# The Effectiveness Of The Implementation Of Health Care And Family Support Therapy For Blood Sugar Levels In Patients With Type 2 Diabetes In Diabetes Center And Kalumata Health Center In Ternate City

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**Abstract:** Diabetes mellitus (DM) is a type of degenerative disease increasing every year in countries whole the world. This disease is characterized by an increase in blood sugar above normal values, because the body cannot release or use insulin adequately. A very high increase in DM will certainly be followed by an increased chronic complications due to poor handling of DM. Optimal glycemic control is a situation where glucose concentration in the blood and HbA1c can be controlled. Therefore, management of DM is needed to stabilize blood sugar levels in DM patients. Management of handling DM patients with health care are education, medical nutrition therapy, physical exercise, pharmacological intervention and family support. The purpose of the study is to analyze the effectiveness of the implementation of health care and family support therapy for blood sugar levels in patients with Type 2 diabetes in Diabetes Center and Kalumata Health Center in Ternate City. The research type is Quasi experimental using Posttest Only Control Group Design. The population was all patients with type II DM, the study sample was divided into 12 treatment groups and 12 control groups. then the data were analyzed using the Independent t-test. The results showed that fasting blood glucose levels had a significant difference between the treatment group and the control group with a significance value = 0,000 (p <0.05), and there were differences in blood sugar 2 hours post-prandial between treatment groups and control group with a significance value = 0.006 (p <0.05). in conclusion, Health care and family support therapy are effective for reducing sugar levels in patients with type 2 diabetes.

**Index Terms**: Health Care, Family Support Therapy, blood sugar, type 2 diabetes

## 1. INTRODUCTION

Type 2 diabetes mellitus (DM) is a chronic metabolic disorder in which prevalence has been increasing steadily all over the world. (Abdulfatai, 2012). According to the International of Diabetic Federation (2014), in 2013 there were 382 million people in the world suffering from diabetes mellitus, of which there were 175 million who had not been diagnosed and threatened to progressively become complications due to non-optimal prevention. The data is expected to increase by 592 million people who will be diagnosed with DM in 2035. Indonesia is a country ranking 7th of DM with 8.5 million people suffer DM after China, India and the United States, Brazil, Russia, Mexico. (IDF, 2014). Based on Riskesdas data (2013) the incidence of DM in Indonesia increased from 1.1% to 2.1% compared to 2007. the increasing of DM prevalence in Ternate City reached 2971 cases, the number of female patient is 1777 cases and male is 1194 cases. A very high increase in diabetes mellitus will certainly be followed by an increased likelihood of chronic complications due to poor control of diabetes mellitus. According to Soegondo et al (2010) there were 1785 people with diabetes mellitus in Indonesia who experienced complications of neuropathy (63.5%), retinopathy (42%), nephropathy (7.3%), macrovascular (6%), microvascular (6%), and diabetic feet (15%). Evidence shows that complications of diabetes can be prevented with optimal glycemic control. Optimal glycemic control is control of glucose concentration in the blood and HbA1c (glycosylated hemoglobin). Treatment of diabetes can be said to be successful if glucose in the blood 2 Postprandial hours is <200 mg / dL (Perkeni, 2011). Therefore, management of DM is needed to stabilize blood sugar levels in DM patients. According to Perkeni (2011) there are several treatments for treating DM patients including education, medical nutrition therapy, physical exercise, and pharmacological interventions. There are several treatments for people with diabetes mellitus, for example by controlling blood sugar levels, checking of blood sugar routinely, taking hypoglycemic drugs, mild physical exercising, adhering to low-calorie diits (Colberg, 2010). Health care in people with diabetes mellitus consists of education, medical nutrition therapy, physical exercise, and pharmacological interventions, which are collaborative management of various inter-profession. Management of diabetes mellitus begins with education to change the lifestyle and behavior of patients. The education provided includes understanding of the course of DM disease, the importance of controlling and monitoring DM, complications and risks, pharmacological and non-pharmacological interventions (Sari, 2017). Physical exercise can burn energy in the body so that excess energy in the body will be stored in the form of fat in the body (Arovah et al, 2013). Based on the research results of Yoga et al. (2011) it was found that respondents who did physical activity / exercise regularly and well had a significant relationship to the successful management of type 2 DM (p = 0,002). Nutritional management in DM patients is directed to achieve the goal of providing all essential food elements (eg vitamins, minerals), meeting energy needs, achieving and maintaining the appropriate body weight, preventing blood glucose level fluctuations every day by seeking near normal blood glucose levels by means of - safe and practical way and reduce blood fat levels if this level increases (Brunner & Suddart, 2002). Not only physical problems, however, people with type 2 diabetes can also affect psychological, social, and economic conditions. The psychological impact of stress and anxiety on DM disease can affect the stability of blood glucose levels. Therefore, the role of the family is very important in giving support (Aini et al, 2011). Families tend to be involved in decision-making and therapeutic processes at each stage of healthy and sick family

