Original Research/Systematic Review

Factors Related to Drug Adherence in Type 2 Diabetes Mellitus Patients

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ABSTRACT

Background: Untreated Diabetes Mellitus (DM) can cause complications that lead to an increase in the number of deaths and a decrease in quality of life. According to IDF, the death rate in Indonesia for DM patients is 58%. The increase in morbidity and mortality in Indonesia is caused by non-adherence to treatment. There are factors that affect treatment, namely knowledge, self-efficacy, family support and support of health workers. The purpose of this study is to find out what factors are related to medication adherence in patients with Type 2 Diabetes Mellitus at the Sindang Barang Health Center in Bogor.

Methods: This study used cross sectional. Sampling was conducted using Purposive Sampling of 88 DM Type 2 respondents who were included in the inclusion criteria. The research instruments were in the form of validated questionnaires, MMAS-8, DKQ-24, HDFSS, DSES, and health worker support which contained 5 questions. The research data was analyzed using the Spearman Rank test.

Results: : The results showed that there was a correlation between knowledge (p = 0.022 and r = 0.244) and self-efficacy (p = 0.001 and r = 0.342) with medication adherence. However, there was no correlation between family support (p = 0.061 and r = 0.201) and health care worker support (p = 0.078 and r = 0.189) with medication adherence.

Conclusion: There is a correlation between the patient's knowledge and self-efficacy and medication adherence. Therefore, it is necessary to increase education and self-efficacy to increase patient compliance in undergoing treatment.

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INTRODUCTION

Diabetes Mellitus (DM) is a condition characterized by increased blood glucose levels or hyperglycemia caused by abnormalities in insulin secretion, insulin dysfunction, impaired metabolism of carbohydrates, proteins, and fats, and is a group of metabolic diseases (Kusumaningrum *et al*., 2021). Diabetes Mellitus is categorized into 4 types based on its etiology and clinical symptoms, namely diabetes Mellitus Type 1(DMTI) , Diabetes Mellitus Type 2 (DMT2), gestational diabetes, and specific types

(Faida & Santik, 2020). Type 2 Diabetes Mellitus is the group of DM diseases with the largest population accounting for 90-95% of the overall population and showing a rapid increase in prevalence.

Data from *International Diabetes Federation* (2021) shows that the prevalence of DM is increasing every year, currently recorded as having Type 2 DM in 2021 is estimated to reach 463 million people. Indonesia ranks seventh with 10.7 million diabetics, including Type 2 Diabetes Mellitus (Falah *et al.*, 2023). Type 2 DM that is not treated properly will cause various complications that can lead to an increase in the number of deaths and a decrease in the quality of life of the sufferer (Prabhawaty & Herlina, 2023). In 2021, the death rate of Type 2 Diabetes Mellitus patients in Indonesia reached 237 thousand people with a prevalence of 58% (IDF, 2021).

One of the causes of the increase in the morbidity and mortality rate of DM in Indonesia is patient non-compliance with treatment. Success in treatment is highly dependent on the patient's compliance with medication to keep blood glucose levels normal (Yulianti & Anggraini, 2020). According to Lawrence Green's theory in Notoatmodjo (2014) There are three factors of medication compliance that can affect a person's health, first, *predisposing factors* consisting of knowledge, self-efficacy, and socio-demographic factors in the form of age, gender, and length of suffering from DM. Second *enabling factors*. Third *reinforcing factors* consisting of family support and support for health workers.

Based on the results of research conducted by Dani *et al.* (2023) showed a significant correlation between knowledge of treatment compliance of DMT2 patients at the Pakisjaya Health Center, and p-*value* 0.014<0.05. Based on research Anti & Sulistyanto (2022) which was carried out at the Kedungwuni I Health Center stated that it was obtained*value* is 0.01<0.05, indicating that there is a significant correlation between *self-efficacy* with treatment adherence in patients with Type 2 Diabetes Mellitus.

