

## Prescribing patterns in the Orthopedics outpatient department in GMC Hospital, Ajman, United Arab Emirates

Syed Ilyas Shehnaz<sup>1\*</sup>, Mohamed Arifulla<sup>1</sup>, Jayadevan Sreedharan<sup>2</sup>, Kishore Gnana Sam<sup>3</sup>

<sup>1</sup>Department of Pharmacology, <sup>2</sup>Statistical Support Facility, CABRI, <sup>3</sup>College of Pharmacy, Gulf Medical University, Ajman, UAE

\*Presenting Author

### ABSTRACT

**Objective:** Information on the utilization patterns of drugs in the Orthopedics outpatient department (OPD) were lacking in Gulf Medical College Hospital (GMCH). Hence, we aimed to investigate the prescribing patterns in the Orthopedics outpatient department (OPD) of GMCH.

**Materials and Methods:** The study was a hospital based observational (record based) study carried out over one year period. The prescriptions of all new patients visiting the Orthopedic OPD of GMCH hospital were critically analyzed using a predetermined criterion.

**Results:** Prescriptions of 623 patients were randomly selected for analysis. The majority patients were South –East Asians or Arab males, aged between 26-35 years and had insurance coverage. The median number of drugs per prescription was 3 (range 5). Low backache was the most common reason for attending the OPD. Non-steroidal anti-inflammatory drugs (NSAIDs) and muscle relaxants were the most commonly prescribed drug group. Fixed dose combinations accounted for around 17% of the prescriptions. All the drugs were prescribed by their brand names. Absence of department name on the prescriptions were also observed.

**Conclusion:** The prescribing pattern in the orthopedic outpatient department in GMC Hospital was generally rational. The most commonly prescribed drugs included were Nonsteroidal anti-inflammatory drugs and fixed dose combinations were observed in many of the prescription.

**Keywords:** Drug use patterns, Drug utilization studies, orthopedics, NSAIDs

## INTRODUCTION

The World Health Organization has defined drug utilization research as “the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences”<sup>1</sup>. Drug utilization research impacts clinical practice by rendering feedback to the medical practitioners and the study of prescribing patterns endeavors to appraise and guide the medical practitioners so as to make health delivery systems more cost effective and rational.

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.”<sup>2</sup> All over the world, irrational drug use is a major issue <sup>3</sup> and is expressed in many ways: polypharmacy, irrational prescribing of antibiotics and injectable preparations, non- adherence to clinical guidelines, etc.<sup>2</sup> In fact according to the WHO, inappropriate prescriptions are prescribed, sold or dispensed for more than 50% patients<sup>2</sup>.

The prescribing pattern in different tertiary hospitals around the world has been studied<sup>4-12</sup>. We were able to identify one study in UAE by Abdul Rasool et al which had analyzed the prescribing pattern according to certain indicators in four private hospitals of UAE <sup>13</sup>. We were unable to find studies analyzing specialty wise prescribing pattern. Moreover, studies on the utilization of drugs in our hospital are lacking. These studies will establish baseline data and provide substance for further research. The results from our study will help us in determining which aspects need to be addressed for a more rational use of drugs in our hospital.

The objectives of this study were:

1. To investigate the prescribing patterns in the Orthopedics outpatient department (OPD) of GMC Hospital and Research Center, Ajman, UAE (GMCH).
2. To analyze the prescribing patterns of NSAIDs.
3. To determine the prevalence of problem prescriptions

## MATERIALS AND METHODS

The study was a hospital based observational (record based) retrospective study. All new patients visiting the OPD of Orthopedic department, GMCH in the preceding year were included in the study. Post –operative follow-up cases and follow up visits for patients with symptoms for which they had previously consulted the physicians during the study period were excluded.

The total number of patients visiting the OPD of Orthopedic department GMCH in the one year time-period was 12540. Around 5% of this was considered to be the sample size which was approximated to 600 patients.

A systematic random sampling technique was used to select the patients’ hospital number. A number within the sampling interval (twenty in our study) was chosen using random number table. Then a random number between 1 and 20 (eleven in our

study) was picked. Subsequently every 20th patient following the eleventh number was selected from the outpatient register maintained in the medical records department (MRD). If the selected patient was found to be on a follow up visit, and then the next patient from the outpatient register was included in the study.