members from a state of well-being to the stages of diagnosis, therapy, and recovery (Roddy et al 2010). Research in the field of family health clearly shows that families have a big influence on the physical health of family members (Campbell dalam Friedman, 2010). Family support is the attitude, action and family acceptance of patients who are sick. Support can come from other people (parents, children, husbands, wives or siblings) who are close to patients where the form of support can be in the form of information, certain behavior or material (Ali, 2009). Support that can be given to people with diabetes mellitus are emotional support, assessment, instrumental and financial (Friedman, 2010). This is in line with the research by Tamara et al (2014), about the relationship between family support and the quality of life of patients with type two diabetes mellitus in RSUD Arifin Ahmad, Riau province, from the results of the study showed that there is a relationship between family support and quality of life of patients with type two diabetes mellitus at Arifin Ahmad Hospital, Riau Province. Therefore, to maintain the stability of blood sugar levels of people with type 2 diabetes in the normal range, the combination of the implementation of health care and family support therapy must be applied together.

## 2 METHOD

This type of research is Quasi experimental (quasi-experimental) using research design Posttest Only Control Group Design. This design uses a treatment group and a control group, where all patients perform fasting blood glucose tests and blood sugar 2 hours post-prandial the treatment group was the group given management of health care and family support therapy, while the control group was not treated. Thus the results of treatment can be known more accurately, because it can compare with the situation before being given treatment in two groups of subjects (Sugiyono, 2017). The study was conducted in the diabetes center and Kalumata Health Center in Ternate City. The sample size was 12 respondents in the treatment group and 12 respondents in the control group. The collected data was then processed using statistical programs with logistic regression techniques and independent t-test and paired t-test. Data collection techniques were carried out by checking fasting blood glucose

## 3 RESULT

### 3.1 Age of Respondents

*Table 1. Respondents Age Frequency Distribution*

| age (Years) | Group | | | | Total | |
|---|---|---|---|---|---|---|
| | treatment | | control | | | |
| | n | % | n | % | n | % |
| 45 - 55 | 6 | 50 | 6 | 50 | 12 | 50 |
| 56 – 65 | 5 | 42 | 5 | 42 | 10 | 42 |
| 66 – 75 | 0 | 0 | 1 | 8 | 1 | 4 |
| 76 – 85 | 1 | 8 | 0 | 0 | 1 | 4 |
| Total | 12 | 100 | 12 | 100 | 24 | 100 |
| Average (SD) | 56,91 (9,61) | | 55 (6,59) | | | |

Table 1 shows the average age of the treatment group (56.91 years) higher than the average age of the control group (55 years).