Based on a study conducted by Marta *et al*. (2023) explained that there is a correlation between family support and treatment in the elderly with Type 2 Diabetes Mellitus in the Tubaan Health Center area in 2022, with p-*value* 0.015<0.05. Based on the results of research conducted by Ningrum (2020) obtained p-*value* i.e. 0.000 (*p<0.05)* shows a correlation between health worker support and medication compliance.

The results of a preliminary study that has been conducted at the Sindang Barang Health Center on patients suffering from Type 2 Diabetes Mellitus found that 6 out of 10 respondents experienced non-compliance with taking medication, which was caused by the respondents' lack of knowledge and confidence in carrying out treatment. Meanwhile, 4 out of 10 respondents explained that there was a lack of family involvement in reminding them to take medication and a lack of interaction between health workers and respondents in taking medication information. Based on this background, the researcher is interested in conducting research on factors related to medication adherence in patients with Type 2 Diabetes Mellitus at the Sindang Barang Health Center in Bogor.

MATERIALS AND METHOD

This study uses a quantitative descriptive method with a cross sectional approach. The research was conducted at the Sindang Barang Health Center in Bogor in January 2025. The population in this study is Type 2 Diabetes Mellitus patients at the

Sindang Barang Health Center in Bogor. The sampling technique used in this study used *purposive sampling* with the following criteria: 1) Type 2 DM respondents who are ≥ 20 years old, 2) Can speak Indonesian well, read and write, 3) No physical limitations, 4) Respondents who are willing, but cannot read and write can be accompanied by their families to fill out the questionnaire. The respondents in this study were 88 respondents obtained based on the calculation of the Slovin formula.

The research instrument was in the form of a questionnaire from *the Morisky Medication Adherence Scale 8-items* (MMAS-8) to measure the level of adherence in consuming drugs. In addition, questionnaires from the *Diabetes Knowledge Questionnaire* (DKQ-24), *Diabetes Self-efficacy Scale* (DSES-8), *Hensarling Diabetes Family Support Scale* (HDFSS), and health worker support questionnaires were also used consisting of 5 question items that have been tested for validity and reliability.

Univariate data analysis uses descriptive statistical techniques using frequency, percentage, mean, standard deviation, minimum and maximum. The bivariate analysis used in this study is a non-parametric statistical analysis with *the Spearman Rank* test because it has an abnormal data distribution.This research has received approval and ethical feasibility from the Research Ethics Commission, Faculty of Health Sciences, National University with letter number 032/e-KEPK/FIKES/XII/2024.

RESULTS

Based on research that has been conducted on Type 2 DM patients at the Sindang Barang Bogor Health Center, the results of this study can be explained as follows.

Table 1. Frequency Distribution of Demographic Data

Variable	Frequency (f)	Percentage (%)
Age (Years)		
Adults (20-59)	41	46,6
Senior (>60)	47	53,4
Gender		
Man	22	25
Woman	66	75
Length of DM (Years)		
< 5 Years	57	64,8
>5 Years	31	35,2

Based on table 1, it can be concluded that the characteristics of patients include demographic data, namely age, gender, and length of suffering from DM. The age of type 2 DM patients is mostly in the elderly (>60 years) as many as 47 patients (53.4%). The majority of DM sufferers were female as many as 66 patients (75%), and some respondents had suffered from Type 2 DM for < 5 years as many as 57 patients (64.8%).

Table 2. Descriptive Statistical Analysis

	N	*Minimum*	*Maximum*	*Mean*	*SD*
Compliance	88	3,50	8	6,645	1,195
Knowledge	88	21	48	36,216	9,227
Self-Efficacy	88	38	73	59,181	9,086
Family Support	88	25	96	76,193	12,055
Health Worker Support	88	3	5	4,716	0,478

Based on table 2, it is known that the average compliance score of people with Type 2 DM is 6.64 with a minimum score of 3.5 and a maximum score of 8, and the standard deviation (SD) is also known to be 1.2. The average knowledge score of people with Type 2 DM was 36.21 with a minimum score of 21 and a maximum score of 48, the standard deviation was known to be 9.22. The average self-efficacy score of people with Type 2 DM was 59.18 with a minimum score of 38 and a maximum score of 73, with a known standard deviation of 9.08. The average family support score of people with Type 2 DM is 76.2 with a minimum score of 25 and a maximum score of 96, the standard deviation is known to be 12.05. The average knowledge score of people with Type 2 DM was 36.2 with a minimum score of 21 and a maximum score of 48, with a standard deviation of 9.2.

