



DRUG UTILIZATION PATTERN OF ACUTE RESPIRATORY TRACT INFECTIONS IN PAEDIATRIC INDOOR PATIENTS IN A TERTIARY CARE TEACHING HOSPITAL

Paediatrics

Dr. Soumita Roy*	3rd year MD PGT (Paediatrics), Department of Paediatrics , Midnapore Medical College & Hospital, Midnapore, West Bengal, India , Pin- 721 101. *Corresponding Author
Dr. Asaduzzaman Laskar	3rd year MD PGT (Paediatrics), Department of Paediatrics , Midnapore Medical College & Hospital, Midnapore, West Bengal, India , Pin- 721 101.
Dr. Abhilash Chatterjee	2nd year MD PGT (Paediatrics), Department of Paediatrics , Midnapore Medical College & Hospital, Midnapore, West Bengal, India , Pin- 721 101.
Prof. Dr. Arun Kumar De	Ex Professor & HOD, Department of Paediatrics , Midnapore Medical College & Hospital, Midnapore, West Bengal, India , Pin- 721 101.

ABSTRACT

Background: Drug utilization study on paediatrics population may identify the core indicators of prescription like the pattern of utilization of drugs, route of administration, average encounters in each prescription, selection of drugs from national list of essential medicine and utilization pattern of antimicrobials. Acute respiratory tract infections (ARI) are very common and a major health problem in paediatric age group in India.

Aim: The study was conducted to find out the utilization pattern of drugs in acute respiratory tract infections (ARI).

Methodology: Cross-sectional observational study was conducted to assess the pattern of drug use in ARI in paediatrics patients admitted in indoor department of Paediatrics, in 3 months period (December 2019 to February 2020).

Results: A total of 117 prescriptions were collected and analysed. Majority of patient were between 0-24 months of age, majority children came from rural areas with lower class of socio-economic status (V) and upper lower class (IV), acute bronchiolitis was the most common type of ARI. Percentage of generic prescription is very much satisfactory (100%), the average encounter was 4.42, 94.01% of drugs prescribed from NLEM, injectable preparations were used frequently (96.58%) Beta lactum antimicrobials were used most frequently.

KEYWORDS

drug utilization study, ARI, beta lactum

INTRODUCTION

Acute respiratory tract infections (ARI) are very common than other infections in all age groups including children. Childhood ARI is a major public health problem throughout the world including India. ARI are the leading cause of morbidity and mortality in paediatric age group.¹

In developing countries, ARI specific mortality is 20-25% among under-fives and infants are majority of them. ARI are the leading cause of death in young children, around 1.9 million childhood death per year in developing countries, 20% of these deaths are from India.²

(ARTIs) are classified as upper respiratory tract infections (URTI) and lower respiratory tract infections (LRTI). Upper respiratory tract infections include rhinitis, sinusitis, ear infections, acute pharyngitis, epiglottitis, tonsillitis and laryngitis. Most of the URTIs have a viral etiology but these may predispose the children for bacterial infections also. LRTIs include laryngotracheitis, bronchitis, bronchiolitis and Pneumonia.³

Although viruses are a frequent cause of ARTIs but in developing countries 50-60% children suffers from bacterial infection. Common bacterial pathogens like *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhali* are also responsible for these infections. Antibiotics are often used for the treatment of acute respiratory infection episodes including non-specific symptoms. Inappropriate use of AMAs for non-bacterial infections and for self-limiting clinical conditions is a major concern of antibiotic resistance in our community.^{4,5}

The World Health Organization (WHO) addressed drug utilization as the marketing, distribution, prescription and use of drugs in a society, considering its consequences, medical, social, and economic. Studies on the process of drug utilization focus on the factors related to the prescribing, dispensing, administering, and taking of medication, and its associated events, covering the medical and nonmedical determinants of drug utilization, the effects of drug utilization, as well as studies of how drug utilization relates to the effects of drug use, beneficial or adverse. The therapeutic practice is expected to be primarily based on evidence provided by pre marketing clinical trials, but complementary data from post marketing period are needed to provide an adequate basis for improving drug therapy.^{6,7}

On this background the study was conducted to find out the prescription patterns in (ARI) in patients of Paediatrics indoor wards of a tertiary care teaching hospital.

Aims And Objectives: to evaluate the prescribing in ARI patients of Paediatrics indoor wards in a tertiary care teaching hospital in Eastern India.

METHODOLOGY

The study was conducted in Department of Paediatrics, Midnapore Medical College and Hospital, Midnapore after getting permission of Institutional Ethics Committee. First written informed consent form was taken from parents of patients, thereafter patients were enrolled on the basis of inclusion and exclusion criteria. All patients admitted in the Paediatric IPD between 0-12 years of age, irrespective of gender, , diagnosed with RTIs were included in the study whereas patients with critically ill, taking antitubercular therapy ,or patients with other systemic illness like unconscious, central nervous system infections mentally retarded, cardiac illness, coagulation disorders or, hepatorenal diseases were excluded from this study.