### 3.2 Respondents Job

***Tabel 2.*** *Distribution of Respondents job Frequency*

| Job | Group | | | | Total | |
|---|---|---|---|---|---|---|
| | Treatment | | control | | | |
| | n | % | n | % | n | % |
| housewife | 6 | 50 | 9 | 75 | 15 | 63 |
| government employees | 6 | 50 | 2 | 17 | 8 | 33 |
| Enterpriser | 0 | 0 | 1 | 8 | 1 | 4 |
| Total | 12 | 100 | 12 | 100 | 24 | 100 |

Based on table 2 shows that the job of respondents in the treatment group as housewives are 50%, government employees are 50% and 0% enterpriser. Meanwhile, the control group 75% of people work as housewives, 17% as government employess and 8% as enterpriser.

***Table 3.*** *Average of Respondent Fasting Blood Sugar Levels*

| Blood sugar levels | Group | | | | Total | |
|---|---|---|---|---|---|---|
| | Treatment | | control | | | |
| | n | % | n | % | n | % |
| ≤ 125 | 12 | 100 | 0 | 0 | 12 | 50 |
| ≥ 126 | 0 | 0 | 12 | 100 | 12 | 50 |
| Total | 12 | 100 | 12 | 100 | 24 | 100 |

### 3.3 Blood Sugar Levels

Table 3. It can be seen, the average fasting blood glucose of the treatment group, 100% have normal fasting blood glucose levels. While in the control group, 100% have abnormal fasting blood glucose. This shows that the treatment group has good fasting blood glucose and all the control group respondents had a hyperglycemic with fasting blood glucose ≥ 126 mg / dl.

***Table 4.*** *Average blood sugar 2 hours post-prandial of Respondents*

| Blood sugar levels | Group | | | | Total | |
|---|---|---|---|---|---|---|
| | Treatment | | control | | | |
| | n | % | n | % | n | % |
| ≤ 199 | 12 | 100 | 2 | 17 | 14 | 58 |
| ≥ 200 | 0 | 0 | 10 | 83 | 10 | 42 |
| Total | 12 | 100 | 12 | 100 | 24 | 100 |

Table 4. It can be seen the average blood sugar 2 hours post-prandial of the treatment group is 100% ≤ 199 mg / dl (normal). While in the control group 17% had blood sugar 2 hours post-prandial levels ≤ 199 mg / dl (normal). This shows that the treatment group had good blood sugar 2 hours post-prandial levels and most of the control group respondents experienced hyperglycemic with blood sugar 2 hours post-prandial ≥ 200 mg / dl.

### 3.4 Data Analysis

Analysis of the different test of the two groups after treatment of the implementation of health care and family support for fasting blood sugar using the independent t-test. The results of the analysis are presented in table 5 below:

***Table 5**. fasting blood glucose analysis using independent t-test*

| Variable | Average | Significance / p Value |
|---|---|---|
| Treatment group | 110,11 | 0,000 |
| Control group | 163,23 | |

Based on Table 5 above shows that the results of probability analysis (Sig.) Are 0,000. Because of the probability (Sig.) 0,000 <0,05, then H0 is rejected. This means that there are significant differences between the results of the treatment group and the control group. Based on the results of the processing, it can be concluded that the results of the blood sugar levels of the two groups had a significant difference.

***Table 6**. fasting blood glucose analysis using independent t-test*

| Variable | Average | Significance/ p Value |
|---|---|---|
| Treatment group | 159,87 | 0,006 |
| Control group | 225,05 | |

Based on Table 6 shows that the results of the analysis using independent samples t-test found that the significance value is 0.006 (p <0.05). This means that there are differences in blood sugar 2 hours post-prandial DM patients in the treatment group given health care and family support therapy with the control group. Based on the results of the processing, it can be concluded that the results of the 2-hour postprandial blood sugar levels of both groups had a significant difference.

***Table 7** Analysis of the Weight of the Treatment Group Using the Paired t-test*

| Variable | average | Significance/ p Value |
|---|---|---|
| body weight in the pretest group | 61,02 | 0,000 |
| body weight in the Post test group | 60,29 | |

Based on Table 7 the weight of the treatment group, it was found that the significance value was 0,000, meaning that there were differences in pretest and posttest weight. This shows that there is an effect of health care and family support therapy on the reduction in weight loss in the treatment group.

