

A LITERATURE REVIEW: THE IMPACT OF PHARMACIST COUNSELING ON MEDICATION ADHERENCE IN TYPE 2 DIABETES MELLITUS OUTPATIENTS

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ABSTRACT

Type 2 diabetes mellitus (T2DM) is a chronic disease with a high prevalence that requires long-term therapeutic management. One of the biggest challenges in managing T2DM is the low level of patient adherence to medication, which can trigger serious complications and increase the economic burden on the healthcare system. Pharmacist counseling plays an important role in improving patient adherence through education, motivation, and support. This study aimed to analyze the effect of pharmacist counseling on medication adherence in T2DM outpatients using data from scientific journals published between 2019 and 2024, sourced from PubMed, ScienceDirect, and Google Scholar. A total of 10 articles were reviewed and selected based on the following inclusion criteria: studies focusing on pharmacist counseling and medication adherence in T2DM outpatients, published in English or Indonesian, and accessible in full text. The study found that various counseling interventions, such as face-to-face education, reminders via short message (SMS), and the use of informational guidance, significantly improved patient adherence, as measured by clinical parameters such as decreased HbA1c levels and improved quality of life. These findings suggest that pharmacist counseling can be an effective approach to improve the success of T2DM therapy while having a positive impact on patients' quality of life.

Keywords: Diabetes mellitus, pharmacist counseling, patient compliance, HbA1c, Quality of life, pharmacy education.

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder with increasing global prevalence, including in Indonesia. According to the [IDF \(2021\)](#), Indonesia ranks fifth globally in terms of the number of diabetes cases, with approximately 19.5 million adults living with the disease. As the most common form of diabetes, T2DM requires long-term management involving both pharmacological and non-pharmacological therapies to prevent complications that can negatively impact patients' quality of life ([Ministry of Health, 2021](#)).

One of the primary challenges in managing T2DM is low patient adherence to medications. Poor adherence can lead to treatment failure, an increased risk of acute and chronic complications, and a greater economic burden on healthcare systems ([WHO, 2019](#)). Multiple factors influence non-adherence, such as limited patient knowledge about the disease and therapy, concerns over side effects, and lack of sufficient support from healthcare providers ([Nasution, Eyaner and Sari, 2021](#)).

Pharmacist counseling plays a critical role in improving medication adherence in patients. As integral members of the healthcare team, pharmacists are responsible for delivering appropriate education on medication use, potential side effects, drug interactions, and the importance of consistent therapy ([Emeka et al., 2020](#)). Through structured and ongoing

counseling, patients are expected to gain a better understanding of their condition, which can positively influence their adherence to therapy (Fajriansyah *et al.*, 2020).

Previous studies have demonstrated that pharmacist-led interventions, including face-to-face education, SMS-based reminders, and informational booklets, can significantly improve adherence among T2DM outpatients (Goruntla, Mallela and Nayakanti, 2019). These interventions have also been associated with reductions in HbA1c levels and improvements in patients' quality of life (Hening, Sartika and Sauriasari, 2019).

However, despite the growing number of individual studies evaluating the effectiveness of pharmacist counseling, comprehensive reviews that consolidate these findings are lacking, especially in the context of hospital outpatient care. This literature review aimed to examine the impact of pharmacist counseling on medication adherence among T2DM outpatients in hospital settings. By synthesizing recent evidence, this review highlights the practical implications of pharmacist interventions and supports the development of more effective counseling strategies in clinical practice.

METHODOLOGY

Literature Search Strategy

This review adopts a narrative literature review focuses on the analysis of studies that discuss the impact of pharmacist counseling on medication adherence in patients with type 2 diabetes mellitus. A literature search was conducted using three major electronic databases: PubMed, ScienceDirect, and Google Scholar. The keywords used included "pharmacist counseling," "type 2 diabetes," and "medication adherence." The search was limited to articles published within the last five years, from 2019 to 2024, to ensure that the data used were current and relevant.

Literature Criteria

The selected literature included national and international journal articles, scientific papers, and relevant research reports. This review aims to explore the role of pharmacist counseling in supporting the treatment of patients with type 2 diabetes mellitus, particularly focusing on interventions conducted in various healthcare settings. Articles were included based on the following criteria: studies that examined the relationship between pharmacist counseling and medication adherence in patients with type 2 diabetes mellitus, published between 2019 and 2024, written in either English or Indonesian, and employed observational or experimental study designs. Articles were excluded if they were not fully accessible or did not specifically address the role of pharmacists in patient counseling.

Literature Search Process

Data were obtained from the final selection of 10 journal articles that met the inclusion criteria. Initially, 20 relevant articles were identified through database searches. After screening the titles and abstracts for relevance and removing duplicates, 18 full-text articles were assessed. Following a detailed eligibility assessment based on the inclusion and exclusion criteria, 10 articles were included in the review.

