International Journal of Pharmacological Research
ISSN: 2277-3312
www.ssjournals.com
Journal DOI:10.7439/ijpr

Prescription pattern of antimicrobials in tertiary care hospital in central India

Admane PD*, Hiware SK, Mahatme MS, Dudhgaonkar SD, Deshmukh SN and Mahajan MM

Department of Pharmacology, Indira Gandhi Government Medical College, Nagpur-18, India

Corresponding author*
Dr. Pallavi Dnyaneshwar Admane
Department Of Pharmacology,
Indira Gandhi Government Medical College, Nagpur-18, India
E-mail: admanester@gmail.com

Abstract
Objective: Antimicrobial agents are the greatest contribution to 20th century, which are used for cure and prevention of infections. Widespread use of antimicrobials has facilitated the development of resistance.
Aim: the study was to assess the use of antimicrobials in tertiary care hospital in Maharashtra.
Method: Prescription audit was done to assess the use of antimicrobials. Total 1942 prescriptions were analyzed for average number of drugs prescribed, antimicrobials prescribed by generic name or brand name, percentage of antibiotics among the prescribed drugs, use of fixed drug combinations, if any.
Statistical analysis used: Data was analyzed by percentage.
Result: Demographic analysis showed that out of 1942 patients in OPD, most were male (56.38) and in the age group between 35 to 50 years. In 1942 prescription, 30.25% drugs were antimicrobials. Three drugs were prescribed in 52.15% of the prescription, followed by 4 drugs in 19.78% prescriptions. 79.18% prescriptions were prescribed by generic name while 20.82% were prescribed by brand name. 29.18% of drugs were fixed dose combinations of all the antibiotics were prescribed empirically on the basis of provisional diagnosis. Of the total of antibiotics prescribed, amoxicillin was prescribed in 50.66% of patients, followed by cotrimoxazole in 26.05 % patients, cephalexin (8.50%) were used commonly.
Conclusion: The rational use of antimicrobial agents is one of the main contributors to control worldwide emergence of antibacterial resistance, side effects and reduced cost of the treatment.
Keywords: Antimicrobials. Prescription, ATC classification

1. Introduction

Antimicrobials (AMA) have changed the outlook of physicians about the power of drugs on the diseases. Antimicrobials are the most common drugs, used for various life threatening and trivial infections. Their importance is magnified in the developing countries, where infective diseases are predominant.[1] But inappropriate and indiscriminate use of antimicrobials have lead to the emergence of antibiotic resistant strains, treatment failure and increase in mortality and morbidity.[2]

Incidence of infectious diseases is common in developing countries resulting in higher consumption of drugs due to non compliance and scarcity of funds favoring the development of drug resistance.[3] Though the newer antimicrobials are introduced but the increased demand is unable to meet the slow pace with which new molecules of antimicrobials are introduced into the market. To tackle with this problem, global initiatives are trying to promote rational use of antibiotics.[4,5] The therapy is considered as rational if the antimicrobial use, its route of administration, dose, frequency and its duration of use are appropriate for the infection. The rational use of antibacterial agents being increasingly recognized as an important contributor to control the worldwide emergence of antimicrobial resistance, to minimize side effects and to reduce the cost of treatment.[6,7]

So, the present study was conducted to evaluate use of antimicrobial agents in tertiary care hospital, just as one of the measures to analyze and promote rational use of drugs so that adequate measures can be taken to prevent problem of antimicrobial resistance in the region.

2. Material and Methods

A prospective cross sectional study was conducted in outpatient department of Indira Gandhi Government Medical College, Nagpur over a period of 8 months. Prescriptions of all the age groups were considered for analysis. The

study was approved by the institutional ethics committee. A total 1942 prescriptions were collected and analyzed for demographic & gender distribution, total number of drugs prescribed, number of antimicrobials among the prescribed drugs, types of antimicrobials used, antimicrobials prescribed by generic name or brand name, use of fixed drug combinations(FDC) and their rationality. Result was expressed as percentage. Antimicrobials were classified using the Anatomical Therapeutic Chemical (ATC) Classification given by WHO International Working Group for Drug Statistics Methodology. In the ATC classification system, the drugs are divided into different groups according to organ or system on which they act and their chemical, pharmacological and therapeutic properties.[8] The main purpose of this classification is for international drug utilization research and for adverse drug reaction monitoring.

