The Review Of
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Integrated Approach Of Clinical Pharmacists And Laboratory Scientists In Optimizing Glycemic Control And Medication Adherence Among Diabetic Patients: A Cross-Sectional Study At A Tertiary Care Hospital

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Abstract

Background: Diabetes mellitus is a long-term metabolic disease that requires ongoing medication and regular lab tests to keep blood sugar levels as low as possible.. Effective diabetes management is still hampered by poor medication adherence and poor laboratory result interpretation, especially in tertiary care hospitals where patients frequently have complex clinical profiles. By optimizing drug use and improving the clinical application of laboratory data, an integrated approach comprising laboratory scientists and clinical pharmacists may enhance therapeutic results.
Aim: was to assess how an integrated approach comprising laboratory scientists and clinical pharmacists affected the glycemic control and medication adherence of diabetic patients who were admitted to a tertiary care hospital.
Methods: A cross sectional study involved adult patients with type 2 diabetes mellitus who presented themselves in outpatient clinics of a tertiary care hospital. Patients were split into two groups: those getting standard care and those receiving combined clinical pharmacist-laboratory support. We gathered and examined information on antidiabetic treatment, medication adherence, clinical parameters, test results (fasting plasma glucose and HbA1c), and demographics.
Findings: Compared to patients getting standard treatment, patients who got integrated care showed significantly greater medication adherence scores and improved glycemic control, as seen by lower mean HbA1c values. Structured pharmacist counseling, prompt laboratory reporting, and improved glucose marker interpretation were linked to better results.
Conclusion: Better glycemic control and medication adherence among diabetes patients were linked to the combined participation of clinical pharmacists and laboratory scientists. In tertiary care facilities, putting multidisciplinary collaborative models into practice may improve patient outcomes and diabetes control.

Keywords: Diabetes mellitus, clinical pharmacist, laboratory scientist, glycemic control, medication adherence, integrated care.

Introduction

Among the range of chronic diseases which are all over the world, the prevalence of diabetes mellitus is one of the most serious ones which presents a challenge to the sphere of public health. The characteristic feature of this syndrome is persistent hyperglycemia that may be the result of an abnormal secretion of insulin, the effect of insulin secretion, or both. T2DM or diabetes mellitus type 2 is the most prevalent form of the given disease and has a close relationship with lifestyle habits, aging populations, and increasing obesity rates. (Abera et al., 2022).

To successfully treat diabetes, a holistic approach is needed. It is a strategy that must entail medicine, lifestyle changes and regular observation of glycemic markers. Another significant factor that can be used to measure the occurrence of problems related to diabetes is glycemic control which is often measured using glycated hemoglobin (HbA1c). This failure in ensuring proper management of blood glucose levels has been linked to multiplicity of microvascular issues which comprise retinopathy, neuropathy and nephropathy and also macrovascular issues, which include cardiovascular disease and stroke. (Yimam et al., 2020).

Taking medications as prescribed is one of the most important issues in the effective treatment of diabetes. Although the number of excellent anti-diabetic medications is rather large, the non-adherence to the treatment measures remains a common phenomenon and one of the main factors of adverse glycemic outcomes. The list of factors that can lead to suboptimal adherence is quite extensive and includes but is not limited to the overly complex treatment regimens, negative pharmacological reactions, lack of patient education, and lack of follow-up. (Muhammad et al., 2025).

In tertiary care units, patients with diabetes often present with a number of comorbidities and complex prescription regimens, and it is hard to ensure optimal care is administered. The clinical pharmacists are placed in a more favorable position of dealing with problems that are related to medication by controlling pharmaceutical therapy, counselling the patient, and collaboration with the physician. Similarly, laboratory scientists also have a significant role through ensuring that the lab measures of the glycemic parameters are accurate and consistent and in also presenting evidence to underpin the clinical interpretation of the laboratory findings (Lubis et al., 2025).

