

doi: <http://dx.doi.org/10.18203/2319-2003.ijbcp20150385>

Research Article

Prescribing pattern of antimicrobial agents in pediatrics department of a teaching hospital

Satyajit Mohapatra^{1*}, Saswati Tripathy², C. Balaji³, R. Jamuna Rani¹, P. Sekar³

¹Department of Pharmacology, SRM Medical College Hospital and Research Centre, SRM University, Chennai, Tamil Nadu, India,

²Department of Obstetrics and Gynaecology, SRM Medical College Hospital and Research Centre, SRM University, Chennai, Tamil Nadu, India,

³Department of Pediatrics, SRM Medical College Hospital and Research Centre, SRM University, Chennai, Tamil Nadu, India

Received: 16 June 2015

Accepted: 05 July 2015

***Correspondence to:**

Dr. Satyajit Mohapatra
Email: satyajit_mp@yahoo.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Antibiotics are commonly used in pediatric illness and irrational use of antibiotics can lead to bacterial resistance. Appropriate studies should be done to frame proper guidelines for the use of antibiotics in pediatric population. The objective of the study was to determine the prescribing pattern of antibiotics and to analyze the rational use of antibiotics in pediatric department.

Methods: An observational prospective study was carried out for a period of 3 months in the Department of Pediatrics. The data were recorded in the specific format, and the result was analyzed by descriptive statistics.

Results: In this study, 347 prescriptions containing antibiotics were analyzed, out of which 54.6% were of male child and 45.4% were of female child. About 40.6% of the patients were in the age group of 1-5 years. A single antibiotic was prescribed in 78% of patients. Respiratory tract infections were the most common disease (68.2%), followed by skin infections (12.3%), gastrointestinal diseases (9.5%), and fever without focus (6.5%). Cephalosporins were the most commonly prescribed antibiotic group (35%).

Conclusion: Irrational use of antibiotics can lead to bacterial resistance and can worsen the existing disease conditions. So, antibiotics should be prescribed according to the WHO guidelines or other rational strategy, especially in the pediatric age group.

Keywords: Antibiotics, Pediatrics, Rational use of drugs

INTRODUCTION

Infants and children represent a higher proportion of population worldwide. They are the most vulnerable population to contract illnesses. The use of antimicrobial agents, especially the antibiotics are used commonly for the treatment of pediatric illnesses.^{1,2} Infectious diseases are prevalent everywhere in developing countries and antibiotics are commonly prescribed for these. An irrational use of

antibiotics may lead to infections which are worse than the original infections.^{3,4} The pediatricians face a number of challenges in prescribing antimicrobials due to a shortage of appropriate drugs. Apart from that, the development of bacterial resistance has promoted the use of antibiotics judiciously in pediatric age groups. Many studies have found that antibiotics are prescribed in viral infections and respiratory tract infections unnecessarily.⁵ Drug utilization is defined as marketing, distribution, prescription, and use

of drug in the society with emphasis on medical, social, and economic consequences. Proper guidelines should be implemented for use of antibiotics in pediatric age group. Several professional societies have framed the guidelines to reduce the use of antibiotics worldwide by means of various control strategies. These guidelines help the physicians to prescribe the antibiotics to pediatric patients when definitely indicated, for example, WHO model formulary for children, 2010. But, knowledge of prescribing pattern will help to formulate these types of guidelines. So, the present study was undertaken to evaluate the prescribing pattern of antibiotics in a tertiary care teaching hospital.

METHODS

An observational and prospective study was done in the outpatient as well as inpatient Department of Pediatrics, SRM Medical College Hospital and Research Centre, Tamil Nadu during the period of April 2013-June 2013 for a period of 3 months. The Institutional Ethics Committee permission was taken to conduct this study. The prescriptions were selected on the basis of various inclusion and exclusion criteria. The prescriptions which contained at least one antibiotic prescribed in the pediatric age (up to 12 years) were included in the study. Prescriptions which were prescribed from outside the hospital and from other departments were excluded. Patient characteristics such as age, sex, body weight, cases with a previous drug history, duration of hospitalization were noted. The prescription were analyzed for the different WHO prescription indicators like average no of drugs prescribed per patient which is calculated by dividing total no drugs prescribed for all patients by total no of patients, number of antibiotics prescribed per patient, type of prescription (monotherapy or polytherapy), most commonly prescribed antimicrobials, percentage of prescribed drugs with generic name, and percentage of fixed dose combination. Data were collected and were presented as a percentage and mean \pm standard deviation.

RESULTS

The study was done in the department of pediatrics. Based on the inclusion and exclusion criteria a total of 347 prescriptions were collected for evaluation. The patients were divided into three groups based on the different ages. The age group of 1-5 years was the most common group who were prescribed antibiotics (40.6%) as shown in Table 1.

