

Antibiotic Prescriptions Pattern in Paediatric In-Patient Department Gauhati Medical College and Hospital, Guwahati

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ABSTRACT

The objective of the study was to determine the antibiotic prescriptions pattern and to analyze the rationale use of antibiotic in Paediatric in-patient department of Gauhati Medical College & Hospital, Guwahati (GMCH), Assam. An observational and prospective study was carried out for 1 month duration between April to May 2011. The details of the patients were being recorded in a specific format and results were analyzed by descriptive statistic and expressed as mean \pm SD. Out of 200 patients, 132 prescriptions received antibiotics, where 77 were male child and 55 were female child. The mean age of the patients was 4.13 ± 3.75 years. The number of antibiotics per prescription was 1.41 ± 0.67 . The duration of antibiotic therapy was 6.05 ± 3.45 days and length of hospitalization was 8.91 ± 5.35 . In our study, 71% of paediatric patients were on single antibiotic and most of the paediatric patients were receiving parental preparation. Maximum Antibiotic prescriptions were found in the age group of 5-12 years. Cephalosporins (41.5%) were the most commonly prescribed antibiotic group. The most commonly found antibiotics combination in our study were Amoxicillin and Clavulanic acid & Cefotaxime and Sulbactam. The antibiotic prescription should be done in accordance with WHO guidelines and rational strategies should be implemented in order to control antibiotic use mainly focus on patient population especially in children and infants.

INTRODUCTION

Antibiotics are the key drugs for treatment of infections and are among the most commonly prescribed drugs in Paediatrics department (Pennie, 1998). Worldwide population constitute of about 28% of children and infants who are most susceptible to diseases due to under development of immune system (Moorthi *et al.*, 2011). Several studies reported that 50% to 85% of children receive antibiotics in developed and developing countries prescribed by physicians (Paluck *et al.*, 2001).

In addition, Paediatric groups are among the most vulnerable population groups to contact illnesses (Ashraf *et al.*, 2010) and cause harmful effects of drugs due to differences in pharmacodynamic and pharmacokinetics (Walson, 1997). The use of antimicrobial agents, especially antibiotics has become a routine practice for the treatment of paediatric illnesses (Palikhe, 2004 & Viswanad *et al.*, 2010).

Antibiotic guidelines are standard set of guidelines for the treatment of infectious diseases based on local culture sensitivity data. These guidelines help the physician to prescribe the antibiotics rationally to paediatric patients when definitely indicated (WHO model formulary for children, 2010). In spite of these children are at high risk for opportunistic or nosocomial infections due to intensive antibiotic therapy or prolonged hospitalization and immunosuppressed condition (Filius *et al.*, 2005). An overall rise in health care costs, lack of uniformity in drug prescribing and the emergence of antibiotic resistance, monitoring and control of antibiotic use is of growing concern (Bhartiy *et al.*, 2008; Van Houten *et al.*, 1998 & Abula and Desta, 1999). Thus, judicious use of antibiotic is therefore an important way to reduce the problem of antimicrobial resistance (Use of Antibiotics in Paediatric Care, 2002). So, detailed rationale knowledge of antibiotic prescribing pattern must be implemented in the clinical practice. Gauhati Medical College and Hospital (GMCH) is the largest tertiary care teaching hospital in the North East India. It is the 2nd largest bed capacity hospital in India. Paediatric patients require more attention while prescribing antibiotics in order to avoid the resistance, adverse drug reactions and drug-drug reactions.

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Moreover, antibiotics are the class of drugs commonly prescribed in the Paediatric department. Thus, the aim of our study was to observe and analyze the prescribing pattern of antibiotics in Paediatric in-patient department of GMCH.

METHODS

An observational and prospective study of one month duration was carried out from April through May 2011. The study site was Paediatric in-patient department of Gauhati Medical College & Hospital, Guwahati (GMCH), Assam. The institutional ethical committee permission was taken to conduct this study. Bed head tickets of each and every admitted paediatric patients were checked and different data like age, sex, body weight, diagnosis, duration of treatment with antibiotics, any Adverse Drug Reaction with antibiotic and duration of hospital stay were recorded. A total number of 200 prescriptions of patients were found, out of these 132 prescriptions who received antibiotic of either sex and all age of Paediatric patients were considered in our study. During the time of discharge, antibiotic prescription pattern and other relevant data were collected and noted again. As per WHO recommendation, medical records of Paediatric in-patient of age upto 12 years were included in our study (WHO Model List of Essential Medicines for Children, 2009). Neonates and Paediatric patients from other wards were excluded from this study. The results were presented as percentage and mean \pm Standard deviation (SD).

