

The Relationship Between Knowledge Level And Family Support On Medication Adherence In Patients With Diabetes Mellitus

Atthiyyah Nur Aini^{1*}, Merry Tiya A², Chamim Faizin³

¹Mahasiswa Program Kedokteran S1 Fakultas Kedokteran Universitas Muhammadiyah Semarang, Indonesia

^{2,3}Departemen Ilmu Kedokteran Keluarga, Fakultas Kedokteran Universitas Muhammadiyah, Indonesia

Corresponden author:

Email: nurainiatthiyyah@gmail.com

Abstract.

Background : Non-compliance in taking medication is the main determining factor that triggers the onset of complications in people with diabetes mellitus, so adherence to pharmacological therapy is a very important element in efforts to control this disease. The level of patient understanding related to diabetes mellitus and the support from the family are believed to have a significant role in encouraging increased patient adherence to the treatment regimen. The purpose of the research is to analyze the relationship between the level of knowledge and family support and medication adherence in patients with diabetes mellitus at the Kedungmundu Health Center, Semarang City. *Method*: This cross-sectional design observational analytical study involving 110 respondents of diabetes mellitus patients at the Kedungmundu Semarang Health Center was determined from a consecutive sampling technique based on inclusion and exclusion criteria. Data were collected using the Diabetes Knowledge Questionnaire (DKQ-24), Hensarling Diabetes Family Support Scale (HDFSS), Medication Adherence Report Scale (MARS-10), then analyzed with univariate and bivariate using the Spearman Rho test with a meaning of $p < 0.05$. *Results*: The Spearman Rho test showed a positive correlation of Knowledge Level and Medication Compliance ($p < 0.05$; $r = 0.584$). Positive correlation of Family Support and Medication Compliance ($p < 0.05$; $r = 0.503$). Good knowledge level 61 respondents (55.5%), high family support 59 respondents (53.6%), high medication adherence 58 respondents (52.7%). Bivariate analysis showed that there was a significant positive correlation between the level of knowledge and family support for medication adherence to diabetes mellitus patients at the Kedungmundu Health Center in Semarang. *Conclusion* : The higher the level of knowledge and family support, the more compliant the medication the diabetic mellitus patients are.

Keywords : Level of knowledge, family support and medication adherence.

I. INTRODUCTION

Glucose metabolism disorders that cause persistently elevated blood sugar levels are the main characteristic of diabetes mellitus (DM). These elevated glucose levels are associated with reduced insulin production, impaired body response to insulin, or a combination of both, resulting in impaired carbohydrate, fat, and protein metabolism. 1 In various developing countries, including Indonesia, the prevalence of diabetes mellitus continues to increase. Although not a contagious disease, diabetes mellitus can cause serious and even life-threatening complications if not properly managed. 2 If not optimally controlled, diabetes mellitus can cause various chronic complications involving damage to large (macrovascular) and small (microvascular) blood vessels, which impacts quality of life and increases the risk of death.

Indonesia still faces a significant burden of diabetes mellitus cases. Based on a publication by the International Diabetes Federation (IDF), the number of people with diabetes mellitus in Indonesia is estimated to reach 19.5 million people in 2021 and is projected to increase to 28.6 million people by 2045. 3 In Central Java Province, approximately 618,000 cases of diabetes mellitus were recorded in 2021, while Semarang City ranked third with 55,075 sufferers. 4 Meanwhile, data from the Kedungmundu Community Health Center shows that 3,411 diabetes mellitus patients received health services in the study year. 5

Adherence to therapy is a crucial component in the management of diabetes mellitus. Although pharmacological therapy is the main component of treatment, its success is greatly influenced by the extent to which patients adhere to the treatment recommendations of healthcare professionals. Good adherence contributes to maintaining glycemic control, preventing complications, and improving quality of life. Conversely, poor adherence can lead to suboptimal therapy outcomes, accelerate the onset of complications, increase hospitalization rates, and increase healthcare costs. 6

Various factors play a role in determining patient adherence during therapy, including knowledge about diabetes mellitus and family support. Adequate knowledge enables patients to understand the disease, the benefits of therapy, and the importance of adherence to treatment, thus encouraging better disease management behaviors. 9. The family is a key support system for patients with diabetes mellitus. Through emotional support, information, appreciation, and instrumental assistance, the family can encourage patients to maintain adherence to therapy. 10.

