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Family Support and Compliance with Diabetes Mellitus Management on Blood Glucose in the Elderly Prolanis Club at the Tompaso Public Health Center

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Abstract

Diabetes mellitus (DM) is a chronic metabolic disease on the rise worldwide, including in Indonesia. Due to physiological changes and decreased self-management abilities, older adults are more susceptible to DM. This study aimed to determine the relationship between family support and adherence to diabetes mellitus (DM) management and blood glucose levels in older adults at the Prolanis Club at Tompaso Community Health Center. This study uses quantitative research with an analytical descriptive design and a cross-sectional approach. Place and Duration of Study Tompaso Community Health Center conducted in January 2025. Methods The sample consisted of 58 respondents with diabetes mellitus (DM) who were members of the Prolanis Club, selected using a non-probability sampling technique. Data were collected through the Hensarling Diabetes Family Support Scale (HDFSS) questionnaire, The Summary of Diabetes Self-Care Activities (SDSCA), and fasting blood glucose measurements using a glucometer.

Data analysis used the Chi-square test. The results of the study show the results showed that most respondents had good family support (82.75%) and good management compliance (55.17%). In addition, the majority of respondents had controlled blood glucose levels (62.1%). There was a significant correlation between family support and blood glucose (p=0.000) and 5-pillar management compliance with blood glucose (p=0.000). Respondents with good family support (82.75%) and management compliance had more controlled blood glucose compared to respondents without family support. The conclusion of this study is that family support and adherence to diabetes mellitus (DM) management play a crucial role in blood glucose control in the elderly. Therefore, active family involvement and increased health education are needed.

Keywords: Family Support, Compliance, Diabetes Mellitus, Blood Glucose, Elderly

Introduction

Diabetes mellitus is a non-communicable disease (NCD) and is a major global health problem. Metabolic disorders affecting metabolism in people with diabetes mellitus are a contributing factor. According to data from the International Diabetes Federation (IDF), in 2019, 463 million people aged 20-79 years suffered from diabetes. It is estimated that by 2030, the number of people with diabetes will reach 578 million, and this number will increase to 700 million by 2045. (Zakiyah *et al*., 2023) [28]. In Indonesia itself, based on data from the Ministry of Health (Kemenkes) in 2014, it stated that 90% of the total number of diabetes mellitus sufferers were type 2 diabetes mellitus sufferers. The prevalence of diabetes mellitus sufferers aged ≥15 years according to data from the Basic Health Research (Riskesdas) in 2018 was estimated at 2%. Compared to the prevalence results in 2015, which was 2.1%, the prevalence of diabetes mellitus sufferers in 2018 decreased, but was still considered high (Riskesdas, 2018). In North Sulawesi itself, especially in Minahasa Regency, the prevalence of diabetes mellitus sufferers in 2018 data showed that 2.29% or as many as 3,471 people suffered from this non-communicable disease. (North Sulawesi Province Basic Health Research, 2018) [23] Diabetes is a chronic metabolic disease characterized by defects in pancreatic insulin production and utilization. Uncontrolled diabetes can lead to complications such as the risk of heart disease and stroke, neuropathy, foot ulcers, retinopathy, and impotence. These complications can be minimized with proper diabetes management. The Indonesian government, in collaboration with BPJS Kesehatan (Social Security Agency for Health), has developed a management plan as the implementing agency, namely the Chronic Disease Management Program, also known as "PROLANIS." (Treasure, 2018) Family support plays a crucial role in the management of diabetes mellitus, especially in the

elderly. Elderly individuals greatly need support from their families, both in prevention, treatment, and management, so that they can enjoy their retirement comfortably and resume their daily activities. Findings indicate that family support, whether emotional, appraisal, instrumental, or informational, is significantly associated with adherence to diabetes management in older adults. Family support is considered important in improving adherence in diabetes patients because it increases self-confidence, motivates them, and provides daily assistance.(Treasure, 2018).

