

RESEARCH ARTICLE

Assessment of Appropriate use of Antibiotics in Paediatric Department of A Tertiary Care Teaching Hospital

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ABSTRACT:

Aim and objective: To determine the appropriate antibiotic therapy in paediatrics and evaluate the appropriateness of antibiotic treatment.

Methods: A prospective study of 9 months duration was carried out from Aug 2015-April 2016. A total 200 prescriptions were collected. The data was collected using specially designed data entry form and appropriateness is assessed with the help of IAP and NICE guidelines.

Results: Out of 200 patients, 14 were in the age group <1 year, 80 were in between 1-3 years of age, 74 were in the age group of 3-8 years and above 8-12 years were 32. Among study population the disease LRTI was the most common diagnosis in 0-1 year (Infant), AGE was the most common diagnosis in the age group 1-3 years, LRTI was mostly found in the age group of 3-8 years and 8-12 years. Significant difference was found in the age group of patient and disease encountered [p= 0.0008]. The third generation cephalosporin, Cefixime (32%) was mostly used, followed by Metronidazole (25%) and Amoxicillin (16%). The Gentamicin(3%) was given to the least patients.

Conclusion: The study concludes that over 200 prescriptions, it was found that most of the antibiotic therapy in the drug regimen is appropriate to the above mentioned guidelines, only slight variation in the drug regimen seen. It shows that the antibiotic therapy in pediatric ward is appropriate to the guidelines.

KEYWORDS:

INTRODUCTION:

The science dealing with the development, diseases and disorders of children is Paediatrics. Rapid growth and development is found in infancy and childhood. Compared to adult medicine, in paediatrics drug use is not extensively researched.

Antibiotics are used in the treatment and prevention of bacterial infection. The antibiotics may either kill or inhibit the growth of bacteria. Inappropriate use of antibiotics leads to increased levels of bacterial resistance making it difficult to treat infections.

The appropriate use of these drugs controls resistance and helps in successful treatment of childhood infections.

Antibiotics are one of the most commonly used medicines in hospitals and have major share from the hospitals' budget^[1-6]. As their inappropriate use has both-medical (increased therapeutic failure, risk of side-effects), economic (financial burden) and public health consequences (selection of resistance) more efforts are required to appropriate their use.

A medical guideline is also called a clinical guideline, clinical practice guideline; it is a document which has the aim of guiding decisions and criteria regarding diagnosis and treatment in specific areas of healthcare. These documents have been in use for past thousand years. However, nowadays modern medical guidelines

are used based on an examination of current evidence within the pattern of evidence-based medicine. They usually include summarized general statements on best practice in healthcare. A healthcare provider is obliged to know the medical guidelines of their profession, and has to decide whether or not to follow the recommendations of a guideline for an individual treatment.

MATERIALS AND METHOD:

Study site:

A prospective study of 9 months duration was carried out from Aug 2015-April 2016. The study site was paediatrics in-patient department of Employee State Insurance Corporation hospital located at Ayanavaram, Chennai. The study proposal was approved by the Institutional Ethics Committee (IEC/DOPV/2015/09).

Sample size:

A total 200 prescriptions were collected.

Inclusion criteria:

1. Patients of either gender.
2. Patients of age limit usually ranges from birth up to 13

Exclusion criteria:

1. Mentally incompetent patients.

Data collection method:

The data was collected using specially designed data entry form which has Patient demographics like age, weight, date of admission, length of stay, antibiotics dose and time of administration, laboratory results, course of therapy. During data collection patients care taker were informed about the study using patient information format. A regular ward round into the study department was carried out

Data analysis:

The data of the patients were screened for appropriateness in all possible ways. Assessment of antibiotic therapy was carried out with the help of Indian Academy of Pediatrics(IAP) and National Institute for Health and Care Excellence (NICE) guidelines.

1. IAP guidelines for Acute Gastric Enteritis (AGE), Enteric fever, Pyrexia of Unknown Origin (PUO).
2. NICE guidelines for Lower Respiratory Tract Infection (LRTI) and Upper Respiratory Tract Infection (URTI)

The values obtained were averaged for analysis. The collected data were analyzed using Microsoft Office Excel 2010 program. The ANNOVA method was used to compare the disease encountered between different age group and significant difference was determined.

