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A qualitative, exploratory study of nurses' decision-making when interrupted during medication administration within the Paediatric Intensive Care Unit

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ABSTRACT

Objective: In the paediatric intensive care unit (PICU), medication administration is challenging. Empirical studies demonstrate that interruptions occur frequently and that nurses are fundamental in the delivery of medication. However, little is known about nurse's decision making when interrupted during medication administration. Therefore, the objective is to understand decision making when interrupted during medication administration within the PICU.
Research design: A qualitative study incorporating non-participant observation and audio recorded semi-structured interviews. A convenience sample of ten PICU nurses were interviewed. Each interview schedule was informed by two hours of observation which involved a further 29 PICU nurses. Data was analysed using Framework Analysis.
Setting: A regional PICU located in a university teaching hospital in the United Kingdom.
Findings: Analysis resulted in four overarching themes:
(1) Guiding the medication process,
(2) Concentration, focus and awareness,
(3) Influences on interruptions
(4) Impact and recovery
Conclusion: Medication administration within the PICU is an essential but complex activity. Interruptions can impact on focus and concentration which can contribute to patient harm. Decision making by PICU nurses is influenced by interruption awareness, fluctuating levels of concentration, and responding to critically ill patient and families' needs.

Implications for clinical practice

- There are clear political and policy drivers for healthcare providers and professionals to improve patient safety, manage risk, and minimise harm.
- Nurses perceive that medication administration is a priority activity, however, this is not always observed in clinical practice which may compromise patient safety.
- Decision making during medication administration is affected by experience, familiarity with the medicine being prepared, interpersonal relationships and teaching.

For future interventions to reduce interruptions to medication administration within the PICU to be effective they must comprehend the complexities of working in imperfect environments, with multidisciplinary teams, and in uncertain circumstances.

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Introduction

The safe administration of medication is vital in the provision of nursing care to children (Richardson and Glasper, 2010). Critically ill children often require a treatment plan which includes significant amounts of medication preparation and administration. The medication preparation and administration process is particularly complex due to the precise and intricate calculations (Dickinson et al., 2012) which may be required at any point during the 24-h timeframe. In addition, the critical nature of the child's illness necessitates constant nursing observation, which promotes the preparation of medication at the bedside, exposing the procedure to frequent interruptions (Bower, 2015; Sasangohar et al., 2015).

Frontier Economics (2014) estimate that medication errors cost the National Health Service (NHS) in excess of £1 billion per annum. The Medicines and Healthcare Products Regulatory Agency (2014) quantifies that in hospitals there is an error in seven percent of prescriptions and between three and eight percent of medications administered to both adult and child inpatients. Internationally medication error rates are similar, with figures documented in North America of errors being found in 5.7% of paediatric prescriptions (Kaushal et al., 2001). However, this is likely to be an understatement as it is widely accepted within the UK that not all medication errors are reported (NHS England, 2014). These figures are important for children in critical care, as medication errors are higher in paediatric departments and intensive care units (McDowell et al., 2009) and they are three times more likely to be involved in a medication error (National Patient Safety Agency, 2007).

Interruptions are frequently listed as key causes for medication errors (Anthony et al., 2010; Colligan and Bass, 2012; Westbrook et al., 2010; Fore et al., 2013). Parker and Coiera (2000) highlight that interruptions can generate conditions which may increase the risk of in memory lapses. Problems with memory recall within a medication situation can have a negative impact on patient safety. It has been demonstrated that there is a 12.7% increase in clinical errors when interruptions occur (Westbrook et al., 2010) and studies frequently list interruptions as a cause of mistakes (Fore et al., 2013). In addition, intensive care nurses are interrupted every five minutes, especially during high-severity tasks, which include medication administration (Sasangohar et al., 2015).