The patients' hospital number was used to extract their online prescriptions. If the prescription was not found online, then the patients file was used to extract the data. If the above methods failed, then the next patient on the list was selected.

The data collection was both by the investigators and research assistants. Data collectors were pre-trained by the principle investigator in an effort to ensure uniformity in data collection.

### **Study instrument & validation procedure**

A questionnaire was formatted involving all the objectives. The questionnaire was divided into the following parts assessing:

1. Demographic profile of the patients.
2. Diagnosis (the commonly occurring classes of orthopedic conditions according to the International Classification of Diseases :ICD 10<sup>14</sup>)
3. Details of prescribed drugs: name, dosage, frequency and duration. (Prescribed drugs were classified according to the International Anatomic-Therapeutic-Chemical Classification system :ATC<sup>15</sup>)
4. Duration of prescription in days
5. Drugs prescribed by Generic name or by Brand name
6. Details of Fixed Drug Combinations

Two subject experts examined the survey instrument for face validity. Pilot testing on data collectors ensured the readability of the instrument. Permission of the orthopedic department was taken to analyze the prescriptions and the study was approved by the Institutional Ethics Committee.

### **Statistical analysis**

The data was entered into the questionnaire manually and subsequently analyzed. Data management and analysis was done on SPSS 21 version. Descriptive analysis was conducted by calculating means and proportions. Chi square test was used to analyze association between use of NSAID and different variables.

Analysis of prescription was based on the prescribing indicators (number of drugs per prescription, number of drugs prescribed by generic name, prescriptions with antibiotic, prescriptions with injections, prescriptions with Fixed Drug Combinations); the prescribing patterns of NSAIDs (the type of NSAIDs, duration and route of administration); presence of problem prescription which included the absence of any one of the following parameters: OPD number, date, demographical profile of patient (name, age, gender), department, diagnosis, drug details (name, dosage, frequency of administration, duration of prescribing and route of administration) and name and signature of the prescribing doctor and polypharmacy (presence of six or more concurrent medications). Rational prescribing was confirmed

by analyzing the selection of drugs, the dose, the frequency of administration, the duration and the route of administration.

**RESULTS**

A total of six hundred and twenty three patients/prescriptions were randomly selected. All the patients selected were on their first visit to the hospital. Of all the prescriptions analyzed, the average age of the patients was 34.4 (SD =12.946) ranging from 1 to 84 years. Around 73% were males and 27% were females; their mean age being 34.9 (SD = 12.5) years and 33.2 (SD = 14.1) years respectively. The distribution of age of the patients is depicted in Figure 1. Majority of the patients had insurance coverage (69%) and belonged to multi-ethnic groups: Asians of Indian subcontinent (51.7%), Arabs (39.1%), African (5%) and others (4.2%).