Conversely, clinical pharmacists and laboratory scientists often do not have much chance to cooperate, thus leading to care that is not unified as a whole. Development of these two professional responsibilities as one can enhance therapeutic decision-making and ability of patients to understand illness control. This research aims at exploring the connection between an integrated laboratory pharmacist approach and glycemic control and medication adherence in a group of diabetic patients who receive care in a tertiary care hospital. (Xia et al., 2024).

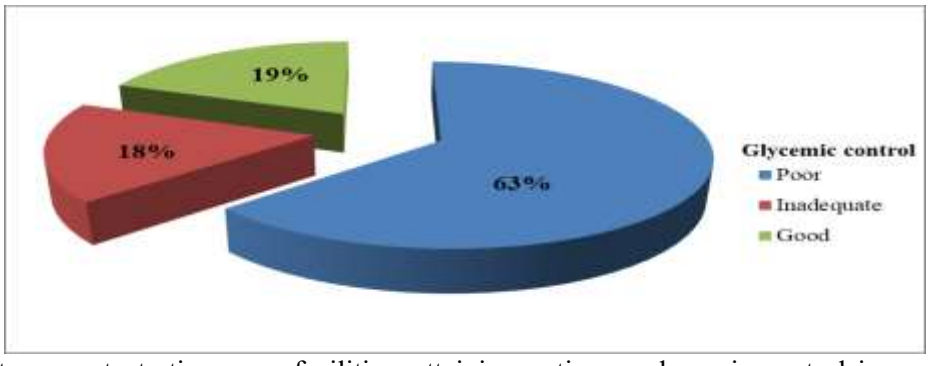
Literature Review

1. Glycemic Control in Patients with Diabetes Mellitus

1.1. Introduction to the Concept of Glycemic Control and Its Importance

One of the key therapeutic objectives in diabetes management is glycemic control, and it is the leading variable defining the clinical outcomes of the long-term course. Sustained high blood glucose levels cause metabolic dysregulation, damage to the vascular system, and ultimate organ dysfunction. Microvascular sequelae, including diabetic nephropathy, neuropathy, and retinopathy have been demonstrated to be significantly reduced when glycemic parameters are kept within recommended targets, as demonstrated in large-scale clinical trials. (Dawite et al., 2023).

Figure 1 Glycemic control amongst type 2 diabetes mellitus patients attending the Limbe Regional Hospital (Chugbe Nathaneal et al.)



When it comes to tertiary care facilities, attaining optimum glycemic control is especially difficult because of the complexity of patient circumstances, the presence of various comorbidities, and the frequent use of sophisticated pharmacotherapy. Because of this, we need to take a thorough and

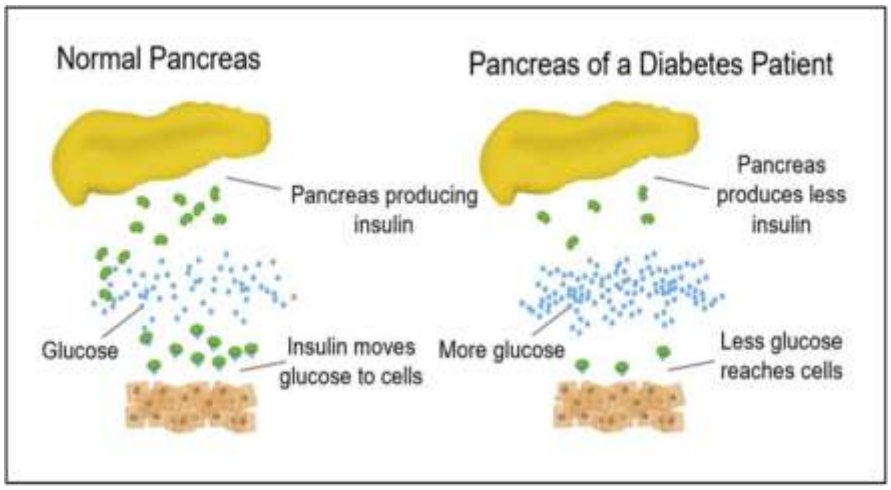
coordinated approach to deal with the many different aspects of glycemic dysregulation and improve patient outcomes as a result (Moges et al., 2025).

