

A Survey of Medication Errors among Anaesthesiologists of Karnataka - A Pilot Study

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Abstract

Background: Medication errors in modern medical practice add to the cost of patient care and increase human suffering. We decided to conduct a survey among practicing anesthesiologists of our region in order to assess the prevalence of medication errors, the current knowledge of medication errors, common drugs involved and the possible corrective measures. **Methods:** After obtaining an approval from the institutional ethical committee a pre-validated questionnaire of 18 questions was distributed by electronic mail to the members of Indian Society of Anaesthesiologists, Karnataka state branch. **Results:** We received 324 survey responses. The percentage of anaesthesiologists who attempted the survey was 14.37% (the number of people who attempted the survey divided by the number of emails delivered including those who opted out) Out of these, 242 respondents (74.69%) said that they had experienced or witnessed at least 1 medication error (Figure 1). Of the 142 respondents who answered the question, 79.58% had a near miss event, and 53.52% had not reported the incident to the hospital authorities (Figure 2). Majority of the incidents involved adults (86.2%), 59.8 % involved substitution of a drug, and the errors were more common with general anaesthesia (84.51%). **Conclusion:** Our survey showed that most respondents believed in a reporting system for medication errors and that multiple precautionary measures were required to prevent such events.

Keywords: Anaesthesia, Medication Errors, Questionnaire, Survey

1. Introduction

Medication errors in modern medical practice add to the cost of patient care and increase human suffering. Errors in medical practice can be devastating to the patient and relatives and lead to the loss of trust in the healthcare system. On the other hand, they do affect the healthcare professional psychologically¹. In the United States around 1,80,000 deaths occur due to adverse medical events every year. Furthermore, 7000 deaths were estimated to be due to drug errors. A teaching hospital spends 5.6 million dollars out of which 2.8 million were spent on preventable causes of adverse events². The actual incidence of medication errors is not known.

Anaesthetic practice involves administration of highly potent drugs, where the physician himself prescribes, dilutes and administers drugs without the involvement of another professional, creating a setting for errors to occur. Sometimes, administration of certain drugs is on an emergent basis, providing a recipe for disaster. Likewise, the detection and treatment of medication errors are also early due to the conventional training of anesthesiologists in monitoring. Studies done in New Zealand have quoted the incidence of drug errors in anaesthesia as 1 per 133 administrations³. A study conducted in Denmark placed orthopaedic surgery, internal medicine and anaesthesiology as the departments in which most

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deaths occurred due to medication error⁴. Most of the studies conducted are either closed claims analysis or are observational studies. Designing studies on medication errors are highly improbable or involve ethical dilemmas. In India, incident reporting or drug error reporting systems are in their infancy. Most errors are reported as case reports in journals. We decided to conduct a survey among practicing anaesthesiologists of our region in order to assess the prevalence of medication errors, the current knowledge of medication errors, common drugs involved and the possible corrective measures. Further, we tried to find out if anaesthesiologists were open to reporting drug errors and whether they felt that punitive action was essential in cases of drug errors.

2. Subjects and Methods

After obtaining an approval from the institutional ethical committee a questionnaire of 23 questions was designed by the authors as an electronic questionnaire. This questionnaire was sent to 5 experts in the field of anaesthesiology for validation. Their suggestions were incorporated and the questionnaire was streamlined to 18 questions (Appendix 1).

The questionnaire contained questions on whether the anaesthesiologist had experienced an error, number of incidents, type of error, and category of the patient involved, the mindset of the anaesthesiologist after the error occurred. Questions were also designed to know whether they had reported the error and their opinion on preventive measures (Appendix 1). The questionnaire was sent to all anaesthesiologists who were members of the state of Karnataka registered with the Indian Society of Anaesthesiologists. Anaesthesiologist attempting the survey was considered as consent to participate in the survey. The survey questionnaire was kept open for 3

months and repeated reminders were sent. Respondents were allowed to skip questions. The Survey Monkey software was used for distribution of questionnaire, collection of the answers, chart preparation and analysis and the results were also collected in the Microsoft excel format.

