Evaluating The Effect Of Turnaround Time On Clinician Satisfaction In Clinical Laboratory Testing At Makkah Region Hospitals

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Abstract

Laboratory turnaround time (TAT) is one of the cornerstones of optimal clinical decision-making, with its immediate impact on patient quality of care in busy healthcare environments. This research explores the effect of TAT on clinician satisfaction in three Makkah region, hospitals. A questionnaire was administered to 160 clinicians, comprising physicians, nurse practitioners, and physician assistants, to elicit their experiences of TAT delays, their level of satisfaction with the quality of the provided laboratory services, and the effect of delays on their clinical practice. Delays in routine tests, notably biochemistry panels and hematology, were widespread and primary reasons for general clinician discontent. This resulted in delayed patient diagnosis and prolonged patient waiting time, leading to clinician frustration and wastage of resources. Suggested solutions were automated result reporting systems and enhanced laboratory staffing. The findings attest that hospitals must render their laboratory processes efficient to enhance TAT and their clinicians' ability to provide quality care. Recommended recommendations include the use of real-time tracking of results with electronic tools, as well as staff education for enhanced efficiency of the laboratory.

INTRODUCTION

In healthcare, clinical laboratories are important because they deliver testing results that help decide on the best care for patients. Turnaround time (TAT) is significant for laboratories since it measures the time it takes from when a specimen arrives until its result is reported (Zhai et al., 2023). In city hospitals, with high patient volumes and complicated medical cases, ready availability of the lab results is necessary for efficient workflows and optimal patient outcomes. TAT delays can interfere with clinical decision-making, increase patient wait times, and contribute to provider dissatisfaction, ultimately influencing overall quality of care

(Dawande et al., 2022). In Makkah region, hospitals that serve diverse patients with diverse medical needs, all of these challenges are ordinarily amplified by the scarcity of resources and high demands.

Despite its recognized value, little research directly explores its impact on clinician satisfaction, particularly in an urban healthcare system. Much of the available literature is focused on metrics that are inherently lab-based, for example, equipment effectiveness or internal processing delays, as opposed to the clinicians who act on those findings to perform their job adequately (Cherie et al., 2024). That is a significant limitation in that clinicians' level of satisfaction is directly linked with their ability to deliver patient-centered care in stressful environments. Laboratory delays interfere with clinical processes, leading clinicians to make clinical judgments with incomplete or delayed information or treatment, potentially losing confidence in the lab and increasing job tension. Urban hospitals with high-pressure, high-volume environments and diverse patient pools have unique challenges for effective TAT.

This study endeavors to fill this gap by examining the effect of TAT on clinicians' satisfaction in three Makkah region, city hospitals. The objectives of this research are, firstly, the major causes of delay in TAT; secondly, their impact on clinicians' satisfaction and clinical practice; and, finally, to propose practical solutions for streamlining the lab. While seeking primary data from a clinician-based questionnaire, this research provides a comprehensive understanding of real-world issues and their implications for healthcare provision. The research outcomes are meant to inform hospital administrators and lab managers on how to apply focused improvement measures that reduce TAT, facilitate clinicians' workflows, and, in turn, enhance patient outcomes in the healthcare system of urban areas.

METHOD

Study Design and Setting

This research employed a quantitative, cross-sectional design to examine the link between TAT in the laboratory and clinician satisfaction (Taherdoost, 2021). Data were gathered in three large Makkah region, hospitals, chosen for their high volume of patients, diverse range of clinical services, and high dependency upon clinical diagnostic laboratories. Sample inclusion criteria were tertiary hospitals with specialty departments of emergency medicine, internal medicine, and cardiology, representing a complete set of clinical environments in which TAT is most critical. Makkah was chosen as the setting for this research, with its designation as a large metropolitan city with a complex health system, high patient volume, and diverse medical demands, all of which serve to increase the challenge involved in TAT.

Participants and Sampling

The study targeted licensed clinicians, i.e., physicians and nurse practitioners, with a minimum of one year of professional practice in ensuring that they had experience with laboratory processes and their implications for clinical practice. The random sampling process was employed in recruiting the 160 clinicians, targeting sampling from a variety of departments and both day and night shifts. This sampling helped maintain a balanced representation of viewpoints of specialties with heavy dependency on laboratory reports, i.e., emergency medicine, and those with intermittent yet considerable requirements, i.e., cardiology. The sample size was selected to generate adequate data for significant analysis, but with feasibility in terms of time and resources of the study.

Data Collection Tool

A structured questionnaire was created based on a comprehensive literature review and consultations with clinical and laboratory experts to ensure appropriateness and precision (Taherdoost, 2021). The questionnaire included five sections: demographic details, delay frequency in TAT, satisfaction with lab services, perceived clinical workflow impacts, and improvement suggestions (see Appendix A). The questions were made simple but clear, with a quantitative response with 5 points (e.g., delay rate, 1 = never, 5 = always; for satisfaction, 1 = very dissatisfied, 5 = very satisfied). Open-ended questions were also administered for capturing the qualitative component. Pilot testing was done with 10 clinicians for clarity and reliability, and minor changes in question statements were made for improved understanding.

