


## Relationship Between Family Support And Blood Glucose Levels In Type 2 Diabetes Mellitus Patients In Mandai Public Health Center, Maros District, South Sulawesi Province

Puan Nusaputri Waetenrisompa<sup>1</sup>, Arni Isnaini Arfah<sup>2</sup>, Yani Sodiqah<sup>3</sup>, Rachmat Faisal Syamsu<sup>4</sup>, Abdul Mubdi Ardiansar<sup>5</sup>

Program Studi Pendidikan Dokter Fakultas Kedokteran Universitas Muslim Indonesia<sup>1</sup>, Departemen Fisiologi Fakultas kedokteran Universitas Muslim Indonesia<sup>2</sup>, Departemen Mikrobiologi Fakultas Kedokteran Universitas Muslim Indonesia<sup>3</sup>, Departemen Ilmu Kesehatan Masyarakat dan Ilmu Kedokteran Komunitas (IKM-IKK) Fakultas Kedokteran Universitas Muslim Indonesia<sup>4</sup>, Departemen Ilmu Penyakit Dalam Fakultas Kedokteran Universitas Muslim Indonesia<sup>5</sup>

Article Info	ABSTRACT
<p><b>Keywords :</b> Family Support, Medication Compliance, Type 2 Diabetes Mellitus, Blood Glucose Value</p>	<p>Diabetes Mellitus (DM) type 2 is a metabolic disease whose prevalence is increasing globally, including in Indonesia. Family support is known to help patients manage this condition through lifestyle changes and adherence to treatment. This study aims to determine the relationship between family support and blood glucose values in patients with type 2 DM, as well as to assess the relationship between medication adherence and blood glucose values. This research method uses a correlation analytic design with a cross-sectional approach. Data collection through questionnaires filled out by 32 type 2 DM patients. Hensarling Diabetes Family Support Questionnaire Scale (HDFSS) to assess family support and Morisky Medication Adherence Scale (MMAS-8) for medication adherence. Data analysis using Fisher's Exact Test to see the relationship between family support and blood glucose levels in type 2 diabetes mellitus patients and stratification analysis with Mental haenszel. The results of the study found a relationship between family support and blood glucose values in patients with type 2 diabetes mellitus (<math>p = 0.002</math>; OR 24,000). The relationship between medication adherence and blood glucose values was not found to be significantly related (<math>p = 0.265</math>). The conclusion of this study is that family support significantly contributes to blood glucose values in patients with type 2 diabetes and medication adherence does not show a significant relationship to blood glucose values..</p>
<p>This is open access articles under the <a href="https://creativecommons.org/licenses/by-nc/4.0/">CC BY- NC</a> license</p> 	<p><b>Corresponding Author :</b> Puan Nusaputri Waetenrisompa Program Studi Pendidikan Dokter Fakultas Kedokteran Universitas Muslim Indonesia. <a href="mailto:putriipuan@gmail.com">putriipuan@gmail.com</a></p>

### INTRODUCTION

Diabetes Mellitus is disease chronic emerging when pancreas No capable Again producing insulin, or at the time body No can using insulin effective. Diabetes Mellitus has a number of

categories, namely type 1 DM, type 2 DM, maturity-onset diabetes of the young (MODY), gestational diabetes, neonatal diabetes.<sup>1,2</sup>

Type 2 Diabetes Mellitus (DM) is characterized by relative insulin deficiency caused by pancreatic beta cell dysfunction and insulin resistance in target organs. Type 2 DM is caused by abnormalities in insulin secretion, how insulin works, or abnormalities in both. Type 2 DM occurs in association with several organs in the body, which is known as *ominous octet* is the failure of pancreatic beta cells to secrete sufficient insulin in an effort to compensate for increased insulin resistance.<sup>3</sup>

