Cognitive Load and Influences Experienced by RNs During Medication Delivery

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Background

- Multiple factors contribute to medication errors. These include distraction, interruption, heavy workload, inexperience and neglect
- Interruptions and distractions place demands on memory and increase cognitive load
- Nurses are at risk for being interrupted and distracted during every medication pass
- With increased cognitive loads, nurses can become vulnerable to loss of attention and potential errors
- A better understanding of these factors as reported and observed by nurses is needed to improve system reliability and prevent medication administration errors

Objectives

1. Describe the cognitive load RNs experience during medication delivery to hospitalized patients
2. Explore the extent that interruptions and disruptions occur and add to a nurse's cognitive load
3. Investigate the impact of these factors on lapses in procedure and medication error that RNs experience during medication administration
4. Involve RNs in clinical research about nursing practice and dissemination of findings internally and externally

Methods

Design: Descriptive, correlational, multi-site, virtual network study, PIs Drs. Thomas and Donahue-Porter. Network study sponsored and coordinated by the Improvement Science Research Network (ISRN)

Sample: 79 total RN participants; 7 RNs at each hospital site on a medical surgical unit. Site demographics: 86% female, average age 41, 57% BSN, full-time status, with average of 12.5 years RN experience

Unit of analysis: An episode of medication administration (one or more medications) given to one patient; Total episodes 857; Total site episodes 84

Data collection:

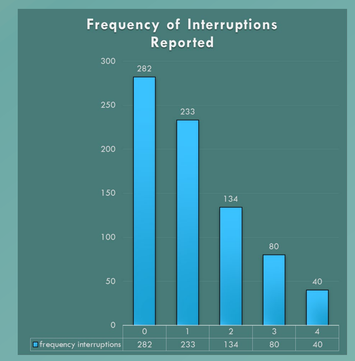
Data	Tool	Method
Demographics	Demographics Form	RN participant completes
Cognitive Load	NASA Task Load Index	RN participant completes
Interruptions	Structured Observation Sheet	Direct observation by 2 trained RN observers
Distractions	Self-Report: Distraction During Med Administration	RN participant completes

Analysis: Generalized linear mixed modeling for hierarchical data to assess correlations among distractions and interruptions during medication episodes; and between each cognitive load element with procedural failures and medication errors.

Results

Procedural failures ranged from 37% - 98%; Frequency site total was 8% (71/584) Medication administration errors ranged from 0% to 37% , Frequency site total was 1%

Results



Distractions 0-100	All RN Experiences	Site RN Experiences
Personal factors	31%	47%
Illness	13%	17%
Fatigue	36%	45%
Pain	11%	9%
Hunger	36%	42%
Bathroom need	21%	30%
Worry (family)	15%	31%
Noise level	31%	31%
Unresolved issues (other patients)	49%	77%

An interruption and the number of interruptions were related to perceived cognitive load: mental demand, temporal demand, effort and frustration ($p \leq 0.05$)

Distractions during med administration were associated with high perceptions of cognitive load: Mental demand, temporal demand, physical demand, effort and frustration levels ($p = 0.0024$)

Number of meds administered were associated with risk of error and procedural failure ($p = 0.034$; $p = 0.005$)

RN age was associated with med administration error risk ($p= 0.032$) but not procedural failure

Distractions or interruptions or any aspect of cognitive load were not significantly related to the risk of making a med administration error or a procedural failure

Conclusion

- RNs encounter challenging demands during medication delivery on M/S units in acute care hospitals.
- Knowledge about interruptions, distractions and cognitive load can inform safeguards and best practices to reduce the demands on RNs.
- Addressing the well-being of healthcare providers has been identified as important enough to change the