

*Full Length Research Paper*

# Drug prescribing practice in a pediatrics ward in Ethiopian

Asrat Agalu<sup>1\*</sup> and Hailemeskel Mekonnen<sup>2</sup>

<sup>1</sup>Wollo University, College of Medicine and Health Sciences, Department of Pharmacy, Dessie, Ethiopia;

<sup>2</sup>School of Pharmacy Addis Ababa University

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The aim of this study was to assess drug prescribing practices in Pediatrics ward of Jimma University Specialized Hospital, (JUSH), southwest Ethiopia, January, 2008. A retrospective cross sectional study was conducted in pediatrics ward of Jimma University Specialized Hospital. Patient cards from January 2004-December 2007 were selected using random sampling techniques and reviewed using structured data collection format from January 19-25, 2008. The rationality of prescribing was compared with standard treatment guidelines, and different textbooks. The collected data was edited, coded, tallied and finally cleaned. Descriptive statistics was computed to meet the stated objective. On review of 384 sampled cards, 510 individual drugs were prescribed. Antibiotics 224 (44.9%) and analgesic/antipyretics 98 (19.2%) were the most commonly prescribed category of drugs. Paracetamol 86 (18.86%), Cotrimoxazole 79 (15.5%) and amoxicillin 53 (10.39%) were the most frequently prescribed drugs. About 261 (67.97%), 265 (51.82%), 63 (12.35%) and 176 (37.51%) of the drugs were prescribed with correct indication, frequency, duration and dose respectively. Drugs prescribed by generic name and from essential drug list of Ethiopia were 82% and 89.8%, respectively. Generally, there was irrational prescribing practice of drugs in the pediatric patients of the study hospital. Prescribers should regularly check completeness of patient cards and pharmacists should prepare a continuous health education programs on rational use of drugs and of course should work in a team spirit with prescribers

**Keywords:** Drug prescribing, Pediatrics, Patient cards, Drugs.

## INTRODUCTION

Drugs are important components of health care and play crucial role in saving life. The limited information available on drug use throughout the world indicated that drugs are not optimally used. This inappropriate use has serious health and economic consequences for individuals, community and for the success of national health care system. In general, the safe and effective use of drugs depends on prescribing pattern. So rational prescribing pattern, and providing correct information during dispensing is invaluable for proper utilization of drugs: Yenet, 2005 and Drug Administration and Control Authority Ethiopia. Introduction 2004.

Drug use in pediatric patients is a unique dilemma in the management and monitoring of disease since these age groups are unique populations with respect to how they metabolize, excrete and respond to drug therapy. Establishing safe and effective therapeutic regimens for children is challenging. From birth to adolescence pediatric patients are continually changed with respect to growth, psychosocial development, information on drug therapy is limited. The administration of drugs to children requires special knowledge and expertise primarily because the doses prescribed for children are often in an amount which is not commercially available in pediatric level. Guidelines are available for extemporaneous preparation of medication that is available only in adult strengths and/or dosage forms. It requires pediatrics research to access drugs that can benefit these age groups by properly testing for pediatric use: Young et al., 1995, Shanker et al., 2006 and Batty et al, 2003.

\*Corresponding Author E-mail: [asratagl@yahoo.com](mailto:asratagl@yahoo.com)  
Tel:+251917156682

Many studies have been done to document drug use pattern, and most of these indicated that over prescribing, multi-prescribing, use of unnecessary expensive drugs, a use of drugs unrelated to diagnosis, overuse of antibiotics and injections were the most common problems of irrational drug use in pediatric patients. Without doubt improving drug use practice would have financial and more importantly public health benefits: Legrand et al., 1999, Delhi society for promotion of drug use concepts and perspectives and Bajracharya et al., 2002.

Even though drug handling in pediatrics is a very sensitive issue, there is significant problem of irrational drug prescribing for pediatrics: Delhi society for promotion of drug use concepts and perspectives (Bajracharya et al., 2002; Benjamin et al., 2002; Volk et al., 1994; Abula et al., 1999). Furthermore, there was no documented data to indicate how much significant the problem is in pediatrics ward of Jimma university specialized hospital/ JUSH/ except one study in inpatient wards: Mengistu 2005. Therefore, the rationale for conducting this study was to provide the baseline information on the drug prescribing pattern in the pediatric patients of JUSH by quantifying the present drug use practice and to identify the problem areas.

## METHODS

### Study area and period

Retrospective study was conducted in pediatrics ward of Jimma University Specialized Hospital (JUSH) from January 28-February 9, 2008. JUSH is a teaching hospital located in Jimma town, Oromia Region, south west Ethiopia, 336 km from Addis Ababa. It is a referral hospital with 558 health professionals, and 450 beds where a multi-disciplinary team of diverse professionals provides a range of health services for approximately 9000 inpatients and 80,000 outpatients each year: Jimma University Specialized Hospital JUSH, 2010.