***Table 8** Weight Analysis of Control Groups Using Paired t-test*

| Variable | average | Significance/ p Value |
|---|---|---|
| body weight in the pretest group | 58,53 | 0,163 |
| body weight in the Post test group | 58,63 | |

Table 8 interpreted that the significance value was 0.163. This shows that there was no difference in pretest and posttest weight in the control group.

## 4 DISCUSSION

This study aims to determine the effectiveness of the implementation of health care and family support therapy for blood sugar levels in patients with Type II diabetes in Diabetes Center and Kalumata Health Center Ternate City in 2018. The results showed that the number of respondents aged 45-55 years are 6 people, 56-65 years are 5 people and 76-85 is 1 person. meanwhile, for the control group respondents who are 45-55 years old were 6 people, 56-65 years old are 5 people and 66-75 are 1 person. With the average age of the treatment group (56.91 years) higher than the average age of the control group (55 years). This shows that people with type II diabetes are more at the elderly. In accordance with the statement Purba et al (2017) stating that the prevalence of DM will increase with age. According to Mahendra, et al (2008) also states that aging is one of the causes of type 2 diabetes mellitus because the pancreatic beta cells begin to shrink continuously which causes reduced insulin secretion and the sensitivity of the receptors also decreases. Based on table 2 shows that the job of respondents in the treatment group as housewives are 50%, government employees are 50% and 0% enterpriser. Meanwhile, the control group 75% of people work as housewives, 17% as government employees and 8% as enterpriser. This means that in the treatment group 50% of government employees suffered diabetes mellitus and in the control group, 17% of government employees suffered diabetes mellitus. The type of job of someone influences knowledge related to diabetes mellitus and the motivation of respondents to maintain blood sugar stability. it is because the job as a government employees has better knowledge to realize the importance of maintaining blood sugar stability And co-workers as a place to share knowledge about handling diabetes mellitus both pharmacologically and non-pharmacologically. According to Irawan (2010) the higher the level of education of someone with a better job will affect the level of knowledge, where someone with a higher level of knowledge will be able to maintain their health. The results showed that the average fasting blood glucose of treatment group, 100% had normal fasting blood glucose levels. While in the control group, 100% had abnormal fasting blood glucose. This shows that the treatment group had good fasting blood glucose and all the control group respondents had a hyperglycemic with fasting blood glucose ≥ 126 mg / dl. his means that the implementation of health care and family support therapy is effective for stabilizing fasting blood glucose in patients with type II DM.

The gene-environment interaction in Western countries indicates that with urbanization access to food and its content may lead to induction of epigenetic alterations and identify the gene Sirtuin 1 (Sirt 1) to be responsible for the increased risk for insulin resistance and NAFLD relevant to Type 1, Type 2 and Type 3 diabetes in these countries(martin 2016)

The research conducted by Lafata (2013) states that regular control of fasting blood sugar levels has a significant relationship with blood sugar levels in DM patients. The more routine the patient does physical exercise, diet and drug compliance that is supported by family support, the fasting blood sugar levels will be better. The results showed that the mean treatment group blood sugar 2 hours post-prandial was 100% ≤ 199 mg / dl (normal). meanwhile, in the control group 17% had blood sugar 2 hours post-prandial levels ≤ 199 mg / dl (normal). This shows that the treatment group had good 2-hour postprandial blood sugar (GD2PP) levels and most of the control group respondents experienced hyperglycemic with GD2PP ≥ 200 mg / dl. according to Rachmawati (2015) states that by controlling blood sugar levels regularly, the value of blood sugar levels will become more controlled. Furthermore, by monitoring blood sugar levels regularly, it can be a warning

