidal Anti – Inflammatory Drugs (NSAIDs)	Paracetamol	18 (08.53)	18 (08.53)	36 (10.11)
2.		Diclofenac	06(02.84)	03(02.00)	09(02.49)
3.		Tramadol	05(02.36)	02(01.33)	07(01.93)
4.		Ibuprofen	00(00.00)	01(00.66)	01(00.27)
5.		Diclofenac gel	00(00.00)	01(00.66)	01(00.27)
6.		Etoricoxib	02(00.94)	00 (0.00)	02(00.55)
7.		Aceclofenac	00(00.00)	01(00.66)	01(00.27)
8.	Anti Peptic Ulcer Drugs	Ranitidine	39 (18.75)	31(20.66)	70 (19.66)
9.		Pantoprazole	09(04.26)	06(04.00)	15(04.15)
10.	Vitamin/Minerals	Folic acid	41(19.43)	28(18.66)	69(19.11)
11.	Anti Diabetic Drug	Metformin	01(00.43)	01(00.66)	02(00.55)
12.		Voglibose	00(00.00)	01(00.66)	01(00.27)
13.		Vildagliptin	00(00.00)	01(00.66)	01(00.27)
14.		Glimepiride	01(00.43)	00(00.00)	01(00.27)
15.	Antibiotics	Cefoperazone sodium	11(05.21)	07(04.66)	18(04.98)
16.		Amikacin	08(03.79)	06(04.00)	14(03.87)
17.		Gentamycin	06(02.84)	04(02.66)	10(02.77)
18.		Azithromycin	01(00.43)	00(00.00)	01(00.27)
19.		Cefixime	02(00.94)	02(01.33)	04(01.10)
20.		Metronidazole	01(00.43)	00(00.00)	01(00.27)
21.		Linezoild	03(01.42)	03(02.00)	06(01.66)
22.		Ciprofloxacin	01(00.43)	00(00.00)	01(00.27)
23.		Doxycycline	01(00.43)	00(00.00)	01(00.27)
24.		Ceftriaxone	01(00.43)	00(00.00)	01(00.27)
25.		Clindamycin	01(00.43)	00(00.00)	01(00.27)
26.	Anti-hypertensive	Clonidine	00(00.00)	01(00.66)	01(00.27)
27.	Anti-epileptic	Levetiracetam	01(00.43)	00(00.00)	01(00.27)
28.		Phenytoin	00(00.00)	01(00.66)	01(00.27)
29.		Clobazam	00(00.00)	01(00.66)	01(00.27)
30.	Anti emetic	Ondansetron	04(01.89)	02(01.33)	06(01.66)
31.	Other	Pheniramine	20(09.47)	12(08.00)	32(08.86)
32.		Atenolol	05(02.36)	02(01.33)	07(04.66)
33.		Mucopolysaccride	00(00.00)	01(00.66)	01(00.27)
34.		Dexamethasone	01(00.43)	00(00.00)	01(00.27)
35.		Enoxaparin	01(00.43)	00(00.00)	01(00.27)
36.		Lactic acid	17(08.05)	12(08.00)	29(08.03)
	Total		**208 (27.80)**	**148 (19.78)**	**356(47.59)**

Table 5: Essential Medicine prescribed in IPD and OPD patient formorthopedic department (n=100).

Prescribed drug included in essential medicine list	Drug utilized by No. of patients	Percentage (%)
Paracetamol	38	5.08
Diclofenac	08	1.06
Ibuprofen	01	0.13
Tramadol	07	0.93
Folic Acid	69	9.22
Ranitidine	74	9.89
Pantoprazole	15	2.00
Metformin	02	0.26
Azithromycin	01	0.13
Cefixime	04	0.53
Doxycyline	01	0.13
Gentamycin	10	1.33
Ciprofloxacin	01	0.13
Amikacin	14	1.87
Ceftriaxone	01	0.13
Clindamycin	01	0.13
Metronidazole	01	0.13
Ondansetron	06	0.80
Phenytoin Sodium	01	0.13
Enoxaparin	01	0.13
Atenolol	07	0.93
Total	**263**	**35.07**

Demographic details of patients

Gender and Age Distribution

In our present study among 100 patients (n=100) studied who were undergoing treatment with different kinds of drugs in orthopedic department, it was observed that Male (58%) were predominant than females (42%). The present study findings were almost similar to the study done by Srividya BP *et al.*[7] and Baghel R *et al.*[8] who reported prevalence of more than female. However, our study results were contradictory to the findings of Shivaleela B *et al.*[7] who reported more cases of female patients in their study where they did their study in postoperative patients in different surgical departments including orthopedic department.[9] The reason may be because of male involvement in outdoor activities and as they are earning members of the family thus, they are more likely to get exposed to trauma. One of the major reasons of male predominance in majority of study could be because of the fact they have can reach out to the hospital more easily compared to female patients where they are dependent on other members especially in rural set up.