1.2. The HbA1c Test as a Long-Term Measure of Glycemic Control

The HbA1c test, which measures the average plasma glucose levels over the last two to three months, is still the most common biomarker used to check blood sugar levels over time. The clinical usefulness of this feature resides in the fact that it has a high link with complications associated to diabetes and the capacity to lead the intensification of therapeutic treatment (Jose, 2017).

On the other hand, there are some limits to how HbA1c can be used. Iron deficiency anemia, chronic renal disease, pregnancy, and hemoglobin variations are just a few of the medical conditions that can cause HbA1c levels to be raised or lowered by mistake. So, it's very important to work with scientists in the lab to make sure that the results are correct and, if necessary, to use other markers like fructosamine or glycated albumin (Gao et al., 2025).

Figure 2 Comparison between normal pancreatic insulin secretion and impaired insulin production in patients with diabetes mellitus (Kumar et al., 2020).



1.3. Keeping an eye on blood sugar levels while fasting and after breakfast

Measures of fasting plasma glucose and postprandial glucose provide information that is different from that of HbA1c because they show short-term changes in blood sugar levels. These factors are particularly useful in identifying patterns of hyperglycemia related to meal timing, medication administration, and insulin dosage (Aliyu et al., 2025).

It is current knowledge that postprandial hyperglycemia is a risk factor that is independent of cardiovascular disease. Detailed glucose monitoring to also involve measurements prior to and following meals is what enables doing more accurate changes to the treatment and improve cardiovascular risk management. (Tarekegn et al., 2025).

1.4. There are many things that can affect glycemic control.

The glucose level control is influenced by a vast scope of factors that encompass taking medicine and as prescribed, eating habits, physical activity and psychosocial stressors, as well as assistance provided by the healthcare system. The patient-related characteristics that are quite significant to this discussion include health literacy, motivation, and cultural attitudes (Akanksh et al., 2025).

There are also additional issues in tertiary care facilities that complicate the process of determining the most appropriate treatment choices. They are polypharmacy, late stages of the disease, and the treatment impacts that complicate the process of selecting the best alternative. In order to address these variables, we must apply a multidisciplinary approach, which entails clinical knowledge, education of patients, and sustained observation. (Uddin et al., 2025).

1.5. Keeping an eye on the lab is an important part of managing diabetes.

The laboratory monitoring is considered to be one of the most important factors of diabetes treatment, as it provides objective data to determine the development of the disease and the personal effect of treatment. The fact that laboratory professionals provide high standards of quality control and conformity to standardized testing procedures guarantees the accuracy of the analytical results. (Dagnew et al., 2025).
Laboratory practitioners assist in clinical care in numerous aspects. To give an instance, they will be able to identify potential interferences, ensure that they will always give the same results and aid clinicians in picking the appropriate monitoring measures. They enhance the therapeutic value of test results and allow easier caring of individual patients. (Chidambaram et al.).