In accordance with the description above, the researcher is interested in conducting research on family support and compliance with management in carrying out the 5 pillars of diabetes mellitus management on blood glucose in the elderly PROLANIS club of Tompaso Health Center. The researcher is also interested in taking samples from the elderly, because the elderly tend to experience this non-communicable disease and based on data from the researcher's interview that the lack of education about diabetes in the elderly in the prolanis club so the researcher is interested in conducting this research, to see the relationship between family support and compliance with management of diabetes mellitus management on blood glucose in the Prolanis club. Diabetes mellitus sufferers in the Prolanis club are categorized as quite a lot in the elderly, according to data in 2024 there were 99 sufferers who suffered from this non-communicable disease (Tompaso Health Center, 2024).

Method

The type of research conducted is quantitative research with an analytical description research design with a Cross Sectional approach which was carried out to collect data on family support variables and diabetes mellitus management in the elderly. This research was conducted in the Working Area of the Tompaso Talikuran Community Health Center, Tompaso District, Minahasa Regency, North Sulawesi. This research began with the preparation of a research proposal which was carried out from April to May 2024. Data collection was carried out in January 2025. The population of this study was all diabetes mellitus sufferers at the Tompaso Community Health Center, Minahasa Regency, North Sulawesi Province, Indonesia. The total population suffering from diabetes mellitus was 99 people. The sampling technique used Non Probability Sampling. The sample size in this study was determined based on the Slovin formula of 50 samples, but a sample size of 58 respondents was taken.

Results

Based on table 1, it can be seen that of the 58 respondents, the least were aged 21-28, namely 3 respondents (5.2%), aged 29-36 as many as 3 respondents (5.2%), aged 37-44 as many as 4 respondents (6.9%), aged 45-52 as many as 6 respondents (10.3%), aged 53-60 as many as 17 respondents (29.3%), aged 61-68 as many as 14 respondents (24.1%), and aged 69-76 as many as 11 respondents (19%).

Table 1: Respondent Characteristics Based on Age

Age	n	%
21-28	3	5.2
29-36	3	5.2
37-44	4	6.9
45-52	6	10.3
53-60	17	29.3
61-68	14	24.1
69-76	11	19
Total	58	100

Furthermore, the research results based on Table 2 show that of the 58 research respondents, 18 people (31.03%) were male and 40 people (68.96%) were female.

Table 2: Respondent Characteristics Based on Gender

Gender	n	%
Man	18	31.03
Woman	40	68.96
Total	58	100

Furthermore, based on table 3, it is known that the duration of diabetes suffering from 2 years was 3 respondents (5.2%), 3 years was 20 respondents (34.5%), 4 years was 18 respondents (31%), 5 years was 9 respondents (15.5%), 6 years was 5 respondents (8.6%), 7 years was only 1 respondent (1.7%), and those in the 8-9 years were 2 respondents (3.4%).

Table 3: Characteristics of Duration of Diabetes Mellitus Suffering

Long-term Diabetes Mellitus Suffering	n	%
2 years	3	5.2
3 years	20	34.5
4 years	18	31
5 years	9	15.5
6 years	5	8.6
7 years	1	1.7
8-9 years	2	3.4
Total	58	100

Furthermore, based on table 4, it can be concluded that most of the people caring for family members suffering from diabetes are husbands (20 respondents) (34.4%), wives (10 respondents) (17.2%), children (19 respondents) (32.8%), siblings (6 respondents) (10.3%) and parents (3 respondents) (5.2%).

Table 4: Characteristics of Families Caring for Diabetes Mellitus Patients

Caring Family	n	%
Parent	3	5.2
Wife	10	17.2
Husband	20	34.5
Child	19	32.8
You	6	10.3
Total	58	100

Furthermore, based on table 5, it can be concluded that 48 respondents (82.75%) had good family support, and 10 respondents (17.24%) had sufficient family support.

Table 5: Characteristics of Family Support

Family Support	n	%
Good	48	82.75
Enough	10	17.24
Total	58	100

Furthermore, based on table 6, it can be concluded that 32 respondents (55.17%) had good compliance with the management of the 5 pillars of diabetes mellitus, and 26

respondents (44.82%) had poor compliance with the management.

Table 6: Characteristics of Compliance with Diabetes Mellitus Management

Compliance with Diabetes Mellitus Management	n	%
Good	32	55.17
Not good	26	44.82
Total	58	100

Furthermore, based on table 7, it can be concluded that 36 respondents (62.1%) had controlled fasting blood glucose, and 22 respondents (37.9%) had uncontrolled fasting blood glucose.