### Study participants

The sample size was determined by using statistical formula:  $n = Z_{\alpha/2}^2 * P(1-P) / d^2$  and prevalence of 50%: Degu et al, 2005. Thus, three hundred eighty four (384) pediatric patient cards registered from January 1/2004-December 31/2007 were included. Among the cards three hundred eighty four (384) pediatric patient cards (96 cards from each year were proportionally selected to account variability of practices by different prescribers using random sampling technique.

## Data collection process

Data was collected by 2 graduating class pharmacy students under supervision of principal investigator using pretested data collection format. All pediatric patient cards in each year were counted to determine the sampling interval to take the desired proportion from each year. Since the cards in each were almost relatively similar the same sampling interval and proportion was used. Standard Treatment Guideline /STG/, Essential Drug list for Ethiopia /EDL/ and text books in pediatrics practice Drug Administration and Control Authority Ethiopia. Introduction (2004). Drug Administration and Control Authority of Ethiopia, 2002, Dipiro JT, et al., 2005, Kliegman et al., and 2007 and Fauci et al., 2008 to determine appropriateness of drug prescribing. Collected data was edited, coded, tallied and cleaned. Descriptive statistics were computed to determine prevalence, means, and standard deviations.

## Ethical consideration

Prior to data collection the management of hospital was requested by formal written letter from school of pharmacy. The head of diabetic clinic was also informed by formally written letter from school of pharmacy. During data collection process all staff and patient-related data were kept confidential. Permission to access patient data obtained from the patient, the attendants and care givers was obtained to access patient cards by written consent when necessary. All the information obtained from the patient was kept confidential by principal investigator only for the sake of research purpose. To ensure confidentiality the names of patients and prescribers were replaced with the code. Ethical issues were considered during data collection in order not to disclose patient and professional information to persons outside the research.

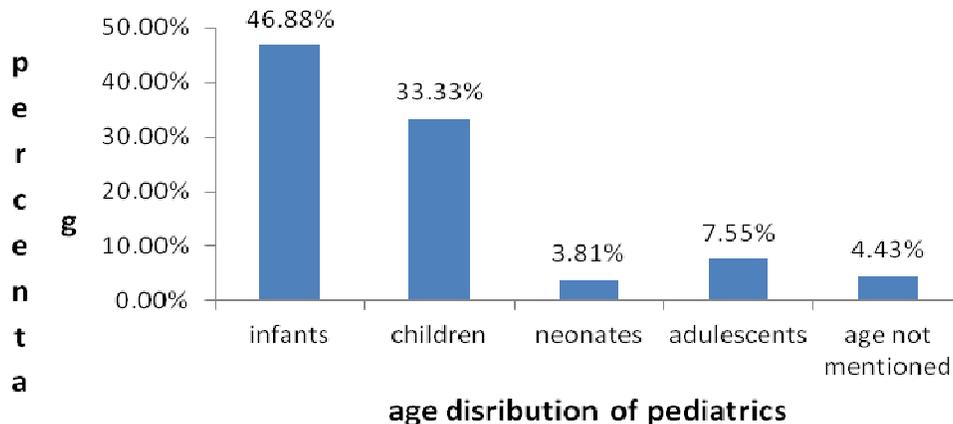
## RESULTS

The study was conducted on 384 Pediatric patient cards in pediatrics ward of JUSH. According to study majority of patients 180 (46.88%) were infants followed by children 128 (33.33%) (Figure 1).

The majority of the patients 78 (20.31%) had body weight of 10-14.9 kg followed by 5-9 kg which was 74 (19.27%) (Table 1).

The most common diagnoses were pneumonia, Acute Gastroenteritis (AGE), malaria each accounting for 160 (36.53%), 50 (11.42%), and 41 (9.36%), respectively (Table 2).