RESULTS

Total 200 prescriptions were collected during study period from Paediatric ward of GMCH whereas only 132 (66%) patients were having antibiotic prescriptions. In our study, patients were divided into three groups based on different age. The mean age of patient on antibiotic was 4.13 ± 3.75 (Table-1).

Table. 1: Pediatric in-patient characteristics.

Age	No. (%)
1 month—1 year	45 (34%)
1—5 year	38 (29%)
5—12 year	49 (37%)
Total Patients	132
Age (mean \pm SD)	4.13 ± 3.75
Sex	No. (%)
Male Child	77 (58.3%)
Female Child	55 (41.7%)
Length of hospital stay (mean \pm SD)	8.91 ± 5.35

The mean duration of hospital stay was 8.91 ± 5.35 (Table-1). The total 186 antibiotics were prescribed to the patients and the average number of antibiotics per prescription was 1.41 ± 0.67 . In our study, 94 (71%) number of patient received one antibiotic, two antibiotics in 26 (20%), three antibiotics in 9 (6.0%), four antibiotics in 2 (2%) and five antibiotics has been prescribed to only 1 (1%) patient of all cases (Table-2). The mean duration of the antibiotics therapy was 6.05 ± 3.45 days and

maximum number of antibiotics 55 (30%) were given for the five days of duration for the treatment. (Table-3).

Table. 2: Paediatric in-patient exposure to antibiotic(s).

No. of Antibiotic (s) / patient	No. of Prescriptions (%)	Total No. of antibiotics prescribed
1	94(71%)	94
2	26(20%)	52
3	9(6%)	27
4	2(2%)	08
5	1(1%)	05
Total Antibiotics prescribed per patient (Mean \pm S.D.)	1.41 \pm 0.67	186

Table. 3: Duration of antibiotics treatment with respect to number of antibiotics prescribed .

Duration of Antibiotics Treatment (Days)	No. of antibiotics prescribed
01	01
02	14
03	26
04	11
05	55
06	15
07	14
08	15
09	10
10	07
>11	18
Mean \pm SD	6.05 ± 3.45

Table. 4: Diagnosis pattern in different age groups.

Diagnosis	1month--1yr. (Group A)	1--5 yrs. (Group B)	5--12 yrs. (Group C)
Pneumonia	13	05	02
Meningitis	02	----	----
Enteric fever	----	----	09
PUO	00	02	02
Pleural effusion	03	--	04
UTI	----	04	03
Nephrotic syndrome	----	03	08
Febrile seizure	06	02	01
RTI	09	02	05
Others**	06	08	08
Combination*	06	12	07
Total	45	38	49

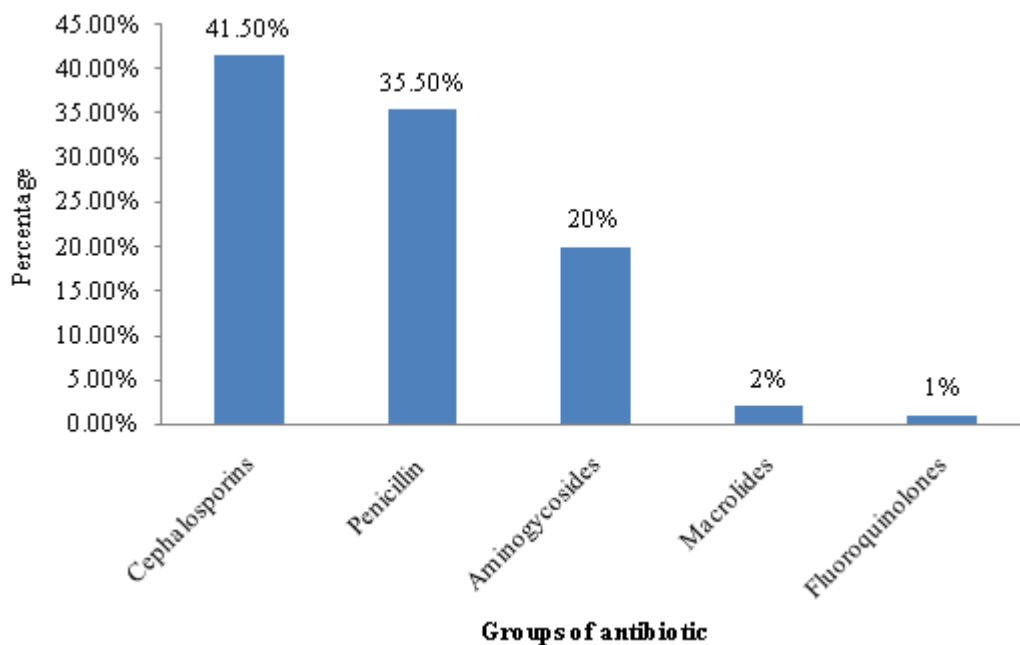
OTHERS (**)--PEM, Scalp Hematoma, Laryngomalacia (WALRI), bleeding diathesis, PEM-grade -III, Aspiration, Poisoning, Seizure disorder, Hematuria, Acute bacillary dysentery, Aplastic anaemia, ALL, Hemophilia, Near drowning, ADEM, septicemia, tubercular lymphadenitis, Kala-azar, abdominal tuberculosis, Vomiting, Neuro cysticercosis, HSP(henoch Schonlein Purpura), Viral hepatitis, renal oedema, hypoplastic anaemia, cardiomyopathy, focal seizure.

