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### An observational study on the extent of medication administration error in pediatric inpatient ward of Ayder Referral Hospital

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#### ABSTRACT

The purpose of this study was to assess prescription rationality and most common prescription errors at the asses the type and the frequency of MAEs in pediatric inpatient ward of Ayder Referral Hospital, Mekelle, Tigray region, North Ethiopia. Region, North Ethiopia. A retrospective drug utilization review of indication-prescription type was carried out. A random sample of 208 medical records of patients assisted over a year period, were reviewed. Prescription appropriateness was evaluated according to the variables: Wrong time error, Wrong dose error, Wrong administration technique error, Unauthorized drug error, Omitted drug error .Prescriptions were rated as appropriate (no prescription errors found) or inappropriate (at least one prescription error found). The prescription error rate revealed by this study addresses the need for strategies to improve prescription's quality. Introducing pharmacists as a key part of health care team is a mean proposed to prevent medication errors and to solve the urgency of pharmaceutical care implementation in the primary care.

**Keywords:** Medication error, Pharmaceutical care, Error reporting

#### INTRODUCTION

Medication errors are defined as a preventable, inappropriate use of medication that may occur at any stage of medication process, and produce a variety of problem for patient ranging from minor discomfort to substantial morbidity that may prolong hospitalization or lead to death. Health professionals, last potential barriers between a medication error and serious harm, have a responsibility to ensure the patients receive the

right medication at right time, and to monitor patients after they are given medication [1].

Children and adolescents are 3 times more at risk than adults for MEs because they have immature physiology, less able to communicate and self-administer a medication, majority of drugs are developed appropriate for adults, Many health care settings are built around the needs of adults [2].

In the developed countries, where there are all the necessary resources, medication errors are problems of health improvement, and MAEs being

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the frequent type of medication errors. At least 44,000 and perhaps as many as 98,000 Americans die each year in hospital as a result of medication errors. Error reporting program demonstrated the increased rate of medication error resulting in harm in the pediatric in patients (31%) compared with adult (13%). Hence medication error rate can be a good indicator of the effectiveness of drug distributing system even though MAEs appear difficult to intercepted. Though thousands of medications are administered to different patients little is known about the correctness [3-5].

In Ethiopia, almost nothing is known about medication administration errors and medication error in general. so, much has to be done to change this reality [6-8].

The purpose of this study is to collect valuable information on the area, to show how series the issue is, to pave the way for further studies, to serve as a guide if any program designed to solve the problem.

The study focus is to assess the type and the frequency of MAEs in pediatric inpatient ward of Ayder Referral Hospital, Mekelle, Tigray region, North Ethiopia. Region, North Ethiopia [9].

- To asses wrong time error.
- To asses wrong rate administration technique error

- To asses the unauthorized drug errors
- To assess the omitted drug administration errors
- To asses wrong dose errors
- To determine drugs mostly involved with errors

## MATERIALS AND METHODS

### Study area and period

The study is to assess the type and the frequency of MAEs in pediatric inpatient ward of Ayder Referral Hospital, Mekelle, Tigray region, North Ethiopia. region, North Ethiopia. A retrospective study of pediatrics record was conducted for three months

### Study design

Medication error rate can be a good indicator of the effectiveness of drug distributing system even though MAEs appear difficult to intercepted.

### Population

The study focus is to assess the type and the frequency of MAEs in pediatric inpatient ward of Ayder Referral Hospital, Mekelle, Tigray region, North Ethiopia.

Both dependent and independent variables were used and ethical clearance was also issued to conduct the study.