Study Methodology: The cross sectional observational, unicentric study was conducted in the Paediatrics IPD of an urban, tertiary care, medical college hospital in West Bengal during December 2019 to February 2020. Total 117 prescriptions were collected from patients admitted in paediatrics IPD with ARIs within three months. Data of demographic parameters and core prescription indicators of each prescription and frequency of different antimicrobials were collected and procured.

The following parameters were analysed

A. Demographic parameters (age, gender, diagnosis, socio-economic status ,resident)

B. The core Prescribing indicators included

1. Average number of drugs per prescription
2. Percentage encounter prescribed injections
3. Percentage of prescriptions containing antimicrobial agents
4. Percentage of drugs prescribed by generic name
5. Percentage of drugs prescribed from the essential drugs list (EDL)

C. Frequency of uses of various antimicrobials

Statistical Methods

Data were stored in Microsoft excel 2007. Statistical analyses were done after enrolment of last patient. Percentage statistic was used and demographic parameters were analysed by Chi-square test. Graph Pad in Stat version 3 was used for analysis. Results were given in numbers and percentages. $p < 0.05$ was set as significant.

RESULTS

In a three months period from January 2020 to March 2020, a total of 112 patients were included in the study and their prescriptions (112 prescriptions) were analyzed, no follow up visit was done.

Demographic parameters are represented in table 1.

Table 1. Demographic Parameters

	Number of prescriptions (117)	Percent ages (%)	p value
AGE (MONTHS)			
0-24	54	46.15	<0.001
25-60	33	28.21	
61- 96	18	15.39	
97- 144	12	10.25	
GENDER			
Male	65	56.41	0.08
Female	52	43.59	
RESIDENT			
Rural	89	76.06	<0.001
Urban	28	23.94	
SOCIOECONOMIC STATUS (SES)			
Lower class (V)	54	46.15	<0.001
Upper lower class (IV)	33	28.21	
Lower middle class (III)	21	17.95	
Upper middle class (II)	9	7.69	
Upper class (I)	0	0	
DIAGNOSIS			
Acute bronchiolitis	57	48.72	<0.0001
Wheeze associated lower respiratory tract infection	31	26.49	
Pneumonia	21	17.95	
Hyperactive airway disease	8	6.84	

Table 1 represented the demographic parameters. Chi square test was done for statistical analysis. Majority children had age between 0-24 months followed by between 25 to 60 months of age. Male suffered more from ARI than female, and major population of children came from rural area. Majority children of ARI belonged to lower socioeconomic class V (46.15 %) followed by upper lower socioeconomic class IV (28.21%). Majority children presented with Acute bronchiolitis (48.72%). Statistical analysis was performed by chi square test.

The WHO core prescribing parameters were analysed and represented in table 2.

Table 2.who Core Prescribing Indicators

Indicator value	Values (%)
Average number of drugs per encounter	4.42
Percentage of drugs prescribed from NLEM	110 (94.01%)
Percentage of drugs prescribed by generic name	117 (100%)
Percentage of encounters with an injection prescribed	113 (96.58%)
Percentage of encounters with antibiotic prescribed	113 (96.58%)

Table 2 represented the WHO core prescribing indicators. Out of 117 patients 110 patients received (94.01%) all drugs prescribed from NLEM, 109 patients got injections (93.16%) and 113 patients received antibiotics.

Number of drugs prescribed in each patient is represented in table no 3.

Table 3. Drugs Prescribed/patient/prescription

Drugs prescribed/patient/prescription	N (%)
1	0 (0%)
2	9 (7.69%)

3	15 (12.82%)
4	33(28.21%)
5	44 (37.61%)
6	9 (7.69%)
7	5 (4.27%)
8	2 (1.71%)
Total	117 (100)

Majority of prescription contained 5 drugs (37.61%) followed by 4 drugs (28.21%), 3 drugs (12.82%).

Table 4: Number Of Antibiotics Prescribed/patient/prescription

Number of antibiotics prescribed/ patient/ prescription	n (%)
0	4 (3.41)
1	52 (44.44)
2	61 (52.15)
Total	117 (100)

In our study it was seen that out of 117 prescriptions, 113 prescriptions contained either single or double antimicrobials. The pattern of use of different antimicrobials is represented in table 5.

