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ORIGINAL ARTICLE

# Use of Antibiotics for Respiratory Illnesses in Rural India

SHARMA R *, CHOPRA V S **, KOUR G ***.

ABSTRACT

The increase in antibiotic resistance is one of the preventable threats being faced in the 20th century. Unnecessary antibiotic prescribing remains common not only in the developing countries, but also in the developed countries like USA and Britain. The present study was conducted to study the antibiotic prescribing pattern in paediatric patients with respiratory and ear infections in rural India.

Materials and Methods: The present prospective study was conducted in a rural health center (RHC) situated about 30 kilometers away from a tertiary care center. 2561 new (first encounter) prescriptions were studied.

Results: Out of the 2561 prescriptions, upper respiratory track infection (URTI), lower respiratory track infection (LRTI), asthma and acute otitis-media (AOM) were the diagnoses made in 29.28%, 5.46%, 5.85%, and 0.97% of the prescriptions, respectively. Cephalosporins were the most frequently prescribed antibiotics in all the age groups of patients. Azithromycin/ erythromycin/roxithromycin were the next most commonly prescribed antibiotics. All patients with URTI, LRTI, asthma and AOM, except 11.11% and 7.50% patients in the age groups of 6-10 years and 11-18 years respectively, received no antibiotic for URTI and 12% patients of AOM received no antibiotic.

Conclusion: Broad spectrum antibiotics are frequently used for viral respiratory illnesses which are generally self limiting, further adding to the threat of antibiotic resistance. There is a need to appoint clinical pharmacologists at various levels in a health setup to supervise and evaluate the prescriptions of doctors and to provide them feedback to improve their prescribing skills.

Key Words: Antibiotics, viral respiratory illness, rural pediatric patients.

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## Introduction

The inappropriate and economically inefficient use of medication in terms of poly pharmacy, use of drugs not related to the diagnosis, poor patient's compliance, overuse and misuse of antibiotics and use of unnecessary expensive drugs has been commonly observed in the health care system throughout the world, especially in the developing countries [1]. Unnecessary antibiotic prescribing remains common not only in developing countries, but also in developed countries like USA and Britain [2]. Children represent an important target group for efforts aimed at reducing unnecessary antibiotic use, as they receive a significant proportion of the antibiotics prescribed each year [3] . The major factors responsible for high

antibiotic use are the lack of knowledge about the use of antibiotics and the demand of patients [4]. The present study was conducted to study the antibiotic prescribing pattern in paediatric patients with respiratory and ear infections in rural India.

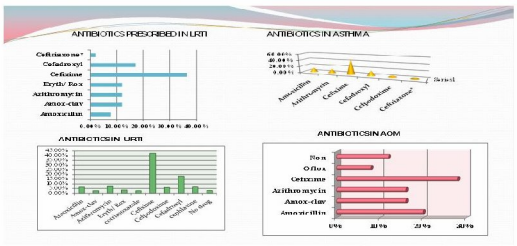
## Materials and Methods

The present prospective study was conducted in a rural health center (RHC) situated about 30 kilometers away from a tertiary care center. The RHC caters to a population of about 1.5 lacs. The present observational study was conducted over a period of six months. About 2600 prescriptions of paediatric patients (<18 years) attending the paediatric and general OPDs of the RHC were randomly collected after taking the informed consent of the parents or the guardian. All the prescriptions were returned back to the patients after noting down the study variables. Out of 2600 prescriptions, 39 follow-up prescriptions were excluded and only 2561 new (first encounter) prescriptions were included. The study variables were the age of the child, diagnosis, the nature of the antibiotics prescribed and oral or injectable antibiotics prescribed.

## Results

Out of 2561 prescriptions, upper respiratory track infection (URTI), lower respiratory track infection (LRTI), asthma and acute otitis media (AOM) were the diagnoses made in 29.28%, 5.46%, 5.85%, and 0.97% of the prescriptions, respectively.

Cephalosporins were the most frequently prescribed antibiotics in all the age groups of patients with URTI. However, cefadroxy was preferred most frequently (42.85%) in children under one year of age and cefixime (31.25%- 48.63%) in children with ages between 1 to 18 years. Azithromycin was prescribed in 21.87% of the children with ages between 11 to 18 years, as against 5.58% of children with ages between 1-5 years and in non in infants and children with ages between 6-10 years. All patients with URTI in age group between 0 to 5 years received antibiotics. However, 11.11% and 7.50% patients in the age groups of 6-10 years and 11-18 years received no antibiotics for URTI [Table/Fig 1], [Table/Fig 2].