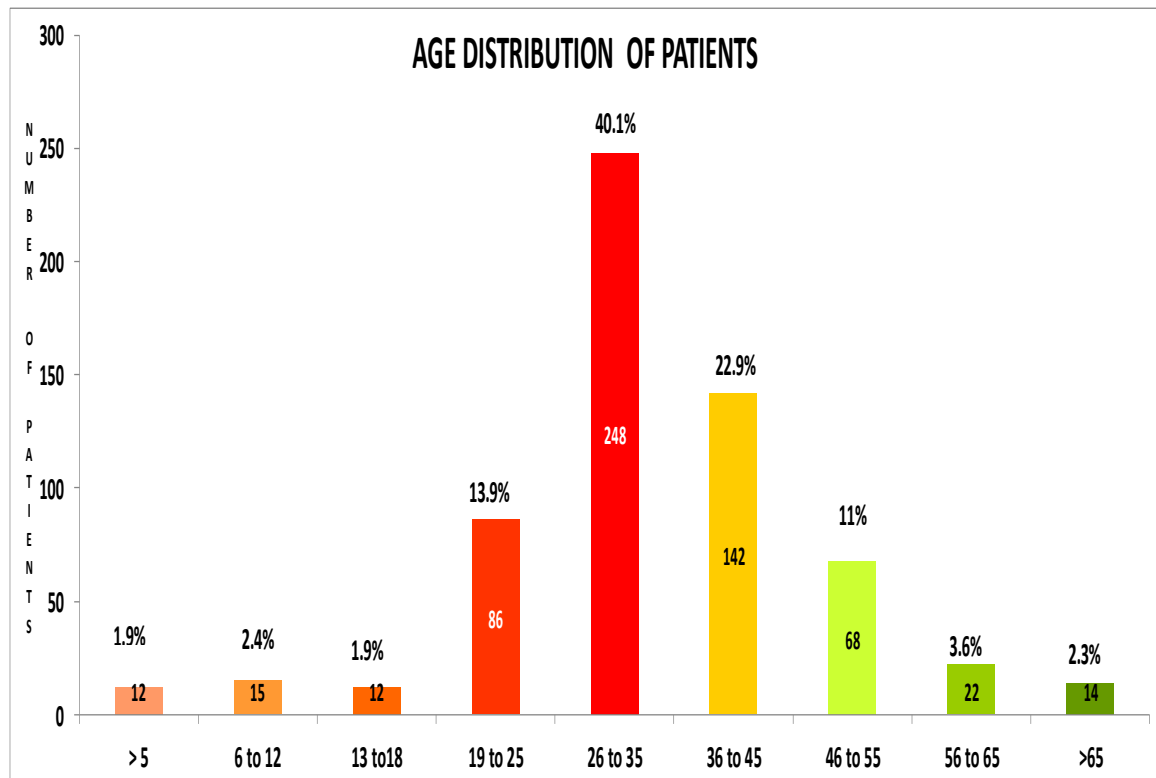


Figure 1: Age Distribution of Patients

The most common reason for attending the Orthopedics OPD was low back ache [patients (173 patients; 27.9%)]. The different diagnoses for patients attending the Orthopedic OPD are given in Table 1.

Table 1. Diagnosis (N=623)

NAME OF DISORDER(ICD -10 CODE)	FREQUENCY	PERCENTAGE
<b>Disorders of spine and thorax(N=224)</b>		
Dorsalgia (M54)	173	27.9
Dorsopathies (M40-M54)(including Spondilopathies /Spondylosis ;M45-M49;scoliosis M41)	51	8.3
<b>Other Disorders and Injuries of spine and thorax (N=2)</b>		
Costochondritis (M94)	1	0.2
Dislocation, sprain and strain of joints and ligaments at neck level S13	1	0.2
<b>Injuries to the shoulder and upper arm(N=49 )</b>		
Superficial injury of wrist and hand (S 60)	18	2.9
Dislocation, sprain and strain of joints and ligaments at wrist and hand level (S63)	8	1.3
Dislocation, sprain and strain of joints and ligaments of shoulder girdle (S43)	19	3.1
Shoulder lesions (Rotator cuff syndrome; M75)	4	0.6
Fractures of the shoulder and upper arm (N=10)		
Fracture at wrist and hand level (S62)	5	0.8
Fracture of forearm (S52)	3	0.5
Fracture of lower end of humerus (S42)	1	0.2
Fracture of clavicle S42	1	0.2
<b>Other disorders of Upper limb(N=9)</b>		
Ganglion (M67)	6	1
Mononeuropathies of upper limb (carpal tunnel syndrome G56; Ulnar palsy (G56)	2	0.3
Palmar fascial fibromatosis (Dupuytren contracture; M72)	1	0.2
<b>Disorders of Lower limb(N=64)</b>		
Arthrosis(M15-M19)	49	7.9
Other soft tissue disorders Plantar fascial fibromatosis M72;synovial cyst M71)	15	2.4
<b>Other Disorders of Lower limb(N=3)</b>		
Osteomyelitis (M86)	2	0.3

