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Nurses' experience of work interruption during the medication administration: A qualitative study

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ABSTRACT

Background & Aim: Work interruptions during medication administration increase the risk of errors, compromising patient safety and underscoring the need to examine the complex challenges nurses face in ensuring medication safety. The purpose of this study was to examine nurses' experiences with interruptions during medication administration, their sources, impacts, and how nurses responded to and managed these situations.
Methods & Materials: A qualitative design was used, and in-depth interviews were conducted with sixteen nurses from tertiary hospitals in Korea using a semi-structured interview guide. Data were analyzed using directed content analysis based on an initial coding scheme.
Results: Three main themes and 10 sub-themes emerged from the analysis. Nurses reported interruptions from various sources, including healthcare colleagues, external departments, patients and caregivers, and environmental factors. These interruptions resulted in workflow fragmentation, elevated medication error risk, and significant emotional burden. In response, nurses employed various individual coping mechanisms while also identifying the need for organizational support.
Conclusion: Interruptions during medication administration stem from multiple sources and impose significant risks for errors, workflow disruption, and emotional burden on nurses. This study suggests that context-sensitive strategies, such as standardizing communication, delegating non-urgent requests, and enhancing education for healthcare providers, patients, and caregivers, are essential to reduce avoidable interruptions while supporting safe medication practices.

Introduction

Medication administration represents a critical nursing responsibility and a fundamental component of patient care delivery (1). Given that medication errors can result in undesirable patient outcomes, nurses play a central role in ensuring medication safety (1, 2). Despite its importance, medication administration frequently encounters interruptions from diverse human and environmental sources (3).

Research demonstrates that medication-related tasks are interrupted at a rate 2.2 times higher than routine nursing activities, with interruptions documented in 39% of all medication-related tasks (4). These interruptions increase nurses' workload (5) and can lead to procedural failures and clinical errors (6). The frequency of interruptions during the medication administration is closely linked to the occurrence and severity of medication errors (6, 7), making this a critical patient safety issue. Interruptions also diminish nurses' work efficiency and place cognitive and emotional strain on them, as they must manage fragmented attention, disrupted task flow, and heightened stress (7, 8).

Previous research on interruptions during medication administration, primarily based on direct observation, has focused on quantifying frequency, identifying sources, and describing adverse outcomes (7). Observational studies have shown that the major sources of interruption include other patients, staff nurses, conversations, phone calls, and physicians (7, 9). However, prior studies have used direct observation to collect objective and detailed

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data, but this method offers only a limited view of the phenomenon (10). Moreover, not all interruptions are inherently negative. Specific interruptions, such as the beeping of a patient's monitor and the use of handheld computer devices, are essential in the treatment process. They furnish essential information to healthcare professionals (11), effectively supporting clinical decision-making (12). This nature of interruptions complicates the issue and necessitates a more nuanced understanding of how nurses perceive, interpret, and respond to interruptions in practice. Such a need underscores the importance of examining nurses' lived experiences of interruptions.

Although previous research has helped establish the sources and impact of interruptions during medication administration, relatively few studies have explored how nurses internally experience these events, or the adaptive strategies nurses employ in response. Given that interruptions have been shown to increase the likelihood of medication errors, delay task completion, and exacerbate nurses' stress and burnout (6-8, 12, 13), a deeper exploration of their experiences and coping strategies is essential to inform the development of effective, context-sensitive interventions. In this context, a qualitative approach is essential to capture the subjective, context-dependent, and emotionally charged aspects of medication interruptions (13).

Therefore, this study aimed to explore how nurses experience and manage interruptions during medication administration, from preparation to administration, and how these interruptions affect both clinical workflow and patient care. By focusing on nurses' lived experiences, this study seeks to generate practical insights into minimizing unnecessary interruptions while supporting essential communication and safe medication practices.

