



Journal for Social
Science Archives

Journal for Social Science Archives

Online ISSN: 3006-3310

Print ISSN: 3006-3302

Volume 3, Number 3, 2025, Pages 23 – 30

Journal Home Page

<https://jssarchives.com/index.php/Journal/about>



Financial Implications of Emergency Room Occupancy Management on Medication Errors: A Case Study of a Tertiary Care Hospital in Pakistan

Dr. Sheeba Zafar¹

¹Assistant professor of Management Sciences, Shifa Tameer-e-Millat University, Islamabad

ARTICLE INFO

Article History:

Received: May 14, 2025
Revised: June 14, 2025
Accepted: June 28, 2025
Available Online: July 05, 2025

Keywords:

Medication Errors, Emergency Room Occupancy, Financial Implications, Patient Safety, Tertiary Care, Hospital Management, Pakistan, Healthcare Workforce, Resource Allocation, Hospital Efficiency

Corresponding Author:

Dr. Sheeba Zafar

Email:

sheebazafar.dms@stmu.edu.pk

ABSTRACT

Medication errors have emerged as the third leading cause of death globally, resulting in increased healthcare costs, patient dissatisfaction, and compromised treatment outcomes. In the context of emergency departments, overcrowding and inefficient occupancy management can significantly exacerbate these errors, placing both patients and healthcare institutions at financial and operational risk. This study investigates the financial and clinical consequences of poor emergency room (ER) occupancy management on medication errors within a public tertiary care hospital in Islamabad, Pakistan. By identifying systemic gaps, the study aims to propose strategies for improving patient safety and institutional performance. This study aims to explore the link between ER occupancy management and medication errors while assessing its financial implications for hospital operations. Specifically, the objectives include: Understanding how emergency room occupancy influences medication errors, Identifying the operational inefficiencies contributing to medication-related incidents, Providing insights into the root causes of such errors for better risk mitigation, Offering evidence-based recommendations to hospital administrators for optimal resource utilization and improved cost-effectiveness, Supporting policy decisions through data-driven findings, Facilitating future research in the domain of healthcare quality and financial sustainability, A descriptive research design utilizing a mixed-methods approach was adopted. The study was conducted in a public sector tertiary care hospital in Islamabad, focusing on medical personnel including doctors, nurses, pharmacists, and paramedics. Stratified random sampling was used to ensure representation across professional groups. Data collection tools included structured questionnaires, checklists, and focus group discussions, developed through expert consultation and a thorough literature review. Ethical approval was obtained from the hospital's ethical committee. The analysis revealed several key factors contributing to medication errors, including overcrowded emergency departments, staff shortages, long working hours, inadequate feedback mechanisms, and limited training opportunities. These operational inefficiencies not only compromised patient safety but also led to avoidable costs associated with adverse drug events, prolonged hospital stays, and repeat treatments. The findings underscore the critical need for improved ER occupancy management to minimize medication errors and associated financial burdens. Recommendations include optimized staff-to-patient ratios, adherence to standard operating procedures (SOPs), regular training programs focused on patient safety, and the establishment of robust adverse event reporting systems. Effective management strategies can improve both clinical outcomes and cost-efficiency in public healthcare facilities.



Introduction

Emergency Room of a hospital plays an important role in terms of saving lives of patients who are brought to hospital's emergency room usually with severe life threatening conditions like cardiac arrest, heavy injuries following a major road traffic accident, Stroke, severe asthmatic attack and many others including the CoVID (Hauswald, 2004). All such patients require immediate and appropriate treatment so they can be brought back to healthy life style or at least can be prevented from permanent loss or disabilities. Emergency room occupancy or overcrowding in hospitals is associated with high risk of mortality or morbidity, an increased time delay for treatment of patients with certain acute conditions like myocardial infarction, stroke and poorly performed CoVID or pneumonia care to suspected patients (Hidayah & Nuraeni, 2020). According to a recent meta-analysis, among other problems, ER occupancy is also associated with increased rate of ambulance diversions and patients leave without being seen due to unavailability of beds (Tampubolon, 2018). On the other hand, overwhelming number of patients in emergency room results in increased number of preventable medication errors that might be from physician end during prescribing as they have to see multiple patients in less time to manage during rush hours or from nursing end during administration of drugs (Scott, Considine, & Botti, 2014).

