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Original Article

Study of prescribing patterns of antimicrobial agents in the Paediatric wards at a tertiary care hospital, Dhaka

Afrin T[1], Jahan I[2], Khatun SA[3], Begum RA[4]

[1]Assistant Professor. Department of Pharmacology, Dhaka Community Medical College, [2]Assistant Professor. Department of Pharmacology, MH Samorita Medical College, [3]Assistant Professor, Department of Pharmacology, Dhaka National Medical College Dhaka, [4]Assistant Professor, Department of Forensic Medicine, Shaheed Monsur Ali Medical College

Abstract:

Background: Antibiotics are generally used in pediatric illness and unreasonable use of antibiotics can lead to bacterial resistance. Rational prescribing practices provide to contest this global public health challenge by preventing antibiotic overuse and misuse.

Objective: Aim of the study to find out the prescribing patterns of antimicrobial agents in the Paediatric wards at a tertiary care hospital.

Methodology: This retrospective study was carried out by collecting prescriptions of the indoor patients admitted in the wards paediatric department at Sir Salimullah Medical College & Hospital, Dhaka to assess the prescribing patterns of antimicrobial agents. Total 110 prescriptions containing antimicrobial agents were collected from the hospital record section for the study during January 2014 to March 2014. Prescriptions were collected irrespective of the indications. The data were collected in predesigned questionnaires, containing information regarding age and sex of the patients as well as trade/generic name of antimicrobial drugs, numbers of drugs prescribed, their dosage, frequency, route of administration, duration of therapy along with the clinical diagnosis.

Results: Majority 74(67.3%) patients had respiratory infection, 15(13.6%) had GIT infection, 11(10.0%) had fever, 4(3.6%) had urinary tract infection and 6(5.5%) others disease. Most 24(17.8%) of the patients prescribed ceftriaxone, 15(11.1%) cefuroxime, 9(6.9%) amoxicillin, 12(9.2%) ampicillin, 11(8.35%) ciprofloxacin, 8(6.2%) metronidazole, 7(5.4%) azithromycin and 7(5.4%) amikacin, 37.7% patients prescribed cephalosporins, 26.9%) beta-lactams (except CP)+ vancomycin, 14.6% metronidazole, 5.4% macrolides and 9.2% amnioglycosides.

Conclusion: Respiratory infections were the most common disease seen followed by GIT infection, fever, urinary tract infection. Injectable cephalosporins and beta-lactams are more common prescribing antibiotics. Addressed properly to prevent bacterial resistance and guidelines for the treatment of pediatric patients should be updated.

Introduction:

Antibiotics are generally used in pediatric illness and unreasonable 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.[1] The increase in antimicrobial-resistant infections has led to significant morbidity, mortality, and healthcare costs. The impact of antimicrobial resistance is greatest on low-income countries, which face the double burden of fewer antibiotic choices and higher rates of infectious diseases.[2] Rational prescribing practices provide to contest this global public health challenge by preventing antibiotic overuse and misuse.3 Unfortunately, uptake of this concept has been slow, with fewer than half of all countries having any policy promoting good antimicrobial stewardship.[3] Prescription of drugs, which needs to be continuously assessed and refined according to disease progression. It not only reflects the physician's knowledge about drugs but also his/her skill to diagnose and attitude towards selecting the most appropriate cost-effective treatment. Antimicrobials are among the most commonly prescribed drugs in hospital.[4]

MATERIAL AND METHODS:

This retrospective study was carried out by collecting prescriptions of the indoor patients admitted in the wards paediatric department at Sir Salimullah Medical College & Hospital to assess the prescribing patterns of antimicrobial agents. Total 110 prescriptions containing antimicrobial agents were collected from the hospital record section for the study during January 2014 to March 2014. Prescriptions were collected irrespective of the

indications. The data were collected in a predesigned questionnaires , containing information regarding age and sex of the patients as well as trade/generic name of antimicrobial drugs, numbers of drugs prescribed, their dosage, frequency, route of administration, duration of therapy along with the clinical diagnosis. Patients taking other drugs for any existing diseases were not counted in the prescriptions. Only antimicrobial agents prescribed for any types of bacterial infections were included in the proforma. Also patients suffering from chronic diseases were included in the study. However the antimicrobial combination containing AKT (3 or 4 drugs) were not included in the study. The antimicrobial agents were divided into following major groups for the study;

