

ANTIBIOTIC PRESCRIBING PATTERN IN PAEDIATRICS OUTPATIENT IN A TERTIARY CARE HOSPITAL

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ABSTRACT

BACKGROUND

The invention of antimicrobials emerged as a transformational turning point in the reduction of the burden of communicable disease in the 20th century. Antimicrobials are among the most widely prescribed therapeutic agents across the world. The use of antibiotics among children is different from adults due to a number of reasons like a lack of data on pharmacokinetics, pharmacodynamics, efficacy and safety of drugs, different physiological spectrum among different age groups- preterm neonates, full-term neonates, infants and toddlers, older children and adolescents, paediatrics populations being vulnerable to the majority of the illnesses and the adverse effect of irrational use of antimicrobials being more serious among children than adults. However, antibiotic use is not explored much in a paediatric population. Existing reports of population-based antibiotic use in children are relatively few, so the present study was carried out in Berhampur city with the objectives of finding out the pattern of oral antibiotic use in children in the outpatient setting of a tertiary care hospital.

MATERIALS AND METHODS

This cross-sectional study was carried out on a convenience sample of 216 patients treated with oral antibiotics in the Paediatrics Outpatient Department in MKCG Medical College, Berhampur. Data was collected and analysed from the prescriptions after obtaining informed written consent of the patient's attendant and there was no interaction with the patients. Any prescription with an oral antibiotic prescribed was included for the study. The main outcome measures were the pattern of oral antibiotic prescription. The data were expressed as proportions and analysed using GraphPad Prism software (trial version).

RESULTS

Of the 216 prescriptions analysed, the most common disease entity for which a prescription with an oral antibiotic was made was acute respiratory infections (68.05%). Cefpodoxime was the commonly prescribed antibiotic. In the present study, all antimicrobials were prescribed empirically without any microbiological evidence.

CONCLUSION

This study highlights antimicrobial prescription pattern in a paediatrics outpatient setting in a tertiary care hospital. Beta lactamase were the commonest antibiotics prescribed. The use of antibiotics without any microbiological evidence warrants for increasing the rational use of antibiotics in children.

KEYWORDS

Antibiotics, Tertiary Care, Paediatrics.

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BACKGROUND

Inappropriate antibiotic use for common childhood illnesses like respiratory tract infections, acute watery diarrhoea and viral fever has contributed to the development of antibiotic resistance.¹ Acute respiratory infection, acute watery diarrhoea and viral fever account for almost 60% outpatient visits, but only about less than 20% of these patients require

antibiotic therapy.²Inappropriate use of antibiotics has contributed largely to the development of antibiotic resistance. In the recent years, there has been a rise in the broad spectrum antibiotic use.³ This is a common problem across regions and there is a regional variation of the extent of the problem. Antibiotics use in children are different from adults due to different pharmacokinetics, pharmacodynamics, efficacy and safety of drugs, different physiological spectrum, paediatrics populations being vulnerable to the majority of the illnesses and the adverse effect of their irrational use is more serious in this vulnerable group. However, antibiotic use is not explored much in a paediatric population. Existing reports of population-based antibiotic use in children are relatively few. With this background, the present study was carried out in Berhampur

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city with the objectives of finding out the pattern of antimicrobial use in children.

MATERIALS AND METHODS

This cross-sectional study based on a convenience sample was conducted in the paediatrics outpatient department in MKCG Medical College, Berhampur. Assuming a prevalence of antimicrobial use to be 50%, the sample size was calculated to be 196 at a confidence level of 95% (two sided) and an absolute precision of 7 using Master’s Software. To account for non-responders, the sample size was increased to 216. As the pattern of antibiotic prescription may vary with the seasons to prevent sampling bias, the study was spread over three seasons, i.e. during summer, rainy and winters. In each seasons, 72 patients were included in the study during the year 2016. The prescriptions from the paediatric outpatient department were analysed. There was no interaction with the patient and data was collected from the prescriptions only. Any prescription with an oral antibiotic prescribed was included for the study as the most common route of administration for systemic antibiotics used worldwide was oral.⁴ The prescriptions of all patients in 0-14 year age group with symptoms (less than 7 days duration) of running nose or blocked nose, cough, sore throat, ear discharge, acute watery diarrhoea and fever without any other localising symptoms were included in the study. Prescriptions of seriously ill children requiring inpatient care or parenteral antibiotics were excluded. The data collected was recorded in a case record form. The main outcome measures were the pattern of oral antibiotic prescription. The data were expressed as proportions and analysed using GraphPad Prism Software (trial version). The data was collected by the investigators themselves after obtaining informed written consent of the patient’s attendant.