Methods

Study design

This study employed a qualitative descriptive design to gain an in-depth understanding of nurses' experiences with interruptions during medication administration. Directed content analysis is particularly suited when prior knowledge, such as theories or empirical research findings, is incomplete and requires further clarification (14). This study employed directed content analysis to build on previously identified sources and impacts of medication interruptions, while expanding the understanding of nurses' experiences by exploring their contextual responses and efforts to reduce such events. The study adhered to the COREQ checklist (15) to ensure rigor and transparency in reporting. Both authors are registered nurses and faculty members in nursing, with extensive experience conducting qualitative research.

Participants

Nurses were included in the study if they met all of the following criteria: (a) currently working in a tertiary hospital and providing direct patient care and medication administration; (b) having at least one year of continuous nursing experience; (c) having experienced interruptions during medication administration in clinical practice. Nurses who withdrew consent or requested to discontinue participation were excluded to ensure voluntary participation and ethical adherence.

Purposive and snowball sampling were used to recruit participants with diverse experiences related to interruptions during medication administration. For purposive sampling, recruitment notices were posted via online communities and social network services, and participants were also recruited through professional referrals and existing networks. In the case of snowball sampling, nurses who had already participated in the study referred other eligible individuals. Interested participants contacted the principal investigator directly, and eligibility was confirmed based on predefined criteria prior to enrollment.

Data collection

The research team developed semi-structured interview guidelines (Table 1) based on the literature review (7, 16-18). According to the findings of previous studies that identified the sources of interruptions during medication administration, medication administration was

defined as activities spanning from medication preparation to administration. Drawing from the sources and situations of interruptions during medication administration revealed in previous studies, we formulated questions to further explore specific experiences within established elements and situations. In-depth interviews were conducted online from March to September 2021 by two experienced researchers. Interviews, lasting 41-70 minutes (average 57 minutes), allowed participants to join from comfortable locations but required stable internet and guidance on using video conferencing tools. Data collection continued until saturation, with no new categories emerging. The authors and an external reviewer discussed data analysis and assessed saturation status collaboratively.

Table 1. In-depth interview progress guideline

Step/topic	Questions
Introduction	Could you briefly describe the work of medication administration you currently perform in your hospital?
Experiences of interruptions during medication administration	Can you describe your experiences with interruptions during medication administration? - According to the process, fill in the items mentioned by the participant and, if necessary, ask additional questions about the missing items to confirm. a. Determine the participant's experience of each medication step b. Confirm the topic of medication interruptions c. Check the type of newly created task
Sources of interruptions	What are the common sources of interruptions you have experienced? - Confirm by asking additional questions as the participant speaks: Communication, phone calls, medical equipment alarms, changes in patient status, missed nursing tasks, etc.
Impacts of interruptions during medication administration	How did these interruptions affect you or your work at that time? - (After confirming participants' experience) What emotions or thoughts did you have at the time? a. Check both positive and negative impacts b. Determine the relationship with the patient
Responses to interruptions during the medication administration	How do you usually handle or manage interruptions when they occur? - Confirm by asking additional questions as the participant speaks. a. Check the measures currently being implemented b. Confirm the opinions about the medication tabards
Finish the discussions	Let us summarize some of the key points from our discussion. Is there anything else? Do you have any questions?

Data analysis

All interviews were audio-recorded and transcribed verbatim. Data were analyzed using directed content analysis (14), which supported the extension of existing knowledge by identifying and incorporating new information derived from in-depth experiences and diverse interruption situations.

The analysis began with two authors carefully reading the interview transcripts multiple times to gain a comprehensive understanding of participants' experiences. During this process, they highlighted text segments that appeared to reflect predetermined categories based on prior research, such as sources of interruptions, impacts, and coping strategies. Next, all highlighted segments were coded using an initial coding scheme. To ensure reliability, the two authors independently coded three transcripts, compared their coding outcomes, and reached consensus through discussion. The corresponding author then conducted the primary coding of the remaining transcripts using the refined scheme, while the other author reviewed and confirmed the coding. In addition, text segments that fit within existing categories but required further emphasis for their analytical significance were also examined.

Finally, when text segments did not align with the initial coding scheme, new codes were created. These emerging codes were continuously reviewed and refined through iterative discussions among the research team, which contributed to enhancing the clarity and analytical rigor of the findings (19). The findings were validated by three participants and three additional nurses who were not involved in the study but met the inclusion criteria. In addition, an experienced qualitative researcher reviewed the analysis to ensure

neutrality, and an external check was conducted.

