

ANTIBIOTICS PRESCRIPTION PATTERN IN PEDIATRIC AT DISTRICT GENERAL HOSPITAL: A CASE STUDY**Mulchand Shende^{1*}, Poonam Gade², Sachin Dongre² and Raksha Tayade²**¹Department of Pharmacy Practice, Government College of Pharmacy, Kathora Naka, Amravati, Maharashtra- 444604, India.²Pharm. D Intern, Department of Pharmacy Practice, Government College of Pharmacy, Kathora Naka, Amravati, Maharashtra- 444604, India.***Corresponding Author: Mulchand Shende**

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Article Received on 09/11/2018

Article Revised on 29/11/2018

Article Accepted on 19/12/2018

ABSTRACT

In pediatrics, the continuously increase use of antibiotics contributes to the emergence of antibiotic resistance. The present study was to investigate selective antibiotics prescription pattern in pediatric population in district general hospital, Amravati. The prospective observational study was conducted in hospital for six months. All patients of either sex aged <16 years receiving antibiotics were included and the prescribing pattern of antibiotics were reviewed. 120 pediatric populations of various departments from October 2017 to March 2018 were observed and retrieved from the record section in district general hospital. The parameters such as antibiotics use, rationality and comorbid diseases were assessed and analyzed in pediatric population. It was observed that the most frequently in the pediatric age group aminoglycoside and 3rd generation cephalosporins including gentamicin, cefotaxime, ceftriaxone, amikacin and amoxicillin. The most common indications for these drugs were used for lower respiratory tract infection (LRTI), upper respiratory tract infection (URTI), acute febrile illness (AFI) and acute gastroenteritis (AGE). Many of the drug use in the hospital for particular indications were found to be rational as compared to the irrational use. Hence, the present study concludes that the prescribing pattern of antibiotics in the pediatric patient of the hospital is found to be rational according to the guidelines.

KEYWORDS: Pediatric, Antibiotics, Prescription pattern.**INTRODUCTION**

The use of antibiotics is become a routine practice for the treatment of pediatric illnesses. It is commonly prescribed for children with conditions for which they provide no benefit, including viral respiratory infections such as the common cold. Broad-spectrum antibiotic use is increasing which adds unnecessary cost and promotes the development of antibiotic resistance.^[1] The rising incidence of bacterial resistance to commonly used antibiotics, particularly the emergence of multi-drug resistant organisms has made it mandatory that antibiotics are used in pediatrics practice.^[2] In pediatrics, the continuously increase use of antibiotics contributes to the emergence of antibiotic resistance. The society face huge challenges in rational use of antimicrobials starting with general lack of awareness and unsatisfactory levels of personal hygiene and environmental sanitation to lack of surveillance mechanisms for monitoring antimicrobial use and resistance, mostly empirical use of antibiotics due to dearth of microbiology laboratory support, absence of or ineffective antibiotic use policies in most healthcare settings and nonhuman use of antimicrobials.^[3] With widespread use of antibiotics, the

prevalence of resistance also increases. The rising prevalence of penicillin-resistant pneumococci worldwide mandates selective susceptibility testing and epidemiological investigations during outbreaks.^[4] Considering the prevalence of use of antibiotics, the present study was aimed to investigate listed antibiotics prescription pattern to inappropriate antibiotic use in pediatric population in district general hospital throughout six months.

MATERIAL AND METHODS

Prospective observational, non-interventional study was conducted for six months at government district general hospital, Amravati under pharmacy practice centre of Pharm.D at Government College of Pharmacy, Amravati, Maharashtra. Patient was informed about the purpose of the study and written consent was taken prior to their participation in the study. Ethical considerations including obtaining permission from the Ethics Committee of the Government College of Pharmacy to provide the management of hospitals, informed consent to participate in research of samples, ensure the

confidentiality of the information received and used only for research purposes were fully met.

Inclusion and exclusion criteria

Patients of either sex age from 1 month to 16 years admitted to the department of pediatrics, medicine wards and intensive care unit (ICU). Patients of either sex aged >16 years of age, patient not willing to sign consent, unconscious patients were excluded.