2.1 Statistical analysis used

Data was analyzed by percentage. The results were also depicted in the form of tables and graphs. Statistical software namely SPSS v20 was used for the analysis of data and Microsoft Word and Excel to generate graphs and tables.

3. Result

Among the 1942 prescriptions evaluated, 1095 (56.38%) were male patients and 847(43.61%) female patients. Most of the cases were in age group 35-50 years of age (44.04%), followed by >50 years of age (22.23%). (Table 1)

Table 1: Demographic characteristics of the patients

Age(years)	Percentage according to age	Male (1095)	Female (847)
<20	18.5	207	153
20-35	15.23	163	134
35-50	44.04	482	373
>50	22.23	243	188

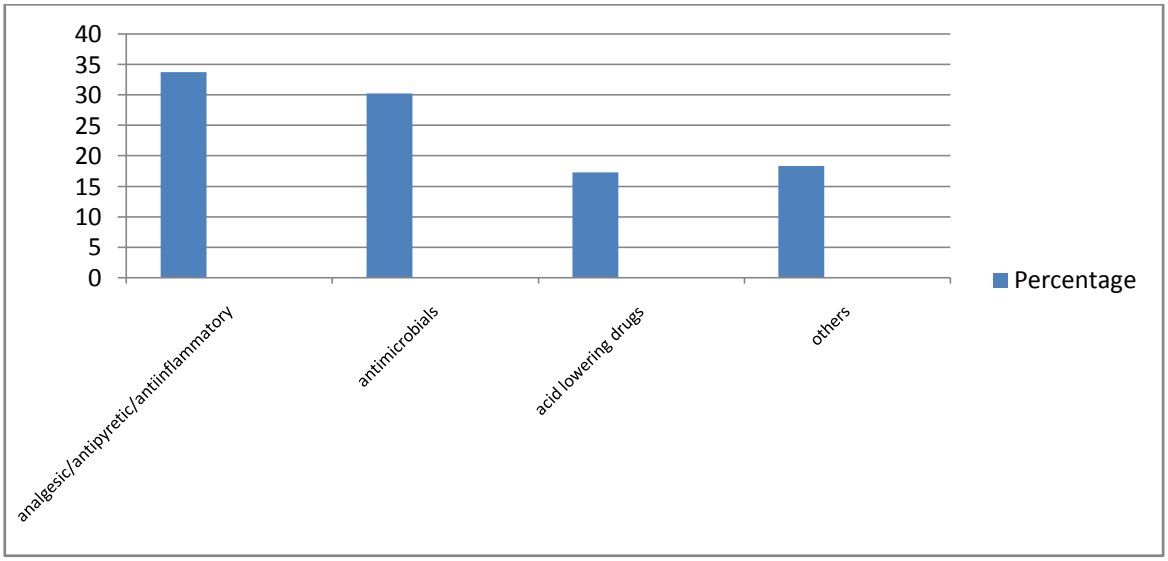
Three drugs were most commonly prescribed in 52.15% patients, followed by 4 drugs in 19.78% patients.(Table 2)

Table 2: number of drugs prescribed per prescription

Number of drugs	Percentage
1 drug	4.62
2 drug	17.18
3 drug	52.15
4drug	19.78
5drug	6.27

Diagnosis was mentioned in only 64.53% of prescriptions. We observed that percentage of antimicrobials among the total drugs was 30.25%, analgesic/antipyretic/anti-inflammatory were 33.75%, acid lowering drugs were 17.34%. (Figure 1)

Figure 1: percentage of most commonly prescribed drugs



Among the 1942 prescriptions 587(30.25%) were antimicrobials. Single antimicrobial was prescribed in 68.32% patients, two antimicrobial in 25.6% as shown in table 3. Amoxicillin was the most commonly prescribed AMA (50.66%) followed by cotrimoxazole(26.05%), cephalexin(8.50%) and ciprofloxacin(5.8%) with their ATC codes as in Table 4.

