CHEPTER I

INTRODUCTION

1.1 Background

Diabetes mellitus (DM) is one of the non-communicable diseases that is still a problem in Indonesia. DM is a condition of high blood sugar levels caused by unstable blood sugar levels in people with diabetes (International Diabetes Federation, 2017). DM not only be overcome with pharmacological therapy, but must be followed by non-pharmacological therapy, one of which is self-management (Hidayah, 2019). Self management is an integral part of DM control. Self management can describe individual behaviour that is carried out consciously, universally, and limited to oneself (Handriana & Hijriani, 2020). So that self-management can help blood glucose levels become stable (normal).

Based on the world prevalence related to DM International Diabetes Federation (IDF) in 2017, the number of people with Diabetes Mellitus aged 20-79 years was 425 million people, and it is estimated that there will be an increase in 2045 at the age of 20-79 years as many as 629 million people. The prevalence of people with diabetes mellitus in Indonesia increased by 1.6% from 6.9% in 2013 to 8.5% in 2018. In East Java people with diabetes mellitus also increased in 2018, from 2.1% in 2018. 2013 to 2.6% in 2018 (Riskesdas, 2018). In Banyuwangi, there were 41,965 people with diabetes mellitus in 2019, and at the Klatak Health Center it took the first position with 1,737 people with diabetes mellitus (Dinkes, 2019). According to data from the Klatak Health Center in 2021, there were 346 DM patients who routinely took

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treatment at the Klatak Health Center with blood sugar levels of more than 200 mg/dL.

Risk factors for type 2 diabetes mellitus include age, physical activity, body mass index (BMI), blood pressure, stress, lifestyle, family history, cholesterol, gestational diabetes, history of glucose disorders and other disorders (De Graaf et al, 2016). Uncontrolled and untreated diabetes mellitus can lead to complications. The main complications that can arise are usually heart attack, kidney failure, stroke, and gangrene. This complication can affect any individual who suffers from type 1 or type 2 diabetes mellitus. Self-management includes five aspects including diet, exercise, blood sugar monitoring, medication adherence, and foot care. Self management, if done properly, can stabilize the blood sugar levels of people with diabetes.

DM management basically begins with eating arrangements with adequate physical exercise for some time (2-4 weeks). If after that the blood glucose level still cannot meet the desired metabolic target level, then pharmacological intervention is carried out with oral antidiabetic drugs or insulin injections as indicated. In conditions of severe metabolic decompensation, example ketoacidosis, DM with severe stress, rapid weight loss, insulin can be given immediately. In certain circumstances, anti-diabetic drugs can also be used according to indications and doses according to the doctor's instructions. Monitoring blood glucose levels if posible can be done alone at home, after receiving special training for it. Management of diabetes patients is in the form of a comprehensive approach that includes medical care,

psychosocial care, lifestyle changes, education, continuous monitoring, and self-management.

Self-management is an individual's ability to manage daily life, control and reduce the impact of the illness he or she suffers from. In relation to diabetes, self-management is the basis of diabetes treatment and is very important in preventing complications. Self Management that can be given to patients according to the Consensus on the Management and Prevention of Type 2 Diabetes Mellitus with a focus on glucose control, namely diet, physical exercise, and medication/insulin (Galuh & Prabawati, 2021). Efforts to control risk factors for type 2 Diabetes mellitus are called CERDIK actions, namely by carrying out: 1) Regular health checks to control weight, check blood pressure, blood sugar, and cholesterol regularly, 2) Stay away from cigarette smoke and do not smoke. smoking, 3) Diligently doing physical activity for at least 30 minutes a day, 4) A balanced diet by consuming healthy food and balanced nutrition, 5) Adequate rest and, 6) Manage stress properly and correctly (Kemenkes, 2017).

Self-management of Diabetes Mellitus in the literature review, Self-management of Type II DM patients at the Tarogong Health Center, DM self-management is an action taken by DM patients to manage and control DM which includes activities, diet (diet), exercise, blood sugar monitoring, drug control and foot care. The goal of self-management is optimizing the control of metabolism in the body, preventing acute and chronic complications, optimizing quality patient's life and reduce the cost of treatment / treatment of DM. In this study, almost all respondents with type II DM 97.1% did moderate

self-management. These results are not in accordance with research (Putri et al and Hung et al 2016) where the self-management behavior of type 2 DM patients is in the good category. Based on the background of the problem above, the researcher is interested in conducting research on The Correlation Between Self Management Level and Blood Glucose in Type 2 Diabetes Mellitus at Klatak Community Health Center In 2022.

1.2 Problem Formulation

How is Based on the above background, the researchers formulated the problem: Is there study The Correlation Between Self Management Level and Blood Glucose in Type 2 Diabetes Mellitus at Klatak Community Health Center in 2022.

1.3 The Objective of Study

Based on the above problem formulation, the objectives to be achieved in this research are:

1.3.1   General Aim

To find out of The Correlation Between Self Management Level and Blood Glucose in Type 2 Diabetes Mellitus at Klatak Community Health Center in 2022.

1.3.2   Specific Aim

1. Identified the Self Management Level in patients with Type 2 Diabetes Mellitus at Klatak Community Health Center in 2022.

2. Identified the Blood Glucos in patients with Type 2 Diabetes Mellitus at Klatak Community Health Center in 2022.

3. Anazlyzed The Correlation Between Self Management Level and Blood Glucose in Type 2 Diabetes Mellitus at Klatak Community Health Center in 2022.

1.4 Expected Result

Based on the research objectives to be achieved, the expected results of this research are:

1.4.1 Theoretical

Develop knowledge in the field of health, especially nursing science and can provide knowledge and become input for further research.

1.4.2 Practical

1. Respondent

Increase knowledge, experience and add skills for future researchers in research The Correlation Between Self Management Level and Blood Glucose in Type 2 Diabetes Mellitus.

2. Researchers

Provide references for research and increase knowledge to respondents about The Correlation Between Self Management Level and Blood Glucose in Type 2 Diabetes Mellitus.