2. Managing diabetes and the role of clinical pharmacists in the process

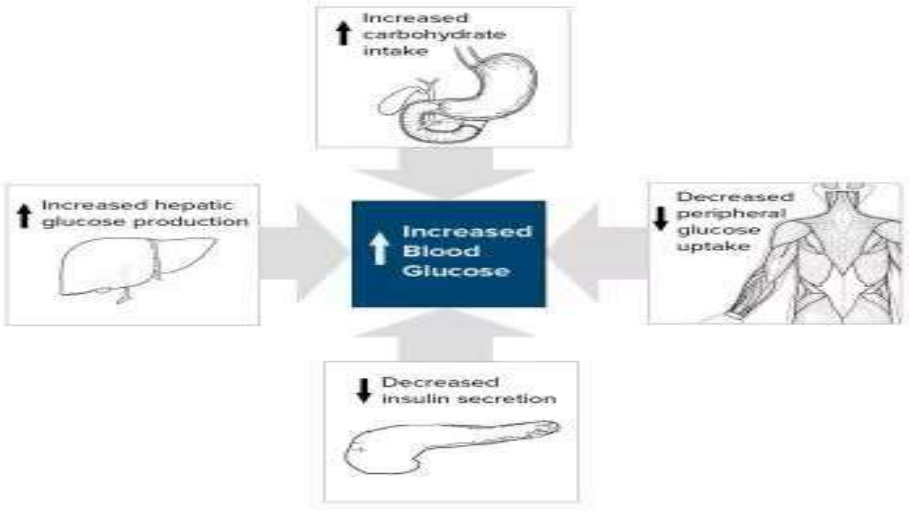
2.1. The Evolution of Contemporary Clinical Pharmacy

Clinical pharmacy has evolved to be a patient-focused discipline that aims at making the best out of medications and enhance health outcomes. The role of clinical pharmacists has been taking a more significant part in multidisciplinary healthcare teams in treatment of chronic diseases like diabetes (Sheleme et al., 2020).
They have been charged with the expanded responsibility of direct-patient care, drug assessment, therapy optimization and working together with other medical experts. This change is an indication of the heightened realization of knowledge that pharmacists hold in the pharmacotherapy and patient educational programs. (Abera et al., 2022).

2.2. Management of Medication Therapy in Patients with Diabetes

Medication therapy management or MTM, is a premeditated service that tries to make the best use of the therapeutic outcomes by conducting an in-depth medication review and motivating the patients to take an active part. Issues related to the management of diabetes that are tackled by MTM are improper drug choice, inappropriate dose, and multiple drug interactions. (Maina, 2025).
By means of systematic assessment of pharmaceutical regimens, clinical pharmacists can detect barriers in the way of successful therapy and implement evidence-based interventions. It has been demonstrated that MTM is not only linked to enhanced glucose regulation but also reduced medication-related problems. (Butt et al., 2023).

Figure 3 Role of clinical pharmacists in patient counseling and education for diabetes management (Galicia-Garcia et al., 2020)



2.3. Counseling and Education of Patients

The provision of patient counseling is an essential component of diabetes care that is led by pharmacists. The patient's comprehension of illness causes, prescription use, and lifestyle adjustments can be

improved by the pharmacist through the use of tailored education sessions by the pharmacist (Letta et al., 2022).
Through increased patient understanding, it has been demonstrated that self-efficacy can be increased, adherence can be promoted, and the risk of medication errors can be reduced. When it comes to patients who are undergoing sophisticated treatment regimens, tertiary care facilities are particularly advantageous for individuals who have frequent counseling sessions (Nigussie et al., 2021).

2.4. Enhancements to Insulin and Other Oral Hypoglycemic Agents

Clinical pharmacists are some of the most important people in the process of making insulin therapy and oral hypoglycemic drugs work better. Some examples of this are making sure the right dose is given, lowering side effects, and improving how the drug is given (Tefera et al., 2020).
It is very important for pharmacists to teach patients how to store insulin, give injections, and treat hypoglycemia. This kind of intervention makes people feel more sure that they can manage their diabetes on their own and makes their blood sugar levels more stable (Acharya et al., 2013).

2.5. The Effect of Pharmacist Interventions on Clinical Procedure Outcomes

A growing body of research shows that pharmacists' actions can improve the outcomes of diagnosing and treating diabetes.The levels of HbA1c have been routinely shown to decrease, and studies have also shown improvements in medication adherence and increased patient satisfaction (Lubis et al., 2025).
These findings underline the importance of incorporating clinical pharmacists into diabetes care teams, particularly in tertiary care settings where the complexity of the patient is considerable.