Subjects, data source, record proforma and data analysis

Records of 120 pediatric populations of various departments from October 2017 to March 2018 in district general hospital, Amravati and data was collected on a prevalidated case record proforma. Patient data relevant to the study has been collected from treatment charts/case sheets, laboratory reports and patient or patient's caregiver's interview by using patient data collection form. The data generated in this study were analyzed for ADR, reporting of ADRs, appropriateness of drug, dose, frequency and duration.

RESULTS

Age distribution and antibiotics used in pediatric population

The age groups were classified as per USFDA guidelines as neonates which include patients with age group from birth to 1 month of age, infants which includes the patients with age group from 1 month to 2 years of age, 3rd classification includes the children which consists of age group from 2 years to 12 years of age, and the last class includes the patients of group 12 years to <16 years of age, called as adolescents. Among the study of 120 patients, antimicrobials agents were used 340 times. Gentamicin is used in the frequency of 59; this indicates that gentamicin being a broad spectrum antibiotic was used more frequently among the pediatric population. Cefotaxim and ceftriaxone are mostly prescribed antibiotic in children as they have certain advantages that have made them a popular choice among pediatrician in the world. Moreover, Amoxicillin and amikacin are also among most frequently used drugs with frequency of 34 and 32 respectively. Framycetin (1), ketoconazole (1), tazobactam (1), albendazole (3), cotrimoxazole (3), doxycycline (2), azithromycin (2) etc were the least frequent antimicrobial agents used in the prescription, of pediatric population. This indicates that these antimicrobial agents are not commonly used in pediatric population.

Use of gentamicin for various indications and rationality

Frequency and gentamicin used in particular indications is given in Fig. 1 and data is depicted in Table 1.

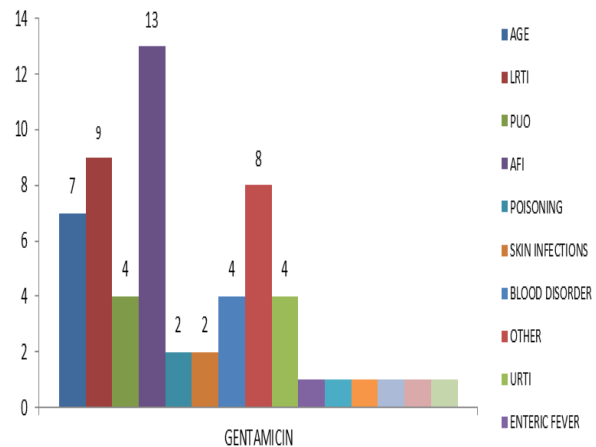


Fig. 1: Frequency of gentamicin for various indications

Table 1: Gentamicin used in particular indications.

Type of Infection	Frequency Among Patients
Respiratory	30
Blood Disorder	30
GIT	24
Other	27
UTI	4
Skin Infection	3
CNS	13
Immune System	34

Gentamicin was used most commonly for the indication of Acute febrile illness (13), Lower respiratory tract infection (9), other indications such as seizures, gluteal abscess (8), Acute gastroenteritis (7) and there was seen a slight use of gentamicin in indications such as jaundice (1), hepatitis (1), hiatus hernia (1), kerosene poisoning (1) and diesel poisoning (1), skin infections (2) such as candidiasis etc. Rationality of Gentamicin in particular indications is given in table 2. The rationality of gentamicin shows that among, 9 indications for gentamicin, there was rational use of gentamicin in only 4 cases those are, LRTI, PUO, AFI, blood infections such as septicemia, secondary infections due to thalassemia etc.

Table 2: Rationality of gentamicin in particular indications.

Indications of Gentamicin	Rationality
AGE	No
LRTI	Yes
PUO	Yes
AFI	Yes
Poisoning	No
Skin infections	No
Blood infections	Yes
URTI	No
Others	No

Use of Cefotaxim, Ceftriaxone, Amoxicillin and Amikacin for various indications

Fig. 2 indicates that Cefotaxim was used as the choice of drug in many indications such as acute febrile illness,

AGE, LRTI, UTI, enteric fever, CNS related diseases, fractures, blood infections and skin infection.