In our study, 271 (78%) of the patients were prescribed one antibiotic, 49 (14%) patients were prescribed two antibiotics, and 27 (8%) patients were given three antibiotics. None of the patients received any combination of four or five antibiotics (Table 2). The average no of antibiotics prescribed was 1.21 \pm 0.56.

Respiratory infections like pneumonia, upper respiratory tract infections, and lower respiratory tract infections

Table 1: Demographic profile of the pediatric patients.

Age	n (%)
1-month to 1-year	102 (29.5)
1-5 year	141 (40.6)
5-12 year	104 (29.9)
Sex	
Male child	189 (54.6)
Female child	158 (45.4)

Table 2: Number of antibiotics prescribed to pediatric patients.

Number of antibiotics/patient	Number of prescriptions (%)	Total no of antibiotics prescribed
01	271 (78)	271
02	49 (14)	98
03	27 (08)	81
04	00	00
05	00	00
Total	347	450
Average antibiotics (mean \pm SD)	1.21 \pm 0.56	

SD: Standard deviation

(68.2%) were the most common disease among the pediatric patients. Skin infections (impetigo) accounted for 12.3% followed by gastrointestinal disorders (9.5%), fever without focus (6.5%) and others (3.5%) (Figure 1).

In this study we found that out of 450 drugs prescribed, the parental route was used for 297 (66%) of drugs and the oral route was used for 153 (34%) of drugs. As shown in Figure 2 cephalosporins (35%) were the most commonly prescribed antibiotic among all the drugs followed by penicillin groups (33%) and aminoglycosides (13%). Among penicillin, amoxicillin was the most common. Injectable cephalosporin like ceftriaxone and cefotaxime (85.7%) prescribed in children with or without localized infections. Fever more than 3 days were prescribed antibiotics without supporting evidence of blood tests or culture.

DISCUSSION

In the present study, the total percentage of male patients was 56.4% as compared to the 45.4% of female patients. The study done by Choudhury and Bezbaruah has shown that male patients were 59.3% as compared to 41.7% of female patients.⁶ Similar findings were found in other studies.^{7,8} In our study, we have observed that the pediatric patients of age group 1-5 years had received a maximum number of antibiotics as compared to the infants and more than 5 years group. This is in contrast to the studies done by

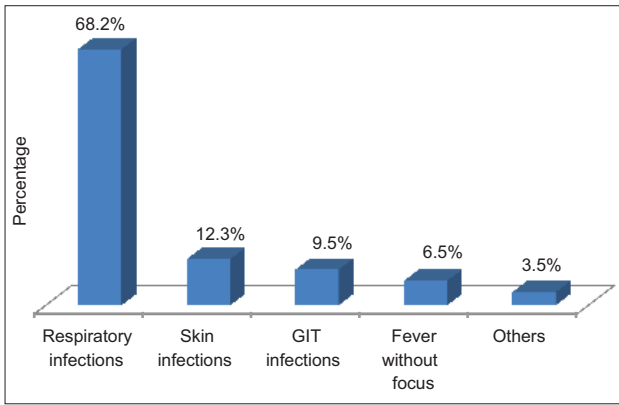


Figure 1: Percentage distribution of different disease conditions.

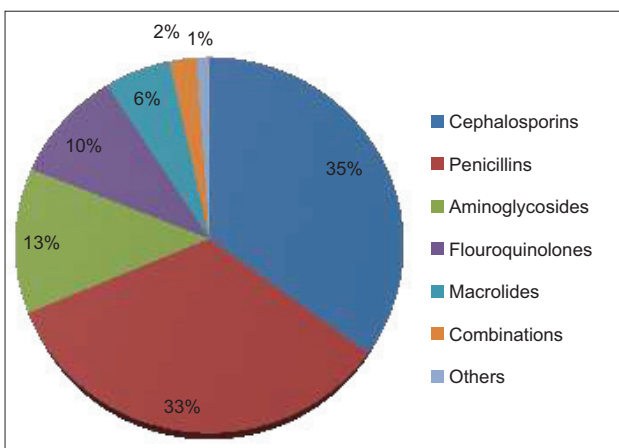


Figure 2: Percentage distribution of the prescribed antibiotics.

Choudhury and Bezbaruah who have observed that patients of age group 5-12 years have received maximum antibiotics, Palikhe has shown that infants <1 year, and Van Houten et al. has shown that patients <2 years have received antibiotics more commonly.^{6,7,9}

In this study, more number of pediatric patients received single antibiotic which is similar to the study done by Choudhury and Bezbaruah⁶ Most of the studies have shown that different number of antibiotics are prescribed to the pediatric patients.^{7,9,10} The differences in the no of antibiotics prescribed may be due to the differences in the clinical conditions and hospital protocol.