Acquired deformities of fingers and toes (Hallux valgus) (M 20)	1	0.2
<b>Injuries to the lower limb(N=111)</b>		
Dislocation, sprain and strain of joints and ligaments of knee(S 83)	73	11.8
Dislocation, sprain and strain of joints and ligaments at ankle and foot level (S 93)	30	4.8
Superficial injury of ankle and foot (S 90)	7	1.1
Superficial injury of lower leg (S 80)	1	0.2
Fractures of the lower limb(N=56)		
Fractures (S00-T19)	46	7.4
Fracture of lower leg, including ankle (S 82)	5	0.8
Fracture of foot, except ankle (S 92)	5	0.8
<b>Generalized disorders(N=48)</b>		
Other soft tissue disorders (M70-M79)(Myalgia ;M79)	48	7.7
<b>Other Generalized disorders(N=44)</b>		
Inflammatory polyarthropathies (M05-M14) (Polyarthritis (M13)	20	3.2
Disorders of synovium and tendon (M65-M68)	14	2.3
Disorders of bone density and structure (M80-M85)(osteomalacia; osteoporosis)	4	0.6
Infectious arthropathies (pyogenic arthritis; M00-M03)	3	0.5
Vitamin D deficiency E55	2	0.3
Paraesthesia R20	1	0.2
<b>Missing</b>	3	
<b>Total</b>	623	100

Around 45 (7.2%) patients had co-morbidities of which diabetes (15.6%), hypertension (13.3%) osteopenia (11.1%), osteoporosis (6.7%) and bronchial asthma (6.7%) were most commonly reported

A total of 1949 drugs were prescribed to the 623 patients, which included around 60 generic drugs of 109 different brands. The groups of drugs which were most commonly prescribed are detailed in Table 2. NSAIDs were the most commonly

prescribed group (48%), followed by muscle relaxants (13.6%), anti-ulcer drugs (12%) and multivitamin and mineral preparations (7%). A total of 75 antibiotics (3.8%; including FDC) were prescribed. All were given orally except one through parenteral route and four were topical preparations. Fixed dose combinations were prescribed in 17.7% prescriptions, which mostly included muscle relaxants and antibiotics. Around 15 drugs were prescribed as injections (0.8%) of which 7 were NSAIDs, five were miscellaneous drugs, two were corticosteroids and one was an antibiotic.

Table 2. Prescribing Frequencies of Drugs

<b>DRUG GROUPS AND DRUGS</b>		<b>FREQUENCY</b>
Analgesics (n=937)	Systemic NSAIDs (M01A)	
	(n= 648)	
	Diclofenac Sodium/Potassium	276
	Celecoxib	188
	Etoricoxib	121
	Ketoprofen	23
	Ibuprofen	9
	Piroxicam	4
	Meloxicam	4
	Lomoxicam	23
	Topical NSAIDs(M02AA) (n=289)	
	Diclofenac sodium/potassium	168
	Ketoprofen	119
	Piroxicam	2
Muscle relaxants(M03B)	Eperisone	154
(n=265)	Orphenadrine citrate +Paracetamol	111
Antiulcer drugs(A02B)(n=233)	Nizatidine	152
	Omeprazole	33
	Lansoprazole	32
	Ranitidine	11
	Pantoprazole	4
	Na Alginate+ Sodium bicarbonate +Calcium carbonate	1
Vitamins/ nutritional supplements(n=136)	Vitamins/ nutritional supplements (A11/ B03)	12

		Vitamins/ nutritional supplements FDC (A11A/A11C/B03AD/ B03BA51/ B03BA53)	124
Analgesics and antipyretics (N02BE01)		Paracetamol	124
Drugs neuropathy(n=84)	for	Pregabalin	83
		Gabapentin + Methylcobalamine	1
Antibiotics (n=75)		Systemic Antibiotics (J01)(n=71)	
		Ciprofloxacin	16
		Cefuroxime	4
		Cefpodoxime	8
		Cefdinir	1
		Ceftizoxime Sodium	1
		Metronidazole	1
		Amoxicillin+ Clavulanic acid	39
		Ampicillin + Cloxacillin	1
		Topical Antibiotics(D06A)(n=4)	
		Neomycin + Bacitracin	3
		Gentamycin Sulfate	1
Anti-gout (M04A)		Allopurinol	10
Anti-allergic (R06A)(n=8)	Drugs	Betahistine	2
		Loratadine	1
		Diphenhydramine combination	3
		Chlorpheniramine+ Pseudoephedrine + Paracetamol	2
Corticosteroids (H02AB) (n=4)		Oral	2
		Parenteral	2
Topical antiseptic (D08AG)		Povidone-iodine	3
Topical anti-inflammatory		Aescin + Diethylamine salicylate	59
Miscellaneous drugs(wound healing supplement)			11

With regard to the use of NSAIDs, there were 481 patients who were prescribed NSAIDs. The majority of prescriptions contained one NSAIDs (65.5%) while some patients were also prescribed two drugs (34.3%) and one was prescribed three NSAIDs. There was no significant difference between males and females with regard to the use of NSAIDs. A significant association between NSAID use and occurrence of diseases was observed ( $p < 0.001$ ).



