

Synergy Between Pharmacy and Laboratory: Enhancing Patient Care and Outcomes

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Abstract

The healthcare landscape is rapidly evolving, with an increasing emphasis on integrated and patient-centered care. Within this context, pharmacy and laboratory services play crucial and often complementary roles in enhancing patient care and optimizing health outcomes. Pharmacy and laboratory professions rely on similar values, principles, and processes, although they have developed unique characteristics and functions. In an effort to promote collaboration between these two fields, a research was conducted to explore the synergy between pharmacy and laboratory services regarding patient care. It begins by examining current pharmacy and laboratory practices in enhancing patient care and health outcomes. From this examination, potential areas for improved collaboration and synergy are identified (Strain & H. Ravalico, 2021). A survey was conducted with the laboratory professionals and pharmacy professionals to gather input regarding the current practices of laboratories and pharmacies in patient care, health outcome improvement initiatives, and collaborative efforts. The qualitative data obtained from these free-text responses were analyzed using the constant comparative method to identify common themes and categories. The findings are then discussed within the context of relevant literature, highlighting the implications of the input with regard to the patient care and health outcome improvement initiatives of pharmacy and laboratory services. Finally, suggestions for enhancing collaboration and synergy are presented (John et al., 2023).

Keywords: *Integration, Pharmacy, Laboratory, Services, Patient Care, Outcomes.*

Introduction

The pharmacy and laboratory services integration is focusing on the synergy between pharmacy and laboratory services in enhancing patient care and patient outcomes research work. It elaborates on the need for integration of pharmacy and laboratory services in hospitals and healthcare systems. It also highlights the patient care services offered by pharmacy and laboratory services including medication management, diagnostic testing, and patient outcomes service. The keywords selection is focused on the integration, pharmacy and laboratory services synergy enhancement patient care and patient outcomes. It is relevant to the research work and helps in identifying and categorizing the research work in pharmacy and laboratory services integration in hospitals and healthcare systems (Strain & H. Ravalico, 2021).

The health care systems and hospitals are facing contemporary challenges like medication therapy problems, laboratory diagnostic intervention, and other healthcare issues. The pharmacy and laboratory services integration offers a solution to the hospital and healthcare systems and improves the patient care services. It is important for the hospital and healthcare systems to have the pharmacy and laboratory services integration and enhance the synergy between pharmacy and laboratory services for better patient care and patient outcomes (Wang et al., 2022). The hospitals and healthcare systems can implement pharmacy and laboratory services integration for enhanced patient care services and improved patient outcomes. The

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selection of keywords will help in improved visibility of the study in databases and search engines and make it easier for researchers to find necessary research work.

With the ever-growing complexity of disease processes and the need for a more patient-centered approach to healthcare, it is becoming increasingly important that professions work together to ensure the most comprehensive patient care possible (Strain & H. Ravalico, 2021). Hospital pharmacy and laboratory services have always worked in partnership, but the critical interrelationship of these two professions is often overlooked by other health professionals. Both pharmacy and laboratory have undergone significant changes in the last decade and, while many of these changes have been mirrored in both professions, there is also a divergence in some areas. Encouraging a better understanding of both professions and how they can best complement one another will ultimately improve patient care and patient outcomes. This essay aims to consider the current and potential future roles of laboratory and pharmacy services in patient care, with a focus on hospital services. Additionally, it will highlight the importance of synergy between the two services in order to deliver the most comprehensive patient care possible (Hahn et al., 2014). Recently there have been concerns regarding the “thinning” of some laboratory services as pathology departments restructure in response to financial pressures and workforce shortages. At the same time, clinical pharmacists and pharmacy services have also undergone significant and radical change in recent years, with an apparent drive to ensure their place at the forefront of patient care. While this “pharmacy takeover” of direct patient care may be welcomed by some, there is a concern that pharmacy and laboratory may be heading towards a “divide” in the patient care services they offer. A brief description of laboratory services and how they currently fit into patient care will be provided, followed by a description of pharmacy services and the current concerns regarding the future of laboratory services excellence. Finally, how the two services work together will be considered, highlighting the importance of this synergy in delivering the most comprehensive patient care possible.