Antibiotics are the most commonly prescribed drugs in the hospital. About 30% of the hospitalized patients are treated with antibiotics.¹¹ According to our study, respiratory tract infection was the most common indication for the prescribed antibiotics followed by Skin infections and gastrointestinal infections. Similar studies have shown that respiratory tract infections are the most common indications for antibiotics.¹² The study was done by Sriram et al. has shown that gastroenteritis was the most common disorder for prescribing antibiotics and pneumonia at the bottom

of the list.¹⁰ A similar study have reported that otitis media accounted for the majority of antibiotic courses dispensed.¹³ The differences in the disease conditions may be due to the difference in the time period during which these studies were conducted as well as the prevalence of the diseases during these time period.

In this study, most of the pediatric patients received parental antibiotics. The antibiotics prescribed by the oral route was also quiet a good number (34%). This may be due the oral drugs are prescribed in the outpatient department more commonly as compared to the inpatient. Similar studies have shown that varying percentage of parentally prescribed antibiotics.^{7,8,10} Cephalosporins were the most commonly prescribed antibiotics followed by penicillin, aminoglycosides, fluoroquinolones, and macrolide. Similar findings have been shown by studies done by Choudhury and Bezbaruah, Sriram et al.^{6,10} In a combination of antibiotics, amoxicillin with clavulanic acid and ceftriaxone with sulbactam were the most commonly prescribed to the patients.

CONCLUSION

In our study, respiratory infections were the most common disease seen followed by skin, gastrointestinal infections. The most common antibiotic prescribed in outpatient children was amoxicillin (69.4%). Injectable cephalosporins like ceftriaxone and cefotaxime (85.7%) were prescribed among the inpatient children with or without localized infections. Fever more than 3 days were prescribed antibiotics without supporting evidence of blood tests or culture. Prescribing of antimicrobials has been reduced in the outpatient children. Prescribing drugs by generic name should be encouraged. But, some irrational prescribing practice still existing, which should be addressed properly to prevent bacterial resistance and guidelines for the treatment of pediatric patients should be updated.

ACKNOWLEDGMENTS

We are thankful to Dr. A Prema, former HOD and Professor and other staffs of dept of pediatrics for their cooperation during the study.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Sanz EJ, Bergman U, Dahlstorm M. Paediatric drug prescribing. *Eur J Clin Pharmacol.* 1989;37(1):65-8.
2. Summers RS, Summers B. Drug prescribing in paediatrics. *Ann Trop Paediatr.* 1986;6(2):129-33.
3. Principi N, Marchisio P, Sher D, Boccazzi A, Moresco RC, Viola G, et al. Control of antibiotic therapy in paediatric

- patients. *Dev Pharmacol Ther*. 1981;2(3):145-55.
4. Schollenberg E, Albritton WL. Antibiotic misuse in a pediatric teaching hospital. *Can Med Assoc J*. 1980;122(1):49-52.
5. Dr. Ipp M. Reduced antibiotic use in a Paediatric practice: Practical office strategies based on current evidence. Published in June 2000. Available at <http://sites.utoronto.ca/kids/aboveruse.htm>.
6. Choudhury DK, Bezbaruah BK. Antibiotic prescriptions pattern in paediatric in-patient department Gauhati medical college and hospital, Guwahati. *J App Pharm Sci*. 2013;3(8):144-8.
7. Palikhe N. Prescribing pattern of antibiotics in pediatric hospital of Kathmandu valley. *J Nepal Health Res Counc*. 2004;2(2):31-6.
8. Orrett FA, Changoor E, Maharaj N. Pediatric drug prescribing in a regional Hospital in Trinidad. *J Chin Clin Med*. 2010;5(3):157.
9. van Houten MA, Luinge K, Laseur M, Kimpen JL. Antibiotic utilisation for hospitalised paediatric patients. *Int J Antimicrob Agents*. 1998;10(2):161-4.
10. Sriram S, Leo M, Manjula Devi AS, Rajalingam B, Ramkumar K, Rajeswari R. Assessment of antibiotic use in pediatric patients at a tertiary care teaching hospital. *Indian J Pharm Pract*. 2008;1(1):30-6.
11. van der Meer JW, Gyssens IC. Quality of antimicrobial drug prescription in hospital. *Clin Microbiol Infect*. 2001;7 Suppl 6:12-5.
12. Feleke M, Yenit W, Lenjisa JL. Prescribing pattern of antibiotics in pediatric wards of Bishoftu Hospital, East Ethiopia. *Int J Basic Clin Pharmacol*. 2013;2(6):718-22.
13. Finkelstein JA, Stille C, Nordin J, Davis R, Raebel MA, Roblin D, et al. Reduction in antibiotic use among US children, 1996-2000. *Pediatrics*. 2003;112(3):620-7.

Cite this article as: Mohapatra S, Tripathy S, Balaji C, Rani RJ, Sekar P. Prescribing pattern of antimicrobial agents in pediatrics department of a teaching hospital. *Int J Basic Clin Pharmacol* 2015;4:753-6.