The median number of drugs per prescription was 3 (range 5). The details of the number of drugs per prescription are presented in Table 3. Five prescriptions had more than six drugs prescribed.

Table 3: Incidence of Polypharmacy

NUMBER OF DRUGS PER PRESCRIPTION	NUMBER OF PRESCRIPTIONS	PERCENTAGE
1.0	68	10.9
2.0	107	17.2
3.0	172	27.6
4.0	213	34.2
5.0	58	9.3
6.0	5	0.8
Total	623	100.0

The median duration for prescription was 10 days (Range 89).The duration of drug prescription is depicted in Figure 2.

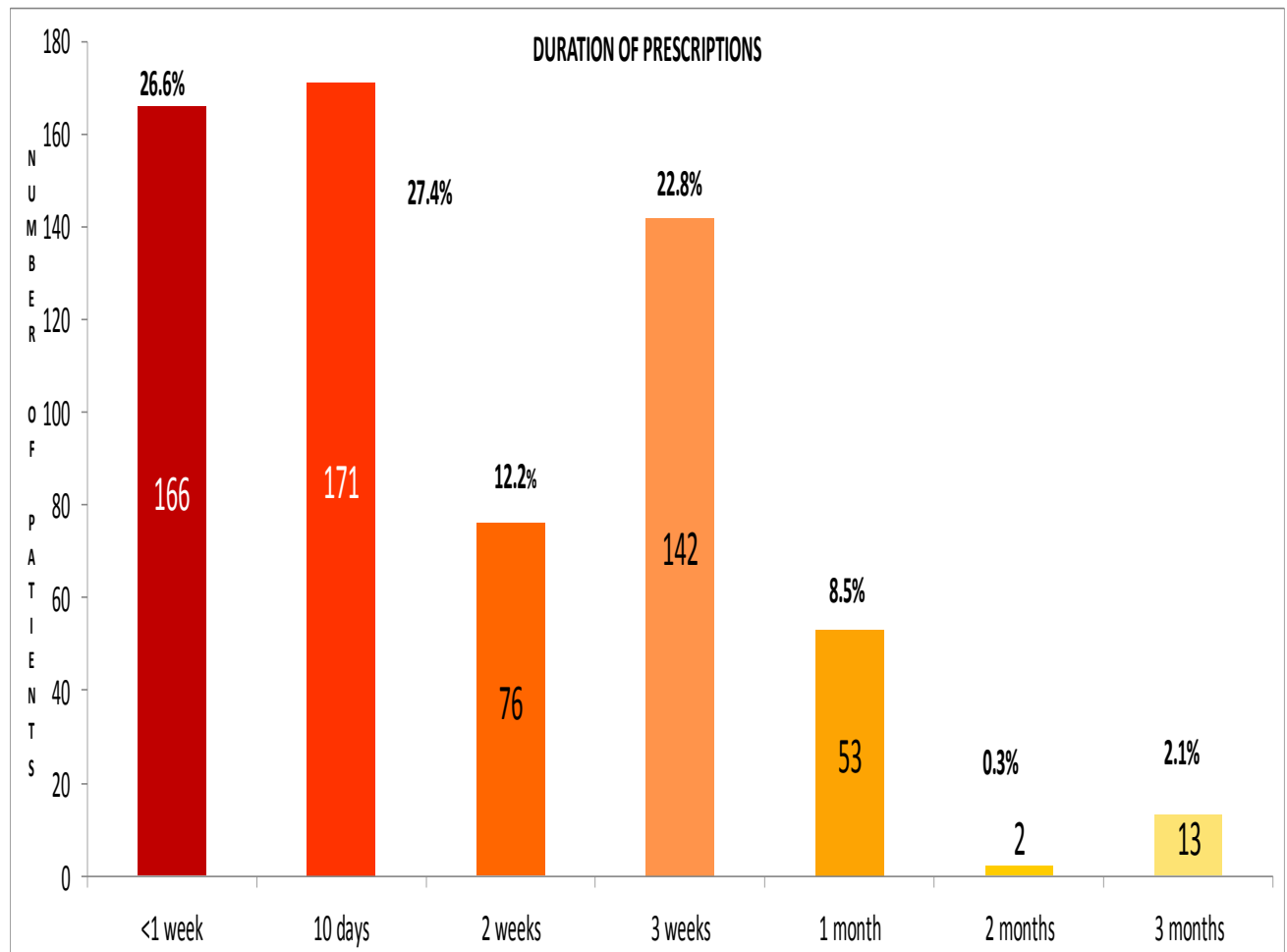


Figure 2: Duration of Prescription

None of the prescriptions had the department name/diagnosis mentioned in them and none of the drugs were prescribed as generic names. The rest of the parameters for identifying problem prescriptions were present in all prescriptions. Subsequent to the analysis of the drugs selected, their posology, the duration and the route of administration, it was observed that almost all the prescriptions were rational.

## DISCUSSION

Our study endeavors to analysis the prescribing patterns in the Orthopedics department of GMCH and supplies baseline information about the prescribing practices with an aim to enhance rational prescribing.

The average number of drugs in a prescription is a vital guiding factor for auditing the prescribing practices of physicians and identifying the areas for educational interventions. The median number of drugs in our study was 3(range 5).Other studies have reported lower mean/median number of drugs:  $2.15 \pm 1.71^3$ ;  $1.9 \pm 0.8^4$ ;  $1.33$  (range 1-3)<sup>5</sup> per prescription. The median duration for prescription (10 days) was almost similar to that reported in other studies<sup>3,4</sup>. A study analyzing the prescribing patterns of NSAIDs reported the duration of prescription to be most commonly 5-7 days<sup>5</sup>.

