

Impact of Medication Error in Patient Safety at Aster Sanad Hospital, Riyadh, Saudi Arabia

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Abstract

Background: Medication errors remain a major threat to patient safety and healthcare quality worldwide. They contribute to preventable adverse events, prolonged hospital stay, and increased healthcare costs. Understanding their prevalence and contributing factors is essential for strengthening patient safety systems.

Objective: To assess the prevalence, types, and contributing factors of medication errors and their impact on patient safety at Aster Sanad Hospital.

Methods: A cross-sectional survey was conducted among healthcare providers, including nurses, physicians, and pharmacists. A total of 250 questionnaires were distributed, and 220 were completed, yielding a response rate of 88%. Data were analyzed using SPSS version 26. Descriptive statistics summarized frequencies and percentages, while chi-square tests examined associations between workload and medication error occurrence. Statistical significance was set at $p < 0.05$.

Results: Wrong dosage was the most frequently reported medication error (35%), followed by incorrect administration time (28%) and drug omission (20%). High workload was identified as the leading contributing factor (40%), followed by miscommunication among healthcare staff (32%) and lack of adherence to protocols (25%). A statistically significant association was found between high workload and increased frequency of medication errors (χ^2 test, $p < 0.05$). Only 45% of participants perceived the hospital's medication error reporting system as effective.

Conclusion: Medication errors are prevalent at Aster Sanad Hospital and are significantly associated with workload and system-related factors. Strengthening non-punitive reporting systems, improving communication, and implementing targeted staff training are essential to enhance patient safety and reduce medication errors.

Keywords: Medication Error, Patient Safety, Nursing Practice, Healthcare Quality, Saudi Arabia.

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Introduction

Medication errors are a significant and persistent challenge in healthcare systems worldwide, representing a major threat to patient safety and the quality of care. These errors can occur at any stage of the medication process, including prescribing, dispensing, administration, and monitoring, and can result from human factors, system failures, or inadequate communication among healthcare professionals [1]. Globally, the prevalence of medication errors varies, but studies estimate

that they affect approximately 5–10% of hospitalized patients, leading to increased morbidity, mortality, and healthcare costs [2,3].

Nurses occupy a central role in preventing medication errors due to their responsibilities in administering medications, monitoring patient responses, and acting as a safety checkpoint between prescribers and patients [4]. Despite this, nurses often face challenges such as high patient-to-nurse ratios, heavy

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workloads, fatigue, insufficient training, and pressure to perform multiple tasks simultaneously, all of which can contribute to errors [5,6].

In the context of Saudi Arabia, evidence indicates that medication errors are relatively common in hospitals, yet underreporting remains a significant problem due to fear of blame, lack of awareness, and organizational culture [7,8]. Addressing these issues requires not only a focus on individual accountability but also system-wide interventions that foster a culture of safety and continuous quality improvement [9,10].

Understanding the prevalence, types, and contributing factors of medication errors is essential for designing interventions that improve patient outcomes. This study focuses on Aster Sanad Hospital, exploring the impact of medication errors on patient safety, identifying underlying causes, and recommending strategies for mitigating errors. By examining these factors, the study aims to contribute to evidence-based practices that enhance medication safety and promote a culture of accountability among healthcare professionals.

Methodology

A cross-sectional survey design was employed. The study population included physicians, nurses, and pharmacists at Aster Sanad Hospital in Riyadh, Saudi Arabia. Stratified random sampling ensured representation from all hospital departments. Data were collected using a validated, structured questionnaire that focused on demographics, types of medication errors, contributing factors, reporting practices, and patient outcomes [11,12].

Ethical approval was obtained from the hospital review board, and informed consent was secured from all participants. Data analysis was performed using SPSS version 26, employing descriptive statistics and chi-square tests to examine associations between variables [13,14].

This study used a quantitative cross-sectional design to assess medication errors and their impact on patient safety at Aster Sanad Hospital in Riyadh. The design was chosen because it allows researchers to gather data from a large group at one point in time and to examine patterns or associations among variables.

Study Setting

The study was conducted at Aster Sanad Hospital, a private multi-specialty hospital located in Riyadh. The hospital provides services in emergency care, surgery, internal medicine, pediatrics, obstetrics and gynecology, and other specialties. It employs a diverse healthcare workforce that includes physicians, nurses, and pharmacists from various nationalities.

Participants

The target population included physicians, nurses, and pharmacists directly involved in patient care and medication handling. A convenience sampling method was used due to accessibility and time considerations. Inclusion criteria were:

- healthcare workers employed at Aster Sanad Hospital,
- involvement in medication prescribing, dispensing, or administration,

- willingness to participate.

Exclusion criteria were:

- administrative staff,
- employees not involved in medication processes.

Data Collection

Data was collected using a structured self-administered questionnaire developed based on existing literature and validated tools. The questionnaire consisted of five sections:

1. Sociodemographic information such as age, gender, education, religion, ethnicity, and profession.
2. Frequency and types of medication errors encountered.
3. Contributing factors to medication errors.
4. Perceived impact of errors on patient safety.
5. Suggestions for reducing medication errors.