3. The Compliance of Diabetic Patients with Their Medication

3.1. The Significance of Medication Adherence in Clinical Practice

prescription adherence may be characterized as the extent to which patients comply with the regimens of prescription medication adherence in regards to the time of day, dosage, and frequency of pharmaceutical schedule. In the case of diabetes management, the adherence is required without any exceptions so that the glycemic control stays stable (Dawite et al., 2023).
The lack of adherence compromises the efficacy of pharmacotherapy, contributing to the disease progression and comorbidities formation. Consequently, adherence is one of the main subjects of diabetes treatment. (Uddin et al., 2025).

3.2. The Frequency of Non-Adherence in Patients with Diabetes

Research has revealed that there exists an extensive heterogeneity among communities and healthcare systems in terms of non-adherence to treatment of diabetes that is highly rampant in the whole world. The complexity of the regimen and the absence of symptoms of an illness are the factors contributing to poor adherence (Abera et al., 2022).
Unadherence can be exacerbated by multiple medication use and frequent changes in treatment in institutions with tertiary care, which is why it is essential to have focused interventions. (Xia et al., 2024).

3.3. A Look at the Factors That Determine Medication Adherence

There are several interrelated factors that influence the presence of adherence to medication or not and these include patient beliefs, socioeconomic status, health literacy, and the support of the healthcare system. Psychological problems such as despair and distress with diabetes also contribute greatly to adherence. (Akanksh et al., 2025).
With this knowledge about these traits, medical staff can tailor interventions to address the needs of specific patients.

3.4. Measurement Techniques for Measuring Compliance with Medication

Medication adherence could be measured through several methodologies, and each of them has its benefits and disadvantages. Pharmacy refill records provide more objective information because they are often used due to the ease of their application, as self-report surveys are (Sheleme et al., 2020).

There may also be a possibility that a combination of different methods of assessment will yield more accurate results and have a more detailed view of the behavior of adherence (Moges et al., 2025).

3.5. As a result of poor adherence, there are clinical and economic consequences.

The lack of compliance with medicine is associated with uncontrolled diabetes, the emergence of more complications, and the growth of the healthcare spending. Adherence can thus be addressed to improve the outcome of therapeutic results and economic efficiency. (Sheleme et al., 2020).

4. Clinical Pharmacists and Laboratory Scientists Working Together to Take an Integrated Approach

4.1. The Concept of Collaboration Between Professionals

Interprofessional collaboration is increasingly being recognized as a key component in delivering high quality healthcare especially in the management of chronic illnesses like diabetes mellitus. This plan makes a special emphasis on collective responsibility, respect, and effective communication among healthcare professionals to achieve common goals, which are patient-centered. Collaborative care models are especially applicable in complex clinical environments, including tertiary care institutions since they lessen service fragmentation and enhance continuity in care (Aliyu et al., 2025).

Interprofessional teamwork contributes to easier decision-making which is coordinated and ensures that therapeutic approaches are backed by proper clinical information in the context of the management of diabetes. Clinical pharmacists in collaboration with laboratory scientists study leads to the more efficient transfer of laboratory results into therapeutic interventions, which subsequently enhance the overall quality of the treatment and the results of clinical trials (Tarekegn et al., 2025).

4.2. The Incorporation of Laboratory Data into Professional Pharmaceutical Care

The integration of laboratory information in pharmaceutical care is a must as far as optimizing the medication therapy of diabetic patients is concerned. Due to access to real-time and past laboratory results, clinical pharmacists can evaluate the effectiveness of the treatment, identify the trends in the glycemic control, and give recommendations, which are grounded in reliable data (Yimam et al., 2020).

Moreover, by combining laboratory data, it is possible to improve the personalized approach to pharmaceutical care because pharmacists are given the opportunity to conduct prescription regimens in accordance with objective clinical evidence. This combination assists in the decrease inertia of treatment and facilitates the intervention promptly, especially in those patients with consistently elevated HbA1C levels or with fluctuating glucose patterns. (Gao et al., 2025).

