



## Assessment of Antibiotics Use for Hospitalized Children in Butajira General Hospital, Southern Part of Ethiopia

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### Abstract

#### Background

Drugs including antibiotics are among the important components of health care systems. However, they are not used appropriately to their maximum potential. The aim of this study was to assess extent of antibiotics use among hospitalized pediatric patients in Butajira general hospital, Ethiopia.

#### Materials and Methods

A cross sectional study was conducted on the 120 hospitalized pediatric patients' medical cards using data abstraction format. A patient's medical card was selected by simple random sampling after cards were arranged in chronological order. Data were analyzed by using statistical package for social science for windows version 20.0.

#### Results

The results revealed that almost three quarter 74.7% (248/332) of pediatric patients were prescribed with antibiotics with an average of 2.07 antibiotics per a patient. Two thirds 66.9% (166/248) of antibiotics treatments were supported by laboratory investigations; and more than three quarters 83.9% (208/248) of them were administered through parenteral routes. Ceftriaxone 20.9% (52/248) and gentamicin 21.7% (54/248) were the most commonly used antibiotics; and acute gastroenteritis 14.2% (17/120) and pneumonia 48.3% (58/120) were the most common causes of hospitalization among the pediatric patients.

#### Conclusion

This study has demonstrated that there was high prevalence of antibiotics use and poly pharmacy practices among hospitalized pediatric patients. There was also prescribing of antibiotics without laboratory investigations.

**Key Words:** Antibiotics, Children, Ethiopia, Pediatric.

\*Please cite this article as: Sado Genamo E, Gebeyehu Bayisa H, Ditamo D R. Assessment of Antibiotics Use for Hospitalized Children in Butajira General Hospital, Southern Part of Ethiopia. Int J Pediatr 2019; 7(1): 8845-51. DOI: [10.22038/ijp.2018.33582.2964](https://doi.org/10.22038/ijp.2018.33582.2964)

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Received date: Apr.20, 2018; Accepted date: Aug.22, 2018

## 1- INTRODUCTION

Drugs, including antibiotics, are among the important components of health care systems and play a crucial role in saving life. However, they are not used appropriately to their maximum potential. It is estimated that about half of all medicines are inappropriately prescribed, dispensed and sold; and about half of all patients fail to take their medicines properly (1, 2). These types of problems are raised from both provider of health care and user of drugs. Inappropriate use of drugs are challenging to the health care systems in both industrialized and developing countries though effect is more pressing in developing countries (1, 2).

Children constitute a large proportion of the population in lower and middle income countries. They are highly vulnerable to infectious diseases and to the harmful effect of drugs, due to differences in pharmacodynamics and pharmacokinetics from adult (3). Hence drug use in pediatric patient is a unique dilemma in the management and monitoring of disease; establishing safe and effective therapeutic regimen for children is challenging (4, 5).

Antibiotics are the key drugs for treatment of infectious diseases and are among the most commonly prescribed drugs in pediatric population. Several studies reported that 50% to 85% of children receive antibiotics in developed and developing countries; while they are needed only in 20% of the cases (5). This inappropriate use of antibiotic might led to the development of antimicrobial resistance (6-8). Antibiotics resistance has become a serious public health concern with economic and social implications throughout the world (9). It has been rising since the last two decades due to multiple factors, where some of them are overuse of broad- spectrum antibiotics in a first line treatment, or erroneous use, and prolonged duration of antibiotic treatment (10-12).

The major contributing factors for emergence of antimicrobial resistance and treatment failure are irrational prescribing with respect to dose, frequency, and duration of antibiotics, and their prescriptions were not supported by laboratory investigation. Other contributing factors are related with irrational dispensing, patients in adherence with therapeutic regimen and disease itself (10, 11). In response to the rise in antimicrobial resistances, world health organization (WHO) developed a global action plan on antimicrobial resistance with five major objectives to contain antimicrobial resistance in 2015. One of those objectives is strengthen the knowledge and evidence base treatment through surveillance and research (13).

In line with this WHO objective, different studies on antibiotics use should be conducted in different countries regardless of their income categories to contain the rising of antimicrobial resistances. Therefore, this study was conducted to assess prevalence of antibiotics use in hospitalized children and to assess extent to which their prescriptions were supported by laboratory investigation in Butajira General Hospital (BGH), Ethiopia.