RESULTS

Of the 216 prescriptions analysed, the most common disease entity for which a prescription with an antibiotic was made was acute respiratory infections 147 (68.05%) (Table 1).

Cefpodoxime was the commonly prescribed antibiotic (Table 2) and was used in 47 of the total patients included in the study. It was observed that the most common antibiotic prescribed for acute respiratory infection was cefpodoxime followed by azithromycin for acute diarrhoeal disease, enteric fever and urinary tract infections, it was cefixime. For a diagnosed case of viral fever, the commonest antibiotic used was azithromycin (Table 3).

Disease	Disease Subtype	Number of Patients (%)
Acute respiratory infections	Acute suppurative otitis media	18 (8.3)
	Acute otitis externa	12 (5.5)
	Acute pharyngitis	24 (11.1)
	Acute tonsillitis	31 (14.3)
Acute diarrhoeal diseases	Pneumonia/Lower RTI	62 (28.7)
	Acute watery diarrhoea	18 (8.3)
Enteric fever	Dysentery	6 (2.7)
		16 (7.4)
Urinary tract infections		17 (7.8)
Viral fever		12 (5.5)

Table 1. Disease Pattern in Paediatrics Outpatient in a Tertiary Care Hospital

Antimicrobial Agent	Number of Patients (%)
Cefpodoxime	47 (21.7)
Azithromycin	45 (20.8)
Amoxicillin-Clav	28 (12.9)
Amoxicillin	21 (9.7)
Cefixime	28 (12.9)
Ofloxacin	18 (8.3)
Cefuroxime	12 (5.5)
Ciprofloxacin	10 (4.6)
Co-trimoxazole	4 (1.8)
Erythromycin	2 (0.9)
Doxycycline	1 (0.4)

Table 2. Common Antibiotic Used in Paediatrics Outpatient in a Tertiary Care Hospital

Disease	Antibiotic Used										
	Cefp	Azit	AmCl	Amo	Oflox	Cefi	Cipr	Cotr	Cefuro	Eryt	Dox
ARI	42	38	28	21	3	0	0	0	12	2	1
ADD	0	0	0	0	9	10	5	0	0	0	0
Enteric fever	0	0	0	0	3	8	5	0	0	0	0
UTI	0	0	0	0	3	10	0	4	0	0	0
Viral fever	5	7	0	0	0	0	0	0	0	0	0

Table 3. Antibiotics Used for Different Diseases in a Tertiary Care Paediatrics Outpatient Setting

ARI = Acute respiratory infections, ADD = Acute diarrhoeal diseases, UTI = Urinary tract infections, Cefp = Cefpodoxime, Azit = Azithromycin, AmCl = Amoxycillin-Clavulanic acid, Amo = Amoxycillin, Oflox = Ofloxacin, Cefi = Cefixime, Cipr = Ciprofloxacin, Cotr = Cotrimoxazole, Cefuro = Cefuroxime, Eryt = Erythromycin, Dox = Doxycycline.

DISCUSSION

The current study provides important information on pattern of and type for antimicrobial use in a tertiary care hospital. In a study done in Ethiopia, it has been reported that penicillin G crystalline was the most (20%) frequently

prescribed, followed by gentamicin (19%) and ampicillin, whereas in the present study cefpodoxime followed by azithromycin and amoxicillin-clavulanic acid were the commonest.⁵ In another study done in the west, the most frequently used antibiotics were cephalosporins (43.7% of

treated children), followed by macrolides, a combination of penicillins plus a beta lactamase inhibitors and broad-spectrum penicillins (40.1%, 29.8% and 29.4%, respectively). Cephalosporins were frequently prescribed in the youngest children and macrolides were mostly prescribed in children >6 years of age.⁴ These differences may be due to the different local sensitivity pattern. The main reason for prescription of an antibiotic in the present study was acute respiratory infection. This observation is similar to the reports by other studies.^{6,7}

In a similar study, it was found that penicillins were the most commonly prescribed class of drugs (77%), while macrolides were the second most commonly prescribed (14%). Amoxicillin and clavulanic acid was the most commonly prescribed antimicrobial agent from the penicillin class followed by amoxicillin alone.⁸

Bharathi et al⁹ in a similar study also found that penicillins were the commonest antibiotic prescribed (42.9%) among, which amoxicillin was the most frequently prescribed of all. In children with diarrhoea and fever, fluoroquinolones were commonly prescribed showing the misuse of antibiotics not meant for primary care.

