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Audit of Timeliness of Patient Assessment and Management in Acute Hospital Admissions

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ABSTRACT

Timely assessment and management of patients admitted through emergency pathways are critical determinants of patient safety, clinical outcomes, and healthcare quality. Delays in initial evaluation and treatment initiation have been associated with increased morbidity, prolonged hospitalization, and mortality. This prospective clinical audit aimed to evaluate compliance with established time-based clinical standards for acute medical admissions in a tertiary care hospital and to identify factors associated with delays. A total of 412 consecutive adult patients admitted through the emergency department over a six-month period were included. Key performance indicators included time to initial nursing assessment, time to first physician review, time to senior clinician review, and time to initiation of definitive management. Compliance was measured against national benchmarks (nursing triage within 15 minutes, physician review within 60 minutes, senior review within 4 hours). Overall compliance rates were 82.5%, 68.2%, and 54.1%, respectively. Median time to definitive management was 92 minutes (IQR 60–150). Delays were significantly associated with peak-hour admissions (OR 2.63; 95% CI 1.71–4.05; p<0.001), high patient acuity (OR 1.94; 95% CI 1.23–3.05; p=0.004), and staffing shortages (OR 3.12; 95% CI 1.98–4.92; p<0.001). Patients experiencing delays beyond recommended thresholds had longer hospital stays (mean 6.8 ± 2.1 days vs 4.3 ± 1.6 days; p<0.001). Timeliness standards were not uniformly met, particularly for senior review. Targeted workflow optimization and staffing interventions are required to improve acute care delivery.

Keywords: *Clinical audit; Acute admissions; Timeliness; Emergency care; Quality improvement*

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INTRODUCTION

Timely clinical assessment and prompt initiation of management are fundamental principles of safe and effective acute hospital care [1]. Acute admissions represent a substantial proportion of hospital workload worldwide, accounting for increasing healthcare expenditure and resource utilization [2]. Delays in the early stages of hospital care have been associated with adverse clinical outcomes, including increased morbidity, extended length of stay, and higher mortality rates [3]. As healthcare systems face escalating patient volumes and workforce constraints, ensuring efficient and timely care delivery remains a major challenge.

Acute hospital admissions commonly occur through emergency departments, where triage systems are designed to prioritize patients based on clinical urgency [4]. International guidelines emphasize early nursing assessment, rapid physician evaluation, and timely senior clinician involvement to improve outcomes [5]. Early decision-making has been shown to reduce complications, facilitate appropriate investigations, and streamline inpatient pathways [6]. However, real-world compliance with time-based targets often varies considerably between institutions [7].

The concept of clinical audit has emerged as a cornerstone of healthcare quality improvement [8]. A clinical audit systematically evaluates current practice against explicit standards and implements changes where deficiencies are identified [9]. Unlike research, which generates new knowledge, clinical audit focuses on improving existing service delivery [10]. In acute care settings, audits of timeliness are particularly valuable in identifying systemic bottlenecks, workflow inefficiencies, and staffing issues [11].

Several studies have demonstrated that early senior review within four hours of admission is associated with reduced mortality and improved discharge planning [12]. Furthermore, prompt initiation of definitive treatment—such as antibiotics in sepsis or anticoagulation in thromboembolism—has measurable survival benefits [13]. Despite these findings, adherence to recommended timelines remains inconsistent, especially during peak admission periods [14].

In developing healthcare systems, overcrowding, limited staffing, and resource constraints may exacerbate delays [15]. Local audits are therefore essential to contextualize national or international standards within institutional capabilities. Without systematic evaluation, gaps in acute care processes may persist unnoticed.

Timeliness in acute admissions also influences patient satisfaction and medico-legal risk [16]. Delays in assessment can result in diagnostic errors, deterioration of clinical status, and potentially preventable adverse events [17]. Thus, measuring performance against defined time benchmarks is critical for maintaining patient safety.

Although several international reports describe emergency department performance metrics, there is limited prospective audit data evaluating the entire pathway from admission to initiation of definitive management in tertiary care hospitals within South Asia [18]. This gap necessitates locally generated evidence to inform targeted quality improvement initiatives.

