



## **Assessments of Medication Error among Inpatients of Obstetrics Ward in a Tertiary Care Teaching Hospital, Tamil Nadu: A Cross Sectional Study**

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### **ABSTRACT**

Medication errors often described as human errors in health care. Medication Error rates in hospitals ranges from 4.4% to 59.1% worldwide. Overall medication errors can increase cost of therapy, morbidity or mortality. Medication during antenatal period should be more cautious, because it is not only going to affect women but also the baby. Hence this present study was conducted to assess the medication errors among inpatients in Department of Obstetrics in tertiary care teaching hospital in Tamil Nadu. The study was conducted during Nov 2018 to April 2019. Sample size was calculated considering 95 % confidence interval with 9% absolute precision. Total 87 prescriptions and case papers were screened for adherence of prescription as per WHO prescription writing guidelines. Also, Nursing record and event registers viewed to find out dispensing or administrative errors. The study was initiated after getting approval from Institution Ethics Committee. Over all percentage of medication error observed was 42.5% with 30 (81.08%) prescribing error and 7 (18.91%) administrative errors. Medical dispensing error was not observed. Most of the cases prescription were written with brand names. In our study we compared the length of hospital stay and number of medications used in comparison to the medication error present. By using chi – square test it is observed that medication error increased with increase in number of medications ( $p=0.03$ ) as well as with increase in number of days of hospital stay ( $p=0.00013$ ). Majority of the errors identified in our study was prescription errors followed by administrative error. The most frequent prescribing error was generic error.

**Keywords:** Medication error, Prescription error, Administration error, Dispensing error.

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### **INTRODUCTION**

A drug is a chemical substance that induce physiological effects after administration and is used for diagnosis, treatment and prevention of disease [1]. Every one of us consume drug at one time for other. Most of the times drug effect is beneficial while rarely it may harm us. These harmful effects are due adverse effects or errors that can occur during medication use [2]. Definition of medication error is very complex. As per The National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP), it is defined as “any avertable event that may root or lead to improper medication use or patient mischief while the medication is in the control of healthcare professional, patient, or consumer” [3]. It is prime importance to ensure safety during patient care in hospital settings as occurrence of medication error can increase hospital cost, and have severe impact on health status of the individual. Additionally, it reduces patient's trust and satisfaction [4]. Medication errors are preventable hence clinician must be cautious

while writing a prescription. Drugs that can be administered in chronic kidney disease patient may need dose change or avoidance of that particular drug.

Medication errors are primarily classified as: Prescribing error, dispensing error and administering error. The types of prescribing errors include the following: irrational, inappropriate and ineffective prescribing, unauthorized or improper drug prescribing, writing a prescription with wrong dose, under prescribing and overprescribing. Administration errors include the omission error, improper route of administration, giving the drug to the wrong patient, overdose of drug. Dispensing error includes, dispensing wrong medication, giving near expiry medications, omission of items and dispensing medicines to wrong patient. Although medication errors are more commonly seen, very few may cause adverse drug reactions [5, 6].

The incidence of medication error is variable worldwide. In UK and USA hospitals, it is reported to range from 0.015-35 % [7]. In India, of 1000 prescriptions 82 medication errors or adverse drug reactions are observed. As per recent study every year, 5.2 million medical errors are observed in India [8, 9].

The most common medication error is prescribing error observed in clinical settings followed by administrative error [10]. Incorrect dose given, omission of drug and drug administered during incorrect time are the frequently reported types of administration error [11].

Overall, medication errors result in increased morbidity, mortality, and economic burden on healthcare system. Majority of the medication errors are due to inadequate time for documentation, work overload and improper communication during shift duty change [10]. Medication in antenatal and postnatal period should be more cautious because it not only affects mother but also baby. As limited obstetrics data is available on medication errors in Obstetrics ward, the present study was undertaken in tertiary care teaching hospital, Tamil Nadu with following objectives:

1. To assess the pattern of medication error and its adherence to WHO prescribing guidelines.
2. To find association of relationship of medication error with length of hospital stay and number of prescribed medications.

## MATERIAL AND METHODS

Study Design: Cross sectional study.

Study Site: The study was conducted in admitted patients in Department of Obstetrics, Karpaga Vinayaga Institute of Medical Sciences and Research Centre.