Table 7: Characteristics of Fasting Blood Glucose

Fasting Blood Sugar	n	%
Under control	36	62.1
Uncontrollable	22	37.9
Total	58	100

Furthermore, based on table 8, the analysis of the relationship between family support and blood glucose concludes that good family support with controlled blood glucose is found in a total of 35 respondents (97.2%), while good family support with uncontrolled blood glucose is found in a total of 13 respondents (59%), and sufficient family support with controlled blood glucose is found in 1 respondent (2.7%), while sufficient family support with uncontrolled blood glucose is found in 9 respondents (41%).

Table 8: Relationship between Family Support and Respondents' Blood Glucose

Family Support	Glucose Criteria				Total		P-Value
	Under control		Uncontrollable				
	n	%	n	%	n	%	
Good	35	97.2	13	59	48	82.7	0,000
Enough	1	2.7	9	41	10	17.2	
Total	36	100	22	100	58	100	

The statistical test results in Table 8 using Fisher's Exact Test through SPSS obtained a significant degree of p-value = 0.000 by setting α = < 0.05, it can be concluded that the p-value in this study is <0.05 so it can be said that there is a significant relationship between family support and blood glucose. In other words, individuals with good family support are more likely to have controlled blood glucose, compared to those who do not get good family support.

Furthermore, based on table 9, the relationship between compliance with diabetes mellitus management (5 pillars) and blood glucose concluded that 28 respondents (77.7%) with controlled blood glucose criteria had good management, while 8 respondents (22.2%) had poor management, while with uncontrolled blood glucose criteria there were 4 respondents (18.1%) with good management, while 18 respondents (81.8%) had poor management.

Table 9: Relationship between Compliance with 5 Pillars Management and Respondents' Blood Glucose

5 Pillars Compliance	Glucose Criteria				Total		P-Value
	Under control		Uncontrollable				
	n	%	n	%	n	%	
Good	28	77.7	4	18.1	32	55.1	0,000
Not good	9	22.2	18	81.8	26	44.8	
Total	36	100	22	100	58	100	

The statistical test results in table 9 using Chi-Square through SPSS obtained a significant degree of p = 0.000 by setting α = < 0.05, it can be concluded that the p-value in this study is <0.05 so it can be said that there is a significant relationship between Compliance with the management of the 5 pillars of diabetes mellitus and blood glucose. In other words, the quality of management of the 5 pillars of diabetes mellitus affects blood glucose levels. These results indicate that the better the management of the 5 pillars of diabetes mellitus, the greater the likelihood of patients having controlled blood glucose levels.

Discussion

Respondent Characteristics

Age is a non-modifiable risk factor in the occurrence of type 2 diabetes. In this study, it was found that most people suffering from diabetes mellitus were aged 53-76 years, this is supported by research conducted by Rosita *et al*. (2022) [24] found that the risk of developing type 2 diabetes in the pre-elderly age group (45-59 years) was 1.75 times higher than in the older age group (over 60 years).

The results of this study found that there were more females (68.96%) than males (31.03%) who suffered from diabetes mellitus, these results were also supported by research conducted by Susanti *et al*. (2024) [5] Studies have shown a link between gender and diabetes risk. Women are more likely to develop diabetes than men.

Long-term diabetes has a significant impact on patient health. In this study, 86.20% of respondents had diabetes for 1-5 years, and 13.79% had diabetes for 6-10 years. Patients who have had diabetes for more than 5 years are at higher risk of organ complications, especially kidney complications. Therefore, controlling blood sugar levels and maintaining a healthy lifestyle is important to reduce the risk of long-term complications. The longer a person has diabetes, the higher the risk of complications. Common complications include diabetic nephropathy, which can lead to kidney failure, as well as retinopathy and neuropathy. Poor blood sugar control over the long term can accelerate organ damage. (Kriswiastiny, 2022) [13].

1. Family Support

This study found that 82.75% of respondents had good family support and 17.24% had adequate family support. This finding is supported by research conducted by Mardiyanti *et al*. (2020) [17] Studies show that family support can help improve patient adherence to diabetes treatment.

