

## Effectiveness of Pharmacist Counselling on Medication Adherence in Diabetes Mellitus Patients: A Systematic Review

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### ABSTRACT

Type 2 diabetes mellitus is a disease with a high prevalence in Indonesia. It is one of the non-communicable diseases that contributes to quite a number of complicating diseases. So type 2 diabetes mellitus must be given appropriate and consistent therapy in order to have an effect that can improve the quality of life of type 2 diabetes mellitus patients themselves. Apart from non-pharmacological therapy, patients with type 2 diabetes mellitus who have been using oral antidiabetic drugs for a long time experience many obstacles in terms of treatment. Therefore, the role of health workers, in this case pharmacists, is needed to provide counselling so that patient compliance with taking medication can be achieved which has an impact on improving the quality of life of diabetes patients.

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### Introduction

Diabetes mellitus is a global health problem that requires serious attention. The Indonesian Ministry of Health reported that in 2019, the number of people with diabetes mellitus (DM) in Indonesia reached 10.9% of the total population. These figures raise concerns among the government and health experts as DM can lead to various serious complications such as heart disease, kidney failure, visual impairment, and amputation. According to a number of epidemiological studies, the prevalence and incidence of type 2 DM are increasing worldwide. The World Health Organization WHO estimates that the number of patients with type 2 DM will increase significantly in the coming years. The organization estimates that the number of patients in Indonesia will increase from 8.4 million in 2000 to approximately 21.3 million in 2030 [1].

Counselling is the process of discovering and addressing medication use issues of patients and their families. Counselling is done to provide patients and their families with a correct understanding of their medications, including treatment goals, schedules, uses, side effects, signs of toxicity, storage, and usage. Pharmacist counselling is part of direct clinical pharmacy services and is responsible for issues related to patient medications. The goal of this counselling is to achieve appropriate outcomes that improve the patient's quality of life [2]. Three interrelated and measurable phases describe medication adherence. These phases ideally follow a shared decision-making process regarding prescribing: initiation (i.e., the first dose taken), implementation (i.e., the extent to which the patient takes the medication as prescribed), and discontinuation (i.e., the patient stops taking the medication earlier than planned by the prescriber). Treatment persistence is the amount of time elapsed between starting and ending [3].

Counselling with pharmacists is essential for treating patients with type

2 diabetes mellitus. The pharmacist can tell the patient how important it is to take the medications prescribed by the doctor to properly control blood sugar. Pharmacists can check the patient's medication regimen, provide explanations on how each medication works, discuss potential side effects, and address concerns about unwanted side effects of medications. It is expected that pharmacists play an important role in providing drug counselling to their patients [4].

Education and counselling will have an impact on diabetes and the patient's lifestyle. Patients are expected to gain sufficient knowledge about diabetes, which will help them change their attitudes and behaviors to control their disease condition and blood sugar levels and improve their quality of life. How a patient follows medication instructions is called adherence. One of the main factors of therapy failure is non-adherence to planned therapy. One important way to improve patient adherence to therapy is to provide them with complete, accurate, and structured education or counselling [5].

However, in the literature on previous studies around the world, it was found that the counselling provided by pharmacists was considered unsatisfactory for various reasons. For example, pharmacists face problems when providing one-on-one medication consultations to their patients, including patients feeling less active and cooperative during medication consultations, and some patients feeling that medication consultations are the responsibility of the doctor rather than the pharmacist. Other barriers, such as patients' shyness and fear of asking questions, refusal to accept pharmacist counselling, and lack of time, may affect patients' attitude towards seeking information about their medication at the facility. Patients' positive perceptions of drug consultation services provided by pharmacists have a direct impact on their encouragement to seek pharmacist counselling so that better outcomes will be achieved [6].

Medication adherence of DM patients in Indonesia has not reached the recommended glycemia target when they receive medication.

Patients with diabetes mellitus do not understand the purpose of therapy, so they do not realize the dangers of complications that can arise as a result of their disease [7]. Patient compliance and success in the use of drugs can be seen from how often the patient checks. The knowledge that pharmacists provide to patients makes them more aware and changes their behavior, which in turn increases patient adherence to their medication use [8]. To overcome the problem of non-adherence of patients with type 2 diabetes, the role of pharmacists in providing education must be measured to determine how knowledge, understanding, and skills of patients in carrying out therapeutic regimens and to monitor [9].