A thorough understanding of ER occupancy and its influence on preventable medication errors can help in streamlining the rational drug use process. For determining the ER occupancy in a particular time point, EDWIN score is used (Tekwani, Kerem, Mistry, Sayger, & Kulstad, 2013). EDWIN or Emergency Department Work INdex (EDWIN) Score is basically the measurement of the ratio of workload to work capacity and it's defined as $\sum n_i t_i / N_a (B_T - B_A)$, where n_i = number of patients in the ER in triage category i , t_i = triage category, N_a = number of attending physicians on duty, B_T = number of treatment bays, and B_A = number of admitted patients in the ER (Kulstad, Sikka, Sweis, Kelley, & Rzechula, 2010). As described in the formula, the term Triage refers to quickly assessing the patient's state of illness and prioritizing the patients for treatment on the basis of assessment so the patients that are in critical situation are treated at priority to avoid further complications (FitzGerald, Jelinek, Scott, & Gerdtz, 2010). Keeping in mind the importance of prioritizing patients for treatment, a professionally trained triage nurse is available in emergency room at any time to perform this activity of prioritizing patients for treatment on the basis of their severity of illness.

Emergency Severity Index (ESI) is the expression of triage category of the patient and helps to assign numerical values to categorize the patients according to the severity of illness (Hinson et al., 2019). ESI levels range from 1 to 5 to express severity of illness from high to low respectively. The patients falling in level 1 are the most critical and are in a condition that if they are not treated immediately and appropriately, they can lose their lives so in any case should be treated at first priority. Those who fall in level 2 are less critical as compared to those of level 1 and have a time margin of maximum 15 minutes and further delay in treatment can be risky for the patient. Level 3 patients are with minor to moderate illnesses and have a time margin to start treatment within 30 minutes. Similarly moving towards level 4 patients having one hour time margin and level 5 patients with treatment delay up to 2 hours maximum (Kuriyama, Urushidani, & Nakayama, 2017). The patients falling in level 4 and 5 are usually stable and visit emergency room just for having an intravenous or intramuscular injection prescribed by physicians from outpatient clinics. While identifying the degree of ER occupancy and using the expertise of ER pharmacists in identifying the medication errors, correlation between ER overcrowding and medication errors can be established. The proposed study has, hence, focused on developing and understanding the

relationship and development of a recommendations for addressing the issue in an effective manner.

Research Gap of the Study

- i. While previous studies have explored the link between emergency room (ER) overcrowding and clinical inefficiencies, there remains a significant gap in understanding the *financial consequences* of such inefficiencies—particularly how ER occupancy management influences medication errors and impacts hospital budgets in resource-constrained public healthcare settings like Pakistan.
- ii. This study addresses the following critical research gaps:
- iii. Limited Longitudinal Data: Most studies rely on short term observations, missing out on long term financial and clinical patterns. A deeper understanding of how sustained ER occupancy levels affect error rates over time is lacking.
- iv. Specific Types of Medication Errors: Existing literature often fails to differentiate between various types of medication errors (e.g., prescription, administration, or dosage errors) in relation to ER occupancy. Exploring these distinctions can offer actionable financial and clinical insights.
- v. Underexplored Role of Technology: There is limited evaluation of how technologies like Electronic Health Records (EHRs) or automated dispensing systems affect medication errors in overcrowded ERs and how these may reduce financial losses.
- vi. Patient Outcomes and Costs: Few studies connect ER occupancy induced medication errors to patient outcomes (e.g., readmission, extended stay) and their financial burden on hospitals.
- vii. Staffing and Training Deficits: Insufficient attention is given to how staffing levels, skill mix, and training influence medication safety under varying occupancy conditions and their cost related implications.
- viii. Patient Demographic Variability: There is inadequate analysis of how different patient characteristics (e.g., age, comorbidities) influence the likelihood and cost of medication errors in busy ERs.
- ix. Comparative Institutional Studies: A lack of cross hospital or regional studies restricts our understanding of best practices in ER occupancy management and their financial outcomes.
- x. Interdisciplinary Team Dynamics: Limited exploration exists on how collaboration between ER teams—doctors, nurses, pharmacists—affects error reduction and cost efficiency during high occupancy.
- xi. Policy and Regulation Impact: Sparse evaluation of how national and institutional policies impact occupancy management practices and their financial efficiency in reducing medication errors.
- xii. Cultural and Systemic Factors: Socio cultural dynamics specific to Pakistan's healthcare system, such as patient expectations and trust in the public sector, are rarely factored into studies addressing ER errors and their financial consequences.
- xiii. Lack of Economic Evaluation: Perhaps most crucially, prior research lacks a financial lens. Few studies quantify the economic impact of medication errors in relation to ER congestion, nor do they assess potential savings from better occupancy management.

