Print ISSN: 2319-2003 | Online ISSN: 2279-0780

IJBCP International Journal of Basic & Clinical Pharmacology

doi: 10.5455/2319-2003.ijbcp20131209

Research Article

Prescribing pattern of antibiotics in pediatric wards of Bishoftu Hospital, East Ethiopia

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Received: 14 October 2013
Accepted: 27 October 2013

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ABSTRACT

Background: Irrational use of antibiotics leads to emergency of resistant bacteria and hence infections that are even worse than the original diagnosed ones. So, appropriate drug utilization studies are found to be crucial to evaluate whether these drugs are properly used. For this reason, this study was designed to assess the overall antibiotics use practice in one of the largest government hospital's pediatric ward in Ethiopia.
Methods: A prospective study was carried out on 120 hospitalized patient's selected using simple random sampling. Data had been analyzed by software called statistical package for social science (SPSS) version 16. Chi-square (X^2) was used to test possible association between some variables.
Results: In this study, the major disorders for which antibiotics were prescribed include pneumonia (56.3%) and acute gastroenteritis 9.40 %. The most commonly used antibiotics were Ceftriaxone and gentamicin which accounted for 43.5% and 25.6% respectively. Poly pharmacy was as high as 28.3% and it was highly associated with the length of hospital stay ($p<0.01$). Antibiotic prescribing in this hospital pediatric ward was purely empirical.
Conclusion: In general, Ceftriaxone and gentamicin were identified to be the most commonly prescribed medications in this hospital. We would like to recommend that antibiotic selection should be based on culture and sensitivity test results. Cost of long term use of parenteral medications and shift to equivalent oral dose should be considered whenever possible.

Keywords: Antibiotics, Bishoftu hospital, East Ethiopia

INTRODUCTION

Infants and children are among the most vulnerable population groups that contract illnesses. The use of antimicrobial agents has become a routine practice for the treatment of pediatric illnesses, and antibiotics are among the most commonly prescribed drugs in paediatrics.[1] The rising incidence of bacterial resistance to commonly used antibiotics, particularly the emergence of multi-drug resistant organisms has made it mandatory that antibiotics are used judiciously in pediatric practice.[2]

Antimicrobial therapy demands an initial clinical evaluation of the nature and extent of the infective process and knowledge of the likely causative pathogen(s). This assessment should be supported, whenever practical, by laboratory investigation and its susceptibility to antimicrobial agents appropriate for the treatment of the infection.

The aim of an antibiotic policy is, therefore, to offer guidelines for the national use of antimicrobial agents in an attempt to prevent or delay the emergence of resistant micro organism.[3]

The overuse and inappropriate use of antibiotics has led to antibiotics resistance.[4] During the last decades, antibiotic resistance is on the rise. This is mainly due to the abuse of broad- spectrum antibiotics in first line treatment, or erroneous use (e.g. treatment of viral

respiratory tract infection), use of multiple courses (e.g. cystic fibroses patients) or prolonged duration of antibiotic treatment.[5]

One of the major contributing factors for emergence of resistance and treatment failure due to irrational use of antibiotics is irrational prescribing with respect to dose, frequency, and duration of antibiotics streaming and not considering compatibility and drug interaction effect of co-administered drug. Other contributing factors are related to pharmacist, the patient, and the disease. In addition of emergence of resistance such factors may led to infections that are worse than the originally diagnosed one which increase duration of hospital stay and cost of treatment.[6] The purpose of drug use evaluation is thus to ensure that drugs are sued appropriately, safely, and effectively to improve patient's health status. Additionally, continual improvement in appropriate and effective use of drugs like antibiotics has potential to lower the overall cost of care. Therefore, this study was meant to address this and similar other issues.