**Methods**

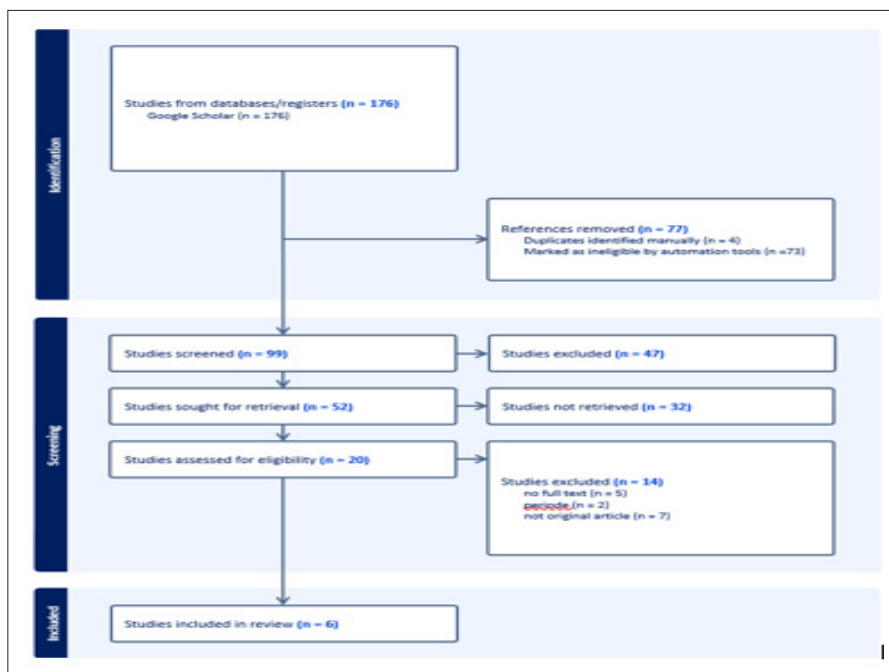
This study used a systematic literature review of journals and PRISMA (Preferred Reporting Item for Systematic Review and Meta Analysis). The literature search was conducted in May 2024. The systematic review was conducted by searching for articles from Goggle Sholar, PubMed, ScienceDirect and Publish or perish. Counselling conducted by pharmacists, full text, counselling methods used, control groups that received counselling and control groups that did not receive counselling, and research journals conducted in Asia in 2020-2024. Exclusion criteria include irrelevant titles, duplication, no abstract, not full text, methods that are not in the form of counselling, the counsellor is not a pharmacist, and not a DM patient. Followed by a keyword search for “pharmacist counselling” [All Fields] AND “diabetes mellitus type 2” [All Fields] AND “medication adherence” [All Fields].

The authors used the PICO method (Population/Problem, Intervention, Comparison, and Outcome), as shown in table 1 to limit the size of the study.

**Table 1: PICO**

Component	Information
Population Problem (P)	Patients with Type 2 Diabetes
Intervention (I)	Counselling by a pharmacist
Comparison (C )	Comparison (C )
Outcome ( O)	Compliance Drinking medication

The author uses the PRISMA (Preferred Reporting Item for Systematic Review and Meta Analysis) method to select a systematic review. PRISMA used in the study as follows:



**Figure 1:** Prisma by Confidence

The results of the PRISMA method as shown in Figure 1, from 176 journals identified from the Google Scholar database using the Publish and Perish application, there were 77 references that were manually ruled out because of duplication and did not meet the predetermined criteria. There were 99 journals that needed to be screened and then 47 studies were excluded and re-screened from the remaining 52 studies and found 32 studies could not be used in this systematic literature review. After the remaining 20 studies were extracted as a whole, 14 studies were finally excluded because 5 articles did not have full text or were not open access, 3 articles did not meet the requirements of the specified year / period and 7 others were not original articles, but books, scope reviews, and even dissertations.

## Results

Based on the analysis conducted by the author, it was found that the effectiveness of pharmaceutical counselling on adherence to taking medication in patients with diabetes mellitus is illustrated in table 2.