Analogous to our study, Shankar et al <sup>4</sup> had also reported low back pain as the most common diagnosis encountered in the Orthopedics OPD. Moreover, similar to the spondylosis, fractures and sprains reported by them as other common disorders, our patients were also diagnosed with dislocation, sprain and strain of joints and ligaments of knee, dorsopathies, arthrosis and myalgia.

The most common drugs prescribed in Orthopedics and trauma practice are NSAIDs<sup>4,16</sup> and our study also revealed the same outcomes. Analogous to Shankar et al<sup>4</sup>, who reported multivitamin/mineral preparations and anti-ulcer drugs as other commonly prescribed drugs, we observed that in addition to these drugs, muscle relaxants were also commonly prescribed. The observation that low back pain was the most commonly derived diagnosis probably corroborates the prescribing of muscle relaxants for relief of symptoms. The high frequency of co-prescription of anti-ulcers drug indicates rational prescribing to reduce the gastric adverse effects of NSAIDs probably <sup>15</sup>. Among the NSAIDs, the most commonly prescribed drugs were Diclofenac Sodium/Potassium and Celecoxib. In two studies conducted in Nepal, not just Diclofenac, but Meloxicam<sup>4</sup>, Ibuprofen and Piroxicam<sup>5</sup> were also commonly prescribed.

The use of Fixed Dose Combinations (17.7%) was found to be much higher than that reported in other studies ( $13.1\%^4$ ;  $6.74\%^3$ ) but lower than that reported by Das et al ( $36.25\%^5$ ). Moreover, the use of injectable preparations (0.8%) was found to be much lower than that reported elsewhere ( $8.6\%^4$ ;  $17.4\%^5$ ).

Most of the drug utilization studies have reported that majority of the drugs were prescribed by brand names ( $80.7\%^4$ ;  $67.4\%^3$ ).As also seen in our study, Das et al have also reported that none of the drugs were prescribed by generic names<sup>5</sup>. Generic drugs are usually much cheaper than brands and generic prescribing reduces prescription errors.

