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Review Article

### AN OVERVIEW OF NURSES AND PHARMACIST ROLES IN MONITORING AND SAFETY HIGH ALERT MEDICATIONS USED INPATIENT

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#### Abstract:

*Medication errors (MEs) are unintended failures in the drug treatment process that can occur during prescription, dispensing, storing, preparation or administration of medications. High alert medications (HAMS) are defined as those medications that bear the highest risk of causing significant patient harm when used incorrectly, either due to their serious adverse events or to a narrow therapeutic window. Nurses are responsible for administration of HAMS; incorrect administration can have a significant clinical outcome. Nurses play a crucial role in the safety of medicines management during transitional care. Therefore, they should be empowered and more involved in medicines management initiatives in the healthcare system. Patient safety and avoidance of medication errors during transitional care require that medicines management becomes a multidisciplinary collaboration with effective communication between healthcare providers.*

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**INTRODUCTION:**

On average, a patient who is admitted to the hospital is subjected to one medication error each day. One Furthermore, it is estimated that around 450,000 prescription errors occur each year in the United States, leading to harm for patients. Out of these errors, roughly 25% are deemed preventable [1]. The Institute of Medicine reports that 7,000 fatalities annually can be related to drug errors that could have been prevented [2]. A high-alert medicine is defined as a medication that poses an increased risk of causing serious harm to patients if administered incorrectly. This does not suggest that errors happen more frequently with high-alert drugs compared to other prescriptions. However, when an error does occur, the outcomes can be severe and perhaps lethal [3]. During the mid-1990s, the Institute for Safe Medication Practices (ISMP) conducted an analysis of medications that posed the highest risk of causing harm to patients. The study findings indicated that a limited number of pharmaceuticals were responsible for medication errors leading to fatalities or severe injury. These findings formed the basis for ISMP's compilation of high-alert medications. The list of high-alert drugs comprises insulin, opiates and opioids, injectable potassium chloride or phosphate concentrate, intravenous anticoagulants, and concentrated sodium chloride [3].

Transitional care has gained significance in patient care within the healthcare system as a result of reduced hospital stays and heightened demands for post-discharge care. Due to the correlation between patient handovers during transitional care and the occurrence of adverse events, transitional care has been recognized as a part of the patient care journey that carries a high risk [2,3]. Transitional care refers to a collection of established strategies aimed at ensuring the smooth and coordinated delivery of healthcare services when a patient is moved between different levels of care within the same or different healthcare settings [4,5]. The transmission of vital information and the responsibility for patient care from one healthcare facility to another is the fundamental and indispensable component of quality and safety in healthcare establishments. Disruptions to successful transitional care across healthcare facilities can be caused by factors such as insufficient patient or caregiver training, incorrect communication among healthcare providers, inadequate assessment of medication access, and low levels of health literacy [6].

**DISCUSSION:**

Effective management of medications is a crucial aspect of delivering excellent treatment and ensuring patient safety throughout the transition between healthcare settings [8]. According to the World Health Organization (WHO), a key approach to ensuring patient safety is to prioritize pharmaceutical safety during transitional care [9]. Furthermore, the significance of medication-related problems in providing excellent transitional care has been acknowledged, particularly in ensuring the safe transfer of the drug regimen [10]. Transitional care programs can effectively mitigate medication-related issues, provide accessibility to medication therapy, offer thorough medication counseling, and address gaps in medication management after hospital discharge [10]. Nevertheless, patients undergoing transitional care between healthcare settings are susceptible to medication errors as a result of inadequate communication among healthcare providers, insufficient education and training, inadequate follow-up, insufficient medication reconciliation, and limited involvement of patients and their family caregivers in medication management [11]. Transitional care is responsible for a significant portion, specifically 46%–56%, of prescription errors that could have been avoided. A systematic analysis found that between 11% and 59% of medication history inaccuracies at admission and discharge had the potential to cause damage to the patient [13]. In a Cochrane analysis, Redmond et al. [14] found that 559 out of 1000 patients were susceptible to one or more drug inconsistencies during routine transitional care programs. Key moments in the healthcare system where patients are at risk of harm from medication include the transition from hospital to home, hospital admission, transfer, and discharge, as well as post-discharge and admission to the emergency department [15].