Globally, 1 in 11 adults have diabetes mellitus (90% of whom have type 2 DM ). The International Diabetes Federation (IDF) has also identify 10 countries with the highest number of diabetes sufferers, where China, India and Pakistan are in the top ranks three top. Indonesia is ranked 5th among 10 other countries. with amount sufferer the most, namely amounting to 19.5 million. Indonesia becomes the only Southeast Asian country on the list, so can estimated the magnitude Indonesia's contribution to prevalence cases of diabetes in Southeast Asia. The prevalence of DM in South Sulawesi ranks 2nd rank disease No infectious after disease heart and blood vessels blood (PJPD) in 2017 was 15.76 %.<sup>1,2,4</sup>

Family is the smallest unit from society, then degrees health House ladder or family determine degrees health society. Family as factor in implementation of the Healthy Indonesia program, which plays a role as function maintenance or maintenance functioning health For maintain condition health member family to stay own high productivity.<sup>4</sup>

Support family can help patient For Can adapt with an unavoidable situation suspected. Presence support family can help maximize Treatment of type 2 DM. Support family expected Can control level glucose blood in patients with type 2 DM with change pattern life and diet changes. Knowledge family is things to do influential to treatment diabetes patients. Knowledge family against diabetes must measured in more concept wide, such as support social, how to face problems, and adaptation.<sup>5</sup>

Patient with type 2 DM especially in the elderly age at risk complications need supervision level glucose blood, treatment, mobility and rehabilitation.<sup>6</sup> Study about connection family with mark glucose blood This has conducted. Research conducted by Desi et al. found results that support family in patients with type 2 DM part big in category good (63.3%) blood sugar levels controlled more dominated compared to those who are not controlled (56.7%). Research conducted by Desi et al. using questionnaire Hensarling Diabetes Family Support Scale (HDFSS).<sup>7</sup>

From the research conducted by Desi and colleagues, it was found that family support has a significant role in helping type 2 DM patients control blood glucose levels. However, the results of the study were still limited to the general aspect of family support without specifically looking at other aspects that also influence the success of type 2 DM control, such as patient compliance in undergoing treatment. Therefore, researchers feel the need to complement previous studies by adding an in-depth evaluation of medication compliance as one of the important factors that influence the effectiveness of patient treatment. This was

done using *the Morisky Medication Adherence Scale* (MMAS-8), a measuring tool designed to evaluate patient compliance with treatment in more detail and measurably.

The addition of this medication adherence component is expected to provide more comprehensive data, considering that type 2 DM treatment does not only depend on family support, but also on patient discipline in carrying out therapy prescribed by health workers. Through the MMAS-8 questionnaire, researchers can obtain an overview of patient habits in taking medication, reasons for non-compliance, and factors that influence such compliance. By understanding the relationship between medication adherence, family support, and blood glucose levels, this study is expected to provide more effective recommendations to improve the quality of life of type 2 DM patients, as well as being a reference for further research in this field.

Based on the background that has been described, this study formulates the main problem, namely: "How is the relationship between family support and blood glucose levels in Type 2 Diabetes Mellitus patients in the Mandai Health Center Area, Maros Regency, South Sulawesi Province?" This study aims to determine the extent to which the role of family support affects blood glucose levels in type 2 DM patients. The general objective of the study is to analyze the relationship, while specific objectives include identifying patient blood glucose values, classifying type 2 DM patients, and assessing the relationship between family support and medication adherence with blood glucose levels using the HDFSS and MMAS-8 questionnaires.

This study is expected to provide benefits for researchers, both as an academic requirement in completing studies at the Faculty of Medicine, Muslim University of Indonesia Makassar and as an effort to expand knowledge about the influence of family support on blood glucose control in type 2 DM patients. With a deeper understanding, the results of this study can be a basis for researchers to provide relevant and useful recommendations, both in patient treatment and in developing effective family support strategies.

## RESEARCH METHODS

This study uses an analytical method with a correlational design and a *cross-sectional* approach. This approach allows simultaneous data collection through a questionnaire to analyze the relationship between independent variables, namely family support, and dependent variables, namely blood glucose values in patients with type 2 diabetes mellitus. Data collection was carried out using two main instruments, namely a questionnaire Hensarling Diabetes Family Support Scale (HDFSS) to assess family support, as well as the Morisky Medication Adherence Scale (MMAS-8) to assess patient compliance in taking medication.

