

The Relationship Between Knowledge Level and Medication Compliance in Type II Diabetes Mellitus Patients at Krobokan Community Health Center

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ABSTRACT

Diabetes mellitus is a condition of chronic hyperglycemia accompanied by various metabolic disorders due to hormonal disturbances, which can cause chronic complications in the eyes, kidneys, nerves, and blood vessels. This condition requires long-term management through lifestyle adjustments, pharmacological therapy, and continuous monitoring of blood glucose levels to prevent further complications. The purpose of this study was to determine the relationship between knowledge levels and medication adherence in type 2 diabetes mellitus patients at the Krobokan Community Health Center. This study used an observational analytical design with a cross-sectional approach. The sample consisted of 51 people using a purposive sampling technique. Data collection instruments were a knowledge level questionnaire (DKQ) and a medication adherence questionnaire (DSMQ). Data analysis used the Spearman correlation test. The results showed that the majority of respondents had a low level of knowledge (68.6%), but had a high level of medication adherence (70.6%). The Spearman correlation test obtained a p value of 0.402 ($p > 0.05$), indicating no significant relationship between knowledge levels and medication adherence in diabetes mellitus patients at the Krobokan Community Health Center.

Keywords: *diabetes mellitus* , knowledge, compliance, treatment

ABSTRACT

Diabetes mellitus is a chronic hyperglycemic condition accompanied by various metabolic abnormalities due to hormonal disorders, which can cause chronic complications in the eyes, kidneys, nerves, and blood vessels. This condition requires long-term management through lifestyle adjustments, pharmacological therapy, and continuous monitoring of blood glucose levels to prevent further complications. This study aimed to determine the relationship between knowledge level and medication adherence in type 2 diabetes mellitus patients at Krobokan Public Health Center. This study used an analytical observational design with a cross-sectional approach. The sample consisted of 51 people taken using purposive sampling. Data were collected using the Knowledge Questionnaire (DKQ) and Medication Adherence Questionnaire (DSMQ). Data analysis was performed using the Spearman correlation test. The results showed that the majority of respondents had a low level of knowledge (68.6%), but had a compliant level of medication adherence (70.6%). The Spearman correlation test results obtained a value of $p=0.402$ ($p > 0.05$), indicating there was no significant relationship between knowledge level and medication adherence in diabetes mellitus patients at Krobokan Public Health Center.

Keywords: *diabetes mellitus* , knowledge, adherence, treatment

INTRODUCTION

Diabetes mellitus is a condition of chronic hyperglycemia accompanied by various metabolic disorders due to hormonal disturbances, which can lead to chronic complications in the eyes, kidneys, nerves, and blood vessels (Seminar et al., 2021). According to WHO (2020), diabetes mellitus (DM) is a group of metabolic diseases characterized by chronic hyperglycemia (high blood sugar levels), which occurs due to disorders of insulin secretion, insulin action, or both. This condition requires long-term management through lifestyle modification, pharmacological therapy, and continuous monitoring of blood glucose levels to prevent further complications.

Globally, the prevalence of diabetes mellitus continues to increase significantly. The International Diabetes Federation (IDF) reports that the number of people with DM increased from 366 million in 2011 to 463 million in 2019, and is estimated to reach 578 million in 2030 and 700 million in 2045 (Indriati & Riau, 2023). In Indonesia, the Ministry of Health of the Republic of Indonesia reported that by 2023 there were 19.47 million people with type 2 diabetes mellitus (Sahadewa et al., 2024). At the Central Java Province level, the prevalence of DM fluctuated, namely 13.39% in 2019, increasing to 13.67% in 2020, decreasing to 11.0% in 2021, and increasing again to 15.6% in 2022. Semarang City was recorded as the area with the highest number of cases in Central Java, and data from the Krobokan Community Health Center showed that in 2025 there were 327 DM sufferers. These data indicate that diabetes mellitus remains a significant health problem and requires special attention, especially at the primary health care level.