Efficient management of medications is a multifaceted task in various healthcare settings, such as hospitals and nursing homes. It necessitates the cooperation of healthcare professionals, including nurses, doctors, and pharmacists, to optimize positive healthcare outcomes and minimize errors in practice [8]. Managing medicines is a highly intricate and interconnected clinical challenge in healthcare. Each healthcare practitioner involved in transitional care has individual, shared, and overlapping duties [16,17]. Nurses are seen as essential members of the transitional care team. Their main responsibility is assessing the transitional care plan, identifying any issues, and subsequently addressing them to enhance patient safety [18]. Nurses' participation in the administration of medications during transitional care

facilitates the provision of healthcare services for patients experiencing fragmented care or those who are at a high risk of being readmitted. Their function has been proposed as a substitute for emergency services, as it enhances the efficiency of referring physicians and facilitates the transition of treatment back to community healthcare professionals through patient education and self-management of medication [19].

Vogelsmeier [20] states that nurses at nursing homes played a crucial role in conducting medication reconciliations. They were responsible for evaluating medication history and detecting any inconsistencies in medication orders during the transfer to nursing homes. Several nurses engaged in "active information seeking" by examining transfer documentation and engaging in conversations with residents and their families to gain a comprehensive understanding of medication history and the rationale behind medication orders. Some individuals engaged in "passive information seeking" by assuming that pharmaceutical orders during transfers were accurate, notwithstanding the difficulties posed by time constraints and large workloads in identifying differences in clinical information. A significant number of nurses actively participated in a cognitive process known as "sense-making" in order to detect medication inconsistencies. Regarding this matter, cues such as rules/regulations, specific prescriptions, and the occurrence of errors and adverse effects were factors to be taken into account when considering possible inconsistencies.

In the research conducted by Otsuka et al [21], nurses played a crucial role as part of interprofessional post-acute care clinics. Their primary responsibility was to oversee the management of medications for patients who were discharged from the hospital and returned to their own homes. The medication reconciliation procedure was initiated by evaluating the patients' ability to complete their new prescriptions. This was done by making telephone calls to the patient or their caregiver within two working days after discharge.

Ensuring the safety of medication during administration is a significant global challenge that directly impacts the safety and quality of patient care. Medication errors, often known as MEs, are unintentional mistakes that can happen at several stages of the drug treatment process, including prescription, distributing, storing, preparation, and administration of pharmaceuticals. Mesotheliomas (MEs) are a significant issue for nursing workers on a global scale [22]. High alert drugs (HAMs) are

classified as pharmaceuticals that provide a significant risk of causing serious harm if they are administered incorrectly. They are primarily responsible for the bulk of dangerous errors. Nurses are tasked with the administration of High Alert Medications (HAMs), and any wrong administration can lead to substantial clinical consequences, and in some cases, even result in fatality. A substantial body of material has been produced regarding the pharmacology knowledge possessed by nurses [23]. In summary, these studies emphasize the necessity for further study to assess nurses' proficiency in pharmacology in relation to drug delivery [23].

HAMs are classified by the American Pharmaceutical Association into various categories, including chemotherapeutic agents (taken orally or injected), cardiovascular medications (such as adrenergic drugs), narcotics (like morphine or fentanyl), anticoagulants (such as warfarin and heparin), neuromuscular blocking agents (like rocuronium or succinylcholine), benzodiazepines (such as midazolam), and electrolytes (like 15% potassium chloride (KCl)) [24]. HAMs are frequently utilized in the emergency department (ER), intensive care unit (ICU), pediatric ward, and medical ward. Due to its application in emergency scenarios, HAMs possess an elevated potential for inflicting patient injury if utilized improperly.