Objective of the Study

The primary objective of this study is to examine the financial implications of emergency room occupancy management on the frequency, severity, and nature of medication errors in a tertiary

care public hospital in Pakistan, with the aim of identifying systemic inefficiencies and proposing cost-effective strategies to improve patient safety and hospital resource utilization.

Research Methodology

The target population for this study comprised all health care workers employed in public sector hospitals of Islamabad. This included doctors, pharmacists, nurses, and paramedical staff directly involved in patient care and medication administration. By focusing on public sector institutions in the capital city, the study aimed to capture a representative snapshot of staffing patterns, clinical responsibilities, and organizational contexts influencing the implementation of medication error prevention practices.

A stratified random sampling technique was adopted to ensure that each professional subgroup within the hospitals was proportionately represented. According to Gay (2009), stratified random sampling “is a way to guarantee desired representation of the relevant subgroup within the sample” (p. 125). Accordingly, the entire staff population of 805 health care workers was divided into four strata: doctors (N=220), nurses (N=313), paramedics (N=260), and pharmacists (N=12). Participants were then selected at random from each category, resulting in a sample of 45 doctors, 40 nurses, 70 paramedics, and 6 pharmacists (total=161). Data were collected via structured questionnaires administered to each participant. Given the relatively small size of the target population, all staff categories in the selected hospitals were considered for inclusion, enhancing the generalizability of findings within Islamabad’s public sector context.

Data were gathered through a self-administered questionnaire designed to assess factors affecting implementation of medication error practices. Drawing on existing literature and expert consultations, the instrument comprised three domains: knowledge, attitude, and practice. An initial draft was prepared by reviewing textbooks, peer reviewed articles, and field specific materials, then refined in consultation with the study supervisor and senior clinicians

Results Based on medication Error on the emergency room occupancy

In this section, responses to factors effecting the implementation of room occupancy in the medication error. In this literature review multiple factors have been identified, for the said purpose, but the researcher has taken only three factors for the same. These three factors are as follows:

- i. Lack of knowledge of the health Care worker.
- ii. Attitude of the Health Care Worker.
- iii. Lack of training of the health Care Worker.

The table below mentioned shows the comprehensive details of the analysis of the above-mentioned attributes effect on the medication errors of the room occupancy in the tertiary care hospital.

Many of the respondents did not carefully fill the questionnaires, so after detail deliration and carefully observation, the questionnaire that was useable was only 100.