Successful diabetes mellitus management is heavily influenced by the patient's active involvement in treatment. Patient knowledge is a crucial factor influencing health behaviors, including adherence to pharmacological therapy, dietary management, and healthy lifestyle practices. Good knowledge of the disease, the goals of therapy, and the appropriate use of medications or insulin will improve patient compliance, thus achieving optimal blood glucose control (Pharamita et al., 2023). Conversely, a lack of knowledge can lead to non-adherence to treatment, leading to

uncontrolled blood sugar levels and an increased risk of acute and chronic complications.

Several studies have shown a significant relationship between knowledge and medication adherence in DM patients. Sumantri's (2024) study found that knowledge is a factor influencing medication adherence, so comprehensive education is essential to improve therapy success. Similar findings were also reported by Pharamita et al. (2023), who found that higher patient knowledge led to higher medication adherence. Good adherence leads to optimal blood glucose control and a reduced risk of long-term complications (Pramudyatama et al., 2025). One more

Based on the research results above, most studies related to the relationship between knowledge levels and medication adherence in DM patients indicate a relationship between knowledge levels and medication adherence in diabetes mellitus patients. In practice, patients with good knowledge are still found to be less than optimally compliant with therapy. This indicates that knowledge alone is not enough to influence medication behavior because other factors such as motivation, family support, and access to health services also play a role. Therefore, further research is needed in the local context, such as at the Krobokan Community Health Center. The results of a preliminary study conducted on 6 respondents stated that 3 respondents had a level of knowledge in the poor category and were not compliant in taking DM medication, while 2 respondents had a sufficient level of knowledge and were compliant in taking medication. In addition, there was 1 respondent with a good level of knowledge but was not compliant in taking medication.

Based on the review above, this study is important to determine the relationship between the level of knowledge and the treatment of diabetes mellitus patients at the Krobokan Community Health Center as an effort to support improving the quality of primary health services.

LITERATURE REVIEW

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by elevated blood glucose levels due to the body's inability to produce or use insulin effectively. This condition is influenced by genetic factors, impaired pancreatic beta cell function, and lifestyle and environmental factors (Bille & Hilda, 2023). Impaired insulin function causes hyperglycemia, causing the body to use fat and protein as energy sources. This can lead to long-term microvascular and macrovascular complications such as retinopathy, nephropathy, neuropathy, heart disease, stroke, and peripheral vascular disease, all of which contribute to a decreased quality of life and an increased risk of death. Based on its cause, diabetes mellitus is classified into type 1 DM, type 2 DM, gestational DM, and DM due to other factors (Sundari et al., 2025). Common symptoms frequently found in DM patients include polyuria, polyphagia without increased energy, and weight loss. Weight loss occurs due to the body's inability to utilize glucose as an energy source, forcing the body to process fat and protein reserves.

Diabetes mellitus testing is performed by measuring blood glucose levels, including random blood glucose (FBS), fasting blood glucose (FBS), 2-hour postprandial blood glucose (2HPP), and HbA1c. The recommended test is to use plasma or venous serum samples using enzymatic methods, while self-monitoring can be performed using a glucometer or Point of Care Testing (POCT) using a capillary blood sample. Normal reference values include FBS <126 mg/dL, FBS <200 mg/dL, 2HPP blood glucose <200 mg/dL, and HbA1c <6.5% (Care & Supply, 2021).

The level of knowledge in a health context describes the extent to which an individual understands information related to the disease, including causes, risk factors, symptoms, prevention, treatment, and health maintenance, which influence health attitudes and behaviors (Lestari et al. 2021). In patients with diabetes mellitus, knowledge encompasses dietary management, self-management, and complication prevention, which are influenced by internal factors such as age, education, and motivation, as well as external factors such as access to information, the role of health professionals, and family support. Good knowledge will encourage optimal treatment

behaviors, such as medication adherence, routine health checks, dietary regulation, and regular physical activity to maintain a stable patient health condition. Therefore, the management of type 2 diabetes requires a comprehensive approach that includes blood glucose control, dietary adherence, and stress management through mindfulness-based meditation, including mindful eating, which plays a role in increasing food awareness, controlling emotional eating, and helping maintain stable blood glucose levels, thereby reducing the risk of complications (Wahyuni et al. 2025).