## 2- MATERIALS AND METHODS

### 2-1. Study setting and design

A retrospective cross sectional study was conducted from February 1 to February 30, 2016. It was conducted by reviewing the medical card of pediatric patients for whom antibiotics were prescribed. It was conducted in pediatric wards of Butajira General Hospital, which is found in Butajira town. The town is located at 136 km away from Addis Ababa in the southern part of Ethiopia.

### 2-2. Study Population

The source of populations was a total of one year pediatric patients' medical cards

(PMR) beginning from January 1 to December 31, 2015. The study population was all PMR containing antibiotic and fulfilling inclusion criteria. Pediatric PMR were included if they contained information on hospitalization, hospital stays for at least one days, and age of children to 12 years old according to WHO category (14). Pediatric PMR of outpatient and PMR of pediatric admitted with Tuberculosis (TB), Leprosy and Human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) were excluded.

### 2-3. Sampling and Sample size Determination

The sample size was determined by using Joint Commission Accreditation of the health Organization criteria (15). Accordingly, the sample size for the study was found to be 120 PMR. Systematic random sampling technique was employed to select a PMR, after they were arranged in a chronological order.

### 2-4. Data collection and analysis

Data were collected by trained data collector by using pretested and validated data abstraction format which was developed for this purpose. The collected data were scrutinized for clarity and completeness, coded and entered into

computer. Analysis was carried out by using statistical package for social science (SPSS) for windows version 20.0. The results were presented by using tables, figures, percentage and mean  $\pm$  standard deviation (SD).

### 2-5. Ethical considerations

Ethical clearance was obtained from the Ethics Review Committee of College of Health Sciences. Letter for permission was written from the department of pharmacy to Butajira General Hospital and collection was commenced after obtaining permission to proceed.

## 3- RESULTS

A total of 120 hospitalized pediatric PMR were scrutinized and analyzed to assess extent of antibiotics use for hospitalized pediatric patients. Almost half 51.7 % (62/120) the studied patients were male. Three fourth 75.8% (91/120) of the patients were under five years of age category. The mean age of the patients was 4.2 (2.7). More than half 60.8% (73/120) of the patients' had body weight between five and ten kilograms. The mean days of hospital staying was 6.4 (2.2) (**Table.1**). The survey showed that the most common causes of hospitalization were pneumonia 48.3% (58/120) and acute gastroenteritis 14.2% (17/120) (**Table.2**).

**Table-1:** Characteristics of pediatric patients prescribed with antibiotics in Butajira General Hospital, February 2016.

Variables	Sub-group	Frequency (n=120)	Percentage
Gender	Male	62	51.7
	Female	58	48.3
Age (in year)	< 1	17	14.1
	1-5	91	75.8
	5-12	12	10.0
Weight (Kg)	<5	20	16.7
	5-10	73	60.8
	>10	27	22.5
Length of hospitalization			6.4(2.2)

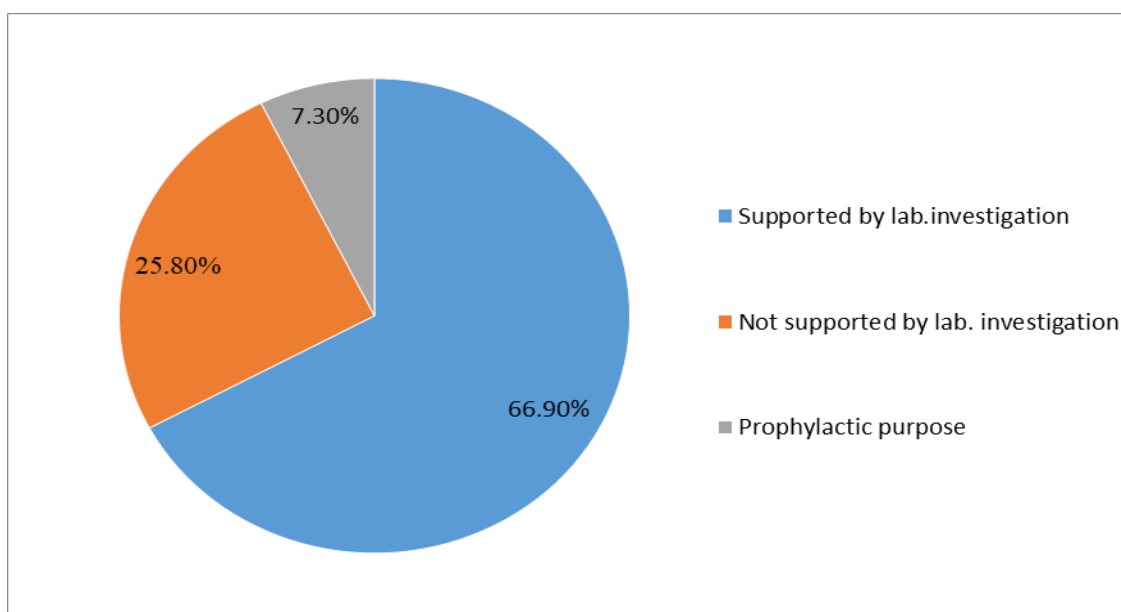
**Table-2:** Causes of hospitalization to pediatric ward in the Butajira General Hospital, February 2016.