METHODS

The study was conducted from January to May 2012 in one of the largest government hospital in Ethiopia. A number of clinics, pharmacies, including the Bishoftu Hospital are among the Health service institutions in the study area. Bishoftu hospital is serving about 125000 population of the town as well as the surrounding population. This hospital has its own independent pharmacy unit, laboratory department and different medical wards generally divided into inpatient and outpatient departments in which pediatric ward is one.

This study is prospective cross-sectional in design which was carried out on 120 sampled admitted patients whose data was collected using data abstraction format developed for the purpose of this study. Simple random sampling technique was employed using the bed number of the patients as the sampling frame.

Data Processing and Analysis

The collected data were checked for completeness, analyzed and presented using tables and figures. Computer soft ware called SPSS version 16 was used for analysis. Association between variables was determined using Chi-square (X^2) and considered to be significant at p value of less than 0.05.

RESULTS

A total of 120 admitted patients medical records were observed and analyzed for the evaluation antibiotic use in Bishoftu Hospital pediatric ward. In this study, the analysis of demographic data showed that under five children constituted the highest proportion (80.8%) and in terms of sex 62.5% of the study participants were male as shown in table 1.

Table 1: Distribution of sample population by age, sex and weight in Bishoftu Hospital pediatric wards, Jan-May 2012.

Variables	Variables category	Frequency	Percentage
Age(in year)	0-5 years	97	80.8
	6-10 years	23	19.2
Sex	Male	75	62.5
	Female	45	37.5
Weight (in kilogram)	<5	35	29.2
	5-10	63	52.5
	>10	22	18.3

This study explored that among the most commonly prescribed antibiotics in pediatric ward of Bishoftu hospital, Ceftriaxone accounted for 73 (43.50 %) followed by gentamicin 43 (25.60 %) as shown in figure 1. Likewise, in this study, the most common reasons for which drugs was prescribed were pneumonia followed by gastroenteritis which made up 72 (56.25 %) and 12 (9.40 %) of the indications respectively as stated on figure 2. As indicated by figure 3, among the total 65 co-administered medications with antibiotics, 32 (49.2%) was paracetamol followed by steroids 10 (15.4%) Table 2 showed the routes of administration of drugs identified by this study. Accordingly, this study showed that out of the 242 total number of medication prescribed, parenteral route was accounted for 201 (83.1 %) with no parenteral to oral shift practiced at all. In analysis of types of drugs prescribed, among the total of 242 drugs, the proportion of drugs prescribed in generic name was high which was 234 (97.5 %). Table 3 shows this fact. Last but not least, this study uncovered that there were 34(28.30%) patients with poly pharmacy (patients who are taking six and more medications simultaneously) in which duration of hospital stay was found to be significantly affecting its occurrence ($p<0.01$).

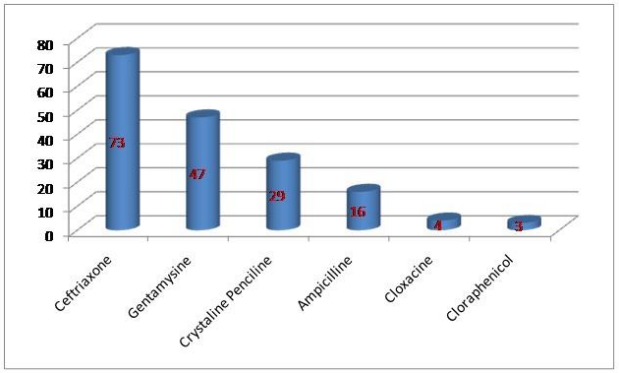

Figure 1: Antibiotics prescribed in Bishoftu Hospital pediatric wards, Jan-May 2012, East Ethiopia.