**Table 2: Analysis Result**

No.	Author / Year	Adherence before pharmacist counselling	Adherence after pharmacist counselling	Study design	Result
1	Annis Rahmawaty dan Nanda Widia Anggraeni / 2023	The level of medication adherence is moderate, namely out of 45 samples, 27 patients with high adherence and 18 patients with moderate adherence.	The level of medication adherence was high, with 45 samples, 42 patients with high adherence and 3 patients with moderate adherence.	<ol style="list-style-type: none"> <li>Pre-experimental research method with One Group Pretest Posttest design with cross sectional data collection using purposive sampling technique.</li> <li>The study focused on the effect of pharmacist counselling on adherence to taking DM medication and KGD (blood sugar levels).</li> </ol>	<ol style="list-style-type: none"> <li>The results showed that before pharmacist counselling was given, there was moderate compliance in DM patients. The results of after pharmacist counselling there is high compliance.</li> <li>Pharmacist counselling can have a good impact on patient medication adherence.</li> <li>There was an increase in drug compliance after counselling by pharmacists.</li> </ol>
2.	Shinta Wulandari, Akrom/ 2022	Medication adherence rate Pretest control $22.16 \pm 2.76$ Treatment $22.88 \pm 2.08$ Value 0.400 p-value 0.212 Change ( $\Delta$ mean post-test-mean pretest)	Medication adherence rate Post-test Control $22.86 \pm 2.59$ Treatment $23.79 \pm 2.37$ Value 0.016 P-value 0.41 $0.69 \pm 2.69$ $0,91 \pm 3,17$ $0,322$	<ol style="list-style-type: none"> <li>This study has a quasi-experimental design with the design used is randomized pretest - post-test control group design. Data collection is prospective and is done by collecting information from patients through face-to-face interviews using questionnaires. this study has a quasi-experimental design with the design used is randomized pretest - post-test control group design. Data collection is prospective and is done by collecting information from patients through face-to-face interviews using questionnaires.</li> <li>The study focused on the level of compliance with taking medication before pharmacist counselling and after pharmacist counselling.</li> </ol>	<ol style="list-style-type: none"> <li>The results showed that both groups after being given counselling, gave high compliance values, but the treatment group showed significant changes after giving counselling and pill boxes.</li> <li>The p-value in the pretest and post-test control group is 0.212 and the treatment group is 0.041 which indicates that there is a significant difference in the pretest and post-test of the treatment group.</li> </ol>
3.	Religia Eka Cahya, Sri Kadarinah/2016	Patients who are not given counselling have increased GDS results with a significance value of 0.017, which means that if the results of the significance value $< (0.05)$ then these results have a significant effect.	A significant effect between patients who are given counselling treatment and not given counselling treatment with a significance value of 0.047, which means that if the results of the significance value $< (0.05)$ then these results have a significant effect.	<ol style="list-style-type: none"> <li>This research uses experimental research methods, using the design used is Pre Test - Post Test Control Group.</li> <li>The study focused on the level of compliance with taking DM medication based on the results of GDS measurements after being given counselling by pharmacists.</li> </ol>	<ol style="list-style-type: none"> <li>There is a significant difference in GDS reduction between patients who are given counselling treatment and patients who are not given counselling treatment by pharmacists can reduce blood sugar levels while patients with type 2 diabetes, meaning that patients provide high compliance value results.</li> </ol>
4.	Satrio Wibowo Rahmatullah, Ika Maulida Nurrahma, Adnan Syahrizal/2020	In the group that was not given counselling, the level of compliance was low, namely out of 20 samples, 16 respondents with low compliance and high compliance as many as 4 respondents (20%).	The counselled group showed a high level of compliance, namely 20 respondents (100%).	<ol style="list-style-type: none"> <li>This study used a quasi-experimental method with a cross sectional approach and took patient data prospectively.</li> <li>The focus of the study was on adherence to taking DM medication in groups that were counselled by pharmacists and did not receive counselling by pharmacists.</li> </ol>	<ol style="list-style-type: none"> <li>The results of this study indicate that in the group that was given counselling showed a high level of compliance, namely as many as 20 respondents (100%). Whereas in the group that was not given counselling, the level of compliance was low, namely 4 respondents (20%). Based on mann-whitney analysis, the p-value = 0.000 (<math>&lt; \alpha = 0.05</math>) so that there are differences in the group with counselling with the group without counselling, while the chi square analysis p-value = 0.004 (<math>&lt; \alpha = 0.05</math>) so that counselling has a significant effect on compliance. taking medication in patients with diabetes mellitus.</li> </ol>