RESULTS:

A total number of 200 patients were included in the study based on their inclusion/exclusion criteria. Out of 200 patients, 14 were in the age group <1 year, 80 were in between 1-3 years of age, 74 were in the age group of 3-8 years and above 8-12 years were 32. The results showed (Table 1) a maximum study population in the age group of 1-3 years.

Table 1: Age distribution of study population

Range	No. of patients	%
< 1 year	14	7
1-3 years	80	40
3-8 years	74	37
8-12 years	32	16

Among the study population males were more (52%) than females (48%) which was depicted in Table 2.

Table 2: Gender distribution of study population

Gender	No. of patients	%
Females	104	48%
Males	96	52%

Among study population the disease LRTI was the most common diagnosis in 0-1 year (Infant), AGE was the most common diagnosis in the age group 1-3 years, LRTI was the mostly found in the age group of 3-8 years and 8-12 years. Significant difference was found in the age group of patient and disease encountered. [p= 0.0008] (Table 3)

Table 3: Diagnosis pattern % (No) in different age group

Diagnosis	< 1 year	1-3 years	3-8 years	8-12 years	Total
AGE	0.5 (1)	12 (24)	8.5 (17)	4.5 (9)	51
URTI	1(2)	7 (14)	4.5 (9)	1 (2)	27
Enteric Fever	0	3.5 (7)	3 (6)	1 (2)	15
PUO	0.5 (1)	4.5 (9)	4 (8)	0.5 (1)	19
UTI	0.5 (1)	5.5 (11)	6.5 (13)	3 (6)	31
LRTI	4.5 (9)	2.5 (5)	10.5 (21)	6 (12)	57

The result shows Cephalosporins 62% were highly prescribed antibiotic category followed by nitroimidazole 25% and penicillin 23%. (Table 4)

Table 4: Class of Antibiotics

Antibiotics	No. of patients	%
Penicillins	46	23
Cephalosporins	124	62
Aminoglycosides	6	3
Nitroimidazole	50	25
Fluoroquinolones	8	4
Sulfonamides	4	2

The data shows 34 prescriptions with 2 antibiotics followed by single antibiotic in 164 prescriptions 3 antibiotics in 2 prescriptions. (Table 5)

Table 5: Type Of Antibiotic therapy

Therapy	No.of patients	%
Mono therapy	164	82
2 drug combination	34	17
3 drug combination	2	1

The third generation cephalosporin drug Cefixime (32%) was mostly used antibiotics followed by Metronidazole (25%) and Amoxicillin (16%). The Gentamicin(3%) was given to the least patients. (Table 6)

Table 6: Commonly used Antibiotics in paediatric ward

Antibiotic	No. of patients	%
Amoxicillin	32	16
Ampicillin	14	7
Cefuroxime	26	13
Ceftriaxone	14	7
Cefoperazone	13	6.5
Cephalodoxime	7	3.5
Cefixime	64	32
Gentamicin	6	3
Metronidazole	50	25
Ciprofloxacin	8	4

From the study it was found that; out of 200 prescriptions, 53 % of Antibiotics were prescribed via parenteral route and 47% of Antibiotics were given orally.(Fig:1)

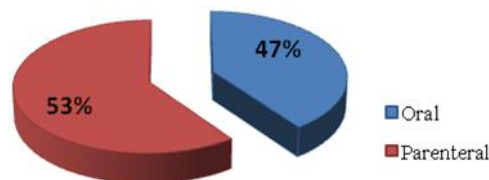


Fig:1 Route of administration of antibiotics

Metronidazole was prescribed in highest percentage in AGE followed by Cefixime. Ampicillin was prescribed in high percentage in URTI followed by Amoxicillin and third generation Cephalosporin-Cefixime. Antibiotic of third generation cephalosporin was the top most frequently prescribed antibiotic group followed Metronidazole [Nitroimidazole group]. Cotrimoxazole were prescribed only for minimum prescription(n=4). (Table 7)