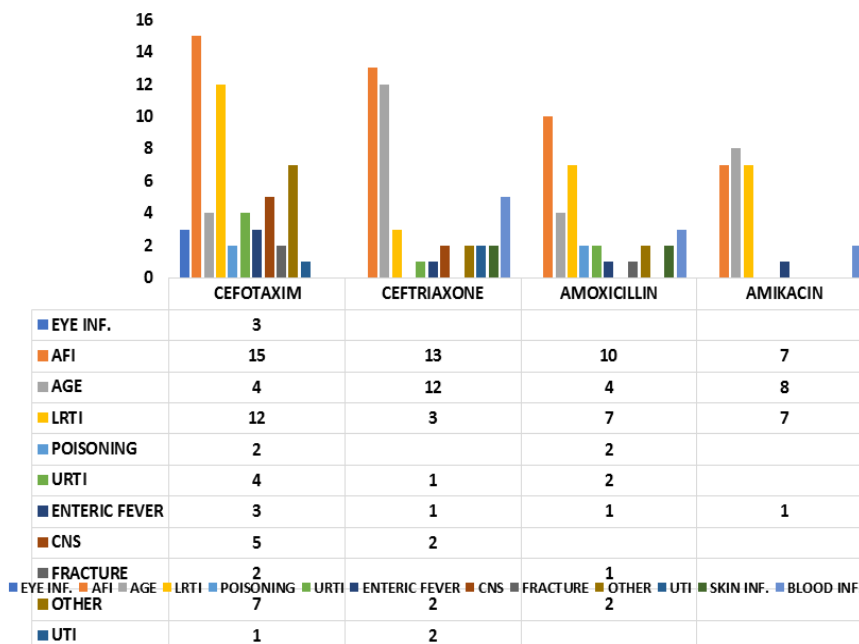


Fig. 2: Indication for Cefotaxim, Ceftriaxone, Amoxicillin and Amikacin.

Frequency of route of administration

Table 3 is represents the data regarding frequency of use of antimicrobial by various routes. In our study the drugs were administered most frequently through intravenous route (67%), oral route was used in 30% of patients, and administration by other routes was found to be (3%). Administration through other routes includes topical application and eye drops.

Table 3: Frequency of route of administration.

Route of Administration	Frequency of use	% Frequency
ORAL	46	30
INTRAVENOUS	101	67
OTHER	5	3

The frequency of administration of the drug was observed through BD route (65%), 30% of drugs was given thrice daily (30%) and only 5% of drugs were used once daily.

Disease wise distribution

Fig. 3 data shows the distribution of diseases most common in the pediatric population of 120 patients. Among these indications diseases related to immune system (20%), respiratory system (18%) and blood related disorders (18%) were most common.^[1] Other indications such as urinary tract infection, CNS related disorders; skin infections were less frequently occurring. Among the study of 120 patients, 94 patients were found in which patient counseling was performed and 26

patients were seen in which patient counseling was not performed. It was found from the study that among 120 prescriptions, interactions were found in 42 patients and there were no interactions seen in 78 prescriptions. Among 42 prescriptions 33 minor ADR's, 18 major ADR's which require significant monitoring and 4 serious ADR's were found.

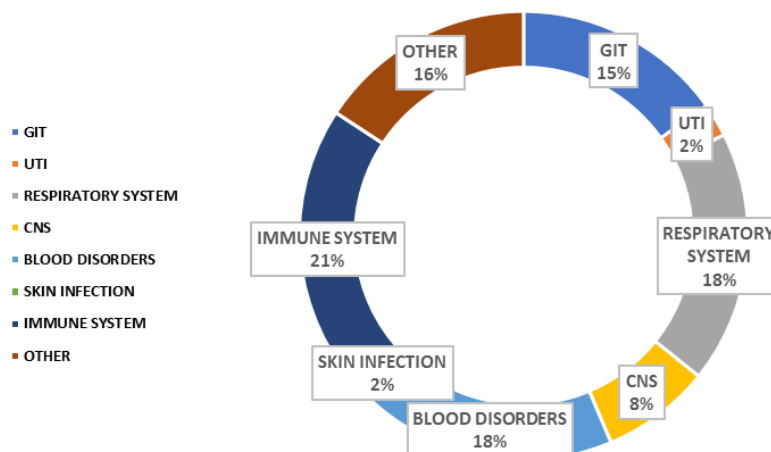


Fig. 4: Disease wise distributions of data.