Cause of Admission	Frequency	Percent (%)
Pneumonia	58	48.3
Sepsis	14	11.7
Acute Gastroenteritis	17	14.2
Acute Febrile illness	10	8.30
Diarrhea	5	4.20
Mal-nutrition	3	2.50
Tuberculosis	2	1.70
Chronic Obstructive Pulmonary Diseases	5	4.20
Others*	6	5.00

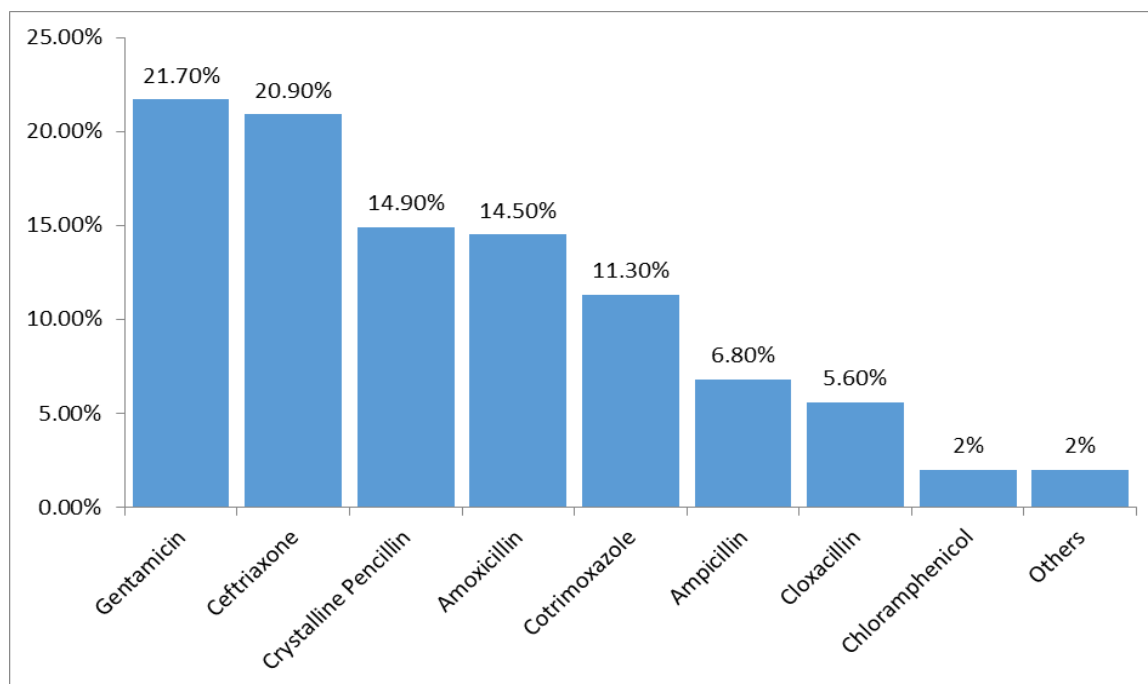
Others\* include: seizure, Congestive Heart Failure, Trauma and combinations.

A total of 332 drugs were prescribed to 120 patients with an average of 2.75 of drugs per a patient. Almost three quarter of 74.7% (248/332) encountered drugs were antibiotics, which gave an average of 2.07 antibiotics per a patient. The study revealed that more than three quarters 83.33% (100/120) of the PMR contained two and more than two antibiotics; whereas the remaining PMR 16.7% (20/120) contained a single antibiotic. It was found that more than three quarters of prescribed antibiotics were administered through parenteral routes 83.9% (208/248) while remaining 16.1% (40/248) were through oral route. Out of a total of 248 prescribed antibiotics, 66.9% (166/248) antibiotics were supported by laboratory

investigations while 25.8% (64/248) antibiotics were prescribed empirically and the remaining 7.3% (18/248) of them were prescribed for prophylactic purposes (**Figure.1**). The top five commonly prescribed antibiotics were gentamicin 21.7% (54/248), ceftriaxone, 20.9% (52/248), crystalline penicillin 14.9% (37/248), amoxicillin 14.5% (36/248) and Co-trimoxazole 11.3% (28/248), other less commonly prescribed antibiotics were ampicillin 6.85% (17/248), cloxacillin 5.64% (14/248), chloramphenicol 2% (5/248), while other 2% (5/248) metronidazole, procaine penicillin fortified and erythromycin were the least prescribed antibiotics (**Figure.2**).



