

STUDY OF PRESCRIBING PATTERN OF ANTIMICROBIAL AGENTS IN SELECTED PATIENTS ATTENDING TERTIARY CARE HOSPITAL IN INDIA

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ABSTRACT: Antibiotics are the most commonly prescribed drugs in hospitals and their irrational use is one of the important factors for the development and spread of resistance. The objective of this study was to evaluate the antibiotic prescription pattern in the patient attending the tertiary care hospital. It was found that a total of 333 antibiotics were prescribed in 245 prescriptions. The average number of antibiotics per prescription was approximately 1.4. The most commonly used antibiotics were moxifloxacin 19.5%, metronidazole 10.4%, amoxicillin + cloxacillin 10.2% and ciprofloxacin 6%. Antibiotics were almost equally prescribed to both male and female. 45.5% of the antibiotics shows adherence with the National List of Essential Medicines of India. 76.6% of the antibiotics were single products while 23.4% were fixed dose combination. The most commonly used dosage forms were tablets (57%), drops (23.5%) and creams (11.7%). 57.3% were prescribed irrationally. Quinolones (48.2%) and antifungals (21.5%) were the most common types of prescribed antibiotics in which irrationality was found.

Key words: Antibiotics, Prescription, Tertiary care hospital, Irrational drug use .

INTRODUCTION

Infectious diseases are responsible for increased rate of mortality, it represents one fifth of the total global deaths (World Health Report 2003). Antibiotics are the one of the important component of modern medicine it plays a vital role in both treatment and prophylaxis of

infectious diseases (Abula and Kadir 2004, World Health Organization 2002). At present it is observed that pathogenic bacteria are becoming resistance to antibiotics at frightening rate (The Indian Science News Association 2006). One of the main cause behind the rise of multi-resistance pathogen is irrational and

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improper use of antibiotics, resulting in serious health hazards to human beings (World Health Organization 2008). World Health Organization (WHO) considered antibiotic abuse as a serious international concern and recognised antibiotic use as a priority in their rational drug use campaign (World Health Organization 2001). Antibiotics resistance now recognised as a world's most serious public health problem that endangers lives of both current and future generations (Abula and Kadir 2004).

Antibiotics are most commonly prescribed drugs in tertiary care hospitals; more than 30% of the hospitalised patients were treated with antibiotics (Shankar *et al.* 2003, Fonseca and Conterno 2004). Rational use of antibiotics is very important to ensure the optimum treatment outcomes and to limit the emergence of bacterial resistance (Shankar *et al.* 2003). Several authors have reported about the expensive, indiscriminate and excessive use of antibiotics that result in antibiotic resistance (Kollef 2001, Niederman 2003, Pulcine *et al.* 2006).

Objective of the study is to determine the antibiotic use in OPD of a tertiary care hospital and to estimate the adherence of prescription to antibiotics to National List of Essential Medicines of India. Other objectives are to determine the rationality in the prescription of antibiotics, to evaluate the most frequently used dosage form of antibiotics.

MATERIALS AND METHODS

This study was conducted in out patient department (OPD) of R.G. Kar Medical College, a tertiary care hospital situated in Kolkata, West Bengal, India.

This study was a cross-sectional study of one month. The sample size was 245. Patient attending OPD of the hospital was included in

the study after written consent. Photo copies of the prescriptions were used to collect the data. Basic demographic information and details of the prescribed antibiotics and their prescribing patterns were noted. Prescriptions of antibiotics were termed to be irrational if either of diagnosis/dose/frequency/duration/strength were not mentioned in the prescription.

Inclusion criteria of the present study was patient attending the OPD of R.G. Kar Medical College & Hospital, willing to participate in the study, whom an antibiotic was prescribed, latest prescription of OPD as per date & legible prescriptions, exclusion criteria was all emergency cases & illegible prescriptions.

RESULTS AND DISCUSSION

For a period of one month a total of 245 legible prescriptions in which an antibiotic was prescribed were selected in this study. Out of total 245 patients 50.2% were male while remaining 49.8% were female. The mean for the patient age was 31.7. It was found that a total of 333 antibiotics were prescribed in 245 prescriptions. The average number of antibiotics per prescription was approximately 1.4. Several antibiotics had been prescribed to the patients, but the most commonly used antibiotics were moxifloxacin 65 (19.5%), metronidazole 35 (10.4%), amoxicillin + cloxacillin 34 (10.2%), ciprofloxacin 20 (6%) followed by the other antibiotics. The most common class of antibiotic in this study were quinolones 94 (28.25%) followed by penicillin's 58 (17.4%) and antifungal 51 (15.3%). Details of the other commonly prescribed class of antibiotics were given in Table 1. No prescription was available containing anti-tubercular, antileprotic, antiviral, carbapenem, chloramphenicol, oxazolidinones.

