

INCIDENCE OF ANTIBIOTIC USE IN PEDIATRIC INFECTIONS AND ENHANCING OPTIMAL ANTIBIOTIC UTILIZATION THROUGH PATIENT COUNSELING**K. Gayathri^{*1}, R. Priyanka¹, G. Sowjanya¹, K. Amulya¹, Dr. G. Ramesh² and Dr. P. Srinivasa**¹Vignan Pharmacy College, Vadlamudi, Guntur.²Assistant Professor and HOD, Department of Pediatrics, Ramesh Hospitals, Guntur.***Corresponding Author: K. Gayathri**

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ABSTRACT

Antibiotics are considered as one of the most commonly sold drug classes in the Received 20/02/2016 developing countries. children have the high rates of minor infection, because of their increased susceptibility to serious bacterial infection, and they are frequently prescribed with antibiotics. Although antibiotics have been a major breakthrough in promoting and securing the health of children, the implications of antibiotic resistance are that we are losing antibiotics that are able to treat common infections in children. . The successful antibiotic treatment depends on rapid diagnosis. In children and infants below 18 years of age the absorption distribution metabolism and elimination of drugs may differ interventions comparison with adults. In this article we are generally describing the unwanted effects of over usage of antibiotics in infants and children and discuss the proper usage of antibiotics in children and risk factor of being parents having low education and illiteracy and unaware of usage of antibiotics in children. To overcome this over usage of antibiotics in pediatrics three criteria were documented antibiotics are not indicated at all using clinical evidence to justify the need for antibiotics diagnostic testing confirming the need for antibiotics. The main aim of the study was to evaluate the antibiotics utilization pattern and check the adherence to the antibiotic policy in pediatric patients of a tertiary care teaching hospital.

KEYWORDS: Antibiotics, interaction, pediatrics, utilization.**INTRODUCTION**

The term “antibiotic “was introduced by S. A Waksman in 1942 the term “antibiotic” was clearly differed from the term “chemotherapeutic drug. The most commonly prescribed drugs among pediatrics are antibiotics.^[1] The resistance developed due to the irrational use of antibiotics is a global public health problem.^[2] Children have high rates of minor infection, and because of their increased susceptibility to serious bacterial infection, they are frequently prescribed with antibiotics. There is a concern that there may be an increasing bacterial resistance in childhood and that changes in childcare practices, particularly the marked increase of day care in pre-school groups, may lead to increasing transfer of antibiotic-resistant organisms within these environments.^[3] Infections caused by resistant pathogens have a significant impact on patient morbidity and mortality.^[4] Although antibiotics act against bacteria and have no effect on viral agents it is often prescribed to treat viral infections, such as Upper Respiratory Tract Infections (URTIs). Inappropriate use of antibiotics leads to development of antibacterial resistance, increasing the burden of chronic diseases, raising costs of health services, development of side effects (e.g. adverse

gastrointestinal effects), whenever the child gets infected with the same infection he requires higher dose. Antibiotic misuse was mostly seen in children, especially when the child is presenting with viral upper respiratory tract infections (URTIs). The implications of antibiotics resistance are that we are losing antibiotics that are able to treat common infections in children. Contributing factors for antibiotics are seen both at the patient’s (or parents of children) level and doctor’s level, namely: cultural factors, behavioural characteristics, self-medication, socio-economic status, and level of education. Main reasons for antibiotics over usage in pediatrics are antibiotics are still prescribed though they are not absolutely necessary.

MATERIALS AND METHODS

This prospective observational study was conducted for a period of 6 months in the inpatient Department of Pediatrics of a tertiary care teaching hospital after getting approval from the Research and Ethics Committee. 50 children from 1 month to 18 years age of either sex admitted to pediatric ward prescribed with antibiotics were included for the study, after getting informed consent from their parents. The patient demographic

details, diagnosis, pharmacotherapy details were noted down in the predesigned pro forma on the day of admission. The lab data were noted down on follow-up. The patient charts were followed up throughout the period of hospitalization for drug interactions. The antibiotic utilization pattern was studied from the revised antibiotic prescribing policy of the Department of Pediatrics. The drug interactions were found using drugs.com.