This study was conducted at the Mandai Health Center, Maros Regency, South Sulawesi, in September 2024. The study population included patients with type 2 diabetes mellitus who underwent treatment at the Mandai Health Center during the study period. The study sample was taken by *purposive sampling*, with a minimum of 32 respondents who met the inclusion and exclusion criteria. Inclusion criteria included patients over 20 years of age,

suffering from type 2 DM for more than one year, living in the same house with family, and in stable condition. Meanwhile, exclusion criteria included patients with sudden health problems that did not allow participation in the study.

Family support data were collected using the HDFSS questionnaire covering four main dimensions, namely emotional support, appreciation, instrumental, and information. This questionnaire consists of 29 questions with a specific rating scale that reflects the quality of family support. Meanwhile, medication adherence data were collected using the MMAS-8 questionnaire, which evaluates three main aspects: frequency of forgetfulness, intention to stop using medication, and ability to control oneself in using medication. Data on fasting blood glucose levels of patients were measured using a glucometer, with measurement results categorized as controlled (80–130 mg / dL ) and uncontrolled (> 130 mg / dL ).

Data analysis was performed univariately and bivariately. Univariate analysis was used to describe the frequency distribution of independent and dependent variables, while bivariate analysis aimed to test the relationship between family support and blood glucose values. Research ethics are also a major concern, by ensuring approval from related institutions and informed consent. consent from respondents. All data collected is guaranteed confidentiality by not including patient identities in the research report.

## RESULTS AND DISCUSSION

### Research result

#### Analysis Univariate

Study was conducted on 32 people with type 2 DM who became Respondents. Characteristic data Respondent covering age, type gender, job level education, income, marital status, gender family, support family and obedience drink medicine. Data obtained with method ask directly to the respondents with guide questionnaire.

**Table 4.1.1** Distribution type 2 diabetes mellitus patients based on age

Valid	Age	
	Frequency	Percent
36-45	5	15.6
46-55	11	34.4
56-65	10	31.3
>65	6	18.8
Total	32	100.0

Source : Primary Data, 2024

Mellitus patients based on blood age is described in table 4.1. 1 shows that patients who participated in this study based on blood glucose values were distributed as follows: Late Adolescent Age (17–25 Years) as many as 0 people, Early Adult Age (26–35 Years) as many as 0 people, Late Adult Age (36–45 Years) as many as 5 people, Early Elderly Age (46–55 Years) as many as 12 people, Late Elderly Age (56–65 Years) as many as 9 people, and Elderly Age (> 65 Years) as many as 6 people.

**Table 4.1.2** Distribution type 2 diabetes mellitus patients based on type sex

Valid	Gender	
	Frequency	Percent
Man	10	31.3
Woman	22	68.8
Total	32	100.0

Source : Primary Data, 2024

Grouping type 2 diabetes mellitus patients based on type sex outlined on Table 4.1. 2 shows that the patients who participated in this study were distributed based on gender as follows: Male 10 people and female 22 people.

**Table 4.1.3** Distribution type 2 diabetes mellitus patients based on work

Valid	Work	
	Frequency	Percent
Doesn't work	2	6.3
Lecturer	1	3.1
Teacher	2	6.3
housewife	9	28.1
Head S	1	3.1
Seller	1	3.1
Retirement n	4	12.5
civil servant	5	15.6
Police	3	9.4
Self -employed	1	3.1
Businessman	3	9.4
Total	32	100.0

Source : Primary Data, 2024

Grouping type 2 diabetes mellitus patients based on work described in table 4.1.3 shows that participating patients in study This based on work distributed as following : No Work as many as 2 people and working as many as 30 people.

**Table 4.1.4** Distribution type 2 diabetes mellitus patients based on education

Valid	Education	
	Frequency	Percent
Low	9	28.1
Tall	23	71.9
Total	32	100.0

Source : Primary Data, 2024

Grouping type 2 diabetes mellitus patients based on education described in table 4.1.4 shows that participating patients in study This based on education distributed as the following : Low education (<junior high school) as many as 9 people, high education high (>SMA) as many as 23 people.