In Palestine, as well as in most countries globally, nurses are responsible for a multitude of activities to ensure accurate and secure administration. The activities encompassed in this role involve the preparation and administration of medications, reporting any adverse drug reactions, assessing the efficacy of treatment, and providing medication counseling to patients. Multiple research have been undertaken among nurses in Palestine to examine their understanding of various subjects [25]. However, none of these investigations focused on HAMs, which are the most perilous and crucial drugs. Insufficient nurse education, as well as inadequate expertise in administration, storage, and dose calculation, heightens the likelihood of medication errors. As far as we know, there has been no research conducted on the level of knowledge of healthcare-associated infections among nurses in Palestine. Insufficient research has been conducted on this subject in both Palestine and the neighboring countries, which is seen as a contributing reason to the substandard and ineffective state of our healthcare services and organizations. This study aimed to assess the extent of pharmacology knowledge among nurses about the administration and regulation of HAMs (Herbal and Alternative Medicines) in the West Bank, Palestine. This study

aims to identify the vulnerabilities and deficiencies in our health system, with a specific focus on identifying appropriate remedies. Addressing these issues is of utmost urgency. Moreover, this study will aid in the development of novel approaches for instructing, educating, and honing skills. Nurses require current medication education to ensure they can deliver the highest quality of care to patients and maintain their safety within their professional domain [25].

Medication errors encompass any avoidable incident resulting in improper medication utilization or harm to the patient. These events can pertain to various aspects of professional practice, health care items, methods, and systems, such as prescribing, order communication, product labeling, packaging, nomenclature, compounding, dispensing, distribution, administration, education, monitoring, and use. The World Health Organization (WHO) has recognized pharmaceutical mistake as a specific area of focus for improving patient safety, as it has a direct impact on both death and morbidity rates [26].

Pharmaceuticals are biologically active compounds utilized for the purpose of treating, preventing, or diagnosing diseases. However, the challenge lies in acquiring accurate information for the appropriate utilization of such medicines, which could potentially lead to medication-related harm or mistakes, as well as unfavorable health consequences and heightened vulnerability to illness and death among patients [26]. Previous studies have indicated that pharmacists are the primary sources of drug knowledge due to their official training or supervision by drug information specialists, which can help in preventing prescription errors [27].

A descriptive study conducted in Brazil detected and described medication errors associated with prescription information inquiries. The study found that the majority of these errors were potential errors. The present study's results further corroborated these findings, revealing a heightened frequency of potential errors. The DPIC pharmacists demonstrated their effectiveness in addressing drug-related concerns from other healthcare professionals, hence promoting optimal patient care and preventing potential errors [27].

This category delineates the nurse's responsibility in overseeing the administration and control of medications during the transitional care process across different healthcare settings, while working in conjunction with other healthcare professionals. The study conducted by Manias *et al* [28] examined the

communication on medicines management during the transition from emergency departments to medical wards. The study found that nurses in medical wards took a proactive approach by addressing concerns about medicines with doctors. The nurses in the medical ward assessed the clinical parameters of patients who were moved from the emergency department and informed doctors about the collected information, which resulted in appropriate modifications to the medication. Upon the patient's transfer to the nursing home, the nurses subsequently coordinated the modification of medications by contacting the general practitioner via telephone [28]. Interdisciplinary communication, involving healthcare professionals such as nurses, physicians, and pharmacists, had an impact on the management of drugs during the transition between different stages of care [28]. Nurses deemed verbal communication crucial for promptly delivering appropriate treatment, but they also appreciated asynchronous communication, such as discharge summaries and referral letters. Precise and clear documentation of communication was crucial to ensure correctness and readability of the material, in order to prevent any errors in drug administration throughout transitions of care. Nurses recognized the importance of textual communication in order to confront the demands of a rapidly evolving workplace [28].

In the study conducted by Lovelace *et al* [29], certain patients were sent to nursing homes for brief periods of rehabilitation after their hospitalizations, as part of the implemented transitional care program. The pharmacist reached out to the nursing home to acquire a roster of medications prescribed upon discharge. Subsequently, the pharmacist forwarded the list and relevant details to the case management nurse, who then contacted the patients or their caregiver to arrange a visit at their residence. After the home visit, any inconsistencies in medication were reported by the case management nurses to the members of the transition care program team, as well as the patients' primary care provider and care manager. The case management nurse would also cooperate with a pharmacist to create an accurate discharge medication chart, making necessary adjustments to the print size for patients with poor eyesight [29].