The present prospective clinical audit was conducted to assess compliance with predefined timeliness standards for acute medical admissions, identify determinants of delay, and evaluate the impact of delays on clinical outcomes such as hospital length of stay and early complications [19,20].

MATERIAL AND METHODS

Study Design and Setting

This prospective clinical audit was conducted at Internal Medicine, Rai Medical College Teaching Hospital, Sargodha, Administration Department, Shalamar Hospital, Lahore, Orbit and Oculoplastics, Al-Shifa Trust Eye Hospital, Rawalpindi, Surgery, Foundation University Medical College, Rawalpindi/Islamabad, Khalid Family Hospital / University College of Medicine and Dentistry, UOL, Lahore from January 2025 to June 2025. The hospital is a tertiary care teaching institution with an annual emergency department census exceeding 80,000 visits.

Ethical approval was obtained from the Institutional Review Board (IRB No: PCMS/IRB/2024-AUD-011). As this was a service evaluation audit, patient consent was waived; however, confidentiality was strictly maintained.

Study Population

All adult patients (≥18 years) admitted through the emergency department to medical wards during the study period were eligible.

Sample

A total of 438 admissions were screened. Twenty-six were excluded due to incomplete time documentation. The final sample comprised 412 patients. Sample size was determined based on expected compliance rate of 70%, 95% confidence level, and 5% margin of error, requiring minimum 323 patients; the final cohort exceeded this threshold.

Inclusion/ Exclusion criteria

Inclusion criteria:

- Adult acute medical admissions
- Admission via emergency department
- Complete documentation of time stamps

Exclusion criteria:

- Direct ICU admissions
- Trauma/surgical cases
- Elective admissions

Audit Standards

The following time-based standards were adopted:

1. Nursing triage assessment within 15 minutes of arrival
2. Initial physician review within 60 minutes
3. Senior clinician review within 4 hours
4. Initiation of definitive management within 2 hours

These benchmarks were derived from established acute care guidelines.

Data Collection

Time stamps were recorded electronically. Data included:

• Time of arrival
• Time of nursing triage
• Time of first physician review
• Time of senior clinician review
• Time of first definitive treatment

Additional variables recorded included patient age, gender, triage category, time of admission (peak vs off-peak), staffing level, and comorbidities.

Outcome Measures

Primary outcome: Compliance with timeliness standards.

Secondary outcomes: Length of hospital stay, in-hospital complications within 72 hours.

Statistical analysis

Data were analyzed using SPSS version 27. Continuous variables were expressed as mean ± SD. Categorical variables were analyzed using chi-square test. Logistic regression identified predictors of delayed assessment. Statistical significance was set at $p<0.05$.

RESULTS

A total of 412 patients were analyzed. Mean age was 58.4 ± 16.2 years. Males comprised 55.8%.Among 412 patients (mean age 58.4 ± 16.2 years; 55.8 % male), compliance with timeliness standards varied across care processes (Table 1), with nursing assessment within 15 minutes achieving the highest adherence (82.5 %, median 11 min) and senior clinician review within 4 hours the lowest (54.1 %, median 238 min). Multivariate analysis (Table 2) identified peak-hour admissions, high triage acuity, and staffing shortages as significant predictors of delayed physician review (>60 min), with staffing shortages having the strongest association (OR 3.12, $p < 0.001$). Delays beyond 60 minutes were clinically meaningful, as patients experiencing delayed assessment had significantly longer hospital stays (mean 6.8 ± 2.1 days) compared with those assessed within standards (4.3 ± 1.6 days, $p < 0.001$, Table 3), indicating that timely evaluation directly impacts patient throughput and resource utilization.

Table 1: Compliance with Timeliness Standards

Standard	Compliance (%)	Median Time (minutes)
Nursing assessment ≤15 min	82.5%	11 (IQR 7–18)
Physician review ≤60 min	68.2%	54 (IQR 38–79)
Senior review ≤4 hrs	54.1%	238 (IQR 170–320)
Definitive management ≤2 hrs	61.4%	61.4%

Explanation: Highest compliance was observed for nursing triage; senior clinician review had lowest adherence.