Ethical consideration

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the Institutional Review Board of Chung-Ang University (Approval no. 1041078-202101-HRSB-017) in 2021. Participants were informed about the procedures, voluntary participation, withdrawal rights, and anonymity. Written informed consent was obtained from all participants. To ensure anonymity and confidentiality, all collected data were anonymized. Personal or identifying information not essential for analysis was removed during transcription and replaced with numbers or initials. All research data were securely stored in a restricted-access location accessible only to the research team. Participants were informed of their right to withdraw from the study at any time without any consequences.

Results

Sixteen nurses participated in this study, including one male nurse, with a mean age of 29.5 years and average clinical experience of 4 years and 10 months (Table 2). Three main themes and 10 subthemes were identified (Table 3).

Table 2. Participant characteristics (n=16)

	Sex/age†	Department	Work experience‡	Nursing degree
1	F/20s	Division of Infectious Diseases	4y1m	Bachelor's
2	F/30s	Surgical Intensive Care Unit	9y5m	Associate
3	F/20s	Division of Infectious Diseases	3y5m	Bachelor's
4	F/20s	Orthopedics, Surgery	3y9m	Bachelor's
5	F/20s	Orthopedics, Surgery, Neurosurgery	3y8m	Bachelor's
6	F/30s	Hemato-oncology	13y2m	Master's
7	F/30s	Pediatrics	6y4m	Doctoral
8	F/20s	Ophthalmology, Urology, Oral surgery, Proctological surgery	3y3m	Bachelor's
9	F/20s	Pediatrics	3y8m	Bachelor's
10	F/20s	Emergency Intensive Care Unit	2y5m	Bachelor's
11	F/20s	Integrated Internal Medicine	3y3m	Master's
12	M/30s	Gastrointestinal Internal Medicine/ Surgery	7y4m	Master's
13	F/20s	Cardiology, Otorhinolaryngology	5y3m	Master's
14	F/20s	Orthopedics	5y4m	Master's
15	F/20s	Urology	2y6m	Bachelor's
16	F/20s	Otorhinolaryngology, Urology	1y1m	Bachelor's

†M: male, F: female
‡y: year, m: month

Table 3. Themes of ward nurses' experience of medication interruptions

Theme	Sub-theme
1. Experiencing Uncontrollable Interruptions during the Medication Administration	1.1 Interruptions from nurses and physicians
	1.2 Interdepartmental interruptions via phone calls
	1.3 Demands from patients and caregivers for immediate attention
	1.4 Interruptions stemming from work environment conditions
2. Recognizing the Impact of Interruptions on Safety and Nurses' Well-being	2.1 Disrupted prioritization and workflow confusion
	2.2 Heightened risk of medication errors
	2.3 Emotional burden from interruptions
3. Navigating Interruptions: From personal coping toward System-level Solutions	3.1 Individual coping and variation in strategies
	3.2 Organizational supports for uninterrupted workflow
	3.3 Education and engagement of staff, patients, and families

Theme 1: Experiencing uncontrollable interruptions during the medication administration

Participants described experiencing diverse interruptions during medication administration that originated from multiple, often unpredictable sources within the clinical environment.

1.1. Interruptions from nurses and physicians

Interruptions from nursing colleagues typically involved patient-related information sharing within the same department. While well-intentioned, these interruptions frequently disrupted the medication-administering nurse's concentration, particularly when visual contact was not established prior to communication initiation or when the initiator was a charge nurse.

"My fellow nurse calls out to me in a loud voice without looking because she doesn't know if I am preparing a medication... because she does not see me." (Participant 3)

Participants reported that physicians would approach during medication administration without acknowledging ongoing tasks, initiating direct communication that required immediate attention. This was a recurring experience reported by a majority of nurses, regardless of their year of experience or age. The interruptions typically occurred when physicians, without regard for ongoing tasks, suddenly appeared and attempted direct communication with nurses who were administering medications. Participants felt that physicians often lacked an understanding of, or consideration for, nurses' tasks and responsibilities.

