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Family support and diabetic dietary compliance among patients with type 2 diabetes mellitus

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Abstract

Background: Controlling blood glucose needs to be done in patients with Diabetes mellitus so that the level is close to the normal threshold. Complications such as retinopathy, neuropathy, and nephropathy can occur as a result of uncontrolled blood glucose levels. To keep their blood glucose levels stable, people with diabetes mellitus can control their diet according to a predetermined diet. Adherence to a diabetes mellitus diet can be influenced by family support. Positive family support will generate motivation both when it comes to controlling diet patterns and blood sugar levels.

Purpose: To determine the relationship between family support and dietary adherence in patients with type 2 diabetes mellitus in the Diabetes Mellitus Association of Surakarta.

Method: Observational research with a cross sectional design. This research was carried out at the Diabetes Mellitus Association of Surakarta, with a sample of 41 people. The instruments used in this study were the *Hensarling Diabetes Family Support Scale* (HDFSS) questionnaire and the *Perceived Dietary Adherence Questionnaire* (PDAQ) questionnaire.

Results: The relationship between family support and dietary adherence was found that as many as 28 respondents (93.4%) had a high family support category with high dietary adherence compared to respondents who had a low family support category with low dietary adherence as many as 6 respondents (54.5%). The results of the statistical test on the variable of family support with dietary adherence obtained a value of $p = 0.008$ ($p < 0.05$) which means that there is a relationship between family support and dietary adherence in patients with type 2 diabetes mellitus in the Diabetes Mellitus Association of Surakarta.

Conclusion: There is a relationship between family support and dietary compliance in type 2 diabetes mellitus patients at the Surakarta Diabetes Mellitus Association.

Keywords: Diabetes Mellitus; Dietary Adherence; Family Support.

INTRODUCTION

Diabetes mellitus is one of the non-communicable diseases that currently occurs in many people of various ages ranging from children to the elderly. Diabetes Mellitus (DM) is a metabolic disorder disease due to increased blood sugar levels due to insulin not working optimally. People with diabetes will experience insulin deficiency, disruption of nutrient metabolism in the body which can cause hyperglycaemia (Yunita, Asdie, & Susetyowati, 2013).

There are four types of diabetes mellitus, namely diabetes mellitus type 1 caused by autoimmune cells that cause absolute insulin deficiency, type 2 diabetes mellitus caused by the loss of adequate insulin secretion process of beta cells due to lack of insulin, gestational diabetes mellitus is diabetes that occurs during pregnancy, and other types of diabetes mellitus caused by other causes such as diabetes syndrome.

at a young age and neonatal diabetes (American Diabetes Association, 2017).

Uncontrolled blood glucose levels can cause complications such as stroke, kidney disease, heart failure, neuropathy, leg ulcers, blindness, and even death (Ministry of Health of the Republic of Indonesia, 2013). According to the diagnostic criteria of the Indonesian Endocrinology Association (2006), it is said to have diabetes if it has a fasting blood sugar level of > 126 mg/dL and at the time of the test > 200 mg/dL. According to estimates from the International Diabetes Federation (IDF), as many as 10.5% of adults in the world between the ages of 20-79 years old had diabetes in 2021. Indonesia is among the top 10 countries in the number of adult diabetics aged 20-79 years, which is ranked 5th with a total of 19.5 million in 2021, and this number will increase by 28.6 million in 2045 (International Diabetes Federation, 2021). Central Java Province has a higher prevalence of diabetes mellitus compared to the prevalence of diabetes mellitus in Indonesia as a whole, based on medical diagnoses at all ages and in patients who are at least 15 years old. Almost in every province, there has been an increase from 2013. The prevalence of diabetes mellitus cases according to the health profile of Central Java in 2020 was 13.67%, in 2021 it was 11.0%, and in 2022 it was 15.6% (Central Java Provincial Health Office, 2022).