Study period: November 2018 to April 2019

Study Population: Patients admitted in Obstetrics ward of Karpaga Vinayaga Hospital.

Sample size calculation: In a study titled assessment of medication errors and adherence to WHO prescription writing guidelines in a tertiary care hospital by Sheikh D et al [12], medication was found to 20%. Taking this as prevalence, 9% absolute precision and 95 % confidence interval. The sample size was found to be 76 using n Master Software. But the data collected during period (November 2018 to April 2019) was found to be 87, hence sample size was taken as 87.

Inclusion Criteria: All the patients who admitted to obstetrics wards during November 2018 to April 2019. Source of the data: All the case sheets of the patients of obstetrics ward admitted during November 2018 to April 2019.

Study Instruments: Collected prescription charts were screened for WHO prescription guidelines [13,14] mentioned below:

- Name, address, telephone number of prescriber
- Date
- Name, gender, age, and address of the patient
- Diagnosis
- Generic name of drug, Strength, dosage form, frequency, total amount
- Label: Instruction and warning
- Signature of the prescriber

Data collection: After obtaining ethical clearance from Independent Ethics Committee, Karpaga Vinayaga Institute of Medical Sciences and Research Centre study was initiated. Data was collected from case sheets of antenatal and postnatal ward who were admitted during study period. Nursing records and hospital event registers were screened for identification of administrative error and dispensing error. Chief Pharmacists was also interviewed to identify dispensing error.

Data analysis: Collected data was entered in the excel sheet and interpreted. Categorical data was presented with tables and graphs. Chi-square test was applied to find the association of medication error with increased number of medications and length of hospital stay.

## RESULTS

During the study period (November 2018 to April 2019), 87 cases were analysed for medication errors. In a given study, 37 (42.53%) medication errors were observed with 7 (18.91%) administrative errors and 30 (81.08%) prescribing error. The mean age group of patients was  $26.49 \pm 4.09$  years, 18 years being lowest and 39 years being highest. In present study, 3 patients were in less than 20 years of age group, 66 were in the 20-30 age groups and 18 were in 30-40 age groups. There were 31 medication errors observed in 20-30 age groups and 6 in 30-40 age groups. (Table 1)

In present study, most common error is observed as prescribing error. Generic name was not written in 14 cases, dosage form and frequency were missing in 14 patients, instruction and warning was not written in 1 prescription while prescriber signature was missing in 1 patient. (Table 2). It is evident from table 3 that omission error is commonest administrative errors. (42.81 %, N=3)

Table 4 shows association of medication errors with duration of hospitalization. In present study, medication errors were 24 (out of 37) when patient's hospital stay was prolonged for more than 7 days while medication errors were 13 (out of 37) when patient discharged within 7 days after admission. The observed chi-square value is 14.63 with p value= 0.00013 which is very highly significant.

In present study, out of 30 medication errors observed in patients receiving more than 5 drugs while 07 medication error observed in those receiving less than 5 medications. The chi-square value for association is 4.415 and p value is 0.035. (Table 5)

To categorize severity, NCCMERP index for categorizing medication errors (3) was used which classifies medication error from Category A (Circumstances or events that have the capacity to cause error -No error) to Category I (An error occurred that resulted in patient death). Figure 1 depicts severity of medication error in a present study.

## DISCUSSION

As there were not much studies conducted specifically on medication errors in obstetrics ward, we planned this study to assess types of medication error, association of medication error with number of medications prescribed and duration of the hospital stay.

The overall incidence of medication error in our study was 42.5% with category B and C type medication errors as per NCC MERP severity index. [3]

Similar results were seen in observational study where most of the error were non-severe and did not harm patient [15]. Another study conducted by Reddy P and associates observed 66.32 % medication error with no fatal outcome [16].

The most common medication error was observed was prescribing error (34.48%, N=30) where 14 prescriptions were without generic name. Similar results were observed in a study conducted by Parthasarathi A and colleagues [10]. As per WHO guidelines, all drugs must be written in capital with generic name however this practice is not being followed to the core. In our study, percentage of drug prescribed by generic name was 54% while study conducted by A. A. Disalegn in South ethopia, 98.7% prescription were adhered to WHO guidelines (Drugs written in generic name) [17]. The probable reason for highest number of prescribing errors was work overload to junior and senior residents, presence of multiple prescribers and lack of time for prescription. Healthcare professionals usually write abbreviations in prescription that can precipitate medication errors [4]. Hospital administrators, members of quality assurance in coordination with Pharmacology department have considerable responsibility in organizing special programs that improves quality of prescription. Regular prescription audits and training on rational use of medication is essential to reduce prescription errors.