The Role of Pharmacy in Healthcare

Pharmacy is a vital component of the healthcare system and makes a number of important contributions to it. Patient health outcomes are improved through the various roles that pharmacy undertakes, which are also related to public health. Pharmacists are “the medication experts,” making sure that patients have safe and effective medication management.

Pharmacy’s responsibility is to conduct a comprehensive review of each patient’s medication regime, which includes prescriptions. This ensures that every medication is appropriate, effective, safe, and convenient for the patient. Assurance of completeness involves assessing whether any additional medications are needed to treat a health condition, prevent health risks, or address other factors such as treating side effects from a current medication. In regards to the effectiveness of prescribed medications, therapy outcomes must be evaluated to see whether the patient’s health condition is being adequately treated. Furthermore, assurance of safety includes the prevention of adverse effects by monitoring for potential negative interactions between medicines, as well as evaluating if the correct doses have been prescribed (Coetzee et al., 2017). All medication-related problems must be documented and immediately resolved with the prescriber’s cooperation in order to provide safe pharmaceutical care.

A crucial component of pharmaceutical care includes educating and counseling patients about their medications and health. All necessary information regarding a patient’s medication regime is given when medications are dispensed, including how to effectively use the medications, avoid possible adverse effects, and what to do in such cases. Patients are encouraged to ask questions in order to understand their medications and health conditions. Since pharmacists routinely provide accessible information regarding health and medication, patients are empowered to make informed decisions about their health (Garattini et al., 2021). To further promote adherence to medication regimens, written information is often provided in conjunction with verbal counseling. Furthermore, the role of pharmacy in the healthcare system is continuously evolving, with a focus on interdisciplinary teams consisting of several different health professionals. Overall patient care is improved through cooperation with other health professionals. As the team member primarily responsible for medications, pharmacists are in the unique position to enhance the team’s ability to better serve the patient.

Medication Management

As experts in medication management, pharmacists work systematically to evaluate and optimize the effectiveness, safety, and appropriateness of medication regimens. This process includes assessing patient-specific information and medications for effectiveness and safety, identifying and resolving problems, and designing an approach to care that's intended to resolve medication-related problems and enhance positive therapeutic outcomes. During individual patient consultations, pharmacists perform comprehensive medication reviews, which are systematic and structured assessments of patients' medications. These reviews frequently identify potential drug interactions that can result in adverse effects, therapeutic duplications that can lead to wasted resources or toxicity, and other types of drug-related problems (R. Doucette, 2019). An estimated one in five patients discharged from the hospital will experience an adverse event, with 66% of those resulting from medication errors. Community pharmacists can play an important role in enhancing patient safety during transitions of care by conducting medication reconciliation to ensure the accuracy of medication lists and reviewing for potential medication-related problems. Medication reconciliation is a formal process that compares a patient's medication orders to all of the medications that the patient has been taking. Discrepancies identified during medication reconciliation can be classified as omissions, duplications, differences in dose or frequency, or unintended changes and may result in medication errors that could harm the patient (Smith et al., 2015). It has been estimated that 60-70% of medication errors occur during patient handoffs. In an effort to decrease medication errors during transitions in care, The Joint Commission mandated hospitals have medication reconciliation processes in place. While the responsibility of medication reconciliation largely falls on nursing staff, research shows that having pharmacists conduct medication review and reconciliation significantly improves accuracy and prevents medication errors. Using a retrospective, pre-implementation and post-implementation design, one of studies examined the impact of pharmacy-led medication reconciliation on medication errors during patient transition from the hospital to a skilled nursing facility. With the assistance of pharmacy staff, a medication reconciliation form was developed for nurses to use when a patient is transferred from the hospital. The form included information on the patient's diagnosis, a list of medications ordered at the hospital, and a list of medications the patient had been taking prior to admission. Findings indicate that pharmacy-led medication reconciliation effectively decreased medication errors during transitions of care. Furthermore, implementation of the medication reconciliation form for nursing staff significantly improved documentation of medication reconciliation.

