JOURNAL OF PHARMACEUTICAL ANALYSIS

THE IMPACT OF LABORATORY AND NURSING INTERACTION ON DIAGNOSTIC ACCURACY AND TIMELINESS OF MEDICAL DECISION-MAKING

Norah Oudah Almunaffi Alruwaili
Higher Diploma Nursing Technician, Turaif General Hospital. Email: norahoa@moh.gov.sa

Jamilah Shehab Silan Alruwaili
Nursing Technician, Nursing and Midwifery, Jouf Maternity and Children's Hospital. Email: jsalrweli@moh.gov.sa

Fatimah Hamad Nasser Alwaliai
Laboratory Specialist, North Medical Tower Hospital. Email: falwaliai@moh.gov.sa

Musaddaha Asri Mater Alhazmi
Laboratory Technician, North Medical Tower Hospital. Email: m.t.d.09@hotmail.com

Rahaf Saleh Mohammad Alshammari
Bachelor of Nursing, Maternity and Children's Hospital. Email: RAlshammari25@moh.gov.sa

Khulfaha Ali Salem Alenazy
Nursing Technician, Al-Jouf Health Cluster, Al-Hamidiyah Primary Care Health Center, Al-Qurayyat.

Abstract:
Effective interaction between laboratory services and nursing teams plays a crucial role in ensuring accurate and timely diagnostic results, which directly influence medical decision-making. Delays in sample collection, labeling errors, communication gaps, and improper specimen handling can compromise diagnostic accuracy and extend turnaround times. This literature-based paper explores how collaboration, communication quality, standardized procedures, and professional competency between nursing and laboratory staff affect diagnostic processes. Evidence from peer-reviewed studies shows that strong interprofessional coordination enhances test accuracy, reduces errors, and speeds up clinical interventions, ultimately improving patient outcomes. Strengthening the relationship between laboratory and nursing teams is therefore essential for supporting safe, efficient, and reliable healthcare services.

Introduction

Accurate and timely diagnostic decision-making is a cornerstone of high-quality healthcare and directly influences patient outcomes, treatment effectiveness, and overall system efficiency. Within the hospital environment, nurses and laboratory professionals serve as essential partners in the diagnostic process. Nurses are often the first to assess patients, identify the need for diagnostic testing, collect specimens, and monitor patient conditions, while laboratory personnel ensure accurate processing, analysis, and reporting of results. The interaction between these two disciplines forms a critical interface that significantly affects diagnostic accuracy and the speed at which clinicians receive actionable information.

Despite technological advancements in laboratory automation and electronic health systems, communication gaps, workflow delays, specimen handling errors, and unclear responsibilities

continue to impact the diagnostic cycle. Poor coordination between nursing and laboratory teams may lead to delayed reporting, repeated testing, misinterpretation of results, and, ultimately, delayed clinical decisions. Conversely, strong collaboration—characterized by clear communication, shared protocols, and mutual understanding of workflow challenges—can reduce errors, shorten turnaround times, and optimize patient management.

Keywords:
Nursing–laboratory collaboration; Diagnostic accuracy; Turnaround time; Interprofessional communication; Specimen handling; Patient safety; Clinical decision-making; Healthcare quality.

Methodology:
This paper utilizes a narrative literature review methodology, based on analyzing peer-reviewed scientific articles from reputable journals indexed in databases such as PubMed, Scopus, and Web of Science. Only studies focusing on laboratory–nursing interaction, diagnostic accuracy, turnaround time, and clinical decision-making were included. No statistical analysis was performed; instead, the review synthesizes published evidence to identify common themes and conclusions relevant to the topic

Literature Review :
Effective coordination between nursing and laboratory services is essential for ensuring accurate and timely diagnostic results. Studies consistently show that most laboratory errors occur in the pre-analytical phase, where nurses are primarily responsible for specimen collection, labeling, and transport. Poor communication or inadequate technique during this stage may lead to mislabeling, sample rejection, or delays, all of which negatively affect diagnostic accuracy and clinical decision-making.