In a present study, most common administrative error was omission error. Similar results were observed in a study conducted by K Hema Sathini et al, where commonest administrative error was dose omission error (42.12%) [18]. In a previous study conducted by Eisa-Zaei A and colleagues also showed omission error in 19.2% of patients [19]. In our study, wrong route error was observed with metronidazole which was given orally instead of intra-venously. 3 patients did not receive Tab B-complex due to occurrence of omission error. Calculation error was observed during salbutamol nebulization. Lack of time for documenting dose in nursing record sheet, hurry in shift changing hours and increased workload leads to medication error. Even though administrative errors have not caused serious harm, continuous nursing education is pivotal to improve the quality of care. Quality manager of the hospital need to take initiatives in organising sessions on high-risk medication, look alike sound like medications, essential drugs etc.

There was no medical dispensing error in our study which was contrast to the study conducted by Ibrahim OM and associates where reported medical dispensing error was 6.7% [20]. This could be due to small sample size (N=87) in present study compared to large number of population (N=350) covered in preceding study how ever study completed by Zirpe K G et al where 6705 cases were evaluated, showed 0.5% dispensing error [21]. As our hospital has applied for National Accreditation Board for Hospitals &

Healthcare Providers (NABH) accreditation, standard operating procedures for dispensing of medicines are in operation. Also, pharmacist is aware with policy on near expiry drugs, look-alike sound alike drugs, high risk medication dispensing. Even though there no medication dispensing error, pharmacists must be trained regularly to ensure safe drug dispensing practice.

Medication errors are associated with increased number of prescriptions, heavy workload, shift change over and increased duration of hospital stay. In a present study, association between number of medication errors and length of hospital stay and medication error with increase number of prescription was assessed by using chi-square test. Medication errors increases with increase in number of prescription ( $p=0.03$ ) and increase number of days in hospital ( $p=0.00013$ ). In our study, 30 medication errors were observed in patients receiving more than 5 drugs. A study conducted by Sheikh D and colleagues showed that increase in duration of hospital stay increases medication errors [12].

As per WHO, not more than 3 drugs to be prescribed in optimal regimen [22]. However, almost every alternate prescription consists of 5 or more than 5 drugs. Polypharmacy means when at least 5 or more than 5 drugs are prescribed in a patient. It has multiple negative consequences including inappropriate medication use and chances of development of medication errors. The previous study has indicated polypharmacy as one of the risk factors for medication error [23]. The negative impact of polypharmacy is more evident in elderly individuals as well as pregnant women. A study conducted by Tomasz Gradalski on polypharmacy and medication error in palliative care concluded that polypharmacy increases risk of inappropriate use of drugs in elderly which may lead to poor prognosis [24]. It is prime duty of the clinician to prioritize the need of the patient and discontinue the unneeded or unindicated drug.

Hospital stay increases due to either complications of existing disease or development of new symptoms or disorder. Increase duration of hospital increases pill burden which may in turn can increase medication errors. Clinician must anticipate and recognize the complication at the earliest and act promptly to reduce morbidity in these patients.

To reduce medication errors, proactive efforts from all the stakeholders is necessary. Implementation of patient safety strategy is necessary to improve patient safety culture [25].

**LIMITATION OF THE STUDY:** The sample size was small hence findings cannot be generalized. There was no direct interview with patient, nurse or patient's relative which could be added inputs in a study.