3. Science and Technology

Add library material and as a consideration for similar research to manage the stress for online learning readiness problem.

4. Community

Be a literature to increase Self Management in Type 2 Diabetes Mellitus.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview of Diabetics

2.1.1 Definition of Diabetics

Diabetes mellitus is the collective term for heterogeneous metabolic disorders whose main finding is chronic hyperglycaemia. The cause is either a disturbed insulin secretion or a disturbed insulin effect or usually both (Petersman Astrid, 2019).

Type 2 diabetes mellitus (DMT2) is an innovative metabolic disease characterized through ordinary insulin secretion and usage. DM is characterised through a growth in blood sugar levels because of a lower or absence of production in the pancreas which could manage blood sugar levels (Anzani, 2019).

2.1.2 Classification

Diabetes mellitus is classified into 4 types, including type 1 diabetes, type 2 diabetes, gestational diabetes, and types of diabetes as follows:

1. DM type 1

    Type 1 diabetes is a condition in which people with diabetes are very dependent on insulin. In type 1 diabetes, the pancreas does not produce insulin, or there is insufficient insulin, so the patient must inject insulin externally. Type 1 diabetes is an autoimmune disease that causes damage to pancreatic cells due to disorders of the patient's immune system or immune system. To

support exercise and a good diet, you must inject insulin, otherwise people with type 1 diabetes will fall because their blood sugar levels are too high (Tandra, 2017). Most people with this type of DM have been diagnosed at a young age. Generally, when they have not reached the age of 30 years, therefore diabetes mellitus is often referred to as diabetes that begins at a young age (juvenile-ondet diabetes) (IDF, 2015).

2. DM type 2

In type 2 diabetes, the pancreas causes an increase in blood sugar. Another diabetes directive is insensitive body tissues and muscle cells. Approximately 90-95% of resistant diabetes (insulin resistance) suffer from type 2 diabetes. In type 2 DM, screening is mandatory at the age above 45 years. The recommended screening is blood glucose examination and HbA1c test (Wijoyo, 2017).

3. DM during pregnancy

Diabetes during pregnancy is defined as diabetes that only occurs during pregnancy or in pregnant women with high blood sugar levels. Pregnant women with this condition are at risk of developing type 2 diabetes later in life (Tandra, 2017). Gestational Diabetes Mellitus (GDM) occurs in the first trimester (Wijoyo, 2017). Insulin will be secreted by pancreatic cells, women with a history of gestational diabetes have defects in pancreatic cell function. In gestational diabetes, an oral glucose tolerance test (OGTT) is definitive between the 24th and 28th weeks of gestation,

but for high-risk women it should be performed early in pregnancy (Einstein, 2016).

4. Other types of DM

Another type of diabetes or secondary diabetes is diabetes caused by another disease. Secondary diabetes occurs after a disease that interferes with insulin production or affects insulin action (Tandra, 2017).

2.1.3 Risk Factors

1. Family history

A child can inherit the gene that causes diabetes from a parent. Usually, someone who suffers from DM family members are also affected by the disease (Uswatun, 2017). The fact shows that those who have a mother with DM have a 3.4-fold higher risk of developing DM and a 3.5-fold higher risk if they have a DM-affected father. If both parents suffer from DM, the potential for developing DM is 6.1 times higher (Isrofah, 2015).

2. Obesity

Obesity is one of the determinant factors that cause the occurrence of (NIDDM), about 80% is a problem of overweight or obesity. Overweight or obesity requires a lot of insulin for the body's metabolism (Ministry of Health, 2014). Obesity can make cells insensitive to insulin (insulin resistance). The fatter tissue in the body, the more resistant the body is to insulin action,

especially when body fat accumulates in the central or abdominal area (central obesity) (Sari, 2018).

3. Age

    The older the age, the higher the risk of developing type 2 diabetes mellitus. Type 2 diabetes occurs in middle-aged adults (ADA, 2015). Factors that are at risk of suffering from Type II Diabetes Mellitus are age above 30 years, after a person reaches the age of 30%, blood glucose levels rise 1-2 mg% each year when fasting and will rise to 6-13% after 2 hours after eating (Damayanti, 2015). While some say that insulin resistance usually occurs at the age of 65 years (Kemenkes, 2014).

4. Blood pressure

    In general, people with diabetes mellitus also suffer from hypertension and someone who suffers has high blood pressure, which is around 140/90 mmHg (Damayanti, 2015). Hypertension is the occurrence of a persistent increase in blood pressure in two measurements with an interval of five minutes during conditions of sufficient rest/quiet where the systolic blood pressure is more than 140 mmHg and the diastolic blood pressure is more than 90 mmHg. Increased blood pressure in the long term and not detected early can cause kidney failure, coronary heart disease and stroke (Kemenkes, 2014).

5. Physical activity

Sedentary or inactive behavior is an important risk factor for death, chronic diseases, one of which is diabetes, and disability (Affisa, 2018). Lack of activity in Diabetes Mellitus patients can cause insulin resistance in type II DM (Damayanti, 2015). because by doing this activity can control blood sugar levels.

6. Cholesterol levels

Abnormal levels of blood lipids are closely related to obesity and type II diabetes. One of the predisposing mechanisms is the rapid release of free fatty acids from an enlarged visceral fat. This process accounts for the high circulation of free fatty acids in the liver. To extract and bind insulin is reduced and this can lead to hyperinsulinemia. Another result is an increase in gluconeogenesis where glucose in the blood increases. The effect of the two free fatty acids is an inhibitor of glucose uptake (Damayanti, 2015).

7. Stress

The first reaction is the stress response, which secretes the sympathetic nervous system to release norepinephrine, which can result in an increase in heart rate. This condition causes the condition of glucose in the blood to increase. If stress persists, it will involve the pituitary hypothalamus. The hypothalamus secretes corticotropin releasing factor which stimulates the anterior pituitary to produce adrenocortrocotopric hormone

(ACTH) and then stimulates the anterior pituitary to produce glucocorticoids. Especially cortisol. Increased cortisol affects the increase in blood through gluconeogenesis, protein and fat catabolism (Damayanti, 2015).