Table 7: Frequency of individual antibiotic for specific diagnosis

Antibiotic/Diseases	AGE	URTI	Enteric fever	PUO	UTI	LRTI	Total
Amoxicillin	0	8	0	8	0	16	32
Ampicillin	0	11	0	0	0	3	14
Cefuroxime	4	0	8	0	4	10	26
Ceftriaxone	0	1	0	0	0	13	14
Cefoperazone	0	4	0	0	0	9	13
Cephalodoxime	0	0	5	0	2	0	7
Cefixime	16	8	7	11	7	15	64
Gentamicin	0	0	0	0	6	0	6
Metronidazole	47	0	3	0	0	0	50
Ciprofloxacin	0	0	0	0	8	0	8

Table:8 Appropriateness of therapy

Antibiotics	Dose			Duration			Indication		ROA	
	Over	Optimum	Under	More	Optimum	Less	Yes	No	Yes	No
Amoxicillin	1	27	4	0	30	2	32	0	32	0
Ampicillin	1	13	0	1	12	1	11	1	12	0
Cefuroxime	2	24	0	0	26	0	26	0	24	2
Ceftriaxone	0	14	0	0	14	0	14	0	14	0
Cefoperazone	1	11	1	2	11	0	13	0	13	0
Cephalodoxime	0	6	1	0	7	0	7	0	7	0
Cefixime	3	59	2	2	57	5	61	3	62	2
Gentamicin	0	6	0	1	5	0	1	5	4	2
Metronidazole	1	47	2	2	47	1	50	0	50	0
Ciprofloxacin	0	8	0	0	8	0	2	6	8	0
Cotrimoxazole	0	4	0	0	4	0	4	0	4	0

From the Table 8 we have seen that there are slight deviations in dose, duration, Indication, ROA from the above mentioned guidelines.

DISCUSSION:

In this study, the total percentage male pediatric were 52% comparatively more than that of females pediatric patients 48%. Similar findings were found in Kathmandu hospital (Palikhe, 2004) and Trinidad Hospital (Orrett et al., 2010)

From the study it is observed that pediatric population of age group 1-3 years had received more number of antibiotics as compared to infants and other groups. In contrast Kathmandu Hospital (Palikhe, 2004) has found that the infants which were less than one year and in Beatrix children's hospitals those which were less than 2 year received antibiotics more commonly (Van Houten et al., 1998)

LRTI was the most prevalent disease among pediatric patients in our study which was similar to the study conducted in Kathmandu Hospital (Palikhe, 2004).

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

From the study it was observed that most of the antibiotics to the pediatric patients were administered through parenteral route. Similarly, several studies have shown the varying percentages of antibiotics were prescribed parenteral (Palikhe, 2004; Orrett et al., 2010; Jason Hall, 2002; Sriram et al., 2005 and Shamsy et al., 2011).

Among the various classifications of antibiotics, cephalosporins (62%) were used most frequently prescribed antibiotics followed by Nitroimidazole (25%), Penicillins (23%), Fluroquinolones (4%), Macrolides (3%), Sulphonamides (2%). Same as the study Chodhury DK and Bezbaruah BK have shown 41.5% Cephalosporins and 35.5% Penicillins prescriptions. However Sriram et al., in 2008 revealed that antibiotics from the class Cephalosporins were most frequently prescribed antibiotics and other categories of antibiotics prescribed include Penicillin 35.5%, Aminoglycosides 20%, Macrolides 2%, Fluroquinolones 1% and Sulphonamide 0.5%.

CONCLUSION:

The study concludes that over 200 prescriptions, it was found that most of the antibiotic therapy in the drug regimen is appropriate to the above mentioned guidelines, slight variation were seen in the drug regimen seen as follows dose(19), duration(17), indication(15) and Route of administration(6).

It shows that the antibiotic therapy in pediatric ward is appropriate to the guidelines.

ACKNOWLEDGEMENT:

The authors are thankful to Vels University (VISTAS) and its management for providing research facilities and encouragement.

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