Diabetes mellitus is ranked 2nd in the highest number of non-communicable diseases after hypertension, which is 16.73% in Surakarta City in 2022 (Surakarta City Health Office, 2022). Diabetes mellitus is an incurable disease that can only be controlled to avoid complications (Reong, 2016). Diabetes mellitus can be managed in several ways, including through education, exercise, medication, and dietary arrangements. Diabetes mellitus is a disease closely related to lifestyle, because if a patient with DM consumes a diet high in carbohydrates excessively, it can increase blood glucose levels. Dietary arrangements or diets are very necessary for DM patients so that their blood glucose levels remain stable and controlled (Indarwati, Riskiana, & Hartanti, 2012).

Controlling blood glucose needs to be done in patients with diabetes mellitus so that the level is close to the normal threshold. Complications such as retinopathy, neuropathy, and nephropathy can occur as a result of uncontrolled blood glucose levels. To

keep their blood glucose levels stable, people with diabetes mellitus can control their diet according to a predetermined diet (Indonesian Society of Endocrinology, 2021). Diabetes mellitus diet adherence is a form of obedience and discipline to the diet that is being carried out by people with diabetes mellitus diet. Dietary adherence in people with diabetes mellitus is in accordance with the "3J principle" which means the right number of calories, the right type of meals, and the right meal schedule (Hardiansyah & Supariasa, 2016). Dietary adherence can also prevent complications from occurring quickly. Adherence to the diet for people with type 2 diabetes mellitus is a problem in itself when the rules must be followed by patients continuously and for a long time (Ciechanowski, Katon, Russo, & Walker, 2001).

Adherence to the diabetes mellitus diet can be affected by family support (Saifunurmazah, 2013). The forms of family support are divided into 4, namely emotional, instrumental, informational, and reward support (Savitri, Umar, Sipatu, Supetran, & Ndama, 2022). The importance of family support to participate in maintaining the food or diet recommended to family members suffering from diabetes mellitus. One form of patient compliance is by following dietary recommendations recommended by nutritionists (Ilmah & Rochmah, 2015). Positive family support will produce good motivation when controlling diet patterns and blood sugar levels (Azis, Tombokan, & Saini, 2019). Research conducted regarding family support with dietary adherence in patients with diabetes mellitus at the Cipondoh Health Center, Tangerang City, shows that there is a relationship between the two and patients who have family support are 5 times more likely to meet the diet compared to patients who do not have support (Irawati & Firmansyah, 2020). Research conducted regarding the relationship between family support and dietary adherence in type 2 diabetes mellitus patients at the North Cimahi Health Center showed that there was a relationship between the two, as many as 56.3% of respondents adhered to a diet program and 47.99% of respondents had decent family support (Bangun, Jatnika, & Herlina, 2020).

Based on the results of a preliminary survey conducted in July 2024 on 15 respondents, it was stated that there were 33.33% of respondents who did not receive family support, and there were 66.67% of respondents who received family support and the

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level of dietary adherence of 66.67% was included in the high category. The prevalence of patients with diabetes mellitus 2 in the Surakarta Diabetes Mellitus Association is 67 patients with an age range of 40 – 70 years. The purpose of this study is to determine the relationship between family support and dietary adherence in type 2 diabetes mellitus patients in the Diabetes Mellitus Association Surakarta.

RESEARCH METHOD

This study uses observational research with a *cross sectional* design. This research was carried out at the Surakarta Diabetes Mellitus Association which was held in September 2024, with a sample of 41 people suffering from diabetes mellitus. The inclusion criteria in this study are: Patients are willing to be respondents, Patients aged 30 - 70 years, Patients who have gained knowledge about diabetes mellitus at least 1 time, and Able to communicate well. Meanwhile, the exclusion criteria are respondents who live alone and retirees. The instrument used in this study is the *Hensarling Diabetes Family Support Scale* (HDFSS) questionnaire developed by Hensarling (2009) and modified by Yusra (2011) with a validity value (r 0.395-0.856) and a reliability value (0.940). And the *Perceived Dietary Adherence Questionnaire* (PDAQ) questionnaire developed by Asaad et al (2015) and modified by Abidin (2018). with a validity value (>0.632) and a reliability value (0.976).

Family support is one of the factors that form dietary adherence in DM patients. The measurement of family support uses the HDFSS questionnaire.