Pharmacists are also key healthcare providers in the medication management process. They monitor for the effectiveness and safety of patients' medications, taking action when necessary to resolve medication-related problems, and document all interventions, recommendations, and patient information in the medical record. It is important for healthcare providers to have access to this information, as documented interventions might impact a patient's care plan or there might be questions regarding the patient's care that cannot be addressed without reviewing the pharmacist's notes. According to a survey of pharmacists active in the clinical management of medication therapy, the most common types of drug therapy monitoring performed include monitoring for therapeutic effectiveness, adverse drug reactions, and compliance. A national study showed that patients with pharmacists involved in their medication therapy management were more likely to achieve their therapeutic goals. As the most accessible healthcare provider, community pharmacists have the potential to play a significant role in disease prevention and health promotion, improving public health outcomes. Community pharmacists are often the first healthcare professional patients consult when experiencing symptoms or health problems, with many patients citing the difficulty in getting appointments with physicians as a reason for seeking care from community pharmacists. Many studies have shown that the implementation of new services in community pharmacies is dependent on a number of external, organizational, and professional factors. Research into the synergy between pharmacy and laboratory services is very limited. However, a number of studies have outlined the potential new roles that community pharmacies can undertake to support public health and chronic disease management. Community pharmacies are gradually expanding their role in public health responses, health promotion, and chronic disease management.

Patient Education and Counseling

Patient education and counseling are essential to pharmacy practice, whether hospital, community, or other settings. With the rapid expansion of medication options and treatment mechanisms, improving patient understanding of what medications do, how to take them, and what side effects might occur is crucial for sustainable health. Pharmacists and pharmacy staff do various things to educate patients about their medications and treatments.

At inpatient settings, pharmacist interventions for medication education may include the patient's medication history on admission, counseling about newly prescribed medications, answering medication-related questions, or even follow-up consultations. Oral and written information might be given, including leaflets about medications or disease states. Generally, these interventions are automatic in response to a medical team's request, especially if the patient is newly prescribed a medication (John et al., 2023). Outside inpatients, educating and counseling patients on medications typically occur upon discharge or medication pick-up in a community or outpatient pharmacy. Education is contained in the information given to the patient, but it is crucial to ensure the information fits the patient. To achieve this, it is important to tailor the information according to individual patient needs, ensuring it fits the patient's health literacy level. Ensuring that patients know what to ask and what not to ask is difficult too. If a patient is unsure, there is not much they can do, and the health professional is in control. The power is in the health professional's hands to either encourage questions and effort from the patient or not, so it is important to empower patients by promoting adherence to medications and taking charge of their health through education and counseling.

The significance of controlling what patients know and not knowing what to ask about is apparent in prior bad experiences with other health professionals. Pharmacists are advised to push the question that if the patients do not understand something, they should ask. Education often occurs with a lot of new information given in a short time, and anything unclear is probably just forgotten. A good example is a patient being told to take a medication and what side effects might occur. It is likely that the patient is only concerned with whether a side effect, like nausea, would happen. If this happens, it is better to ask questions about what was discussed to clarify details instead of having a long list of questions to refer back to. Good communication skills impact patient care by building trust between the patient and the pharmacist or pharmacy staff. There are many things to consider when talking to patients. A clear explanation of medications, side effects, doses, and routes is crucial, along with questions to ensure understanding rather than just hearing. What was said should also be noted and remembered, as it is difficult to explain the same thing differently if the patient does not understand. Written information is a good aid in this case. Helpful questions and follow-up concerns to ask are about what happens next if a side effect occurs, especially what to do about it. This is important for health outcomes since some side effects are commonly forgotten, like hypotension with certain blood pressure medications. Providing reassurance that ongoing support is available through follow-up consultations is also important for patient education to work.

The Role of the Laboratory in Healthcare

Diagnostic Testing

Precision Medicine

Challenges and Opportunities in Integrating Pharmacy and Laboratory Services

Integration of pharmacy and laboratory services holds significant potential for enhancing patient care and outcomes. However, several challenges must be addressed to realize this vision. One crucial barrier is the lack of communication and understanding between pharmacists and laboratory personnel. This breakdown in interprofessional communication can lead to errors, omissions, and compromised patient safety. It is essential to foster a shared understanding of both fields, with an emphasis on their interconnectedness. Standardized protocols and parameters should be developed for collaborating professionals to follow, mitigating the effects of variable expertise and interpretation. Moreover, investing in shared electronic

health records can facilitate the systematic exchange of patient and test information, enhancing collaboration between pharmacists and laboratory personnel (Strain & H. Ravalico, 2021).