Different drugs prescribed were categorized into 8 groups and accordingly antibiotics 98 (19.23%), fluids and



**Figure1.** Age of pediatric patients in peditrics ward of JUSH, Jan. 2004 –Dec. 2007

**Table1.** Body weight of pediatric patients in peditrics ward of JUSH, June, 2008.

Weight / kg	Frequency (%)
<4.95-9.9	14 (3.65)
5-9.9	74 (19.27)
10-14.9	78 (20.31)
15-19.9	55 (14.32)
20-24.9	38 (9.90)
>25	40 (10.42)
Not mentioned	85 (22.14)
Total	384 (100)

**Table2.** Top ten diagnoses in peditrics ward of JUSH, June, 2008.

Diagnosis	Frequency (10%)
Pneumonia	160 (36.53)
Acute Gastro enteritis	50 (11.42)
Malaria	41 (9.36)
Upper Respiratory Tract infections	35 (7.99)
Intestinal Parasites	29 (6.62)
Conjunctivitis	20 (4.57)
Tinea capitis	18 (4.41)
Diarrhea	15 (3.42)
Tonsilo-phyrangitis	12 (2.74)
Meningitis	9 (2.05)
Others*	49 (11.19)
Total	438 (100)

\*Others: Asthma , amoeba, impetigo, Otitis media, Urinary Tract infections

electrolytes 45 (8.82%) and vitamins and minerals 43 (8.43%) were the most commonly prescribed categories of drugs in the ward (Table 3).

The average number of drugs prescribed per-encounter was 1.33 where 208 (54.17%), 92 (23.96%), of patient

cards contained one drug, and two drugs respectively. The maximum number of drugs per patient card was 1.04% but there was no dug in 1.98% of patient cards. Of all prescribed drugs, the three most comm- only prescribed individual drugs were paracetamol,

**Table 3.** Therapeutic category of drugs prescribed in pediatrics ward of JUSH, June, 2008.

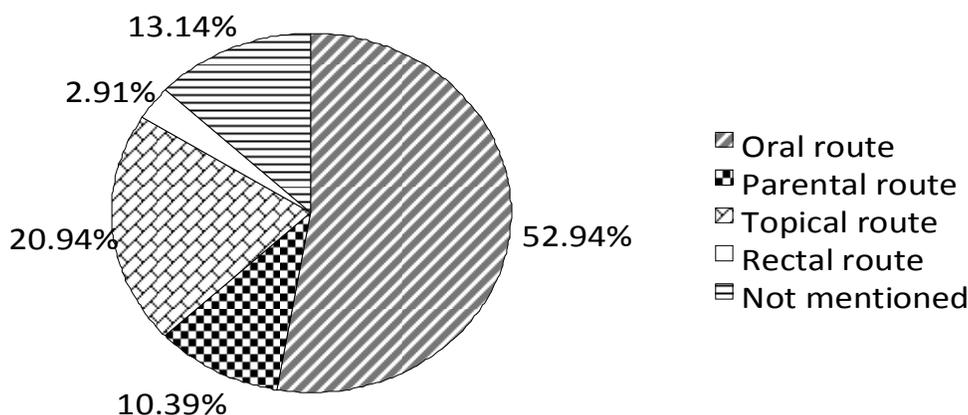
Therapeutic class	Frequency (%)
Antibiotics	229 (44.90)
Analgesic/ antipyretics	98 (19.23)
Fluids and electrolytes	45 (8.82)
Vitamins and minerals	43 (8.43)
Anti-protozoals	34 (6.67)
Ant-helmentics	26 (5.10)
Antifungal	13 (2.550)
Others*	22 (4.31)
Total	510 (100)

\*Others: antihistaminic, dermatological, hormones and respiratory drugs.

**Table 4.** Top ten commonly prescribed drugs in pediatrics ward of JUSH, June, 2008.

Drug	Frequency (%)
Paracétamol	86 (16.86)
Cotrimoxazole	79 (15.49)
Amoxacillin	53 (10.39)
ORS*	31 (6.08)
Mebendazole	25 (4.90)
Tétracyclines	23 (4.51)
Crystalline pénicilline	19 (3.73)
Cloxacilline	16 (3.14)
Benzanthine penicillin	13 (2.55)
Quinine	11 (2.55)
Others (50 drugs)	154 (30.20)
Total	510 (100)