## RESULTS AND DISCUSSION

**Table 1. Age dependent description of the pediatric inpatients whose medication administration was observed.**

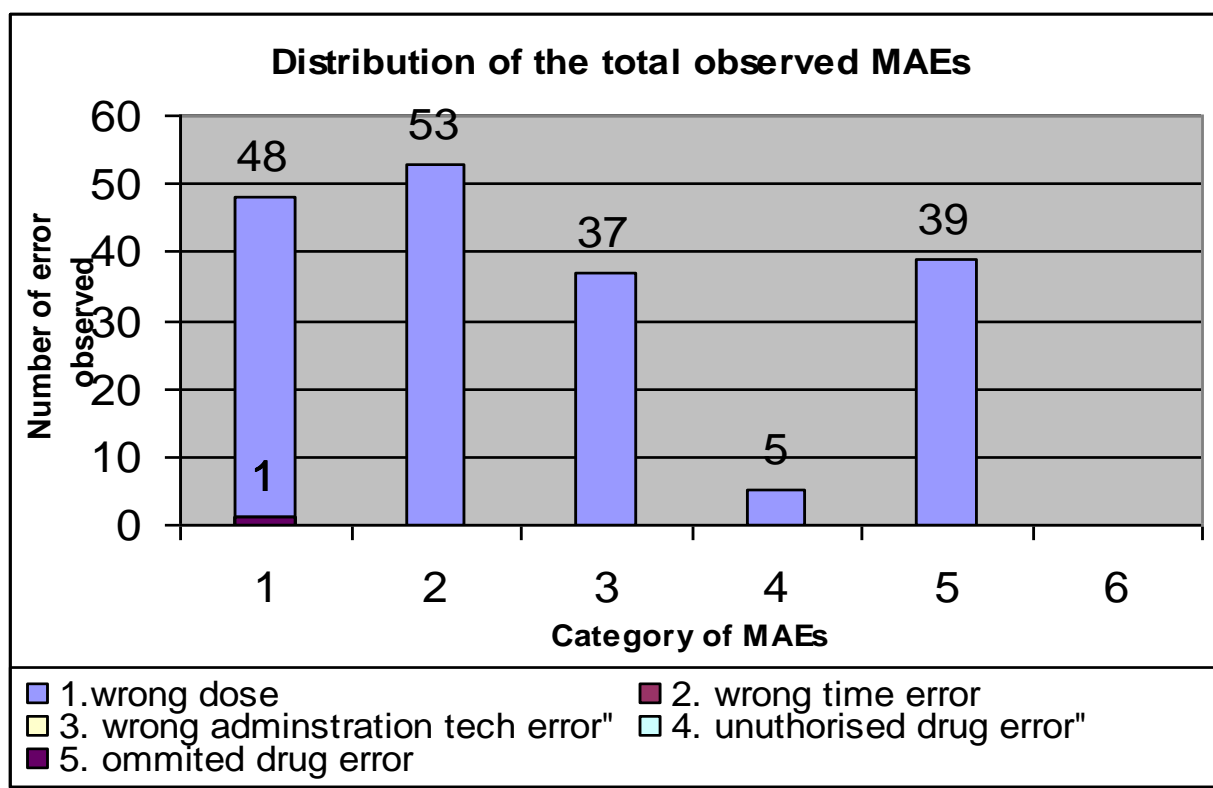
Age	Pediatric inpatient ward			total
	Ward 1	critical	NRU	
Less than 1 year	1	5	3	9
1- 5 years	3	1	9	13
6-10 years	4	6	2	12
11-15 yrs	3	3	-	9
total	11	15	14	40

**Table 2-Total no of MAs and MAEs observed**

Type of paediatric medical unit	No.of observation	No.of MAEs observed
Ward-1	60	64
Critical	70	59
NPU	78	59
Total	208	182

High incidence (87.5%) of MAEs was detected from this observational study, which is higher than the two study findings in Paris, France reported

31.29% and 6.6% from the totally observed MAs. [1]

**Fig. 1 Distribution of the totally observed MAEs**

Wrong time error was the most frequent of the identified MAEs accounting 29.12% which show similar pattern with study in Bounes Ireus, Argentina. According to the paper done in US, incorrect dosing was the most commonly reported MAEs. Though not the case in this particular study, wrong dose errors were (26.37%) the second largest detected errors. [2, 4, 5]