8. Alcohol and Cigarettes

Changes in lifestyle are associated with an increase in the frequency of type 2 diabetes, although most of this increase is associated with an increase in obesity and diabetes reduction of physical inactivity, other factors associated with changes from the traditional environment to western environments which include changes in alcohol and cigarette consumption, also play a role in increasing type 2 diabetes. Alcohol will interfere with blood sugar metabolism, especially in people with diabetes, this is will make it difficult to regulate blood sugar and increase blood pressure. A person will increase blood pressure if he consumes more than 60 ml of ethyl alcohol / day which is equivalent to 100 ml of proof whiskey, 240 ml of wine or 720 ml (Fatimah, 2015).

9. History of Gestational Diabetes

This type of diabetes is common in pregnant women who fail to maintain normal blood glucose levels. The risk factors for gestational diabetes are family history, obesity and glycosuria. This type of diabetes is found in 2-5% of the population of pregnant women. Usually the blood sugar will return to normal

after giving birth, but the risk of the mother getting type 2 diabetes in the future is quite large (Damayanti, 2015).

10. Lifestyle

Lifestyle is a person's behaviour that is shown in daily activities. Fast food, irregular exercise and drinking soft drinks are one of the lifestyles that can trigger diabetes mellitus (ADA, 2015).

11. Unhealthy diet

Unhealthy dietary behaviours are lack of exercise, suppress appetite and often eat fast food (Sari, 2018).

2.1.4 Signs and Symptoms

Some common symptoms that can be caused by DM, according to Rudijanto (2015):

1. Excretion of urine (Polyuria)

Polyuria is a condition where the volume of air in 24 hours exceeds the normal limit. Polyuria arises as a symptom of Diabetes Mellitus because sugar levels in the body are relatively high so that the body is unable to break it down and tries to excrete it through urine. This symptom of passing urine is more common at night and the urine excreted contains glucose.

2. Thirst arises (Polydipsia)

Polydipsia is where excessive thirst that arises because glucose levels are carried away by the urine so that the body responds to increase fluid intake

3. Feeling hungry (Polyphagia)

Patients with Diabetes Mellitus will usually feel hungry and weak, this is because the level of glucose in the blood is quite high while the glucose in the body is running out.

4. Weight loss

Weight loss in Diabetes Mellitus patients is caused because the body is forced to take fat as an energy reserve, which is why weight gain occurs.

While the symptoms of diabetes mellitus are divided into 2, namely acute and chronic according to Fatimah (2015):

1. Symptoms of acute diabetes mellitus are:

a) Polyphagia (a lot of eating)

b) polydipsia (drink a lot)

c) Polyuria (lots of urine/frequent urination at night), increased appetite but rapid weight loss (5-10 kg in 2-4 weeks), tired easily.

2. Symptoms of chronic diabetes mellitus are:

a) tingling,

b) the skin feels hot or like being pricked by a needle,

c) numbness in the skin

d) cramps,

e. tired,

f) easy,

g) blurred vision,

h) teeth are easy to lose and easy to come off,

i) decreased sexual ability even in men impotence can occur,

j) in pregnant women often miscarriage or fatal death in the womb or with babies born weighing more than 4 kg.

2.1.5 Pathophysiology

Diabetes mellitus is a disease with disturbances in the metabolism of carbohydrates, proteins and fats because insulin cannot occupation optimally, the amount of insulin that does not meet the needs or both. Metabolic disorders can occur due to 3 things, namely first due to damage to pancreatic beta cells due to external influences such as chemicals, viruses and bacteria. The second cause is a decrease in glucose receptors in the pancreas gland and the third is due to damage to insulin receptors in peripheral tissues (Fatimah, 2018).

Insulin, which is secreted by pancreatic beta cells, regulates blood glucose levels in the body. High blood glucose levels will stimulate pancreatic beta cells to secrete insulin. Pancreatic beta cells that do not function optimally resulting in a lack of insulin secretion are the cause of high blood glucose levels. The causes of pancreatic beta cell damage are numerous, such as autoimmune and idiopathic diseases (Hanum, 2016).

Impaired metabolic response to insulin action is called insulin resistance. This situation can be caused by receptor, pre-receptor and post-receptor disorders so that more insulin is needed than usual to

maintain normal blood glucose levels. Insulin sensitivity to lower blood glucose by stimulating the use of glucose in muscle and fat tissue and suppressing glucose production by the liver decreases. The decrease in sensitivity also causes insulin resistance so that glucose levels in the blood are high (Prabawati, 2016).