Similarly, out of 100 Patients it was observed that 46 (46%) patients were in the Age group of 41-60, 35 patients (35%) in the Age group of 21-30 while Patients with age group of 80 and above was 3 (3%) which was contradictory to the findings of Baghel R *et al.*[8] who reported very less percentage of patients in 41-60 age group. However, our study findings were in accordance with the findings of Ghosh *et al.*[10] who reported around 47 number of patients (47%) patient within the age group of 41-60. A possible reason of middle-aged patients reaching hospital could be because of age related bone changes which make them prone to fractures after trivial trauma. Similarly, prominent chances in age group of 21-30 years may be because these age group people are more proactive and communicating making them vulnerable to meet accidents.

Diagnosis

Our study results revealed that out number of 100 Patients, i.e. (23%) were diagnosed with pain in knee, (20%) patients with Pain in upper limb, (10%) with fracture while (5%) cases were diagnosed as osteoarthritis which was least no of diagnosed cases. These findings were different to the findings of Baghel R *et al.*[8] who reported fracture as the most common diagnosis however osteoarthritis was the least diagnosed cases in both the study. None of the study was found in the literature who reported pain as the most common diagnosis. The most prevalent diagnosis could be pain in knee because it is the most common reason and first signal where the patient approaches the doctor.

Co-morbid conditions

The present study result revealed that 08 number of patients (53.33%) were affected with Diabetes Mellitus (DM) as co-morbidity 05 number of patients (33.33%) patients with Hypertension (HTN) while 1 (6.66%) patient had Tuberculosis (TB) and Epilepsy which was least no. of co-morbid conditions. The present study findings were contradictory to the findings of Srividya BP *et al.*[7] who reported hypertension as the most common co-morbid conditions. Since, the greatest number of patients in our study were middle aged, diabetes Mellitus and hypertension were most common associated co-morbidity because this is the age group where people are more concerned about their

Table 6: Gender wise overall utilization of fixed dose combination drugs in IPD and OPD patients (*n*=100).

Sl. No.	Brand Name	Generic name	Patients		Total no. of patients
			Male (%) (*n*= 56)	Female(%) (*n*=44)	
1.	**MVBC**	Multivitamin (B complex)	49(22.07)	33(19.18)	82(20.81)
2.	**Limcee Z**	Vitamin C and Zinc Chewable	38(17.11)	28(16.27)	66(16.75)
3.	**Calci D**	Calcium + Vitamin D^3	39(17.56)	26(15.11)	65(16.49)
4.	**Zostum**	Sulbactam + Cefoperazone	11(04.95)	7(04.06)	18(04.56)
5.	**Thrize**	Trypsin + Bromelain + Rutoside Trihydrate	21(09.45)	12(06.97)	33(08.37)
6.	**Tonofolic**	Ferrous fumarate + folic acid + zinc silphate	01(00.45)	02(01.16)	03(00.76)
7.	**Calinta kit**	Calcium+Calcitriol+Zinc+Ibandronic Acid	00(00.00)	02(01.16)	02(00.50)
8.	**Dan P**	Diclofenac + Paracetamol	15(06.75)	08(04.65)	23(58.84)
9.	**Rx plus**	Choline + Boron, Chromium + Copper, Iron + Selenium + Silicon + Zinc, Gingko biloba + Green tea powder + Inositol + Lycopene, Molybdenum + Niacinamide + Potassium + Tin + Vanadium + Vitamin B1 + Vitamin C + Vitamin E	00(00.00)	02(01.16)	02(00.50)
10.	**Tendowell**	Mucopolysaccrides collagen type 1 + Vitamin C	00(00.00)	01(00.58)	01(00.25)
11.	**Zerodol SP**	Aceclofenac, Serratiopeptidase + Paracetamol	00(00.00)	03(01.74)	03(07.7)
12.	**Tendocare forte**	L arginine collagen + peptidetype 1 sodium + hyaluronate chondroitin solfate + Vitamin C	00(00.00)	01(00.58)	01(00.25)
13.	**GMT-SR**	Glimepiride + Metformin	00(00.00)	02(01.16)	02(00.50)
14.	**Zerodol MR**	Aceclofenac+ Thiocolchicoside	00(00.00)	01(00.58)	01(00.25)
15.	**Aclofen MR**	Aceclofenac+ Paracetamol+Chlorzoxazone	00(00.00)	01(00.58)	01(00.25)
16.	**Akilos-P**	Aceclofenac+ Paracetamol	01(00.45)	01(00.58)	02(00.50)
17.	**Ramcet D**	Domperidone **+** Paracetamol+ Tramadol	00(00.00)	01(00.58)	01(00.25)
18.	**Robinaxol**	Methocarbamol + Paracetamol	00(00.00)	01(00.58)	01(00.25)
19.	**Pan-D**	Domeperidone + Pantoprazole	01(00.45)	00(00.00)	01(00.25)
20.	**Rablet IT**	Rabeprazole+ Itopride	00(00.00)	01(00.58)	01(00.25)
21.	**Calinta kit**	Calcium + Calcitriol zinc + ibandronic acid	00(00.00)	02(01.16)	02(00.50)
22.	**Caldison CT**	Calcitriol + calcium carbonate +zinc	00(00.00)	01(00.58)	01(00.25)
23.	**Dexone**	Dexamethansone sodium + Phosphate	01(00.45)	01(00.58)	02(00.50)
24.	**Supradyn**	Multivitamin with minerals and trace elements	01(00.45)	01(00.58)	02(00.50)
25.	**Vitatek**	Antioxidants with Multivitamin + Multimineral	06(02.70)	02(01.16)	08(20.46)
26.	**Glimestar-M**	Glimepiride + Metformin	00(00.00)	02(01.16)	02(00.50)