Various studies have examined the role of knowledge and family support on medication adherence in diabetes mellitus patients. However, results vary due to differences in respondent characteristics and social and cultural conditions in each region. To date, studies assessing both factors simultaneously in diabetes mellitus patients in the Kedungmundu Community Health Center (Puskesmas) in Semarang are limited. Based on these conditions, this study aims to evaluate the relationship between knowledge and family support on medication adherence in diabetes mellitus patients at the Kedungmundu Community Health Center in Semarang.

II. METHOD

Research Design

This study used an observational analytical design with a cross-sectional approach. Data collection was conducted at the Kedungmundu Community Health Center in Semarang in February 2026.

Population and Sample

The study subjects were diabetes mellitus patients participating in the Chronic Disease Management Program (Prolanis) at the Kedungmundu Community Health Center in Semarang. A total of 144 patients met the criteria.

Sampling requirements were determined using the Slovin formula to obtain a minimum of 106 respondents. During the study period, 110 respondents were collected. Respondent selection was carried out using consecutive sampling, meaning all patients who met the criteria were included sequentially until the sample size was reached.

Respondent Criteria

Inclusion criteria included diabetes mellitus patients undergoing outpatient treatment at the Kedungmundu Community Health Center in Semarang, able to read and write, and willing to participate. Patients who were currently undergoing hospital treatment or did not complete the questionnaire were excluded from the study.

Variables and Instruments

This study evaluated two independent variables, namely the level of knowledge and family support, with medication adherence as the dependent variable.

Knowledge levels were measured using the Diabetes Knowledge Questionnaire (DKQ-24). Family support was identified using the Hensarling Diabetes Family Support Scale (HDFSS), while medication adherence was assessed using the Medication Adherence Report Scale (MARS-10). All data were obtained through structured interviews using instruments that had met validity and reliability requirements.

Data analysis

Univariate analysis was used to describe the characteristics of the respondents and the distribution of each study variable. Furthermore, the relationship between knowledge level, family support, and medication adherence was analyzed using the Spearman Rho test. Data processing was performed using the Statistical Package for the Social Sciences (SPSS) software. The analysis results were declared statistically significant if the p-value was <0.05 .

Research Ethics

The research has obtained approval from the Health Research Ethics Commission (KEPK) of the Faculty of Nursing and Health Sciences, Muhammadiyah University of Semarang with ethical approval number 079/KE/09/2025.

III. RESEARCH RESULT

Respondent Characteristics

Based on the table, it is known that the average age of respondents is >60 years, namely 72 people (65.5%) respondents. The age distribution shows that most respondents are in the elderly age group. Based on gender, the majority of respondents are female, namely 85 people (77.3%), while 25 respondents are male (22.7%). Based on the latest education table, the majority of respondents have an elementary school education of 38 respondents (34.5%), as many as 24 respondents (21.8%) have a junior high school education, as many as 27 respondents (24.5%) have a high school education, as many as 11 respondents (10.0%) have a college education, and 10 respondents (9.1%) have not attended school. Based on the job characteristics table, most respondents are housewives, namely 51 people (46.4%), 10 retired respondents (9.1%), 15 civil servant respondents (13.6%), while 25 respondents work as self-employed (22.7%), 9 respondents whose occupation was not stated (8.2%).

Table 1. Respondent characteristics

Variables	Frequency	Percentage
Age		
Adults (18-44 years)	2	1.8%
Pre-Elderly (45-59 years)	36	32.7%
Elderly (>60 years)	72	65.5%
TypeSex		
Woman	85	77.3%
Man	25	22.7%
Last education		
No school	10	9.1%
Elementary School	38	34.5%
JUNIOR HIGH SCHOOL	24	21.8%
SENIOR HIGH SCHOOL	27	24.5%
College	11	10.0%
Work		
Housewife	51	46.4%
Retired	10	9.1%
civil servant	15	13.6%
Self-employed	25	8.2%
Not mentioned	9	22.7%

Univariate Analysis

Based on univariate analysis, the distribution of respondents' knowledge levels was dominated by the good category, with 61 respondents (55.5%). Furthermore, the adequate knowledge category was recorded in 42 respondents (38.2%), while the poor knowledge category was only found in 7 respondents (6.4%).

Based on the table of family support characteristics, the majority of respondents had high family support, namely 59 respondents (53.6%), while the remaining 51 respondents (46.4%) received low family support. Meanwhile, based on compliance characteristics, 58 respondents (52.7%) were classified as compliant, 42 respondents (38.2%) were quite compliant, and 10 respondents (9.1%) were non-compliant.