3. Results

Out of the 2356 emails sent, 102 emails bounced and 91 respondents had opted out of the survey (blocked mails from Survey Monkey). We received 324 responses for the first question. The number of responses received for the other questions is mentioned in Table 1. The percentage of anaesthesiologists who attempted the first question was considered the response rate (14.37%, the number of people who attempted the survey divided by the number of emails delivered including those who opted out) Out of these 242 respondents (74.69%) said that they had experienced or witnessed at least 1 medication error (Figure 1). Of the 142 respondents who completed the survey, 79.58% had a near miss event, 53.52% and had not reported the incident to the hospital authorities (Figure 2). Majority of the incidents involved adults (86.2%), 59.8 % involved substitution of a drug, and the errors were more common with general anaesthesia (84.51%) most commonly administered by a postgraduate trainee (49.30%). Haste and distraction were the commonest causes (35.21% and 32.09% respectively). Most of the incidents required only monitoring (66.9%), 91.93% felt that medication error is a problem in anaesthesia and 90.95% felt the need for a reporting system with 73.87% of them expressing that it should be anonymous. Majority (68.34%) of the respondents felt that multiple measures (insisting on anaesthesiologist loading and labelling the syringes, insisting the manufacturers provide pre-filled

Table 1. The response rates for survey questions

Questions No./Nos.	Number of respondents who answered	Number who skipped	Response rate (%)
1	324	0	14.37
2-12	142	182	6.02
13	198	126	8.40
14-18	199	125	8.44

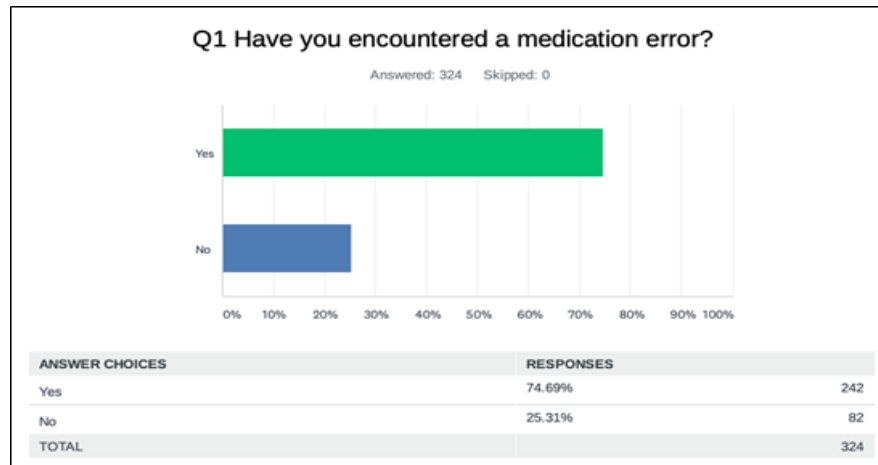


Figure 1. Shows the percentage of people who had encountered a medication error.

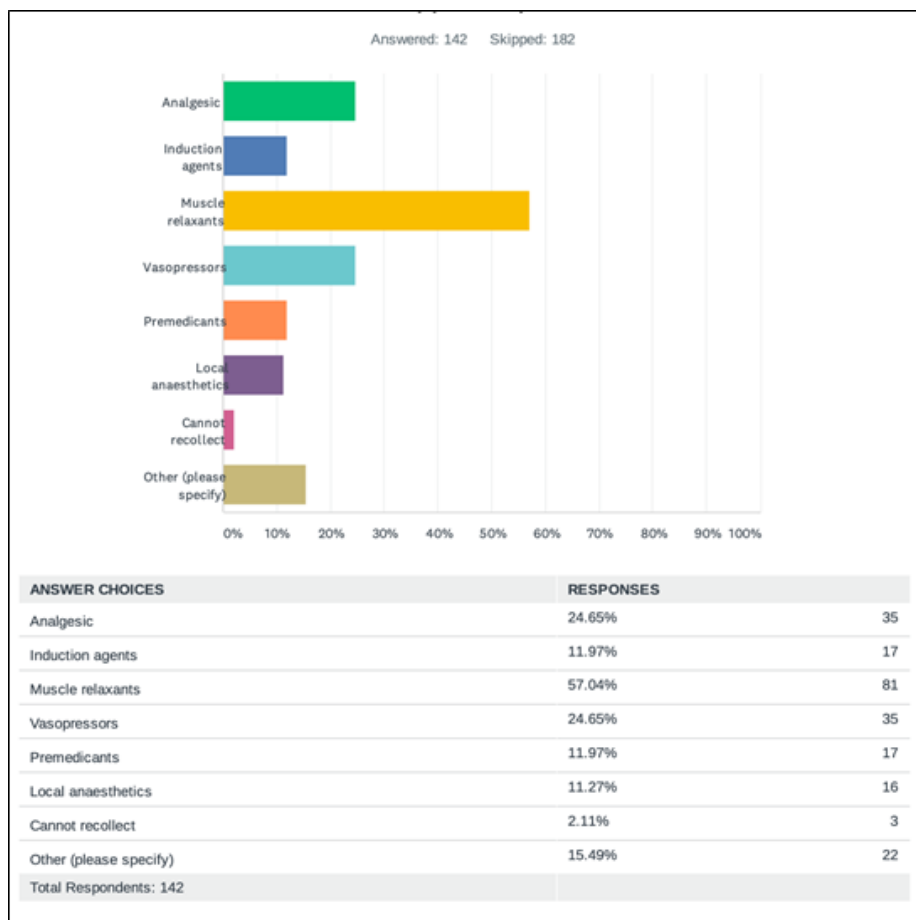


Figure 2. The type of error as reported by the respondents.