Diabetes mellitus treatment behavior is the patient's willingness and concrete actions in following medical recommendations, including adherence to medication or insulin, regular health checks and blood sugar monitoring, healthy eating patterns, and regular physical activity (Yulianti, 2026). Treatment behavior is influenced by social, economic, family support, and cultural factors. Family support has been shown to improve self-efficacy, therapy adherence, and glycemic control, while economic limitations and certain cultural beliefs can be barriers to successful diabetes mellitus treatment (Karingga et al., 2024).

METHOD

This study used observational analytics with a correlational approach and cross-sectional method, with a sample of 51 people using purposive sampling or total sampling techniques. Data collection instruments were a knowledge level questionnaire (DKQ) and a medication adherence questionnaire (DSMQ). Data analysis in this study used a Spearman correlation test to determine the relationship between knowledge level and medication adherence. The inclusion criteria for this study were patients who had been diagnosed with type II diabetes mellitus, were undergoing treatment at the Krobokan Community Health Center, were aged ≥ 50 years and were following

prolanis, able to communicate well, and willing to be respondents by signing an informed consent. Exclusion criteria included patients with type I or gestational diabetes mellitus, patients with cognitive impairment or serious illnesses that prevented them from completing

the questionnaire, and respondents who did not complete the questionnaire completely.

RESULTS AND DISCUSSION

A. Patient characteristics

Table 1.1 Distribution of Characteristics of Diabetes Mellitus Patients Based on Age, Education, and Prolanis at Krobokan Community Health Center in February 2026.

Characteristic	Frequency	Percentage (%)
Gender		
Man	18	35.3%
Woman	33	64.7%
Σ	51	100%
Age		
50-59 years	20	39.2%
60-69 years	21	41.2%
70-79 years	9	17.6%
≥ 80 years	1	2.0%
Σ	51	100%
Education		
No school	3	5.9%
Elementary School	15	29.4%
JUNIOR HIGH SCHOOL	12	23.5%
SENIOR HIGH SCHOOL	14	27.5%
PT	7	13.7%
Σ	51	100%

Based on table 1.1, it can be seen that the majority of respondents were female, as many as 33 people (64.7%), while 18 people were male (35.3%). Based on age, the majority of respondents were in the 60–69 age group, as many as 21 people (41.2%), followed by 50–59 years old as many as 20 people (39.2%), 70–79 years old as many as 9 people (17.6%), and ≥ 80 years old as many as 1 person (2.0%). In terms of education level, the majority of respondents had elementary school education (SD) as many as 15 people (29.4%), followed by high school as many as 14 people (27.5%), junior high school as many as 12 people (23.5%), college as many as 7 people (13.7%), and no school as many as 3 people (5.9%).

Patient Knowledge Level

Table 1.2 Distribution of Knowledge Level of Diabetes Mellitus Patients at Krobokan Community Health Center in February 2026

Level	Frequency	Presentation
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Knowledge		(%)
Good	0	0%
Enough	16	31.4%
Not enough	35	68.6%
Amount	51	100%

Based on table 1.2 above, it can be seen that the majority of Type II DM patients at the Krobokan Semarang Community Health Center have a relatively low level of knowledge, namely 68.6%.

Medication Compliance

Table 1.3 Distribution of Medication Compliance of Diabetes Mellitus Patients at the Krobokan Community Health Center in February 2026

Compliance Take medicine	Frequency	Presentation (%)
Obedient	36	70.6%
Not obey	15	29.4%
Amount	51	100%

Based on table 1.3 above, it can be seen that the majority of Type 2 DM patients at the Krobokan Semarang Community Health Center have a medication compliance rate of 70.6%.