After evaluation of prescription data it was observed that 79.18% antimicrobials were prescribed by generic name

while 20.82% antimicrobials were brand name.

Amongst antimicrobials 29.18% were fixed drug combinations, out of which 0.75% were not from rational drug combination given by WHO. All the cases were managed empirically or symptomatically by the clinical judgment.

Table 3: Number of antimicrobials prescribed per patient

Antimicrobial prescription	No. Of patients (587)	Percentage
1 antimicrobial drug	401	68.32
2 antimicrobial drugs	150	25.6
3 or >3 antimicrobial drugs	36	6.08

Table 4: percentage of most commonly prescribed antimicrobial with ATC classification

Group	Subgroup	ATC code	No. of antimicrobial prescription
Amoxicillin	Extended spectrum penicillin	J01CA	50.66
Sulfonamide & Trimethoprim	Combination of sulphonamide & Trimethoprim	J01EE	26.05
Cephalexin	1st generation cepalosporin	J01DA	8.50
Ciprofloxacin	Fluoroquinolones	J01Ma02	5.80
Metronidazole	Nitroimidazole derivative	P01AB01	2.50
Amoxicillin & Clavulanic acid	Combination of penicillin	J01CR02	2.38
Albendazole	Anthelmintic	P02CA03	1.20
Azithromycin	Macrolide	J01FA	0.78
Ofloxacin	Quinolones	J01MA01	0.67
Ofloxacin with ornidazole	Combination of Fluoroquinolones and Nitroimidazole	J01RA09	0.50
Nitrofurantoin	Urinary antiseptics	J01XE01	0.46
Others			0.5

ATC- Anatomical Therapeutic Classification.

4. Discussion

Antimicrobial resistance is one of the major global preventable problems. The causes of antimicrobial resistance are unnecessary use, inappropriate doses, inadequate duration of therapy and irrational fixed dose drug combinations. Hence this study was undertaken to improve the quality of medication and to promote the prescription of drugs.

Average number of drugs per person is an important index of prescription audit. Mean number of drugs per prescription should be kept as low as possible. Higher figures (polypharmacy) always lead to increased risk of drug interaction, adverse effects, development of bacterial resistance, increased hospital cost. In our study most of prescriptions contained three drugs and antimicrobial monotherapy was the main stay. β lactam antibiotics (61.54%,) sulphonamides (26.05%) and fluoroquinolones(6.97%) were the preferred drugs. β lactam antibiotics were commonly prescribed drugs corresponding with the previous studies.[9,10] This might be due to their round the year availability. As ours is a government institution, cheaper efficacious drugs are preferred considering the budget. Among the antimicrobials amoxicillin (50.66%), cotrimoxazole(26.05%), cephalexin(8.50%) were commonly prescribed drugs. Their ATC codes are J01CA, J01EE, J01DA respectively. ATC classification can be helpful in adverse drug monitoring which is the need of the hour. Also, it has a role in drug utilization studies.

We found that 70.18 % drugs were prescribed by generic name. In our study prescription of generic drugs were more common than brand name drugs which is similar with previous studies.[11,12] Generic drugs are cheaper than brand name drugs. Moreover, ours is a tertiary care hospital where prescription of generic drugs is always emphasized. But this is in contradiction to some previous studies where brand name drugs were commonly prescribed.[13,14] In our study FDC were 29.18% as in other study.[15] 0.75% FDC were not from rational medicine list given by WHO. Irrational FDC must have been prescribed depending on the patient's requirement otherwise only rational FDC are preferred.