Family support is said to be low if the total score is 0-49 and is said to be high if the total score is 50-100.

Compliance is the level of patients in carrying out the treatment and behaviour recommended by their doctor (Sarafino, 1998). Dietary adherence is a rule or behaviour recommended by health workers, such as doctors or nutritionists, that needs to be followed by patients. These recommendations include the accuracy of the schedule, the number of portions, and the type of meals (Novian, 2013). The measurement of dietary adherence uses the PDAQ questionnaire. Dietary adherence is said to be low if the total score is 0-32 and is said to be high if the total score is 33-63.

The analysis begins with a data normality test using the Kolmogorov Smirnov test. If the data is normally distributed, it is continued with the Pearson Product Moment Correlation test, but if the data is not normally distributed, the test used is the Spearman Rank test. Decision making is seen from the p value with the following provisions: 1) If the p value ≥ 0.05 H_a is rejected and H_o is accepted, which means there is no relationship between family support and dietary compliance in patients with diabetes mellitus. 2) If the p value <0.05 H_a is accepted and H_o is rejected, which means there is a relationship between family support and dietary compliance in patients with diabetes mellitus.

This research has been ethically approved and has met the declaration of Helsinki 1975, the Council for International Organization of Medical Sciences (CIOMS) and WHO 2016, with the number: 5363/B.1/KEPK-FKUMS/X/2024.

RESEARCH RESULTS

Table 1. Characteristics of The Respondents (N=41)

Variable	Results
Age (n/%)	
Age (Mean$\pm$SD)(Range)(Year)	(62.56 $\pm$ 7.786)(34-86)
30-49 year	1/2.44
50-64 year	23/56.10
65-80 year	16/39.02
> 80 year	1/2.44
Gender (n/%)	
Man	15/36.59
Woman	26/63.41

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Variable	Results
Education (n/%)	
Low (Elementary School/Middle School/Equivalent)	13/31.71
High (High School/University)	28/68.29
Employment (n/%)	
Retirees	13/31.71
Housewives	13/31.71
Civil Servants	2/4.88
Teacher	4/9.75
Private	7/17.07
Self employed	2/4.88
Long Suffering (n/%)	
1-10 year	30/73.17
11-20 year	11/26.83
Family Support (n/%)	
Low	11/26.83
High	30/73.17
Dietary Adherence (n/%)	
Low	8/19.51
High	33/80.49
Family Characteristics (n/%)	
Age	
(Mean±SD)(Range)(Year)	(52.58±16.760)(20-87)
19-29 year	4/9.75
30-49 year	12/29.27
50-64 year	14/34.15
65-80 year	9/21.95
> 80 year	2/4.88
Education	
Low (Elementary School/Middle School/Equivalent)	5/12.20
High (High School/University)	36/87.80
Employment	
Retirees	12/29.27
Housewives	9/21.95
Teacher	3/7.31
Private	12/29.27
Self Employed	5/12.20
Relationship	
Husband	13/31.71
Wife	13/31.71
Child	12/29.27
Others	3/7.31

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Based on table 1, it can be seen that the average and standard deviation of the respondents' age is 62.56 ± 7.786 with an age range between 34 to 86 years, the age range based on the nutritional adequacy rate is mostly 50-64 years old, which is 23 (56.1%). Most respondents are female (63.41%). Having a high level of education is 28 (68.29%). This can occur due to hereditary factors and lifestyle. Most respondents are retired and civil servants, which is 13 (31.71%). The duration of suffering in the respondents of this study was 1-10 years, which is 30 (73.17%).

Most respondents have high family support, which is 30 (73.17%), while respondents with low family support are 11 (26.83%). The results of the study showed that most respondents received good family support in carrying out the DM diet. Most respondents had high dietary compliance as many as 33 (80.49%), while respondents who had low dietary compliance were 8 (19.51%).

In the characteristics of the respondent's family based on age with an average and standard deviation of 52.58 ± 16.760 with an age range between 20 to 87 years, the majority are aged 50-64 years as many as 14 (34.15%), the majority with the highest level of education as many as 36 (87.80%), the majority of the respondent's family occupations are retired and private, each as many as 12 (29.27%), based on family relationships, the majority have a relationship, namely husband and wife, each as many as 13 (31.71%).