RESULTS

Majority of children were in the age group of 1-5 years ($n = 29$; 40%), followed by children <1 year ($n = 19$; 20%). Male children constitute more ($n = 45$; 51%). The diagnosis of children was shown in Table 1.

Diagnosis	N=50 (%)
Enteric fever	14 (19)
UTI	16 (21)
URTI	12 (14)
Dengue	9 (10)
Sepsis	7 (8)
Pneumonia	6 (7)
Dysentery	5 (6)
Scrub typhus	5 (6)
Meningitis	4 (4)
URTI: Upper respiratory tract infection	
UTI: Urinary tract infection	

Majority of children were diagnosed with enteric fever and urinary tract infection (UTI) ($n = 9$; 14%), followed by upper respiratory tract infection (URTI) ($n = 11$; 14%).

The indication for starting antibiotics was clinical in 23 children (40%), definitive in 10 children (14%), and prophylactic in 2 children (4%).

The adherence of prescribed antibiotics was checked and it was found that complete adherence was seen in 45 children (53%).

Medication errors were found in 10 prescriptions (12%). The medication errors include wrong dose error, omission error, extra dose error, and wrong time error and were depicted in Table 2.

Type	N=10 (%)
Wrong dose error	4 (24.66)
Omission error	4 (26.66)
Extra dose error	4 (26.66)
Wrong time error	3 (20)

The culture tests were done in 53 children. Blood culture was done in 32 children and urine culture in 21 children. Positive culture tests were obtained – 24 in blood culture and 15 in urine culture. The causative organism along with the diagnosis was shown in Table 3.

Diagnosis	N	Causative organism
Blood culture (N=24)		
Enteric fever	16	<i>Salmonella typhi</i>
Sepsis	6	<i>Neisseria meningitidis</i>
Dysentery	2	<i>Shigella</i>
Urine culture (N=15)		
Enteric fever	3	<i>Salmonella typhi</i>
UTI	9	<i>Escherichia coli</i>
Dysentery	3	<i>Shigella</i>

Majority of the children were prescribed with cephalosporins ($n = 43$; 50%), followed by aminoglycosides ($n = 18$; 21%). The class of antibiotics prescribed was shown in Table 4.

Class of antibiotics	N=50 (%)
Cephalosporins	43 (50)
Aminoglycosides	18 (21)
Penicillins	14 (17)
Tetracyclines	4 (2)
Metronidazole	2 (2)
Fluoroquinolones	2 (2)
Piperacillin	1 (1)

Antibiotics were prescribed for duration of 1-5 days in 42 children (59%), 6-10 days in 14 children (9%), and more than 10 days in 11 children (12%).

Among the 50 prescriptions, 44 prescriptions contained intravenous therapy, and 2 prescriptions had an intravenous to oral conversion of antibiotics.

The antibiotics prescribed were compared with the hospital guidelines, and the same was given in Table 5.

Diagnosis	Drugs to be prescribed as per guidelines	Drugs prescribed
Pneumonia	Amoxicillin	Amoxicillin
UTI	Ampicillin+aminoglycoside Or Cefotaxime/ceftriaxone	Ceftriaxone+amikacin
Enteric fever	Ceftriaxone/cefotaxime	Ceftriaxone
Sepsis	Cefotaxime/ceftriaxone+amikacin Cefotaxime/ceftriaxone	Cefotaxime+amikacin
Acute dysentery	Ciprofloxacin (first line) Cefixime, ceftriaxone, cefotaxime (alternative therapy)	Ceftriaxone, ciprofloxacin, Cefotaxime