5.	Chilmia Nurul Fatiha dan Farroh Bintang Sabiti/2021	The level of compliance with taking medication before pharmacist counselling was given from 70 respondents, 28 respondents had low compliance, 29 had moderate compliance and 13 had high compliance.	The level of compliance with taking medication after pharmacist counselling from 70 respondents, 1 respondent had low compliance, 42 respondents had moderate compliance and 27 had high compliance.	1. This research is a pre-experimental study with The One Group Pretest-Posttest design. 2. Medication adherence was measured using the Morisky, Green, and Levine Medication Adherence Questionnaire (MGL MAQ) instrument and pill count..	1. Compliance based on MGL MAQ was analysed using the Wilcoxon test, and obtained a p-value of 0.000 so that it can be said that compliance with taking medication before and after pharmacist counselling is significantly different. 2. Pharmacist counselling is very influential on adherence to taking medication for DM patients
6.	Muhammad Dwi Suprobo, Nia Fadillah, 2020	Pre-test P=0.017* Knowledge Pre-test Mean ± SD 27.54±2.187	Post-test 0.001* Post-test knowledge 38.76±1.061	Kohort observasional	Increase in score Patient knowledge questionnaire about external medicine preparations increased by 11.22 as seen from the mean pretest of 27.54 and posttest of 38.76. This increase occurred after counselling so that the purpose of pharmacist counselling is achieved.

### Discussion

Based on a systematic review of several articles, the effect of pharmacist counselling on medication adherence was analyzed to determine how effective pharmacist counselling is on adherence to taking medication for patients with type 2 diabetes mellitus in improving therapeutic effects and medication adherence because according to research on several articles, medication adherence is strongly influenced by pharmacist counselling [10].

A review of articles shows that pharmacist counselling in patients with type 2 diabetes mellitus significantly improves treatment adherence and the level of achieving blood glucose according to the target [11].

This is in line with research conducted showing that, compared to routine care, treatment compliance was higher after receiving pharmacist counselling [12]. Pharmacist counselling can increase patient knowledge about the importance of taking medication according to the rules and recommendations that have been given to improve the success of diabetes mellitus therapy to control blood sugar and prevent complications of diabetes mellitus with other diseases such as hypertension [13].

Another study conducted by) showed that both groups, namely after being given counselling by pharmacists, gave the results of high compliance values, but the treatment group showed significant changes after giving counselling and pill boxes [14].

According to Chilmia Nurul Fatiha and Farroh Bintang Sabiti, 2022 the examination of GDS levels was carried out twice, namely before counselling and after receiving counselling. Monitoring of blood sugar levels before counselling is carried out in the first week, while sugar levels after counselling are carried out in the first week of the following month. The results obtained the average before counselling was 173.25 and the average after counselling was 162.12 from the average results obtained a difference of 11.08. These results show that counselling improves blood sugar control in DM patients because blood sugar levels after counselling have decreased. The type of analysis carried out is paired t-test, where the results obtained are 0.000 so it is concluded that there is a significant difference in blood sugar levels in type 2 DM patients before and after counselling.

According to Muhammad Dwi Suprobo, Nia Fadillah, 2020 Counselling is a very important and appropriate method in

improving patient compliance and knowledge, because counselling is a systematic two-way communication between patients and pharmacists. Counselling is formed from two elements, namely consultation and education. With consultation, patients express all their difficulties in undergoing treatment, and with education a pharmacist can help solve patient problems including knowledge about drugs or treatment [2]. The increase in the value of the patient's knowledge questionnaire about external medicinal preparations increased by 11.22 as seen from the mean pretest of 27.54 and posttest of 38.76. This increase occurred after counselling so that the pharmacist counselling objectives were achieved.

### Conclusion

From all the articles that have been extracted and examined in depth, the author can conclude that overall, the 6 articles used in this systematic literature review support the theory that the provision of counselling by pharmacists has great potential and provides significant results in providing increased knowledge and also increasing adherence to taking medication for Type II Diabetes Mellitus patients. Counselling conducted by pharmacists has an impact in terms of increasing patient perceptions about DM disease, the diet that must be followed and changes in the lifestyle of patients with type 2 DM so that the patient's blood sugar levels can be well controlled.

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