4.3. Laboratory scientists play an important role in providing support for pharmaceutical care.

test scientists play a vital role in the process of delivering pharmaceutical care as it is their role to make sure that test outcomes are accurate, reliable and applicable in clinical practice. The outcomes of the tests will certainly be able to indicate the physiological situation of the patient since they are competent in terms of analytical methodology and quality assurance procedures (Uddin et al., 2025).

The laboratory scientists assist the clinical treatment by providing interpretive assistance and determining possible test constraints or test interferences. This is not to mention the technical requirements that they are accountable to. The ability of the pharmacist to change the medication therapy in an effective way is enhanced due to this collaboration and the chance of misinterpretation that may lead to the wrong treatment decisions is minimized. (Akanksh et al., 2025).

4.4. In terms of diabetes outcomes, the impact of integrated care models is as follows:

It is proved that integrated care practices that align the experience and knowledge of laboratory scientists and clinical pharmacists can effectively promote diabetes-related outcomes. Some of the outcomes that can be obtained with the help of the use of the specified models are the facilitation of timely therapeutic changes, enhanced medication adherence due to patient-centered counseling, and improved patient knowledge about glycemic goals and laboratory outcomes (Dawite et al., 2023).

Another benefit of the integrated care models is that it encourages patient involvement through implementation. When patients are listening to messages that are congruent and coordinated by a large

number of healthcare specialists, the level of confidence in the treatment plan is higher. The result of this confidence is better self-management behaviors and glycemic control. (Sheleme et al., 2020).

4.5. Obstacles Facing Integrated Care Plans and Their Prospects for the Future

Although there are some positive indications that a combined work between laboratories and pharmacists is effective, several challenges exist which make it impossible to use it on the large scale. Some of these include limited resources in the institution, lack of laid-out channels of communication, and full appreciation of the therapeutic value of the laboratory specialists (Maina, 2025).

One of the future strategies that will be employed in the integrated diabetes treatment is the development of digital health platforms that would allow sharing of data in real-time, adopting shared clinical dashboards and increasing joint practice agreements. These barriers will have to be met in favor of maximizing the potential of integrated care models with respect to enhancing the outcomes of diabetes management. (Lubis et al., 2025).

Discussion

Analysis of Glycemic Control Results

The findings of this research indicate that clinical pharmacists and laboratory scientists working interdependently are associated with clinically significant glycemic control enhancement in patients with type 2 diabetes mellitus although glycemic disorders may be multifactorial. The patients who received integrated care demonstrated reduced mean levels of HbA1c and increased percentage of achieving individualized glycemic targets when compared to patients who were sustained on traditional models of care. These benefits are particularly remarkable in a tertiary care environment, where therapy inertia is often caused by concomitant burden and complexity of illness. (Akanksh et al., 2025).

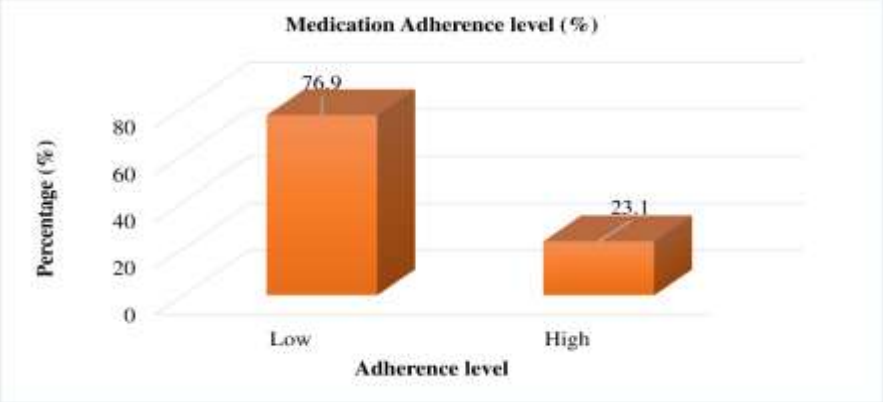
Mechanistically, these findings can be attributed to timely drug modification and enhanced analysis of laboratory trends. Intensification of treatment timeframes is reduced through laboratory-validated therapy changes facilitated by laboratory-supported pharmacist-led reviews. This emphasizes the clinical importance of the mentioned advantages, and is in line with the fact that every 1 percent reduction in HbA1c is associated with significant reductions in microvascular complications. (Aliyu et al., 2025).

