Drug Utilization Study on Antibiotics Use in the Upper Respiratory Tract Infection

Harish Govind Naik[1], Chitra C. Khanwelkar[2], Ashwini Kolur[3*], Rohit Desai[4], Sunil Gidamudi[5]

{[1]Assistant Professor, Department of Pharmacology} {[3]Assistant Professor, Department of Pathology}

Azeezia Medical College, Meeyanoor, Kollam, Kerala, INDIA.

{[2]Professor and Head, [4,5]PG Student}Department of Pharmacology, KIMSDU, Karad, Maharashtra, INDIA.

[*]Corresponding Address:

dr.ashukolur@gmail.com

Research Article

Abstract: Antibiotics are commonly prescribed for the Upper respiratory tract infection. But if antibiotics are not used rationally then there will be increase chances of resistance of bacteria as well as increase in the total cost of treatment. This study was conducted to see the antibiotics utilization pattern. Aim: This drug utilization study was conducted to evaluate the pattern of antibiotics use in Medicine Department of a Krishna Hospital, Karad, and Maharashtra, India. 200 case records were examined, of which 56.5% were URTI (nonspecific URTI), 28% were sinusitis, pharyngitis and CSOM accounted for 24% and 7% respectively. Female accounted for 64% and male for 36% of total cases. The World Health Organization (WHO) indicators (utilization in defined daily doses (DDD); DDD/1000inhibitant/day) were used and the ATC/DDD method was implemented. The most frequently prescribed antibiotic was Azithromycin, followed by ceftriaxone. The DDD/1000inhibitant/day of Azithromycin was the highest (2.3308). Out of the 200 case records, culture and sensitivity was done in only 8 cases of URTI and all were sterile. Out of the total case records analyzed, antibiotics were not prescribed in 18 (9%) cases. Rest received antibiotics. Prescribing by generic names has to be encouraged.

Key words: Drug utilization, Antibiotics, DDD (defined daily dose), Upper respiratory tract infection.

Introduction

Upper respiratory tract infections (URTIs) are responsible for more visits to physicians than any other types of infectious disease.(1) It is a nonspecific term used to describe acute infections involving the nose, paranasal sinuses, pharynx, larynx, trachea, and bronchi. The prototype is the illness known as the common cold and others infections are tonsillitis, pharyngitis, laryngitis, sinusitis, otitis media and tracheobronchitis.(2) Often considered trivial from the standpoint of mortality, these infections have a considerable economic impact. Respiratory tract infections in general account for more restricted activity and loss of time from work and school than any other category of infections.(3)Viruses cause most URTIs, with rhinovirus, parainfluenza virus, coronavirus, adenovirus, respiratory syncytial virus, coxsackievirus, and influenza virus accounting for most cases.(4)The decision to prescribe antibiotics is complex and multifactorial.(5) However, almost 75% of adults with URTIs are prescribed antibiotics by their physicians. Many studies suggest that antibiotic have no role in the management of the common cold or any mild URTI.(2) In addition to clinical factors, many nonclinical influences can affect decisions to prescribe antibiotics; these include patient, provider and neighborhood characteristics, cultural influences and regulatory practices.(5) There is now clinical evidence that active bacterial eradication is also necessary in achieving optimal clinical success in upper respiratory tract infection.(6)There are more effective drugs (medicines) today on the market than ever before. Patients are better educated, have greater expectations from health care, and they use multiple sources of health care. Still, drugs are not frequently used to their full potential or according to the generally accepted criteria. All prescribing may not necessarily be based on patient needs and all patient needs are not necessarily met with drug therapy. Consequently, there is as much concern about inappropriate and expensive prescribing, as about under-prescribing. The development of drug utilization (DU) as a research area made it possible to study drug prescribing and drug usage in a scientific and formal manner.(7) Developing countries have limited funds available for health care and drugs and it becomes very important to prescribe drugs rationally so that the available funds can be utilized optimally. DU Studies aids in commenting about unnecessary and irrational prescribing which increases burden of cost of therapy, also causes loss of working hours (either due to hospitalization or morbidity).(8) These are definitely not affordable for a developing country like India.In the recent years studies on drug utilization have become a potential tool to be used in the evaluation of health systems. The methodology used in these studies has mainly consisted in the comparison of consumption using defined daily doses (DDD) of the drugs consumed. Drug utilization

among outpatient is frequently monitored in many countries but the studies on inpatient are rare and incomplete. Studies of drug utilization in respiratory tract infection are low. The objective of present study is to focus on the trends in the antimicrobial utilization in upper respiratory tract infections. This information is not disease specific but reflects overall rates and illustrates trends in utilization of antimicrobials in the treatment of upper respiratory tract infection.

