

ANALYSIS OF FAMILY SUPPORT WITH BLOOD GLUCOSE LEVELS IN TYPE 2 DIABETES MELLITUS

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ABSTRACT

Type 2 diabetes mellitus is a chronic disease that requires long-term management to prevent complications caused by uncontrolled blood glucose levels. This study aims to analyze the relationship between family support and blood glucose levels in patients with type 2 diabetes mellitus at the Internal Medicine Polyclinic of RSI Sakinah Mojokerto. This study uses an analytical correlation design with a *cross-sectional* approach. The population consisted of 214 patients, with 152 respondents selected using *purposive sampling*. Family support was measured using the *Hensarling Diabetes Family Support Scale* (HDFSS), while blood glucose levels were obtained from laboratory tests. The data was analyzed using the *Spearman Rank* test. The results showed that 47.4% of respondents had high family support and 71.7% had normal blood glucose levels. Statistical analysis revealed a p value of 0.000 (<0.05) with a correlation coefficient of -0.828, indicating a strong negative correlation. Emotional support showed the strongest association with blood glucose levels, while physical activity support showed the weakest association. Higher levels of family support were associated with better blood glucose control among patients with type 2 diabetes mellitus.

Keywords: *family support, blood glucose levels, type 2 diabetes mellitus*

INTRODUCTION

Type 2 diabetes mellitus is a chronic disease that occurs widely among the community and requires long-term management. This condition is characterized by hyperglycemia due to suboptimal insulin action, so that carbohydrate, fat, and protein metabolism is disrupted. Family support, which includes emotional support, appreciation, information, and direct assistance in daily life, is indispensable for the blood sugar levels of type 2 DM patients to be maintained (Bar et al., 2025). Blood glucose levels themselves are the body's main source of energy, but in patients with type 2 diabetes, the concentration tends to increase due to impaired insulin function, so its control is an important aspect to prevent complications and improve the patient's quality of life (Galuh & Prabawati, 2021).

Based on a report by the World Health Organization (WHO) together with the International Diabetes Federation (IDF), in 2024 Indonesia will occupy the fifth position with a prevalence of diabetes reaching 20.4 million individuals, and this figure is projected to continue to increase in the next decade (IDF, 2025). According to the American Diabetes Association (2025), about 45–60% of patients with poor glycemic control have low levels of family support, while Corrao et al. (2026) report that patients with poor family support are 2–3 times more likely to experience uncontrolled blood glucose levels. In developing countries, around 40–50% of diabetic patients report a lack of family support related to high HbA1c levels (World Health Organization, 2022), and in Indonesia alone, around 35% of diabetic patients still receive suboptimal family support (Muharram et al., 2025).

A preliminary study conducted at the Internal Medicine Polyclinic of RSI Sakinah Mojokerto found that out of 642 patients with type 2 DM in the last three months, some patients with above-normal blood sugar levels showed low family support scores, especially on information and motivational support, while patients with normal blood sugar levels tended to have better family support. This condition is in line with the research of Azahra (2025) which emphasizes the role of emotional, instrumental, and family appreciation support in controlling blood sugar levels in type 2 DM patients, as well as the research of Noor et al. (2025) which shows that dietary adherence, physical activity, and family support are the main factors in maintaining blood glucose stability.

Low family support not only impacts patient care behavior, but can also trigger psychological stress that stimulates the hormones cortisol and adrenaline thereby inhibiting the work of insulin and increasing blood sugar levels (Antoro et al., 2023). On the other hand, optimal family support helps patients to be more compliant with diet, medication, and physical activity, so that blood glucose levels are more controlled (Sarwono et al., 2025). Previous studies such as Azahra (2025), Noor et al. (2025), and Galuh & Prabawati (2021) have generally analyzed family support as a single variable for blood sugar levels or self-management, but not many have unraveled the strength of the relationship in each family support domain (diet, physical activity, medication, monitoring, emotional, and informational) separately, so that the domains that play the most role and those that need to be strengthened have not yet been strengthened specifically identified.