alarm for DM patients so that patients will be more vigilant on subsequent checking if their blood sugar levels are poor. Based on the results of the study of analysis of fasting blood glucose levels using the Independent sample T-test it was found that the significance value was 0,000 (p <0.05). This means that there are significant differences in fasting blood glucose levels between the treatment group and the control group. In this study the treatment group given management of health care and family support therapy was better than the control group on the results of blood sugar levels in patients with Type II DM. This is evidenced by the average fasting blood glucose level in the normal range (≤ 125 mg / dl) compared to the control group. This means that the management of health care and family support therapy is effective for decreasing blood sugar levels in patients with type II diabetes mellitus. The results of the blood sugar 2 hours post-prandial analysis is found that the significance value was 0.006 (p <0.05). This means that there is a significant difference in postprandial 2 hour blood sugar levels (GD2PP) between the results of the treatment group and the control group. So that it can be said that the management of health care and family support therapy is effective in reducing blood sugar levels 2 hours postprandial in patients with type II diabetes mellitus. This study focuses on managing health care in people with diabetes mellitus such as education (health education), physical exercise, diet and pharmacological therapy. From the results of the 2 analysis, it was proved that there were significant differences in blood sugar levels in both fasting blood glucose and blood sugar 2 hours post-prandial levels in the treatment and control groups. This shows that health care and family support therapy is effective for blood sugar levels in patients with type II diabetes. Active involvement of the respondents of Diabetes Melitus and family in each intervention has a contribution in maintaining blood sugar levels under normal conditions. The implementation of health care and family support therapy has the goal of maintaining blood sugar levels in the body to remain within normal limits and overcome various kinds of complaints that are often experienced by people with diabetes and avoid complications. The results of this study are in line with the results of research by Yoga (2013) that the success of managing type 2 DM are supported with education, exercise regularity, dietary patterns and compliance with medication, and the most influential factors are regular exercise or physical exercise. Rustam (2008) also showed that there was a relationship between diet, exercise habits, family support, and health education on blood sugar levels in DM patients. The quality of life of people with DM is influenced by several factors such as physical health, psychological conditions, family support and the environment. According to the Public Health Agency of Canada (2011) explained that various changes occuring in physical, psychological, social and environmental aspects affect the quality of life of people with DM. This can happen if DM patients carry out a combination of health care and get family support. According to Ardyana (2014) the status of blood glucose in patients with DM is not only influenced by one of the handling factors but all treatments such as diet, exercise, education and drug use. This is also in accordance with the study of Istikharoh et al. (2015) that there were significant differences between the treatment group and the control group which meant that family assistance was effective against the level of independence of stabilize blood sugar levels of respondents. Awareness of DM patients that they are able to carry out life attitudes is a sign that patients will adhere to the treatment given and will affect the quality of life of patients (Rose et al, in Astuti, 2011). Bodyweight is one of the parameters seen in the treatment management of patients with diabetes mellitus. The results of this study indicate that there were differences in pretest and posttest weight in the treatment group (p <0.05). This is in line with research conducted by Selfi et al (2018) about the effect of education on diet and exercise on blood sugar levels in Type II DM sufferers, that there is a decrease in body weight in the intervention group. This is also supported by Sutiawati (2013), which is a positive effect on knowledge, frequency of independent blood glucose monitoring, dietary habits self-reported, and glucose control with follow-up can effectively improve glucose control, and education that involves collaboration with patients having a more effective impact in improving patient's blood glucose control and weight loss. Education followed by physical activity is needed to provide benefits for the body because exercise can lower blood pressure, maintain body weight, increase body strength and control blood sugar (Listiana et al, 2015).

## 5. CONCLUSION

Based on the results obtained from this study, it can be concluded that the implementation of Health care and family support therapy is effective against decreasing blood sugar levels in fasting blood glucose and blood sugar 2 hours post-prandial levels in patients with type 2 diabetes with a difference test using the Independent t-test. DM patients to be able to carry out self-care at home such as routine blood sugar checks, regular exercise at least 2-3 times a week and light walks up to 6000 steps every day, obedient in managing diit DM so that blood sugar levels in the body remain stable.

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