Materials and Method

The present study was conducted after obtaining the permission of ethical committee of our institution in Krishna Institute of Medical Sciences Deemed University, Karad. The present study included patients of upper respiratory tract infection who were admitted to medicine ward of the hospital.It was an eighteen month (January 2011 to June 2012) non-interventional retrospective study, observational study and the data was collected from the Medical Record Room. The proforma for collecting the data was designed. The data collected were subjected to descriptive statistical analysis using Microsoft excel.Anatomical therapeutic chemical (ATC) classification and defined daily dose (DDD) system was used for the quantification of drug utilization. Following formula of defined daily dose was used for calculation and results obtained were expressed in terms of defined daily dose per 1000 inhabitants per day (DDD / 1000 inhabitants / day).(9)

Formula

$$\text{DDD/1000inhabitants /day} = \frac{\text{Total use of a drug(mg) during the study period}}{\text{DDD (mg) x Duration of study x Total sample size}} \times 1000$$

DDD/1000 inhabitants/day may provide a rough estimate of the proportion of the study population that may be treated daily with certain drugs.

Result

The study monitored the drug utilization pattern to the patients treated to upper respiratory tract infection in medicine department at Krishna Hospital, Karad. A total of 200 case records of the patients with different presenting symptoms were analyzed. All the case records had the complete documentation of information, including patient's demographic characteristics, diagnosis, drug names, dose route and frequency of intake. Observations of the study are presented in the form of different tables.

Table 1: Distribution of case according to illness and sex

Illness	Number	Percentage	Male		Female	
			No. of. Cases	%	No. of. Cases	%
URTI(nonspecific URTI)	113	56.5	41	20.5	72	36
Sinusitis	56	28	20	10	36	18
Pharyngitis	24	12	10	5	14	7
CSOM	7	3.5	1	0.5	6	3

Table 2: Associated illnesses

Illness	DM	HTN	IHD	RHD	PTB	COPD	Anemia
URTI(nonspecific URTI)	3	8	1	1	2	0	2
Sinusitis	1	7	1	0	0	0	1
Pharyngitis	1	1	1	0	0	0	0
CSOM	0	0	0	1	0	0	0

Table 3: Average number of Antimicrobial agents used, State of the patients at the time of discharge

Illness	Drugs	Improved	Unchanged
URTI(nonspecific URTI)	1.15	109	4
Sinusitis	1.17	56	0
Pharyngitis	1.3	24	0
CSOM	1.14	6	1

Out of the 200 case records, culture and sensitivity was done in only 8 cases of URTI and all were sterile. Out of the total case records analyzed, antibiotics were not prescribed in 18 (9%) cases. Rest received antibiotics.

Table 5: Distribution of individual AMAs

Sr. No.	Name of The Drug	Upper Respiratory Tract Infection	
		No. of. Pts	%
Penicillin's			
1	Amoxicillin + Clavulanic acid	12	6
2	Amoxicillin	14	7
Cephalosporin's			
3	Cefotaxime	3	1.5

4	Cefadroxil	13	6.5
5	Cefixime	22	11
6	Cefuroxime	1	0.5
7	Ceftriaxone	38	19
8	Cefpodoxime	1	0.5
Marcrolide			
9	Azithromycin	61	30.5
Flouroquinolones			
10	Ciprofloxacin	7	3.5
11	Levofloxacin	4	2
Tetracycline Antibiotic			
12	Doxycycline	6	3

