

## ORIGINAL RESEARCH

# Prescribing Pattern of Anti-Microbial Agents in the Orthopaedic Department of a Teaching Hospital Using WHO Prescribing Indicators – An Observational Study

<sup>1</sup>Dr. Tauseef Nazir, <sup>2</sup>Dr. Semira Imran, <sup>3</sup>Dr. Majid Farooq

<sup>1</sup>Lecturer, Department of Pharmacology, Government Medical College, Srinagar, India

<sup>2</sup>Assistant Professor, Department of Pharmacology, Sher-I-Kashmir Institute of Medical Sciences, Medical College and Hospital, Bemina, Srinagar, India

<sup>3</sup>Lecturer, Department of Pharmacology, Government Medical College, Srinagar, India

### Corresponding author

Dr. Majid Farooq

Lecturer, Department of Pharmacology, Government Medical College, Srinagar, India

Email: [drmajidfarooqghat@gmail.com](mailto:drmajidfarooqghat@gmail.com)

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### ABSTRACT

**Background:** Anti-microbial are the most commonly prescribed class of drugs in the patients admitted in the orthopaedic department, prescribed for prophylaxis as well as for the treatment of infections. As per the World Health Organization (WHO) report around 30-40% of medications are not as per the guidelines. **AIM:** The study was conducted to evaluate the drug prescribing trends in the management of indoor patients of orthopaedic department and to promote rational use of drugs. **Material & methods:** This was a prospective, observational study conducted by the department of pharmacology in association with the department of orthopaedics, Sher-I-Kashmir Institute of Medical Sciences, Medical College and Hospital (SKIMS-MCH), Bemina, Srinagar, India. **Results:** A total of 620 patients were included in this study, average number of drugs per prescription was 2.08, percentage of Anti-Microbial Agents (AMA) 56.28%, percentage of drugs prescribed by generic name was 50.59%, percentage of drugs prescribed in injectable form was 61.37% while as 94.91% of the drugs were prescribed from National List of Essential Medicines (NLEM). **Conclusion:** The WHO prescribing indicators aim to promote the rational use of drugs as the use of AMA's is common in the orthopaedic department therefore regular evaluation of drug prescribing pattern can help in providing the feedback thus promoting the rational use of drugs.

**Keywords:** Anti-Microbial Agents (AMA), World Health Organization (WHO), Rational Use of Drugs (RUD).

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### INTRODUCTION

Hospitals often categorise antibiotics based on their use for documented infection treatment, empiric therapy, and antibiotic prophylaxis (ABP). Aside from the typical nosocomial infections that frequently occur in surgical wards, there are specific septic diseases, including osteomyelitis, osteitis, spondylodiscitis, septic arthritis, and prosthetic joint infection. These particular infections are especially concerning as they can have severe consequences, such as complete loss of joint function, the need for additional surgical procedures, amputation, and, in rare cases, death[1].

The issue of antibiotic resistance is not a recent one, but rather has persisted for several decades. Many specialists believe that in order to decrease the occurrence of bacterial resistance, it is necessary to prevent the improper and excessive use of

antibiotics[2]. Antibiotics are often recommended medications in the field of orthopaedics. Antibiotics are provided either as a preventive measure before orthopaedic surgery or to treat existing infections such as septic arthritis or osteomyelitis. The objective of surgical prophylaxis is to decrease the incidence of surgical site and healthcare-associated infections, hence reducing surgical morbidity and mortality[3]. Nevertheless, the use of systemic antibiotics should be exercised cautiously due to the potential occurrence of allergic responses, toxicity, adverse effects, and the emergence of resistant microbial strains[4,5]. In nations with limited financial resources, such as India, it is crucial to prioritise the sensible use of medications due to the lower affordability of patients [6]. The WHO and International Network of Rational Utilisation of Drugs have acknowledged the