Table 3. The Relationship Between Knowledge and Compliance with Taking DM Medication in Type 2 DM Patients at the Sindang Barang Health Center in Bogor

Knowledge Score	Compliance with Taking DM Medication	
	p-*value*	Correlation coefficient (*r*)
Knowledge	0,022	0,244

Based on table 3, a p-value of 0.022 ($p < 0.05$) was obtained, which showed that there was a significant correlation between knowledge and adherence to taking DM medication at the Sindang Barang Bogor Health Center. The value of the correlation coefficient (r) is weak and the direction is positive.

Table 4. The Relationship Between Self-Efficacy and Compliance with Taking DM Medication in Type 2 DM Patients at the Sindang Barang Health Center in Bogor

Self-Efficacy Score	Compliance with Taking DM Medication	
	p-value	Correlation coefficient (*r*)
Self-Efficacy	0,001	0,342

Based on table 4, a p-value of 0.001 ($p < 0.05$) was obtained, which showed that there was a significant correlation between self-efficacy and compliance with taking DM medication at the Sindang Barang Bogor Health Center. The value of the correlation coefficient (r) is weak and the direction is positive.

Table 5. The Relationship between Family Support and Compliance with Taking DM Medication in Type 2 DM Patients at the Sindang Barang Health Center in Bogor

Family Support Score	Compliance with Taking DM Medication	
	p-value	Correlation coefficient (*r*)
Family Support	0,061	0,201

Based on table 5, it was shown that there was no correlation between family support and compliance with taking DM medication at the Sindang Barang Bogor Health Center, with a p-value of 0.061 ($p > 0.05$). The value of the correlation coefficient (r) is weak and the direction is positive.

Table 6. The Relationship between Health Worker Support and Compliance with Taking DM Medication in Type 2 DM Patients at the Sindang Barang Health Center in Bogor

Healthcare Worker Support Score	Compliance with Taking DM Medication	
	p-value	Correlation coefficient (*r*)
Health Worker Support	0,078	0,189

Based on table 6, it was shown that there was no correlation between the support of health workers and compliance with taking DM medication at the Sindang Barang Bogor Health Center with a p-value of 0.078 (p > 0.05). The value of the correlation coefficient (r) is very weak and the direction is positive.

DISCUSSION
The Relationship between Knowledge and Medication Compliance in Type 2 DM Patients at the Sindang Barang Health Center in Bogor

The results showed that there was a meaningful correlation between knowledge and medication adherence in Type 2 DM patients at the Sindang Barang Bogor Health Center with a p-value of 0.022 (p < 0.05) with a value of r = 0.244 which means that the correlation strength is weak. The results of this study are in accordance with the research conducted by Pharamita (2023) which stated that there was a correlation between knowledge and medication adherence in Type 2 DM patients. Knowledge about DM disease in general is obtained from the explanation of health workers when conducting routine checkups and taking Diabetes Mellitus medication.

According to Arfania *et al*. (2023) Knowledge has an important role in shaping a person's behavior. Adequate information about the disease can influence patients to undergo therapy better. With the right understanding, patients will be more compliant with treatment and comply with instructions from medical personnel with more discipline. Therefore, providing information about DM disease is very important to improve adherence to medication.

Based on the researcher's assumptions, DM medication adherence in Type 2 DM patients can be influenced by knowledge so that providing in-depth information related to diabetic melitus can make medication adherence increase. The higher the knowledge of Type 2 Diabetes Mellitus patients, the higher the compliance with taking medication in Type 2 DM patients.

