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### Pattern of drug prescriptions in pediatrics ward of university of gondar specialized hospital, gondar, ethiopia

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#### ABSTRACT

**Introduction:** The assessment of prescribing pattern in pediatrics has an important relevance to identify problems regarding rational uses of drugs and to propose intervention. The objective of this study was to evaluate and assess pattern of drug prescribing practice in Gondar University specialized hospital pediatrics ward.

**Method:** Retrospective stratified systematic random sampling method was conducted from January 26-June 12, 2013 on a total of 347 patient charts.

**Result:** About 60% of drugs were prescribed empirically. This study showed that 45(13%) of the diagnosis were without treatment. On the other hand, 30 (8.6%) of the drugs were prescribed without indication. Antibiotics were the most commonly prescribed agents (75.5%) followed by fluid and electrolytes (54.5%). Gentamycin was the highly prescribed individual drug (10.80%) followed by Ampicillin (10.02%), and Paracetamol (8.83%). About 92% of the drugs were prescribed in correct frequency and 88.8% of the drugs were prescribed in correct dose. Injectables were the top prescribed dosage form (49.18%) followed by solid dosage forms (32.97%). About 83.19% of the drugs were prescribed in their generic name.

**Conclusion:** The study showed that antibiotics were the most frequently prescribed groups of drugs followed by fluid and electrolytes and analgesics. There was good prescribing practice concerning polypharmacy according to WHO recommendation. Injectables were the most prescribed dosage forms and solid dosage forms were the second. Majority of the drugs were prescribed empirically. So, there should be correction of such empiric prescription to decrease risk of drug resistance and cost.

**Keywords:** Drugs, Empiric prescription, Pediatrics, Polypharmacy.

## INTRODUCTION

Drugs play crucial role in the health care system. Studies on proper drug utilization are imperative tools to evaluate whether drugs are appropriately utilized in terms of efficacy, safety, convenience and economic aspects at all stages in the chain of drugs use<sup>1</sup>. Knowledge of prescribing pattern is important tools for a rational drug therapy. The limited information available on drug use indicated that drugs are not optimally used. This inappropriate use has serious health and economic consequences for individual, community and for success of national health care system. In general, the safe and effective use of drugs depending on prescribing pattern. So, rational prescribing pattern and providing correct information during dispensing is invaluable for proper utilization of drugs<sup>2</sup>.

Pediatrics is a branch of medicine dealing with development, disease and disorders of children<sup>3</sup>. Compared to adult medicine drug use in pediatrics is not extensively researched and the range of licensed drug in appropriate dosage form is limited<sup>4</sup>

Several drugs were frequently used for children, though they were investigated in adults only. Nevertheless pharmacokinetic as well as pharmacodynamics in children differ from that of adults. From birth to adolescence pediatric patients are continually changed with respect to growth, psychosocial development but information on drug therapy is limited. The administration of drug to children requires special knowledge and expertise. Primarily because the dose prescribed for children are often in an amount which is not commercially available in pediatric level<sup>5</sup>.

Many studies have been done to document drug use pattern and most of these indicated that over prescribing, multiple prescribing use of unnecessary expensive drug, use of drugs for unrelated diagnosis, over use of antibiotics and injections were the most common problems of irrational drug use in pediatric patients<sup>6</sup>.

A study conducted by Rahana *et al.* in institute of health science Dharan Nepal shows that the most commonly prescribed groups of drug was antibiotics (42.8%) followed by anti-inflammatory and analgesic (13.1%)<sup>7</sup>. Another two consecutive

studies done by Kafle *et al* in 1992 and 1996 in Nepal kathm showed that 43% and 55% of the prescribed drugs were antibiotics.<sup>8, 9</sup> According to the study in Haute Gorne (France) the common category of drugs prescribed were respiratory (29.7%), antibiotics (15.6%) and CNS drugs (13.8%)<sup>10</sup>. A research conducted in India reported that analgesic or antipyretics (43%), antibiotics (17.2%) and antiallergic drug (7%) were the most frequently used group of drugs<sup>11</sup>.