This support includes emotions, appreciation, tools, and information to help patients manage their daily care. Emotional support is the easiest type of support to provide, with a high level of support (60.4%). Rahmi *et al*. (2020) [22], family support has a crucial role in diabetes management because the support provided, whether emotional, instrumental, informational, or appreciation, can improve the patient's quality of life and help in controlling blood glucose levels effectively.

2. Compliance with Diabetes Mellitus Management

The results of this study showed that 55.17% of respondents had good compliance, while 44.82% of respondents had poor compliance in efforts to manage diabetes mellitus such as diet, taking medication, physical activity, education and blood sugar control.

2.1 Diet Compliance

Based on the research results from Anggi and Rahayu (2020) [3] The level of dietary compliance is not only influenced by internal factors such as knowledge, but also by external factors such as emotional support and information from family, therefore to support dietary compliance there must be support from those around them. These results also show that respondents who do not comply with the diet have a 44.7 times greater risk of experiencing uncontrolled blood sugar levels compared to respondents who comply with the diet due to support from family and social circles. (Nursihhah *et al*., 2021) [18].

2.2 Medication Compliance

Medication adherence in type II diabetes mellitus (DM) patients is greatly influenced by education, knowledge, number of medications, and support from family and healthcare professionals. Research results from Kusumaningrum and Azinar (2021) [15] In the journal "Higeia Journal of Public Health," it was shown that medication adherence is still low, with 41% being compliant and 59% being non-compliant. Furthermore, medication adherence significantly influences the reduction of blood sugar levels in patients with type II diabetes mellitus (DM). The more compliant a patient is in taking their medication, the greater the reduction in blood sugar levels. (Fandinata and Darmawan, 2020) [8].

2.3 Physical Activity Compliance

Physical activity plays a crucial role in diabetes management. Regular exercise can help lower blood sugar levels, improve insulin sensitivity, and reduce the risk of diabetes complications. Therefore, diabetes patients are encouraged to engage in physical activity regularly and according to their abilities. (Duri *et al*., 2024) [7] Diabetic patients who are less active tend to experience higher insulin resistance, making blood sugar levels difficult to control. Patients with low physical activity have an 11.14 times greater risk of experiencing uncontrolled blood sugar levels compared to patients with moderate or high physical activity. (Manalu *et al*., 2022) [16].

2.4 Educational Compliance

Education is a key component in diabetes management. Patients who are better informed about diet, physical activity, and medication have more stable blood sugar control and a lower risk of complications. (Widayati, 2021) [27] This study shows that education is significantly associated with patient compliance and also indirectly influences blood sugar levels. Adequate knowledge will improve self-care skills, including medication adherence and blood sugar monitoring. (Shahid, 2021).

2.5 Blood Glucose Control Compliance

Regular monitoring helps patients adjust their treatment as needed. Some respondents (57.3%) in the study Pratiwi *et al*. (2025) [20] This indicates that blood glucose levels are within normal limits, and this is also related to the implementation of the five pillars of diabetes management. Furthermore, adherence to blood sugar control plays a crucial role in preventing diabetes complications such as hypertension, stroke, kidney failure, and amputation. (Antoro *et al*., 2023) [4].

3. Blood Glucose Levels

This study found that 62.1% of respondents had controlled blood glucose levels, while the remaining 37.9% had uncontrolled blood glucose levels. Uncontrolled blood glucose levels in diabetic patients can fluctuate throughout the day, increasing after meals and decreasing after a few hours. Patients with uncontrolled blood glucose levels are at higher risk of complications, including neuropathy, retinopathy, nephropathy, and cardiovascular disease. Other factors that influence uncontrolled blood glucose levels include adherence to treatment (insulin therapy or hypoglycemic drugs), irregular eating patterns and consumption of foods high in carbohydrates, lack of physical activity, stress and emotional conditions that can affect insulin and blood glucose levels, and other comorbidities such as anemia or kidney disorders. The results of a case study on two diabetic patients conducted by Sandi *et al*. (2022) It was found that both patients had uncontrolled blood glucose levels despite four weeks of intervention. Patients with anemia tended to have higher blood glucose levels than those without anemia, and some patients experienced tingling in the lower extremities, a symptom of diabetic neuropathy caused by uncontrolled blood glucose levels.