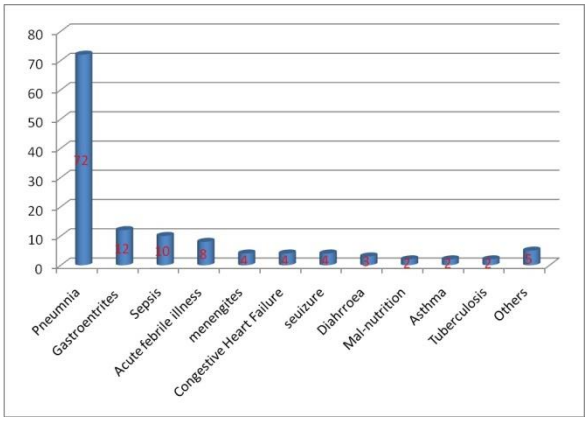

Figure 2: Indications for antibiotics and co-medications prescribed in Bishoftu Hospital pediatric wards, Jan-May 2012, East Ethiopia.

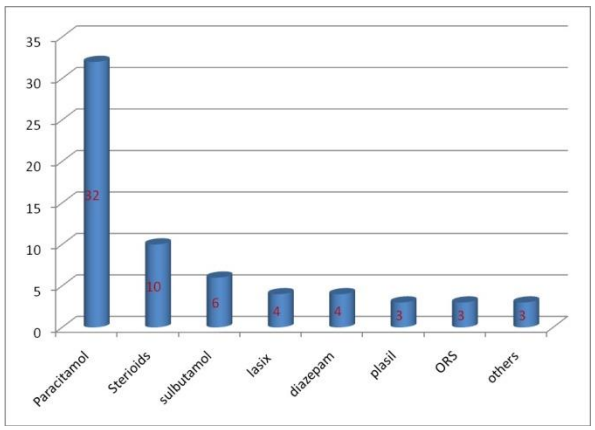

Figure 3: Distribution of Co-administered drugs in pediatric ward of Bishoftu Hospital pediatric wards, Jan-May 2012, East Ethiopia.

Table 2: Route of administration of drugs prescribed in Bishoftu Hospital pediatric wards, Jan-May 2012, East Ethiopia.

Routes of Administration	Number	Percentage (%)
Oral (po)	41	16.9
Parenteral	201	83.1
Parenteral to oral shift	0	0

Table 3: Drugs prescribed by generic versus brand name in Bishoftu Hospital pediatric wards, Jan-May 2012, East Ethiopia.

Drug form	Number	Percentage (%)
Generic	235	97.5
Brand	7	2.5

Table 4: Percentage of patients with poly pharmacy in in Bishoftu Hospital pediatric wards, Jan-May 2012, East Ethiopia.

Poly pharmacy	Number	Percentage (%)
Yes	34	28.3
No	86	71.7

DISCUSSION

During the study period, from January to May 2012, a total of 120 patients' data was analyzed for which antibiotics were prescribed for the treatment of various disorders generating essential findings discussed below.

According to this study, the most frequent clinical indication for which antibiotics were prescribed was pneumonia followed by gastroenteritis which is similar to the study done in USA which revealed that community acquired pneumonia too was an important reason to prescribe antibiotics in hospitalized children.[7] However, the study done by Rajeswari.R.et al on assessment of antibiotic use in pediatric patients put pneumonia at the bottom of the proportion of disorders for which antibiotics were prescribed and gastroenteritis the most commonly occurred disorder.[2] Similar studies conducted by Jonathan A Finkelstein in 2001 reported that otitis media accounted for the majority of antibiotic courses dispensed.[12] This discrepancy might be due to the difference in the time period during which these studies were conducted as there is seasonal variation regarding the prevalence of some diseases.

Antibiotics are among the most commonly prescribed drugs in hospitals and in developed countries around 30% of the hospitalized patients are treated with these drugs.[13] In this study we showed that Ceftriaxone was the most frequently prescribed antibiotic and gentamicin the second most commonly prescribed antibiotic. Similar study by Rajeswari R et al revealed that cefuroxime as the most commonly prescribed antibiotics followed by Ceftriaxone/Sulbactam combination and Ceftriaxone alone ranked 5th.[2] This difference might be due to the fact that in this similar study antibiotic selection was based on the sensitivity of the responsible pathogens unlike in our case which was empiric. In addition to this, the difference in the indications between the present study and this similar study for which antibiotics prescribed may matter.

