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Knowledge and Medication Adherence among Type 2 Diabetes Mellitus Patients: A Cross-Sectional Study in Yogyakarta, Indonesia

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ABSTRACT

Diabetes mellitus has become a major public health concern, with Indonesia ranking fifth globally in prevalence, affecting approximately 19.5 million people. This study aimed to evaluate the relationship between knowledge and medication adherence among patients with type 2 diabetes mellitus receiving oral antidiabetic therapy at the Prambanan Community Health Center. A quantitative cross-sectional design was employed involving 50 respondents who met the inclusion criteria. Data were collected using two validated instruments: the *Diabetes Knowledge Questionnaire-24 (DKQ-24)* and the *Morisky Medication Adherence Scale-8 (MMAS-8)*. The results showed that 56% of respondents had a good level of knowledge and 52% demonstrated high adherence to oral antidiabetic therapy. Statistical analysis using *Spearman's rho* revealed a significant positive correlation between knowledge and medication adherence ($p = 0.003$; $r = 0.357$). These findings indicate that higher patient knowledge contributes to better adherence behavior. Strengthening diabetes education and pharmacist counseling is recommended to enhance treatment adherence and optimize glycemic control in primary healthcare settings.

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ABSTRAK

Diabetes melitus merupakan masalah kesehatan masyarakat yang signifikan, dengan Indonesia menempati peringkat kelima dunia dan jumlah penderita mencapai sekitar 19,5 juta orang. Penelitian ini bertujuan untuk menganalisis hubungan antara tingkat pengetahuan dan kepatuhan minum obat pada pasien diabetes melitus tipe 2 yang menjalani terapi antidiabetik oral di Puskesmas Prambanan. Penelitian ini menggunakan desain kuantitatif dengan pendekatan potong lintang (cross-sectional) yang melibatkan 50 responden sesuai kriteria inklusi. Pengumpulan data dilakukan menggunakan dua instrumen terstandar, yaitu *Diabetes Knowledge Questionnaire-24 (DKQ-24)* untuk menilai pengetahuan dan *Morisky Medication Adherence Scale-8 (MMAS-8)* untuk mengukur kepatuhan. Hasil menunjukkan bahwa 56% responden memiliki tingkat pengetahuan yang baik dan 52% menunjukkan kepatuhan tinggi terhadap terapi antidiabetik oral. Analisis statistik dengan uji korelasi Spearman menunjukkan hubungan positif yang signifikan antara pengetahuan dan kepatuhan ($p = 0,003$; $r = 0,357$). Temuan ini mengindikasikan bahwa peningkatan pengetahuan pasien berkontribusi terhadap perilaku kepatuhan yang lebih baik. Peningkatan edukasi diabetes secara terstruktur dan pendampingan oleh apoteker direkomendasikan untuk memperkuat kepatuhan terapi serta mengoptimalkan kontrol glikemik di fasilitas pelayanan kesehatan primer.

Kata Kunci: Tingkat pengetahuan; Tingkat kepatuhan; Diabetes Melitus tipe 2; Terapi antidiabetika oral

1. Introduction

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by impaired glucose metabolism, often accompanied by hormonal imbalances that lead to various systemic complications. These include chronic conditions affecting the eyes, kidneys, and blood vessels, often marked by lesions on the basement membrane and persistent hyperglycemia [1]. According to the International Diabetes Federation (IDF) (2025), diabetes mellitus (DM) is a serious, chronic condition that occurs when the body cannot produce enough insulin or cannot effectively use the insulin it does produce, leading to elevated blood glucose levels (hyperglycaemia). Globally, diabetes remains a critical public health issue, with 589 million individuals living with the disease in 2025; this number is projected to rise to 643 million by 2030 and 783 million by 2045. In the same report, Indonesia ranked fifth worldwide in diabetes prevalence, with an estimated 19.5 million people affected [2].

Extensive preclinical and clinical studies have explored the etiology of diabetes and identified various pharmacological strategies to improve therapeutic outcomes [3],[4],[5]. Despite these advances, several investigations emphasize that the success of diabetes management strongly depends on patients' adherence to prescribed treatment regimens [6],[7],[8]. According to Green's health behavior theory, treatment adherence is influenced by three major components predisposing factors such as knowledge and motivation, enabling factors like access to healthcare services, and reinforcing factors including family and healthcare provider support [9].