1.2. Interdepartmental interruptions via phone calls

Personal work-related mobile phones created unavoidable interruption pathways, particularly through calls from other departments such as laboratories. However, the majority of nurses emphasized that calls from other departments were typically essential and patient-related, with minimal occurrences of unnecessary interruptions. They emphasized having no choice but to pause their activities and respond when called.

"Usually, the calls I get are for communication or confirmation. I do not think checking is unnecessary; hence, there may be a necessary call that is needed." (Participant 5)

1.3. Demands from patients and caregivers for immediate attention

Patients or caregivers would come to the nurse's station to make various requests or use the call bell to communicate their wishes, abruptly interrupting the nurse's medication duties. Call bells, which are used to request an immediate response to a patient's needs or emergencies, often interrupt medication preparation. Despite having a planned work schedule, if the call bell alarm rang during medication administration, the nurse had to stop immediately. Nurses expressed dissatisfaction with the frequent use of patients' call bells for non-emergency requests, such as assisting with patient mobility, connecting to feeding, and expediting routine tasks.

"I am administering medication to a patient, but often, other caregivers use the call bell and ask me to quickly connect the feeding tube." (Participant 4)

1.4. Interruptions stemming from work environment conditions

Beyond human-initiated interruptions, participants encountered interruptions from environmental sources and systemic workflow conflicts. Monitor alarms, sudden patient condition changes, concurrent routine tasks, and conflicting interdisciplinary schedules created unavoidable interruption scenarios that required immediate nursing response.

"When the monitor of a patient in poor condition suddenly alarms, I am required to stop administering medication and go provide care." (Participant 6)

Theme 2: Recognizing the impact of interruptions on safety and nurses' well-being

Interruptions during medication administration generated significant impacts on both patient safety outcomes and nursing professional well-being.

2.1 Disrupted prioritization and workflow confusion

In a busy hospital environment, various interruptions caused deviations in the nurses' planned work activities. Participants highlighted that if they were administering medications according to the plan, any unforeseen events interrupting the medication administration resulted in the postponement of their planned tasks. Both novice and experienced participants expressed that interruptions during medication administration disrupted their workflows, diminishing overall work efficiency and performance.

"There were times I was deeply focused, but when I got interrupted and had to start over, it became quite challenging." (Participant 3)

2.2. Heightened risk of medication errors

Interruptions during medication administration impair nurses' concentration, increasing the likelihood of medication errors. Participants reported that such interruptions hindered their focus and raised the risk of errors related to drug dosage, patient identification, and medication administration. In particular, newly graduated nurses who were less familiar with medication tasks expressed fear of making mistakes and uncertainty about how to respond when errors occurred.

"I cannot remember what quantity of drug was mixed. I cannot remember when I started doing other work for 30–40 minutes, but I do not know how to solve the problem." (Participant 4)

2.3. Emotional burden from interruptions

Nurses who experienced interruptions in their medication administration and disruptions to their work plans reported feeling overwhelmed as their planned activities were thrown off course. Interruptions led to an increased workload, which in turn caused feelings of anxiety, irritability, and frustration. One participant reported experiencing more burnout on days with interruptions than on days without them.

"If I were preparing and my task was interrupted... of course, I feel bad when I am busy. I have to do this, and I have to do that. What if someone touches the drug I left behind? I am anxious. Anxiety seems to be the biggest. I feel pressured." (Participant 1)

Theme 3: Navigating interruptions: From personal coping toward system-level solutions

Nurses responded to interruptions during the medication administration using both individual strategies and system-level suggestions. These efforts reflect their ongoing attempts to maintain patient safety and manage workload burden in the face of unavoidable interruptions.

3.1. Individual coping and variation in strategies

When asked how they managed interruptions, most nurses reported prioritizing tasks based on the urgency of patient needs. Unless the cause of the interruption was an emergency, some nurses preferred to complete the planned medication administration before responding, which they believed helped prevent medication errors. However, participants also acknowledged the difficulty of determining priorities in complex situations, particularly when dealing with distressed or angry patients. Some described that they always tried to respond thoughtfully, even under pressure.