Within the intensive care environment, it has been demonstrated that not all interruptions are detrimental to patient safety. Sasangohar et al. (2015) identified that some interruptions related to the communication of important information about a task or patient. Furthermore, Sasangohar et al. (2015) identified that interruptions which included personal conversation occurred more frequently during low severity tasks (which did not include medication administration). This suggests that on occasions interruptions are filtered when critical tasks are being completed demonstrating a decision-making process.

Healthcare teams have evaluated several different types of interventions to reduce interruptions to medication administration. These studies have been performed primarily within adult settings (Sasangohar et al., 2015; Anthony et al., 2010; Colligan et al., 2012) and not specifically in PICU. The interventions include sterile cockpit areas (Anthony et al., 2010; Fore et al., 2013; Colligan et al., 2012), coloured tabards (Pape, 2003; Verweij et al., 2014), checklists (Pape, 2003), lanyards and education programmes (Relihan et al., 2010). Frequently multiple interventions are instigated at the same time making it difficult to discern which intervention is effective (Relihan et al., 2010) reducing the effectiveness of the results (Raban and Westbrook, 2013).

Multiple interruption handling strategies have been identified within the literature; prioritisation (primary task is prioritised over a less urgent secondary task), multitasking, delegation, engagement (primary task is suspended for a priority secondary task) and blocking (ignoring the interruption) (Colligan and Bass, 2012; Sitterding et al., 2014). Each strategy results in different actions and can produce a different outcome to the primary task. Dougherty et al., (2011) examined risk taking and decision making during intravenous medication preparation and found that interruptions to decision making were a major theme within medication administration. Colligan and Bass (2012) found that these decisions were influenced by risk and workflow assessments and experience. Conversely, a study (Sitterding et al., 2014) which examined situational awareness and interruptions found that the most common handling strategy used was engagement. It was identified that the decision-making process was influenced by factors such as constant auditory and visual processing, the impact of stress on memory and stacking of jobs (Sitterding et al., 2014).

Current literature indicates that the phenomenon of interruptions to medication administration in the unique environment of PICU has not been explored. In addition, there is limited analysis of the decision-making process when nurses are interrupted. Before appropriate interventions can be developed and implemented it is key that factors which influence decision making are identified and their impact examined.

Methods

The aim of the study was to explore and understand PICU nurse decision making when interruptions occur during medication administration in the critical care environment. The selection of a qualitative exploratory method allowed human behaviour to be examined in its natural setting (Streubert and Carpenter, 2011; Denzin and Lincoln, 1994). A guiding principle within this study was that the data collected should reflect the reality that PICU nurses experience, therefore a combined non-participant observation and semi-structured interview design was selected. The field notes collected during the observation phase informed the schedule of the interviews. An interpretivist approach allowed theory to be generated from the rich data provided by both observation and interview (Mustafa, 2011). A critical realist lens was used within the data analysis to focus on understanding reality as it exists and seeking to understand and provide explanations for these events and outcomes (Clark, 2008). The aim of these approaches was to understand decision making by exploring what was observed in practice, what was perceived by nurses and identifying any underlying structures that were influential. The study was approved by a Higher Education Ethics Review process and governance approval obtained from the Hospital Trust in which the study was conducted.

For the purpose of this study an interruption was operationalised as 'A break in continuity of complete focus on the task of preparing medication.' (Anthony et al., 2010)

Participants and setting

The setting of the study was a regional PICU located in a large, tertiary, university teaching hospital in the United Kingdom. All qualified nurses working on the PICU were invited to participate within the study. A convenience sample of ten nurses consented to be observed and interviewed, a further 19 nurses consented to be observed within the medication process. The unit medication policy requires the independent double checking of the majority of medicines. The sample size was guided by the factors described by Morse (2000); scope, nature, quality and design. The scope, nature and quality of this study was focused on a clear, obvious topic which was related to recent medication administration events ensuring participants were able to talk easily about the subject. These factors contributed to the conclusion that a smaller sample would be acceptable. In addition, design of the study facilitated data

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