Based on these gaps, the formulation of this research problem is whether there is a relationship between family support and blood glucose levels in patients with type 2 diabetes mellitus at the Internal Medicine Polyclinic of RSI Sakinah Mojokerto. The purpose of this study is to analyze the relationship between family support and blood glucose levels in patients with type 2 diabetes mellitus at the Internal Medicine Polyclinic of RSI Sakinah Mojokerto, as well as to analyze the strength of the relationship in each domain of family support on blood glucose levels. The main contribution of this study is to provide an overview of the most dominant and weakest family support domains, so that it can be a basis for health workers and patients' families in developing more targeted educational priorities and nursing interventions in the management of type 2 diabetes mellitus.

METHODS

This study uses a correlational analytical design with *a cross-sectional approach*. The study population is all type 2 DM patients at the Internal Medicine Polyclinic of RSI Sakinah Mojokerto as many as 214 patients. The sample was determined using a non-probability purposive sampling technique with the inclusion criteria of patients who have a history of type 2 DM and still have families, as well as the exclusion criteria of patients who refuse to participate or do not live with their families. Based on these criteria, 152 respondents were obtained as a research sample.

The independent variable in this study was family support, while the dependent variable was blood glucose levels. Family support was measured using the *Hensarling Diabetes Family Support Scale* (HDFSS) questionnaire (Hensarling, 2009) which consisted of six domains, namely dietary support, physical activity, medication, monitoring of blood glucose levels, emotions, and information, with measured results in the form of low, medium, and high support categories (ordinal scale). Blood glucose levels were obtained from

laboratory tests and categorized into hypoglycemia (<70 mg/dl), normal (<200 mg/dl), and hyperglycemia ($\geq$ 200 mg/dl).

The data collection procedure begins with the selection of respondents according to the criteria, explanation of the purpose of the research, and the signing of an informed consent sheet. The researcher then recorded the results of the respondents' blood sugar levels and guided the filling out of the HDFSS questionnaire. The collected data is processed through editing, coding, scoring, and tabulating stages before being analyzed using *the Statistical Package for the Social Sciences* (SPSS). Analysis of the relationship between variables was carried out using *the Spearman Rank correlation test*. This research pays attention to the ethical principles of research, including respect for human dignity, privacy and confidentiality of subjects, justice, and anonymity of respondents through a coding system.

This research has been declared ethically feasible by the *Research Ethics Committee* (KEP) of the Institute for Research and Community Service, Bina Sehat University PPNI Mojokerto based on the Ethical Feasibility Letter No. 69/KEP/UBS-PPNI/IV/2026 issued on April 1, 2026, referring to the 7 (seven) Standards and Guidelines of the *World Health Organization* (WHO) in 2011 and the *Council for International Organizations of Medical Sciences* (CIOMS) in 2016

FINDINGS AND DISCUSSION

RESEARCH RESULTS

1. Univariate Analysis

The univariate analysis in this study aims to describe the characteristics of respondents and the frequency distribution of each study variable, namely family support and blood glucose levels, separately without linking one variable to another.

The characteristics of the respondents are shown in Table 1. Most of the respondents were $\geq$ 60 years old (61.8%), female (55.9%), had a job (55.9%), had a high school/vocational education (55.9%), and had suffered from type 2 DM for more than 5 years (67.8%).

Table 1. Distribution of Respondent Frequency Based on General Data at the Internal Medicine Polyclinic of RSI Sakinah Mojokerto in 2026

Number	General data	Frequency	Present (%)
1.	Age of respondents		
	18-59	58	38,2
	$\geq$ 60	94	61,8
2.	Gender		
	Men	67	44,1
	Women	85	55,9
3.	Jobs		
	Not working	67	44,1
	Work	85	55,9
4.	Education Level		
	Elementary School	5	3,3
	Junior High School	44	28,9
	Senior/ Vocational High School	85	55,9
	Colleges	18	11,8

5.	Long suffering from type 2 DM		
	Less than 5 years	49	32,2
	More than 5 years	103	67,8
	Total	152	100.0

Source: Primary data of research in 2026

The distribution of family support in Table 2 shows that most respondents (47.4%) received high family support, followed by low support (29.6%) and moderate support (23.0%).