significant value of drug utilisation studies in advancing rational drug use. They have actively worked to develop standardised drug use indicators and methods for collecting data [7]. Regular monitoring of the prescription pattern in orthopaedics is necessary due to the potential harmful effects associated with most prescribed medicines. Prior studies with comparable aims have shown that the medications often recommended in the orthopaedics department include nonsteroidal anti-inflammatory drugs (NSAIDs), antibiotics, and ulcer protectives [8]. Research has shown that frequently administered nonsteroidal anti-inflammatory drugs (NSAIDs) in the field of orthopaedics are linked to a higher likelihood of being hospitalised and experiencing fatalities due to gastrointestinal bleeding and perforation [9]. Overutilization of these medications may lead to significant negative outcomes, reducing their intended therapeutic impact. A prescription-based survey is often regarded as a very successful approach for assessing and evaluating the prescribing behaviour of doctors and dispensing practices [10]. While there are several research on prescription patterns in the outpatient orthopaedic department, there is a lack of data about the use of drugs in orthopaedic in-patients. medication utilisation studies undertaken in the in-patient settings are valuable instruments for assessing medication prescription patterns, efficacy, and cost-efficiency of hospital formularies [10].

#### MATERIAL & METHODS

This was a prospective, observational study conducted by the department of pharmacology in association with the department of orthopaedics, Sher-I-Kashmir

Institute of Medical Sciences, Medical College and Hospital (SKIMS-MCH), Bemina, Srinagar, India. The protocol was prepared and submitted to the Human Research Ethics Committee of the institution, where it received approval (IEC/80/2022). This research comprised a total of 620 patients who were admitted to orthopaedics wards throughout the study period. Individuals of various age groups and both genders were included.

#### METHODOLOGY

This study was conducted on the patients admitted to the orthopaedic ward of the hospital. Data pertaining to all 620 patients was obtained from the wards. Every patient included in the research was monitored daily from the date of admission until they were discharged from the ward, and their medical records were examined to collect the required information according to the Data Collection form.

#### RESULTS

The male participants accounted for 72.58% of the total, while the female group comprised 27.42%. A larger proportion of patients, namely 186 individuals (30%), belonged to the age group over 60 years. 21.61% of the patients belonged to the age range of 20-30 years, while the lowest percentage, 10.48%, was seen in the age group below 20 years. A grand total of 1290 medications were prescribed. An overview of the demographic statistics is provided. Table 1 presents the frequency distribution of the demographic data, including the gender and age group, for all patients seen throughout the research period.

**Table 1: Gender and age of the participants**

Gender	Number	Percentage
Male	450	72.58
Female	170	27.42
Age group in years		
AGE GROUP	Number	Percentage
below 20 years	65	10.48
20-30years	134	21.61
30-40years	75	12.10
40-50years	90	14.52
50-60years	70	11.29
Above 60 years	186	30

The primary reason for patient admission was fractures in different anatomical regions, accounting for 360 cases (58.06%). The next most frequent cause was PIVD, accounting for 101 cases (16.29% of the total).

**Table 2. Various diagnosis for which patients were admitted**

Diseases	Number	Percentage
Fracture	360	58.06
PIVD	101	16.29
Dislocation	30	4.84
Pott'sSpine	36	5.81
RheumatoidArthritis	30	4.84
Osteoarthritis	15	2.42
Others	48	7.74

This study included a total of 620 patients. The average number of Anti-Microbial Agents (AMA) per prescription was 2.08. The percentage of Anti-Microbial Agents (AMA) was 56.28%. The percentage of drugs AMAs prescribed by generic name was 50.59%. The percentage of drugs prescribed in injectable form was 61.37%. Additionally, 94.91% of the drugs were prescribed from the National List of Essential Medicines (NLEM).

**Table 3: Prescribing indicators**

Prescribing indicators	Percentage
Average number of drugs per prescription	2.08
Drugs prescribed by generic name	50.59
Anti-Microbial Agents (AMA)	56.28
Drugs prescribed in injectable form	61.37
Drugs were prescribed from National List of Essential Medicines (NLEM).	94.91

Table 4 displays a range of medications that make up the Drug Utilisation section.