"If it is an immediate need to assess the patient's condition or an emergency situation where I have to attend to another patient, I would completely stop the medication administration. However, if I am in the process of administering medication to a patient, and nearby caregivers call me for minor issues, like 'Can you come here for a moment?' I would politely say, 'Please wait a moment,' finish the medication administration, and then attend to their request. It seems like there is a difference in those situations."(Participant 4)

Participants also noted variations in how individuals coped with interruptions, which were influenced by factors such as experience level. As nurses gained clinical proficiency, their coping strategies evolved. To reduce unnecessary interruptions, some nurses adopted proactive techniques such as informing others that they were performing medication tasks or drawing bed curtains while administering medications to signal that they should not be interrupted.

3.2. Organizational supports for uninterrupted workflow

Nurses frequently mentioned the establishment of "medication zones," designated workspaces marked with signs such as "Medication zone," which allow them to focus on medication-related tasks without interruption.

However, participants also emphasized the need for additional organizational strategies to reduce unnecessary interruptions. Specifically, they suggested standardizing communication tools and tailoring delivery methods based on urgency to improve work efficiency. Nurses noted that scheduled medication times often overlap with work routines in other departments. To address this, they proposed implementing a prescreening step to assess the urgency of situations, enabling nurses to better concentrate on their medication duties. In addition, they emphasized the importance of assigning dedicated personnel to manage patient call bells or phone calls during scheduled medication times to help prevent errors. Furthermore, some participants expressed concern that certain hospital-level strategies aimed at preventing interruptions might inadvertently increase nurses' workload. They emphasized the importance of practical, low-burden approaches that do not add extra steps to their already demanding workflows.

"I think it is necessary. The time for administering medications is set like this, but even then, it would be nice if there were a call bell or phone call from outside or if someone would take care of it and respond during that time." (Participant 14)

3.3. Education and engagement of staff, patients, and families

Nurses perceived a lack of awareness of interruptions among healthcare providers, patients, and their caregivers. They stressed the importance of educating healthcare providers to refrain from non-urgent requests when nurses are administering medications. Additionally, nurses advocated for frequent awareness campaigns directed at patients and caregivers, focusing on safe medication practices and the appropriate use of call bells to convey changes in patient conditions or emergencies.

"The patient or caregiver should be aware of the importance of medications, the perception that medications should not be wrong, and the possibility that medications can go wrong in some processes." (Participant 12)

Discussion

This study illuminates the multifaceted nature of interruptions during medication administration through exploration of nurses' lived experiences, revealing how these interruptions compromise clinical efficiency, elevate patient safety risks, and impose emotional burdens on nursing professionals. Additionally, it identified nurses' perceptions of measures for managing interruptions within this context. While previous studies mostly relied on direct observations from a third-party perspective (7, 9, 16), this qualitative approach offers valuable insights by exploring the intricate nature of interruption situations and capturing nurses' emotions and perceptions. Recent qualitative research has also

underscored the importance of understanding nurses' subjective experiences to better address medication-related challenges (20). These findings emphasize the need for system-level strategies, including communication standardization, additional staffing, and workflow coordination, along with education and context-specific interventions, to support uninterrupted and safe medication administration.

This study deepens the understanding of the contextual nature of interruptions during medication administration by exploring diverse and often uncontrollable sources. Consistent with prior studies (7), interruptions initiated by nurses were reported. In particular, our study found that interruptions by charge nurses to convey patient information were recognized as necessary for facilitating rapid information exchange, whereas abrupt demands from patients, caregivers, or physicians, especially when delivered without regard for nurses' ongoing tasks, were perceived as burdensome. In addition, while phone calls from other departments were generally regarded as necessary for patient care, participants emphasized the need for organizational support to manage such interruptions in order to ensure medication safety. To mitigate these challenges, it may be helpful to adopt targeted strategies that reduce non-urgent interruptions while preserving essential communication. A combination of visual warnings (e.g., red tabards, signs, and do-not-disturb zones), checklists, and other interventions is effective in reducing interruption frequency (9). In addition, the temporary delegation of patient requests during critical medication times could serve this purpose without increasing nurses' workload(21). These findings underscore the importance of designing tailored interventions that reflect the complexity of clinical settings. A context-sensitive, system-level approach informed by nurses' lived experiences is essential for minimizing avoidable interruptions and ensuring the safety of medication administration.