There were 34 prescriptions in which 1 interaction was found, 4 interactions in 1 prescription, 2 interactions in 4 prescriptions and 3 interactions in 3 prescriptions were found. 14 prescriptions were seen in which interaction was between 2 antimicrobial agents. Interaction of antimicrobial agent with other non- antimicrobial agent was seen in 28 prescriptions and 13 prescriptions shown interaction of non- antimicrobial agent with non-antimicrobial agent.

DISCUSSION

Frequency of occurrence of diseases was seen to be more in the age group of 2 years to 12 years of age. Only 1 patient from the adolescent age group was found. 40 patients among 120 patients belong to the infant age group. In our study showed the most frequently used antimicrobial agents example; Gentamycin, ampicillin, amoxicillin, cefotaxim, pipozo, ciprofloxacin, metronidazole, amikacin, artesunate, cotrimoxazole, doxycycline, tazobactam, piperacillin, framycetin, amoxclav, furazolidone etc. Gentamycin was among the most commonly prescribed drugs, which was prescribed in 59 pediatric patients for various indications such as AGE, LRTI, URTI, Otitis media infection, kerosene poisoning, diesel poisoning, hiatus hernia, stomatitis, hepatitis, jaundice and enteric fever. There was a frequent use of gentamicin in pediatric population for indication such as acute febrile illness. The irrational antibiotic prescribing in the children has major impact on the future of the children, because it will increase the potential for the emergence of antibiotic resistance while discovery of newer types of antibiotics that could counter the resistant organisms is in its all-time low Muslim et. al. [5] As from Fig. 1 gentamicin was used most frequently our study was conducted to find out whether the use of gentamicin was rational or irrational.[6] The rationality of gentamicin shows that among, 9 indications for gentamicin, there was rational use of gentamicin in only 4 cases those are, LRTI, PUO, AFI, blood infections such as septicemia, secondary infections due to thalassemia etc. The data is reported by Marianne Sutton et al., clinical guidelines for diagnosis and treatment manual, for curative programmes in hospitals and

dispensaries, guidance for prescribing to check the rationality of gentamicin in the given indications.[7] There was irrational use of gentamicin in indications such as Gluteal abscess, UTI, skin infections, acute gastroenteritis.[8] Cefotaxim was most commonly used in AFI in frequency of 15, and its use in LRTI was slightly less (12). Other antimicrobial agents such as Ceftriaxone is also most frequently used in AFI and used 12 times in case of AGE. Ceftriaxone was used with the frequency of 5 in Blood related infections. Amoxicillin is used most commonly in AGE (10) and less common in LRTI (7). Similarly for Amikacin is used most commonly in AGE (8) and equally used in AFI and LRTI. The less common indications of these drugs are Poisoning, fracture, eye infections, skin infections etc. In our study we find that maximum antimicrobial agents were given through BD route (65%), 30% of drugs were given thrice daily (30%) and only 5% of drugs were used once daily. A similar study was found in the study conducted in Banglore, Prescribing pattern of Antibiotic in pediatric inpatient department of a tertiary care training teaching hospital, by Laya Vahdati Rad et al. in 2015.[9] The data was distributed as per most common diseases occurring in the pediatric population such as diseases related to immune system, blood disorders, CNS related diseases, urinary tract infection, blood disorders, skin infections. The data about the duration of stay of pediatric patients in the hospital shows that 58% of the pediatric population stayed for 4-5 days in the hospital and 1% case of longer stay; 28 days was seen in 1 patient.[10] Among the study of 120 patients, 94 patients were found in which patient counseling was performed and 26 patients were seen in which patient counseling was not performed. Two antimicrobial related ADR's were observed in the pediatric age group. The drug-drug interactions were observed in many cases, but many of the drug use in the hospital for particular indications were found to be rational as compared to the irrational use.

CONCLUSION

In conclusion, the most common indications for gentamicin and cephalosporins were used for treating LRTI, URTI, AFI and AGE. Antibiotics are used most

frequently in children age group, and the use of non-antimicrobial agents such as antipyretics, analgesics, IV fluids were used most commonly. The drug-drug interactions were observed in many cases, but many of the drug use in the hospital for particular indications were found to be rational as compared to the irrational use.

ACKNOWLEDGMENT

The authors are grateful to the health professionals of hospitals for their kind support in managing the cases.

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