Evidence also indicates that strong interaction—such as clear communication pathways, standardized protocols, and shared training—significantly improves turnaround times and reduces pre-analytical errors. Research demonstrates that when nurses and laboratory staff collaborate closely, critical test results are communicated faster, allowing physicians to make timely treatment decisions, especially in emergency and intensive care settings.

Technology, including electronic ordering systems and automated tracking, further enhances coordination, but studies emphasize that human communication remains a decisive factor. Persistent challenges such as unclear responsibilities, workload pressure, and limited interprofessional understanding continue to impact workflow efficiency. Overall, the literature supports that improving the quality of interaction between nursing and laboratory teams leads to better diagnostic accuracy, fewer errors, and more timely medical decisions.

Discussion:
The literature consistently demonstrates that the interaction between nursing and laboratory departments is a critical determinant of diagnostic accuracy, workflow efficiency, and timely clinical decision-making. Strengthening this interprofessional relationship not only improves the technical aspects of laboratory testing but also enhances overall patient safety and clinical outcomes. The findings from the reviewed studies highlight several key themes that deepen the understanding of how collaboration—or lack thereof—affects diagnostic processes.

First, the pre-analytical phase emerges as the most vulnerable step in the diagnostic pathway. Errors such as incorrect labeling, improper sample collection, and delayed specimen transport are strongly linked to communication gaps between nursing and laboratory staff. When workflow expectations are unclear or when staff training is inconsistent, these errors increase, resulting in repeated testing, delays in treatment, and compromised diagnostic validity. This underscores the need for standardized specimen-handling protocols that are jointly developed and monitored by both teams.

Second, timely communication plays a pivotal role in improving clinical decision-making. Studies indicate that rapid reporting of critical values, supported by clear escalation pathways,

significantly reduces morbidity in emergency and critical care settings. When laboratory and nursing teams maintain real-time channels of communication—whether through digital systems or structured verbal reporting—the diagnostic process becomes more streamlined and predictable. Conversely, inefficient communication systems often lead to delays, duplication of work, and increased frustration among healthcare workers.

Third, interprofessional education and shared training initiatives have been shown to strengthen mutual understanding of roles and responsibilities. Nursing staff who receive structured training on pre-analytical requirements demonstrate lower specimen rejection rates, while laboratory professionals who understand clinical workflow demands are better equipped to prioritize urgent tests. Such training also helps improve the culture of teamwork, reducing the traditional silo mentality that often impedes collaboration.

Fourth, the integration of digital solutions provides substantial opportunities for improving accuracy and speed. Electronic test ordering, automated specimen labeling, barcoding, and electronic tracking systems reduce human error and enhance transparency in the testing process. However, the effectiveness of these technologies depends on proper adoption by both nursing and laboratory personnel. Without joint training and shared accountability, digital tools cannot fully compensate for communication deficiencies.

Despite these positive trends, several persistent challenges continue to affect diagnostic performance. High workload, staffing shortages, competing priorities, and time pressure often contribute to lapses in communication and adherence to protocols. Differences in departmental cultures—such as nursing's patient-centered workflow versus the laboratory's analytical focus—may also hinder effective coordination. Addressing these barriers requires organizational commitment, leadership support, and continuous quality improvement efforts that emphasize teamwork and shared responsibility.

Ultimately, the literature suggests that improving nursing–laboratory interaction is not merely a technical adjustment but a systemic change. It requires a shift toward collaborative practice models supported by clear policies, aligned expectations, performance monitoring, and ongoing education. By investing in these improvements, healthcare organizations can significantly enhance diagnostic reliability, reduce preventable errors, and support faster, more informed clinical decision-making.

Conclusion:

This review highlights the critical role of effective interaction between nursing and laboratory teams in ensuring diagnostic accuracy and timely clinical decision-making. Evidence consistently shows that strong collaboration—supported by clear communication, standardized protocols, mutual understanding of roles, and continuous training—significantly reduces pre-analytical errors, improves specimen quality, and accelerates laboratory turnaround times. These improvements directly enhance patient outcomes, particularly in high-acuity settings where rapid diagnostic information is essential for life-saving interventions.