COMBINATION (*)--Pneumonia with seborrhea capilis, CHD not failure, CHD with pneumonia, DDM with partially treated meningitis, AGE with dehydration , A cyanotic CHD, DDM with seizure with spino muscular atrophy, floppy with infant syndrome, anaemia with splenomegally, PEM with oedema, bleeding diathesis with anaemia, fever with hepatomegally with anaemia, fever with altered sensorium with seizure, nephritic syndrome with steroid toxicity, grade II PEM with night blindness, bacillary dysentery with fever, persistent diarrhoea with grade-III, hemolysis intake of antipyretic, poisoning with hydrocarbon pneumonia, ALL with septicemia, fever with anaemia, septicemia with CHD, GI bleeding with hepatic mass, hemophilia with haemostasis right knee joint, pneumonia with septic arthritis, hypothyroidism with metabolic disorder, down's syndrome with a cyanotic CHD with dysentery, hemolytic anemia with superlative cervical lymphadenitis.

Table. 5: Distribution of antibiotic on the basis of diagnosis.

Diagnosis	A.+ C.	Ceftria.	Amika.	Cefo.+ Subl.	Vanco	Tobra.	Piper.	Genta.	Ceftaz.	Ampi.	Oflo.	Cefixi.	Cipro.	Total
Pneumonia	17	2	6	5	1									31
Meningitis		2	1											3
E. Fever		8									1			9
PUO		4												4
P.effusion.	7		3											10
UTI	1	5	5				1			1				13
N.Syndrom.	6	4	5	4									1	20
F.Seizure	3	8	2											13
RTI	10	1	2	2		2								17
Others	14	4	5	4	1				1			1		30
Combination	7	16	2	8	1		1	1	1					36
Total	65 (35%)	54 (29%)	31 (17%)	23 (12%)	3 (2%)	2 (1%)	2 (1%)	1 (0.5%)	1 (0.5%)	1 (0.5%)	1 (0.5%)	1 (0.5%)	1 (0.5%)	186

A.+C.: Amoxicillin + Clavulanic acid, Ceftria.: Ceftriaxone, Amika.: Amikacin, Cefo.+ Subl.: Cefotaxime + Sulbactam, Vanco.: Vancomycin, Tobra.: Tobramycin, Piper-Piepricillin, Genta.: Gentamycin, Ceftaz.: Ceftazidime, Ampi.: Ampicillin, Oflo.: Ofloxacin, Cefixi.: Cefixime, Cipro.: Ciprofloxacin. E.fever: Enteric fever, PUO: Pyrexia Unknown Origin, P. effusion: Pleural effusion, UTI: Urinary Tract Infection, N.syndrome : Nephrotic Syndrome, F.seizure : Febrile seizure, RTI: Respiratory Tract Infection.

**Fig. 1:** Percentage of administration of different groups of Antibiotic(s).

Maximum use of antibiotics prescriptions were found in the age group of 5 - 12 years followed by infant of 1 month to 1 year and 1 to 5 years of age group. Pneumonia was the most frequently found disease among the infants, whereas co-morbid conditions were frequently found in the age group of 1-5 years. Likewise enteric fever was frequently found in the age group of 5-12 years (Table-4). Maximum number of antibiotics prescribed were Amoxicillin+Clavulanic acid (35%) followed by Ceftriaxone (29%), Amikacin (17%), Cefotaxime+Sulbactam (12%), Vancomycin (2%), Tobramycin (1%), Piperacillin (1%), Gentamycin(0.5%), Ceftazidime(0.5%), Ampicillin(0.5%), Ofloxacin(0.5%), Cefixime(0.5%) and Ciprofloxacin(0.5%). Maximum numbers of antibiotics were prescribed to pneumonia patients among infants. Amoxicillin and Clavulanic acid, Cefotaxime and Sulbactam were found to be most commonly prescribed combination of antibiotics (Table-5).