Table 2. Distribution of Respondent Frequencies Based on Family Support in Type 2 DM Patients

Categories of family support	Frequency	Present (%)
Low support	45	29,6
Moderate support	35	23,0
High Support	72	47,4
Total	152	100.0

Source: Primary data of research in 2026

The distribution of blood glucose levels in Table 3 shows that the majority of respondents (71.7%) have normal blood glucose levels, while 28.3% have hyperglycemia, and there are no respondents with hypoglycemia.

Table 3. Distribution of Respondent Frequency Based on Blood Glucose Levels in Type 2 DM Patients

Categories of blood glucose levels	Frequency	Present (%)
Hypoglycemia	0	0,0
Normal	109	71,7
Hyperglycemia	43	28,3
Total	152	100.0

Source: Primary data of research in 2026

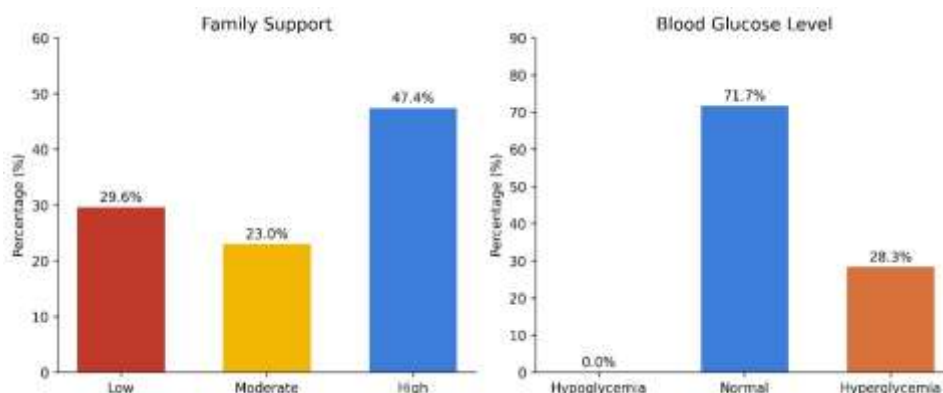


Figure 1. Distribution of Family Support Categories and Respondents' Blood Glucose Levels

2. Bivariate Analysis

The bivariate analysis aims to determine the relationship between family support and blood glucose levels in patients with type 2 diabetes mellitus, through cross-tabulation between the two variables as well as *the Spearman Rank correlation test* at the significance level of $\alpha = 0.05$.

The results of the cross-tabulation in Table 4 showed that all respondents with moderate (35 respondents) and high (72 respondents) had normal blood glucose levels. Meanwhile, of the 45 respondents with low family support, 43 respondents (95.6%) had hyperglycemia and 2 respondents (4.4%) had normal blood glucose levels.

The results of data analysis using *the Spearman Rank correlation test* between family support and blood glucose levels had a correlation coefficient (r) value of -0.828 with a significance (p-value) of 0.000, which is smaller than the value of $\alpha = 0.05$, so that H1 was accepted and H0 was rejected.

Table 4. Cross-Tabulation of Family Support with Blood Glucose Levels in Type 2 DM Patients

Family support	Blood glucose levels	Hypoglycemia		Normal		Hyperglycemia		Total		p-value
		f	%	F	%	f	%			
Low support		0	0,0%	2	4,4%	43	95,6%	45	100,0%	0,000
Moderate Support		0	0,0%	35	100,0%	0	0,0%	35	100,0%	
High support		0	0,0%	72	100,0%	0	0,0%	72	100,0%	
Total		0	0,0%	109	71,7%	43	28,3%	152	100,0%	
Correlation Coefficient					-0,828					

Source: Primary data of research in 2026

Analysis at the subvariable level (Table 5) showed that the entire family support domain had a significance value of $p < 0.05$. Emotional support had the highest *correlation coefficient* ($r = -0.886$), while physical activity support had the lowest *correlation coefficient* ($r = -0.774$) compared to other domains.