In Vogelsmeier's study, it was discovered that nursing home physicians depended on the nurse's knowledge and suggestions to determine the drugs that the resident should be taking. This reliance was due to the fact that the physicians only offered care within the nursing home setting. The physicians had limited knowledge of the residents' medical treatment before



the transfer, had infrequent communication with other healthcare providers, and were absent during the transfer process. Consequently, nurses were the primary providers of information regarding the management of medications and would ask the physician to conduct necessary evaluations and examine laboratory results. Before prescribing medications, the nurse would first confer with the physician.

### CONCLUSION:

There is evidence indicating that nurses lack enough expertise on the administration and regulation of HAMs, particularly when it comes to administering IV boluses. Nurses faced a challenge in administering HAMs due to a lack of understanding, which might lead to medication errors. Nurses expressed a need for more training to enhance their proficiency in pharmacology. Additionally, they observed that the most frequently encountered challenges during the administration of HAMs were the competing perspectives between nurses and doctors, as well as the absence of established standard operating procedures for HAMs. These factors contribute to the potential occurrence of medication errors. The individuals who possessed the highest level of expertise were the male individuals and the nurses who were employed in the Intensive Care Unit (ICU) ward. Proper emphasis should be placed on degree-level education and in-service training for nurses, given their crucial role in medicines management during the transitional care phase. Efficient administration of medications and the prevention of pharmaceutical errors necessitate the acknowledgment of duties and positions, as well as a collaborative and communicative approach among many healthcare disciplines, such as nursing, medicine, and pharmacy. Healthcare professionals engage in interdisciplinary collaboration and communication to collectively pursue common objectives, demonstrate shared responsibility and authority, make choices collectively, and collaborate to enhance medication safety during transitional care. Additionally, it is crucial for healthcare providers to recognize the nurse's responsibility in medication administration in order to guarantee the safety of medications during transitional care.

### REFERENCES:

1. Donald F, Kilpatrick K, Reid K, et al. Hospital to community transitional care by nurse practitioners: a systematic review of cost-effectiveness. *Int J Nurs Stud*. 2015;52(1):436–451.
2. Kapoor A, Field T, Handler S, et al. Adverse events in long-term care residents transitioning from hospital back to nursing home. *JAMA Intern Med*. 2019;179(9):1254–1261.
3. Tsilimingras D, Bates DW. Addressing postdischarge adverse events: a neglected area. *Jt Comm J Qual Patient Saf*. 2008;34(2):85–97.
4. Tsilimingras D, Schnipper J, Duke A, et al. Post-discharge adverse events among urban and rural patients of an urban community hospital: a prospective cohort study. *J Gen Intern Med*. 2015;30(8):1164–1171.
5. Naylor MD, Aiken LH, Kurtzman ET, Olds DM, Hirschman KB. The care span: the importance of transitional care in achieving health reform. *Health Aff (Millwood)*. 2011;30(4):746–754.
6. World Health Organization (WHO). *Transitions of Care: Technical Series on Safer Primary Care*. Geneva: WHO; 2016. Available from: <https://apps.who.int/iris/bitstream/handle/10665/252272/9789241511599-eng.pdf;jsessionid=08FCC79EDB6223987AEFA4611AD59B0E?sequence=1>.
7. Aase K, Laugaland KA, Dyrstad DN, Storm M. Quality and safety in transitional care of the elderly: the study protocol of a case study research design (phase 1). *BMJ Open*. 2013;3:8.
8. Vogelsmeier A, Pepper GA, Oderda L, Weir C. Medication reconciliation: a qualitative analysis of clinicians' perceptions. *Res Social Adm Pharm*. 2013;9(4):419–430.
9. World Health Organization (WHO). Patient safety solutions preamble. *WHO Collaborating Centre for Patient Safety Solutions*. 2007. Available from: <https://www.who.int/patientsafety/solutions/patientsafety/Preamble.pdf?ua=1>.
10. Spinewine A, Claeys C, Foulon V, Chevalier P. Approaches for improving continuity of care in medication management: a systematic review. *Int J Qual Health Care*. 2013;25(4):403–417.
11. Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. *N Engl J Med*. 2009;360(14):1418–1428.
12. Chhabra PT, Rattinger GB, Dutcher SK, Hare ME, Parsons KL, Zuckerman IH. Medication reconciliation during the transition to and from long-term care settings: a systematic review. *Res Soc Admin Pharm*. 2012;8(1):60–75.
13. Tam VC, Knowles SR, Cornish PL, Fine N, Marchesano R, Etchells EE. Frequency, type and clinical importance of medication history errors at admission to hospital: a systematic review. *Cmaj*. 2005;173(5):510–515.]