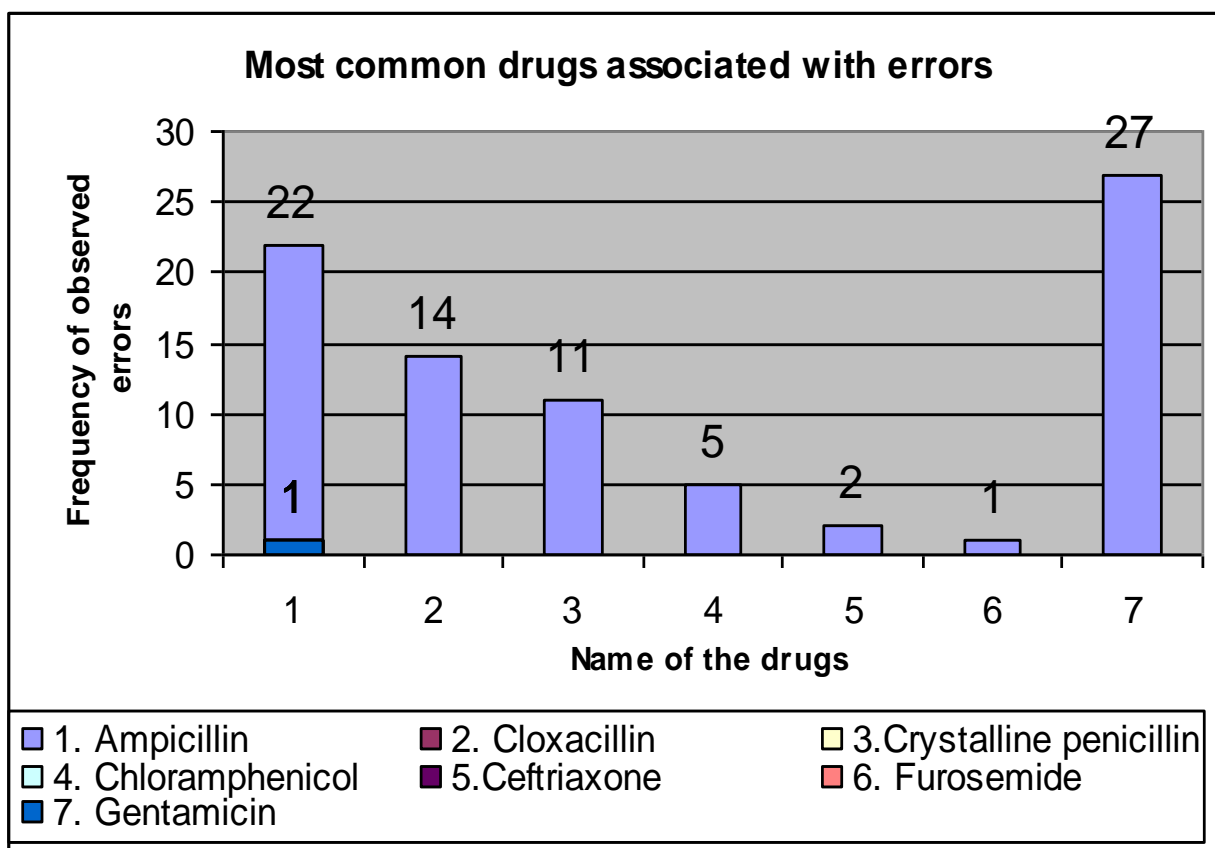
Wrong administration technique errors were found to be 20.32%. The figure is higher than the one found in India where 62 (13.6%) errors were related to treatment procedures.

The incidence of un authorized drug errors were 2.75% which is minor from the reviewed study done in Paris, France detected as 10%.

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**Fig -2 lists of common drugs associated with errors**

The drugs mostly involved with errors were antibiotics where Gentamicin 81.81% and Ampicillin 48.88% are the largest figures.

**Table-3 Examples of the observed categories of errors on medication administration**

Category of errors	Examples
Wrong time error	Furosemide 100mg/ml IV bid was ordered for a 2 yrs old male patient but the medication to be given at 6:00am was rather given at 8:53am.
Wrong dose error	A 625,000 IU of crystalline penicillin was prescribed for a 4 yrs old male patient but the administered dose was 1 vial i.e. 1,000,000 IU
Wrong administration technique error	Gentamicin IV bolus a single adult dose preparation was being given in divided doses keeping the ampoule open for use.
Unauthorized drug error	Gentamicin IV bolus a single adult dose preparation was being given in divided doses keeping the ampoule open for use.

A study in pediatric teaching hospital, UK, indicated antibiotics to be the most frequent drugs involved in errors (44%). [8, 9]

From the totally observed 208 MAs, 21.42% of the observed cases were omission errors. Most of the drugs administered being antibiotics, omission of drugs might have a devastating effect as it may lead to resistance which worsening already due to other many factors.

A high rate intravenous drug administrations where most of the patients being aged 1-5 yrs having an immature physiology to resist harm, IV drug errors may be a potential sources of serious harm for patients and risk reduction strategies should be developed accordingly.

During the study high frequency of error was observed. Errors being on pediatrics and intravenous route being mostly associated with errors still indicate the seriousness of the problem. So, proper programs and further studies should be conducted to solve the problem for the better outcome of societal health and patient satisfaction. Suggested measures to prevent medication errors.

- Be familiar with medication ordering and use system
- Verify drug orders before MA
- Confirm patient identity before administration of each dose and
- Check medication calculation with a second individual
- The hospital should design proper error reporting methods
- A standard operation procedure should be posted in the wards
- Further studies should be done on factors associated with these errors

In order to assure the correct application of specific techniques and standard procedures, it's better if a health professional is assigned to suggest the right way of administering medications.

Prescribing errors in general practices are common, although severe errors are unusual. Many factors increase the risk of error. Strategies for reducing the prevalence of error should focus on GP training, continuing professional development for GPs, clinical governance, effective use of clinical computer systems, and improving safety systems within general practices and at the interface with secondary care.

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