Prescription Auditing of Antimicrobial Agents in a Tertiary Care Teaching Hospital in Andhra Pradesh

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ABSTRACT

Introduction: 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. The present study was done to screen rational use of antibiotics in the medicine OPD of a tertiary care teaching hospital.

Material and Method: A total of 850 prescription files were collected from the medicine outpatient department over a period of six months. Prescriptions containing antimicrobial drugs were assessed for appropriateness in dosage, duration of therapy and fixed dose drug combinations (FDCs). The antimicrobials were grouped using the anatomical therapeutic chemical (ATC) codes.

Results: 25.37% of total patients evaluated received antibiotics. Among them 40.15% patients were prescribed one antibiotic and 27.40% were prescribed antimicrobial FDCs. Out of the 248 prescriptions, 47.98% were found to be irrational. The most commonly prescribed antibiotic categories were penicillins (35.79%), followed by fluoroquinolones (16.50%) and combinations of antibiotics from different groups (8.87%).

Conclusion: Rational use of antimicrobial agents is one of the mainfactors in controlling worldwide emergence of antibacterial resistance, adverse effects and reduced cost of the treatment.

Keywords: ATC codes, Antimicrobials, Fluoroquinolones, Irrational

INTRODUCTION

Antimicrobials (AMA) have changed the outlook of physicians about the power of drugs on the diseases. These drugs are used for various life threatening and trivial infections and their significance is magnified in the developing countries, where infective diseases are leading.[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] The worldwide increase in antibiotic resistant bacteria isof great worry but is not described sufficiently in the developing countries. It is the duty of the doctors to develop good prescribing habits which will help in reducing the intensity of the problem. Some of the common causes that contribute to the development of antimicrobial resistance are unnecessary use of antimicrobial drugs, unsuitable dose, inadequate duration of therapy and use of irrational antimicrobial fixed dose drug combinations (FDCs). 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 reduce side effects and to decrease the cost of treatment.[6,7] So, the present study was conducted to assess use of antimicrobial agents in tertiary care hospital of Andhra Pradesh.

MATERIALS AND METHODS

This was a prospective study conducted at the medicine OPD of a tertiary care hospital i.eSanthiram Medical College and General Hospital, Nandyal, AP. Prescription files from OPD of the teaching hospital were collected on all Saturday over a period of six months (June 2013- December 2013) and taken for analysis. Institutional ethics committee approval was obtained prior to start of the study.The number of drugs prescribed in each prescription was taken into

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How to cite this article: K. Anantha Babu, Madhavi Latha, Anjaly Mary Varghese, G. Vijayakumar. Prescription auditing of antimicrobial agents in a tertiary care teaching hospital in Andhra Pradesh. International Journal of Contemporary Medical Research 2016;3 (1):288-291.

account to calculate the incidence of polypharmacy. The data from the records were entered into a specially designed proforma. The following parameters were recorded for each prescription: patient's demographic profile, diagnosis, drug name, dose, route, frequency and duration of prescription. The patients were categorized by sex and then divided into four age groups. The frequency of prescription was calculated for each age group and for males and females separately. Prescribing frequency was expressed as a percentage of the prescription of the individual drug/drug class in a particular age/sex category to the total number of patients in the particular age/sex category. WHO guidelines were considered for evaluating the rationality of prescriptions. The parameters for evaluation were: (1) Dose strength and dosage schedule (2) Duration of therapy (3) FDCs: rational/irrational. The antibiotics were classified using the Anatomical Therapeutic Chemical (ATC) classification system. In the ATC classification system, the drugs are divided into different groups according to the organ or system on which they act and their chemical, pharmacological and therapeutic properties.[7]

RESULTS

During the study period, prescriptions of 850 patients were studied. It consisted of 449 (52.8%) males and 401(47.1%) females. The age distribution of the patients is shown in Table 1. The most common diagnosis which warranted antibiotic prescription in the medicine OPD was upper respiratory tract infection (35%), followed by diarrhoea (19%) and urinary tract infection (15%). The number of drugs per prescription is shown in Table 2. A total of 295 (34.70%) patients received 2 drugs and 192 (22.50%) patients received only one drug. The average number of drugs per prescription was 2.42.

The duration of antibiotic drug prescription was less than 5 days in 37.73% of the patients and between 5-7 days in 62.27% of the patients.

Out of 850 prescriptions drugs prescribed in the medical outpatient department, the most commonly prescribed drug categories in the descending order were analgesics, antiulcer drugs, antibiotics, antihistamines, antihypertensives, oral antidiabetics, antipsychotic drugs, antidepressants, vitamins and haematinics.

Out of 850 patients, 248 (29.17%) received antibiotics. Out of that, 101 (40.15%) patients were prescribed one antibiotic and 68 (27.41%) were prescribed antimicrobial FDCs (Table 3). Out of 248 antimicrobial prescriptions, 47.98% were irrational (Table 4). As per Table 5, the most commonly prescribed antibiotic categories were penicillins (35.7%), closely followed by fluoroquinolones (16.51%) and combinations of antibiotics from different groups (8.87%). ATC codes for each antibiotics were stated. There was no prescription noted with incorrect dosage, incorrect duration of therapy or use of banned drug formulations of antibiotics

DISCUSSION

Inappropriate and indiscriminate use of antimicrobials is a global concern causing selection of resistant strains.[6-8] This could result in a substantial economic load on individual and health care systems. Antimicrobial drug resistance refers to non-responsiveness of micro-organisms to an antimicrobial agent. One of the primary reasons for antimicrobial drug resistance is unreasonable use of FDCs. This study was undertaken to assessthe rational use of antimicrobial FDCs in the Medicine outpatient of a tertiary level teaching hospital.