colour coded and labelled syringes, Double checking (two people check during loading drugs) were required to prevent such incidents. The respondents were asked

to enter the drugs involved in the error and the drugs entered are represented in Figure 3. A total of 57 drugs and classes of drugs were entered with muscle relaxants

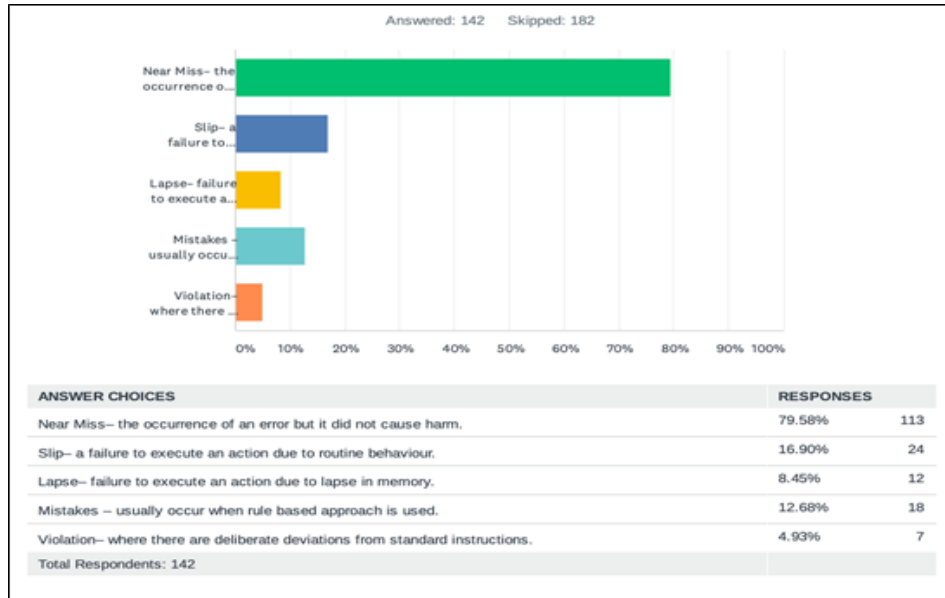


Figure 3. The commonest drug involved.

being the most common drugs involved in medication error.

4. Discussion

Medication errors in anaesthesia are underreported due to the fear of punitive action but anaesthesiologists experience at least one medication error in their practice despite adequate emphasis on prevention of medication errors. Errors tend to occur under similar circumstances. Improvement of reporting systems help in the development of preventive measures. Most of the studies have shown very low mortality rates with near miss events being the most common. In our survey, we tried to establish the prevalence of medication errors. Earlier surveys done by Orser *et al.*⁵ and Erdmann *et al.*⁶ showed 85% and 91.8% incidence of medication errors respectively. In our survey, 74.69% of the respondents reported that they had experienced a medication error. Studies done prospectively in New Zealand and in South Africa have quoted the incidence to be 1 in 133 and 1 in 274, respectively^{3,7}. A study done by Nanji *et al.*⁸. in 2016 estimated a medication error or adverse drug event of 1 in 20 administrations. Since our survey was designed as a cross sectional study, the incidence of medication error could not be estimated per administration or per anaesthetic administered by anaesthesiologist⁸. In our

survey, most of the anaesthesiologists reporting errors had less than 3 years of experience (49.30%) but in the survey conducted by Orser *et al.*⁵, most of the respondents had an experience of 5 to 15 years, even though residents with 0 to 5 years of experience were also included. The prevalence reported in our survey would further decrease if the study population was restricted to consultant anaesthesiologists with more than 3 years of experience⁵. In most studies, wrong drug or syringe swap have been reported as the commonest type of medication error, while 59.8% respondents in our survey reported that drug substitution was the commonest cause. Llewellyn *et al.*⁷. have also reported a similar incidence in paediatric population and the 'i' dose errors were as frequent as wrong drug errors. They also reported that 36.9% of the error was due to wrong identification of the ampule and 21.3% were due to wrong syringe identification⁷. In the survey done by Orser *et al.*⁵, the colour of the ampule and its label, the text colour and external packaging were considered extremely important and 86.9% "Agreed" or "Strongly Agreed" that these standardised labels reduced the incidence of medication errors⁵. In our survey we found that multiple measures including colour pre-filled syringes, double checking of the syringe and insisting that the anaesthesiologist administering the drug load and label the syringe would prevent medication errors.