**Fig.1:** Percentage of antibiotics prescriptions supported by laboratory investigations Butajira General Hospital, February 2016.



Other: includes metronidazole, procaine penicillin fortified and erythromycin.

**Fig.2:** Percentage of commonly prescribed antibiotics for hospitalized children in Butajira General Hospital, February 2016.

#### 4- DISCUSSION

The present study revealed that there was high prevalence of antibiotics use for hospitalized pediatric patients, where it was higher in the children of age group 1-5 years than children aged group 5-12 years. This finding is in contrast to the reports from a study conducted in Guwahati hospital, which showed the higher use of antibiotics in the children, aged 5-12 years (5). This discrepancy might be due to difference in the number of hospitalized children in each age group. The study also revealed that pneumonia was the most frequent clinical indication for which antibiotics were prescribed. Similar finding was reported from study conducted in the Bishoftu hospital (10), and Guwahati Hospital (5). However, acute gastroenteritis was the second common indication of antibiotics. This finding was in agreement with the study done by Feleke and his co-investigators (10), and it was disagreement with the study done by Bezbaruah and his co-investigator (5). This

discrepancy might be due to difference in the socio-demographic characteristics of children, whom antibiotics were prescribed and seasonal variation regarding to the prevalence of some infectious diseases. The study also showed that ceftriaxone and gentamicin were the two most frequently prescribed antibiotics for hospitalized children. Similar findings were reported from study conducted by Feleke and his co-investigators in Bishoftu hospital (10). However, similar studies conducted by Murali and his co-investigators in a tertiary care hospital (10), and Bezbaruah and his co-investigator in Guwahati Hospital (5) showed different types of antibiotics frequently prescribed. This variation of antibiotics frequently prescribed in pediatrics ward might be associated with level of education and experience of prescribers, availability and type of antibiotics, due to difference in clinical setting and hospital protocol from country to country and standard treatment guidelines. The findings from the present



study suggest that there is poly pharmacy practice for prescribing antibiotics for pediatric patients, 2.07 antibiotics per patient. This finding is in contrast to reports from studies conducted by Feleke and his colleagues; Bezbaruah and his co-investigator which showed that large number of pediatric patients received a single antibiotic (10, 16, 17). The use of combination of antibiotics for treatment might be useful to alleviate emergency of resistance strains but it matters the safety issues in the pediatric population (9). Almost two thirds of antibiotics prescriptions 66.6% were supported by laboratory investigations. This finding is higher than the study done in Bishoftu hospital, which reported 0% of antibiotics prescription supported by laboratory investigations (10). This big discrepancy of findings from similar studies might be due to time difference, where currently there is an attention on antibiotics use from the government, in devising and implementing of policy that limit antibiotics as prescription on medicines.

Supporting antibiotics prescriptions by laboratory investigations and sensitivity test; help to combat the resistant strains (10). The study also revealed the high prevalence of parenteral use of antibiotics. This finding is higher than the World Health Organization recommendation (18). Gentamicin is the most commonly prescribed injection. This might be associated with the availability of parenteral dosage form of gentamicin. Since parenteral preparations are expensive as compared to oral preparations, cost of antibiotics should be also considered during prescribing (10, 19, 20). This finding is consistence from the study conducted by Feleke and his co-investigators in Bishoftu Hospital (10).

## 5- CONCLUSION

The purpose of the current study was to assess the prevalence of antibiotics use

in the hospitalized children and to assess the extent of supporting antibiotics prescription by laboratory investigation. The following points are emerged from the present investigation: this study shown as there was high prevalence of antibiotics use among pediatric patients, where there was a high poly pharmacy practice. Ceftriaxone and gentamicin were the most commonly used type of antibiotics. Almost two thirds of antibiotics prescriptions were supported by laboratory investigations. It also showed as high prevalence of parenteral administration of antibiotics, where more than three quarters of antibiotics were administered through parental routes. This research has thrown up many questions in need of further investigation. Further study needs to be conducted to devise policy and guidelines to intervene over use of antibiotics and to contain antimicrobial resistance.