(1) β-lactams = β-lactams (except cephalosporins) +vancomycin
(2) Cephalosporins,
(3) Aminoglycosides,
(4) Fluoroquinolones,
(5) Sulfonamides
(6) Metronidazole and;
(7) Macrolides

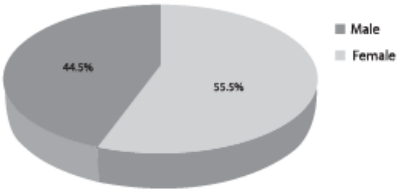
Total numbers of the antimicrobial agents prescribed in each prescription were counted irrespective of numbers of the prescription. Basic drug indicators were selected to analyze the prescribing patterns. Data were also analyzed by using prescribing patterns of antimicrobial agents for every infections involving different system. Data were also analyzed by using SPSS ver-23. Proportions of different antimicrobial agents were calculated from the total number of antimicrobial agents prescribed. Further, proportions of the different antimicrobial agents prescribed for different systems were calculated.

Results:

A total of 110 patients, majority (41.8%) patients belonged to age 1-5 years and the mean age was found 4.5±1.7 years (Table 1). Male was found 55.5% and female was 44.5%. Male: female ratio was 1.2:174(67.3%) patients had respiratory infection, 15(13.6%) had GIT infection, 11(10.0%) had fever, 4(3.6%) had urinary tract infection and 6(5.5%) others disease (Table II). Most 24(17.8%) of the patients prescribed ceftriaxone, 15(11.1%) cefuroxime, 9(6.9%) amoxiclillin, 12(9.2%) ampicillin, 11(8.35%) ciprofloxacin, 8(6.2%) metronidazole, 7(5.4%) azithromycin and 7(5.4%) amikacin (Table III). 37.7% patients prescribed cephalosporins, 26.9%) beta-lactams (except CP) + vancomycin, 14.6% metronidazole, 5.4% macrolides and 9.2% amnioglycosides (Figure 2).

Table I: Distribution of the study patients by age (n=110)

Age	Frequency	Percentage
1- 12 month	33	30.0
1-5 years	46	41.8
6-10 year	23	20.9
>10 years	8	7.3
mean±SD	4.5±1.7	



Sex distribution

Figure 1: Distribution of the study patients by sex (n=110)

Table II: Percentage distribution of different disease conditions (n=110)

Disease conditions	Frequency	Percentage
Respiratory infection	74	67.3
GIT infections	15	13.6
Fever	11	10.0
Urinary tract infection	4	3.6
Others	6	5.5

Table III: Frequency of prescribing patterns of antimicrobial agents

Antimicrobial Agents prescribed	Frequency	Percentage
Cephalosporins		
Ceftriaxone	24	17.8
Cefuroxime	15	11.1
Cefipime	5	3.7
Ceftazidime	5	3.7
β-lactams (except CP)+ Vancomycin		
Amoxicillin	9	6.9
Ampicillin	12	9.2
Cloxacillin	5	3.8
Vancomycin	5	3.8

Penicillin-G	2	1.5
Meropenum	2	1.5
Fluoroquinolones		
Ciprofloxacin	11	8.5
Ofloxacin	4	3.1
Gatifloxacin	2	1.5
Norfloxacin	2	1.5
Metronidazole		
Metronidazole	8	6.2
Macrolides		
Azithromycin	7	5.4
Aminoglycosides		
Amikacin	7	5.4
Gentamicin	5	3.8
Total	**130**	**100.0**

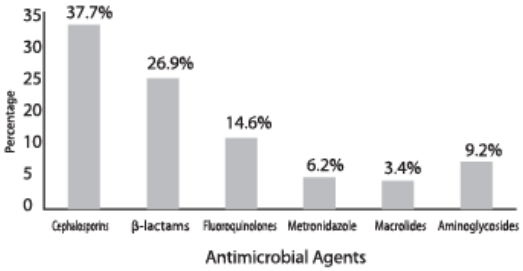


Figure 2: Bar diagram showing antimicrobial agents of the study patients.