Knowledge, as a cognitive domain, significantly influences individual behavior. Health-related behaviors that are grounded in adequate knowledge tend to be more

consistent and sustainable compared to those that are not [10]. In the context of diabetes, patient knowledge about the disease and its treatment correlates with medication adherence, which in turn enhances therapeutic outcomes. Nevertheless, non-adherence remains prevalent, often stemming from limited knowledge about disease management and the importance of sustained therapy [11].

A study conducted by Firdiawan et al. (2021) on 200 patients with type 2 diabetes mellitus in urban primary healthcare centers in Yogyakarta revealed that 57% of patients exhibited low medication adherence. The primary reasons for non-adherence included forgetting to take medication (42%) and poor clinical outcomes (68%). A statistically significant association was observed between adherence and clinical outcomes (p= 0.009; OR = 2.211; 95% CI = 1.208–4.048), emphasizing the need for healthcare providers, particularly pharmacists, to reinforce adherence counseling to improve treatment effectiveness [12].

To our knowledge, no study has specifically examined the relationship between knowledge and medication adherence among type 2 diabetes patients in Prambanan. This makes the present research contextually valuable, providing evidence that can support primary healthcare policies in Indonesia.

2. Methods

Study Design and Setting

This research employed a quantitative approach with a cross-sectional design to investigate the relationship between knowledge level and medication adherence among patients with type 2 diabetes mellitus (T2DM) receiving oral antidiabetic drugs (OADs). The study was conducted in January 2024 at Prambanan Primary Health Center, located at Jl. Raya Piyungan–Prambanan Km 1, Jirak, Bokoharjo, Prambanan Subdistrict, Special Region of Yogyakarta, Indonesia.

Population and Sampling

The study population included all T2DM patients visiting Prambanan PHC between January and February 2024. A total of 50 respondents who met the inclusion criteria were selected using consecutive sampling [13]. Inclusion criteria were: (1) age above 18 years, (2) confirmed diagnosis of T2DM, (3) use of at least one OAD, and (4) willingness to participate by signing informed consent. Exclusion criteria included pregnancy, lactation, hearing or speech impairment, and incomplete questionnaire responses. The independent variable was patients' knowledge about diabetes, and the dependent variable was medication adherence to OAD therapy.

Research Instruments

Two standardized and validated instruments were used to collect primary data. The *Diabetes Knowledge Questionnaire-24 (DKQ-24)* assessed patients' knowledge, while the *Morisky Medication Adherence Scale-8 (MMAS-8)* measured medication adherence [14],[15],[16]. Both instruments have been previously validated in Indonesian populations, demonstrating strong reliability and construct validity. The DKQ-24 comprised 24 items assessing general understanding, complications, symptoms, and causes of diabetes. The MMAS-8 consisted of eight items evaluating behaviors associated with medication-taking patterns.

Data Collection Procedure

Data collection was performed through direct distribution of questionnaires to eligible respondents at the health center. The researcher assisted participants during completion to ensure comprehension of all questions. After completion, each form was

immediately checked for accuracy and completeness. The process was carried out under the supervision of health officers to maintain consistency and validity of the responses.

Data Analysis

Data were processed through several steps including editing, coding, entry, and cleaning prior to analysis. Descriptive statistics were applied to describe the frequency and percentage distribution of knowledge and adherence levels. Knowledge scores were categorized as poor (<55), moderate (56–75), and good (76–100) according to DKQ-24 scoring criteria [14]. Adherence levels were classified as low (<6), medium (6–7), or high (8) based on MMAS-8 scoring [14], [15],[16]. The Spearman correlation test was used to determine the association between knowledge and adherence, with statistical significance set at $p < 0.05$. Correlation strength was interpreted as very weak (0.00–0.25), fair (0.26–0.50), strong (0.51–0.75), or very strong (0.76–0.99) [17],[18].

Ethical Considerations

This study was approved by the Health Research Ethics Committee of Universitas Aisyiyah Yogyakarta, approval number 1815/KEP-UNISA/I/2024. All participants were informed of the study objectives, procedures, and confidentiality measures, and each provided written informed consent prior to participation.