(Table/Fig 1) Pattern of antibiotic prescription in study population

(Table/Fig 2) Distribution of antibiotics prescription among study population

| Antimicrobials | < 1 yr | 1-5yrs | 6-10 yrs | 11-18 yrs | Total |
|---|---|---|---|---|---|
| *URTI* | N=70 | N=430 | N=90 | N=160 | 750 |
| Amoxicillin | 10(14.28%) | 10(2.32%) | 9(10%) | 20(12.5%) | 49 (6.53%) |
| Amox-clav | | 15(3.48%) | 5(5.55%) | | 20 (2.66%) |
| Azithromycin | | 24(5.58%) | | 35(21.87% | 59 (7.86%) |
| Eryth/ Rox | | 10(2.32%) | | 16(10%) | 26 (3.46%) |
| Cotrimoxazole | | 20(4.65%) | | | 20 (2.66%) |
| Cefixime | 20(28.57%) | 210(48.63%) | 40(44.44%) | 50(31.25% | 320 (42.66%) |
| Cefpodoxime | | 21(4.88%) | 10(11.11%) | 16(10%) | 47 (6.26%) |
| Cefadroxyl | 30(42.85%) | 80(18.60%) | 16(17.77%) | 11(6.87%) | 137 (18.26%) |
| Cephlaxine | 10(14.28%) | 40(9.30%) | | | 50 (6.66%) |
| *No drug* | | | 10(11.11%) | 12(7.50%) | 22 (2.93%) |
| *LRTI* | N=10 | N=50 | N=60 | N=20 | 140 |
| Amoxicillin | 5(50%) | | 6 (10%) | | 11 (7.85%) |
| Amox-clav | | 11 (22%) | 6 (10%) | | 17 (12.14%) |
| Azithromycin | | | 11 (18.33%) | 6 (30%) | 17 (12.14%) |
| Eryth/ Rox | | 4 (8%) | 9 (15%) | 4 (20%) | 17 (12.14%) |
| Cefixime | 5(50%) | 20 (40%) | 18 (30%) | 8 (40%) | 51 (36.43%) |
| Cefadroxyl | | 12 (24%) | 10 (16.66%) | 2 (10%) | 24 (17.14%) |
| Ceftriaxone* | | 3 (6%) | | | 3 (2.14%) |
| Asthma | N=0 | N=80 | N=50 | N=20 | 150 |
| Amoxicillin | | 20(25%) | | | 20 (13.33%) |
| Azithromycin | | 11(13.75%) | 6(12%) | 3(15%) | 20 (13.33%) |
| Cefixime | | 33(41.25%) | 30(60%) | 10(50%) | 73 (48.66%) |
| Cefadroxyl | | 12(15%) | 10(20%) | 3(15%) | 25 (16.66%) |
| Cefpodoxime | | | 4(8%) | 4(20%) | 8 (5.33%) |
| Ceftriaxone* | | 4(5%) | | | 4 (2.67%) |
| AOM | | | N=9 | N=16 | 25 |
| Amoxicillin | | | 2(22.22% | 3(18.75%) | 5 (20%) |
| Amox-clav | | | 1(11.11%) | 3(18.75%) | 4 (16%) |
| Azithromycin | | | 2(22.22%) | 2(12.50%) | 4 (16%) |
| Cefixime | | | 4(44.44%) | 3(18.75%) | 7 (28%) |
| Oflox | | | | 2(12.5%) | 2 (8%) |
| Non | | | | 3 (18.75%) | 3 (12%) |

URTI= upper respiratory track infection, LRTI = lower respiratory track infection , AOM= acute otitis media, Oflox= ofloxacin, Amox=amoxicillin, Clav=clavulenic acid, Eryth\ erythromycin, Rox = roxithromycin.

Cefixime was the most frequently prescribed drug (30-40%) in all the age

groups with LRTI. Azithromycin/ erythromycin/roxithromycin were the next most commonly prescribed antibiotics in older children (6-18 years of age) with LRTI. Injectible ceftriaxone was prescribed in 6% of the patients with LRTI, in the age group of 1-5 years.

In asthmatic patients, cefixime was the most frequently prescribed drug in 48.66% cases, fallowed by cefadroxy (16.66%), amoxicillin (13.33%) and Azithromycin (13.33%) cases. In AOM patients, cefixime was the most frequently prescribed drug in 28% of the cases, followed by amoxicillin (20% cases), amoxicillin-clavulenic acid (16% cases) and Azithromycin (16% cases), respectively.