Cephalosporins (41.5%) group of antibiotics were most frequently prescribed antibiotics followed by Penicillin groups, Aminoglycosides, Macrolides and Fluoroquinolones group (Fig-1). Most of the antibiotics were administered parentally. In our study period, we have found a single adverse reaction due to injection Amikacin which induced fever and skin rashes all over the body. Study investigator has reported this ADR to Uppsala Monitoring Centre, Sweden via ADR Monitoring centre, Department of Pharmacology, GMCH.

DISCUSSION

In our study, the total percentage of male paediatric patients were 58.3% comparatively more than that of female paediatric patients 41.7%. Similar findings were found in Kathmandu hospital (Palikhe, 2004) and Trinidad hospital (Orrett *et al.*, 2010).

The average length of stay in our study was 8.9 days which was more than the study done at Kathmandu. The average duration of antibiotics treatment was 6.05 days, whereas in one of the study the average duration of antibiotic prescription was 3 days (Torvi and Dambal, 2011). In our study we have observed that paediatric patients having age group 5-12 years had received more number of antibiotics as compare to infants. In contrast, Kathmandu Hospital (Palikhe, 2004) has found that the infants which were less than 1 year and in Beatrix Children's Hospitals those which were less than 2 year received antibiotics more commonly (Van Houten *et al.*, 1998). Pneumonia was the most prevalent disease among the infant which was similar to the finding of the study conducted in Kathmandu Hospital (Palikhe, 2004)

In our study, more number of patients have received single antibiotics. In contrast, most of the studies have shown the varying percentage of antibiotics prescription to Paediatric patients (Palikhe, 2004; Van Houten *et al.*, 1998; Jason Hall, 2002 & Sriram *et al.*, 2008). Similarly, one of the study conducted in the district of Ghana have shown the variation in average percentage of patients receiving at least one antibiotic, which was 41%, 45%, 79% and 98% in different health care centers (Bosu, 1997). These variations in antibiotic prescription to Paediatric patients may be caused due to difference in clinical setting and hospital protocol from one region to another.

In our study, most of Paediatric patients received antibiotics through parental route. Similarly, several studies have shown the varying percentages of antibiotics were prescribed parenterally (Palikhe, 2004; Orrett *et al.*, 2010; Jason Hall, 2002; Sriram *et al.*, 2008; Shankar *et al.*, 2006 & Shamshy *et al.*, 2011). Among the various groups of antibiotics, Cephalosporins (41.5%) were the most frequently prescribed antibiotics followed by Penicillin (35.5%), Aminoglycosides (20%), Macrolides (2%), Fluoroquinolones (1%) and Sulfonamide group (0.5%). Whereas, the study of Sriram *et al.* have shown 68.2% of Cephalosporins and 31.3% of Penicillins prescriptions. However, Sandra R Arnold in 1999 revealed that antibiotics from the penicillin class were the most frequently prescribed antibiotics and other categories of antibiotics prescribed include Aminoglycosides (8.9%), Macrolides (6.1%) Fluoroquinolones (4.7%) (Sriram *et al.*, 2008).

In our study, among the combination of antibiotics, Amoxicillin with Clavulanic acid and Cefotaxime with Sulbactam were found to be commonly prescribed antibiotics to paediatric patients. In one of the study conducted in tertiary care hospital have found that the commonly used antibiotic combination were Cephalosporin with Aminoglycoside, Cephalosporin with Macrolide and Penicillin with Aminoglycosides (Sriram *et al.*, 2008). Whereas, in another tertiary care hospital in Tamilnadu have shown the common combination of antibiotic were prescribed with Amoxicillin with Clavulanate, Piperacillin with Tazobactam, Cefotaxim with Sulbactam, Cefoperazone with Sulbactam, Ampicillin with Cloxacillin and Ceftriaxone with Tazobactam (Shamshy *et al.*, 2011) and also in one of the study in child care centre of Moradabad city have found common

antibiotics combinations of Cefpodoxime with Amikacin, Cefotaxim with Sulbactam, Amoxicillin with Clavulanic acid, Ceftriaxone with Vancomycin and Amoxicillin with Cloxacillin (Ashraf *et al.*, 2010).

CONCLUSION

In our study, 66% of paediatric patients had received the antibiotic prescriptions, out of these maximum numbers of antibiotic prescriptions were found in the age group of 5-12 years. As per our finding, multiple antibiotics were prescribed in the age group of infant between 1 month to 1 year. Almost 95% of the antibiotics were given parenterally. The average numbers of antibiotic per prescription were markedly higher than recommended by WHO.

Generic prescribing of drugs was comparatively lower and mainly prescribed from Essential Drug List. Our study suggests that strategies to control irrational use of antibiotics should be implemented and the guidelines used for treatment of paediatric patients should be upgraded periodically.

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