Analysis of the Relationship between Knowledge Level and Medication Compliance

Table 1.4 Analysis of the Relationship Between Knowledge Level and Medication Compliance in Diabetes Mellitus Patients at the Krobokan Community Health Center in February 2026

Medication Compliance	Level of Knowledge						Total	
	not enough		Enough		Good		F	%
	F	%	F	%	F	%		
Obedient	26	72.2%	10	27.8%	0	0	36	100%
Not obey	9	60.0%	6	40.0%	0	0%	15	100%
Total	35	68.6%	16	31.44%	0	0	51	100%

Spearman Correlation Test Significant value $p=0.402$ with $p<0.05$ $N=51$

Based on table 1.4, the results of Type 2 DM patients at the Krobokan Health Center, West Semarang, show that most of the respondents, both those who were compliant and those who were not compliant with treatment, had a low level of knowledge, namely 68.6%.

Based on the results of the Spearman correlation test between the level of knowledge (DKQ) and adherence/treatment (DSMQ) in diabetes mellitus patients at the Krobokan Community Health Center, West Semarang, a correlation coefficient value of $r = -0.120$ was

obtained with a significance value of $p = 0.402$ and a p value > 0.05 , this indicates that the relationship between the level of knowledge and adherence to treatment is very weak. Thus, it can be concluded that there is no significant relationship between the level of knowledge and adherence to treatment in diabetes mellitus patients.

DISCUSSION

A. Patient Characteristics

Table 1.1 shows that the majority of diabetes mellitus patients (41.2%) are between the ages of 60 and 69, with women accounting for the majority of the patients. This indicates that the aging process that occurs after the age of 30 causes changes in the anatomical, physiological, and biochemical aspects of the body (Paramita et al., 2023). Pre-elderly individuals are defined as individuals aged 45–59.

As a person ages, cognitive abilities, including memory, can experience changes that affect their level of knowledge. Declining memory function in older age makes it more difficult for individuals to receive, store, and recall new information compared to younger individuals (Widyaningrum et al., 2021). Consequently, increasing age is often associated with a reduced ability to retain previously acquired knowledge.

It can be concluded that the majority of diabetes mellitus patients at the Krobokan Community Health Center in West Semarang are in the elderly age group of 60–69 years and are predominantly female, indicating that the risk of DM increases with age. The aging process causes anatomical, physiological, and biochemical changes as well as a decline in cognitive function, particularly memory, which can affect the ability to receive and retain knowledge. Thus, advanced age not only contributes to the increased incidence of DM but also to the decreased capacity of individuals to understand and remember health information.

The highest level of education attained was elementary school, at 29.4%. This indicates that most respondents had a relatively low educational background, potentially impacting their level of knowledge. Education level is a crucial factor influencing a person's ability to understand, receive, and process information. The higher the education level, the broader the individual's insight and thinking skills (Ramadhana & Meitasari, 2023). Therefore, education plays a significant role in shaping cognitive abilities and determining a person's level of understanding of various information.

Elementary school education generally only allows for a basic level of knowledge without in-depth analytical skills, including for diabetes mellitus patients who do not yet fully understand their disease. This situation indicates that diabetes mellitus patients at the Krobokan Community Health Center in West

Semarang still have limited understanding of the disease and its management. Therefore, ongoing health education and outreach regarding diabetes mellitus and its management are necessary.

The Chronic Disease Management Program (Prolanis) is a health care program aimed at people with chronic diseases, particularly diabetes mellitus and hypertension. Prolanis is an integrated health care system involving participants, healthcare facilities, and the BPJS Kesehatan (Social Security Agency) to continuously monitor health conditions. The primary goal of Prolanis is to improve participants' quality of life through disease control, complication prevention, and increased adherence to treatment and a healthy lifestyle (Minropa et al., 2022).

Through Prolanis activities, one of the interventions carried out is the administration of antidiabetic medication, which must be taken by patients as part of therapy. The use of this medication is an effort to maintain and control blood sugar levels to keep them within normal limits. This procedure is included in the pharmacological management of diabetes mellitus patients.

B. Patient knowledge level

Based on Table 1.2, the majority of diabetes mellitus patients have a low level of knowledge, at 68.6%. This finding is inconsistent with other studies that show that most diabetes mellitus patients only have low confidence (43.8%). However, in general, patients have good confidence in the management of type 2 diabetes mellitus (Ahmad, 2021). These differences in findings indicate that low levels of knowledge do not always translate into low confidence in disease management.