Table 2: Predictors of Delayed Physician Review (>60 min)

Variable	OR	95% CI	| p-value
Peak-hour admission	2.63	1.71–4.05	<0.001
High triage acuity | 1.94 | 1.23–3.05 | 0.004	1.94	1.23–3.05	0.004
Staffing shortage | 3.12	3.12	1.98–4.92	<0.001

Explanation: Staffing shortages were strongest predictor of delay.

Table 3: Impact of Delays on Length of Stay

Group Variable	Mean LOS (days)	p-value
Within standards	4.3 ± 1.6	-
Delayed >60 min	6.8 ± 2.1	<0.001

Explanation: Delayed assessment significantly increased hospital stay.

DISCUSSION

This prospective clinical audit evaluated timeliness of patient assessment and management in acute hospital admissions and identified significant gaps in compliance with established time standards. While nursing triage met recommended benchmarks in over 80% of cases, physician and senior clinician review demonstrated lower adherence rates. These findings underscore critical system-level challenges in acute care delivery.

Timely assessment is a cornerstone of patient safety. Studies have demonstrated that early physician evaluation reduces diagnostic delay and improves therapeutic decision-making [15]. Our finding of 68.2% compliance for physician review suggests room for improvement. Comparatively, European audits have reported compliance rates between 70% and 85% [16].

Senior clinician review within four hours is particularly important in complex cases. Our compliance rate of 54.1% indicates suboptimal performance. Previous studies have shown that early consultant involvement reduces mortality and shortens hospital stay [17].

Staffing shortages emerged as the strongest independent predictor of delays. Workforce constraints are widely recognized contributors to emergency department overcrowding [18]. Similarly, peak-hour admissions were associated with delayed assessment, consistent with international literature [19].

Importantly, delayed physician review significantly increased length of hospital stay. This association may reflect progression of untreated pathology or delayed initiation of diagnostic pathways [20]. Early management in acute settings is known to reduce complications such as sepsis progression or cardiac deterioration [21].

This audit provides prospective local evidence highlighting operational inefficiencies in acute care delivery. Unlike retrospective database studies, prospective audits allow real-time monitoring and quality improvement planning [22].

Implementation of targeted interventions such as dedicated admission teams, optimized shift scheduling, and electronic alert systems may improve compliance [23]. Furthermore, senior clinician presence during peak hours may reduce delays.

The present prospective clinical audit provides an in-depth evaluation of timeliness in acute hospital admissions and demonstrates measurable deficiencies in compliance with predefined standards, particularly in physician and senior clinician review. While triage nursing assessment achieved relatively high compliance, delays in medical decision-making and escalation to senior staff represent significant quality gaps. These findings have important clinical, operational, and policy implications.

Timeliness in acute care is directly linked to patient outcomes. Early clinical evaluation facilitates rapid diagnosis, initiation of investigations, and therapeutic intervention. In time-sensitive conditions such as sepsis, acute coronary syndrome, stroke, and respiratory failure, even modest delays can significantly alter prognosis. In our audit, patients who experienced physician review delays beyond 60 minutes had significantly longer hospital stays. This association may reflect progression of underlying pathology, delayed initiation of definitive treatment, or inefficiencies in downstream processes such as imaging and laboratory investigations. Similar findings have been reported in multicenter observational studies where early intervention correlated with reduced complications and improved survival.

Senior clinician review demonstrated the lowest compliance rate (54.1%). Consultant involvement is known to improve diagnostic accuracy and streamline management plans. Senior review often results in early discharge decisions, avoidance of unnecessary investigations, and timely escalation of care. The relatively low compliance observed in this audit may be attributed to limited consultant availability during off-hours, competing responsibilities, and increased patient load. International evidence suggests that structured consultant-led acute medical units improve both efficiency and safety. Hospitals implementing extended consultant presence have demonstrated reductions in mortality and length of stay.

Staffing shortages were identified as the strongest independent predictor of delayed assessment. Workforce constraints are a global healthcare challenge, particularly in emergency departments and acute medical wards. Insufficient staffing leads to increased patient-to-clinician ratios, prolonged waiting times, and provider fatigue. Fatigue itself may contribute to cognitive overload, diagnostic error, and slower workflow. Addressing staffing gaps through strategic recruitment, optimized scheduling, and task redistribution may significantly enhance timeliness.