27.	**Human mixtard**	Biphasic isophane + insulin	01(00.45)	00(00.00)	01(00.25)
28.	**Zostum**	Salbactum + Cefoprerazone	11(04.95)	07(04.06)	18(46.05)
29.	**Amoxiclav**	Amoxicillin + Clavulanic Acid	03(01.35)	01(00.58)	04(01.01)
30.	**Vokflex**	Rosehip Extract undenaturedcollagen peptide Type 2; Vitamin C and Sodium Hyaluronate	01(00.45)	00(00.00)	01(00.25)
31.	**Telma H**	Telmisartan + hydrochlorothiazide	01(00.45)	01(00.58)	02(00.50)
32.	**Dan P**	Diclofenac + Paracetamol	00(00.00)	01(00.58)	01(00.25)
33.	**Rbson D**	Domeperidone + Rabeprazole	01(00.45)	00(00.00)	01(00.25)
34.	**HRZE**	Isoniazid (H)+ Rifampin (R)+ Pyrazinamides + Ethambutol	01(00.45)	00(00.00)	01(00.25)
35.	**Amtas-M**	Amlodipine+ Metoprolol	00(00.00)	01(00.58)	01(00.25)
36.	**Calvis**	Calcitriol + calcium citrate +magnesium hydroxide + zinc sulphate	03(01.35)	01(00.58)	04(01.01)
37.	**Tonofolic Z**	Ferrous furnarate + folic acid + Vitamin B12	01(00.45)	02(01.16)	03(00.76)
38.	**Ultracet**	Tramadol + Acetaminophen	02(00.90)	04(02.32)	06(15.35)
39.	**Naxi – P**	Lornoxicam + Paracetamol	00(00.00)	01(00.58)	01(00.25)
40.	**HCQs**	Hydroxychloroquine sulphate	00(00.00)	02(01.16)	02(00.50)
41.	**Ultracet semi**	Paracetamol/Acetaminophen + Tramadol	01(00.45)	02(01.16)	03(00.76)
42.	**Omoshi DSR**	Omeporazole + Domeperidone	04(01.80)	03(01.74)	07(01.77)
43.	**Coxi – TH**	Etoricoxib + Thiocolchicoside	01(00.45)	00(00.00)	01(00.25)
44.	**Zelcal K 27**	Calcitriol + calcium carbonate + Vitamin + folic acid	02(00.90)	02(01.16)	04(01.01)
45.	**Zifi cv**	Cefixime + Clavulanate potassium	00(00.00)	01(00.58)	01(00.25)
46.	**GLYCIPHAGE SR**	Metformin + Hydrochloride	01(00.45)	00(00.00)	01(00.25)
47.	**Fix joint max**	Native collagen + sodium hyaluronate +curcuma longa extract + Boswellia Serrata	01(00.45)	00(00.00)	01(00.25)
48.	**Pioglitozone**	Pioglitozone Hydrochloride	01(00.45)	00(00.00)	01(00.25)
49.	**Nervigen P**	Benfotiamine + folic acid + Methylcobalamin + Pregabalin +Vitamin B6	01(00.45)	00(00.00)	01(00.25)
50.	**Rock bone kit**	Ibandronic acid + calcium + Vitamin D3	01(00.45)	01(00.58)	02(00.50)
Total (%)	**220(29.41)**	**172(22.99)**	**382 (52.40)**		

