

# Investigating Nursing Task Interruptions in Intensive Care Units: A Scoping Literature Review

Mahnoosh Sadeghi, Farzan Sasangohar  
Texas A&M University, Department of Industrial and Systems Engineering

An alarmingly large number of fatalities (more than 250,000) in the United States are attributed to preventable medical errors (Hayward & Hofer, 2001) making it the third largest cause of death in the United States after heart disease and cancer (Makary & Daniel, 2016). Recent studies show a strong association between the rate of the errors made and interruptions to personnel (Spooner, Corley, Chaboyer, Hammond, & Fraser, 2015). While interruptions are inherent characteristics of the healthcare system due to the importance of communication to convey task-relevant information routinely (Berg et al., 2013), these interruptions are frequent and may negatively affect patient safety (Yngman-Uhlin, Klingvall, Wilhelmsson & Jangland, 2016). For instance, interruptions affect working memory and result in shifting focus away from the task-at-hand and therefore may lead to a significant increase in task completion time (Elganzouri, Standish, & Androwich, 2009). Additionally, in many studies, decreased work satisfaction which deteriorates employee's productivity is related to interruptions. However, observational studies indicate that not all interruptions are detrimental, for they may carry crucial patient-related or task-related information that is of importance to patient safety (Sasangohar, Donmez, Easty, Storey, & Trbovich, 2012). Hence, blocking all interruptions may not be a systematic approach to deal with this phenomenon (Rivera-Rodriguez & Karsh, 2010). Although a variety of interventions have been introduced to the healthcare system, these interventions were rarely used in a sustainable manner in hospitals. This can be a result of the gaps and limitations in the studies in this domain. While interruptions to nurses have been studied, comprehensive investigation of interruptions' content, context, and characteristics in the ICU – one of the most complex healthcare systems – needs further attention (Rivera, 2014). A scoping review of literature was conducted to understand current models, gaps and biases in this area of research. Our findings suggest that there are four main research gaps in existing studies in this area which have to be focused on more in future. These gaps are: 1) Lack of evidence connecting interruptions to high-severity medical errors: while several observational studies have been conducted in ICU and other complex healthcare settings, the effects of interruptions have been mostly studied in the context of task resumption performance and not their direct and

indirect effects on medical errors (e.g., Bower, Coad, Manning, & Pengelly, 2018). Such lack of evidence can be attributed to two factors: cultural sensitivity and limitations in detecting errors (Ünal & Seren, 2016); 2) Lack of using interrupters as unit of analysis: Most previous investigations or observes use interruptee (i.e., the nurse being interrupted) as the unit of analysis. While understanding the interruptee's tasks, performance and response behavior is critical, understanding interrupters' intentions, available information (e.g., interruptee's task-at-hand or interruptability), and decision mechanisms remain as important for a systematic investigation of context; 3) Inconsistent accumulation of knowledge: An important challenge that affect the quality of knowledge in the interruptions science is the lack of consistency in methodologies, models, definitions, and framings used in the literature. While this issue has been raised by several authors (e.g., Grundgeiger & Sanderson, 2009) this current effort shows that comparison among recent studies is still not easy, and in some cases, almost impossible; 4) Study design limitations and biases: This and other reviews of interruptions research suggest the dominance of observations as the methodology of choice. While observational studies are powerful method of understanding systems, such studies remain among the most abused methodologies specifically in human factors research.

## REFERENCES

- Berg, L. M., Källberg, A., Göransson, K. E., Östergren, J., Florin, J., & Ehrenberg, A. (2013). Interruptions in emergency department work: an observational and interview study. *BMJ Quality & Safety*, 22(8), 656-663.
- Bower, R. A., Coad, J. E., Manning, J. C., & Pengelly, T. A. (2018). A qualitative, exploratory study of nurses' decision-making when interrupted during medication administration within the Paediatric Intensive Care Unit. *Intensive and Critical Care Nursing*, 44, 11-17.
- Elganzouri, E.S., Standish, C.A., & Androwich, I. (2009). Medication Administration Time Study (MATS): Nursing staff performance of medication administration. *Journal of Nursing Administration* 39, 204-210.
- Grundgeiger, T., & Sanderson, P. (2009). Interruptions in healthcare: Theoretical views. *International Journal of Medical Informatics*, 78(5), 293-307.

- Hayward, R. A., & Hofer, T. P. (2001). Estimating hospital deaths due to medical errors: Preventability is in the eye of the reviewer. *JAMA*, *286*(4), 415-420.
- Makary, M. A., & Daniel, M. (2016). Medical error-the third leading cause of death in the US. *BMJ: British Medical Journal*, *353*, i2139. doi:10.1136/bmj.i2139
- Rivera-Rodriguez, A. J., & Karsh, B. T. (2010). Interruptions and distractions in healthcare: Review and reappraisal. *Quality and Safety in Health Care*, *19*(4), 304-312.
- Rivera, A. J. (2014). A socio-technical systems approach to studying interruptions: Understanding the interrupter's perspective. *Applied Ergonomics*, *45*(3), 747-756.
- Sasangohar, F., Donmez, B., Easty, A. C., & Trbovich, P. L. (2017). Effects of nested interruptions on task resumption. *Human Factors*, *59*(4), 628-639.
- Spooner, A. J., Corley, A., Chaboyer, W., Hammond, N. E., & Fraser, J. F. (2015). Measurement of the frequency and source of interruptions occurring during bedside nursing handover in the intensive care unit: an observational study. *Australian Critical Care*, *28*(1), 19-23.
- Ünal, A., & Seren, S. (2016). Medical error reporting attitudes of healthcare personnel, barriers and solutions: A literature review. *Journal of Nursing Care*, *5*(377), 2167-1168.
- Yngman-Uhlin P, Klingvall E, Wilhelmsson M, & Jangland E. (2015). Obstacles and opportunities for achieving good care on the surgical ward: nurse and surgeon perspective. *Journal of Nursing Management*, *24*(4), 492-499.