3. Results and Discussion

Patient Demographics

The demographic characteristics of the respondents in this study included variables of age, gender, religion, education level, and occupation (**Table 1**). The study involved participants over the age of 18 years according to the inclusion criteria. The majority of respondents (36%) were aged 46–55 years, which is consistent with previous studies showing that type 2 diabetes incidence peaks in middle to late adulthood. This finding underscores the importance of targeted interventions for this age group, as they remain economically active but face increasing risk of chronic complications that may reduce productivity. This finding is consistent with Sidrotullah's study (2022), which reported that the majority of respondents with type 2 diabetes mellitus were in the age range of 40-50 years at 30%, and age above 50 years at 70%[19]. In line with this, several studies reported that patients with type 2 diabetes mellitus were mostly suffered at the age of 41-65 years by 67% [20] and 59.5% [4]. The same thing was also reported by the Indonesian Ministry of Health (2018) that 90-95% of people with diabetes are type 2, with the highest prevalence in individuals over 45 years old.

In terms of gender, the majority of respondents were female, 31 people (62%), while 19 people (38%) were male. The high participation of women can be attributed to their social role in household health management and the tendency to be more involved in promotive-preventive activities in the health sector. This is in line with Sidrotullah's report (2022) which noted the dominance of female respondents at 72.8% [19]. In addition, Riskesdas data (Ministry of Health, 2018) also shows that the prevalence of diabetes tends to be higher in women than men [21].

In terms of religious affiliation, the majority of respondents in this study were Muslim, numbering 45 people (90%), followed by Catholic respondents (8%) and Protestant Christians (2%). This distribution reflects the composition of the local population, which is predominantly Muslim, with minorities of other religions also represented in the study population.

Table 1. Demographic characteristics of patients with type 2 diabetes mellitus at Prambanan Health Center, Yogyakarta, Indonesia

Characteristics	Frequency (n)	Percentage (%)
Age (year)		
26 – 35	3	6
36 – 45	5	10
46 – 55	18	36
56 – 65	14	28
>65	10	20
Gender		
Male	19	62
Female	31	38
Religion		
Islam	45	90
Catholic	4	8
Christian	1	2
Education		
Elementary school	7	13.7
Junior high school	17	33.3
High Schol	18	35.3
University	8	15.7
Occupation		
Housewife	16	32.0
Retired	6	12.0
Farmer	10	20.0
Private employee	6	12.0
Self-employed	11	22.0
Laborer	1	2.0

The educational level of respondents shows diversity, with the majority having completed high school (SMA) at 35.3%. 33.3% of respondents completed education up to junior high school (SMP), 15.7% have a higher education background (university), and 13.7% only completed elementary school (SD). This variation provides an overview of the heterogeneous educational background and may influence understanding and health behaviors related to diabetes management.

The distribution of occupations also shows diversity. Most respondents are housewives (32%), followed by entrepreneurs (22%), farmers (20%), private sector employees (12%), laborers (2%), and retirees (12%). The high proportion of respondents not engaged in formal employment suggests that they may have more time available for therapy and disease management programs. This is supported by the findings of Mahmud et al. (2018), who reported that type 2 diabetes patients who are not employed tend to show higher adherence to medication compared to those who are employed [22].

Thus, this demographic data provides a comprehensive overview of the respondents' profile, which serves as an important foundation for analyzing the relationship between individual characteristics and levels of knowledge and adherence to diabetes pharmacological therapy.

Patient Knowledge Level

The level of patients' knowledge about medication use plays a crucial role in the management of Type 2 Diabetes Mellitus. Good knowledge can improve patient

adherence to therapy, reduce the risk of complications, and support a better quality of life.

The evaluation of patients' knowledge level regarding Type 2 Diabetes Mellitus was conducted using the Diabetes Knowledge Questionnaire-24 (DKQ-24), which covers four main domains: (1) general knowledge about diabetes mellitus (Statement items: 4, 6, 7, 9, 10, 12, 13, 15, 16, 17, 18, 24), (2) diabetes complications (Statement items: 14, 19, 23, and 26), (3) hyperglycemic and hypoglycemic symptoms (statement items numbered: 5, 8, 21, and 22), and (4) understanding of the types of diseases and their causes (statement items numbered: 1, 2, 3, and 11). The analysis was based on the proportion of correct and incorrect answers from each respondent (**Table 2**).

