

Risks of Using Smart Infusion Pumps to Reduce Intravenous Medication Administration Errors

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Introduction

Smart infusion pumps are widely used across healthcare services to reduce intravenous medication administration errors. Although smart infusion pumps with Dose Error Reduction Software (DERS) were built to eliminate medication errors, new types of usability errors have been identified.

Aim

To identify the prevalence and type of medication administration errors associated with smart pumps in a tertiary hospital.

Methods

1. A retrospective cross-sectional study was conducted across a large multi-site tertiary hospital.
2. Reported medication incidents were extracted from the hospital incident medication management system (VHIMS Riskman) from December 2020 to July 2021.
 - Medication incidents related to smart pump use were included in the study.
 - Patients' demographic data, their length of stay, type of administration errors, medication class as well as incident severity rating.
 - Medication errors were classified according to the Victorian Therapeutics Advisory Group (VicTAG) taxonomy guideline.
3. Descriptive statistics were used to analyse the data.

Results

- A total of 1788 intravenous medication administration incidents were reported over the study period.
- Smart pump related incidents accounted for 11% (200/1788) of total intravenous medication administration incidents reported during the study period.

Patients' demographics data

- Mean age: 59±21 years.
- Mean length of stay: 11±16 days.
- Mean Charlson Comorbidity Index: 2.

Reported medication errors and harm

- A total of 60% of reported medication errors involved high risk medications (APINCH)*
- No reported incidents resulted in patient harm

Most common medication classes involved in intravenous medication administration incidents were:

- Antibiotics - 25%
- Loop diuretics 12%

Types of administration errors

Incorrect frequency and rate of medication as well as incorrect formulation were the most commonly reported medication errors in this study. Refer to Figure 1.

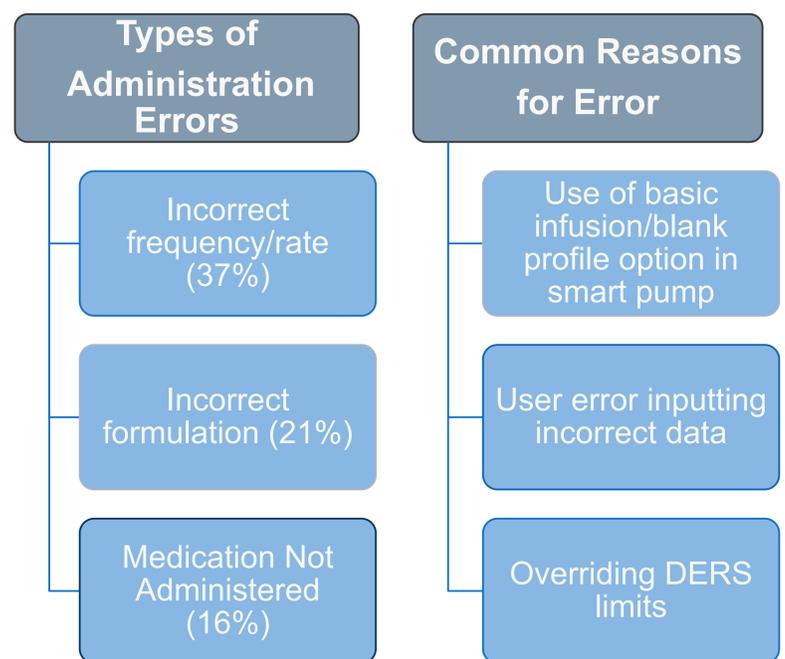


Figure 1 : Types of administration errors identified in the study and common reasons for their occurrence .

Discussion

A large prevalence and wide range of intravenous administration errors were identified in this study, despite the use of the smart pump to intercept such errors. Data from this study will be used to introduce a targeted education programs to nursing staff on commonly reported errors associated with the use of these Pumps. Additionally, a large project is currently underway at this organisation to implement an integration process of smart pumps with electronic medial records.

Integration of smart pumps with Electronic Medical Records and introduction of medication barcode scanning technology may have the potential to reduce these errors and further optimise patient safety.

Limitations

This study relied on voluntarily reported medication administration errors or incidents and therefore is unlikely to have captured all possible data.

References

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*APINCH – Antibiotics, Potassium and electrolytes, Insulins, Narcotics, Cytotoxics, Heparins and anticoagulants