

Medication Errors Assessment and Prevention by a Clinical Pharmacist in Pediatric Wards of RMI Hospital Peshawar, KPK-Pakistan

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ABSTRACT

Background: Medication errors are the most common avertible cause of unwanted adverse actions in medication practice and present a major public health encumbrance. They are common in health care settings of developing countries where inpatient care is a major threat to hospitalized infants and children.

Objectives: Assessment of different types of medication errors and role of clinical pharmacists in detection and prevention of these errors were evaluated in this study.

Materials and Methods: This was a cross sectional study during which medication errors were detected, monitored and prevented by clinical pharmacists (n=60;) in the pediatric ward of RMI teaching hospital at Peshawar, Pakistan. Medication errors were classified on the basis of Pharmaceutical Care Network Europe Foundation drug-related problem coding.

Results: During the study period, 136 (68 %) medication errors were encountered in medication orders (n=200) by clinical pharmacists. Male gender was found most susceptible to medication errors (70.59%). Among the identified errors, prevalent error found was dosing error (27.21%), followed by incomplete prescription error (22.29 %). Drug dosing, choice, use and interactions were the most frequent causes of error in medication processes, respectively. All of these errors were detected, reported, and prevented by pediatric ward clinical pharmacists.

Conclusion: Medication errors occur frequently in medical wards. Clinical pharmacists' interventions can effectively prevent these errors. The types of errors indicate the need for continuous education and implementation of clinical pharmacist's interventions. Role of clinical pharmacist should be strengthened to improve the overall health care system. For this allocation of pharmacist in wards in necessary.

Keywords: Medication errors, inpatient care, Pediatric ward

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Introduction

Globally medication errors are among the major health and economic concerns. Annually 44,000 people die from preventable medication errors.¹ One in every hundred Medication errors leads to adverse reaction that can result in death ². The *United States Pharmacopeia* defines medication errors as any preventable event that may cause or lead to an

inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer.³ Studies has estimated that the risk of medication errors in pediatric population is three fold higher than that of adults, dosing error was most frequently found.⁴ Studies on pediatric inpatients found rates of preventable medication error ranging from 4.5 to 5.7 errors per 100 medication orders.⁵

Medication utilization process involves many healthcare practitioners simultaneously, starting with physician's prescription which is followed by dispensing of medicines by pharmacist after review ending with the nurse's administration of medicine to the patient.⁶ Each step of medication utilization process is prone to errors starting from prescribing to dispensing and administration, prescription error being the most frequent.⁷⁻⁹ Pediatric inpatients are more vulnerable to medication errors. Unavailability of appropriate dosage forms for children which leads to calculation and dilution, on body weight basis, the process itself needs proper expertise. In addition to this under developed physiology of pediatrics like immature renal and hepatic systems can lead to serious adverse drug reactions if not monitored properly.^{10, 11}

Pharmacists are health care professionals that are specially trained to identify and monitor drug related problems. Pharmacists can provide benefits to both the institution and patients by detecting and preventing errors before their occurrence and by ensuring cost effective therapy hence providing economic benefits to the institution. A study in US analyzed that how clinical pharmacist identifies prescription errors in pediatric ward, of which about 78% of potentially harmful prescribing errors were prevented by pharmacists.¹²

Several studies have shown that pharmacist in wards can reduce medication errors in many ways e.g.

- Checking physician prescription orders before drugs are requested from pharmacy, and suggesting intervention to prescribers if necessary.
- Individualizing therapy by checking allergy status of patient, looking for drug-drug interaction and drug contraindications.
- Adjusting dose on weight basis, renal and hepatic impairment, checking daily progress reports and detecting administration errors.
- Checking of drugs on discharge of patient and switching the route of drugs hence ensuring patient compliance.

Although medication errors in pediatrics can result in serious health problems as compared to adults, still very few studies have been conducted in this regard. The studies on pediatric medication errors are scarce in Pakistan, therefore this study was carried out to estimate and identify the types of errors that commonly occurs in general pediatric ward. Furthermore, role of clinical pharmacist and the major causes that leads to

potential medication errors are also investigated during the course of study. The prevention of medication error is responsibility of every health care professional, but clinical pharmacist can play better role on preventing medication error as they are involved in each step of medication utilization process in a hospital.