**Table 1: Age wise patient distribution with medication errors**

Age group	Medication error observed (N=37)	Medication error not observed (N=49)	Total number of patients (N=87)
< 20 years	0	3	3
20-30 years	31	35	66
30-40	06	12	18

**Table 2: Types of prescription error as per WHO prescription guidelines**

SL No.	Sub type	Number of errors (N=30)
1	Name, address, telephone number of prescriber	0
2	Date	0
3	Name, gender, age and address of the patient	0
4	Diagnosis	0
5	Generic name of the drug, strength	14 (46.66%)
6	Dosage form, frequency, and total amount	14 (46.66%)
7	Label: instructions and warning	01 (3.33%)
8	Signature of subscriber	01 (3.33%)

**Table 3: Types of administration error**

SL No.	Subtype	Number of errors (N=07)
1	Wrong dose error	1 (14.28%)
2	Wrong medication error	0
3	Wrong route administration	1 (14.28%)
4	Missing signature in Nursing record sheet	0
5	Omission error	3 (42.81 %)
6	Wrong drug preparation	0
7	Wrong calculation error	2 (28.56%)
8	Wrong frequency administration	0

**Table 4: Association of medication error with length of the hospital stay**

Length of Hospital Stay (in days)	Total number of patients (N=87)	Number of patients with medication error (N=37)	Number of patients without medication error (N=50)
> 7	36	24	12
<7	51	13	38

Chi-square test value= 14.63, P value= 0.00013

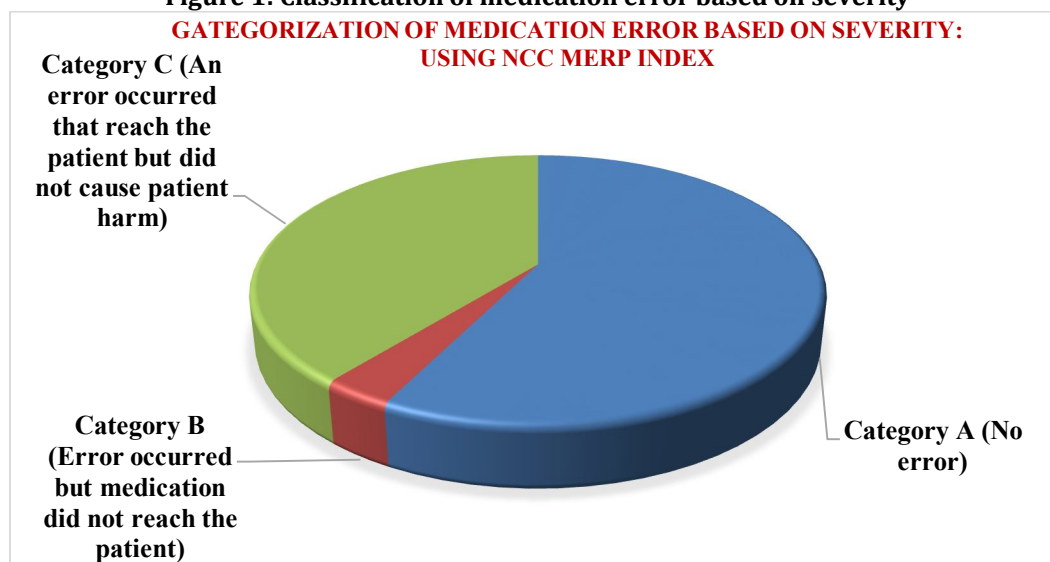
\* P value= 0.00013 is statistically very highly significant

**Table 5: Association of medication errors with number of medications**

Total number of medications in a patient	Total number of patients (N=87)	Number of patients with medication error (N=37)	Number of patients without medication error (N=50)
> 5	60	30	30
<5	27	07	20

Chi-square test value= 4.415, P value= 0.035

\* P value= 0.03 is statistically significant

**Figure 1: Classification of medication error based on severity****CONCLUSION**

Prescription errors are more commonly observed error followed by administrative error. Medical Professionals must update themselves on standard prescription guidelines and act professionally to reduce medication error. Nurses should work as per the standard protocol. Medication errors increases with increased number (5 or more than 5) of medications. Polypharmacy increases risk of medication errors. It is the duty of every healthcare provider not to overburden patient with excessive pills. Prolonged hospital stay was associated with increase in medication errors. As hospital stay lengthens, medication error risk increases. This can be more detrimental in certain high-risk groups like elderly patients, pregnant women and patients with chronic disorders. Hence Health care professional must monitor such high-risk patients vigilantly to avoid complications developed due to medications.

There is need to develop a system that can prevent medication errors.

**CONFLICT OF INTEREST**

The author declared that there is no conflict of interest.

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