High blood glucose levels then result in a filtration process that exceeds the maximum transport. This situation causes glucose in the blood to enter the urine (glucosuria) resulting in an osmotic diuresis characterized by excessive urine output (polyuria). The amount of fluid that comes out causes a sensation of thirst (polydipsia). Glucose is lost through urine and insulin resistance causes a lack of glucose to be converted into energy, causing increased hunger (polyphagia) to compensate for energy needs. Patients will feel easily tired and sleepy if there is no compensation for these energy needs (Hanum, 2016)
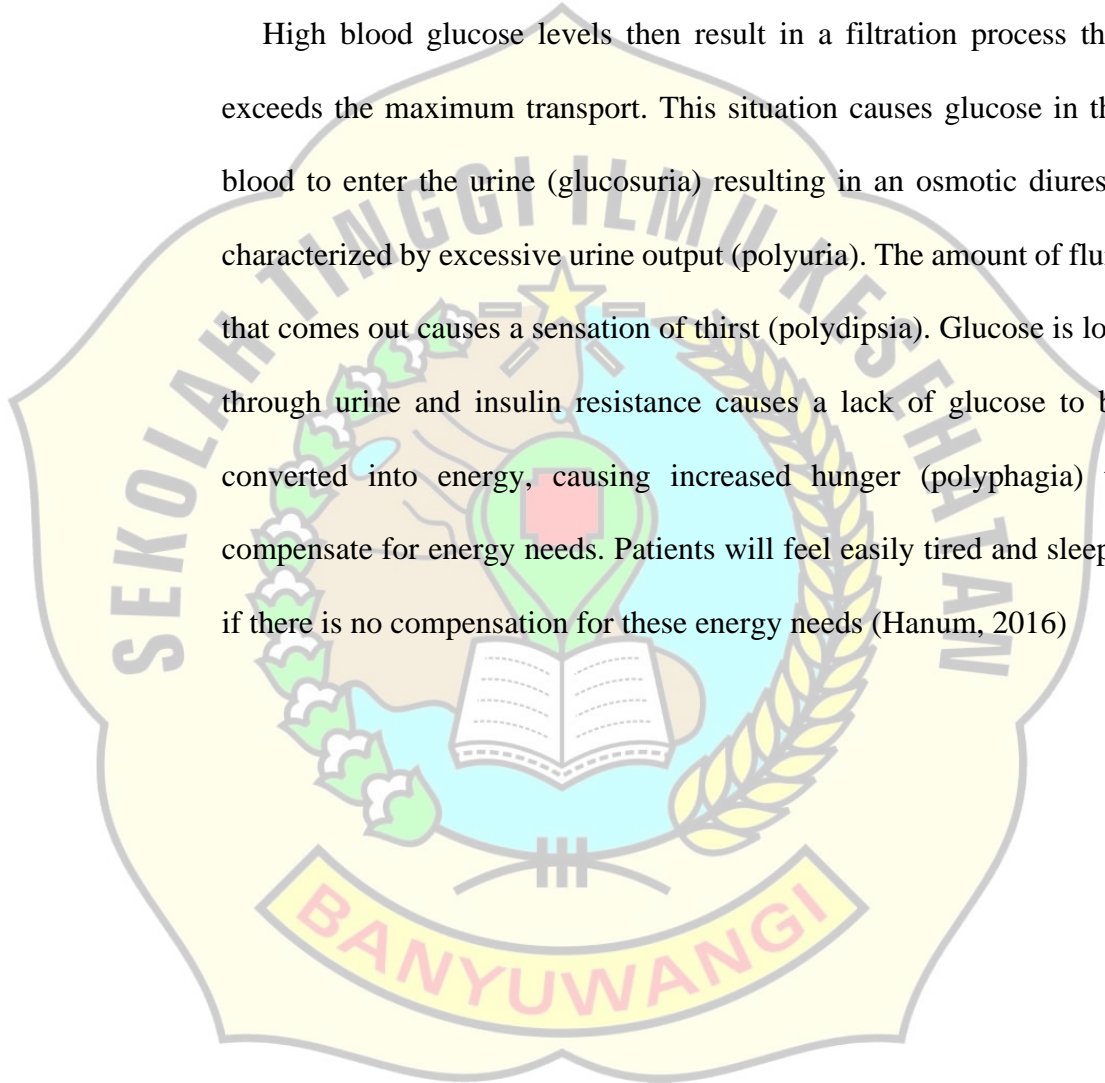
2.1.6 Prevention

Prevention of diabetes mellitus according to Fatimah (2018) is divided into four parts, namely:

1. Primordial Prevention

   Primordial prevention is an effort to provide conditions in the community that allow disease not to get support from habits, lifestyles and other risk factors. This precondition must be created with the multiparter. primordial prevention in DM, for example, is to create preconditions so that people feel that the consumption of western food is a bad diet, a relaxed lifestyle or lack of activity, and obesity is not good for health.

2. Primary Prevention

   Primary prevention is an effort aimed at people belonging to high risk groups, namely those who have not suffered from DM, but have the potential to suffer from DM, including:

   a. Old age group (>45 years old)

   b. Overweight (BW(kg)>120% ideal body weight or BMI>27 (kglm2))

   c. High blood pressure (>140i90mmHg)

   d. DM family history

   e. Pregnancy history with birth weight > 4000 g.

   f. Dyslipidaemia (HvL Triglyceride>250mg/dl).

   g. Ever had TGT or impaired fasting blood glucose (GDPT)

For primary prevention must be exposed to the factors that influence the onset of DM and efforts to eliminate these factors. Accordingly it is very important in this prevention. An understanding of the importance of regular physical activity, patterns and types of healthy food should be instilled from an early age to keep the body from being too fat, and the risks of smoking for health.

3. Secondary Prevention

Secondary prevention is an effort to prevent or inhibit the emergence of complications by early detection and providing treatment from the beginning of the disease. In the management of DM patients, from the beginning it must be watched out and as much as possible prevented the possibility of chronic complications.

4. Tertiary Prevention

Tertiary prevention is an effort to prevent further disability and rehabilitate patients as early as possible, before the disability persists. Holistic and integrated health services between related disciplines are needed, especially in referral hospitals, for example experts from fellow disciplines such as experts in heart disease, ophthalmology, medical rehabilitation, nutrition and others.

2.1.7   Management of Diabetes Mellitus

According to the Consensus of the Indonesian Endocrinology Association (Perkeni, 2015) there are four pillars of controlling type 2 Diabetes mellitus, namely as follows:

1. Education

Education is a form of promotive effort with the main goal of changing a healthy lifestyle. Comprehensive education and efforts to increase motivation are needed to provide knowledge about the patient's condition and create positive behaviour changes. As well as increasing knowledge about self-monitoring of blood glucose, signs and symptoms of hypoglycaemia and how to deal with it should be given to patients.

2. Medical nutrition therapy

Medical nutritional therapy is part of total diabetes management. The principle of food regulation for people with diabetes is almost the same as eating recommendations for the general public, namely a balanced diet and in accordance with the calorie and nutritional needs of each individual. It's just that in diabetic patients it is necessary to emphasize the importance of regular eating in terms of meal schedules, types, and amounts of food, especially in patients taking blood glucose-lowering drugs or insulin. The main diet of Diabetes mellitus patients is the restriction of complex carbohydrates and fats and increased fiber intake.