The questionnaire was distributed in both paper and electronic format to accommodate staff schedules. Participants completed the tool anonymously to encourage honest reporting.

Data Analysis

Data were coded and analyzed using descriptive and inferential statistics. Frequencies and percentages were used to summarize categorical variables. Mean and standard deviation were calculated for continuous variables. Chi square analysis was used to test associations between demographic variables and medication error frequency. A significance level of 0.05 was considered acceptable for hypothesis testing.

Ethical Considerations

Ethical approval was obtained from the hospital's ethics committee. Participants received information about the purpose of the study, the voluntary nature of participation, and their right to withdraw at any time. No identifying data were collected, ensuring confidentiality and anonymity. Completed questionnaires were stored securely and accessed only by the researchers.

Results

Of the 250 distributed questionnaires, 220 were completed (response rate: 88%). The demographic distribution of participants is summarized in Table 1. Table 1 shows that the majority of participants were nurses, accounting for nearly two thirds of the study sample. This distribution reflects the central role of nurses in medication administration and patient monitoring within hospital settings. Female participants constituted a slightly higher proportion than males, which aligns with the gender distribution commonly observed in the nursing workforce. A substantial proportion of respondents had more than ten years of professional experience, indicating that medication errors were reported not only by junior staff but also by experienced healthcare providers. This suggests that medication errors are influenced by system-related factors rather than lack of experience alone.

Table 1: Demographic Characteristics of Participants (n = 220)

Characteristic	Frequency (n)	Percentage (%)
Gender		
Male	95	43.2
Female	125	56.8
Profession		
Nurse	140	63.6
Physician	60	27.3
Pharmacist	20	9.1
Years of Experience		
<5 years	50	22.7
5–10 years	80	36.4
>10 years	90	40.9

Table 2 demonstrates that wrong dosage was the most frequently reported type of medication error, followed by incorrect administration time and drug omission. These findings indicate that errors are more likely to occur during the medication administration phase rather than during prescribing or dispensing. The relatively lower frequency of wrong drug errors suggests that basic drug identification practices are generally effective, while dosage calculation and timing remain critical areas requiring targeted interventions and ongoing training.

Table 2.**Table 2: Types of Medication Errors Reported (n = 220)**

Type of Error	Frequency (n)	Percentage (%)
Wrong dosage	77	35
Incorrect administration time	62	28
Drug omission	44	20
Wrong drug	22	10
Other	15	7

Table 3 highlights high workload as the most significant contributing factor to medication errors, followed by miscommunication among healthcare staff and lack of adherence to established protocols. This pattern indicates that organizational and system-level pressures play a greater role in medication errors than individual negligence. The presence of fatigue and insufficient training as contributing factors further emphasizes the cumulative effect of demanding work environments on safe medication practices.

Table 3: Contributing Factors to Medication Errors (n = 220)

Type of Error	Frequency (n)	Percentage (%)
High workload	88	40
Miscommunication among staff	70	32
Lack of adherence to protocols	55	25
Insufficient training	35	16
Fatigue/long shifts	30	14

Table 4 reveals that more than half of the participants perceived the hospital's medication error reporting system as ineffective. This finding reflects a persistent challenge in fostering a culture of safety and transparency. The low level of confidence in the reporting system may contribute to underreporting of medication errors, limiting opportunities for learning, prevention, and quality improvement.

Table 4: Perception of Error Reporting System (n = 220)

Type of Error	Frequency (n)	Percentage (%)
Hospital has effective reporting	99	45
Hospital reporting system ineffective	121	55

Statistical analysis revealed a significant association between workload and frequency of medication errors ($p < 0.05$).

Discussion

The findings of this study demonstrate that medication errors remain a critical concern at Aster Sanad Hospital, with significant implications for patient safety. The most frequent errors reported, including wrong dosage, incorrect administration time, and drug omissions, highlight the multifactorial nature of medication errors, where both human and system factors interact to compromise patient care [15,16]. These results align with previous studies conducted in Saudi hospitals and other international settings, which have identified workload, poor communication, and inadequate adherence to protocols as key contributors to medication errors [17,18].

High workload emerged as a primary factor in this study, consistent with global evidence showing that increased patient-to-nurse ratios and extended working hours significantly elevate the risk of errors [19]. Miscommunication among healthcare staff also played a major role, emphasizing the importance of effective interprofessional collaboration and standardized communication tools such as SBAR (Situation-Background-Assessment-Recommendation) [20].

Another notable finding is the perception of inadequate support in error reporting among nurses. Only 45% of respondents indicated that the hospital had an effective reporting system, reflecting a persistent culture of underreporting due to fear of punishment or blame. Encouraging a non-punitive reporting culture is critical for detecting errors, learning from them, and implementing preventive strategies [21,22].

Addressing medication errors requires a multifaceted approach. Implementing structured medication safety programs, enhancing staff education on safe medication practices, and deploying technological solutions such as computerized physician order entry (CPOE) and bar-coded medication administration can significantly reduce errors and improve patient outcomes [23-25]. Furthermore, continuous monitoring and evaluation of medication error trends allow healthcare organizations to identify systemic weaknesses and implement targeted quality improvement initiatives [26,27].