Similar studies have been also conducted in different parts of Ethiopia. For instance, a study conducted in pediatrics ward of Jimma University Specialized Hospital, showed that antibiotics (44.9%) and analgesic/antipyretics (19.2%) were the most commonly prescribed group of drugs. Paracetamol (18.86%), Cotrimoxazole (15.5%) and amoxicillin (10.39%) were the most frequently prescribed drugs. About (67.97%), (51.82%), (12.35%) and (37.51%) of the drugs were prescribed with correct indication, frequency, duration and dose respectively. 82% drugs were prescribed by generic name<sup>9</sup>.

Another study conducted in pediatrics ward of St. Paulos specialized hospital, Addis Ababa, also showed that antibiotics (53.42%) followed by analgesics and antipyretics (15.17%) being the most commonly prescribed category of drugs. Cotrimoxazole (18.87%), amoxicillin (14.50%), and paracetamol (10.4%) were the most commonly prescribed medications. Average number of drugs per encounter was 1.22. About 71.35%, 59.4%, 45.73% and 15.17% of drugs were prescribed with correct indication, frequency, dosage and duration respectively<sup>12</sup>.

A study done in pediatric ward of three Ethiopian hospitals (Gondar, Debreabor and Bahirdar hospitals) showed that antibiotics and analgesics/antipyretics drugs were also more frequently prescribed ones. Very wide range of number of drugs per encounter were shown; ranging from 0-16 in Gondar hospital, 0-15 in Debreabor Hospital and 0-10 in Bahirdar hospital<sup>13</sup>.

To the best of the researchers' knowledge concerned, there is limited information on drug prescription in pediatric ward of University of Gondar specialized hospital although different

studies were conducted in different parts of the world as stated above. Hence, this study was done to assess the prescription pattern in pediatrics ward of this hospital.

## METHODS

### Study Design

Cross sectional Retrospective study was conducted in pediatrics ward of Gondar University Specialized Hospital

### Study Area and Period

The study was conducted in GUSH located 727 km North West of Addis Ababa, Ethiopia. The hospital is located in North Gondar Zone, Amhara region. GUSH is one of the largest teaching hospitals in the country. It serves Gondar town and the surrounding population of about 5 million. The study was conducted at pediatric ward in GUSH in 4 month period from January 26, 2013 to June 13, 2013.

### Sample and Sampling Technique

Three hundred forty seven (347) pediatric patient charts registered from March, 2012 to February, 2013 were included. Among the charts 112 from neonatal ward, 50 from malnutrition ward and 185 from main ward were proportionally selected by stratified systematic random sampling method.

### Ethical consideration

Official letter was obtained from research and community services office of the university. During data collection process, all the data was kept confidential. To ensure confidentiality the name of patient and prescribers were not included in the check list. Ethical issue was considered during data collection in order not to disclose patient and professional information to person outside the research.

## RESULTS AND DISCUSSION

Three hundred forty seven pediatric charts were reviewed. As displayed in Fig. 1, the study showed that majority of patient; 184(53%) were children.

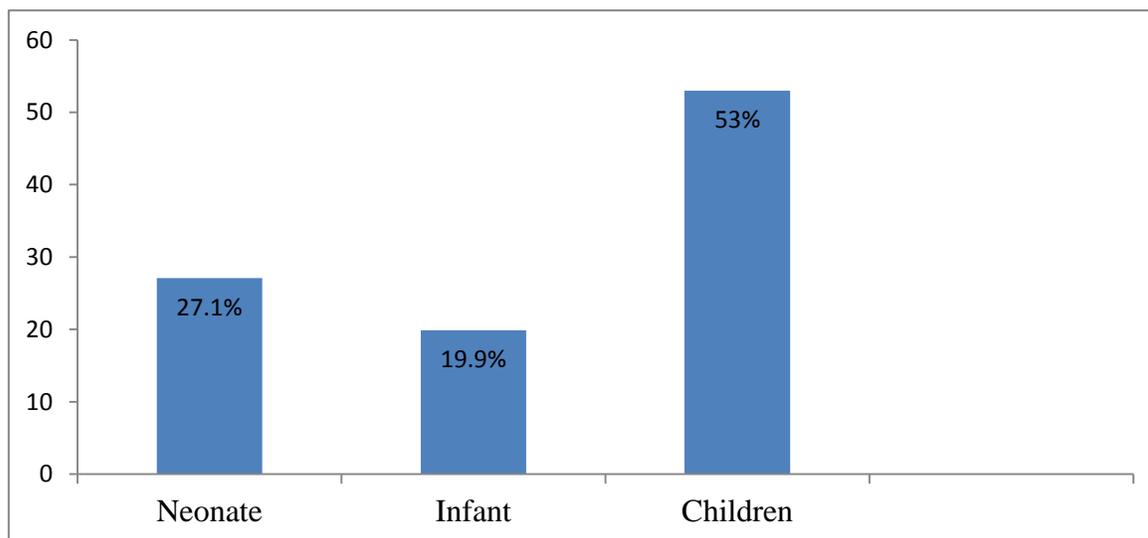


Figure 1. Age group of patients included in the study (n = 347 )