## Discussion

The increase in antibiotic resistance is one of the preventable threats faced in the 20th century. Much antibiotic prescription is of little value and a decreased prescription rate may lead to a low rate of resistance to them. On the other hand, lower antibiotic prescription seems to be theoretically associated with an increase in the complications of infections. However, in an analysis from England, it was found that a sustained decrease in antibiotic prescription rates in the recent past (1996-2002) was associated with a smaller corresponding increase in the admission rate for RTI [5].

In the present study, no antibiotic was prescribed for URTI and ASOM (which are mostly viral in nature) in 2.93% and 12% cases, respectively.

In a study from Dutch, an increased disease based prescription rate for antibiotics with more prescription of non-recommended broad spectrum antibiotics for ASOM, URTI and LRTI, was observed in 2001 than in 1987 [6].

In a cross sectional study from South India, 79.9% of children with ARI (Acute respiratory infection) and ADD (Acute watery diarrhea) were prescribed antibiotics. Penicillins (43.9%) were the commonest antibiotics prescribed [7].

In a study on 366 licensed paediatricians and family physicians in Georgia, 86% were found to prescribe antibiotics for bronchitis, regardless of the duration of cough and 42% prescribed antibiotics for common cold [8].However, 97% physicians agreed that overuse of antibiotics is a major factor contributing to the development of antibiotic resistance [8]. In a study from USA, 44%, 46% and 75% children younger than 18 years of age, with common colds, URIs and bronchitis received antibiotics respectively [3]. However, antibiotics were prescribed more often for children aged 5 to 11 years than for younger children [3]. In another survey on the parent's view regarding antibiotic use, 80% of parents were found to have given their child an antibiotic at home before consulting a physician and they believed that antibiotics were always or sometimes required for ear infections (93%), throat infections (83%), colds (32%), cough (58%), and fever (58%) [9]. About 30% of paediatricians said that they agreed to the parent's requests often or most of the time regarding the antibiotic prescription to their child [9].

Population-based data from British Columbia (from 1996 to 2003) revealed the increased use of macrolides and use of a large proportion of antibiotics in children for upper respiratory tract infections and bronchitis, indications where there is a high likelihood that the aetiology is viral rather than bacterial [10]. It also showed that the use of erythromycin decreased by 72%, while the use of clarithromycin increased by almost 3-fold and the use of Azithromycin increased 81-fold in 2003 as compared to 2003 [10].

The patient's lack of knowledge and past experience of receiving antibiotics for respiratory tract infections make them to believe that antibiotics are effective for viral respiratory illnesses which were generally self limiting. Parents often request doctors to prescribe antibiotics for viral conditions to their children and doctors mostly comply to their requests. There is need to convince doctors that a patient's satisfaction is based more on communication than on prescription. Moreover, economic factors contributing to over prescription of antibiotics in the form of incentives and gifts by pharmaceutical companies to the prescribers, is another factor which needs to be addressed. Hence, multifaceted interventions in the form of a public relations campaign with simple messages, clinic based patient education, and community outreach activities, are needed to reduce the unnecessary use of antibiotics. Moreover, physicians should be trained in rational prescribing skills by imparting them rational therapeutic guidelines and refresher training. Evidence-based reviews and guidelines recommend lesser use of antibiotics for acute respiratory infections, not only because the antibiotics are ineffective, but because their widespread use is thought to contribute to the development of antibiotic resistance. Some of the strategies recommended are :- reduce or do not prescribe antibiotics for bronchitis if pneumonia is not a concern, prescribe antibiotics only if symptoms do not improve after 48 hours, do not prescribe antibiotics for simple AOM or myringitis, do not prescribe broad spectrum antibiotics like azithromycin, use respiratory quinolones only in community acquired pneumonias or pneumonias in high risk patients (asthma, renal ,hepatic and cardiac failure, cancer and chronic obstructive air way disease) [11].

The economic rationale and the symbiotic relations that exist between doctors, medical-representatives, medicine wholesalers and retailers, need to be more closely scrutinized by those advocating rational drug uses [12]. There is a need to interrupt the viscous circle of supply and demand between physicians and the pharmaceutical industry by enforcing laws and appointing clinical pharmacologists at various levels in a health setup to supervise and evaluate the prescriptions of doctors and to provide them feedback to improve their prescribing skills.

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