Table 2. Frequency and percentage distribution of diabetes knowledge statements among patients at Prambanan Community Health Center, Yogyakarta, Indonesia

No	Statement	True *f* (%)	False *f* (%)
1	**Consuming too much sugar and other sweet foods is a cause of diabetes.**	30 (60.0%)	20 (40.0%)
2	**One cause of diabetes is a lack of effective insulin in the body.**	37 (74.0%)	13 (26.0%)
3	**Diabetes is caused by the kidneys' failure to retain sugar through urine**	18 (36.0%)	33 (64.0%)
4	**The kidneys produce insulin.**	20 (40.0%)	30 (60.0%)
5	**In untreated diabetes, blood sugar levels usually rise.**	41 (82.0%)	9 (18.0%)
6	**If I have diabetes, my children are more likely to develop diabetes.**	44 (88.0%)	6 (12.0%)
7	**Diabetes can be cured.**	22 (44.0%)	28 (56.0%)
8	**A fasting blood sugar level of 210 mg/dL is too high.**	32 (63.0%)	18 (34.0%)
9	**The best way to check for diabetes is to test my urine.**	22 (44.0%)	28 (56.0%)
10	**Regular exercise will increase the need for insulin or other diabetes treatments.**	30 (60.0%)	20 (40.0%)
11	**There are two main types of diabetes: Type 1 (*insulin-dependent*) and Type 2 (*noninsulin-dependent*).**	22 (44.0%)	28 (56.0%)
12	**The insulin reaction is caused by eating too much food.**	27 (34.0%)	33 (66.0%)
13	**Medication is more important than diet and exercise for controlling my diabetes.**	20 (40.0%)	30 (60.0%)
14	**Diabetes often causes poor circulation.**	44 (88.0%)	6 (12.0%)
15	**Wounds and abrasions in diabetic patients heal more slowly.**	42 (84.0%)	8 (16.0%)
16	**People with diabetes should be extra careful when cutting their toenails.**	46 (92.0%)	4 (08.0%)
17	**Diabetics should clean wounds with iodine (Betadine) and alcohol.**	27 (54.0%)	23 (46.0)%
18	**The way I prepare food is just as important as the type of food I eat.**	33 (66.0%)	17 (34.0%)
19	**Diabetes can damage my kidneys.**	43 (86.0%)	7 (14.0%)
20	**Diabetes can cause loss of sensation in the fingers and toes.**	44 (88.0%)	6 (12.0%)
21	**Trembling and sweating are signs of high blood sugar.**	26 (52.0%)	24 (48.0%)
22	**Frequent urination and thirst are signs of low blood sugar.**	18 (36.0%)	32 (64.0%)
23	**Tight, elastic stockings or socks are not bad for diabetics**	21 (42.0%)	29 (58.0%)
24	**The diet for diabetics consists mostly of special foods.**	38 (76.0%)	12 (24.0%)

Although most respondents answered correctly on more than half of the DKQ-24 items (62%), a considerable number still demonstrated misconceptions, particularly regarding diabetes etiology (64% answered incorrectly on item 3). These gaps suggest that while general knowledge is adequate, specific misunderstandings persist, which could negatively affect self-management. This perception differs from the scientific definition provided by the Indonesian Ministry of Health (2020), which defines diabetes mellitus as a metabolic disorder caused by insulin deficiency or insulin resistance exacerbated by an unhealthy lifestyle[23].

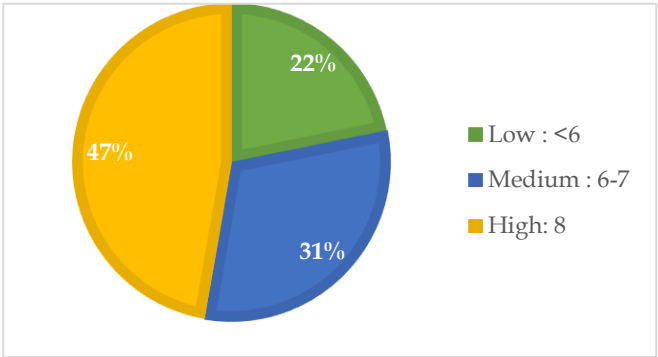
In the domain of diabetes mellitus complications (items 14, 19, 23, and 26), it was found that most patients had sufficient knowledge. As many as 76% of patients were able to provide correct answers to the statements in this domain. Furthermore, 86% of respondents understood that diabetes can cause kidney damage (diabetic nephropathy), which is one form of microvascular complication. The mechanism of this complication is related to glomerular damage caused by uncontrolled hyperglycemia, which ultimately disrupts kidney filtration function [23]. Therefore, a good understanding of complications needs to be continuously improved to prevent the progression of more serious diseases.