3. Physical exercise

    Physical exercise in the form of daily physical activity and regular exercise 3-4 times a week for 30 minutes. Physical exercise in addition to maintaining fitness is also proven to lose weight and improve insulin sensitivity. The recommended physical exercise is aerobic exercise such as walking, leisurely cycling, jogging, and swimming. Physical exercise is adjusted to age and health status. In addition, before doing physical exercise, it is recommended to check blood sugar first.

4. Self management for Diabetic Mellitus

    Self management is an integral part of diabetes control. For example, in many cases patients are advised to maintain a healthy diet and exercise to keep glucose levels under control. Self management can describe individual behaviour that is carried out consciously, universally, and limited to oneself. Diabetes self-management is an action taken by individuals to control diabetes including treatment and prevention of complications. Several aspects that are included in diabetes self-management are regulation of diet (diet), physical activity/sports, blood sugar monitoring, drug consumption compliance, and foot care (Wahyuni, 2020). The application of optimal self-management in diabetic patients can help in increasing the achievement of goals in the management of Type 2 DM. Therefore, patient compliance/discipline is needed in implementing

diabetes self-management in order to improve the patient's quality of life (Hidayah, 2019).

Pharmacological therapy is given along with diet and physical exercise. Therapy in the form of insulin injections and oral hypoglycaemic drugs, including metformin and beclamide. Metformin is a biguanide drug that occupations to increase insulin receptor sensitivity. In addition, metformin also prevents gluconeogenesis, thereby lowering blood glucose levels. The duration of action of metformin is 8 hours, so it is given 3 times a day or every 8 hours. Metformin is used to keep glucose levels under control (Wicaksono, 2015).

Gribbenclamide is a sulfonyl urea group which has the main effect of increasing insulin secretion by pancreatic beta cells and is the main choice for patients with normal or underweight. The use of sulfonylurea drugs is more effective in controlling sugar levels 2 hours after eating (Wicaksono, 2015).

2.1.8 Complications

Uncontrolled diabetes can cause complications, and here the complications of diabetes mellitus according to Fatimah (2018) are divided into 2, namely chronic complications and acute complications according to:

1. Acute complications

    a. Hypoglycaemia

        Hypoglycaemia is a person's blood glucose levels below normal values (< 50 mg/dl). Hypoglycaemia is more common in

people with type 1 DM which can be experienced 1-2 times per week. Blood sugar levels that are too low cause brain cells to not get an energy supply so that they do not function and can even be damaged.

b. Hyperglycaemia

Hyperglycaemia is when blood sugar levels rise suddenly, it can develop into a dangerous metabolic state, including diabetic ketoacidosis, Non-Ketotic Hyperosmolar Coma (KHNK) and chemotactic acidosis.

c. HHNK syndrome (nonketotic hyperosmolar hyperglycaemic coma)

HHNK syndrome is a complication of diabetes mellitus which is characterized by severe hyperglycaemia with serum glucose levels of more than 600 mg/dl (Perkeni, 2015).

2. Chronic complications

a. Macrovascular complications,

Complications in large blood vessels in DM patients are coronary heart disease and stroke.

b. Coronary heart disease

Complications of coronary heart disease in patients with diabetes mellitus are caused by ischemia or myocardial infarction which is sometimes not accompanied by chest pain or is called SMI (silent myocardial infarction).

c. cerebrovascular disease

Patients with DM have a 2-fold risk compared to non-DM patients for cerebrovascular disease. Symptoms that are caused resemble those of acute complications of DM, such as complaints of dizziness or vertigo, visual disturbances, weakness and slurred speech.

3. Microvascular complications,

a. Damage to the retina of the eye (retinopathy)

Damage to the retina of the eye is a microangiopathy characterized by damage and blockage of small blood vessels (Perkeni, 2015).

b. Nerve damage (diabetic neuropathy)

Nerve damage is the most common complication found in DM patients. Neuropathy in DM threatens a group of diseases that attack all types of nerves (Perkeni, 2015).

2.1.9 Diagnosis of type II DM

The diagnosis of DM is made on the basis of examination of blood glucose levels. The recommended blood glucose examination is the enzymatic examination of blood glucose with venous blood plasma material. For the purpose of monitoring the results of treatment can be done using a capillary blood glucose test. For the purpose of monitoring the results of treatment, it can be done using a capillary blood glucose examination (Drecoli, 2019).

The diagnosis of DM can be established through venous blood examination with an enzymatic system with the results of Drecoli (2019):

1. Classic symptoms + GDP 126 mg/dl

2. Classic symptoms + GDS 200 mg/dl

3. Classic symptoms + GD 2 hours after OGTT 200 mg/dl

4. No classic symptoms + 2x Examination of GDP 126 mg/dl

5. No classic symptoms + 2x GDS examination 200 mg/dl

6. No classic symptoms + 2x GD examination 2 hours after OGTT 200 mg/dl

7. HbA1c 6.5%

2.1.10 Definition of Blood Glucoses

Blood sugar levels are an increase after eating and a decrease in the morning after waking up. Blood sugar in the body increases above normal when a person experiences hyperglycaemia, while hypoglycaemia is when there is a decrease in blood sugar values below normal (Perkeni, 2015). The highest level is reached one hour after eating normally does not exceed 180 mg per 100 cc of blood (180 mg / dl), if more than this number the kidneys can not hold sugar and the excess will be excreted along with the urine. It can be toxic and can also cause weakness and lead to complications and other metabolic disorders. If you can't get enough energy from sugar, the body will process other substances, namely fat and protein (Desita, 2019). An increase in blood sugar levels can cause narrowing of all blood vessels. As a result, the organs of the body wither and their functions experience a decline (Noviyanti, 2015).

2.1.11 Checking Blood Glucoses

There are several types of blood sugar tests, including:

1. Random blood sugar levels (GDS)

Checking blood sugar levels when is regular blood sugar checks, without fasting and eating conditions. This check done 4 times a day before eating and before going to bed so that it can be done independently (Andreassen LM, 2014). Checking blood sugar levels when not describe long-term DM control (blood sugar control for approximately 3 months). Normally the results of checking random blood sugar levels ranged from 80-144 mg/dL (Tandra, 2013).