Table 2. Distribution of each variable

Variables	Frequency	Percentage
Knowledge		
Good	61	55.5%
Enough	42	38.2%
Not enough	7	6.4%
Family support		
Tall	59	53.6%
Low	51	46.4%
Compliance		
Obedient	58	52.7%
Quite obedient	42	38.2%
Not obey	10	9.1%

ConnectionLevel of Knowledge-Compliance in Taking Medication

The relationship between knowledge level and medication adherence in diabetes mellitus patients was analyzed using the Spearman Rho test. The analysis showed a p-value of 0.001 ($p < 0.05$), indicating a statistically significant relationship between the two variables.

Based on the analysis results, of the 61 respondents who had a good level of knowledge, 49 respondents (80.3%) were included in the compliant category, 8 respondents (13.1%) were quite compliant, and 4 respondents (6.6%) were non-compliant. In the group with a sufficient level of knowledge (42 respondents), 8 respondents (19.0%) had good compliance, 32 respondents (76.2%) were classified as quite compliant, while 2 respondents (4.8%) were non-compliant. Meanwhile, in the group of respondents with a low level of knowledge, which amounted to 7 people, there was 1 respondent (14.3%) with good compliance, 2 respondents (28.6%) were quite compliant, and 4 respondents (57.1%) were non-compliant.

Table 3 Relationship between Knowledge Level and Medication Compliance

Medication Compliance									
Level of Knowledge	Obedient		Quite obedient		Not obey		Total		p-value
	n	%	n	%	n	%	n	%	
Good	49	80.3	8	13.1	4	6.6	61	100.0	0.001
Enough	8	19.0	32	76.2	2	4.8	42	100.0	
Not enough	1	14.3	2	28.6	4	57.1	7	100.0	

Relationship between Family Support and Medication Compliance

The relationship between family support and medication adherence in diabetes mellitus patients was further evaluated through bivariate analysis. The results showed that of the 59 respondents with high family support, 45 (76.3%) were compliant, 12 (20.3%) were moderately compliant, and 2 (3.4%) were non-compliant.

On the other hand, in the group of respondents with low family support, totaling 51 people, 13 respondents (25.5%) were classified as compliant, 30 respondents (58.8%) were quite compliant, while 8 respondents (15.7%) were not compliant.

The results of the Spearman Rho test showed a p-value of 0.001 ($p < 0.05$), so it can be concluded that there is a statistically significant relationship between family support and medication adherence in diabetes mellitus patients.

Table 4 Relationship between Family Support and Medication Compliance

Compliance with taking medication									
Family Support	Obedient		Quite obedient		Not obey		Total		<i>P-value</i>
	n	%	n	%	N	%	n	%	
Tall	45	76.3	12	20.3	2	3.4	59	100.0	0.001
Low	13	25.5	30	58.8	8	15.7	51	100.0	

IV. DISCUSSION

Medication adherence in diabetes mellitus patients at the Kedungmundu Community Health Center in Semarang is related to the patient's level of knowledge and family support. These two factors complement each other in shaping adherence behavior during therapy. Knowledge provides a basis for patients to understand the goals of treatment, the benefits of therapy, and the risks that can arise if treatment is not carried out consistently. On the other hand, family support helps patients maintain these behaviors through guidance, motivation, and supervision during treatment. This condition shows that the success of diabetes mellitus therapy is influenced by the interaction between individual characteristics and social support in shaping health behavior. This finding aligns with Lawrence Green's concept, which states that health behavior is formed through the interaction of motivating, supporting, and predisposing factors (11-13).

Knowledge levels are related to medication adherence in diabetes mellitus patients. Patients who have a better understanding of diabetes mellitus tend to be more consistent in following the recommended

therapy. Understanding the function of medications, the long-term benefits of treatment, and the risks of complications allows patients to make more informed decisions in managing their disease. Interestingly, a good level of knowledge was still found among the majority of respondents despite their relatively low formal educational background. These results indicate that formal education is not the only source of health knowledge. Routine education provided by health workers at community health centers (Puskesmas) regarding physical activity, dietary management, medication use, and complication prevention is thought to contribute to improved patient understanding. Repeatedly conveying information using easily understood language allows patients to maintain adequate knowledge even with limited educational backgrounds.¹⁴

However, not all respondents with good knowledge had high medication adherence. These findings indicate that knowledge is an important component, but not sufficient to guarantee behavioral change. Adherence to medication is a complex behavior because it is also influenced by individual motivation, belief in the benefits of therapy, daily habits, perceptions of the disease, and supportive social conditions of the patient. Therefore, increasing knowledge should be accompanied by other strategies that can strengthen motivation and build patient habits in continuing therapy. The results of this study align with research by Ramdani (2024) which reported a significant relationship between knowledge level and medication adherence in patients with diabetes mellitus 15-16.