In this study the other classes of drugs prescribed along with the antibiotics were also analyzed. Accordingly the most commonly drugs were acetaminophen 32 (49.2%), steroids 10 (15.4%) and bronchodilators 6 (9.2%). Our finding was similar to the case of Rajeswari R and his co investigators in which antipyretics, bronchodilators, and expectorants accounted for the vast majority of medication prescribed with antibiotics.[2]

This seems reasonable as fever is the most common finding as the sign of infection during presentation to hospital. Again as asthma and other respiratory disorders are common in children the use of bronchodilators, steroids and expectorants are also justifiable.

In this study most common route of antibiotic administration was found to be parenteral route that accounted for 81.8% and oral route for 16.9%. This is because the largest percentages of the prescriptions in our study were made up of Ceftriaxone and gentamicin which are both available as parenteral route only. The use of these medications is also appropriate since the majority of the cases identified were severe pneumonia which caused admission and hence need to be managed as soon as possible with parenteral antibiotics which is impossible with the oral ones. However, the fact that parenteral to oral shift was not being practiced in this hospital should be the issue that needs an urgent solution.

The percentage of drugs prescribed by generic name should ideally be 100%. According to world health organization (WHO) recommendation, prescribing and dispensing of drugs by its generic name avoids confusion between prescribers and dispensers.[8-10] In our study we found that the pattern of generic prescribing was 97.5% which were considerably sufficient. However, other studies conducted in different parts of Ethiopia showed that the use of generic products (Bahirdar hospitals 70.5%, Gonder hospital 72.6% and Debretabore hospital 84%) was low compared to this study showing the better performance of the present study hospital in this regard.[11]

Lastly, this study found that poly pharmacy was common and found in 28.3% of patients. This magnitude is higher than what was reported by Rajeswari R and his co investigators in which only 17.3% the prescriptions were with poly pharmacy.[2]

This study is limited by the fact that we relied on small sample size that may compromise the generalizability of the findings. The other drawback of our present study is the very short time allocated so that it was difficult to address every point that need to be addressed.

CONCLUSION

Generally, our findings are in line with what were reported by previous similar works. Pneumonia and gastroenteritis were the first and second most common reasons which initiated prescribing of antibiotics while Ceftriaxone and gentamicin from antibiotics and paracetamol (acetaminophen) and steroids from co-prescribed drugs were identified to be the first and second most commonly prescribed medications in this hospital. As antibiotics' prescribing in this hospital is empirical, we would like to recommend that antibiotic selection should be based on culture and sensitivity test results. Parenteral route of administration dominated the prescription with no shift to equivalent oral dose. However, the prescribers should also consider their cost especially in the long term use of these drugs and hence we encourage them to practice the shift to equivalent oral medications based on the patients' prognosis. The percentage of drugs prescribed in generic form was found to be very similar to what WHO recommended. Lastly, we recommend further and larger scope prospective study as this is an important issue to emphasize on to ensure rational use of antibiotics and hence fighting against the alarmingly increasing antimicrobial resistance.

ACKNOWLEDGMENTS

We would like to thank Jimma University, college of public health and medical sciences for financial support. Next, data collectors and Bishoftu Hospital staffs for their cooperation should be acknowledged.

Funding: Jimma University, college of public health and medical sciences
Conflict of interest: None declared
Ethical approval: Ethical approval of the research was obtained from the ethical review board of Jimma University

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doi:10.5455/2319-2003.ijbcp20131209
Cite this article as: Feleke M, Yenet W, Lenjisa JL. Prescribing pattern of antibiotics in pediatric wards of Bishoftu Hospital, East Ethiopia. Int J Basic Clin Pharmacol 2013;2:718-22.