**Table 4.1.5** Distribution type 2 diabetes mellitus patients based on income

Valid	Income	
	Frequency	Percent
<UMR	15	46.9
Minimum Wage	12	37.5
> Minimum Wage	5	15.6
Total	32	100.0

Source : Primary Data, 2024

Grouping type 2 diabetes mellitus patients based on income described in table 4.1.5 shows that participating patients in study This based on income distributed as following : below the minimum wage ( <Rp. 3,000,000) as many as 15 people, above the minimum wage ( >Rp. 6,000,000) as many as 5 people, and according to the minimum wage (Rp. 3,000,000 – Rp. 6,000,000) as many as 12 people.

**Table 4.1.6** Distribution Type 2 diabetes mellitus patients based on marital status

Valid	Marital status	
	Frequency	Percent
Not married yet	5	15.6
Marry	26	81.3
Separate	1	3.1
Total	32	100.0

Source : Primary Data, 2024

Grouping Type 2 diabetes mellitus patients based on marital status described in table 4.1.6 shows that participating patients in study This based on marital status distributed as following : Not yet Marry as many as 5 people, separated as many as 1 person, already Marry as many as 26 people.

**Table 4.1.7** Distribution type 2 diabetes mellitus patients based on type family

Valid	Family Type	
	Frequency	Percent
Big family	5	15.6
Nuclear family	2	6.3
My own family	25	78.1
Total	32	100.0

Source : Primary Data, 2024

Grouping Type 2 diabetes mellitus patients based on marital status described in table 4.1.7 shows that participating patients in study This based on marital status distributed as following : family extended family ( nuclear family, aunts, uncles, extended family) grandfather, family grandmother ) as many as 5 people, nuclear family ( father, mother, and child ) as many as 2 people, and extended family alone ( husband / wife, children ) as many as 25 people.

**Table 4.1.8** Distribution type 2 diabetes mellitus patients based on mark glucose blood

Valid	Blood Glucose Value	
	Frequency	Percent
Controlled	22	68.8
Not controlled	10	31.3
Total	32	100.0

Source : Primary Data, 2024

Table 4.1.8 shows that Of the 32 DM patients, there were 22 people (68.8%) with mark glucose blood controlled whereas patient with mark glucose blood No controlled as many as 10 people (31.1%).

**Table 4.1.9** Distribution type 2 diabetes mellitus patients based on support family

Valid	Family Support (HDFSS)	
	Frequency	Percent
Good Family Social Support	17	53.1
Poor Family Social Support	15	46.9
Total	32	100.0

Source : Primary Data, 2024

In table 4.1.9 it is given description about support family obtained that Of the 32 DM patients, 17 people (53.1%) received it support Good from family and 15 people (46.9%) received it support bad from family.

**Table 4.1.10** Distribution type 2 diabetes mellitus patients based on compliance drink drug

Valid	Medication Adherence (MMAS-8)	
	Frequency	Percent
Compliance Low	17	53.1
Moderate Compliance	15	46.9
Total	32	100.0

Source : Primary Data, 2024

Table 4.1.10 shows that from 32 respondents there were 15 people (46.9%) with level compliance moderate and 17 people (53.1%) with level compliance low.

### Analysis Bivariate

Bivariate analysis was used to determine the relationship between family support and values. glucose blood fast in type 2 DM patients at the Mandai Health Center, Maros Regency. In this analysis, the *chi-square* statistical test was used with *Fisher's Exact* Test continuation to test the relationship between these variables. For know how much big risk of independent variables on dependent variables so must known Odds Ratio (OR) value.

### The relationship between family support and blood glucose values using the Hensarling Diabetes Family Support Questionnaire Scale (HDFSS) in type 2 diabetes mellitus

Mellitus patients using the Hensarling Diabetes Family Support Questionnaire Scale (HDFSS) at the Mandai Health Center, Maros Regency is described in Table 4.2.1 showing that the results of the hypothesis test *chi-square* obtained Significance or Exact value Sig. (2-

sided) of 0.002. Exact value. Sig. (2-sided) 0.002 < 0.05, it can be interpreted that in this study there is a significant relationship or correlation between family support and blood glucose values in type 2 diabetes mellitus patients at the Mandai Health Center, Maros Regency. The Odds Ratio (OR) value of 24,000 means patients who receive support family have 24 times chance of experiencing mark glucose controlled blood compared to with patients who receive support bad family.