In addition to knowledge levels, this study shows that family support is also associated with medication adherence. Family members are the closest group of people who interact directly with patients, thus having a greater opportunity to influence daily behavior. This support is not limited to emotional care, but also includes assistance in reminding patients to take medication, providing necessary medication, providing information, and accompanying patients when accessing healthcare services. The presence of family can increase patient confidence, reduce boredom during long-term therapy, and encourage patients to remain compliant with treatment. Education from healthcare professionals to patients and families also plays a role in strengthening this function, enabling more optimal management of diabetes mellitus.

The results of Saftriani's (2026) study support the findings of this study, namely that diabetes mellitus patients who receive high levels of family support tend to demonstrate better medication adherence than those who receive low levels of family support. Family involvement is crucial because diabetes mellitus is a chronic disease that requires lifelong treatment and lifestyle changes that must be maintained continuously. In such circumstances, the family serves as a primary source of support, helping patients maintain motivation, overcome obstacles during treatment, and improve the sustainability of therapy. 19-21

Diabetes mellitus control is determined not only by the appropriateness of the therapy provided, but also by the patient's ability to maintain adherence to the treatment regimen over the long term. Good adherence contributes to blood glucose control, a reduced risk of complications, and an improved quality of life for patients. 22-23 However, this study still found several barriers that prevent patients from complying with medication, such as forgetting to take medication on schedule, not carrying medication when traveling, considering medication use a hassle, and discontinuing therapy when feeling better. These barriers indicate that education is not sufficient only at the beginning of treatment. Continuous support from healthcare professionals, along with active family involvement in reminding, motivating, and accompanying patients, is necessary to ensure long-term adherence to therapy. 24

V. CONCLUSION

Research findings indicate that medication adherence in diabetes mellitus patients is related to the patient's level of knowledge and family support. Respondents with a better understanding of their disease and adequate family support tend to demonstrate higher adherence to therapy. These results demonstrate that ongoing health education, coupled with family involvement in the support process, is a crucial step in supporting successful therapy and reducing the risk of diabetes mellitus complications.

VI. THANK-YOU NOTE

The authors would like to thank all diabetes mellitus patients at the Kedungmundu Community Health Center in Semarang who participated as respondents in this study. They also express their gratitude to the Head of the Kedungmundu Community Health Center in Semarang, along with all the healthcare workers and staff who provided permission, support, and facilitated the research. Appreciation is also extended to all parties who provided assistance, support, and contributions throughout the research process and the preparation of this article.