Medication Adherence and Biological Plausibility as a Mediating Factor

This paper discovered a pharmacodynamic relation between medication adherence and diabetes control that is biologically realistic and well-established. To keep glucose within normal limits, it is necessary to maintain a constant plasma drug level which is attained by continuous compliance with antidiabetic treatment. Patients receiving integrated care were found to have higher adherence rates, which means that a combination of laboratory feedback and pharmacist-led counseling is crucial to alter the behavior of patients. (Abera et al., 2022).

Laboratory supported education is another way to enhance patient understanding of the cumulative effects of adherence and non-adherence particularly in explaining the HbA1c trends over time. Enhanced compliance leads to foreseeable gains in glycemic exposure, which justifies the therapeutic utility of integrated care models, and is equal to dose-response profiles observed in the pharmacotherapy of chronic illnesses. (Tarekegn et al., 2025).

Figure 4 Medication adherence in T2DM patients with comorbidity at hospitals in Northwest Ethiopia (Sendekie et al., 2022).



Combining Laboratory and Pharmacist Interventions

Diagnostic testing has a greater overall translational value when laboratory science and clinical pharmacy services are taken together. In the current research, the pharmacists could put the prescription regimens into context with objective biochemical parameters because of the immediate availability of laboratory findings. It is an integration that avoids the likelihood of misleading the HbA1c readings particularly in people with conditions such as anemia or chronic renal disease when lab expertise is a key factor. (Sheleme et al., 2020).

Also, personalized drug adjustments, including dose adjustments and regimen complexity, are enabled through cooperative elucidation of laboratory findings. Since tertiary care populations are characterized by polypharmacy and complex treatment plans, the impact of these strategies is especially high in this patient group. Rather than being an addition to the conventional diabetic care, the outcomes substantiate the classification of the integrated type of pharmacist-laboratory collaboration as a distinctive and successful paradigm of care. (Maina, 2025).

Outcome Stratification according to Clinical Complexity

Integrated care was beneficial to the patients with greater baseline HbA1c levels, long disease duration and greater drug burden. Patients within such groupings stand a better chance of undergoing undesirable outcomes and require healthcare services. As stratified impact observed, tertiary care hospitals with high-risk groups might be the most beneficiary group of integrated care models. (Butt et al., 2023).

Patients receiving insulin therapy or combination therapy reported better glycemic control and compliance when pharmacist counseling and laboratory informed feedback were used. This finding supports the use of integrated therapies to patients with the greatest clinical complexity and is comparable to workload-based risk classification models applied in other clinical fields. (Gao et al., 2025).

Methodological Advantages and Disadvantages

In spite of the fact that cross-sectional approach cannot be used to make causal inferences, it provides informative practical details regarding modern patterns of practice. Although the correlation between integrated care and improved outcomes is strong, longitudinal studies should be conducted to identify time-specific correlations. Medication adherence was measured using self-report and this could overstate the actual adherence due to social desirability bias or memory. (Yimam et al., 2020).

Nevertheless, objective laboratory indicators such as HbA1c increase the validity of the findings. The presence of biochemical data coupled with clinical and behavioral measurements is one of the methodological strengths which enhance the interpretability of results. Nevertheless, one cannot ever be sure that there is no residual confounding that is linked to socioeconomic factors and health literacy. (Xia et al., 2024).