Materials and Methods

This cross-sectional study was conducted from June to August 2014 at pediatrics wards of 400 bedded tertiary care teaching hospitals (RMI) at Peshawar, Pakistan. The pediatric ward contains 60 beds. During 3 months study in pediatric ward of tertiary care teaching hospital, medication errors were analyzed prospectively. The forms used for data collection were filled by the clinical pharmacist working that ward. All medication orders in study time period were reviewed by clinical pharmacist. In the course of study, the identified medication errors were majorly classified into two main categories 1)prescription errors 2)administration errors and their prevalence was determined afterwards. Medication errors were classified on the basis of Pharmaceutical Care Network Europe Foundation drug-related problem coding¹³. The interventions made by clinical pharmacist were also recorded and its significance was determined statistically.

Inclusion Criteria: All children of age ranging from 1 day to 15 years admitted to ward during this study period were included in study.

Exclusion Criteria:

- 1) Patients with a shorter stay in hospital i.e less than 2 days.
- 2) Patients with serious infections i.e meningitis e.t.c.
- 3) Out patients.

Data Collection Procedure: Special forms were designed on which data from the pediatric ward was collected. The forms were filled by clinical pharmacist using patient progress charts and physician orders.

Data Processing and Analysis: The data was statistically analyzed using SPSS software, version 17 (SPSS, Inc., Chicago, IL, USA). *P-values* < 0.05 were considered statistically significant.

Results

During the study period of 3 months, total 136 medication errors were encountered in 200 medication orders. Two physicians were involved in prescribing medicines. Different factors contributing to overall

medication errors were closely monitored i.e. age of the patients, type of medication prescribed, dosage form and route of administration. Majority of the patients were males (70.59%) Figure 1

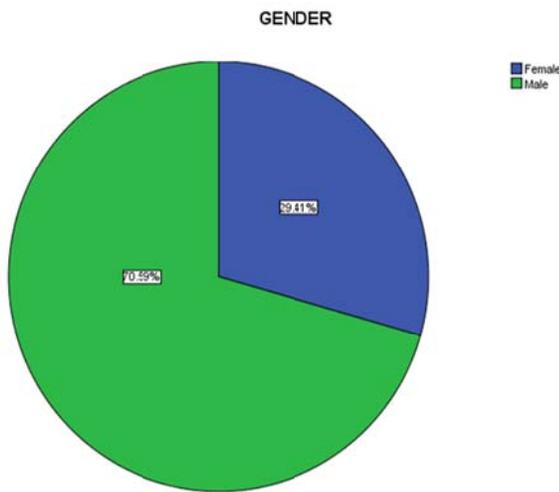


Figure 1. Gender of the patients included in this study

Among the subject population, most of the errors were recorded were in the age group of 1-15 years Figure 2.

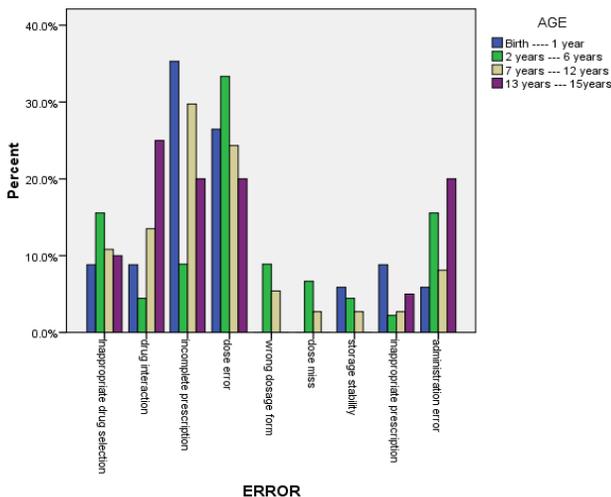


Figure 2: Error in different age groups

Among 68% of observed medication errors, 11.76 % were administration errors, rest being the prescribing errors Figure 3. Errors occurred in almost patients of all age groups, but most of the errors were found in age group between 1-6 years. Errors like incomplete prescription and dosing errors were commonly observed in neonates. Drug interactions mostly occurred in age group of 13 years. while its ration in other age groups were not significant Figure 3.

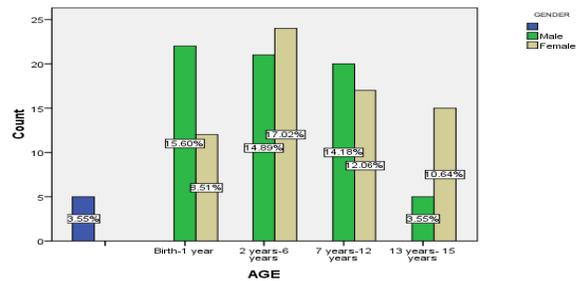


Figure 3: Age pattern of patients

In genders, errors were frequently observed in females, dosing errors being the frequent one 45%, while in males dosing error was 19.8%. Likewise drug interactions were also frequently observed in females. In contrast, rates of errors of incomplete prescription and inappropriate drug selection were more common in males Figure 4.

