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Original Research Article

An Observational Assessment of the Prescription Pattern of Antimicrobials in the Treatment of upper respiratory tract infections (URTI) in Patients of Paediatric Age Group

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Abstract

Aim: The aim of the present study was to analyze the prescription pattern of antimicrobials used in pediatric patients with respiratory tract infections attending a tertiary care hospital.

Material & Methods: A cross-sectional observational study including 200 pediatric patients with repiratory tract infection was conducted in department of pharmacology Darbhanga Medical College and Hospital , Darbhanga, Bihar, India in collaboration with department of pediatrics over a period of 12 months. It was performed in accordance with the Declaration of Helsinki and institutional ethics committee approval was obtained before initiation of the study.

Results: Total 200 pediatric prescriptions were analysed of which 110 (55%) were male and 90 (45%) were females. Number of children diagnosed with URTI was 128 (64%), whereas 72 (36) children had LRTI. Total 80 (40%) children belonged to age less than 5 years and 120 (60%) were between the age range of 5-18 years. On analysis of 128 prescriptions with URTI, it was found that 52 children were prescribed Co-Amoxiclav, a fixed dose combination (FDC) of amoxicillin and clavulanic acid and azithromycin was prescribed to 3 children. Paracetamol for fever and cough syrups containing antiallergic, antitussives and expectorants were also prescribed for symptomatic relief. Out of 170 prescriptions of paracetamol, 140 were generic and cough syrups were prescribed in generics in all the prescriptions. 250 were in syrup formulations whereas 110 were injectables and 38 tablet formulations.

Conclusion: The analysis reflected that the prescriptions were in accordance with the national guidelines with the predominant use of β lactam antibiotics for treating both URTI and LRTI. Positive trend toward monotherapy was observed.

Keywords: Antibiotics, Pediatrics, Rational Prescribing, Prescribing Pattern, WHO Prescribing Indicators.

Introduction

Respiratory tract infection (RTI)is defined as the Infection of the upper or lower respiratory tract. [1] The most common upper respiratory tract infections (URTI) include- common cold, laryngitis, pharyngitis, otitis media, tonsillitis, acute

rhinitis, acute rhino- sinusitis etc. [2] Lower respiratory tract infection (LRTI) mostly includes pneumonia, bronchiolitis and bronchitis. [2] Both upper and lower respiratory tract infections are very common in developing countries like India. [3] According to previous studies, respiratory tract infections are one of the most common causes of physician consultation in our country. Antibiotics are also being prescribed for nonspecific symptoms like common cold, running nose and sore throat for which there is no therapeutic benefit. [4,5]

Antibiotics play a crucial role in the management of infectious diseases. [6] The accurate determination of safety and efficacy of any drug being prescribed to a child is rather different from adults as it is dependent on understanding pharmacokinetics and pharmacodynamics of a particular drug, as well as the clinical characteristics of the child being treated with that particular drug. [7] Prescribing antimicrobial agents not adhering to the treatment guidelines, inappropriate use of medicines such as overuse, underuse and misuse, and self-medication can inadvertently lead to development of antimicrobial resistance and creating an increase in demand for new drugs. [8] According to Centre for Disease Control and Prevention Guidelines (CDC), acute upper respiratory tract infections resolve spontaneously without the need for anti-microbial therapy. The treatment with antibiotics is indicated only when the patient have symptoms sustained for at least 10- 14 days without showing any improvement. Proper information about antibiotic usage pattern and the pressing need to curtail resistance has become an absolute necessity for a constructive approach to the problems arising due to the inappropriate use of antibiotics, especially among the pediatric population. [9] Hence good prescribing practises should be followed to provide maximum clinical benefit and minimum risks to the patient.

The study of prescription pattern is one of components of medical audit which evaluates the prescribing patterns of health care practioners as well as recommends necessary changes in the prescribing pattern to provide best medicine to the patient. Thereby prescription pattern studies are an important indicator to judge the quality and standard of clinical practice among health care professionals. The current study aimed to analyze the prescription pattern of antimicrobials used in pediatric patients with respiratory tract infections attending a tertiary care hospital.

Material & Methods

A cross-sectional observational study including 200 pediatric patients with respiratory tract infection was conducted in department of pharmacology Darbhanga Medical College and Hospital, Darbhanga, Bihar, India in collaboration with department of pediatrics over a period of 12 months. Written informed consent from the parent of each child who met the inclusion criteria was taken after explaining the purpose of the study and before screening their prescriptions. Assent was obtained from the children between 12 to less than 18 years of age along with their parents' written informed consent.

Inclusion Criteria

Pediatric patients diagnosed with respiratory tract infection having age more than 2 and less than 18 years attending pediatric outpatient department (OPD) or admitted in pediatric ward or pediatric intensive care unit.

Exclusion Criteria

Children suffering from malaria, tuberculosis, HIV/AIDS or other immunodeficiency diseases, congenital heart diseases, and cancer, necessitating long-term antibiotic treatment or prophylaxis.

The demographic details of each selected pediatric patient, diagnosis, and details of drugs prescribed such as, name of the drug,

generic or brand name, its strength/dose, route of administration, frequency of use, average number of drugs per prescription, number of fixed dose combinations (FDCs), and duration of treatment were recorded in the case record form.

Statistical analysis

The data was analyzed with the help of statistical software SPSS, version 22 for windows. Descriptive statistic was used and the collected data was expressed in terms of numbers and percentages.

