

Enhancing the Safety of Medication Administration: The Synergistic Role of Closed Loop Electronic Medication Management and IV Medication Administration



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Purpose/PIO

PIO: For ICU nurses using an EHR, (P) what is the impact of the closed loop electronic medication management (CLEMM) framework (I) in the reduction of medication errors and patient harm (O)?

Purpose: The purpose of this project was to investigate the impact of integrating consistent CLEMM to decrease medication errors in the ICU for bedside nurses who use EHRs.

Aim: To implement CLEMM as standard practice in the ICU and promote patient safety.

Background

Medication Errors in the ICU

- In the ICU, there is an average of 1.75 medication errors per patient per day.
- Patients in the ICU are prescribed twice as many medications than other units, with many of them being high-alert drugs.
- Without a proper system in place, increased risk is posed to the patient.
- Currently there is not consistency in the use of one single medication management model.

CLEMM with EHRs

- The closed loop electronic medication management system integrates all steps of the medication delivery process.
- The CLEMM key players include the pharmacist, prescribing providers, and the primary nurse.
- The CLEMM is made possible by using an Electronic Health Record (EHR), barcode scanning, and smart IV pumps.
- EHRs facilitate the ability for nurses to send the rate and dosage to the pump electronically via barcode scanning, instead of using manual entry.
- The number of keystrokes decreased from 15 to 2 when this technology is used.

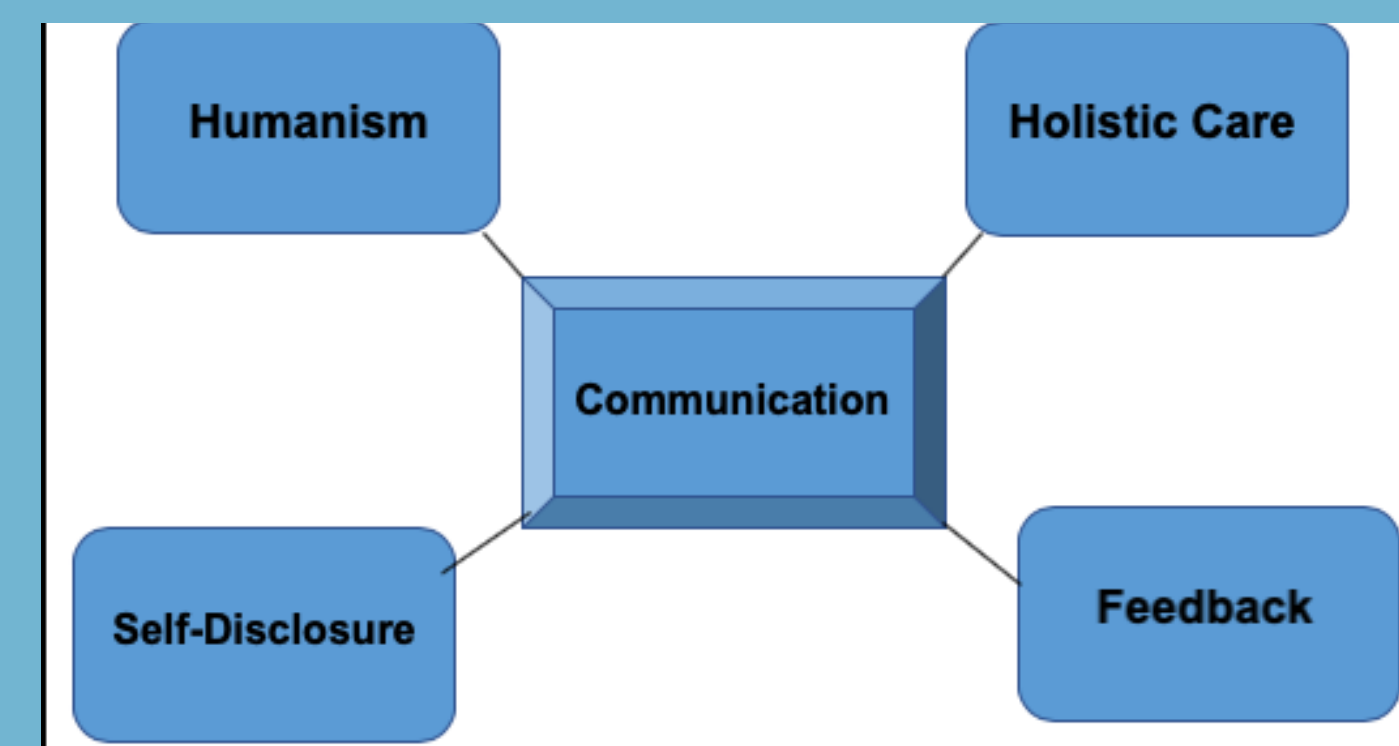
Methods of Data Collection

Databases: CINAHL, PubMed, Medline, and Google Scholar were used to gather articles.

Keywords: closed-loop electronic medication management, barcode medication management, medication errors, IV smart pumps.

Level of Evidence	Number of Studies	Evidence Types
I	1	Systematic Review
II	5	Cross-Sectional Study & Quasi-Experimental
III	3	Qualitative/Quantitative Studies
IV	2	Literature Review
V	1	Case Report

Theoretical Framework



Bonnie Duldt-Batthey's Humanistic Nursing Communication Theory

Results/Key Findings

- Combining the use of BCMA and EHRs increases the effectiveness of CLEMM by ensuring that the rate and dosage correspond with the provider's orders.
- A break in the CLEMM loop can occur when the IV pump's drug library is not up to date or if the nurse manually overrides the rate provided by the electronic system.
- The number of medication errors in the ICU setting is reduced by 51% when CLEMM is used in tandem with IV smart pumps.
- There is insufficient evidence to support any one intervention on its own, suggesting that more than one is necessary.

Conclusion

- The occurrence of medication errors is a multifaceted issue requiring a combination of interventions.
- Integration of the CLEMM in the ICU contributes to safer patient care provided by nurses and ultimately decreases the risk of medication errors.
- Enhanced communication is a necessity for structured medication administration.

Recommendations/Future Research

- CLEMM education for all providers involved in care
- Nurses who participate in CLEMM medication administration should complete at least two simulations per year to enforce proper utilization of CLEMM guidelines.
- To ensure efficiency, the model should be re-evaluated and assessed for effectiveness quarterly.
- Color-coded stickers should be implemented on IV lines to reduce confusion and ultimately errors.

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