14. Redmond P, Grimes TC, McDonnell R, Boland F, Hughes C, Fahey T. Impact of medication reconciliation for improving transitions of care. *Cochrane Database Syst Rev*. 2018;8(8):Cd010791.
15. Zarif-Yeganeh M, Rastegarpanah M, Garmaroudi G, Hadjibabaie M, Sheikh Motahar Vahedi H. Incidence of medication discrepancies and its predicting factors in emergency department. *Iran J Public Health*. 2017;46(8):1086–1094.
16. Choo J, Hutchinson A, Bucknall T. Nurses' role in medication safety. *J Nurs Manag*. 2010;18(7):853–861.
17. Gunadi S, Upfield S, Pham N-D, Yea J, Schmiedeberg MB, Stahmer GD. Development of a collaborative transitions-of-care program for heart failure patients. *Am J Health Syst Pharm*. 2015;72(13):1147–1152.
18. Camicia M, Lutz BJ. Nursing's role in successful transitions across settings. *Stroke*. 2016;47(11):e246–e249.
19. Fox MT, Butler JI, Sidani S, et al. Collaborating with healthcare providers to understand their perspectives on a hospital-to-home warning signs intervention for rural transitional care: protocol of a multimethod descriptive study. *BMJ Open*. 2020;10(4):e034698.
20. Vogelsmeier A. Identifying medication order discrepancies during medication reconciliation: perceptions of nursing home leaders and staff. *J Nurs Manag*. 2014;22(3):362–372.
21. Otsuka S, Smith JN, Pontiggia L, Patel RV, Day SC, Grande DT. Impact of an interprofessional transition of care service on 30-day hospital reutilizations. *J Interprof Care*. 2019;33(1):32–37.
22. Vaughn S, Mauk KL, Jacelon CS, et al. The competency model for professional rehabilitation nursing. *Rehabil Nurs*. 2016;41(1):33–44.
23. Smith M. Transitional care clinics: an innovative approach to reducing readmissions, optimizing outcomes and improving the patient's experience of discharge care-conducting a feasibility study. *J Nurs Educ Pract*. 2016;6(6):34.
24. Corbett CF, Setter SM, Daratha KB, Neumiller JJ, Wood LD. Nurse identified hospital to home medication discrepancies: implications for improving transitional care. *Geriatr Nurs*. 2010;31(3):188–196.
25. Hellström LM, Bondesson Å, Höglund P, Eriksson T. Errors in medication history at hospital admission: prevalence and predicting factors. *BMC Clin Pharmacol*. 2012;12:9.
26. Huynh C, Wong IC, Tomlin S, et al. Medication discrepancies at transitions in pediatrics: a review of the literature. *Paediatr Drugs*. 2013;15(3):203–215.
27. Riordan CO, Delaney T, Grimes T. Exploring discharge prescribing errors and their propagation post-discharge: an observational study. *Int J Clin Pharm*. 2016;38(5):1172–1181.
28. Manias E, Gerdtz M, Williams A, Dooley M. Complexities of medicines safety: communicating about managing medicines at transition points of care across emergency departments and medical wards. *J Clin Nurs*. 2015;24(1–2):69–80.
29. Lovelace D, Hancock D, Hughes SS, et al. Care Case management program: taking case management to the streets and beyond. *Prof Case Manag*. 2016;21(6):277–290.