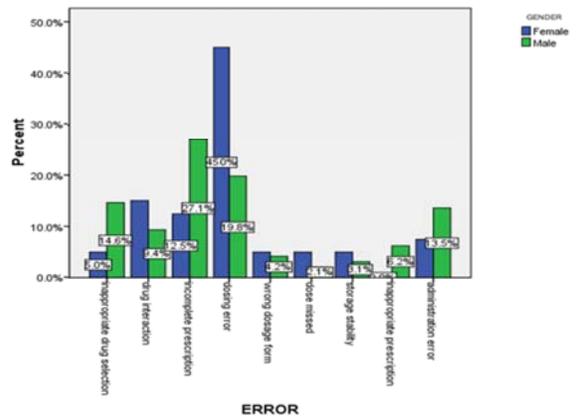


Figure 2: Error in different gender

Among 200 medication orders analyzed during this study period, there were 136 errors identified 68%. The most prevalent errors found was incomplete prescription error (22.79%), followed by dosing errors (27.2%). Among other errors found were inappropriate drug selection, drug interaction Figure 5

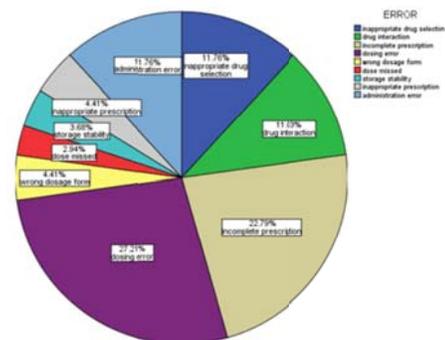


Figure 5: Prevalence of type of errors

Discussion

This study was conducted with aim of identifying potential medication errors with their prevalence in pediatric ward, in resource limited setting. The role of clinical pharmacist in preventing medication errors was also investigated. It was found that medication errors were common in pediatric population .It was shown that total 68% of preventable prescribing and administration errors were identified. This type of study was conducted for the first in Pakistan. In addition, insignificant work on this topic is conducted in neighboring countries. The results of this study were compared with the results of some European and Gulf countries. Somewhat same rates of medication errors were found in Ethiopia, Saudi and Egypt which were 58 %, 56 % and 68 % respectively. U.S study reported rate errors per 1000 medication orders.^{14, 15, 16}

In this study, the most common prescribing error found was dosing error followed by incomplete prescription. In general, pediatrics dosing should be based on body weight, because of the immature physiology of the pediatrics, a practice which is totally ignored in our country. Figure 2 shows all types of errors with their percentages found during the study. From the results, it was shown that in appropriated drug selection was the most frequent after the earlier mentioned errors. The inappropriate selection is actually the prescribing of wrong drug for stated medical condition, which in case of pediatrics population is very serious problem in terms both health and economic concerns. In wrong drug selection, mostly antibiotics were prescribed without any indication, which is against International guidelines and is associated with growing antimicrobial resistance. From this study, it was shown that clinical pharmacist can benefit the healthcare system by preventing serious medication related adverse reaction and the extra cost associated with it All of the found medication errors were prevented before their occurrence by clinical pharmacist.

The clinical pharmacist monitoring of therapeutic plan and preventing medication errors is investigated in Europe. The clinical pharmacist might prevent 58% of all and 72% of potentially harmful errors and that improved physician-pharmacist communication might prevent 47.4% of errors.¹²

Conclusions

In regard to the results of current study, it can be clearly concluded that higher rates of medication errors occurs

in pediatric population, which needs improvement in the system adopted for care of this population. Prescription guidelines should be followed by all prescribers in order to reduce or prevent the error's occurrence. Role of clinical pharmacist should be strengthen to improve the overall health care system. For this allocation of pharmacist in wards in necessary.

In Pakistan, Clinical pharmacy services are yet at stage of its infancy, and very few private sector hospitals have adopted the system in which pharmacist provide clinical services to the patients, while this practice is totally scarce in Government sector hospitals. Most of the population of the area in which the current research in conducted, have low socio economic class, consequently, their load is on Government sector as compared to private sector. So government needs to improve the current health care system by adapting the international guide lines. Furthermore, as this type of study was conducted for the first time in Pakistan, such more studies are needed to be conducted so that subject matter can be addressed.

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