Discussion:

In present study observed that the majority (41.8%) patients belonged to age 1-5 years and the mean age was found 4.5±1.7 years. Similar observation was found Baidya et al.[5] study they showed the majority of the children belonged to the preschool age group, with the median age at 36.0 (interquartile range 8.5–96.0) months. In a nation-wide point prevalence study in pediatric in-patients across 8 children hospitals in Australia,[6] the authors reported that of 1373 patients, 631 (46%) were prescribed at least one antimicrobial agent, 198 (31%) of whom were <1-year-old. Sharma et al.[2] observed that the median patient age was 5.0 years (interquartile range 2.0–9.0). Mohapatra et al.[1] the age group of 1-5 years was the most common group who were prescribed antibiotics (40.6%). Choudhury and Bezbaruah[7] who have observed that patients of age group 5-12 years have received maximum antibiotics, Palikhe[8] has shown that infants <1 year, and Van Houten et al.[9] has shown that patients <2 years have received antibiotics more commonly.[6,7,9]

In present study showed male was found 55.5% and female was 44.5%. Male: female ratio was 1.2:1. In the Mohapatra et al.[1] 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 Bezbaruah7 has shown that male patients were 59.3% as compared to 41.7% of female patients. Similar findings were found in other studies. Baidya et al.[5] observed among these 265 children, 162 (61.10%) were males. Sharma et al.[2] study showed 59.6 % (n = 483) of patients were male.

In this study reported that the majority 74(67.3%) patients had respiratory infection, 15(13.6%) had GIT infection, 11(10.0%) had fever, 4(3.6%) had urinary tract infection and 6(5.5%) others disease. Similar observation was found different studies, in study of Mohapatra et al.[1] showed respiratory infections like pneumonia, upper respiratory tract infections, and lower respiratory tract infections (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%). Baidya et al.[5] reported highest numbers in this group were prescribed for respiratory tract infections (37.57%) and the lowest for skin and soft tissue infections (1.21%). Sharma et al.[2] study reported that the most common diagnoses for which drugs were prescribed were injuries (25.8 %), asthma (20 %), respiratory infections (19.5 %), and gastrointestinal infections (12.1 %).

In present study reported the majority 24(17.8%) patients prescribed ceftriaxone, 15(11.1%)cefuroxime, 9(6.9%) amoxiclillin, 12(9.2%) ampicillin, 11(8.35%) ciprofloxacin, 8(6.2%) metronidazole, 7(5.4%) azithromycin and 7(5.4%) amikacin. In Mohapatra et al.[1] study 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. 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. Baidya et al.[5] showed that the highest number of antimicrobial prescriptions

were from the cephalosporin class (229; 42.80%) while co-trimoxazole, amphotericin B and mupirocin (0.2% each) were used sparingly. Ceftriaxone was the single most frequently prescribed drug (36.3%). Among the 229 instances of cephalosporin use, the highest prescribed was ceftriaxone (194; 84.71%) whereas cefalexin (0.2%) and ceftazidime (0.2%) were used the least. The majority of the cephalosporins were prescribed for respiratory tract infections (57; 24.89%) and the least for soft tissue infections (2; 0.87%). Penicillins, other β-lactams, and vancomycin accounted for 165 (30.84%) instances. Co-amoxiclav (13.5%) and ampicillin (4.9%) were prescribed more frequently, whereas benzathine penicillin and imipenem (0.2% each) were used sparingly. Sharma et al.[2] reported the 360 antibiotics prescribed, 74.7 % (n = 269) were broad-spectrum. β-lactam penicillins were prescribed most frequently (51.4 %), followed by sulfonamides (13 %), cephalosporins (7.7 %) and fluoroquinolones (1.7 %). Of the B-lactam. penicillins, amoxicillin was the most popular choice (33.9 %). Fixed-dose combinations of antibiotics were encountered in 12.9 % of all prescriptions. Sulfamethoxazole and trimethoprim accounted for 5.5 % of all prescriptions and was classified as a sulfonamide for the purposes of this study. Amoxicillin and clavulanic acid was classified as a beta-lactam antibiotic and accounted for 7.4 % of all prescriptions.

In present study observed that the 37.7% patients prescribed cephalosporins, 26.9%) beta-lactams (except CP) + vancomycin, 14.6% metronidazole, 5.4% macrolides and 9.2% amnioglycosides. Similar observation was found Prajapati and Bhatt4 study they reported of them aminoglycosides (233; 33.77%) was frequently prescribed followed by β-lactam group (191; 27.68) and cephalosporins (176; 25.5%).

Conclusion: Respiratory infections were the most common disease seen followed by GIT infection, fever, urinary tract infection. Injectable cephalosporins and beta-lactams are more common prescribing antibiotics. Addressed properly to prevent bacterial resistance and guidelines for the treatment of pediatric patients should be updated.

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