family and professional life taking more stress and have unscheduled diet giving rise to these diseases.

Drugs Prescribed by Generic/Brand Name

Our study result showed that out of 100 patients prescribed with different types of drugs it was found total of 748 drugs were prescribed for treating various clinical conditions. Prescribing trends by generic name according to the WHO standard should be 100%, but in our study only 230 (30.74%) drugs were prescribed with Generic name and 518 (69.25%) drugs were prescribed with Brand name which was in accordance with the findings of Baghel R *et al.*[8] This revealed more physicians prescribed drugs by brand name rather than by generic name, which needs to be discouraged because it will have an impact on economic burden of the patients leading to poor patient compliance. Factors responsible for this trend could be because of drug promotional activities, pressures of pharmaceutical men, lack of continuing education on the principles of

Table 7: Gender wise distribution of prescribed drugs by Generic Name/Brand Name.

	No. of Patients (*n*=100)		
Drug Nomenclature	**No. of prescribed drugs (%)**	**No. of prescribed drugs in male (%) (n=56)**	**No. of prescribed drugs in female (%) (n= 44)**
Generic name	230 (30.74)	130 (30.23)	100 (84.24)
Brand name	518 (69.25)	300 (69.76)	218 (15.75)
Total (%)	**748 (100)**	**430 (100)**	**318 (100)**

Note: p value < 0.05 = Significant, p < 0.001 = Highly Significant, p < 0.0001 = Very Highly Significant.

rational prescribing, and non-familiarity with generic names among the physicians. However, these findings were contradictory to the study done by Srividya BP *et al.*[7] who showed greater tendency of prescribing pattern with generic name.

Drug utilization Pattern

The present study results revealed that overall utilization of single drugs was 356 number of drugs (47.59%) which were prescribed for treating pain and other conditions. Amongst 356 number of drugs, most prescribed drug was Ranitidine which appeared to be prescribed in 74 (20.49%) encounters, Folic acid in 69 (19.11%) encounters, Paracetamol in 38 (10.52%) encounters while many drugs were prescribed in single encounters. Not much of the studies were found in literature describing the prescribing trend of overall drugs. However, many studies were done on prescribing trends of analgesic where they revealed that Tramadol as the most commonly prescribed analgesics which was contradictory to the study done by Srividya BP *et al.*[7] Other medications apart from NSAIDs were calcium salts, Vitamin supplements, Hypoglycemic, Benzodiazepines, and Antihypertensives. Calcium salt and Vitamin supplements are used for nutritional supplements for better health.

Percentage of encounters with antibiotics in our study was 7.75%. This was acceptable according to the WHO guidelines. This is encouraging as this can help in reducing drug resistance in the community. WHO recommends target for injection exposure 10% or less.[11] In our study percentage of encounter with injection (25.93%) was high when compared with study conducted by Afsan *et al.*[12] where only 3.33% injectables were prescribed. Injectables should be minimally advised because of the risk of infection and cost of the health care. Majority of NSAIDS were prescribed as combination drugs. Hence, the percentage of drug prescribed as FDC in our study was 52.80% which was less in comparison to the study done by Srividya BP *et al.*[7] On comparison of percentage of drugs prescribed from essential drug list, it was found to be less in our study (35.07%) when compared with study conducted by Muraraiah *et al.*[13] Our study results revealed average drug per prescription 7.48 which was less in comparison to the study done by Srividya BP *et al.*[7]

CONCLUSION

Rational use of medicines plays is important for achieving standard healthcare services. Many drug utilization studies have been conducted across the country. However, with few exceptions a majority study revealed irrational use of medicines and therefore suggests promoting rational use of medicines at healthcare delivery system. Factors relating to misuse or overuse of medicines can be because of involvement of various parties in the distribution of medicines like health care providers, pharmacists and patients. The major reason for medicine misuse can be observed because of poor script regulations, non-qualified practitioner, unregulated dispensing of medicines, non-availability of health care services mainly in rural area and weak drug policies. Hence, DUR play's important role in helping the health-care providers to understand, interpret and improve the prescribing trends and use of medications. There is need for comprehensive review of a patient's regarding medication and health history before, during, and after dispensing medicine in order to achieve appropriate therapeutic decision making and positive patient outcomes.