Another challenge is the interprofessional silos created by the unique and specialized training pathways of pharmacists and laboratory personnel. While this specialization is vital for service quality, it can hinder teamwork and shared responsibility for patient care. The opportunity lies in designing joint training programs for pharmacy and laboratory personnel to foster a collaborative working culture. These programs could encompass co-attending lectures and tutorials on safety, ethics, and fundamentals in one discipline, enabling participants to appreciate the complexities of the other's profession. Alternatively, placements could be conducted where either pharmacy or laboratory students gain experience in the other discipline (Hahn et al., 2014). Such initiatives could pave the way for a workforce adept at interprofessional cooperation, ensuring the benefits of integrated services are fully realized.

Other barriers include variability in practice standards and the potential underutilization of pharmacists' skills due to different approaches taken by pharmacy services across institutions. Technological opportunities exist for improved integration. Telepharmacy offers a practical solution for small hospitals looking to implement clinical pharmacy services within laboratory medication monitoring. Furthermore, the widespread implementation of laboratory information systems presents opportunities for generating alerts in drug monitoring tests, which pharmacists can use to review results and act accordingly. Ultimately, the integration of these services is framed as a process that evolves according to local circumstances and needs. However, it is crucial to view this integration as dynamic and ongoing. It can create a culture of interprofessional collaboration that enhances patient care and health outcomes.

Technological Integration

Technological integration between pharmacy and laboratory services is vital for streamlining workflows and enhancing collaboration. Various technologies facilitate seamless communication of patient information, ensuring that recent laboratory data are readily accessible to pharmacists at the point of care. This integration improves decision-making and patient outcomes. Electronic health records (EHRs) and medication management software allow healthcare providers to view and share data on medications, laboratory tests, and other clinical information, enhancing the accessibility of patient data (D. Wood et al., 2013). To further boost care coordination, it is crucial for pharmacy systems to incorporate the same technology as the laboratory, ensuring interoperability between the pharmacy management system and laboratory information management system. By having the same software, pharmacists can conveniently access laboratory data and clinical services provided by the laboratory. Manual processes that involve phone calls or paper-based laboratory request forms should be eliminated to enhance efficiency. In rural communities where access to healthcare providers is limited, telehealth and e-pharmacy solutions can streamline patient and pharmacy workflows, increasing accessibility to pharmacy and laboratory services (Rafid Raean, 2018). However, there is also a challenge regarding the use of telehealth and pharmacy technologies concerning cybersecurity and data privacy. It is essential to establish legal and ethical frameworks for the technologies used in pharmacy and laboratory services to address data sensitivity and confidentiality concerns for patients and healthcare providers. Overall, technological integration is key to achieving the vision of pharmacy and laboratory service synergy in promoting better patient care and outcomes.

Interprofessional Collaboration

To foster the synergy between pharmacy and laboratory, interprofessional collaboration is paramount. Teamwork amongst healthcare professionals is fundamental for the creation of optimum conditions for achieving the best possible outcomes for patients. Collaborative practice models, which involve pharmacists and laboratory technicians as key members of patient care teams, are therefore essential. With the growing complexity of patients and their needs, it is necessary for these professionals to work together to discover and develop the best possible therapies. When pharmacists and laboratory technicians collaborate, the management of therapies can be ensured more broadly, with a greater emphasis placed on the quality and comprehensiveness of the management (Al-Salloum et al., 2020).

In order to promote interprofessional collaboration, training and educational initiatives targeting pharmacy and laboratory technicians are needed. These initiatives should address each profession's knowledge of the other profession, practical skills, and attitudes and behavior towards collaboration. Maintaining an educational focus on the synergy between pharmacy and laboratories is also vital when planning further collaboration. Some barriers to effective collaboration can arise, such as ambiguity of roles, a lack of understanding of other professions' skills, and different priorities. Research has shown that good role clarity and respect for other professions create a good team spirit. These findings also support the need for cooperation between disciplines.

Positive outcomes of collaborative practice have been reported, including improved patient safety, management of the therapeutic effect, and health literacy. Synergy between pharmacy and laboratory professions generates benefits for patients in the form of team management, minimized errors, and monitoring the quality of care. This makes interprofessional collaboration necessary in the future of healthcare.