Data Collection Procedure

The questionnaire was distributed both electronically and in hardcopy form, with the electronic ones being distributed through hospital intranet mail systems and hard copies being left out during department meetings or briefings. It was on a voluntary basis, and clinicians had three weeks in which to complete it, reminders being sent by email on a weekly basis. Overall, 140 out of 160 distributed were completed and found valid for analysis, with a high response rate. Responses were stored in a secure web-based database for data integrity and easy analysis.

Ethical Considerations

All participants signed informed consent before filling out the questionnaire, and their responses were anonymized to ensure confidentiality. Data were kept securely, with the research team being the only ones with access, and all processes complied with ethical guidelines so that the privacy of participants and the integrity of the research process would be maintained.

RESULTS

Demographic Profile

One hundred and forty respondents were sampled, of whom 80 were physicians and 60 were nurse practitioners, representing the pool of clinical practitioners in participating hospitals. There were 72 females and 68 males, with a balanced gender distribution. The age of the participants averaged 40, ranging from 26 to 58, and covered new and old professionals. The clinicians had five or more years of experience, covering practicing professionals with experiential knowledge of the processes. The participants were also spread widely by department, with 50 in emergency medicine, 45 in internal medicine, 30 in cardiology, and 15 in others, covering the diversity of operating conditions in metropolitan hospitals. By shifts, there were 60 during day shifts, 40 during night shifts, and 40 during rotating shifts, covering the diversity of operating conditions in metropolitan hospitals.

TAT Delays and Satisfaction

Clinicians reported frequent delays, especially for the most frequently ordered diagnostic test sets, including hematology and biochemistry. Using a scale of 1 = never to 5 = always, the average delay score for hematology tests was 3.7, meaning delays were routine. An average delay score for biochemistry tests of 3.5 indicated that they were also routine but slightly less so compared with hematology. Microbiology tests, which usually require longer processing due to culturing, had the highest average delay score of 4.0. Emergency medicine clinicians reported delays most frequently, with an average delay of 3.9, partly due to their need for quick results to treat acute patients.

Satisfaction with lab TAT was generally low, mirroring the effect of these delays. The overall satisfaction rating in routine tests was 2.4 on a 5-point scale (1 = very dissatisfied, 5 = very satisfied), representing pervasive dissatisfaction. For urgent tests prioritized in labs, the slightly better overall rating was 2.6, but still below neutral. Clinicians in emergency medicine were least satisfied, with a rating of 2.2, whereas those in cardiology were most satisfied, with a rating of 2.8, possibly because their cases have less time-critical outcomes.

Average Scores for TAT Delays by Test Type

Test Type	Average Delay Score (1–5)
Hematology	3.7
Biochemistry	3.5
Microbiology	4.0

Note: 1 = never, 5 = always.

Average Satisfaction Scores by Department

Department	Average Satisfaction Score (1–5)
Emergency Medicine	2.2
Internal Medicine	2.5
Cardiology	2.8

Note: 1 = very dissatisfied, 5 = very satisfied.

Impact on Clinical Work

TAT delays also significantly affected clinicians' timeliness in delivering care. Many said delays hindered patient diagnosis, with an average impact rating of 3.8 out of 5 (1 = never, 5 = always). Long patient waits were another frequent problem, with a mean rating of 3.6, suggesting delays intruded on hospital efficiency and patient satisfaction. Open-ended comments reflected clinicians' frustrations. A cardiologist commented, "Delayed lab results cause our entire clinic schedule to get disrupted, with patients being kept waiting longer than necessary." An emergency medicine clinician said, "Slow results compel us to make decisions with incomplete information, which is stressful and risky."

Recommended Enhancements

Several solutions were suggested by clinicians for TAT reductions, with high support for technological upgrades and staffing increases. Automated reporting of results held the highest average approval rating of 4.2 (not helpful = 1, very helpful = 5), with clinicians thinking they could decrease manual retrieval time and make results more accessible. Laboratory staffing increases were also widely supported, with an average rating of 4.0, representing the need for increased personnel for high-volume samples. Digital tracking programs, allowing clinicians to track the progress of results in real time, had an average of 3.9. Open-ended responses offered some clinicians further ideas, including in-house lab liaisons to increase communication between clinical areas and laboratories. An internal medicine clinician said, "Having a direct contact in the lab to check on results would make a big difference in our workflow." Both suggestions offer practical recommendations for hospital administrators.

DISCUSSION

The study's findings show that TAT delays are a significant concern for clinicians in Makkah region, city hospitals, especially for routine tests such as biochemistry and hematology panels.