Another study done by Miti Maniar et al,¹⁰ a cross-sectional study to determine the antibiotic usage trend in children with URTI and diarrhoea in 140 children under 15 years of age visiting the Paediatric OPD. Forty four (31%) patients received antibiotics of which 5 (11.3%) patients received combination antibiotics. Eighteen (24%) patients with nasopharyngitis, 2 (16%) patients with pharyngitis, 7 (100%) patients with tonsillitis, 7 (22.5%) patients with acute diarrhoea, 5 (62.5%) patients with dysentery and 5 (83%) patients with chronic diarrhoea received antibiotics. ($p=0.014$). Amoxicillin (33%) and macrolides (44%) are preferred for nasopharyngitis and only macrolides are used for pharyngitis (100%), while cefixime is used predominantly for acute diarrhoea (29%) and dysentery (40%). Metronidazole (60%) is the preferred antibiotic for chronic diarrhoea.

Prescription patterns and appropriateness of antibiotics in the management of cough/cold and diarrhoea in a rural tertiary care teaching hospital. It was also noticed that 74% and 57.5% of antibiotics prescribed in these conditions were included in the NLEM list, respectively. The data showed that cephalosporin was among the commonly prescribed drugs (46.2%, $n=140$). Among cephalosporins, ceftriaxone, cefotaxime, cefdinir and cefixime were majorly prescribed. Furthermore, penicillins were second on the list with 39.93% prescriptions. However, with respect to generic prescribing, these drugs were lowest in prescriptions (10%). Aminoglycosides were prescribed in 32.67% patients in which gentamicin and amikacin were most extensively prescribed. In comparison, quinolones (ciprofloxacin, norfloxacin with or without the combination of metronidazole and tinidazole) were the least prescribed drugs (16.17%).¹¹

Drug prescription pattern in paediatric outpatient department in a teaching hospital in central India, a study by Sharad Gedam et al¹² found that the most common

diagnosis in the patients was Upper Respiratory Tract Infection (URI) (50.07%) followed by acute gastroenteritis (20.94%) and viral fever (5.73%) (Table 3). Most frequently prescribed drug class was antipyretics (44.18%) followed by antibiotics (37.21%) and antihistaminic (29%) of total prescription (Table 4). Antibiotics constituted 240 of total number of prescription. Out of 240 antibiotics used, the most frequently used antibiotics were ofloxacin and metronidazole combination (25%) followed by cefpodoxime (22.83%) and amoxicillin and clavulanic acid combination (16.67%).

In a similar study by Ashok Kumar Malpani et al,¹³ majority of the prescriptions contained only one antibiotic. Moderate drug interactions of 85% and minor interactions of 15% were found from both the hospitals. Most common diseases found were Upper Respiratory Tract Infections (URTI-25.58%), fever (25.58%), Gastroenteritis (GE) 17.82% in hospital 1 and fever (22.72%), URTI (20.12%), LRTI (14.93%), GE (19.48) and UTI (16.23%) in hospital 2. Commonly prescribed antibiotic class and drugs was penicillin-amoxicillin (18.18%)- hospital 1, cephalosporins-cefixime (32.14%), ceftriaxone (21.42%) and cefpodoxime (40.17%)- hospital 2. The commonly used antibiotic combination was amoxicillin + clavulanic acid (hospital 1:75%, hospital 2- 100%).

In the present study, all antimicrobials were prescribed empirically without any microbiological evidence. Excessive and inappropriate use of antibiotics has been a major contributor to this ever-growing problem of antibiotic resistance. The majority of common childhood illnesses are caused by viruses, which do not require antibiotics. Some studies have reported that the proportion of antibiotic prescription to be 79.4% as against the WHO recommendation of 20% antibiotic use for these common childhood illnesses.² The major limitations of the present study are that it is carried out in the outpatient setting on a small sample. So, it does not reflect the problem in the inpatient setting. The study has explored only the pattern of prescription of oral antibiotics, so it does not capture the use pattern of parenteral antibiotics. The methodology and the statistical analysis plan has used only descriptive statistics and has presented the results in proportions, so the observations of the present study cannot be generalised to the population in the absence of the use of an advanced inferential statistical analysis plan.

CONCLUSION

This study highlights antimicrobial prescription pattern in a paediatrics outpatient setting in a tertiary care hospital. The study is significant because of the emerging and an increase in antimicrobial resistance. There must be increase in the awareness about antibiotic use to dispel the inappropriate information caused by pharmaceuticals and initiate necessary steps to deliver the latest advances of the knowledge to every practicing physician through academic activities in order to check over this emerging problem of antibiotic resistance.

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