\*ORS-oral rehydration salt



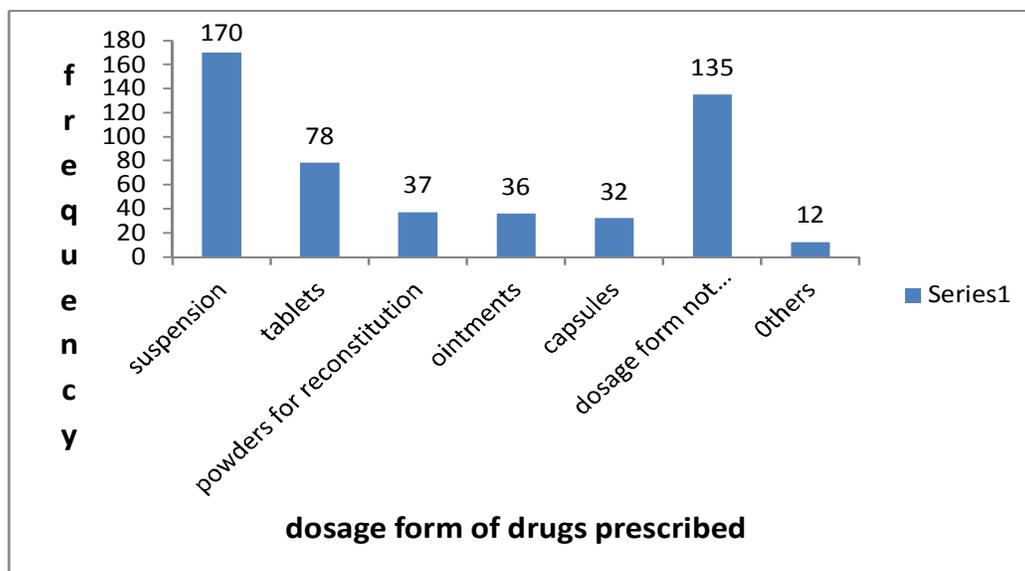
**Figure 2.** Route of drug administration in pediatrics ward of JUSH, June, 2008.

Cotrimoxazole, and amoxicillin, oral which were 86 (16.86%), 79 (15.49%), 53 (10.39%), respectively (Table 4).

According to this study the most common route of drug administration was oral 270 (52.94%) followed by

parental routes (SC, IM, IV) 67 (13.14%) and topical routes 53 (10.39%) (Figure 2).

Regarding the therapeutic indication, majority of the drugs 261 (67.97%) were prescribed for correct indication based on the STG for Ethiopia. The majority of dosage



Others\* *creams, suppositories, liquids, syrups.*

**Figures 3.** Dosage forms of drugs prescribed in pediatrics ward of JUSH, June, 2008.

form of drugs prescribed were suspensions (170) followed by tablets (78) (Figure 3).

Regarding frequency of drug administration, about 265 (51.82%) of the drugs were prescribed by correct frequency but for about 165 (32.29%) of the prescribed drugs the frequency of administration was not mentioned. About 49 (9.62%) and 32 (6.27%) of drugs were prescribed more frequently and less frequently than specified in STG for Ethiopia respectively.

Concerning the duration of drug treatment, for almost drugs 359 (70.39%) duration of drug treatment was not mentioned and for about 70 (13.74%) of the drugs the duration of drug treatment was incorrect that is for 47 (9.23%) longer and 23 (4.51%) shorter than specified in the standard treatment guideline (STG).

Only about 176 (34.51%) of drugs were given by correct dose but 293 (57.45%), 41 (8.04%) of the drugs were given without mentioning the dose, and by incorrect dose respectively.

About 418 (82%) of drugs were prescribed by generic name and 92 (18%) were prescribed by Brand name. About 458 (89.80%) of drugs were prescribed from Essential Drug List (EDL) and about 52 (10.20%) of the drugs prescribed were not in the Essential Drug List of Ethiopia.

## DISCUSSION

In this study the common category of drugs prescribed were antibiotics (44.9%) and analgesic /antipyretics (19.23%). Drug prescribing practice was different from a study in Katmandu where analgesic/ antipyretics

accounted for 43% and antibiotics for 17.2% (Bajracharya et al., 2002). Whereas in Haute Gornne (France), respiratory drugs (29.7%), antibiotics (15.6% and CNS drugs (13.8%) were the common prescribed drugs Benjamin et al., 2002. But it was comparable with the study in pediatrics ward of three Ethiopian hospitals where antibiotics and analgesic/antipyretics were frequently prescribed Abula et al., 1999. The difference in the trend of prescribing practice may be due to the difference in the prevalence of disease.

The study showed that antibiotic prescribing practice was high compared with those studies in Katmandu 17.2% Bajracharya et al., 2002. Haute Goronne in France 15.6%: Benjamin et al., 2002 but it was low when compared with other researchers study in Chennai in India 79.4% Delhi society for promotion of drug use concepts and perspectives, and Cameroon 48.9% Volk et al., 1994, and it was almost comparable with a study in JUSH in 2002 that is 42.6%: Mengistu 2005. The high value of antibiotics in this study was due to high prevalence of infectious disease such as pneumonia and empirical treatment of different infectious diseases. If such high antibiotic usage is continued, resistance might be developed that would end up in treatment failure.