**6- CONFLICT OF INTEREST:** None.

## 7- ACKNOWLEDGMENTS

The authors would like to thank the administration and staff members of BGH for their collaboration and assistance during data collection; and Wollega University, Department of Pharmacy for giving for logistic support and all individuals who render help during the study period are highly acknowledged.

## 8- FINANCIAL SUPPORT

There is no financial fund support to carry out this study.

## 9- REFERENCES

1. Yenets W. Baseline survey on drug prescribing indicators for outpatients in JUSH Southwest Ethiopia. *Ethiopian J Health Dev* 2005; 15:147-48.
2. Kaffe KK, Karkee SB, Shrestha N, Prasad RR, Bhujra GB, Chataut BD. Community intervention to improve knowledge and practice on commonly used

3. drugs. Kath Mendu, Kathmandu University Med J 2010; 8: 29-34.
4. Vishwanath M, Narayana Reddy S, Sahana D. Assessment of drug utilization in hospitalized children at a tertiary care teaching hospital. *J of Chemical and Pharmaceutical Res* 2014;6:592-98.
5. Shanker PR, Upadhyay DK, Subish P, Dupcy AK, Mishara P. Prescribing pattern among paediatric inpatients in teaching hospitals in western Nepal. *Singapore Med. J. Health* 2006; 47: 261-65.
6. Choudhury DK, Bezbaruah BK. Antibiotic Prescriptions Pattern in Paediatric In-Patient Department Gauhati Medical College and Hospital, Guwahati. *J App Pharm Sci* 2013; 3: 144-48.
7. Mohammed M, Mirrahimi B, Mousavi S, Moradi M. Drug Use Evaluation of Three Widely Prescribed Antibiotics in a Teaching Hospital in East of Iran. *J Pharm Care* 2013; 1: 100-3.
8. Schleiss MR. Antibiotic therapy. In: Behran FJ, Stanton J. 18<sup>th</sup> ed. *Nelson text book of Paediatrics*. Philadelphia; Saunders Elsevier 2007; 1110-22.
9. Diriba L, Worku F, Grma T. Evaluation of prophylactic use of Cotrimoxazole for people living with HIV AIDS in Jimma University specialized hospital. Southwest Ethiopia. *Ethiopian. J health Sci* 2008; 18:59-63.
10. Arti K. The challenge of antibiotic resistance: Need to contemplate. *Indian J Med Res* 2005; 121: 83-91.
11. Feleke M, Yenet W, Lenjisa JL. Prescribing pattern of antibiotics in paediatric wards of Bishoftu Hospital, East Ethiopia. *Int J Basic Clin Pharmacol* 2001; 2:718-22.
12. Weinstein RA. Controlling antimicrobial resistance in hospitals: Infection control and use of antibiotics. *Emerg Infect Dis*. 2001; 7: 188-92.
13. Getachew E, Aragaw S, Adissie W, Agalu A. Antibiotic prescribing pattern in a referral hospital in Ethiopia. *African J of Pharmacy and Pharmacol* 2013; 7 (38): 2657-61
14. World Health Organization. Global action plan on antimicrobial resistance 2015. Geneva, Switzerland.
15. World health organization. Model List of Essential Medicines for Children 2<sup>nd</sup> list, 2009.
16. Hamami A. Determination of sample size for drug use evaluation 2009: <http://www.pharmacorner.com/default.Asp?Action=article&ID=136> assessed on line February 16, 2015.
17. Murali R Venkateswaramurthy N, Sampath K R. The study of drug utilization pattern in paediatric patients. *Int J of Pharmacy and Pharmaceutical Sci*. 2013i; 5.
18. Sriram S, Leo M, Manjula Devi AS, Rajalingam B, Ramkumar K, Rajeswari R. Assessment of Antibiotic Use in Paediatric Patients at a Tertiary care Teaching Hospital. *Indian J Pharm Pract* 2008; 1:30-6.
19. World Health Organization. International Network of Rational Use of Drugs. Drug use indicators 1993.
20. Paluck E, Katzentein D, Frankish CJ, Herbert CP, Milner R, Speert et al. Prescribing practices and attitudes toward giving children antibiotics. *Can Fam Physician*. 2001; 47:521-7.
21. Zenaw T, Chalachew T, Segewkal H. A Retrospective Review of Antibiotic Utilization in Adult Medical Wards of a Primary Care Hospital in Ethiopia. *Int J of Pharmacy* 2014; 4: 56-62.