Frequent delays by clinicians corroborate earlier research pointing out staffing shortages and obsolete lab processes as primary barriers to efficiency (Zhai et al., 2023). Based on how well they were able to help with people's problems right away, emergency medicine doctors got the most delays and were less happy with their results. This suggests that laboratories need to focus on getting test results back more quickly for areas that need them right away, and they could do this by moving around staff or using special tools to put important tests at the front of the line (Dawande et al., 2022).

The impact of TAT delays goes beyond just slowing down work, as it also harms how well patients do and makes doctors and staff feel less happy with their jobs. High overall scores for delayed diagnosis and patients waiting longer show that longer TATs can really affect how patients feel and how well the hospital works day to day. Clinicians' open-ended comments also show that having to wait for test results can be stressful for them, making them anxious and frustrated when they have to do their job without getting the reports on time (Paul et al., 2023). The findings show that there should be changes made to help doctors in super busy city hospitals, where they deal with many patients and have to meet many demands.

Proposed solutions, such as result reporting automatically and increased staffing, offer promising opportunities for improvement. Automation can make result release smoother by reducing manual handling, and increased staff can enable laboratories to handle workload variability better (Cherie et al., 2024). Digital monitoring systems, through which clinicians are able to observe progress in results, can also improve transparency and reduce follow-up calls made to the lab. However, investing in technology and staff training is necessary for developing solutions that may be prohibitive for financially strained hospitals. Beginning with cheaper options, like improved communication channels or staff education, may yield short-term benefits while longer-term options are developed.

One of this study's strengths is its clinician-centric focus since it identifies downstream impacts of TAT delays on clinicians directly involved in patient care. By merging quantitative survey responses with qualitative findings, the study offers a complete picture of the challenges and potential solutions. However, the research is confined to Makkah's urban hospitals, whose resources and patient populations may differ from those of rural or small facilities. Satisfaction ratings could also be driven by external variables, like overall workload or hospital culture, which are not examined in detail (Byrum, 2021). Future research could assess proposed solutions, like automated reporting tools, in terms of effectiveness through pilot projects or longitudinal designs to quantify their effect on TAT and clinician satisfaction.

CONCLUSION

This research underlines the effect of laboratory TAT delays on clinician satisfaction in Makkah region, urban hospitals. Systematic delays in biochemistry, hematology, and microbiology tests result in overall dissatisfaction, delay in patient diagnosis, and longer waits, notably in high-pressure units such as emergency medicine. Clinicians have made recommendations such as using automated systems to issue results, improving staffing numbers, and using electronic monitoring, all of which could address this issue. It is important for hospital and clinical lab managers to focus on cutting the TAT, as it allows doctors to initiate treatment faster and leads to better patient results. Long-term studies are needed to confirm the success of proposed measures in different health care settings.

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Appendix A: Survey Questionnaire

Section	Questions	Response Options
Demographics	1. Age	_____ (Years)
	2. Gender	☐ Male ☐ Female ☐ Other
	3. Role	☐ Physician ☐ Nurse Practitioner
	4. Department	☐ Emergency Medicine ☐ Internal Medicine ☐ Cardiology ☐ Other: _____
	5. Years of Experience	☐ 1–3 ☐ 4–6 ☐ 7–10 ☐ >10
TAT Delays	6. How often do you experience TAT delays for hematology tests?	☐1 (Never) ☐2 ☐3 ☐4 ☐5 (Always)
	7. How often do you experience TAT delays for biochemistry tests?	☐1 (Never) ☐2 ☐3 ☐4 ☐5 (Always)
	8. How often do you experience TAT delays for microbiology tests?	☐1 (Never) ☐2 ☐3 ☐4 ☐5 (Always)
Satisfaction	9. Rate your satisfaction with TAT for routine tests.	☐1 (Very Dissatisfied) ☐2 ☐3 ☐4 ☐5 (Very Satisfied)
	10. Rate your satisfaction with TAT for urgent tests.	☐1 (Very Dissatisfied) ☐2 ☐3 ☐4 ☐5 (Very Satisfied)
Impact	11. Do TAT delays cause delayed diagnoses?	☐1 (Never) ☐2 ☐3 ☐4 ☐5 (Always)
	12. Do TAT delays increase patient wait times?	☐1 (Never) ☐2 ☐3 ☐4 ☐5 (Always)
Solutions	13. Would automated result reporting help?	☐1 (Not Helpful) ☐2 ☐3 ☐4 ☐5 (Very Helpful)

	14. Would more laboratory staff help?	☐1 (Not Helpful) ☐2 ☐3 ☐4 ☐5 (Very Helpful)
	15. Would digital result tracking help?	☐1 (Not Helpful) ☐2 ☐3 ☐4 ☐5 (Very Helpful)
Open-ended	16. What is the biggest TAT-related challenge in your work?	[Open Text]
	17. What would improve laboratory efficiency?	[Open Text]