DUR helps us to estimate that to what extent drugs are used rationally. DUR also helps clinicians to compare their approach to treat certain diseases with their peers. The benchmarking generated by these comparative studies is useful in stimulating clinician to change their prescribing habits in an effort to improve care system. This research work was useful to observe the prescription pattern of drugs used in orthopedic department. The findings of the current study can be generalized by performing similar studies elsewhere in other parts of the country so that it can help in meticulous planning in order to reduce the expenditures in health care without affecting efficacy. There is also a need that clinicians must be motivated towards increased use of generics. Similar studies with large sample size can guide more clinician toward rational drug prescribing in other parts of the world fulfilling an aim of drug utilization studies.

ACKNOWLEDGEMENT

The author would like to thank the entire faculty and especially all the patients who have shown their keen interest and active participation.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

REFERENCES

1. Dukes MNG. Drug utilization studies: methods and uses. World Health Organization regional office for Europe Copenhagen, Denmark. World Health Organ Reg Publ Eur. 1993;45.
2. Wade O. Drug utilization studies – the first attempts. Plenary lecture. Acta Med Scand Drug utilization studies: implications for medical care. 1984;683:7-9.
3. World Health Organ Tech Rep S No. (The selection of essential drugs: report of a WHO Expert Committee). 1977;615.
4. Consumption of drugs. Report on a symposium in Oslo, Copenhagen. WHO Regional Office for Europe; 1970 (EURO 3102): 1969.
5. Duarte-Ramos F, Cabrita J. Using a pharmaco-epidemiological approach to estimate diabetes type 2 prevalence in Portugal. Pharmacoepidemiol Drug Saf. 2006;15(4):269-74. doi: 10.1002/pds.1186, PMID 16294365.
6. Rejimon G, Reghu R. Drug utilization pattern of non-steroidal anti-inflammatory drugs in patients attending orthopaedic department of A hospital in Kerala. J Pharm Sci Res. 2018;10(5):1014-6.
7. Bp S, Ns S, G A. Retrospective audit of prescription of drugs among inpatients of orthopedic wards at Medical College Teaching Hospital, Mandya. Natl J Physiol Pharm Pharmacol. 2016;6(4):282-5. doi: 10.5455/njppp.2016.6.20022016128.
8. Baghel R, Adwal SK, Singh V, Chourishi A. Prescribing pattern and drug utilization study in inpatients of department of orthopaedics in a rural teaching hospital of Ujjain, Madhya Pradesh, India. Int J Basic Clin Pharmacol. 2018;7(9):1763-9. doi: 10.18203/2319-2003.ijbcp20183486.
9. Barawade S, Gursale S. A study of drug utilization pattern of analgesics in postoperative patients of tertiary care hospital. MedPulse International Journal of Pharmacology. 2017;1(2):28-32.
10. Ghosh AK, Dalai CK, Kumar A, Ray M. Drug utilization study on antibiotics use in an orthopaedics department of a tertiary care hospital in West Bengal. J Drug Deliv Ther. 2013;3(2):98-103. doi: 10.22270/jddt.v3i2.421.
11. World Health Organization. International Network for Rational Use of Drugs and World Health Organization. How to investigate drug use in health facilities: selected drug use indicators. EDM Research Series No. 7. 1993;192
12. Afsan M, Haque ME, Alam MM, Noor N. Audit of prescribing practices to evaluate rational use of medicines in the OPD of orthopaedics in a private medical college hospital. J Shaheed Suhrawardy Med Coll. 2012;4(2):39-42. doi: 10.3329/jssmc.v4i2.14399.
13. Muraraiah S, Rajarathna K, Vishwanath M, Ramaswamy A, Kamath S, Seshu S, *et al.* Evaluation of WHO prescribing indicators among orthopaedic inpatients at a tertiary care hospital. J Chem Pharm Res. 2014;6(8):278-80.

Cite this Article : Valand KK, Piruwa S, Chaudhary PK. A Prospective Study of Drug Utilization Pattern in Patients from Orthopaedic Department in A Tertiary Care Teaching Hospital. J. Clin. Res. Applied Med. 2023;3(2):21-30.