Peak-hour admissions were also significantly associated with delays. This finding aligns with established literature on emergency department crowding. High patient influx during evenings and weekends often exceeds available capacity, leading to bottlenecks in triage, assessment, and bed allocation. Implementation of surge protocols, dynamic staffing models, and real-time capacity monitoring systems may mitigate this effect. Additionally, predictive analytics based on historical admission trends could facilitate proactive resource allocation.

High triage acuity was independently associated with delayed physician review in this audit. While critically ill patients are expected to receive rapid attention, paradoxical delays may occur when multiple high-acuity cases present simultaneously. Competing emergencies may overwhelm available clinicians. This emphasizes the need for robust escalation protocols and rapid response teams to distribute workload effectively.

One notable finding was the significant increase in hospital length of stay among patients experiencing assessment delays. Prolonged hospitalization increases risk of hospital-acquired infections, venous thromboembolism, and deconditioning, while also escalating healthcare costs. The relationship between early assessment and reduced length of stay suggests that improving timeliness could yield both clinical and economic benefits.

From a quality improvement perspective, this audit highlights actionable targets. First, structured admission pathways could standardize early management. For example, predefined admission bundles for common conditions such as pneumonia or heart failure may reduce variability and expedite treatment. Second, implementation of electronic time-tracking dashboards could provide real-time feedback to clinical teams. Transparency of performance metrics often drives behavioral change.

Third, early warning score integration into triage systems may prioritize high-risk patients more effectively. Automated alerts to senior clinicians for abnormal physiological parameters could reduce escalation delays. Fourth, multidisciplinary admission teams—comprising physicians, nurses, pharmacists, and allied health professionals—may facilitate parallel processing of tasks rather than sequential workflow.

This audit also underscores the importance of continuous monitoring. Clinical audit is not a one-time activity but a cyclical process involving measurement, intervention, and re-evaluation. Re-audit following implementation of corrective measures is essential to determine effectiveness and sustain improvement.

Comparing these findings to international benchmarks, compliance rates in high-income countries often exceed 75% for initial physician assessment but vary widely for senior review. The comparatively lower compliance in this setting may reflect contextual resource limitations. However, even within constrained environments, process optimization can yield meaningful gains without substantial financial investment.

The prospective design of this audit strengthens its validity. Real-time data collection reduces recall bias and improves accuracy of time documentation. Additionally, the relatively large sample size enhances statistical power and generalizability within similar tertiary care contexts.

Nevertheless, several limitations must be acknowledged. As a single-center audit, external validity may be limited. Seasonal variation in admission patterns was not assessed, and the six-month duration may not capture annual trends. Furthermore, while associations between delays and length of stay were observed, causality cannot be definitively established.

Future directions should include multi-center audits to establish regional benchmarks. Incorporation of patient-reported outcomes, such as satisfaction and perceived waiting times, may provide complementary insights. Economic evaluation of delayed care could further support administrative investment in staffing and infrastructure.

The novelty of this study lies in its comprehensive assessment of the entire admission pathway—from arrival to definitive management—rather than isolated metrics. By identifying specific predictors of delay, the audit moves beyond descriptive analysis toward targeted intervention planning. Additionally, quantifying the impact of delays on length of stay strengthens the argument for system reform.

In conclusion, the extended analysis reinforces the central finding that timeliness in acute admissions remains suboptimal and is influenced by modifiable organizational factors. Strategic workforce planning, workflow redesign, real-time monitoring, and structured escalation pathways are key interventions that may enhance performance. Continuous audit and re-evaluation will be critical to sustaining improvements and ensuring patient safety in acute hospital settings.

CONCLUSION

This prospective clinical audit demonstrates that timeliness standards for acute hospital admissions are inconsistently achieved, particularly regarding senior clinician review. Delays are associated with staffing shortages and peak-hour pressures and contribute to prolonged hospitalization. System-level workflow optimization and targeted staffing interventions are necessary to enhance patient safety and acute care efficiency.

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ETHICS STATEMENT

Approved by Institutional Review Board (IRB No: PCMS/IRB/2024-AUD-011).

INFORMED CONSENT

Waived due to service evaluation audit design.

COMPETING INTERESTS

The authors declare no competing interests.

FINANCIAL DISCLOSURE

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