Although technological advancements such as electronic ordering systems and automated tracking provide valuable support, they cannot replace the need for efficient human communication and coordinated workflows. Persistent challenges related to workload, staffing, and inconsistent adherence to procedures highlight the necessity for system-level strategies that strengthen interprofessional relationships.

Overall, fostering a collaborative environment between nursing and laboratory departments is essential for promoting patient safety, improving diagnostic reliability, and supporting efficient, evidence-based clinical practice. Healthcare organizations aiming to optimize diagnostic performance must prioritize integrated teamwork models, invest in ongoing training, and ensure that communication pathways between the two departments remain timely, structured, and effective.

References:

1. Andrade, C. (2018). The preanalytical phase of laboratory testing and its impact on patient safety. *Indian Journal of Psychological Medicine, 40*(3), 211–213.
2. Barth, J. H. (2020). Clinical laboratory turnaround time and patient outcomes. *Clinical Chemistry, 66*(5), 641–643.
3. Campbell, C. A., & Zuk, J. (2019). Improving communication between laboratory and clinical staff to enhance diagnostic accuracy. *Journal of Healthcare Quality, 41*(4), 223–230.
4. Cornes, M. P., et al. (2019). Reducing pre-analytical errors: Current strategies and best practices. *Biochemia Medica, 29*(2), 020501.
5. Hawkins, R. (2017). Managing the pre-analytical phase to improve laboratory quality. *Clinics in Laboratory Medicine, 37*(1), 1–14.
6. Lippi, G., & Plebani, M. (2020). Interprofessional collaboration in laboratory medicine. *Clinical Chemistry and Laboratory Medicine, 58*(3), 364–372.
7. Plebani, M. (2017). Errors in laboratory medicine and patient safety: The road ahead. *American Journal of Clinical Pathology, 148*(4), 224–230.
8. Almatrafi, L., et al. (2021). Impact of nursing communication on patient outcomes in acute care settings. *Journal of Nursing Management, 29*(5), 1021–1029.
9. Forsman, R. (2017). Why is the laboratory an afterthought for improving patient care? *Clinical Chemistry, 63*(6), 1020–1022.
10. Zaninotto, M., & Plebani, M. (2020). The importance of sample quality in laboratory diagnostics. *Biochimica Clinica, 44*(3), 251–258.
11. Green, S. F. (2018). The role of nurses in ensuring diagnostic quality through proper specimen handling. *Nursing Outlook, 66*(4), 398–404.
12. Phansalkar, S., et al. (2019). Timely communication of critical laboratory values: Best practices and challenges. *BMJ Quality & Safety, 28*(9), 753–760.
13. Trenchard, M., et al. (2020). Collaborative practice between clinical laboratories and nursing units: A systems approach. *Journal of Interprofessional Care, 34*(2), 260–267.
14. Westbrook, J. I., et al. (2018). Delays in laboratory test results and clinical decision-making. *BMJ Open, 8*(10), e020123.
15. Lippi, G., et al. (2017). Pre-analytical variability and its influence on diagnostic accuracy. *Clinical Biochemistry, 50*(10–11), 587–594.
16. Callen, J., et al. (2016). Errors in medical test ordering, sample processing, and result communication. *International Journal of Medical Informatics, 95*, 9–18.
17. Bryant, J., et al. (2020). Nursing–laboratory workflow integration to reduce turnaround times. *Nursing Management, 51*(7), 22–29.
18. Salinas, M., & López-Garrigós, M. (2021). Interdepartmental cooperation in laboratory medicine: Enhancing diagnostic efficiency. *Biochemia Medica, 31*(1), 010201.
19. Romero, R., et al. (2022). Improving diagnostic timeliness through optimized laboratory processes. *Diagnostic Pathology, 17*(1), 1–9.
20. Nguyen, K., et al. (2023). Factors affecting turnaround time in hospital laboratories: A systematic review. *Healthcare, 11*(4), 589.