Interruptions tend to disrupt nurses' workflow, reduce efficiency, and provoke negative emotional responses (8). In this study, nurses described how interruptions during medication administration led to medication errors, anxiety, and burnout. These findings support the view that interruptions not only compromise patient safety but also place emotional strain on nurses. To mitigate these effects, work design and communication processes should be improved in ways that consider the content and purpose of interruptions, with the aim of reducing unnecessary cognitive load (22). Additionally, given that newly graduated nurses appeared particularly vulnerable to errors and emotional distress, targeted training on managing interruptions and preventing medication errors should be prioritized for this group (23).

Nurses may respond to interruptions by immediately switching tasks or multitasking (4). However, coping with interruptions is a complex process that requires ongoing prioritization and judgment. In our study, participants reported that they generally considered the urgency of the situation when deciding how to respond, but they often experienced difficulty when confronted with distressed or angry patients. Nurses' approaches to addressing interruptions during medication administration vary based on their individual inclinations (24). Our findings confirmed this variation: while some nurses calmly reprioritized their tasks based on urgency, others responded assertively to prevent unnecessary interruptions. In particular, as nurses gained clinical experience, they demonstrated more effective coping mechanisms for handling interruptions. These findings suggest that educational interventions, such as training on patient communication and structured career development programs, may help enhance nurses' capacity to manage interruptions.

In terms of system-level coping strategies, nurses in this study emphasized the need to standardize communication tools and assign dedicated staff to handle call bells and

phone interruptions during peak medication times. According to one study, 9 of the 14 observed interruptions were considered avoidable (25). Thus, incorporating the perspectives of frontline nurses who directly experience interruptions into policy and procedural changes is essential to reducing unnecessary interruptions. However, there are cases in which nurses perceive interruption-reduction strategies as an additional task (18), and such measures are ineffective in preventing interruptions (26). The nurses in our study also emphasized that any intervention should be practical and must not add to their workload. Furthermore, interruption-reduction strategies targeting patients or caregivers should be introduced with caution. Patients may perceive the wording of tabards as directed toward them and may fail to communicate their urgent needs (27). To address this, messages should not be aimed at patients, and measures such as using different colors may be used to avoid causing an alarm. Physical barriers should be selected considering their potential negative effects on patients.

Furthermore, participants in this study emphasized the need for education, as healthcare providers, patients, and caregivers often lack awareness of how their actions may cause interruptions and compromise medication safety. Therefore, it is necessary to enhance awareness among these groups to prevent interruptions and promote their active participation in maintaining a safe medication environment. Given the differences in knowledge levels and empathy between healthcare providers and patients or caregivers, separate educational approaches are required. In addition, training for nurses and nursing students is essential. Simulation training on managing work interruptions has been shown to improve nurses' and nursing students' awareness and coping strategies (28). Although behavioral e-learning programs have not significantly reduced interruptions in nursing care (24), appropriate training is still needed in clinical settings where frequent interruptions are anticipated. Establishing a positive patient safety culture and providing appropriate support are essential for helping nurses effectively manage interruptions.

This study has several limitations. The participants were selected from nurses working at tertiary general hospitals. Variations in patient safety policies and safety levels across different types of hospitals or work environments may influence nurses' perceptions and experiences related to patient safety (29). Therefore, further research is necessary to explore nurses' experiences and the current state of interruptions in various healthcare settings. While this study focused exclusively on front-line clinical nurses involved in medication administration, it did not capture the perspectives of nurse managers or charge nurses. This represents a limitation, as these individuals play a critical role in addressing interruptions through their authority over staffing and resource allocation (30). To deepen understanding in this area, future research should include the viewpoints of nurse managers and charge nurses, whose experiences could offer valuable insights into the organizational challenges related to interruptions during medication administration.