Results

Table 1: Demographic details

Gender	**N%**
Male	110 (55)
Female	90 (45)
Number of children diagnosed	
URTI	128 (64)
LRTI	72 (36)
Age groups	
Less than 5 years	80 (40)
5-18 years	120 (60)

Total 200 pediatric prescriptions were analysed of which 110 (55%) were male and 90 (45%) were females. Number of children diagnosed with URTI was 128 (64%), whereas 72 (36) children had LRTI. Total 80 (40%) children belonged to age less than 5 years and 120 (60%) were between the age range of 5-18 years.

Table 2: Drugs prescribed to children with URTI (n=128)

Drugs prescribed	**Number of children with URTI**	**%**
Co-amoxiclav	52	40.62
Azithromycin	3	2.34
Paracetamol	100	78.12
Cough syrup	75	58.59

On analysis of 128 prescriptions with URTI, it was found that 52 children were prescribed Co-amoxiclav, a fixed dose combination (FDC) of amoxicillin and clavulanic acid and azithromycin was prescribed to 3 children. Paracetamol for fever and cough syrups containing antiallergic, antitussives and expectorants were also prescribed for symptomatic relief.

Table 3: Detailed analysis of various drugs prescribed (in numbers) to all children diagnosed with respiratory tract infection

Parameters	**Brand**	**Generic**	**Injectables**	**Syrup**	**Tablet**	**IPD**	**OPD**
Co-amoxiclav	118	2	38	45	35	48	65
Ceftriaxone	16	0	15	0	0	15	0
Vancomycin	0	5	5	0	0	5	0
Azithromycin	0	3	0	0	3	0	5
Oseltamivir	16	0	0	15	0	18	0
Cough syrup	0	85	0	85	0	0	85
Paracetamol	30	140	52	105	0	58	125
Total	180	235	110	250	38	144	280

Out of 170 prescriptions of paracetamol, 140 were generic and cough syrups were prescribed in generics in all the prescriptions. 250 were in syrup formulations whereas 110 were Injectables And 38 Tablet Formulations.

Discussion

The inevitable result of the extensive use of antimicrobials gives rise to the development of antimicrobial-resistant pathogens, creating an increase in demand for new drugs. An upward trend in the antimicrobial resistance and, concomitantly, the decline in the development of new antimicrobials have impacted the public health and economy. Judicious selection of antimicrobial agents requires proper clinical judgment and a thorough understanding of microbiological and pharmacological factors. [10] Therefore, rational prescribing practices can resolve the global issue of antibiotic overuse and misuse. [6] Irrational drug use is a serious global problem and can pilot its course towards morbidity, mortality, and economic burden on the health-care system. [11,12] World Health Organization (WHO) has reported that over half of all drugs are either inappropriately administered, dispensed or sold. [13] India has reported 37% of inappropriate antimicrobial use. [12]

Total 200 pediatric prescriptions were analysed of which 110 (55%) were male and 90 (45%) were females. Number of children diagnosed with URTI was 128 (64%), whereas 72 (36) children had LRTI. Total 80 (40%) children belonged to age less than 5 years and 120 (60%) were between the age range of 5-18 years. similar findings were recorded in studies by Kokani et al, Malpani et al, Tiwari et al and Mahapatra et al. [13-17] This large number is perhaps because the children in this age group are more susceptible to infection, mainly due to weaning causing reduction in their immunity and getting exposed to the outside environment more often. In the present study, 2/3rd children screened were from the outpatient department whereas 1/3rd were from the pediatric ward. This could be due to the fact that the study was carried out during monsoon, and children are more susceptible to infections in this season, both bacterial and viral. Similar finding was reported by Malpani et al. [15]

On analysis of 128 prescriptions with URTI, it was found that 52 children were prescribed Co-amoxiclav, a fixed dose combination (FDC) of amoxicillin and clavulanic acid and azithromycin was prescribed to 3 children. Paracetamol for fever and cough syrups containing antiallergic, antitussives and expectorants were also prescribed for symptomatic relief. Out of 170 prescriptions of paracetamol, 140 were generic and cough syrups were prescribed in generics in all the prescriptions. 250 were in syrup formulations whereas 110 were injectables and 38 tablet formulations. The studies conducted by Kokani et al [14], Majhi et al [19] and Baidya et al [18] reported injectables as the major route of drug administration. It could be possibly because these studies had more cases of LRTI and use of injectables was appropriate considering the indication. The use of penicillins was predominant as it is the safest antibiotic in this population and is also recommended by the American academy of pediatrics and National centre for disease control in India pertaining to antimicrobial use in pediatric population. Children diagnosed with LRTI received antimicrobials, anti-pyretics like paracetamol, and anti-viral drugs like oseltamivir. Among the various antimicrobials, most commonly prescribed was co-amoxiclav which was given either alone or addition of 3rd generation cephalosporin, ceftriaxone, or oseltamivir, an antiviral agent was required. Similar findings were reported by number of such studies. [14,15,20-23] WHO recommends an optimal value of 100% in prescribing drugs by generic name, while our study presented with only 25.76%. [24]

Physicians have grown accustomed to the practice of prescribing branded drugs. Generic prescribing has been recognized to be much simpler, minimize dispensing errors, facilitates coordination and transparency between healthcare providers and clients, as well as being comparatively cheaper than branded drugs. [25]

Conclusion

The analysis reflected that the prescriptions were in accordance with the national guidelines with the predominant use of β lactam antibiotics for treating both URTI and LRTI. Positive trend toward monotherapy was observed. Regular sensitization program on antibiotic stewardship would inculcate the practice of appropriate antimicrobial prescribing in treating physicians and thereby curb the challenging the threat of antimicrobial resistance.

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