Average number of drugs per person is aimportant index of prescription audit. Mean number of drugs per prescription must be kept as low as possible. Polypharmacy leads to increased risk of drug interaction, side effects, bacterial resistance and also increased cost in hospital. This study showed that most of prescriptions contained twodrugs and antimicrobial monotherapy was the main stay. β lactam antibiotics (35.79%,) Aminoglycosides (9.27%),sulphonamides (4.83%) and fluoroquinolones (16.05%) were the preferred drugs. β lactam antibiotics were commonly prescribed drugs which was corresponding with the previous studies by Khan FA et al and Das BP et al.[9,10] This might be due to their round

Age in years	Male (%)	Female (%)
16-30	94	93
31-45	174	165
46-60	113	95
> 60	68	48
Total	449(52.8)	401(47.1)

Table-1: Distribution by age and sex of patients who had visited medicine OPD

No. of drugs per prescription	No. of prescriptions	%
0	42	4.94%
1	192	22.5%
2	295	34.70%
3	234	27.5%
4	48	5.6%
Above 4	39	4.5%

Table-2: Frequency of drugs administered per prescription

Parameter	No. of patients (n=248)	%
Antibiotic prescriptions	248	29.17%
Single antibiotic	101	40.05%
Two antibiotics	45	18.14%
>Two antibiotics	34	13.70%
Antimicrobial FDCs	68	27.41%

Table-3: Number of antibiotics prescribed per patient

Evaluation	No. of patients (n=248)	%
Rational	129	52.01%
Irrational	119	47.98%

Table-4: Evaluation of antibiotic therapy

Drug group	Subgroup	ATC code	No of patients
Tetracyclines	Tetracyclines	J01A	8(3.2%)
Penicillins	Extended spectrum penicillins	J01CA	19(7.66%)
	Combination of penicillins (Amoxicillin and Clavulanic acid)	J01CR	31(12.5%)
Other β-lactams	1st Generationcephalosporins	J01DB	24(9.6%)
	3rd Generationcephalosporins	J01DD	15(6.04%)
Sulfonamide with Trimethoprim	Combination of Sulfonamide with Trimethoprim	J01EE	12(4.83%)
Aminoglycosides	Other Aminoglycosides	J01GB	23(9.27%)
Macrolides	Macrolides	J01FA	20(8.06%)
Quinolones	Fluoroquinolones	J01MA	41(16.5%)
Combination of antibiotics	Combination of antibiotics (Combination of Fluoroquinolones and Nitroimidazole)	J01RA	22(8.87%)
Other antibiotics	Glycopeptideantibacterials	J01XA	5(2.01%)
	Imidazole derivatives	J01XD	8(3.20%)
Agents against amoebiasis and other protozoal	Nitroimidazole derivatives	P01AB	8(3.20%)
diseases	Other agents against amoebiasis and other protozoal diseases	P01AX	12(4.83%)

Table-5: Distribution of antibiotics with ATC codes

the year availability. Among the antimicrobials- amoxicillin, cotrimoxazole and cephalexin were commonly prescribed drugs. Each drug was assigned with ATC code. ATC classification is needed in detecting adverse drug reactions which is the need of the hour. Apart from this, it has a role in drug utilization studies. Our study found that the 75.04 % drugs were prescribed by generic name. This findings were similar with the previousstudies.[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] In our study FDC were 27.4%, this matches with the previous study doneby Patel S et al.[14] Irrational FDC might have been prescribed based on the patient's requirement or else only rational FDCs were preferred. Doctor should have a clear understanding and knowledge of rational therapeutic use of antimicrobial agents. Doctors should be well versed with the prevalence of pathogens and resistance patterns in their working hospital and work out good practice and decision in selection of the antibiotic regimens.[15] Additionally they should keep abreast of recent strains of pathogens toavoid inappropriate use of drugs. Irrationality can be tackledby properusage of guidelines, educational programs and surveillance at all level of health care. So, specific procedures should be taken to avoid the inappropriate use of antibiotics. Drug utilization review programshould be undertaken to study the rational use of antimicrobials.

CONCLUSION

The rational use of antimicrobial agents is one of the main factor in controlling the global emergence of antimicrobial resistance, adverse effects ofdrugs and also to reduced cost of the treatment.

REFERENCES

1. 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;3:93-8.
2. Amane H, Kop P. Prescription analysis to evaluate rational use of antimicrobials. IntJ Phar. ma and Biosci 2011;2:314-319.
3. Ernest J.S. Resistance to antimicrobials in humans and animals. BMJ 2005, 331:1219-20.
4. Tripathi KD. Antimicrobial drugs, Essentials of Medical Pharmacology.7 th Edition, 12. New Delhi JAYPEE Brothers medical publishers, 2013; 688-704.
5. World Health Organization Financing of Health in India Available from: http://www.ino.searo.who.int/Linkfiles/Other_Content_WHD11-Seinar _Presentation-WRpdf. Date accessed 21 December 2015
6. Amane H, Kop P. Prescription analysis to evaluate rational use of antimicrobials. Int J Pharma and Biosci 2011;2: 314-319.
7. Ernest J.S. Resistance to antimicrobials in humans and animals. BMJ 2005; 331:1219-20.
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;12:155-58.
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. J ClinDiagn Res 2013;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. 2005;3:370-75.

11. Sharma R, Khajuria B. Prescribing practices of doctors in rural and urban India. J ClinDiag Res 2009;3:1480-82.
12. Babalola CP, Awoleye SA, Akinyemi JO, Kotila O. Evaluation of prescription pattern in Osun State (South-west) 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;3:474-7.
14. 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;03:75-8.
15. Hanssens Y, Ismaeili BB. Antibiotic prescription pattern in a medical intensive care unit in Qatar. Saudi Med J 2005;3:1269-76

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 06-12-2015; **Published online**: 27-12-2015