The Relationship between Self-Efficacy and Drug Medication Compliance in Type 2 DM Patients at the Sindang Barang Health Center in Bogor

The results of this study showed a significant value of p-value 0.001 with r = 0.342, so it can be concluded that there is a correlation between self-efficacy and adherence to taking DM medication at the Sindang Barang Bogor Health Center with a weak correlation strength. This is supported by the results of research conducted by Djaelan *et al*. (2022) conducted at the Baptist Hospital, Batu City showed that there was a correlation between *self-efficacy* with adherence to taking medication. Diabetic mellitus patients who have *self-efficacy* positive ones tend to be more motivated to maintain their health through DM management, including adherence to medication, so that blood sugar levels can be maintained and complications can be avoided.

According to Pranata & Sari (2021) Self-efficacy is the result of a cognitive process in the form of a person's belief in estimating his ability to perform certain actions independently such as treatment in DM treatment. Compliance with taking the drug begins with confidence (*self-efficacy*) a person will control the condition of his disease. If a person has a high level of confidence, they tend to show positive behavior in dealing with health problems, so strong confidence is very important in the management of diseases such as Diabetes Mellitus.

Based on the researcher's assumptions, self-efficacy is related to medication adherence. This is because the higher the self-efficacy that patients feel, the more likely

they are to improve their health by motivating themselves in disease management plans such as DM treatment, thus making patients feel better.

The Relationship between Family Support and Medication Compliance in Type 2 DM Patients at the Sindang Barang Health Center in Bogor

The results of this study showed that the p-value was 0.061, which means that there was no significant correlation between family support and medication adherence in Type 2 DM patients, with r = 201 which means that the correlation strength was weak. This is in line with research conducted by Simorangkir *et al.* (2024) at the Pematang Siantar Hope Internal Medicine Poly who said that there was no significant relationship between family support and medication adherence in patients with diabetes mellitus. Because adherence to medication is not only influenced by family factors, but other factors such as self-desire, individual knowledge, self-management, and economic factors.

According to Azizah *et al*. (2023) Patient care at home is the responsibility of the family. Thus, the role of the family in the care of DM patients is very important to increase motivation for compliance in treatment. DM sufferers in a supportive family environment can help patients maintain consistency in taking medication on schedule, so that compliance in taking medication can be carried out properly.

Based on the researchers' assumptions, family support plays a very important role in determining medication adherence in patients with Diabates Mellitus. The family is a nurse at home who provides care to Type 2 DM patients, so the patient's family must have adequate knowledge about the patient's illness including its treatment, where the lower the family support, the more likely it is that the DM patient still has a good level of taking medication or vice versa.

The Relationship between Health Worker Support and Drug Medication Compliance in Type 2 DM Patients at the Sindang Barang Health Center in Bogor

The results showed that there was no correlation between the support of health workers and medication adherence in Type 2 DM patients, a p-value of 0.078 and a value of r = 0.189, which means that the correlation strength was very weak. The results of this study are in line with the study conducted by Riani *et al*. (2025) which stated that there was no significant correlation between the role of health workers and medication adherence in Type 2 DM patients. This is because, health workers always remind patients to take medication and routinely provide education periodically about the benefits of taking diabetes medication for DM sufferers, but if the patient forgets and lacks family support, then the patient may not comply with the treatment.

According to Almira *et al*. (2019) Factors related to compliance behavior include factors in the form of support from health workers so that patients follow treatment. One of the factors that hinders patient compliance with treatment is the poor relationship between patients and health workers. Communication between health workers and DM sufferers is very necessary, because good communication makes patients feel comfortable while undergoing treatment and has a positive impact on their mental health.

Based on the researchers' assumptions, the support of health workers plays an important role in improving compliance in people with Type 2 DM in taking medications. Good communication between health workers can have a positive impact on DM sufferers. By providing the right information about how and when to take medication, the benefits of medication, how to store medication properly, and possible side effects, this can help sufferers not forget to take their medication.

CONCLUSION

Based on the results of the research that has been carried out, the researcher concluded that there is a significant correlation between knowledge and self-efficacy and adherence to taking DM drugs. However, there was no significant correlation between family support and health worker support and compliance with taking DM medication in Type 2 DM patients at the Sindang Barang Bogor Health Center. It is hoped that by increasing knowledge and self-efficacy in DM patients, it can increase compliance with DM treatment in the long term.

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