Table 1: Categories of most commonly used class of antibiotics. (n= 333)

Group	Number	Percentage
Penicillin's	58	17.4
Cephalosporins	24	7.2
Aminoglycosides	18	5.4
Tetracycline	6	1.8
Macrolides	15	4.5
Quinolones	94	28.2
Sulphonamides	19	5.7
Antifungal	51	15.3
Antimalarials	2	0.6
Antiprotozoal	34	10.3
Anthelmintics	12	3.6
Total	333	100

In this study it was seen that antibiotics were almost equally prescribed to both male and female. 69.9% of the total prescribed antibiotics were of broad spectrum. Only 45.10% of the antibiotics showed adherence with the National List of Essential Medicines of India (Fig. 1). 87.7% of the antibiotics were most commonly prescribed by their brand name. Out of total 333 prescribed antibiotics it was found that 76.6% were single products while 23.4% were fixed dose combination (Fig. 2). During the prescription evaluation for antibiotic it was found that provisional, differential diagnosis and finding were not properly mentioned in

27.4%, 58.8% and 60.5 % of the cases where an antibiotic was prescribed. Antibiotics had been prescribed by using various dosage forms but most commonly used dosage forms were tablets (57%), drops (23.5%) and creams (11.7%) followed by syrup (3.9%) and capsule (3.9%) summarized in Table 2.

During the analysis of antibiotic prescription for rationality it was seen that out of total 333 prescribed antibiotics 57.3% were prescribed irrationally (Table 3). Quinolones (48.2%) and antifungals (21.5%) were the most common types of prescribed antibiotics in which irrationality was found followed by aminoglycoside (9.9%), sulphonamides (7.9%), penicilline (7.3%), macrolides (3.7%) and cephalosporins (1.5%). Data are summarized in Table 3. Antibiotics per prescription are an indicator & study reveals that out of 245 prescriptions a total of 333 antibiotics were prescribed *i.e.*, number of antibiotics per prescription was approximately 1.4. The data's are slightly higher than the other studies which were conducted in other parts of India as well

Table 2: Most commonly used dosage form (n=333)

Dosage form	Number of antibiotics	Percentage
Tablets	190	57%
Injections	0	0%
Syrups	13	3.9%
Capsule	13	3.9%
Drops	78	23.5%
Cream	39	11.7%
Total	333	100

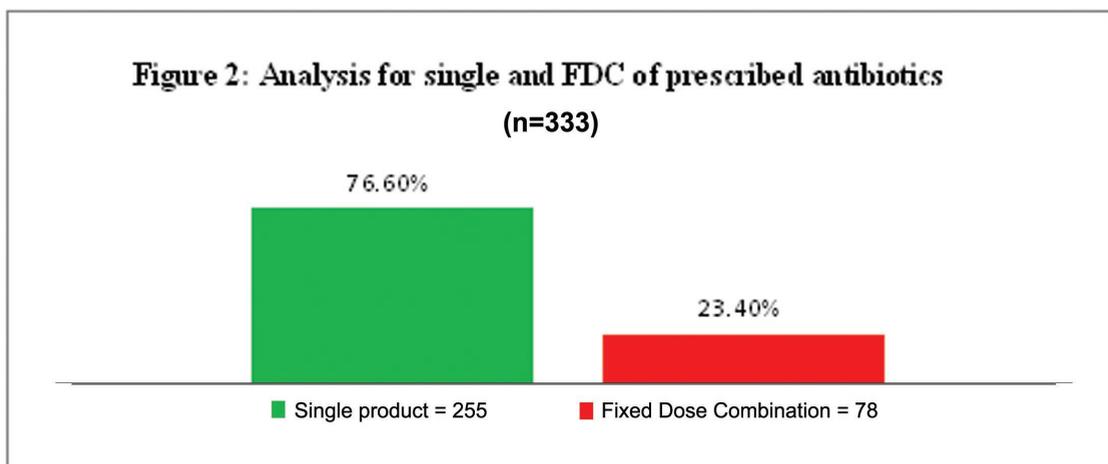
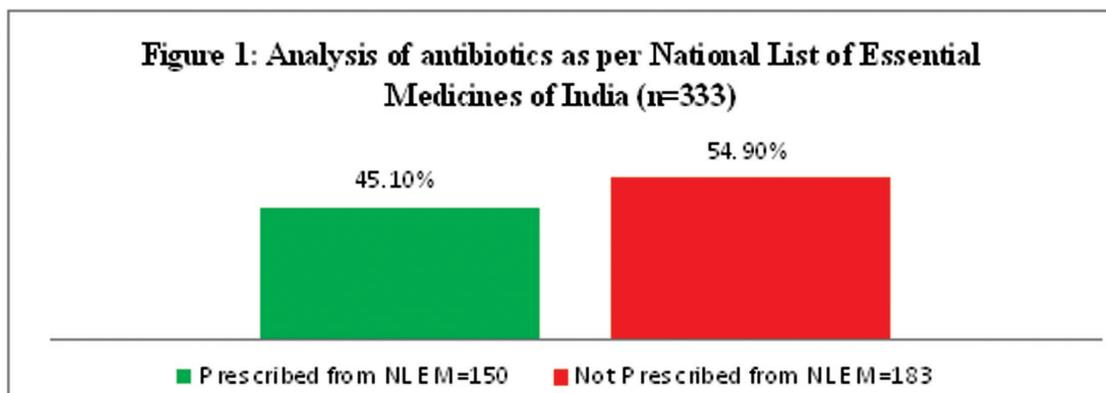
Table 3: Analysis of cases of irrationality in prescription of antibiotics (n=333)