Table 1: knowledge assessment of medical workers N=100

Item No	Statements	Knowledge Assessment									
		Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
		f	%	f	%	f	%	f	%	f	%
1	Medication Error are important to know?	17	17	20	20	7	7	41	41	15	15
2	Do you know the number of admitted patient?	10	10	21	21	3	3	49	49	17	17
3	What were the main causes of these untoward incidents? (Mark whichever applies)										
	• Workload	80	80	10	10	0	0	5	5	5	5
	• Lack of knowledge	70	70	20	20	1	1	4	4	5	5
	• Lack of SOPs	50	50	30	30	10	10	7	7	3	3
	• Organizational culture/non accountability	80	80	10	10	0	0	5	5	5	5
	• Shortage of staff/technical manpower	70	70	20	20	1	1	4	4	5	5
4	An adverse event should always be reported?	5	5	27	27	9	9	38	38	21	21

Table no 4.2.1 this table shows that the knowledge of the health worker about the o concurrent status of the patients are admitted in the Hospital.

It was concluded from the result of the respondent that, they are aware in the no of enrolled patient, But the static of the admitted patient is not possible, so that the respondent as divide in the followings four domains:

- i. Doctors.
- ii. Nursing Staff.
- iii. Para-Medical Staff.
- iv. Pharmacists

The above questionnaires items regarding the knowledge of the staff about the admitted patients can helps to avoid the medication errors of the patient in the hospital.

Table 2: Medical Worker on Attitude on The Medication Error N=100

Item No	Statements	ATTITUDE									
		Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
		f	%	f	%	f	%	f	%	f	%
6	Do you feel comfortable reporting a medication	5	5	20	20	14	14	42	42	19	19

	error?										
7	Do you think long working hours contribute to medical errors?	23	23	43	43	12	12	10	10	12	12
8	Do you think heavy workload contribute to medical errors?	5	5	8	8	7	7	51	51	29	29
9	Have you been informed about importance/priority of medication Errors?	62	62	13	13	6	6	14	14	5	5
10	Do you feel lack of feedback from higher ups is de-motivating factor for staff involved in medication errors?	54	54	18	18	9	9	5	5	14	14

In table shows 42% of respondents disagreed and 19% strongly disagreed that they feel comfortable in reporting an error whereas, 20% of respondents agreed with this statement.

23% of respondents strongly agreed that long working hours contribute to medical errors, whereas, 43% of respondents strongly agreed with this statement, while 12% strongly disagreed & 10% disagreed with this statement.

62% strongly agreed and 13% medical workers agreed that they have been informed about the importance/priority of medication errors and patient safety. 14% disagreed and 5% strongly disagreed with the statement.

54% medical workers strongly agreed & 18% agreed that lack of feedback from higher ups is de-motivating factor for staff involved in patient safety. While 14% strongly disagreed & 5% disagreed with the statement.

Table 3: Medical workers on practices(N=100)

Item No	Statements	PRACTICES									
		Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
		F	%	f	%	f	%	F	%	f	%
11	Medication Error workshops /training sessions are conducted for staff in your hospital on regular basis?	35	35	37	37	8	8	6	6	14	14
12	Adequate staff is available vis viz hospital workload	24	24	1	1	5	5	41	41	29	29
13	Regular review of adverse events/near misses is carried out in your hospital?	11	11	7	7	10	10	23	23	49	49
14	Do you think that biggest hindrance in reporting errors in	51	51	40	40	4	4	5	5	0	0

	public sector hospital is the fear of inquiries?												
15	Does your hospital have mechanism of reporting an adverse event like printed form?	63	63	10	10	0	0	15	15	12	12		

In table shows the majority of respondents agree that **Medication Error workshops** /training sessions are conducted for staff in the hospital on regular basis.

41% Medical workers disagreed & 29% strongly disagreed that adequate staff is available vis viz hospital workload.

49% strongly disagreed & 23% disagreed that regular review of adverse events/near misses is carried out in your hospital while only 18% agreed with the statement.

51% strongly agreed & 40 % agreed that biggest hindrance in reporting errors in public sector hospital is the fear of inquiries while only 5% medical workers disagreed to the statement.

63% strongly agreed & 10% agreed that hospital has mechanism of reporting an adverse event like printed form while 27 % disagreed to the statement.