2. Fasting blood sugar (GDP) test

This GDP test is done after the client does not consume anything except drinking water for 8 hours and is carried out in the morning before breakfast ADA (2014) in (Rahayu, 2018). Because fasting is required, patients are asked not to eat and drink in the middle of the night and fasting blood sugar checks are considered a reliable test for diagnosing diabetes (ADA, 2015). The patient does not eat or drink for 8-10 hours.

Result	Fasting blood Glucose level
Normal	<100 mg/dl
High	100-125 mg/dl
Low	>126 mg/dl

Table 2.1 Blood Glucoses

Classification of fasting blood glucose (GDP) levels in DM patients (ADA, 2015).

3. HbAIc. Tes

   HbA1c is a substance formed from the reaction between glucose and haemoglobin (the part of red blood cells that carries oxygen to all parts of the body). The higher the blood sugar level, the more haemoglobin molecules there are. The amount of HbA1c that is formed depends on the level of glucose in the blood so that the results of the HbA1c examination can describe the average sugar level of DM patients within 3 months and the HbA1c examination can also be used to assess the quality of DM control because the results of the HbA1c examination are not influenced by food intake, drugs, as well as sports so that it can be done at any time without any special preparation (Rachmawati, 2015). In this HbAIc test, it is used to control blood sugar levels in DM patients and measure it on average in the last 2-3 months. (Rahayu, 2018).

Result	Level HbAIc
Normal	≤5,7%
High	5,7-6,4
Low	Same or more 6,4%

Table 2.2 Blood Glucoses Classification of HbAIc levels in DM patients (ADA, 2015).

4. Blood glucose 2 hours post prandial

   This examination is carried out or calculated when the patient is 2 hours after the patient finishes eating (Ekasari, 2018). After consuming 75 grams of glucose dissolved in 300 mL of water.

2.1.12 Benefits of Checking Blood Glucose Levels

Diabetes Mellitus Control is done to monitor blood sugar levels. In addition, monitoring results are used to assess the benefits of treatment for Diabetes mellitus patients and are also used in adjusting diet, exercise and drugs, so that blood sugar levels in Diabetes mellitus patients remain within normal limits and avoid hyperglycemia and hypoglycemia (Ekasari, 2018).

2.2 Overview of Diabetes Self Management

2.2.1 Definition of Diabetes Self Management

Self management is an integral part of diabetes control. For example, in many cases patients are advised to maintain a healthy diet and exercise to keep glucose levels under control. Self management can describe individual behavior that is carried out consciously, universally, and limited to oneself. Diabetes self-management is an action taken by individuals to control diabetes including treatment and prevention of complications. Several aspects that are included in diabetes self-management are regulation of diet (diet), physical activity/sports, blood sugar monitoring, drug consumption compliance, and self/foot care. Implementation of optimal self-management in diabetic patients can help in increasing the achievement of goals in the management of Type 2 DM. Therefore, patient compliance/discipline is needed in implementing diabetes self-management in order to improve the patient's quality of life. Self-management is useful for developing skills faced by patients to increase self-confidence. Skills and knowledge can determine the best management for himself. Diabetic patients easily

experience stress in carrying out a diet program, so the way the patient handles stress when undergoing a diet affects their success in complying with the diet program and controlling blood sugar levels. It is hoped that it will minimize the occurrence of complications, both acute and chronic. DM patients who are on a diet experience high levels of stress (Handriana & Hijriani, 2020).

2.2.2 Benefits of Self-Management

The goals of self-management in DM patients are to control blood glucose, reduce long-term DM complications, and optimize quality of life. DM self-management is considered as the foundation of the overall DM management (G. Kisokanth, 2016). Self-management is useful for developing skills faced by patients to increase self-confidence. Skills and knowledge can determine the best management for himself (Yusnita, 2021).

2.2.3 Aspects of Self-management

Several aspects are included in diabetes self-management as follows (Windani et al., 2019):

1. Eating arrangements (diet)

This regulation is very important because its goal is to maintain normal blood sugar, maintain insulin receptor sensitivity, avoid or manage it. Assist customers in improving their metabolic control with these eating habits. People with diabetes mellitus are advised to consume nuts, vegetables, fresh fruits such as papaya and kedondong and carbohydrates such as apples, tomatoes and salak. It

is not recommended to eat fruits that are too sweet such as sapodilla, oranges, pineapple, durian, jackfruit and small round fruit. The principle of controlling diet in people with diabetes mellitus is the same as the recommended diet for the general public. Rigment diet is based on the consensus on the management and prevention of type 2 DM, which is to determine how many calories are needed, for example considering the basic calorie needs of 25-30 calories/kg ideal body weight plus or minus depending on several factors (Endrawati, 2020).

a. Carbohydrates

The recommended carbohydrate is 45-65%, the total limit of carbohydrates is <130 g/day is not recommended and the fibrous must contain carbohydrates. Sugar is allowed in spices so that it can be the same as the others but should not exceed 5%.

b. Fat

The recommended fat intake is 20-25% and should not exceed 30%. Saturated fat is less than 7% of the requirement. Less than 10% polyunsaturated fat. The recommended cholesterol is <300 mg/day.

c. Protein

Protein contributes 10-20% of your total energy intake, and good sources of protein are seafood, lean meat, skinless chicken, low-fat dairy, beans, tofu and tempeh. People with kidney

disease should reduce 0.8 g/kg per day or 10% of their needs and 65% have a biological value.

d. Sodium

The recommended nutritional intake is the same as for the general population, which is less than 300 mg or 6-7 g of a teaspoon of salt.

e. Fibber

Diabetics are encouraged to eat foods that are sufficient in fibber and the recommended fibbers consumption is ±25 g/10001 kcal/day.

f. Alternative sweetener

When used, sweeteners are divided into 2, namely nutritional sweeteners and non-nutritive sweeteners. When used nutritious sweeteners must consider the number of calories. Fructose is not recommended for diabetics because its side effects on fat are severe.