Table 5. Frequency Of Use Of Antimicrobials

Antimicrobials	Frequency (%)	Percentage
Single antimicrobial/prescription (52)		
Ceftriaxone	23	20.35%
Amoxicillin-clavulanic acid	17	15.04%
Piperacillin- tazobactam	12	10.61%
Two antimicrobials /prescription (61)		
Piperacillin- tazobactam + Amikacin	23	20.35%
Cefotaxime with amikacin	14	12.39%
Ceftriaxone with vancomycin	11	9.74%
Meropenem with vancomycin	5	4.42%
Cefotaxime with vancomycin	4	3.54%
Meropenem with linezolid	2	1.77%
Cefotaxim + gentamicin	2	1.77%
Total	113	100

It was observed that dual antimicrobials are more prescribed than single use of antimicrobials. Ceftriaxone (20.35%) is commonly used single antimicrobial in prescriptions whereas, Piperacillin-tazobactam and Amikacin combinations were commonly used as dual therapy (20.35%)

DISCUSSION

The cross sectional observational, unicentric study was conducted in the Paediatrics IPD of a tertiary care teaching hospital in West Bengal. To find out the pattern of drugs used in ARI, a total 117 prescriptions were collected from patients admitted in paediatrics IPD with ARIs within three months (December 2019 to February 2020). Data of demographic parameters and core prescription indicators of each prescription and frequency of different antimicrobials were collected and procured.

In our study majority of patients of ARI were within 24 months of age (46.15%), followed by 25 to 60 months (28.21%), 61 to 96 months (15.39%) and 97-144 months (10.25%). The age related distribution of ARI was statistically significant ($p < 0.001$).

This result correlated with previous study also. In a study it was seen that majority of children presented with ARI belonged to age group of 0-2 years of age², in another study majority of children presented were between 11-20 months of age group.¹

But in another study it was noted that majority of patients were presented with upper respiratory tract infections between 1 to 5 years (49.02%), followed by 5 to 10 years age which was (23.31%).⁴

In our study 56.41 % children were male and 43.59% children were female. This result also correlates with previous study. In various studies it was seen that male were comparatively more than the number of female children.^{1,2,3}

In this study it was observed that majority of children belonged to low

socioeconomic class (V- 46.15%) followed by upper lower class (IV- 28.21 %) and lower middle class (III- 17.95%) and upper middle class (II- 7.69%). In a study similar type of distribution was observed.⁸

In our study, maximum patients were diagnosed as acute bronchiolitis (48.72%) followed by wheeze associated lower respiratory tract infection (26.49%), pneumonia (26.49%) and hyperactive airway disease (6.84%). This result also correlates with previous study.^{4,9}

The WHO core prescribing parameters were analysed thoroughly. In our study the average number of drugs per encounter was 4.42. In a study it was seen that the average no of encounters/prescription was 4.1 whereas 2.81 was also seen in a study⁴. value of average no of encounters/prescription was found 4.39 in a study.⁴ Average number of encounters / prescription is an important index in prescription evaluation. Mean number of encounters / prescription should be kept as low as possible. As per WHO recommendation that the average number of encounters /prescription should be <2.¹⁰

In our study, 110 prescriptions (94.01%) contained drugs that are enlisted in National List of Essential Medicine (NLEM). In a study it was observed that 97.32% medicine were prescribed from NLEM¹ whereas in another study⁴ only 38% drugs were prescribed from this list.

In our study all medicines (100%) were prescribed as generic name that is very satisfactory for us. In a study it was observed that the percentage of drugs prescribed by generic name was 0%¹ in another studies the value of this indicator was 62.7%³, 56.12%⁴ respectively.

In this study 109 prescriptions (96.58%) contained injectable preparation. The percentage of prescriptions contained injectable preparations was differing in various clinical trials. . In a study it was seen that 24.83% received injectable preparation.¹ In another study no drug was given through parenteral route.³ In a study only 23.20% prescriptions contained the injectable preparation.⁴ In a study 100% prescriptions contained injectable preparations in IPD department.

In our study it was seen that antimicrobials were frequently used, out of 117 prescription, 113 prescriptions contained at least one antimicrobial (96.58%). Among these 113 prescriptions, single antimicrobial was prescribed in 52 prescription (44.44%), rest 61 prescription contained dual antimicrobials (52.15%). Ceftriaxone (20.35%) was most frequently prescribed among single antimicrobial/prescription whereas piperacillin- tazobactam and amikacin combination 20.35%) were most frequently prescribed antimicrobials in dual antimicrobials/prescription. In a previous study it was noted that amoxycillin + clavulanic acid was used most commonly in ARI.^{1,2,4} In another study it was seen that ceftriaxone plus amikacin was most commonly prescribed. So it can be noted from our study and previous studies that beta lactum group of antimicrobials are preferred agents in ARI, the selection of antimicrobials differ may be due to sensitivity pattern of different areas.

Like every study our study has certain limitation, the sample size was low, follow up visit was not performed, treatment output was not analyzed.

CONCLUSION

Despite those limitations, it can be said that the number of ARI patients were observed more commonly between 0-24 months, majority came from rural areas with lower class of socie-economic status (V) and upper lower class (IV), males suffered more commonly than females and acute bronchiolitis was the most common type of ARI. After analysis of core prescription indicators, it was seen that percentage of generic prescription is very much satisfactory (100%), the average encounter was little high (4.42) than WHO recommendation , injectable preparations were used frequently and number of dual antimicrobials/ prescription were higher than the single antimicrobial/ prescription. Beta lactum antimicrobials were used most frequently.

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