Table 9: ATC code, DDD, PDD and DDD/1000inhabitants/day of the drugs

NO	Name of the drug	ATC code	DDD (mg)	PDD	DDDs/1000 Inhabitants/ day
Penicillin's					
1	Amoxicillin (O)	J01CR02	1000	1294.52	0.8638
	Amoxicillin (P)		3000	2000	0.0304
Cephalosporin's					
2	Cefotaxime	J01DD01	4000	2000	0.0411
3	Cefadroxil	J01DB05	2000	1000	0.1828
4	Cefixime	J01DD08	400	390.32	0.5530
5	Cefuroxime	J01DC02	500	1000	0.0365
6	Ceftriaxone	J01DD04	2000	2209.30	1.3025
7	Cefpodoxime	J01DD13	400	400	0.0091
Macrolide					
8	Azithromycin	J01FA10	300	506.6	2.3308
Flouroquinolones					
9	Ciprofloxacin	J01MA02	1000	1042.8	0.1334
10	Levofloxacin	J01MA12	500	500	0.0914
Tetracycline Antibiotic					
11	Doxycycline	J01AA02	100	136.36	0.1371

Table 10: Comparison of PDD and DDD

PDD > DDD	PDD < DDD	PDD = DDD
Amoxicillin (O)	Amoxacillin (P)	Levofloxacin
Cefuroxime	Cefotaxime	Cefpodoxime
Ceftriaxone	Cefadroxil	
Azithromycin	Cefixime	
Doxycycline		

The PDD can vary according to both the illness treated and national therapy traditions. For anti-infective, for instance, PDDs vary according to the severity of the infection. The DDDs for most anti-infective are based on treatment of moderately severe infections. In hospital care, much higher doses are frequently used and this must be considered when using the DDD as a unit of measurement.

Discussion and Conclusion

URTIs account for more visits to physicians than any other types of infectious disease(1) and these infections have a considerable economic impact. Respiratory tract infections in general account for more restricted activity and loss of time from work and school than any other category of infections.(3) Moreover, inappropriate and excessive treatment of these infections contributes to the reported problems of resistance among previously susceptible pathogens.(10) Drug utilization studies have the potential to make objective evaluation and analysis of health professionals work and provide them with feedback to stimulate thinking about their practice and looking for ways to improve their own performance. These studies should become a method of increasing job satisfaction and means of education for health professionals, rather than being perceived as threat or another bureaucratic burden.(11) Antibiotic resistance is an emerging problem and has become a major threat to the medical field. Excessive and in appropriate use of antibiotic has been a major contributor to this ever growing problem.(12)Demographic characteristics showed that percentage of females suffering from infection was more than males (Table: 1) In this study the diagnosis of URTI (Non Specific LRTI and Acute Bronchitis) accounted for 56.5%, Sinusitis 28%, pharyngitis 12% and CSOM 3.5%.Further it was noted that a majority of the URTI and Sinusitis were in the age

group of 21-30 years. The reason for admission to the hospital of URTI might be recurrent infection as the chief complaints were not suggestive of the associated illness but they were suggestive of the respiratory tract infection. Out of the 200 case records, culture and sensitivity was done in only 8 cases of URTI and all were sterile. When prescriptions were screened thoroughly, antibiotics were not prescribed in 18 (9%) cases. Rest received antibiotics. The decision to prescribe antibiotics is complex and multifactorial.(5) However, almost 75% of adults with URTIs are prescribed antibiotics by their physicians. There is now clinical evidence that active bacterial eradication is also necessary in achieving optimal clinical success in upper respiratory tract infection.(6) Only few trials have mentioned the positive and the beneficial effect of the antibiotic treatment.(13) Most of the drugs are prescribed by brand name. Prescribing by generic name helps the hospital pharmacy to have better inventory control. These will also aid the pharmacy to purchase the drugs on contract basis, as the number of brand is less, reduce the confusion among the pharmacists while dispensing. Generic drugs are often more economic than the branded ones. Prescribing by brand name may be an evidence of vigorous promotional strategies by pharmaceutical companies. Drug consumption data were expressed as defined daily doses (DDD) per 1000 inhabitants per day. The highest value of 2.3308 DDD/1000inhabitants/day was accounted for Azithromycin indicating that it was the popular drug of choice as a broad spectrum antibiotic, followed by ceftriaxone with the value of 1.3025 DDD/1000 inhabitants /day. To conclude, it is evident from the present study that, antibiotics were commonly prescribed in the patients of URTI and is a matter of concern. The most commonly used antibiotic was azithromycin followed by ceftriaxone. Prescribing by generic names has to be encouraged.

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