**Table 4. Drugs constituting Drugs used segment.**

AMA CLASS	Number =726	Percentage
Ceftriaxone+Tazobactam	124	17.08
Amikacin	149	20.52
Cefoperazone+Sulbactam	108	14.87
Metronidazole	97	13.36
Ciprofloxacin	75	10.33
Amoxicillin+	70	9.64
Linezolid	57	7.85
Cefotaxime	46	6.33

The total amount of antibiotics given was 726. Ceftriaxone+Tazobactam 124 (17.08%), Amikacin 149(20.52%), Cefoperazone+Sulbactam 108 (14.87%), Metronidazole 97 (13.36%), Ciprofloxacin 75 (10.33%), Amoxicillin+70 (9.64%), Linezolid 57 (7.85%) and Cefotaxime 46 (6.33%).

## DISCUSSION

The male participants accounted for 72.58% (n=450) of the total, while the female group made for 27.42% (n=170). A total of 186 patients, accounting for 30% of the population, were aged over 60 years. The percentage of patients in the age range of 20-30 years was 21.61%, while the lowest percentage was seen in the age group below 20 years, which was 10.48%. A grand total of 1290 medications were prescribed. An overview of the demographic statistics is provided. Prior research conducted in northern India have shown a higher prevalence of elderly individuals among patients[11].

One potential explanation may be the increased prevalence of age-related bone alterations in older individuals, rendering them more susceptible to fractures after minor injuries. The subsequent surge in the age bracket of 20-30 years may be attributed to the heightened level of activity and communication within this demographic, thereby increasing their susceptibility to accidents.

The distribution of patients by sex indicates that there were more male patients (450 out of 620) than female patients (170) in this research. The investigations conducted by Gupta et al[12] similarly revealed male dominance. This might be attributed to the prevalence of male hegemony in society, since they engage in outdoor pursuits and serve as primary breadwinners for their families, hence increasing their susceptibility to traumatic experiences.

The predominant diagnosis seen in our research, for which patients were hospitalised, was fracture of various anatomical regions. The most prevalent symptoms reported in a research conducted in Nepal[13] were low back pain and spondylosis. This might be attributed to the fact that their research only included outpatients.

The mean number of medications per prescription is a crucial indicator when conducting a prescription audit. The mean number of medications per prescription was 2.08.

The very low (50.59%) utilisation rate of generic pharmaceuticals in prescriptions, particularly at tertiary level health facilities, may indicate the significant influence exerted by pharmaceutical firms. Our results on generic prescription contradict some research conducted in other countries, but align with other studies conducted in India and neighbouring countries [14,15]. Promoting generic prescription is beneficial since it results in cost savings for the patient and decreases the likelihood of medication errors.

Of the whole sample, 94.91% of the medications were given from the National Essential Medicine List. In a prior investigation conducted at primary healthcare institutions in the Kaski area, the proportion of medications dispensed from the Essential drug list ranged from 70.9% to 74%[16].

In our study the total amount of antibiotics given was 726. Ceftriaxone+Tazobactam 124 (17.08%), Amikacin 149(20.52%), Cefoperazone+Sulbactam 108

(14.87%), Metronidazole 97 (13.36%), Ciprofloxacin 75 (10.33%), Amoxicillin+70 (9.64%), Linezolid 57 (7.85%) and Cefotaxime 46 (6.33%). Amikacin was the most frequently prescribed antibiotic (28.05%) followed by Ceftriaxone+Tazobactam (19.60%), Ciprofloxacin (10.09%) and Metronidazole (9.15%) study done by Baghel R et al [17]. During the study period, the most commonly prescribed antibiotic was Amikacin (28%) followed by Ceftriaxone+Tazobactam (19.6%).  $\beta$  lactum antibiotics were most commonly used in a study done by Bithi et al [18].

## CONCLUSION

The WHO prescribing indicators aim to promote the rational use of drugs as the use of AMA's is common in the orthopaedic department therefore regular evaluation of drug prescribing pattern can help in providing the feedback thus promoting the rational use of drugs.

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