It is commendable that all the prescriptions were complete except for the name of the department being specified. Other studies have reported varying presence of problem prescriptions. The study by Shankar et al had reported absence of strength, dose, frequency and duration of administration of the drugs prescribed in approximately 36% of prescriptions<sup>3</sup>. Another study had reported the presence of 27.4% problem prescriptions with the diagnosis (11.3%) and duration of prescription absent (5.4%)<sup>4</sup>. A complete prescription obviously helps to reduce dispensing errors and enhances patient compliance.

The retrospective design of the study and the random selection of patients who may not be representative of the patient population are some of the limitations of our study.

## CONCLUSION

The prescribing pattern in the orthopedic outpatient department in GMC Hospital was generally rational. The most commonly prescribed drugs included were Non-steroidal anti-inflammatory drugs and a high frequency of fixed dose combinations were observed in many of the prescriptions.

## REFERENCES

1. World Health Organization. Introduction to drug utilization research. Oslo: World Health Organization, 2003.
2. World Health Organization. The Rational Use of Drugs. Report of the Conference of Experts. Geneva. World Health Organization; 1985.
3. Shankar PR, Partha P, Nagesh S. Prescribing patterns in medical outpatients. *Int J Clin Pract.* 2002;56:549-551.
4. Shankar PR, Pai R, Dubey AK, Upadhyay DK. Prescribing patterns in the orthopaedics outpatient department in a teaching hospital in Pokhara, western Nepal. *Kathmandu Univ Med J (KUMJ).* 2007 Jan-Mar; 5(1):16-21.
5. Das BP, Adhikari N, Garg M, Rauniar GP, Naga Rani MA. Utilization pattern of Nonsteroidal anti-inflammatory drugs (NSAIDs) in orthopaedic practice at a tertiary care hospital in eastern Nepal. *J Nep Med Assoc.* 2000;39:315-318.
6. Biswas NR, Biswas RS, Pal PS, Jain SK, Malhotra SP, Gupta A, et al. Patterns of prescriptions and drug use in two tertiary hospitals in Delhi. *Indian J Physiol Pharmacol.* 2000;44:109-112.
7. Das N, Khan AN, Badini ZA, Baloch H, Parkash J. Prescribing practices of consultants at Karachi, Pakistan. *J Pak Med Assoc.* 2001;51: 74-77.
8. Shankar PR, Upadhyay DK, Subish P, Bhandari RB, Das B. Drug utilisation among older inpatients in a teaching hospital in Western Nepal. *Singapore Med J.* 2010 Jan;51(1):28-34.
9. Shankar PR, Upadhyay DK, Subish P, Dubey AK, Mishra P. Prescribing patterns among paediatric inpatients in a teaching hospital in western Nepal. *Singapore Med J.* 2006 Apr;47(4):261-5.
10. Ghimire S, Nepal S, Bhandari S, Nepal P, Palaian S. A prospective surveillance of drug prescribing and dispensing in a teaching hospital in western Nepal. *J Pak Med Assoc.* 2009 Oct;59(10):726-31.
11. Alam K, Mishra P, Prabhu M, Shankar PR, Palaian S, Bhandari RB, Bista D. A study on rational drug prescribing and dispensing in outpatients in a tertiary care teaching hospital of Western Nepal. *Kathmandu Univ Med J (KUMJ).* 2006 Oct-Dec;4(4):436-43.
12. Lamichhane DC, Giri BR, Pathak OK, Panta OB, Shankar PR. Morbidity profile and prescribing patterns among outpatients in a teaching hospital in Western Nepal. *McGill J Med.* 2006 Jul; 9(2):126-33.
13. Rasool ABK, Fahmy SA, Abu-Gharbieh EF, Ali HS. Professional practices and perception towards rational use of medicines according to WHO methodology in United Arab Emirates. *Pharmacy Practice (Internet)* 2010 Jan-Mar; 8(1):70-76.
14. World Health organization. International Classification of Diseases (ICD). Available from: URL: <http://apps.who.int/classifications/icd10/browse/2010/en> (Accessed 01/10/2014)

15. WHO Collaborating Centre for Drug Statistic Methodology. ATC/DDD Index 2007. Available from: URL: <http://www.whocc.no/atcddd> (Accessed on 01/10/2014).
16. Eyichukwu GO. Non-Steroidal anti-inflammatory drugs usage in orthopaedics and trauma practice. A guide and review. Niger J Med. 2010;19(4):374-81.