DISCUSSION

The most commonly prescribed drugs in children are antibiotics. The inappropriate and excessive use of antibiotics is a major public health issue^[5] This study utilized the revised guidelines of antibiotic use in the Department of Pediatrics. This study analysis focused on antibiotic prescriptions for hospitalized child patients from the average time of hospitalization associated with antibiotic therapy, the range of antibiotics used and the appropriateness of the antibiotic utilization. Nowadays, we are dealing with problems due to increasing health-care costs and the development of antibiotic resistance. Recent studies proved an association between antibiotics use and resistance development. Due to these emergent threats it is essential to be informed regularly about the antibiotics use in the hospital.^[6] Over 50% of 90 antibiotic prescriptions were started on a clinical basis, without confirmation of a bacterial infection. In this study, amoxicillin was prescribed for pneumonia. It is in contrast to the study conducted Most of the prescriptions in this study contained the antibiotics given on empirical basis, i.e. without the confirmation of the diagnosis. This finding is similar to the study conducted by Hekster *et al.*,^[7] which reported that the antibiotic prescription is independent of the diagnosis in over 50% of the hospitalized children. by Palikhe,^[8] which reported that the benzyl penicillin and gentamicin/cefotaxime were used in case of pneumonia. In this study, URTIs are much less common which shows a significant decline in the use of inappropriate antibiotics for these conditions. This study also identified a substantial increase in the use of third generation cephalosporins in case of UTIs which is similar to the study conducted by Copp *et al.*,^[9] which reported the use of broad spectrum antibiotics in approximately one third of the UTI antibiotic visits which is an example of overprescribing broad spectrum antibiotics on the basis of empirical therapy. In this study, we identified 67 (74.4%) nonsignificant drug interactions, 13 (14.4%) minor, 10 (11.1%) moderate, and nil major interactions. We found that 83.33% of the patients had complete adherence to the prescribed medication. There were 26.66% wrong dose errors, 26.66% omission errors, 26.66% extra dose errors, and 20% other errors which do not fit into the above categories.

CONCLUSION

A high percentage of 90 hospitalized children received antibiotics on a clinical basis, without the proof of bacterial infection, nor before the start of therapy neither afterward. The antibiotic resistance develops in the same setting. The control on antibiotic use should focus on these patient populations. There was 83.33% complete adherence to the prescribed medication, no significant drug interactions were found in this study. Pharmacist plays a major role in monitoring, adherence of drug according to the guidelines, and drug interactions. This study helps to promote appropriate antibiotic usage and serve as a check mark to the health-care professionals.

REFERENCES

1. Palikhe N. Prescribing pattern of antibiotics in paediatric hospital of Kathmandu valley. Kathmandu Univ Med J (KUMJ), 2004; 2: 6-12.
2. Togoobaatar G, Ikeda N, Ali M, Sonomjamts M,
3. Dashdemberel S, Mori R, *et al.* Survey of non-prescribed use of antibiotics for children in an urban community in Mongolia. Bull World Health Organ, 2010; 88: 930-6.
4. Sharland M; SACAR Paediatric Subgroup. The use of antibacterials in children: A report of the Specialist Advisory Committee on Antimicrobial Resistance (SACAR) paediatric subgroup. J Antimicrob Chemother, 2007; 60(1): i15-26.
5. Gerber JS, Newland JG, Coffin SE, Hall M, Thurm C, Prasad PA, *et al.* Variability in antibiotic use at children's hospitals. Pediatrics, 2010; 126: 1067-73.
6. Palikhe N. Prescribing pattern of antibiotics in paediatric hospital of Kathmandu valley. Kathmandu Univ Med J (KUMJ), 2004; 2: 6-12.
7. Avorn J, Harvey K, Soumerai SB, Herxheimer A, Plumridge R, Bardelay G. Information and education as determinants of antibiotic use: Report of task force 5. Rev Infect Dis, 1987; 9(3): S286-96.
8. Hekster YA, Vree TB, Goris RJ, Boerema JB. The defined daily dose per 100 bed-days as a unit of comparison and a parameter for studying antimicrobial drug use in a university hospital. A retrospective study of the effects of guidelines and audit on antimicrobial drug use. J Clin Hosp Pharm, 1982; 7: 251-60.
9. Palikhe N. Prescribing pattern of antibiotics in paediatric hospital of Kathmandu valley. Kathmandu Univ Med J (KUMJ) 2004; 2: 6-12.
10. Copp HL, Shapiro DJ, Hersh AL. National ambulatory antibiotic prescribing patterns for pediatric urinary tract infection, 1998-2007. Pediatrics, 2011; 127: 1027-33.