Conclusion

This study highlights that work interruptions during medication administration are not merely individual problems but also systemic issues embedded within clinical environments. Nurses reported experiencing interruptions from multiple sources, including patients, caregivers, other healthcare professionals, and external sources. These interruptions had significant consequences, such as increased risk of medication errors, cognitive overload, and emotional distress. Addressing interruptions requires a multifaceted approach that includes fostering a culture of medication safety, improving interdisciplinary communication, ensuring adequate staffing, and implementing targeted interventions to minimize unnecessary interruptions without increasing nurses' workload. While some interruptions are unavoidable or even necessary for patient

safety, structured coping strategies and supportive work environments can help mitigate their adverse effects. Enhancing awareness among healthcare providers, patients, and caregivers through education and training is also essential for reducing interruptions and promoting safer medication practices. A systematic and context-specific approach is crucial to sustaining effective and practical solutions for managing interruptions in clinical settings.

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Conflict of interest

The authors declare that they have no competing interests.

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References

1. De Baetselier E, Dilles T, Feyen H, Haegdorens F, Mortelmans L, Van Rompaey B. Nurses' responsibilities and tasks in pharmaceutical care: A scoping review. Nursing Open. 2022 Nov;9(6):2562-71.
2. Musharyanti L, Claramita M, Haryanti F, Dwiprahasto I. Why do nursing students make medication errors? A qualitative study in Indonesia. Journal of Taibah University Medical Sciences. 2019 Jun 1;14(3):282-8.
3. Yu EJ, Lee EN, Kim JM, Jun HJ. Concept analysis of the work interruption by nurses. Journal of Korean Academy of Nursing Administration. 2019 Sep 30;25(4):272-81.
4. Reed CC, Minnick AF, Dietrich MS. Nurses' responses to interruptions during medication tasks: A time and motion study. International Journal of Nursing Studies. 2018 Jun 1;82:113-20.
5. Forsyth KL, Hawthorne HJ, El-Sherif N, Varghese RS, Ernste VK, Koenig J, Blocker RC. Interruptions experienced by emergency nurses: implications for subjective and objective measures of workload. Journal of Emergency Nursing. 2018 Nov 1;44(6):614-23.
6. Westbrook JI, Woods A, Rob MI, Dunsmuir WT, Day RO. Association of interruptions with an increased risk and severity of medication administration errors. Archives of Internal Medicine. 2010 Apr 26;170(8):683-90.
7. Schroers G. Characteristics of interruptions during medication administration: An integrative review of direct observational studies. Journal of Clinical Nursing. 2018 Oct;27(19-20):3462-71.
8. Puranik H, Koopman J, Vough HC. Pardon the interruption: An integrative review and future research agenda for research on work interruptions. Journal of Management. 2020 Jul;46(6):806-42.
9. Dall'Oglio I, Fiori M, Di Ciommo V, Tiozzo E, Mascolo R, Bianchi N, Degli Atti ML, Ferracci A, Gawronski O, Pomponi M, Raponi M. Effectiveness of an improvement programme to prevent interruptions during medication administration in a paediatric hospital: A preintervention–postintervention study. BMJ Open. 2017 Jan 1;7(1):e013285.
10. Danesh V, Sasangohar F, Kallberg AS, Kean EB, Brixey JJ, Johnson KD. Systematic review of interruptions in the emergency department work environment. International Emergency Nursing. 2022 Jul 1;63:101175.
11. Rivera-Rodriguez AJ, Karsh BT. Interruptions and distractions in healthcare: Review and Reappraisal. BMJ Quality & Safety. 2010 Aug 1;19(4):304-12.
12. Glanville D, Hutchinson A, Khaw D. Handheld computer devices to support clinical decision-making in acute nursing practice: systematic scoping review. Journal of Medical Internet Research. 2023 Feb 13;25:e39987.
13. Wang Q, Ding X, Zhu M, Chen H, Yang Y, Wang Y, Gan Z, Chung Y, Li Z. Experiences of clinical nurses with medication interruption: A systematic review and qualitative meta-synthesis. Worldviews on Evidence-Based Nursing. 2024 Dec;21(6):598-610.
14. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. Qualitative Health Research. 2005 Nov;15(9):1277-88.
15. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for

interviews and focus groups. International Journal for Quality in Health Care. 2007 Dec 1;19(6):349-57.