Physicians must have a clear understanding of rational therapeutic use of antibiotics. They must be aware of the prevalence of various pathogens and resistance patterns in their hospital and exercise good judgment in selection of the antibiotic regimens.[16] Irrationality can be addressed by use of guidelines, educational activities and surveillance at all level of health care. So, measures should be taken to avoid the inappropriate use of antibiotics. Drug utilization review programme must be carried out to study the rational use of antimicrobials.

5. Conclusion

The rational use of antimicrobial agents is one of the main contributors to control worldwide emergence of antibacterial resistance, side effects and reduced cost of the treatment.

References

[1] Tripathi KD. Antimicrobial drugs, Essentials of Medical Pharmacology.7 th Edition, 12. New Delhi JAYPEE Brothers medical publishers, 2013; 688-704.
[2] Woldu MA, Suleman S, Workneh N, Berhane H. Retrospective study of the pattern of antibiotic use in Hawassa University Referral Hospital Pediatric Ward, Southern Ethiopia; *J App Pharm Sci*; 2013;3(02):93-8.
[3] World Health Organization Financing of Health in India Available from: http://www.ino.searo.who.int/Linkfiles/ Other_Content_WHD11-Seinar _Presentation-WRpdf.
[4] Amane H, Kop P. Prescription analysis to evaluate rational use of antimicrobials. *Int J Phar. ma and Biosci* 2011; 2(2); 314-319.
[5] Ernest J.S. Resistance to antimicrobials in humans and animals. *BMJ;* 2005, 331:1219-20.
[6] Goossens H. Antibiotic consumption and link to resistance. *Clin Microbiol Infect*. 2009 Apr; 15 Suppl 3:12-15.
[7] MacDougall C, Polk RE. Antimicrobial stewardship programs in health care systems. *Clin Microbiol Rev*; 2005 Oct; 18(4):638-56.
[8] Sharma M, Eriksson B, Marrone G, Dhaneria S, Lundborg CS. Antibiotic prescribing in two private sector hospitals; one teaching and one non-teaching: a cross-sectional study in Ujjain, India. *BMC Infect Dis*. 2012; 12:155.
[9] Khan FA, Singh VK, Sharma S, Singh P. Prospective Study on the Antimicrobial Usage in the Medicine Department of a Tertiary Care Teaching Hospital. *Journal of Clinical and Diagnostic Research*; 2013; 7(7):1343-46.
[10] Das BP, Sethi A, Rauniar GP, Sharma SK. Antimicrobial utilization pattern in outpatient services of ENT department of tertiary care hospital of Eastern Nepal. *Kathmandu Univ Med J. (KUMJ)* 2005; 3:370-75.
[11] Sharma R, Khajuria B. Prescribing practices of doctors in rural and urban India. *J Clin Diag Res* 2009; 3; 1480-82.
[12] Babalola CP, Awoleye SA, Akinyemi JO, Kotila O. Evaluation of prescription pattern in Osun State (Southwest) Nigeria. *J Public Health Epidem* 2011; 3:94-8.
[13] Saurabh MK, Jaykaran, Yadav AK, Jyoti N. Study of prescribing pattern and assessment of rational use of drugs in tertiary hospital, Rajasthan. *J Pharm Res* 2010; 3(3):474-7.
[14] Patel V, Vaidya R, Naik D, Borker P. Irrational drug use in India: A prescription survey from Goa. *J Postgrad Med*. 2005; 51:9-12.
[15] Patil S, Kachare A, Shaikh T, Nikam SS. Evaluation and prescribing pattern study of antibacterial agents in Medicine out-patient department of a teaching and referral Hospital in satara district area. *UJP* 2014; 03 (01):75-8.
[16] Hanssens Y, Ismaeili BB. Antibiotic prescription pattern in a medical intensive care unit in Qatar. *Saudi Med J* 2005; 26:1269-76.