105(30%), 98 (28.2%), and 60(17.5%). of the patients had body weight less than 4.95kg, 5-9.9kg and 10-14.5kg, respectively [ Table1].

**Table 1. Body weight of pediatric patients in GUSH**

Body weight	Frequency	Percentage (%)
<4.99	105	30.3%
5-9.9	98	28.2%
10-14.9	60	17.3%
15-19.9	25	7.2%
20-24.9	29	8.4%
>25	30	8.6%
Total	347	100%

Majority of the pediatric patient were diagnosed for pneumonia 84(13.29%), malnutrition 75(11.87%) and sepsis (9.01%) [Table 2].

**Table 2: Top 14 diagnosis in pediatric ward of GUSH**

Diagnosis	Frequency (%)
Pneumonia	84(13.29%)
Malnutrition	75(11.87%)
Sepsis	57(9.01%)
AGE	44(6.96%)
DHN	41(6.49%)
HAAD	35(5.54%)
Meningitis	31(4.90%)
Malaria	25(3.95%)
Diarrhea	21(3.32%)
CHF	12(1.90%)
HI	10(1.60%)
Jaundice	8(1.27%)
TB	6(0.90%)
Others*	218(34.49%)
Total	632(100%)

\*Others: Intestinal parasite, Anemia, Croup, Tonsil, Pharyngitis, Tiniacapitis

The therapeutic categories of drugs prescribed in the patient chart included in this study were showed in [Table 3]. The most frequently prescribed category of drugs were antibiotic 262(34.98%), fluid and electrolyte 189(25.23%), analgesic 90(12.02%), and corticosteroid 43(5.74%).

This study showed antibiotic prescribing practice (34.9%) was high in GUSH compared to hospitals of Kathmandu India and Haute Gorme France, where antibiotics accounted for 17.2%)<sup>16</sup>, and

(15.6%)<sup>10</sup> respectively. However, it was less than Cameroon (48.9%)<sup>14</sup>, Chenna India (79.4%)<sup>15</sup> St.paul specialized hospital (53.4%)<sup>12</sup> and JUSH (44.9%)<sup>9</sup>. This difference in prescription practice with other studies might be due to difference in prevalence of disease and empiric prescription. If this practice of antibiotics prescription continues, it ends up with high rate of antibiotics resistance, economic burden of disease which leads to exhaustion of the limited resource.

**Table 3: Therapeutic category of drugs prescribed in pediatrics ward of GUSH.**

Therapeutic class	Frequency (%)
Antibiotics	262(34.98%)
Fluids and electrolytes	189(25.23%)
Analgesics	90(12.02%)
Corticosteroids	43(5.74%)
Vitamins	38(5.07%)
Anti-helminthic	13(1.73%)
Antifungal	7(0.93%)
Others*	107(14.28%)
Total	749(100%)

\*Others: Antimalarial, Anticonvulsants

Concerning poly pharmacy, about patient charts contained; one drug - 73(21.1%), two drugs - 101(29.1%), three drugs - 65(18.7%), four drugs - 54(15.6%) and more than four drugs - 42(12.1%). But the average number of drugs per encounter was 2.86 which showed that there was good prescribing practice according to WHO recommendation.

As it was shown in [Table 4], the three most frequently prescribed individual drug were gentamycin 100(10.80%), ampicillin 93(10.02%), and paracetamol 82(8.83%). With regard to drug

selection, there was slight difference when compared to other studies like in St paulos specialized hospital cotrimoxazole was the first(18.8%), amoxicillin was the second(14.5%), paracetamol was the third(10.5%)<sup>12</sup>, in JUSH paracetamol was the first(16.8%), cotrimoxazole was the second(15.5%) and amoxicilline was the third(10.4%)<sup>9</sup>. The high percentage of gentamicine and ampicilline prescription might be due to high prevalence of sepsis and other gram negative infection in neonatal ward.