According to this study, the three most commonly prescribed drugs were paracetamol 16.86%, Cotrimoxazole 15.49% and amoxicillin 10.39%. This practice of selecting specific drugs was different from those studies in three Ethiopian hospitals penicillin G 13.4%, chloramphenicol 8.5% and Cotrimoxazole 7.6% in Gonder hospital, chloramphenicol 12.7%, ampicillin 10.6% and penicillin G 9.5% in Bahir Dar hospital; and Penicillin G 8.8%, chloramphenicol 8.8% and Cotrimoxa-

zole 9.8% in Deber Tabor hospital Abula et al., 1999. The high percentage of Cotrimoxazole prescription could be due to high prevalence of pneumonia in pediatric ward and that of paracetamol due to its co-prescription with other drugs to treat the symptoms of diseases in addition to being prescribed alone for fever management.

In this study the percentage of injectables prescribed (13.14%) was very much lower when compared with a study in Cameroon i.e. 41.8%.

Volk et al., 1994, which indicates relatively very good injectables prescribing practice in pediatric ward of JUSH as injection related problems such as chance of HIV and hepatitis transmission could be low. A very high frequency of oral routes of administration is an acceptable practice because oral route is relatively safe, convenient and simple for self administration where as parental routes are costly, have risk of HIV transmission and other injection related problems.

The frequency for inappropriate indication of drugs was low as compared with a study in JUSH (24%) in 2002:

Mengistu 2005 indicating relatively a good prescribing practice according to the STG for Ethiopia.

In relation to the prescribing guideline for Ethiopia and when compared with a study in JUSH in 2002 (77 %), the value for correct frequency of drug administration (15.9%) obtained from this study was so much low: Mengistu 2005. Regarding the duration of drug administration the study showed that only for about 63(12.35%) of drugs the duration was correct. When compared with another study in JUSH in 2002, 53 %: Mengistu, 2005, the value for correct duration of drug administration was very low i.e. 12.35%. This might be because of lack of knowledge, inexperience and/ or overlooking the importance of frequency and duration of drug administration. Absence of hospital STG could be another reason.

In this study for about 293 (57.45%) of drugs there was no information regarding the dose, for 176 (34.5%) the dose was correct and for about 41 (8.04%) the dose was inappropriate (below and above recommended). When compared with a study in JUSH in 2002, 31 %: Mengistu, 2005, the value for inappropriate dose was very low i.e. 8.04%. Obviously prescribing drugs without specifying the dose could lead to treatment ineffectiveness or ADRs.

The percentage of drugs prescribed by generic name was 82%. When compared with a study in Cameroon 56.1% Volk et al., 1994, the value for generic prescribed drugs was high but according to Ethiopian health policy which expects 100% generic prescription the value is still satisfactory.

According to this study the major dosage form prescribed were suspensions. But important dosage forms for pediatrics such as suppositories were very much low. Of the prescribed drugs, 458(89.8 %) were included in EDL for Ethiopia. This figure is higher than a study in

Cameroon 82.1% [10] but according to the Ethiopian health policy which expects 100 % of the prescribed drugs to be included in the Essential Drug List it is not satisfactory.

The possible limitations of the study were incomplete patient charts, all necessary information was not recorded (age, weight, dosage form, frequency etc). Due to this appropriateness of all the prescribed drugs was not determined.

In conclusion, drugs prescribing practice in the pediatrics ward of the JUSH is irrational. Many drugs were prescribed without information regarding dose, frequency and duration of drug treatment. So, prescribers should regularly check completeness of patient cards and pharmacists should prepare a continuous health education programs on rational use of drugs and of course should work in a team spirit with prescribers. Based on the result of this study it is recommended that large and comprehensive studies should be initiated in pediatrics to ensure rational prescribing practice by identifying existing prescribing problems.

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Table 1: WHO prescribing indicators to measure the drug use pattern in paediatrics with respiratory tract infections and gastro intestinal tract infections. WHO prescribing indicator Average /percentage WHO optimal / reference. value. 12.El Mahalli AA. WHO/INRUD drug prescribing Patient Department in a Tertiary Care Teaching and indicators at primary health care centres in Eastern Non-Teaching Hospital. Indian Journal of Pharmacy province, Saudi Arabia. Eastern Mediterranean Practice. Journal of prescription pattern in pediatric out patient ward. Nepal Health Research Council. 2008 Dec 30. Irrational prescribing is a global problem. Bad prescribing habits lead to ineffective and unsafe treatment, exacerbation or prolongation of illness, distress and harm to the patient, and higher costs. According to the WHO document "How to investigate drug use in health facilities," at least 600 encounters should be included in a cross-sectional survey to describe the current prescribing practices, with a greater number, if possible [10]. For this particular study, more than 1,200 prescriptions were collected retrospectively from more than 50,000 prescriptions written for a 2-year period from September 2007 to September 2009.