2. Sports

Doing good and regular exercise increases the flow to the muscles by opening the capillaries (the opening of small blood to the muscles), and this lowers blood pressure in the muscles which in turn increases the supply in the muscle tissue itself. Thus, will reduce carbohydrate metabolism disorders in people with diabetes mellitus, thereby lowering blood glucose levels. Acutely the effect of exercise is to reduce plasma glucose levels and reduce tissue energy storage,

besides that it can also develop insulin sensitivity and glycaemic control, without losing weight and with exercise it is also expected to lose weight in type 2 DM sufferers. Physical activity is estimated to cause oxygen and energy consumption to increase about 20 times, so that the use of glucose can also be used in large quantities without the need for insulin. This is thought to be because muscle fibres become more permeable to glucose due to contraction of the muscle itself. In patients with diabetes mellitus, physical exercise is a very important program in preventing the occurrence of diabetic complications, because by exercising, glucose is widely used by muscles to move actively, and glycogen in the liver is used to meet glucose in the body, so that blood glucose levels remain stable or decreased (selfi, 2018).

Exercise increases muscle glucose intake and also increases insulin use, which lowers blood sugar levels. Exercise can also improve blood circulation and tone. Physical exercise for DM sufferers is the same as any other physical exercise. The principles that must be met are the frequency must be 3-5 times per week, the intensity, the duration is 30-60 minutes, the types of sports are cycling and swimming (Endrawati, 2020). In doing sports, several things must be considered, namely blood sugar levels should be in the range of 100-300 mg/dl if you are more worried about ketosis. The types of sports that are recommended such as:

a. Endurance training

b. Continuously for 30-60 minutes

c. Rhythmic and also regular like walking or running

d. Fast and slow alternating non-stop

e. Done step by step

Patients with type 2 diabetes mellitus will reduce insulin resistance and glucose production from the liver, while also reducing stress. physical exercise. There are several things that need to be considered according to Endrawati (2020):

a. Preheating heating 5-10 minutes

b. Heart rate conditioning reaches target heart rate

c. Cooling is recommended for DM patients to cool down after exercising

d. Stretching aims to release and bend tense muscles to keep them elastic.

3. Blood sugar monitoring

The expected target is, for fasting blood glucose between 72 – 125 mg/dl, and 2 hours after eating between 90 – 180 mg/dL. DM patients are recommended to have their blood sugar checked once a month, but if the blood sugar is more than 200 mg/dl, the doctor recommends the control patient to the polyclinic for 2 weeks. Blood sugar checks are carried out on the initiative of doctors, not patient awareness, so it can be said that self-management in monitoring blood sugar levels in DM patients.

4. Medication adherence

The content contained in anti-diabetic drugs such as sulvunilurea derivative drugs can help the absorption of glucose in the blood as well as biguanides to inhibit the process of glucose formation (Milda, 2019).

5. Foot care

For people with DM, foot care is very important because foot disorders are the most common problems resulting in patients having to be treated, amputated or disabled for life (Sonsona, 2014).

2.2.4   Factors for self-management of diabetes Mellitus

The following are factors that can influence self-management behaviour:

1. Demographic Factors

Demographic factors consist of age, gender, and marital status. As age increases, the prevalence of DM and impaired glucose tolerance increases. This happens because of the aging process that takes place after the age of 30 years which results in anatomical, physiological, and biochemical changes in the body that affect homeostasis. One of the organs undergoing changes is the beta cells of the pancreas which produce the hormone insulin. If there is a disruption in hormone secretion or inadequate use of glucose, it will have an impact on increasing blood sugar levels. Age is associated with Type 2 DM, in the elderly there is an increase in blood sugar levels due to insulin resistance caused by decreased activity, changes in diet, and decreased neurohormonal

function (Kusniawati, 2017). Men have better self-management than women. Especially in doing regular physical activity, men do better. Meanwhile, women are more obedient in following the recommended diet and are very concerned about complications that may occur (Baumann, Opio, Otim, Olson, & Ellison, 2016).

2. Socio-cultural characters

Socio-cultural characters include education level, socioeconomic level, and religion or spirituality). Higher education levels provide wider opportunities to access information compared to lower levels of education. In addition, better economic conditions have an impact on better self-management of DM patients (Rafiyah et al., 2016).

3. Social support

Good social support is associated with high self-management behaviour. Social netoccopations give patients a strong feeling and provide opportunities to talk about healthy lifestyles (Mehammedsrage, 2019).

4. Disease-related factors

Disease-related factors consist of duration of disease, type of DM, and complications that arise. The effect of disease-related factors on self-management is not significant, but some complications have a negative relationship in problem solving. This may be due to the many complications that will have a negative impact on the patient's physical condition and behaviour,

so that there are more problems that need to be resolved. Individuals with type 1 diabetes are reported to exhibit better self-management activities than patients with type 2 diabetes. In addition, DM sufferers with a longer duration of illness have a positive correlation with self-management activities, seen from the experience aspect and the change from feeling sick to feeling alive like other people (Mehammedsrage, 2018).

5. Confidence in the effectiveness of therapy In order to increase the success of treatment, it is necessary to have confidence from the patient that the therapy is able to control the disease and prevent complications that may occur (Skinner, John, & Hampson, 2016).

6. Psychological status Anxiety and depression have a relationship with self-management. Anxiety and depression are psychological states associated with somatic, emotional, cognitive, and behavioural components that have a negative impact on mental status and behaviour (Udlis, 2017).

