



Research Article

## PERIOPERATIVE MEDICATION ERROR: A RETROSPECTIVE SURVEY AMONG JUNIOR RESIDENTS OF FIVE TEACHING HOSPITALS OF INDIA

\*Dr Aparna Shukla

Associate Professor, Anesthesiology, King George Medical University, Lucknow

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### ABSTRACT

**Introduction-** Medication errors in the operating room poses significant risk to patients and adverse effects can vary from minor systemic changes to life threatening complications. This study was undertaken in five teaching medical colleges and hospitals in india. Total 130 residents participated in the study.

**Aims And Objectives-** This retrospective study was undertaken to 1. Find the frequency of inadvertent wrong drug administration 2. Cause of inadvertent wrong drug administration in the perioperative period. 3. To identify effect of training on medication error 4. Identify any complication occurring due to medication error.

**Method-** A questionnaire was prepared. Junior residents of the selected institutions were given a anonymous form and they were asked whether they have given any wrong drug anytime during their existing junior residency period of one year and if so, details were noted like possible cause and adverse outcome.

**Result-** 75 out of 130 residents [57.69%] confessed that they have given wrong drug/doses at least once in their existing junior residency period. However incidence decreased with seniority. Highest [80%] among JR1 and lowest 15% among JR2. Most common cause of medication error was long duty hours and large number of cassettes leading to lack of sleep. Tendency of not labelling the drug or wrong labelling was second cause of medication error as reported by the residents.

Major medication error was syringe swap reported by 80 residents among total 130.

**Conclusion-** Improved medication safety requires a system-wide approach and standardization of drug preparation and dispensing at the level of anaesthesiologist as well as at the level of the institution. Continuous training and checking of medical students is need of the hour. Time to time monitoring and reporting of these errors is needed and should be made mandatory to monitor the impact of safety measures applied. It will also help in developing institutional protocol regarding drug safety.

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### INTRODUCTION

As said by Alexander Pope that “A man should never be ashamed to own that he has been in the Wrong, which is but saying in other words that he is wiser today than he was yesterday”.

Medication errors in our field is not very uncommon. This can be catastrophic and translates directly into morbidity and mortality. Most importantly these complications are preventable and underreported. Therefore these problems should be attended on priority basis. Some simple measures like proper labelling of syringes can reduce the incidence dramatically. For significant change to occur efforts are needed at each level. Development of new drug delivery system, good and safe workplace practices, vigilance of

doctors, training of staff and institutional protocol all are needed at the same time. In most of the institutions there is no protocol regarding preparation, dispensing and administration of drugs. We must sensitize and modify our system to reduce occurrence of these unwanted complications.

This study was undertaken to find the incidence of medication errors among residents of five teaching institutions.

### AIMS AND OBJECTIVES

The purpose of this study was to find the 1. Frequency of inadvertent wrong drug administration 2. Cause of inadvertent wrong drug administration in the perioperative period. 3. To identify effect of training on medication error 4. Identify any complication occurring due to medication error.

### METHOD

A questionnaire was prepared. 130 Junior residents of the selected institutions were given a anonymous form and they were asked whether they have given any wrong drug during

\*Corresponding author: Dr Aparna Shukla

Associate Professor, Anesthesiology, King George Medical University, Lucknow

their existing junior residency period of one year and if so details were noted like possible cause and adverse outcome if any. It means JR 3 told only about their third year experience and so on. The purpose was to identify the frequency of medication error among residents and effect of training in reducing incidence of these preventable complications.

**RESULT**

Total 130 residents participated in the study 50 JR1[junior resident first year] , 40 JR2 [junior resident second year]and 40 junior resident third year [JR 3 ]. It was observed that with increasing experience and training medication error was reduced dramatically.