Table 2. The Relationship Between Family Support and Dietary Adherence (N=41)

Variable	Min	Max	Mean	SD	p-value*
Family support	42	84	65.22	13.198	0.008
Dietary adherence	22	54	42.10	7.971	

*Pearson Product Moment *test analysis results*

Based on table 2, the results of data processing on 41 respondents obtained a minimum value (the smallest score result) of 42 and the maximum value (the largest score result) of 84 on the family support variable. This shows that the value of family support owned by respondents is in the range of 42 to 84. In the minimum nail diet adherence variable, which is 22 and the maximum value is 54, it shows that the dietary adherence value of the respondents is in the range of 22 to 54.

The standard deviation measures the data on how wide the deviation or spread of the data is from the mean value (Febriani, 2022). In the family support variable, a mean value of 65.22 was obtained with a standard deviation of 13.198 which means that the data is widely spread around the average value. The average score of 65.22 illustrates that the level of family support in the respondents is quite high. In the dietary adherence variable, an average value of 42.10 and a standard deviation of 7.971 were obtained, which means that the data deviation in the average value was less. An average score of 42.10 indicates that the patient's dietary adherence is high.

The results of the statistical test using *Pearson Product Moment* on the variable of family support with dietary adherence obtained a value of $p = 0.008$ ($p < 0.05$) which means that there is a relationship between family support and dietary adherence in patients with type 2 diabetes mellitus at the Diabetes Mellitus Association of Surakarta.

Table 3. Distribution of Family Support Categories Based on Dietary Adherence

Variable	Family Support	
	Low (n=11)	High (n=30)
Dietary Adherence (n/%)		
Low	6/54.5	2/6.7
High	5/45.5	28/93.3

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In Table 3, it is known that as many as 28 (93.3%) have a high family support category with high dietary adherence compared to respondents who have a low family support category with low dietary adherence as many as 6 (54.5%).

DISCUSSION

Characteristics Respondents

The results of this study are the same as the study conducted in the Tigo Baleh Health Center work area where 66 respondents were female out of 89 female respondents (Chaidir, Wahyuni, & Furkhani, 2017). According to Basic Health Research (2013), the prevalence of women is higher than men, this is due to several risk factors that cause a high incidence of type 2 DM in women. These risk factors are increased BMI (Body Mass Index), monthly cycle syndrome (premenstrual syndrome), and pregnancy. Physically, women have a greater chance of experiencing an increase in BMI (Damayanti, 2010; Chaidir et al., 2017).

Age is also one of the risks of developing type 2 diabetes mellitus. This is due to the increased formation of fat that accumulates in the abdomen which is a major component of central obesity. As a result, this condition leads to insulin immunity and early incidence of DM. The elderly can also reduce insulin stimulation which can interfere with the body's glucose levels. People over the age of forty experience significant physiological declines, which impact the pancreas. This is also another factor that causes type II DM (Suastika, Dwipayana, & Kuswardhani, 2012). The level of education is categorized into 2, namely the low level of education if the last education is between elementary and junior high school, and the level of high education if the last education is high school-college (Arikunto, 2020). A person with a high level of education will have a lot of knowledge about health and increased awareness in maintaining health. A person who has low education is at risk of paying less attention to lifestyle and diet to prevent diabetes mellitus (Notoadmodjo, 2014).

Individuals with higher education do not always care about their health conditions. There are some people who neglect their health conditions due to their relationship with work and strenuous activities, which leads to lifestyle changes, eating habits, and lack of physical activity (Mamangkey, Kapantow, & Ratag, 2014). The duration of a person's diabetes mellitus is

due to the chronic nature of the disease and requires a long healing time (American Diabetes Association, 2011). Diabetes mellitus is a chronic disease that will be suffered throughout life by the sufferer and tends to develop progressively which can eventually lead to complications (Permana, 2009). The length of time a person suffers from diabetes mellitus is highly dependent on the individual's ability to control his or her blood sugar levels, because although the disease cannot be cured, it can only be controlled with treatment carried out throughout life (Tjokropawiro, 2006).