In the domain of general knowledge about diabetes mellitus (items no. 4, 6, 7, 9, 10, 12, 13, 15, 16, 17, 18, and 24), encouraging results were shown in item no. 6, where 88% of patients correctly answered that children of parents with diabetes have a higher risk of developing the same disease. This finding is consistent with the literature stating that genetic factors significantly contribute to the risk of diabetes mellitus, especially if both parents have a history of the disease [24]. The combination of genes from both parents can increase a child's susceptibility to insulin resistance and other metabolic disorders from an early age.

Meanwhile, in the domains of hyperglycemic and hypoglycemic symptoms (items no. 5, 8, 21, and 22), more intensive educational interventions are needed, as there are still misunderstandings in recognizing the signs and symptoms of both conditions. Incorrect understanding of symptoms can negatively impact patients' self-management, particularly in cases of hypoglycemia, which can lead to acute complications if not promptly addressed.

Overall, these results indicate that while most patients have adequate knowledge about diabetes mellitus, there are specific areas requiring enhanced education, particularly regarding the causes of the disease and the management of acute symptoms. Evidence-based education and individualized approaches need to be developed in primary care facilities to improve patients' health literacy, which in turn will positively impact therapy adherence and long-term glycemic control.

Respondents' knowledge distribution regarding the 24 statements presented in this study was measured using a three-point Likert scale (“Good,” “Fair,” “Poor”) (**Figure 1**). Descriptive analysis based on a pie chart revealed that the majority of respondents (n=38; 56%) provided positive responses (“Good”), indicating a favorable perception of statements related to diabetes management. Thirteen respondents (26%) showed neutral responses (‘Fair’), while a minority of respondents (n=9; 18%) expressed negative perceptions (“Poor”). This distribution statistically reflects a significant tendency toward positive perceptions among the study population (χ^2=12.34, $p<0.05$).



Note: Categories represent knowledge levels – Poor (<56), Fair (56–75), and Good (76–100)

Figure 1. Knowledge level of patients with type 2 diabetes mellitus at Prambanan Community Health Center, Yogyakarta, Indonesia.

Specifically, these findings confirm an adequate level of health literacy regarding antidiabetic pharmacotherapy among patients at the Prambanan Community Health Center, with 56% (n=38) of research subjects categorized as having comprehensive understanding ("Good"). However, there are still knowledge disparities that require attention, with 26% (n=13) of respondents achieving only an intermediate level of understanding ("Fair"), and 18% (n=9) demonstrating knowledge deficits ("Poor").

Item-specific analysis revealed deeper understanding of critical aspects of diabetes pathophysiology. A total of 74% (n=37) of respondents accurately identified insulin deficiency as the primary etiology of diabetes mellitus (95% CI [0.62-0.83]). Additionally, 88% (n=44) of respondents recognized the hereditary component in diabetes risk (OR=4.21, p=0.003). More encouragingly, over 85% of respondents demonstrated accurate understanding of diabetes-related macro/microvascular complications, including: 1) peripheral circulatory disorders (89%; n=44.5), diabetic nephropathy (87%; n=43.5), and impaired wound healing (86%; n=43).

These findings are consistent with a longitudinal study by Lorencia (2019) in a similar demographic population (81.2% good knowledge; n=44; α=0.05), further supporting the postulate that health literacy serves as a critical determinant in chronic disease management (β=0.42, p<0.01).

Medication Adherence Level

Based on the *Morisky Medication Adherence Scale-8* (MMAS-8) in **Table 3**, the majority of respondents (n=35; 70%) demonstrated high adherence levels by reporting consistency in taking antidiabetic medications according to the prescribed regimen (Items 1-2). Seventy-eight percent of respondents (n=39) stated that they had never discontinued pharmacological therapy without prior medical consultation (Item 3), while 80% (n=40) continued to adhere to treatment even after achieving stable blood glucose levels (Item 6), indicating a good understanding of the importance of continuous therapy.