Considerations for the Economy and Implementation

Since the integrated pharmacist-laboratory care models minimize the long-term issues associated with ineffective glycemic care, such models are likely to be cost-efficient in terms of health economics. By

avoiding the issues, which are associated with diabetes like retinopathy, nephropathy, and cardiovascular disease, healthcare expenses can be saved significantly. (Butt et al., 2023).
Despite these pros, adoption still faces challenges, including workforce shortage and workflow integration challenges. Such challenges may be reduced through heightened clinical roles of pharmacists and enhanced interoperability of electronic health records. To improve clinical outcomes and efficiency in healthcare, one should invest in integrated care in a long-term strategy. (Maina, 2025).

Future Research Directions and Policy Implications
The findings support the official inclusion of laboratory scientists and clinical pharmacists as a critical part of diabetes care teams in tertiary care hospitals. Policy frameworks should promote standardized referral pathways of pharmacist-led interventions, access to laboratory data, and collaborative organization. (Moges et al., 2025).
To quantify the long term impacts of integrated care in terms of hospitalization, death and complication rates, future studies should focus on the prospective interventional studies. Moreover, exploring the individualized therapy and digital decision-support systems based on biomarkers could enhance the effectiveness of the combined management strategy in diabetes (Dawite et al., 2023).

The discussion's conclusion
To sum up, the risks linked to inadequate control can be addressed through proactive, combined management strategies although the clinical challenge linked to the glycemic damage in tertiary care diabetes groups might be a significant challenge. The collaboration of clinical pharmacists and laboratory scientists enhances medication optimization, improvement in medication adherence, and the therapeutic usefulness of laboratory monitoring. Such integrated models demonstrate a plausible and empirically endorsed approach to improving long-term outcomes in patients with diabetes in the face of an up-trend in the disease burden.

Conclusion
This research highlights the clinical advantage of the integrated care approach involving the knowledge of laboratory scientists and clinical pharmacists in the treatment of diabetes mellitus in a tertiary care hospital setting. The findings indicate that such integration is associated with the improvement of medication adherence and glycemic control two crucial variables that define long-term diabetes outcomes. Single therapies are often not able to achieve long term metabolic control in an environment characterized by intricate patient profiles, polypharmacy, and advanced disease stages.
Precise laboratory surveillance and pharmacist-led drug modification collaborate with each other to enhance glycemic indicators. Although systematic pharmacist counseling addresses adherence barriers to behavior and regimen, more precise treatment adjustments can be made when laboratory competence is used to interpret the HbA1c and glucose trends. With the dual approach, laboratory results are converted to dynamic therapeutic tools that directly affect the care of the patient in a manner that can be considered patient-centered care.
Most importantly, the research focuses on the role of medication adherence as a modifiable mediator between improved diabetes outcomes and integrated treatment. Laboratory data related with individual pharmaceutical care helps the patients to better understand the relationship between metabolic management and their pharmaceutical practices. This promotes responsibility, enhances self-control and promotes long-term and constant compliance.
Regarding the perspective of systems, the findings lean towards considering the pharmacist-laboratory co-operation as an ordinary aspect of diabetes management in tertiary hospitals. Such models can also reduce long-term healthcare costs as well as clinical outcomes by preventing the complications of diabetes and reducing unnecessary hospital stays. The fact that there was consistency behind the observed relationships gives a strong argument that further implementation and evaluation should be conducted although the cross-sectional design limits causation.
In conclusion, integrating laboratory scientists and clinical pharmacists in an integrated diabetes care model provides an effective, scalable, and evidence-based method of bridging the persistent gaps in health promotion through medication adherence and glycemic control. More longitudinal and interventional studies are required to confirm these findings, cost-efficacy, and explore the possibilities

of digital health technologies and bio-markers-mediated customisation to improve combined diabetes therapy.

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