Key information was extracted from each study, including study design, sample size, population characteristics, pharmacist counseling methods (e.g., face-to-face, SMS reminders, educational materials), and clinical outcomes such as medication adherence, HbA1c levels, and quality of life. The extracted data were then descriptively analyzed using narrative synthesis and tabulation to identify emerging trends, consistent findings, and research gaps.

The inclusion criteria focused on observational or experimental studies published between 2019 and 2024 that examined the relationship between pharmacist counseling and medication adherence in patients with type 2 diabetes mellitus and were available in either English or Indonesian. Studies were excluded if they did not specifically address the pharmacist's counseling role or were not fully accessible to the authors. Based on these

criteria, the analysis emphasized the relevance, accessibility, and clarity of the reported outcomes.

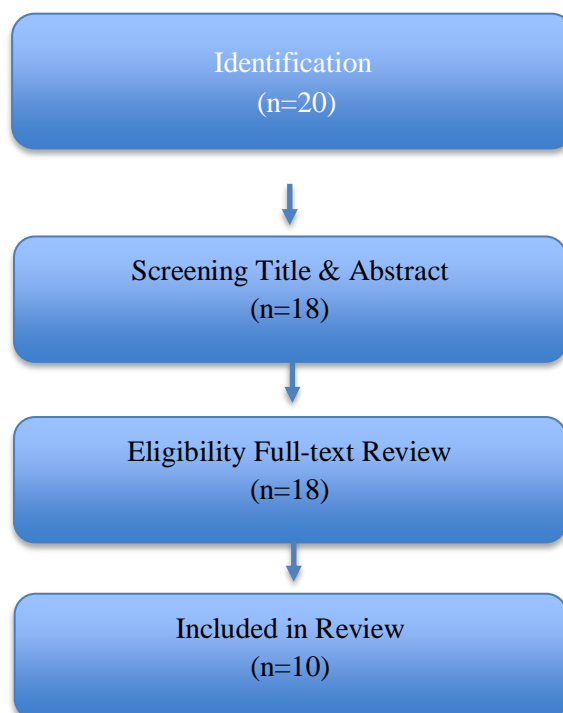


Figure 1. PRISMA-based literature selection flowchart.

RESEARCH AND DISCUSSION

Table I. Summary of Reviewed Studies on the Impact of Pharmacist Counseling on Medication Adherence in T2DM Outpatients

Author	Sample	Evaluation Approach	Result	Study Design	Location	Primary Outcome
Neswita <i>et al.</i> , 2023	65 patients	Measured adherence before and after counseling	Increased medication adherence from 26.66% to 83.33%	Pre-post intervention	Indonesia	Medication adherence
Febriyanti <i>et al.</i> , 2022	26 geriatric T2DM patients	Compared quality of life before and after intervention	Improved quality of life through Islamic Home Pharmacy Care (p = 0.003)	Quasi-experimental	Indonesia	Quality of life
Fajriansyah <i>et al.</i> , 2020	220 T2DM patients (Prolanis program)	Measured quality of life and HbA1c levels	Improved quality of life and reduced HbA1c through structured pharmacist counseling	Cluster RCT	Indonesia	Quality of life, HbA1c
Nasution, Eyanoer and Sari, 2021	94 T2DM patients	Survey on pharmacist counseling impact	Counseling improved patient adherence to diabetes therapy	Cross-sectional	Indonesia	Medication adherence
Alkhoshaiba <i>et al.</i> , 2019	102 T2DM patients	Survey on adherence and	Improved adherence and satisfaction, but	Cross-sectional	Saudi Arabia	Adherence, Satisfaction

		satisfaction after counseling	delayed HbA1c effect			
Iqbal <i>et al.</i>, 2019	2,997 diabetes patients	Measured HbA1c levels before and after counseling	Pharmacist counseling reduced HbA1c by 0.75%	Observational longitudinal	Pakistan	HbA1c
Goruntla, Mallela and Nayakanti, 2019	330 T2DM patients	Measured adherence after counseling and SMS reminders	Counseling and reminders improved adherence by 12.2% and reduced HbA1c	Quasi-experimental	India	Adherence, HbA1c
Hening, Sartika and Sauriasari, 2019	77 T2DM patients	Measured HbA1c and other clinical indicators after counseling	Improved adherence, reduced HbA1c, and enhanced overall clinical indicators	RCT	RSUD Depok, Indonesia	HbA1c, Health indicators
Syarifuddin <i>et al.</i>, 2019	45 T2DM patients	Quality of life survey after pharmacist counseling	Significant improvement in quality of life	Pre-post intervention	Indonesia	Quality of life
Emeka <i>et al.</i>, 2020	278 diabetes patients (Al Ahsa)	Survey and interviews post-counseling	Inadequate counseling reduced satisfaction, highlighting need for improved service quality	Cross-sectional	Saudi Arabia	Satisfaction

Type 2 diabetes mellitus (T2DM) is a chronic condition that requires continuous therapy and lifestyle management. However, low adherence to prescribed medications remains a key barrier to optimal treatment outcomes. Pharmacist counseling has emerged as a valuable strategy for addressing this issue, particularly in outpatient care settings.