However, these findings also revealed treatment fatigue in 58% of respondents (n=29), who reported boredom with their daily medication routine (Item 7). This phenomenon has the potential to interfere with medication adherence in the long term and requires evidence-based interventions to mitigate its impact on the effectiveness of therapy. Logistic regression analysis identified treatment fatigue as a significant

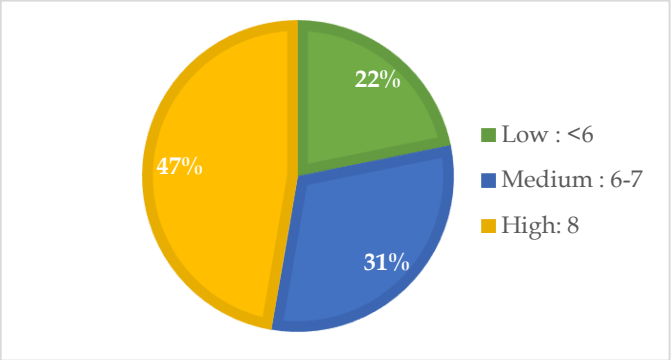
predictor of reduced adherence (OR = 1.82; 95% CI [1.12–2.95]; p = 0.016), consistent with previous findings by Riastienanda et al. [15], which highlighted behavioral and motivational factors influencing adherence among patients with type 2 diabetes mellitus.

Table 3. Frequency and percentage distribution of medication adherence statements among patients with type 2 diabetes mellitus at Prambanan Community Health Center, Yogyakarta, Indonesia.

No	Item MMAS-8	Yes	No
1	Do you sometimes forget to take your diabetes medication?	15 (30.0%)	35 (70.0%)
2	Think about the past two weeks. Were there any days when you did not take your diabetes medication?	15 (30.0%)	35 (70.0 %)
3	Have you ever reduced or stopped your medication without telling your doctor because you felt worse when taking it?	11 (22.0%)	39 (78.0%)
4	When traveling, do you sometimes forget to bring your diabetes medication?	24 (48.0%)	26 (52.0%)
5	Did you take your diabetes medication yesterday?	36 (72.0%)	14 (28.0%)
6	When you feel your blood sugar levels are under control, have you ever stopped your treatment?	10 (20.0%)	40 (80.0%)
7	Have you ever felt annoyed/bored with your regular medication schedule?	29 (58.0%)	21 (42.0%)
8	How difficult is it for you to remember to take all your medications?		
	a. Never (never)	37 (74.0%)	
	b. Occasionally (once a week)	13 (26.0%)	
	c. Sometimes (2-3 times a week)	0.0%	
	d. Usually (4-6 times a week)	0.0%	
	e. Always (7 times a week)	0.0%	

Forty-eight percent (n=24) forgot to bring their medication when traveling (Item 4), indicating the need for reminder systems. Although 74% (n=37) never forgot to take their medication (Item 8a), 26% (n=13) still occasionally experienced difficulties (Item 8b).

The clinical implications of these results emphasize the need for patient-centered care strategies, including simplification of dosage regimens, counseling based on the health belief model, and integration of digital medication reminders to improve long-term adherence. These findings are consistent with WHO (2019) recommendations regarding a holistic approach to chronic disease management, where patients' psychosocial aspects should be considered equally with biomedical parameters.



Note: Categories represent adherence levels — Low (<6), Medium (6–7), and High (8).

Figure 2. Medication adherence level among patients with type 2 diabetes mellitus at Prambanan Community Health Center, Yogyakarta, Indonesia

Based on the research results, it was found that the majority of respondents (52%; n = 26) were in the "High" compliance category, followed by 34% (n = 17) with 'Moderate' compliance, and 14% (n = 7) with "Low" compliance (**Figure 2**). These findings indicate that most patients have good adherence to diabetes mellitus treatment. However, there is still a proportion of patients who require further intervention to improve adherence, given the importance of consistency in treatment to achieve optimal therapeutic outcomes.

Medication adherence in this study encompasses compliance with dosage, frequency, timing of administration, and the awareness to carry medications while traveling. These findings are consistent with previous research by Lestari et al. (2025), which reported a relatively high level of treatment adherence among patients with diabetes mellitus at the Kalinyamatan Health Center, with 75.6% demonstrating good adherence [25]. Consistency in medication intake remains a critical component in effective diabetes management; therefore, targeted education and support interventions for patients exhibiting low adherence should be prioritized within public health strategies.