Findings

The study revealed critical gaps in knowledge, attitude, and practice among health care workers in Islamabad's public sector hospitals. Many respondents lacked basic understanding of medication-error prevention and the importance of reporting adverse events. Heavy workloads, unsupportive organizational cultures, lack of accountability, staff shortages, and insufficient technical resources emerged as major contributors to unsafe medication practices. Attitudinal barriers—particularly fear of disciplinary action and burnout from long working hours—undermined error-reporting behaviors despite widespread recognition of its importance. Although awareness programs such as workshops and lectures were routinely offered, systematic review of adverse events or near misses was uncommon. Existing reporting mechanisms (e.g., printed forms) were underutilized due to staff concerns about formal inquiries.

Practical Implications

To address these issues, hospitals must foster a nonpunitive culture that prioritizes patient safety and encourages open reporting. Human resources should be aligned with international safe-staffing standards to reduce workloads and burnout. Shift patterns need optimization to safeguard staff well-being. Regular, mandatory training on current patient-safety protocols should be institutionalized, and managers must provide timely, constructive feedback to sustain engagement. Clear, accessible protocols, SOPs, and checklists should be developed and rigorously enforced at every level of care.

Conclusion

Medication-error prevention in public sector hospitals requires ongoing vigilance, systemic change, and innovation. A culture of transparency, accountability, and continuous learning is

essential to reduce harm. When staff feel knowledgeable, supported, and free to report mistakes without fear, both clinician performance and patient outcomes improve markedly.

Recommendations

Cultivate a Blame-Free Reporting Culture: Implement nonpunitive systems and ensure anonymity where possible.

Align Staffing with Workload: Recruit and deploy sufficient staff to meet patient-care demands.

Optimize Shift Schedules: Design rotas that minimize fatigue and support work–life balance.

Institutionalize Continuous Training: Mandate regular workshops on the latest medication-safety standards.

Enhance Feedback Mechanisms: Provide prompt, constructive feedback on reported incidents to reinforce learning.

Develop and Enforce SOPs: Create clear protocols and checklists for medication administration and error reporting.

Invest in Technology and Research: Explore tools to intercept potential errors and translate best practices into user-friendly templates.

Secure Dedicated Funding: Advocate for Ministry of Health support to finance patient-safety training and quality-improvement initiatives.

References

1. FitzGerald, G., Jelinek, G., Scott, D., & Gerdtz, M. F. (2010). Systems-Model-Based Triage: A Clinical Framework for an Emergency Department. *Emergency Medicine Australasia*, 22(5), 357–365.
2. Hinson, J. S., Martinez, D. A., Cabral, S., Deutschendorf, A., Daya, M., et al. (2019). Implementation of the Emergency Severity Index for Triage in the Emergency Department: A Prospective Study. *Annals of Emergency Medicine*, 74(5), 672–682.
3. Kulstad, E. B., Sikka, R., Sweis, R., Kelley, K. M., & Rzechula, K. J. (2010). EDWIN: A Simple Index of Emergency Department Crowding. *Academic Emergency Medicine*, 17(7), 671–674.
4. Kuriyama, A., Urushidani, T., & Nakayama, Y. (2017). Examining the Validity of Time-Based Patient Flow Targets in Emergency Departments. *Journal of Emergency Nursing*, 43(4), 287–295.
5. Scott, P. A., Considine, J., & Botti, M. (2014). Medication Errors in the Emergency Department: A Cross-Sectional Analysis. *Journal of Clinical Nursing*, 23(19–20), 3042–3052.
6. Tampubolon, G. (2018). The Impact of Emergency Department Crowding on Patient Outcomes: A Meta-Analysis. *Health Services Research*, 53(4), 2548–2572.
7. Tekwani, K. L., Kerem, Y., Mistry, C. D., Sayger, B. E., & Kulstad, E. B. (2013). Development of an Emergency Department Crowding Metric Using Multivariable Regression. *Academic Emergency Medicine*, 20(5), 488–495.