16. Biron AD, Lavoie-Tremblay M, Loiselle CG. Characteristics of work interruptions during medication administration. Journal of Nursing Scholarship. 2009 Dec;41(4):330-6.

17. Johnson M, Levett-Jones T, Langdon R, Weidemann G, Manias E, Everett B. A qualitative study of nurses' perceptions of a behavioural strategies e-learning program to reduce interruptions during medication administration. Nurse Education Today. 2018 Oct 1;69:41-7.

18. Westbrook JI, Li L, Hooper TD, Raban MZ, Middleton S, Lehnbom EC. Effectiveness of a 'Do not interrupt'bundled intervention to reduce interruptions during medication administration: A cluster randomised controlled feasibility study. BMJ Quality & Safety. 2017 Sep 1;26(9):734-42.

19. Lincoln Y, Guba E. Naturalistic Inquiry. Beverly Hills, CA: SAGE Publications; 1985.

20. Saifan, A. R., Dimitri, A., Al-Yateem, N., Shajrawi, A., Hamdan, K., Al-Habeis, O. M.et al. Medication errors occurrence and reporting: A qualitative study of the Jordanian nurses' experiences. Nursing Practice Today. 2024;11(2): 141-9.

21. Nguyen EE, Connolly PM, Wong V. Medication safety initiative in reducing medication errors. Journal of Nursing Care Quality. 2010 Jul 1;25(3):224-30.

22. Weigl M, Beck J, Wehler M, Schneider A. Workflow interruptions and stress at work: a mixed-methods study among physicians and nurses of a multidisciplinary emergency department. BMJ Open. 2017 Dec 1;7(12):e019074.

23. Schroers G, Ross JG, Moriarty H. Undergraduate nursing students and management of interruptions: Preparation of students for future workplace realities. Nursing Education Perspectives. 2021 Nov 1;42(6):350-7.

24. Johnson M, Weidemann G, Adams R, Manias E, Levett-Jones T, Aguilar V, Everett B. Predictability of interruptions during medication administration with related behavioral management strategies. Journal of Nursing Care Quality. 2018 Apr 1;33(2):E1-9.

25. Buchini S, Quattrin R. Avoidable interruptions during drug administration in an intensive rehabilitation ward: improvement project. Journal of Nursing Management. 2012 Apr;20(3):326-34.

26. Berdot S, Vilfaillot A, Bezie Y, Perrin G, Berge M, Corny J, Thi TT, Depoisson M, Guihaire C, Valin N, Decelle C. Effectiveness of a 'do not interrupt' vest intervention to reduce medication errors during medication administration: A multicenter cluster randomized controlled trial. BMC Nursing. 2021 Aug 24;20(1):153.

27. Palese A, Ferro M, Pascolo M, Dante A, Vecchiato S. "I Am Administering Medication—Please Do Not Interrupt Me": Red Tabards Preventing Interruptions as Perceived by Surgical Patients. Journal of Patient Safety. 2019 Mar 1;15(1):30-6.

28. Henneman EA, Marquard JL, Nicholas C, Martinez V, DeSotto K, Scott SS, Soares WE, Henneman PL. The Stay SAFE strategy for managing interruptions reduces distraction time in the simulated clinical setting. Critical Care Nursing Quarterly. 2018 Apr 1;41(2):215-23.

29. Yoon YS, Lee W, Kang S, Kim IS, Jang SG. Working Experience of Managers Who Are Responsible for Promoting and Monitoring Patient Safety in South Korea: Focusing on Small- and Medium-Sized Hospitals. Journal of Patient Safety. 2022 Jun 1;18(4):365-9.

30. Blok AC, Anderson E, Swamy L, Mohr DC. Comparing nurse leader and manager perceptions of and strategies for nurse engagement using a positive deviance approach: A qualitative analysis. Journal of Nursing Management. 2021 Sep;29(6):1476-85.