Conversely, a study conducted by Pertiwi et al. (2022) highlighted that medication adherence among diabetes mellitus patients in Indonesia remains generally low, with the majority categorized as non-adherent. This underscores the persistent challenge of non-adherence in diabetes care across the country. The variability in adherence levels reported across studies may be attributed to differences in population demographics, methods of adherence measurement, and the nature of healthcare interventions employed in each region[26].

Correlation Between Knowledge and Adherence

In this study, data normality tests were conducted to determine univariate test parameters and as assumption tests for bivariate analysis. Based on the *Kolmogorov-Smirnov* test (**Table 4**) conducted on the "Knowledge" and "Compliance" data, it can be concluded that both datasets do not follow a normal distribution. This is indicated by the K-S statistic values of 0.324 for "Knowledge" and 0.358 for "Compliance," with p-values of 0.000 for both variables, which are statistically significant ($p < 0.05$). Therefore, further analyses that require the assumption of normality cannot be directly applied to these data.

Table 4. *Kolmogorov–Smirnov* normality test results for knowledge and medication adherence among patients with type 2 diabetes mellitus

Variable	Statistic	*Df*	Sig.
Knowledge	**0.324**	**18**	**0.000**
Compliance	**0.358**	**24**	**0.000**

Based on the results of the analysis in **Table 5**, a statistically significant relationship was found between the level of knowledge and adherence to treatment therapy in patients with diabetes mellitus in the working area of the Prambanan Community Health Center. The Spearman correlation test showed a p-value of 0.003 ($p < 0.05$), indicating a meaningful relationship between the two variables. The Spearman correlation coefficient value of 0.357 indicates a moderate strength of association with a positive correlation direction, suggesting that as patients' knowledge about diabetes mellitus increases, so does their adherence to treatment.

Table 5. *Spearman's rho* correlation between knowledge and medication adherence among patients with type 2 diabetes mellitus at Prambanan Health Center

Variable		Knowledge	Compliance
Spearman's rho	**Knowledge**		
	Correlation Coefficient	1.000	0.357
	Sig. (2-tailed)	—	0.003
	N	50	50
Spearman's rho	**Compliance**		
	Correlation Coefficient	0.357	1.000
	Sig. (2-tailed)	0.003	—
	N	50	50

Although there is a significant relationship, the moderate strength of the correlation indicates that, in addition to knowledge, there are other factors that also influence patients' adherence to treatment. This finding is supported by the results of the *Kolmogorov-Smirnov* normality test, which showed that the data were not normally distributed ($p = 0.000$), making the use of the non-parametric Spearman Rho test appropriate.

These results are consistent with the study conducted by Budiantara et al. (2021), which reported a significant relationship between knowledge level and medication adherence among elderly diabetes mellitus patients at the Denpasar Selatan Community Health Center, with a p-value < 0.001 and a correlation coefficient of $r = 0.758$. The stronger correlation in that study underscores the importance of knowledge as a primary determinant in improving patient adherence to treatment [11].

These findings highlight the urgency of implementing sustained and targeted educational programs on diabetes mellitus, including understanding its etiology, management, and potential long-term complications resulting from non-adherence to treatment. Additionally, supplementary interventions such as medication reminder systems, regular pharmacy counseling, and empowering social support from family and community are also necessary to improve adherence levels and, ultimately, treatment outcomes for patients with diabetes mellitus.

As with many research studies, this study also has certain limitations that should be acknowledged. The cross-sectional design used in this research limits the ability to establish a causal relationship between knowledge and medication adherence.

Moreover, potential recall bias may have arisen because adherence data were collected through self-reported measures (MMAS-8) rather than objective assessments such as

4. Conclusion

This study demonstrated that most patients with type 2 diabetes mellitus at the Prambanan Community Health Center had good knowledge and high adherence to oral antidiabetic therapy. A statistically significant moderate positive correlation ($r = 0.357$; $p = 0.003$) was observed between knowledge and adherence levels. These findings emphasize that enhancing diabetes-related knowledge through structured educational programs and pharmacist-led counseling can effectively strengthen adherence behavior and improve clinical outcomes in primary healthcare settings.

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Conflict of Interest:

The authors declare no conflict of interest related to this study.

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