Family Characteristics

The level of education is related to the ability to receive information, the higher the level of education of the patient and his/her family, the better the ability to receive information. This will increase support and influence family behaviour in maintaining family health, especially in people with diabetes mellitus (Luthfa, 2016). The partner is the person who interacts the most with the patient, so partner support is very important to make the patient comply with the diet. When the partner provides diet support, the patient will find it easier to follow it (Delianty, 2015).

Family Support

Family support is the help provided by family members that can provide physical and psychological comfort to individuals who are facing stressful situations (Taylor, 2006). The process of family support occurs throughout the life cycle and the type of support provided varies depending on the stage of the family life cycle. Family support encourages families to function optimally and improve adaptation to family health (Friedman, 2010).

Dietary Adherence

The results show that most of the respondents have been compliant in carrying out the DM diet, but there are still some respondents who are not compliant in carrying out the DM diet. There are several aspects that cause a person to be non-compliant in carrying out the DM diet, namely medication compliance, exercise, stress, low insight into diabetes mellitus, family support, and the length of suffering from diabetes mellitus (Isnaini & Saputra, 2017).

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Based on the results of the interview, almost all respondents have received knowledge from a doctor about the diet of Diabetes mellitus, so that respondents understand what needs to be applied. Most of the respondents are elderly, on average respondents tend to maintain their diet more by reducing the consumption of sugary foods or drinks, not consuming offal and ready-to-eat food, often consuming fruits or vegetables. This was done because respondents were aware of diabetes mellitus and were worried about the emergence of other complications.

There are several respondents whose level of dietary adherence is low. Based on the results of the interview, this is because some respondents who have a low economy, have a habit of drinking sweet tea in the morning, and rarely have family members to remind them about the diabetes mellitus diet. This is in line with research conducted at the Kudungmundu Health Center, Semarang City, which stated that family support is one of the factors that influences eating patterns (Yulia, 2015).

The Relationship Between Family Support and Dietary Adherence

Dietary adherence in patients with diabetes mellitus is useful for maintaining normal blood sugar levels and preventing complications (Febriana & Fayasari, 2023). One of the factors that affect dietary adherence is the existence of family support. Family support is very necessary because the family is the smallest unit in society and as a recipient of nursing care. Family support consists of 4 dimensions, namely emotional, informational, instrumental, and reward support. The fulfilment of these 4 dimensions, respondents who have good family support will tend to be more obedient in carrying out the diabetes mellitus diet (Bangun et al., 2020). Based on the results of the study, it was shown that there was a relationship between family support and dietary adherence in type 2 diabetes mellitus patients, this was due to the motivation from the family so that the respondents felt cared for, and appreciated which made them feel confident to recover. These results are in line with research conducted at the North Cimahi Health Center which shows a relationship between family support and dietary compliance in patients with type 2 diabetes mellitus (Bangun et al., 2020).

The results of this study are in line with research on the relationship between family support and dietary compliance in type 2 diabetes mellitus patients in the Malaka Health Center work area, Lalabata District, Soppeng Regency, which shows that there is a relationship between activity support ($p = 0.035$), family psychological support ($p = 0.029$), family social support ($p = 0.035$) with dietary compliance in type 2 diabetes mellitus patients (Asniar, Darwis, & Asdar, 2023). Likewise, research on the relationship between family support and compliance with diabetes mellitus management in diabetes mellitus patients at Dr. Pirngadi Medan Hospital shows that there is a relationship between family support and compliance with diabetes mellitus management with a p value of 0.000 ($p < 0.05$) and an r value of 0.456 (Fatimah, 2018).

Family support that is often given by family to respondents in this study is emotional support and instrumental support. Emotional family support includes expressions of empathy, care, encouragement, warmth, love, or emotional help. If there is a behavioural drive that encourages the respondent to feel comfortable, it will encourage the sufferer to think that the sufferer is praised, respected, loved, and that others are willing to give attention. Family support in the form of instrumental support is the family as a practical resource and that includes things such as the health of the sufferer, food and drink needs, rest, and preventing fatigue (Friedman, 2010).