REFERENCE

- [1]. Kunaryanti K, Andriyani A, Wulandari R. The Relationship between Knowledge Level about Diabetes Mellitus and Blood Sugar Control Behavior in Outpatients with Diabetes Mellitus at Dr. Moewardi Regional Hospital, Surakarta. *Journal of Health*. 2018;11(1):49–55. doi:10.23917/jk.v11i1.7007
- [2]. Colberg SR, Sigal RJ, Yardley JE, Riddell MC, Dunstan DW, Dempsey PC, et al. Physical Activity/Exercise and Diabetes: A Position Statement of the American Diabetes Association. *Diabetes Care*. 2016 Nov 1;39(11):2065–79. doi:10.2337/dc16-1728
- [3]. Chaidir R, Wahyuni AS, Furkhani DW. The Relationship between Self-Care and Quality of Life in Diabetes Mellitus Patients. *Endurance Journal*. 2017;2(2):132. doi:10.22216/jen.v2i2.1357
- [4]. IDF. Diabetes Atlas 11th Edition. Diabetes Atlas 11th Edition. Published online 2025; 2025. 1–399 p.
- [5]. Ministry of Health. Time to regulate the sweet. <https://P2PKemkesGoId/Saatnya-Mengatur-Si-Manis/>. 2024;1.
- [6]. Semarang PK. Number of Diabetes Mellitus Cases in Semarang City in 2022. 01-02-2023. 2023;2021.
- [7]. Semarang DKK Health Dashboard. 1069 monthly weekly. 2025;
- [8]. Safitri MF. The Relationship Between Medication Compliance and Quality of Life of Type 2 Diabetes Mellitus Patients at the Bojong Rawa Lumbu Community Health Center, Bekasi City. [Bekasi]: Mitra Keluarga Health Sciences College; 2023.
- [9]. Farida U, Sugeng Walujo D, Aulia Maratina N. The Relationship between Knowledge Level of Diabetes Mellitus and Blood Sugar Levels of Diabetes Mellitus Patients at Community Health Center X. *Indonesian Journal of Pharmaceutical Education*. 2023;3(1):125–30. doi:10.37311/ijpe.v3i1.19052
- [10]. Aini L, Astuti L, Anita F. The Relationship between Family Support and Diet Compliance in Type 2 Diabetes Mellitus Patients at the Internal Medicine Clinic of Siti Khadijah Islamic Hospital, Palembang. *Malahayati Nursing Journal*. 2024;6(2):689–99. doi:10.33024/mnj.v6i2.12607
- [11]. Shrivastava SR, Shrivastava PS, Ramasamy J. Role of self-care in management of diabetes mellitus. *J Diabetes Metab Disord*. 2018 Mar 5;12(1):14. doi:10.1186/2251-6581-12-14
- [12]. Ulfa S, Muflihatin SK. The relationship between knowledge and quality of life of type 2 diabetes mellitus sufferers in the Pasundan Community Health Center, Samarinda City. *Borneo Student Research*. 2022;4(1):22–30.
- [13]. Fadhilah H, Kasumawati F, Yuningsih D. Analysis of the Level of Compliance with Oral Antidiabetic Drug Use in Type II Diabetes Mellitus Patients. *Edu Masda Journal*. 2023 Sep 29;7(2):121. doi:10.52118/edumasda.v7i2.190
- [14]. Soelistijo SA. Guidelines for the management and prevention of type 2 diabetes mellitus in adults in Indonesia 2021. Jakarta: PB PERKENI; 2021.
- [15]. Farida U, Sugeng Walujo D, Aulia Maratina N. The Relationship between Knowledge Level of Diabetes Mellitus and Blood Sugar Levels of Diabetes Mellitus Patients at Community Health Center X. *Indonesian Journal of Pharmaceutical Education*. 2023;3(1):125–30. doi:10.37311/ijpe.v3i1.19052
- [16]. Supriyati S, Syahyuning A, Wahyu D, Ichtiar M, Geraldi R, Darell S. Level of Knowledge about Diabetes Mellitus among Health Profession Students. *Health Promotion and Community Engagement Journal*. 2024 Jan 30;2(1):48–56. doi:10.70041/hpcej.v2i1.66
- [17]. Alafghan YM. The relationship between family support and quality of life of elderly with diabetes mellitus in the working area of Cakung Community Health Center, West Cakung Village, East Jakarta. Jakarta: Mitra Keluarga Health Sciences College; 2023.

- [18]. Safari G, Siti Nurlani M, Juliar Hermanto E. The Relationship Between Family Support and Blood Sugar Control Compliance in Diabetes Mellitus Patients. *Healthy Journal*. 2021;10(2):45–55. doi:10.55222/healthyjournal.v10i2.1001
- [19]. Marni GE. The relationship between family support and medication adherence in type II diabetes mellitus patients at Puskesmas II, West Denpasar, Denpasar: Bali Health Institute; 2023.
- [20]. Safwendra E, Dormina D, Martawinarti RN, Nurhusna N. Health Education on Nutrition Pattern Management for Patients with Type 2 Diabetes Mellitus. *Journal of Nursing, University of Jambi*. 2025 Apr 24;9(2):23–30. doi:10.22437/jkuj.v9i2.43411
- [21]. Nurlaili. The relationship between family support and blood glucose control compliance with the quality of life of diabetes mellitus patients at Sultan Agung Islamic Hospital, Banjarbaru. Banjarbaru: Related Institutions; 2024.
- [22]. Lilis SR. The relationship between knowledge and attitude levels with medication adherence in type 2 diabetes mellitus patients at Pacarkeling Community Health Center, Surabaya [thesis]. Surabaya: Widya Mandala Catholic University, Surabaya; 2021.
- [23]. Maryani L. Diabetes complications. *J Health Education Poltekkes Jogja*. 2020:8–31.
- [24]. Septi Fandinata S, Ernawati I. Management of therapy in degenerative diseases. Recognizing, preventing, and treating degenerative diseases (diabetes mellitus and hypertension). 2020;1–134.