This literature review focused on 10 studies published between 2019 and 2024, as summarized in **Table I**, to examine the role of pharmacist counseling in improving medication adherence and clinical outcomes in T2DM patients. Among these, the study by [Hening, Sartika and Sauriasari, \(2019\)](#) conducted at RSUD Kota Depok is particularly noteworthy, as it assessed not only adherence but also key clinical parameters such as HbA1c, fasting blood glucose (FBG), postprandial blood glucose (PPBG), lipid profile, and blood pressure. The intervention group that received pharmacist counseling demonstrated significant reductions in HbA1c, FBG, and PPBG levels compared to the control group, indicating better glycemic control.

These findings are consistent with those of other studies. [Goruntla, Mallela and Nayakanti, \(2019\)](#) observed that pharmacist counseling combined with SMS reminders increased adherence by 12.2% and reduced HbA1c levels. Similarly, the Prolanis-based counseling evaluated by [Fajriansyah *et al.* \(2020\)](#) was shown to enhance both the quality of life and glycemic control in patients with type 2 DM. Interventions such as Islamic Home Pharmacy Care [Febriyanti *et al.*, \(2022\)](#) further reflect the adaptability of pharmacist-led approaches to various cultural and community settings.

The results of these studies reinforce the expanding role of pharmacists beyond drug dispensing. As healthcare educators and therapy monitors, pharmacists help patients understand the purpose, risks, and benefits of their medications, ultimately promoting long-term adherence and improved outcomes.

However, not all studies have reported immediate clinical improvements. For instance, [Alkhoshaiba et al., \(2019\)](#) found that while counseling improved adherence and patient satisfaction, its impact on HbA1c was delayed. More importantly, [Emeka et al. \(2020\)](#) highlighted that poor-quality or unstructured counseling may reduce patient satisfaction and hamper adherence, underlining the need for pharmacist competence in communication and individualized care.

It is also important to acknowledge the limitations of the reviewed studies. Many had relatively short follow-up periods and were conducted within specific healthcare systems, which may limit the generalizability of their results. Additionally, most studies focused on the immediate effects of counseling, with fewer exploring its long-term sustainability or cost-effectiveness.

Although most studies consistently showed improved adherence and glycemic control, the magnitude and sustainability of the outcomes varied. This variation may be attributed to differences in counseling frequency, intervention methods, pharmacist training and cultural context. For example, interventions with additional components, such as SMS reminders [Goruntla, Mallela and Nayakanti, \(2019\)](#) or religious contextualization [Febriyanti et al., \(2022\)](#) tended to show greater impact than standard sessions alone. Meanwhile, some studies, such as [Alkhoshaiba et al. \(2019\)](#), revealed a delay in clinical improvements despite increased adherence, suggesting that outcome progression might depend on patient baseline characteristics or comorbidities.

Furthermore, not all counseling yielded positive results [Emeka et al., \(2020\)](#) cautioned that unstructured or low-quality counseling could reduce patient satisfaction and ultimately impair adherence, highlighting the importance of pharmacist competence and communication skills.

This review has some limitations. The small number of studies (n=10), relatively short follow-up durations, and varying study designs restrict the generalizability of these findings. Additionally, the absence of a formal quality appraisal tool may have affected the strength of the conclusions drawn.

Overall, the evidence suggests that pharmacist counseling significantly improves adherence and clinical parameters in T2DM patients. Effective interventions, ranging from face-to-face sessions and reminder systems to holistic community-based models, should be supported by continuous pharmacist training and integrated into broader chronic disease management frameworks.

CONCLUSION

This review confirms that pharmacist counseling is an effective and relevant strategy for improving medication adherence in patients with type 2 diabetes mellitus (T2DM). Therefore, it is crucial for healthcare institutions to develop structured, evidence-based counseling programs tailored to patient needs to support long-term therapeutic success.

However, this review is limited by the relatively small number of included studies and the lack of long-term outcome evaluations. Future research should focus on assessing the sustainability, cost-effectiveness, and scalability of pharmacist counseling programs in various healthcare settings.

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