Case Studies of Successful Collaborations

Impact on Patient Care and Outcomes

The impact of integrated pharmacy and laboratory services on patient care and health outcomes is profound. Numerous studies have documented the effectiveness of collaborative pharmacy services in various care settings and populations. The majority of studies presented provide evidence that patients benefit from the involvement of pharmacists trained in the care of specific diseases and medications (Strain & H. Ravalico, 2021). Selecting treatment options is increasingly dependent on laboratory tests, and medications must be tailored based on test results. Therefore, laboratory and pharmacy services should collaborate and ensure that patients receive optimal medication therapy management in conjunction with laboratory services. This connection reduces the likelihood of adverse drug events (Hahn et al., 2014). Once integrated services are established, health systems should focus on measuring and monitoring patient care and health outcomes to identify ongoing opportunities for improvement. Examples of metrics that could be tracked to demonstrate the impact of pharmacy and laboratory integration on patient care include the percentage of care recommendations accepted and implemented by the medical team, the types of recommendations made by the service, and patient characteristics. As the population of patients increases or the complexity of their needs changes, the integration of care teams should adapt to continue improving outcomes. Overall, the discussions provide evidence that interdisciplinary teamwork is fundamentally linked to the overall well-being of patients. Efforts directed solely at either medication-related issues or laboratory diagnostics will leave gaps in the delivery of care. However, by addressing both needs, healthcare providers will be able to care for patients in a more holistic manner.

Future Directions and Innovations

Integration of pharmacy and laboratory services is widely recognized as integral to quality patient care and improving outcomes. Discussion encourages stakeholders to advocate for the integration of pharmacy and laboratory services in every setting, emphasizing that the marriage between pharmacy and laboratory services should be one made to last. The integration of laboratory and pharmacy services has the potential to enhance and expand the care provided by both departments. Currently, integration could involve electronic alerts generated within the laboratory that could prompt actions by pharmacy staff or a collaborative care pathway developed between the two services for a targeted patient population.

While laboratory medicine is generally well integrated into many hospital medication practices, the integration of pharmacy services into laboratory medicine is less common. Further integration could enhance the ability of laboratory services to impact on patient care and outcomes. Looking to the future, the success of healthcare delivery will depend on how well disciplines work together for the benefit of patients and healthcare systems as a whole. As the healthcare landscape continues to evolve, there are opportunities for pharmacy and laboratory services to expand and enhance their current roles in patient

care. Continuous professional development and training will assist healthcare disciplines in keeping pace with emerging practices and expectations.

Anticipated innovations and trends in healthcare over the next 10 years will encourage the wider integration of pharmacy and laboratory services. Many of the current healthcare challenges have been exacerbated or highlighted by the COVID-19 pandemic, including workforce shortages, increased demand for services, and inequitable access to care. These challenges need to be addressed to ensure a sustainable and effective healthcare system in the future. Use of artificial intelligence (AI) and machine learning to support diagnostic tests and the development of treatment protocols within AI would assist in addressing these issues.

At a laboratory level, consolidation or regionalization of services would be enhanced by greater integration with pharmacy services. Clinical decisions, including prescribing and monitoring, would be driven by genetic rather than phenotypic information, greatly enhancing the current role of laboratories in healthcare. Pharmacists would have the opportunity to develop personalized medicine approaches based on genetic information. As a pharmacy and laboratory services marriage matures, healthcare disciplines will develop greater expectations of how professions should work together. Consideration of how best to achieve the integration of services will ensure that professions are working together for the greatest benefit of patients. Research will be vital in identifying best practice and successful models of integration.

Emerging health technologies, such as telehealth and mobile health applications, will improve access to care, particularly in rural and remote communities. Telehealth multidisciplinary team meetings will facilitate integrated care across professional disciplines. Every effort should be made to ensure that health technologies are designed to provide the greatest benefit to all community members. There is potential for pharmacy services and laboratories to work together in the design and implementation of new health technologies. Integration provides an opportunity for pharmacy services to take the lead in the implementation of health technologies that could enhance the current care provided by laboratories. Efforts should be made to ensure new technologies are designed to enhance access to care for all community members (A Olsen et al., 2020) (Strain & H. Ravalico, 2021).

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