**Table 4.2.1** Relationship between family support and blood glucose values in type 2 diabetes mellitus patients using the Hensarling Diabetes Family Support Questionnaire Scale (HDFSS)

Family Support	Blood Glucose Value				P Value *	OR 95% CI **
	Controlled		Not controlled			
	Frequency	Percent	Frequency	Percent		
Good	16	94.1%	1	5.9%	0.002	24,000
Bad	6	40.0%	9	60.0%		(2,482-232,087)

Information :

\*Fisher Exact Test, 2024

\*\*Mantel-Haenszel Test Common Odds Ration Estimate, 2024

**The relationship between medication adherence and blood glucose levels in type 2 diabetes mellitus using a questionnaire Morisky Medication Adherence Scale (MMAS-8)**

Relationship results medication compliance with blood glucose levels in type 2 diabetes mellitus patients at the Mandai Health Center, Maros Regency is described in Table 4.2.2 showing that the results of the chi-square test obtained Significance or Exact value Sig. (2-sided) is 0.265. Exact value. Sig. (2-sided) 0.265 > 0.05, it can be interpreted that in this study there is no significant relationship or correlation between medication adherence and blood glucose levels in type 2 diabetes mellitus patients at the Mandai Health Center, Maros Regency. The Odds Ratio (OR) value of 2.800 means patient with compliance drug low own 2,800 times chance of experiencing mark glucose blood No controlled compared to patient with compliance drug currently.

**Table 4.2.2** Relationship between medication adherence and blood glucose levels in type 2 diabetes mellitus patients using the Morisky Questionnaire Medication Adherence Scale (MMAS-8)

Medication Compliance	Blood Glucose Value				P Value *	OR 95% CI **
	Controlled		Not controlled			
	Frequency	Percent	Frequency	Percent		
Currently	12	80.0%	3	20.0%	0.265	2,800
Low	10	58.8%	7	41.2%		(0.570-13.754)

Information :

\*Fisher Exact Test, 2024

\*\*Mantel-Haenszel Test Common Odds Ration Estimate, 2024



## Discussion

Characteristics overview respondents suffering from type 2 DM at the Mandai Health Center, namely part big aged 45-55 years as many as 11 people (34.4%). Insulin resistance is a physiological condition characterized by the inability of muscle cells to receive signals caused by insulin to remove glucose from the circulation. This is due to the fact that insulin affects and changes carbohydrate metabolism with age, which causes changes in insulin release in response to blood glucose levels and inhibition of glucose release into cells caused by insulin. Gender most is women, 22 people (68.8%) More women at risk getting diabetes is caused by there are differences in body composition and differences in sex hormone levels between adult women and men.<sup>31-34</sup>

Work most are 9 housewives (28.1%). Some respondents spend their time doing activities as housewives (IRT) such as cooking, washing, and cleaning the house, after that they will fill their time by watching TV, sleeping, or chatting with other people. Physical activity helps people with diabetes mellitus to improve glycemic control, reduce insulin resistance, improve lipid profiles, lower blood pressure, and maintain body weight. Most education is education tall as many as 23 people (71.9%) Even though people who are educated tall more easy understand knowledge to understand risk factors, ways to improve health, access and quality of health that can reduce the risk of diabetes mellitus, but factor other risks that are not can changed like genetics and age will also become factor risk reason the occurrence of diabetes mellitus.<sup>20,32,35,36</sup>

Income most is income below the minimum wage as many as 15 people (51.9%). This is because people with high incomes have better access to greater monetary value which leads to an affordable and healthier lifestyle. Marital status most is Already Marry as many as 26 people (81.3%) From the analysis results, it was found that there was a change in body mass index after marriage which was related to type 2 diabetes mellitus. Type of family most is type family Alone as many as 25 people (78.1%). The results can be influenced by the distribution of patients, most of whom only live with their children because their partner (husband/wife) has died, so that most mothers /fathers live with their children.<sup>32,37,38</sup>

Study This show that majority DM patients get good support from family as many as 17 people (53.1%) compared to with DM patients who are lacking get support from family as many as 15 people (46.9%). The results of the study This indicates that family patient has understand with Good roles and responsibilities answer they in nurse member sick family. DM patients who receive good support from family show that family the capable recognize problem health and take the right decision in nurse member families suffering from DM. Research this also found that There were 15 people (46.9%) patients who did not accept support from family. This is due to busyness member family with work they so that forget remind patient about importance control glucose blood and consume drug in a way regular.