**Table 4: Most commonly prescribed individual drugs in GUSH pediatrics ward**

Drug	Frequency (%)
Gentamycin	100(10.80%)
Ampicillin	93(10.02%)
Paracetamol	82(8.83%)
Crystalline penicillin	75(8.10%)
Ceftriaxone	70(7.50%)
Amoxicillin	42(4.50%)
Therapeutic food	38(4.09%)
Vitamin	38(4.09%)
Salbutamol	34(3.66%)
Cloxacilline	30(3.20%)
ORS	30(3.20%)
Chloramphenicol	25(2.70%)
Coartem	23(2.47%)
Hydrocortisone	22(2.37%)
Furosemide	20(2.15%)
Phenobarbitone	20(2.15%)
Phenytoin	20(2.15%)
Cotrimoxazole	13(1.40%)
Metronidazole	10(1.08%)
Anti TB	4(0.40%)
Other	139(15%)
<b>Total</b>	<b>928(100%)</b>

When rout of drug administration considered, Parenteral (IV, IM, Sc) drug administration contributed the highest, 270 (49.18%) followed by oral 181(32.97%) and rectal 42(7.65%) drug administration [Table 5].

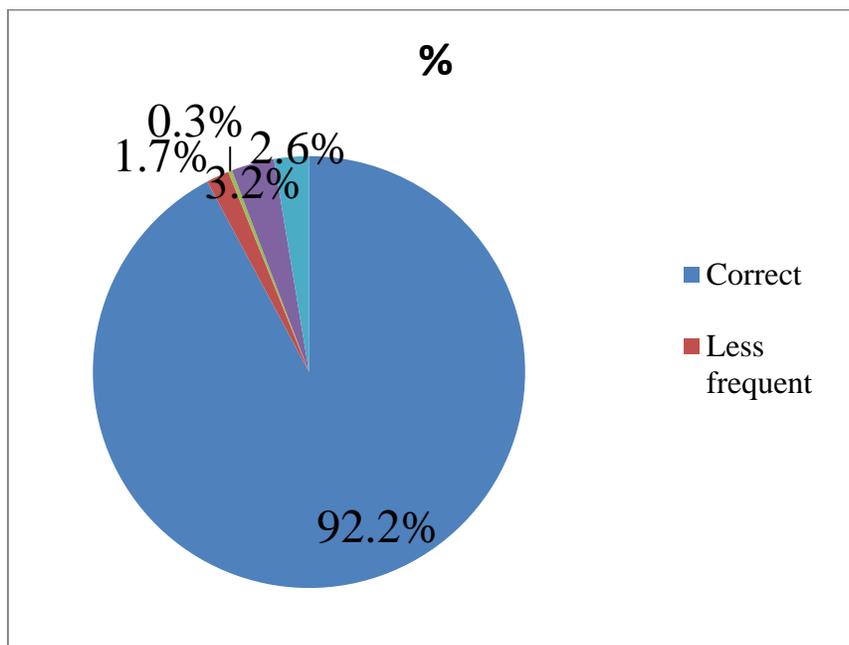
**Table 5: Route of drug administration in GUSH pediatric ward**

Route	Frequency (%)
IV/IM/SC	270(49.18%)
Oral	181(32.97%)
Rectal	42(7.65%)
Inhalation	30(5.46%)
Topical	5(0.90%)
Other	21(3.80%)
Total	549(100%)

This study showed that 45 (13%) of the diagnosis were without treatment. On the other hand, 30 (8.6%) of the drugs were prescribed without indication.

The result of this study showed that most of drugs (92%) were prescribed with correct frequency of drug administration but 3.2% of them prescribed

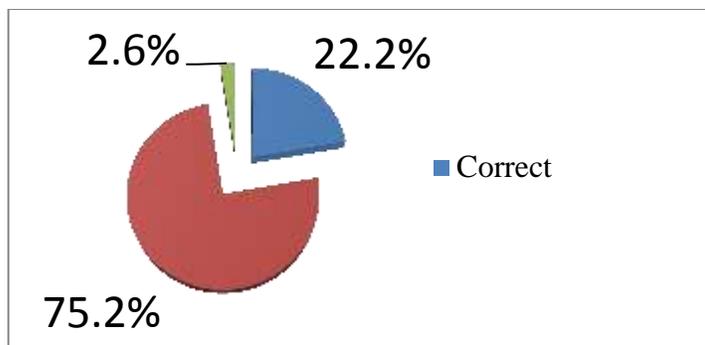
without specified frequency, 1.7% of them prescribed less frequently and 0.3% of them were prescribed more frequently than the normal one mentioned in Ethiopian pediatric drug formulary [Fig. 2]. The result obtained in this study was better than a study conducted in JUSH (15.9%)<sup>9</sup>.