According to research by Akcay *et al*. (2022) [2], reactive oxygen species may be a key player in the pathophysiology of diabetes mellitus, and controlled blood glucose levels can also result in hearing loss, both in the diabetic state and during the hyperglycemia phase preceding the onset of overt diabetes mellitus. Negative impacts on hearing function can be avoided by controlling excessive glucose levels even before overt diabetes mellitus manifests.

4. The Relationship Between Family Support and Blood Glucose

With a p-value of $0.000 < 0.05$, the study's findings show a significant correlation between blood glucose levels and family support. Research from Galuh and Prabawati (2021) [9], which found a substantial correlation between blood glucose levels in diabetic patients and family support, further supports this. Compared to patients with diabetes who do not receive enough family support, those with diabetes who have strong family support are more likely to maintain blood glucose control. According to the findings of the study by Irawati and Firmansyah (2020) [11], blood glucose control and family support are significantly correlated. This implies that the likelihood of the patient's blood glucose levels being stable increases with the quality

of family support.

Family support is an important factor in improving quality of life and self-care behavior in diabetes patients, especially those with ulcers. In research conducted by Pratiwi *et al*. (2020) [19] In patients with diabetes ulcers, family support not only helps physical recovery but also strengthens psychological resilience and spiritual practices, which are crucial for holistic healing. Patients with higher levels of family support demonstrate better spiritual self-care practices compared to those with lower levels. Psychological studies have also shown that family support for patients with diabetes mellitus can cause unstable blood sugar levels. This is evidenced by stress, anxiety, feelings of frustration, impact on self-identity, disruption of social relationships, and mental burden, which significantly affect blood sugar levels in diabetes patients. (Kubiak *et al*., 2020) [14].

5. The Relationship between Compliance with Diabetes Mellitus Management (5 Pillars) and Blood Glucose

According to the study's findings, blood glucose levels and compliance with the five pillars of diabetes mellitus care are significantly correlated (p-value 0.000 < 0.05). These results are supported by research conducted by Astutisari *et al*. (2022), which found a link between blood glucose levels and diet, supports these findings. Glucose levels increase with dietary irregularities. In the meanwhile, blood glucose and physical activity are significantly correlated. Blood glucose levels in individuals with type II diabetes are significantly correlated with the five pillars of diabetes treatment, according to research findings by by Rahmadina *et al*. (2022) [21], it can be concluded that the five pillars of diabetes management have a significant relationship with blood glucose levels in patients with type II diabetes. Most respondents (57.3%) had blood glucose levels within normal limits, indicating that implementing the five pillars plays a role in diabetes control. Patients who adhere to the five pillars well are seven times more likely to control their blood glucose levels better than those who do not adhere to the five pillars.

Diabetes patients' blood glucose levels can be considerably impacted by self-care through a variety of glycemic control-enhancing techniques. According to research by (Dewi *et al*., 2023) [6]. This study demonstrates a substantial correlation between blood sugar levels and diabetes self-care management among patients with type II diabetes mellitus, and that the majority of respondents who practice effective diabetes self-care management also have good blood sugar levels. In order to control blood glucose levels, this study highlights the significance of enhancing diabetes self-care management through adherence to medication, nutrition, exercise, blood glucose control, foot care, and quitting smoking. Additionally, studies on women with diabetes have shown that self-care training improves quality of life and disease control, particularly for those women. In contrast to women who do not practice self-care, who may suffer from lower blood sugar control and a deterioration in their general health, women who practice self-care are more likely to have better blood sugar control, a higher quality of life, and a more positive view on their health.[Ahrari and others. (Ahrari *et al*., 2021) [1].

Conclusion

The relationship between family support and compliance with diabetes mellitus management in elderly members of the Prolanis Club at the Tompaso Community Health Center shows a significant relationship.

Consent

The author(s) have collected and preserved the written assent of respondents in accordance with international or university standards.

Ethical Approval

The Health Polytechnic Ethics Commission of the Ministry of Health Manado has granted sanction for this research (KEPK /01/ 11/467/2024). November 7 2024.

Competing Interests

The authors have declared that there are no competing interests.

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