Knowledge is the result of a person's sensing process of an object through their five senses, which is then understood, stored, and used as a basis for thinking and acting (Octaviana & Reza, 2021). Knowledge in a domain is crucial for shaping one's actions. Factors influencing the level of knowledge in diabetes mellitus patients include education, age, experience with the disease, occupation, and access to health information, all of which play a role in a patient's ability to understand and manage their disease effectively (Sevani et al., 2024).

Some of the things that were less known by diabetes mellitus patients in this study, based on the questionnaire results, were the causes of diabetes mellitus and how to clean wounds. Patients prioritized medication over diet and exercise. This may be influenced by the fact that most patients were aged 60-69 years, or elderly, as some had elementary school education. Furthermore, their management practices were less effective due to several patient characteristics.

Diabetes mellitus patients with a low level of knowledge about the disease and how to control it result in less than optimal treatment and therapy for controlling diabetes mellitus.

C. Compliance with taking medication

Based on Table 1.3 above, it can be seen that the majority of diabetes mellitus patients had adequate medication adherence (70.6%). This is in line with research conducted by Pratiwi et al., 2022, which showed that the highest level of medication adherence was 66.67%.

Medication adherence is the patient's behavior in following healthcare providers' recommendations regarding medication use, including dosage, timing, and proper method of consumption. This adherence is influenced by various factors such as knowledge level, motivation, family support, economic situation, drug side effects, and access to healthcare services (Rosalinda, 2023). Good adherence ensures optimal treatment, helping control the disease and prevent complications.

In this study, it can be concluded that this occurs because diabetes mellitus patients do not neglect taking medication. This is evidenced by the answers that match the key (very applicable to me) in question number 4 in questionnaire with the question "I take diabetes medication (e.g. tablets or insulin) according to the doctor's recommendations." This is because patients follow the doctor's recommendations despite their lack of knowledge.

B. Knowledge Level and Medication Compliance

Based on Table 1.4, it can be seen that the majority of diabetes mellitus patients with inadequate knowledge (68.6%) had medication adherence of 70.6%. And a small proportion of diabetes mellitus patients with sufficient knowledge (29.4%) had medication adherence of 31.4%. This indicates that knowledge level

does not affect medication adherence in diabetes mellitus patients.

Based on the results of the Spearman correlation test between the level of knowledge (DKQ) and compliance/treatment (DSMQ) in diabetes mellitus patients at the Krobokan Health Center, West Semarang, a significant value of $0.402 > 0.05$ was obtained, meaning there was no significant relationship between knowledge and the level of compliance in taking medication in diabetes mellitus patients at the Krobokan Health Center, West Semarang. The correlation coefficient value of the relationship between the level of knowledge and compliance in taking medication in diabetes mellitus patients was -0.120 , meaning there was a weak relationship between the level of knowledge and compliance in taking medication in diabetes mellitus patients at the Krobokan Health Center, West Semarang.

This shows that medication adherence in diabetes mellitus patients is not influenced by the knowledge that can be obtained from patient health care workers during routine check-ups and taking diabetes mellitus medication.

Based on the above description, it can be concluded that the level of knowledge of diabetes mellitus patients does not influence medication adherence. Patients with good knowledge and management are not necessarily compliant with medication. However, as is well known, knowledge is not the sole factor influencing medication adherence in diabetes mellitus patients. Other factors also contribute to adherence, such as motivation, family support, economic conditions, medication side effects, and access to healthcare. This is demonstrated by the results of the study, which showed that 72.2% of patients with poor knowledge had poor medication adherence, as knowledge was not the dominant factor. Other factors can influence medication adherence in diabetes mellitus patients.

CONCLUSION

The majority of diabetes mellitus patients at the Krobokan Community Health Center in West Semarang are in the 60-69 age group with an elementary school education. The majority of patients have low levels of knowledge about diabetes mellitus. Despite this, most patients demonstrate a high level of medication adherence. The analysis also

showed no significant relationship between knowledge and medication adherence among diabetes mellitus patients at the Krobokan Community Health Center in West Semarang.

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