Analysis results connection support family to mark glucose blood in DM patients shows There is a significant relationship or correlation between family support and blood glucose values in type 2 diabetes mellitus patients at the Mandai Health Center, Maros Regency. This is proven with n exact values s ig. (2-sided)  $0.02 < 0.05$  and *the Odds Ratio* (OR) was

obtained mark of  $24,000 > 1$ . This means support family influential positive in a way significant to mark glucose blood. Result analysis This is also in accordance with research conducted by Susanti *et al*, where obtained connection between support family with mark glucose blood ( $p$  value=0.002). The more Good support family give to care DM patients, then mark glucose blood will controlled well.<sup>7</sup>

Support family capable give Type 2 DM patients feel comfortable and can increase motivation patient in undergo treatment and care the self that will influence control glycemic become more controlled with give support in the form of form emotional, instrumental, appreciation, and information. Family support in DM patients is crucial for better outcomes, patient well-being, improved health status, and prevention of complications. Management of diabetes mellitus requires patient responsibility, which includes compliance with follow-up time. up, adherence to glucose monitoring treatment, healthy diet, and increased physical activity. Lack of family support can lead to poor<sup>39,40</sup> outcomes.

Analysis results connection compliance drink drug to mark glucose blood in patients with type 2 diabetes mellitus showed that in this study there was no significant relationship or correlation between medication adherence and blood glucose values in patients with type 2 diabetes mellitus at the Mandai Health Center, Maros Regency. This proven with significance or exact value  $s$  ig. (2-sided)  $0.265 > 0.05$ . *Odds Ratio* (OR) was obtained mark of  $2,800 > 1$ . This is in accordance with research conducted by Handayani, where the results study No obtained significant relationship between compliance drink drug with mark glucose blood with  $P$  value  $> 0.005$ , namely  $p=0.158$ . This is contrary to research conducted by Rismawan *et al* in 2023, where the results of the study found a significant relationship between medication adherence and blood sugar levels in type 2 DM patients with a  $P$  value  $< 0.005$ , namely  $p = 0.000$ . Patients who are compliant with taking medication have normal blood sugar levels and patients who are not compliant with taking medication have high blood sugar levels. Treatment compliance in DM patients is influenced by many factors such as patient age, perception and duration of the disease, polytherapy, psychological factors, and socioeconomics. The consequences of low medication compliance cause poor glycemic control and complications, resulting in increased mortality and morbidity.<sup>41</sup>

## CONCLUSION

Based on the results of the study, the average fasting blood glucose value of type 2 diabetes mellitus patients at the Mandai Health Center was 130 mg / dL, with the lowest value of 72 mg / dL and the highest of 236 mg / dL. Most patients were in the age range of 56-65 years, had a job status as a Housewife (IRT), had an education above high school, income below the UMR ( $< Rp3,000,000$ ), were married, and had their own family. The results of the analysis using the HDFSS questionnaire showed a significant relationship between family support and blood glucose values with a  $P$  value of 0.012 and *odds ratio* 24,000, indicating the importance of the role of family support in controlling blood glucose levels. However, the results of the MMAS-8 questionnaire did not find a significant relationship between family support and medication adherence, with a  $P$  value of 0.146 and *odds ratio* 2,800. For further research, it

is recommended that researchers consider other factors that may affect blood glucose levels, such as diet, physical activity levels, and psychological conditions of patients, to improve data accuracy. In addition, direct interviews with family members of patients can provide deeper insights into the form of family support. Future research can also use larger samples and involve different research locations to strengthen the validity of the results and understand the variation in family support patterns in various social environments.

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