The results of the study are known that the emotional support provided by the family to the respondents is that when the respondents feel sad about this diabetes mellitus, family members listen to the respondent's complaints, calm them down, provide support to always be enthusiastic, and accept the disease experienced by the respondent. Meanwhile, the instrumental support provided by the family is to provide special food or drinks that support the diet for DM patients, such as replacing regular sugar with corn sugar, vegetables and fruits that are low in sugar every day, and accompanying the respondent for routine control every month. The respondent's family did not help pay for the treatment because the medical expenses of all the respondents used Government Health Insurance.

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Family support and dietary adherence to patients with diabetes mellitus at the Diabetes Mellitus Association of Surakarta are good, because some respondents still live in the same house with their families so that support can be realized properly, and the majority of respondents understand diabetes mellitus so that respondents better maintain their diet so that complications do not occur. There are still some respondents whose family support and dietary adherence are low even though the respondents live in the same house as their families. This happened because the respondent's family members were busy with their work, most of which worked as private employees. So there are rarely family members who remind respondents about the DM diet. Respondents also stated that sometimes they feel saturated with the diet they are running. Diabetes diet usually takes a long time to heal, diabetics will experience fatigue points. The role of the family is very important here because the patient will experience stress if the patient does not get family support. This stress will worsen the patient's condition (Fauzia, Sari, & Artini, 2015).

Family is the main source for diabetes mellitus (DM) patients in carrying out independent management at home. One of the important functions of the family is to provide care, where the family's ability to carry out nursing care or maintain health has an impact on the health status of the individual and the family as a whole. Family support is a process of relationship between the family and its social environment. The concept of family support has developed into family coordination, both from outside and from within the family. Support from the family aims to share the burden and provide informational support by doing things that are beneficial to the patient (Friedman, 2010). Family support has a huge contribution in improving patient medication adherence. A good family role is also a motivation or support in encouraging patients to control routinely in accordance with the rules of doctors or health workers (Choirunnisa, 2018).

Research on the relationship between family support and compliance with hypertension diet in hypertension sufferers in Tapos Village, Depok shows that there is a significant relationship between family support and compliance with hypertension diet with a p-value of 0.001 and an OR value = 5.704, which means that respondents who receive family support

have a 5.704 times greater chance of complying with a hypertension diet compared to respondents who do not receive family support (Amelia & Kurniawati, 2020). Research conducted at the Depok Health Center concluded that family support is an important factor in implementing dietary compliance in type 2 diabetes mellitus sufferers (Anjani & Gayatri, 2018).

In people with type 2 diabetes, it is highly recommended to follow the 3J rule, which includes the amount of food consumed, the type of food, and the meal schedule. Types and amounts of foods that are high in glucose levels and irregular schedules can increase blood glucose levels (Eltrikanawati, 2022). Usually the form of family support that the family gives to the sufferer is in the form of emotional support such as, showing empathy, attention, encouragement, personal warmth, and love. With the emotional support provided, the patient feels that he or she is supported and understood by the family. A good form of family support can cause sufferers to adhere to the correct food and meal times (Purnaningsih, Suhaema, Adiyasa, & Cahyaningrum, 2019).

The positive effect of supporting families in carrying out dietary patterns for people with type 2 diabetes mellitus is that it can help in controlling what health workers recommend in carrying out their diet patterns, can remind each other, and can motivate each other. Especially to families who are carrying out a diet pattern so that people with type 2 diabetes mellitus are able to be motivated to continue to follow the diabetes mellitus diet pattern according to their needs. The lack of support provided by the family can cause people with type 2 diabetes mellitus to be unmotivated to recover and have no desire to improve their health (Bangun et al., 2020).

CONCLUSION

There is a relationship between family support and dietary adherence in type 2 diabetes mellitus patients in the Diabetes Mellitus Association of Surakarta.

SUGGESTION

For families of diabetes mellitus patients to better understand the importance of family support and pay more attention to diabetic patients in carrying out the DM diet. And for the next researcher, it is expected to further examine each type of family support for dietary adherence.

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