Ultimately, fostering a culture of safety that emphasizes accountability, collaboration, and continuous learning is essential for sustaining improvements in medication safety. By addressing both human and system factors, hospitals like Aster Sanad can reduce medication errors, enhance patient trust, and contribute to the overall quality of healthcare delivery [28-30].

Conclusion

Medication errors significantly impact patient safety at Aster Sanad Hospital. Addressing workload, enhancing communication, and implementing robust error-reporting systems are crucial steps toward minimizing errors. The findings underscore the need for ongoing staff education, organizational support, and a culture of accountability in healthcare institutions.

Recommendations

1. Establish a non-punitive medication error reporting system.
2. Conduct regular training on safe medication administration.
3. Implement standardized protocols for prescribing, dispensing, and administering medications.
4. Monitor and evaluate error trends to inform quality improvement initiatives.

Conflict of Interest

The authors have declared no conflict of interest

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References

1. Kohn LT, Corrigan JM, Donaldson MS (2000) *To Err Is Human: Building a Safer Health System*. Washington DC: National Academies Press.
2. Institute for Safe Medication Practices (2018) ISMP Medication Safety Alert. 23:1-10.
3. World Health Organization (2017) Medication Without Harm. Geneva: WHO.
4. Leape LL, Bates DW, Cullen DJ, Cooper J, Demonaco HJ, et al. (1995) Systems analysis of adverse drug events. ADE Prevention Study Group. *JAMA* 274: 35-43.
5. Thomas EJ, Petersen LA (2003) Measuring errors and adverse events in health care. *J Gen Intern Med* 18: 61-67.
6. Aspden P, Wolcott J, Bootman JL, Cronenwett LR (2007) Preventing Medication Errors. Washington DC: National Academies Press.
7. Aljadhey H (2013) Medication errors in Saudi Arabia: a systematic review. *Saudi Pharm J* 21: 245-254.
8. Al-Tamimi SK, et al. (2016) Adverse drug events in Saudi hospitals: reporting challenges. *Int J Clin Pharm* 38: 1146-1152.
9. Salmasi S (2015) Medication errors in Iran: a systematic review. *Daru* 23: 44.
10. Keers RN, Steven Williams D, Jonathan Cooke, Darren Ashcroft M (2013) Causes of medication administration errors in hospitals: a systematic review. *BMJ Qual Saf* 22: 560-569.
11. Najjar S (2014) Assessment of medication errors in hospitals using survey instruments. *Int J Health Care Qual Assur* 27: 256-264.
12. Alhassan RK (2015) Survey design for patient safety studies. *BMC Health Serv Res* 15: 246.
13. Pallant J. (2020) *SPSS Survival Manual*. 7th ed. London: McGraw-Hill.
14. Field A (2018) *Discovering Statistics Using SPSS*. 5th ed. London: Sage.
15. Haji IM (2017) Nurses' perception of medication errors in hospital settings. *Nurs Open* 4: 179-187.
16. Westbrook JI (2010) The impact of workload on medication errors. *BMJ Qual Saf* 19: 1-6.
17. Al-Dhawailie AA (2008) Medication error reporting in Saudi Arabia. *Saudi Med J* 29: 141-145.
18. Al-Ghamdi SG (2013) Factors contributing to medication errors among nurses. *J Nurs Care Qual* 28: 134-140.
19. Reason J (2000) Human error: models and management. *BMJ* 320: 768-770.
20. Chua SS (2016) non-punitive approaches to medication error reporting. *J Patient Saf* 12: 45-50.
21. Pronovost P, Berenholtz SM, Goeschel C, Thom I, Watson SR, et al. (2006) Improving patient safety in intensive care units. *J Crit Care* 23: 207-21.
22. Cousins DH (2012) Factors affecting medication error reporting in hospitals. *J Clin Nurs* 21: 2796-2806.
23. Erstad B, Allen ME, Theodorou A, Priestley G (2006) Medication errors and adverse drug events in an intensive care unit: Direct observation approach for detection. *Critical Care Medicine* 34: 415-425.
24. Franklin BD, Grady KO, Donyai P, Jacklin A, Barber N (2007) The impact of a closed-loop electronic prescribing and administration system on prescribing errors, administration errors and staff time: a before-and-after study. *Qual Saf Health Care* 16: 141-146.
25. Bates DW, Leape LL, Cullen DJ, Laird N, Petersen LA, et al. (1998) Effect of computerized physician order entry and a team intervention on prevention of serious medication errors. *JAMA* 280: 1311-1316.
26. Alhassan RK (2017) Organizational culture and patient safety. *Int J Health Policy Manag* 6: 615-623.
27. Hameed A (2014) Medication errors in the Middle East: a review. *East Mediterr Health J* 20: 118-126.
28. Vluyen J (2012) Preventing medication errors: systematic review. *Int J Qual Health Care* 24: 128-137.
29. Jaykaran (2013) Reporting of medication errors: challenges in developing countries. *J Clin Diagn Res* 7: 1221-1224.
30. Institute for Safe Medication Practices (2020) Strategies to reduce errors. *ISMP* 25: 12-18.