**Table 1** Q Have you given the wrong drug in the prioperative period at least once during last one year?

JR1[NO.50]		JR2[NO.40]		JR3[NO.40]	
YES	NO	YES	NO	YES	NO
40[80%]	10[20%]	20[50%]	20[50%]	15[37.5%]	25[62.5%]

**Table 2** Q Cause of wrong drug abministration ?

Cause	Number	Percentage
Lack of sleep	55	[42.3%]
Not labelled	40	[30.7%]
Prepared by someone else	15	[11.55]
Similar ampoules	10	[7.7%]
Other causes	10	[7.7%]

75 out of 130 residents [57.69%] confessed that they have given wrong drug/doses at least once in their existing junior residency period. [Table 1].However incidence decreased with seniority. Highest among JR1 [80%]and lowest 15% among JR2.

Most common cause of medication error was long duty hours and large number of cases leading to lack of sleep. Tendency of not labelling the drug or wrong labelling was second cause of medication error as reported by the residents. [Table 2]

Major medication error was syringe swap reported by 80 residents among 130 i.e. giving muscle relaxant instead of reversal because most of the residents were in habit of writing short form of drugs. However none of them reported any serious adverse outcome.

**DISCUSSION**

According to National co-ordinating council for Medical error reporting and prevention [NCC MERP]“ A medication error is any preventable event that may cause or lead to inappropriate medication use or patient harm.

In our study 80% of JR1, 50% of JR2 and 37.5% JR3 confessed that they had given wrong drug at least once in their respective tenure. Most common cause of wrong drug administration was lack of sleep followed by improper and/or no labelling. Incidence was highest among first year junior residents. Major medication error was syringe swap reported by 80 residents among 130 i.e. giving muscle relaxant instead of reversal because most of the residents were in habit of writing short form of drugs. Similar observations were recorded by Orser BA, Chen RJ, Yee DA<sup>[1]</sup>They did survey of 687 anesthesiologist with 30% response rate. They reported that Most anesthesiologists experienced at least one drug error. The commonest error was a "syringe swap" that involved a muscle relaxant. Most errors were of minor consequence,

however, serious morbidity and mortality resulted from clearly preventable events.

Karren C Nanjii evaluated the perioperative medication errors and adverse drug event in 277 operations with 3671 medications out of which 193 involved medical error and/or adverse drug events out of which 153 were preventable. They observed that 1 in 20 perioperative medication administration resulted in medication error. They defined medication error ranging from no potential harm to error with adverse drug events which can be life threatening too.<sup>[3]</sup>

Llewellyn RL, Gordon PC *et.al* .did an prospective study to determine the incidence of nedication errors in two adult and one paediatric hospital over the period of six months. Among total of 30,412 the incidence of errors and near-misses were 48.8%inHospital A, 81.3% (1:252) in hospital B and 48.1% in hospital C(1:250). The overall response rate was 53% and the combined incidence was 1:274. Experience of the anaesthetist or emergency surgery did not influence occurrence of an error . Most errors occurred during the maintenance phase of anaesthesia. The most common errors were those of substitution.<sup>[4]</sup>

A medication error is defined as failure to complete a required action in the medication administration process, or the use of an incorrect plan or action to achieve a patient care aim.<sup>[2]</sup>Medication errors can occur any stage from preparation to administration. Many times these incidences are underreported due to fear of losing job or other causes. Medication error can be anything from wrong drug, wrong patient, wrong time, wrong route and wrong doses.

The time has come when we should be more responsible towards our mistakes. First we should accept our mistakes and then try to develop safe anesthesia practices. Few measures that we can take to reduce the medication errors are-

**Immediate Measures-**<sup>[5-9]</sup>

1. Training of residents on simulators initially before exposing them to real patients.
2. Role playing of real case scenarios for first year residents.
3. Limitation of working hours of residents so that they get proper sleep.
4. Standarization of dosing preparations for each drugs and each institute.
5. Proper labelling of drugs in legitimate handwriting.
6. Avoiding similar looking ampoules of two drugs.
7. Double checking before preparation and administration
8. Avoid giving vague commands about drug administration intraoperatively. Mention drug salt and doses in mg/kg.
9. Chart in each OT depicting preparation and dosing of each drug.
10. Reporting and review of medication error.