Total Number of antibiotics		Cases of irrationality in prescription of antibiotics	
333		191 (57.3%)	
Classes of antibiotic where irrational use was found			
SN	Antibiotic	Number	Percentage
1	Penicillin	14	7.3
2	Cephalosporins	3	1.5
3	Aminoglycosides	19	9.9
4	Macrolides	7	3.7
5	Quinolones	92	48.2
6	Sulphonamides	15	7.9
7	Antifungal	41	21.5
Total		191	100

as in the world (Abula and Kadir 2004, Ganguly and Arora 2011, Goosens *et al.* 2005, Tunger *et al.* 2009).

In the present study moxifloxacin (19.5%), metronidazole (10.4%), amoxicillin + cloxacillin (10.2%), ciprofloxacin (6%), fluconazole (4.8%) and fusidic acid (4.5%), were the prescribed antibiotics in all the OPD of R.G. Kar Medical College followed by amoxicilline + clavulanic acid (4.3%), albendazole (3.7%) and amoxicilline (3.3%) and some other antibiotics. The most common class of antibiotic in this study were quinolones (28.25%) followed by penicillin's (17.4%) and antifungal 15.3%. Survey by National Hospital Ambulatory care, USA during eight year period (1992-2000) reported that penicillin, tetracycline, sulphonamide, azithromycin, clarithromycin and quinolones were the most

frequently prescribed antibiotics (McCoig *et al.* 2003). Study from northwest Ethiopia, antibiotic usage in the in-patient department of a teaching hospital for a period of three months showed that ampicillin was the most commonly prescribed drugs for prophylaxis and treatment (Abula and Kadir 2004). Study from Turkey indicates that more than one third of the hospitalized patents were received antibiotics. β -lactam, quinolones and third generation cephalosporins were most frequently prescribed drugs in hospitals of Turkey (Tunger *et al.* 2009). A study in Karnataka, India showed that among the all prescribed antibiotics in all the departments' quinolones and nitromidazoles was the most frequently prescribed antibiotics followed by amino-penicillin combinations (Ganguly and Arora 2011). A similar study in Panjab, India showed that antibiotics were the



most frequently drug prescribed in Hospital, which includes amoxicillin (18.04%), ciprofloxacin (15.9%), ofloxacin (14.7%) and erythromycin (11.5%) (Takhar *et al.* 2011).

It was also observed in the present study that 45.1% of the antibiotics were prescribed from the National List of Essential Medicines of India while remaining 54.9% were not from the list. The data's were very similar to a study conducted in a tertiary care hospital in Pondicherry (Topno *et al.* 2012). The data's are slightly better in case of a similar study conducted in Madhya Pradesh (India) (Bhartiy *et al.* 2008). Similar findings were also reported

by some study (Yasmeen *et al.* 2011). The main cause behind this may be, increase in the number of brand drug prescription which is mainly influence by the promotional activities. Proper diagnosis and findings of a disease is very important for prescribing an antibiotic rationally. But in the present study it was found that provisional and differential diagnosis were not mentioned done in 27.4% and 58.8% of the cases respectively while findings were not mentioned in 60.5% of the cases.

Irrational use of antibiotics is a global problem now days. Present study revealed that more than 57% of the antibiotics where

prescribed irrationally. This increases the chances of antibiotic resistance. Despite numerous guidelines from governmental and professional groups, there is broad evidence that antibiotics are prescribed inappropriately in upto 50% of the cases (Goldmann *et al.* 1996). It stated that previous efforts have not worked because medical practice is locally driven, and national guidelines simply do not reflect or determine the system of care and the pattern of practice in individual hospitals (Meyer *et al.* 2007). Several studies have also shown that the administration of antibiotics was inappropriate in 22% to 65% of the patients that received treatment (Giammarino *et al.* 2005). Clinicians showed the consequences of the overuse of antibiotics (Giammarino *et al.* 2005).

CONCLUSION

Wide spectrum of clinical diagnoses and a variety of drugs reduces scope for improving rational use of antimicrobial agents. Antibiotics were prescribed on clinical judgments in majority of the patients rather than taking the specimen of blood or urine for culture. The majority of the prescribing patterns of antibiotics were not accordance with the National List of Essential Medicines of India. The branded antibiotics were prescribed more commonly, with result in increased cost. There is a strong need to control the increased trend of poly-pharmacy by using implementing antibiotic policy. Educational interventions emphasizing rational prescribing, along with a multidirectional effort to create an updated local formulary, and a strict antibiotic prescribing policy with the guidelines of standard treatment along with essential and generic drug concept can help significantly to overcome these problems and to reduce the extent of resistance to antibiotics.

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