Table 5. Spearman Rank Correlation Test Results on Family Support Subvariables with Blood Glucose Levels in Type 2 DM Patients

Number	Subvariabel	N	Spearman's rank (r) value	p-value
1.	Diet Support	152	-0,859	0,000
2.	Physical Activity Support		-0,774	0,000
3.	Treatment Support		-0,859	0,000
4.	Monitoring Blood Glucose Levels Support		-0,823	0,000
5.	Emotional Support		-0,886	0,000
6.	Information Support		-0,834	0,000

Source: Primary data of the 2026 research, processed using SPSS

DISCUSSION

The majority of respondents had high family support, which according to Friedman (2010) reflects the role of the family as the main support system in helping individuals meet their self-care needs. Family involvement can be seen in the encouragement of exercise, medical assistance, empathy for patient complaints, provision of health information, and dietary arrangements. However, some respondents (29.6%) still had low family support, which according to House (1981) could be influenced by education level, socioeconomic conditions, age, family fatigue in caring for patients, and changes in roles in the family.

The results of the *Spearman Rank test* showed a very strong and significant negative relationship between family support and blood glucose levels ($r = -0.828$; $p = 0.000$), which means that the higher the family support, the more controlled the patient's blood glucose levels are. These findings are in line with Rosyid et al. (2022) who stated that family support improves patient adherence in diabetes management through medication schedule reminders, dietary control, physical activity motivation, and psychological stress reduction that can suppress the hormones cortisol and adrenaline. Optimal family support is also in line with the findings of Latifahny et al. (2024) and Rahmadhani et al. (2024) which show the role of the family as the main reminder and companion of type 2 DM patients in living a healthy lifestyle.

At the domain level, emotional support had the strongest association with blood glucose levels ($r = -0.886$). According to Friedman (2010), emotional support is the easiest form of support for families to provide because it is part of the family's daily affective function, such as listening to complaints, providing empathy, and showing concern. Yesi Hasneli (2023) added that diabetic patients often experience stress and anxiety due to chronic diseases they are undergoing, so good emotional support can reduce anxiety and increase patient motivation in undergoing treatment. In contrast, physical activity support showed the weakest association ($r = -0.774$). This is in line with the World Health Organization (2021) guidelines which state that the elderly experience a decrease in muscle strength, balance, and mobility, as well as the fear of falling, so families tend to limit rather than encourage physical activity of patients. Sudaryanto (2024) emphasized that consistent physical activity support, such as accompanying light exercise, can increase insulin sensitivity and help control blood

glucose, so family education about the importance of physical activity for the elderly with diabetes needs to be improved.

In addition to family support, several characteristics of respondents are also related to blood glucose levels. Elderly age (≥ 60 years) is associated with decreased insulin sensitivity and pancreatic beta cell function (Dhanny, 2022; Smeltzer, 2020), while higher levels of education are related to better understanding and adherence to diabetes management, resulting in lower proportion of hyperglycemia in highly educated respondents (Chusun et al., 2025). The longer duration of suffering from type 2 diabetes is also associated with a progressive decline in pancreatic beta cell function, increasing the risk of uncontrolled blood glucose levels (Nanang Priambodo et al., 2022). It was also found that two respondents with low family support but normal blood glucose levels, which according to the Health Belief Model framework (Abraham & Sheeran, 2014) can be explained by the individual's awareness and understanding of disease risk that promotes self-adherence regardless of the level of family support received.

This study has limitations, including a *cross-sectional design* that cannot ensure a cause-and-effect relationship, data collection in the polyclinic waiting room which is relatively crowded so that it has the potential to interfere with respondents' concentration, and the involvement of researchers in helping fill out Google Form-based questionnaires which has the potential to cause information bias. The results of this study confirm the importance of family involvement, especially in the aspect of physical activity support, in education programs and nursing services for type 2 DM patients.

CONCLUSION

There was a significant and very strong negative relationship between family support and blood glucose levels in patients with type 2 diabetes mellitus at the Internal Medicine Polyclinic of RSI Sakinah Mojokerto ($r = -0.828$; $p = 0.000$), which means that the higher the family support received by the patient, the more controlled the blood glucose levels were. Emotional support is the domain of family support with the strongest relationship, while physical activity support is the domain with the weakest relationship. Increased family involvement, particularly in encouraging physical activity, needs to be a concern for health workers in diabetes mellitus education programs, while further research is recommended using longitudinal design and HbA1c parameters to more comprehensively describe long-term glycemic control.

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