**Long term measures**

APSF Hosed a Medication Safety Conference and suggested few measures to reduce the medication errors <sup>[10,11,12,]</sup>. Few important points of guidelines are-

### **Standardization of drugs, drug concentrations, and drug delivery equipment.**

It means that units as well as concentration of drugs should be standardized at institutional level. Continuous infusions should be delivered by an electronically-controlled smart pump that contains a pre-existing drug library with standardised concentrations and recommended infusion rates. Before starting the administration of an infusion in the operating room it should be double checked by a second person. and there should be a alarm for non-standard doses or concentrations. Concentrated formulations of any potentially lethal agent like phenylephrine should not be allowed in the operating room.

### **Maximize the use of newer technology**

Like barcode reader, Automated information system, Technology assisted drug identification and delivery,

**Dedicated pharmacy for operating room:** Which can provide premixed solutions and prefilled syringes of anaesthesia medications and Prefilled bolus medication syringes and solutions for infusions. This can completely eliminate errors made by anaesthesia providers while transferring and diluting drug from vial to syringe, making inappropriate doses and improper labelling.

### **Limitation of the study**

#### **There were two limitations in the study**

1. Sample size was small.
2. Dependency on residents for the recall of events.

### **CONCLUSION**

As rightly said by Gandhiji that ‘Our greatest ability as humans is not to change the world: but to change ourselves’. It starts with accepting the facts that medication errors do exist and most of them are preventable. Simple measures can be taken to minimize medication errors. Let us develop a zero tolerance to these errors and maximize the patient safety in the operation theatres.

### **References**

1. Orser BA, Chen RJ, Yee DA. Medication errors in anesthetic practice: a survey of 687 practitioners. *Can J Anaesth.* 2001;48(2):139–46. [PubMed] [Google Scholar]
2. Rothschild JM, Landrigan CP, Cronin JW, Kaushal R, Lockley SW, Burdick E, Stone PH, Lilly CM, Katz JT, Czeisler CA, Bates DW. The Critical Care Safety Study: The incidence and nature of adverse events and serious medical errors in intensive care. *Crit Care Med.* 2005;33(8):1694–700. [PubMed] [Google Scholar]

3. Karen C, Nanji. Evaluation of Perioperative Medication Errors and Adverse Drug Events. *Anesthesiology.* 2016 Jan; 124(1): 25–34.
4. RL Llewellyn, PC Gordon, D Wheatcroft, D Lines. Drug administration errors: a prospective survey from three South African teaching hospitals. *Anaesth Intensive Care.* 2009 Jan;37(1):93-8.
5. Webster CS, Merry AF, Larsson L, McGrath KA, Weller J. The frequency and nature of drug administration error during anaesthesia. *Anaesth Intensive Care.* 2001;29(5):494–500. [PubMed] [Google Scholar]
6. Shridhar Iyer U, Fah KK, Chong CK, Macachor J, Chia N. Survey of medication errors among anaesthetists in Singapore. *Anaesth Intensive Care.* 2011;39(6):1151–2. [PubMed] [Google Scholar]
7. Flynn E, Barker K, Pepper G, Bates D, Mikeal R. Comparison of methods for detecting medication errors in 36 hospitals and skilled-nursing facilities. *Am J Health Syst Pharm.* 2002;59(5):436–46. [PubMed] [Google Scholar]
8. Barker KN, McConnell WE. The problems of detecting medication errors in hospitals. *Am J Health Syst Pharm.* 1962;19:360–69. [Google Scholar]
9. Barker KN, Flynn EA, Pepper GA. Observation method of detecting medication errors. *Am J Health Syst Pharm.* 2002;59(23):2314–6. [PubMed] [Google Scholar]
10. Eichhorn, J.H. APSF Hosts Medication Safety Conference: consensus group defines challenges and opportunities for improved practice. *APSF Newsl.* 2010; 1: 3–8
11. R.S.Litman. How to prevent medication error in the operating room? Take away the human factor. *March 2018. vol 120, issue 3, pages 438-440*
12. Grigg, E.B., Martin, L.D., Ross, F.J. et al. Assessing the impact of the anaesthesia medication template on medication errors during anaesthesia: a prospective study. *Anaesth Analg.* 2017; 124: 1617–1625

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