Webster and colleagues used a prospective anonymous incident reporting system to establish the frequency of anaesthetic medication error and 'near misses' in two New Zealand hospitals. They found that drug administration error rate was 0.75%, with a 'near miss' rate of 0.37%. In our survey 79.58% medical professionals who responded reported a near miss³.

Haste, stress, distraction, and decreased vigilance were reported to cause increased medication errors⁵. Similarly, our survey showed "Haste" as the commonest cause (35.21%) for medication error.

Another study reported that first-year residents are five times more likely to make prescribing errors than those with more experience correlating with our survey where we found that medication errors were most commonly experienced by a postgraduate trainee (49.30%)¹⁰.

Mahajan *et al.*¹¹ stated that under-reporting still remains endemic among health-care professionals, and this limits the capacity of health-care workers and organisations to learn from the errors.

5. Limitation

Out of 2356 emails sent to anaesthesiologists, 324 attempted the first question of the survey and the rest of the questions had variable response rates. We attribute this low response rate to single mode of distribution of survey and discomfort among the anaesthesiologists to use the digital platform¹².

6. Conclusion

The medication error experienced or witnessed by respondents of our survey was high. The response to the survey, though poor, showed that most respondents believed in a reporting system for medication errors and that multiple precautionary measures were required to prevent such events.

7. References

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Appendix 1

1. Have you encountered a medication error?
 - Yes
 - No
2. If Yes, Do you recall the number of such incidents?
 - One
 - Two
 - Three
 - > Three
 - Can't say
3. Was the incident a?
 - Near Miss– the occurrence of an error but it did not cause harm.
 - Slip– a failure to execute an action due to routine behaviour.
 - Lapse– failure to execute an action due to lapse in memory.
 - Mistakes – usually occur when rule based approach is used.
 - Violation– where there are deliberate deviations from standard instructions.
4. Was the error reported to hospital authorities?
 - Yes
 - No
 - Not all
5. The Incident experienced by you involve a?
 - Adult
 - Paediatric
 - Geriatric
6. What type of medication error did it involve?
 - Omission-drug not given
 - Repetition- Extra dose of an intended drug
 - Substitution
 - Insertion
 - Incorrect dose
 - Incorrect route
 - Cannot recollect
 - Other (please specify)
7. What was the group of drug involved in the error?
 - Analgesic
 - Induction agents
 - Muscle relaxants
 - Vasopressors
 - Premedicants
 - Local anaesthetics
 - Cannot recollect
 - Other (please specify)
8. Which drugs were specifically involved?
 - Drug 1
 - Drug 2
 - Drug 3
 - Drug 4
9. Which technique of anaesthesia did it involve?
 - General anaesthesia
 - Regional anaesthesia
10. Who was the person administering the drug
 - Person with <3 yrs experience in anaesthesia (Postgraduate)
 - Person with 3-10 yrs experience
 - Person with >10 yrs experience
11. What was the cause for the error?
 - Inadequate experience
 - Inadequate familiarity
 - Haste
 - Poor communication
 - Carelessness
 - Distraction
 - Dependency on other personnel
 - Others
 - If others specify...
 - Other (please specify)
12. What harm did the error cause?
 - No harm, it did not reach the patient
 - No harm, it only required monitoring
 - Harm, minor harm like increased duration of ventilation etc
 - Harm, serious—death
13. Do you think that medication errors are a problem in Anaesthesia?
 - Yes
 - No
 - Can't say
14. Do you believe in the need for reporting system for drug errors?
 - Yes
 - No
 - Can't say
15. If yes, do you want it to be?
 - Anonymous
 - With disclosure
16. What do you think should be done when such an event occurs?
 - Handle it yourself
 - Involve the administration (department/ hospital)

- | | |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 17. Do you think we have adequate measures in place to prevent such errors in India?
Yes
No
Can't Say | Insisting on anaesthesiologist loading and labelling the syringes
Insisting the manufacturers provide prefilled colour coded and labelled syringes
Double checking (two people check during loading drugs) |
| 18. If yes, what measures do you feel is the best when adopted would reduce/prevent errors during drug administration? | All the above
Other (please specify) |