**Figure 2: Medication error with respect to frequency of drugs prescribed in GUSH pediatric ward**

Regarding duration of drug treatment, this study showed [Fig. 3] that majority of drugs (75.2%) were prescribed without duration. From all the prescribed drugs only 22.2% of them were prescribed with correct duration. Compared to other studies of St.Paulos (15.17%)<sup>12</sup> and JUSH

(12.35%)<sup>9</sup>, this study showed that the prescribers in the study area gave less attention on the duration of treatment. This could result in under or over treatment both of which have a negative consequence.



**Figure 3: Medication error with respect to duration of drugs prescribed in GUSH pediatric ward**

This study also indicated that 731(78.77%) of drugs were prescribed with correct dose, but 76(8.18%), 55(5.92%), 66 (7.11%) of them were overdose, under dose and not mentioned respectively. Inappropriate dosing leads to ineffectiveness and toxicity.

This study showed that injectables were the most prescribed dosage forms (47.13%) which were

much higher compared to that of JUSH (13.14%)<sup>9</sup> and St .Paul specialized hospital (5.34%)<sup>12</sup>. This high level of injectable prescription might lead to high risk for developing injectable related problems such transmission of HIV, hepatitis and kalazar.

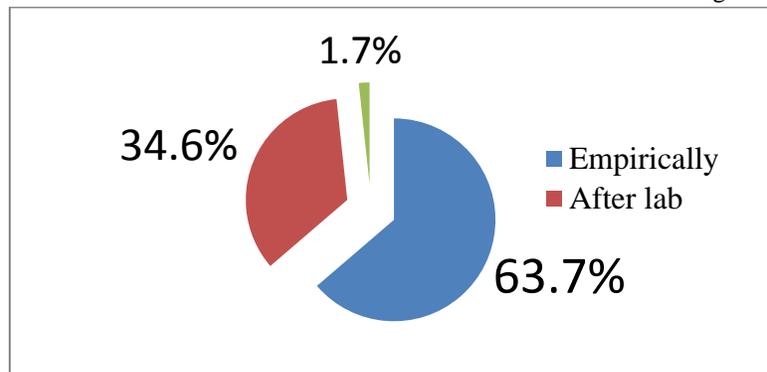
**Table 6: Most frequently prescribed dosage forms in GUSH pediatrics ward**

Dosage form	Frequency (%)
Injectable	263(47.13%)
Oral Solid	151(27.06%)
Oral liquid	105(18.82%)
Other	39(6.97%)
Total	558(100%)

Generic prescription accounts 772 (83.19%) in this study. However, about 116(12.5%) were prescribed as abbreviated and 40(4.31%) as brand. This value is higher compared with study in Cameroon

(56.1%)<sup>14</sup>. But it was comparable with a study in JUSH (82%).<sup>9</sup>

Most (63.7%) of the drugs were prescribed empirically [Fig. 4] which might increase risk of resistance and cost of drugs



**Figure 4: Diagnosis basis to prescribe drugs in GUSH pediatric wards**

## CONCLUSION AND RECOMMENDATION

The percentage of antibiotics prescribed was high which could contribute for drug resistance. The average number of drugs per encounter was satisfactory. The proportion of injectables prescribed was also very high compared to drugs administered through other routes. Most of the drugs were prescribed in their generic name even if a few of them were prescribed in abbreviated form. Majority of the drugs were prescribed empirically.

All necessary drug information on the chart and prescription paper should be included. All of the drugs should be prescribed in their generic name. Empiric prescription should be reduced to minimize drug resistance and economic burden of disease.

Injectable dosage forms should be reduced as much as possible since oral liquid and solid dosage forms are easy and convenient for self administration. Duration of treatment should be mentioned. Further research should be conducted on the topic with wide sample size and analytical statistics.

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