2.2.5 Diabetes Self Management Level Assessment Instrument

The data collection tool for self-care behaviour uses the Summary of Diabetes Self-Care Activity (SDSCA) questionnaire developed by Toobert, Hampson & Glasgow (2000) and has been translated and modified by Kusniawati (2011). This questionnaire consists of 14 questions related to diabetes self-care activities in type 2 DM clients which include diet (diet regulation), physical exercise, blood sugar monitoring, drug use and foot care. This instrument consists of 8

alternative answers, namely 0 days to 7 days. Favourable questions consist of 12 questions, namely on questions 1-4 and 7-14, the value given is a value of 0 never doing, a value of 1 doing in 1 day, a value of 2 doing in 2 days, a value of 3 doing in 3 days, a value of 4 dos in 4 days, 5 does in 5 days, 6 does in 6 days, 7 does in 7 days. For the unfavourable questions number 5 and 6, the score given is a score of 7 that has never done it, a value of 6 did it in 1 day, a value of 5 did it in 2 days, a value of 4 did it in 3 days, a value of 3 did it in 4 days, a value of 2 did it in 3 days. 5 days, value 1 commits in 6 days, value 0 commits in 7 days.

The respondent's score is obtained by adding up the scores of all questions. From these results can be categorized into 3 groups as follows:

A. Low : 0-32

B. Medium: 33-65

C. Hight : 66-98

Table 2.3 Questionnaire Summary of Diabetes Self-Care Activity (SDSCA)

Indicator	Favorable	Unfavorable	Total
Diet	1,2,3,4	5 dan 6	-
Sports/Physical Activity	7,8	-	-
Blood Sugar Level Check	9	-	-
Drug Use	10	-	-
Foot Care	11,12,13,14	-	-
Total	12	2	14

2.2.6   The Effect of Self Management on Blood Glucose

Self- management in diabetes mellitus, namely glucose management which includes checking blood sugar, use of drugs, and controlling blood glucose is needed so that the blood sugar of diabetes mellitus patients remains stable and does not cause complications, diet control which includes choosing foods that facilitate blood glucose control, avoiding Excess food is needed by diabetic patients so that nutritional intake is still fulfilled but does not interfere with the stability of blood sugar in diabetes mellitus patients or make it easier for patients to control blood sugar, and comply with dietary recommendations, physical activity which includes regular physical activity, and physical activity planning is needed so that the physical condition of patients with diabetes mellitus stay healthy and facilitate glucose control, the health care used includes programs designed to achieve normal blood sugar and doctor's appointments, and self-care is needed so that diabetes mellitus patients know and are able to take care safely themselves (Schmitt A, 2014).
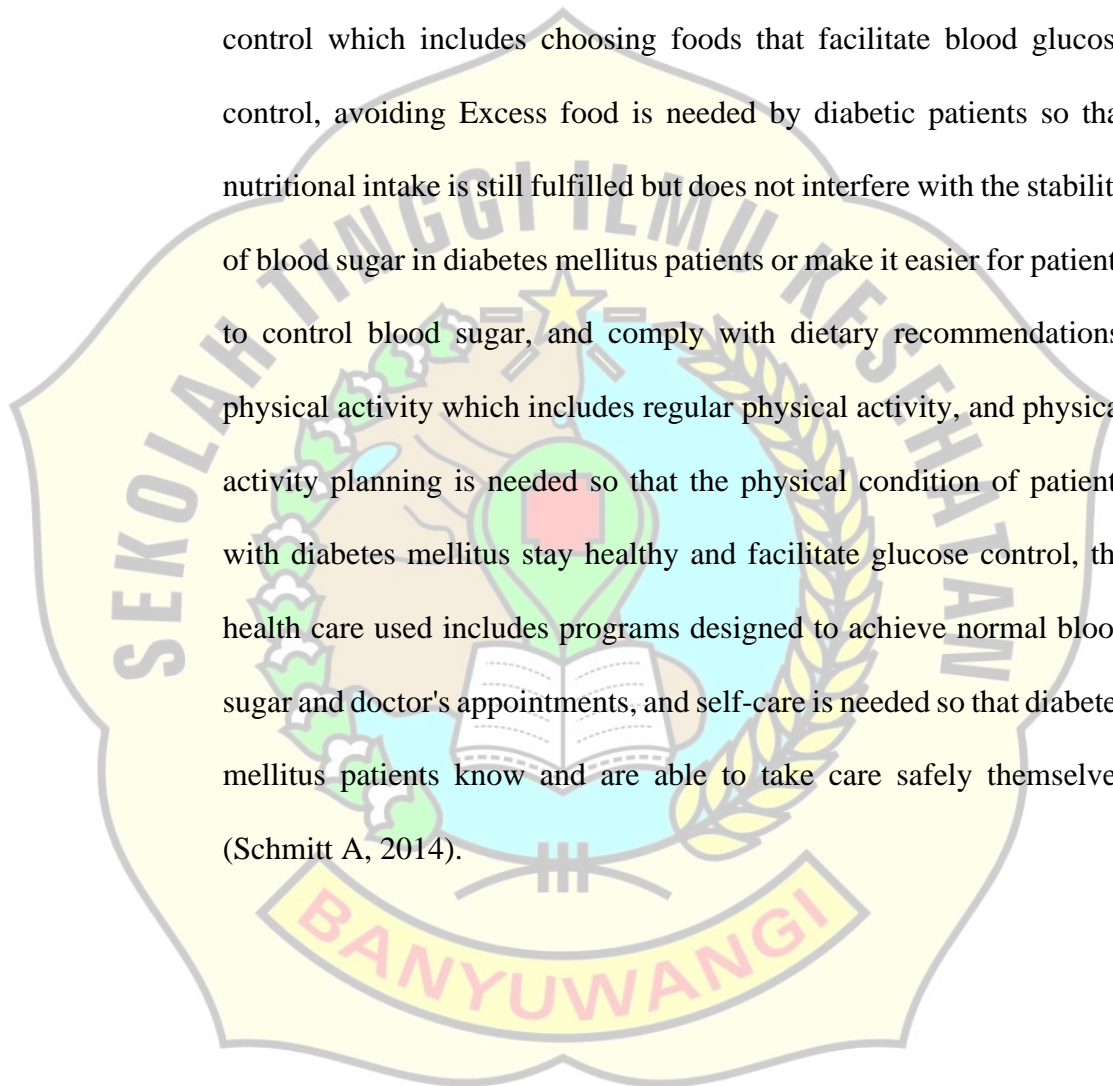
2.3 Synthesis Table

Table 2.4 Synthesis Table

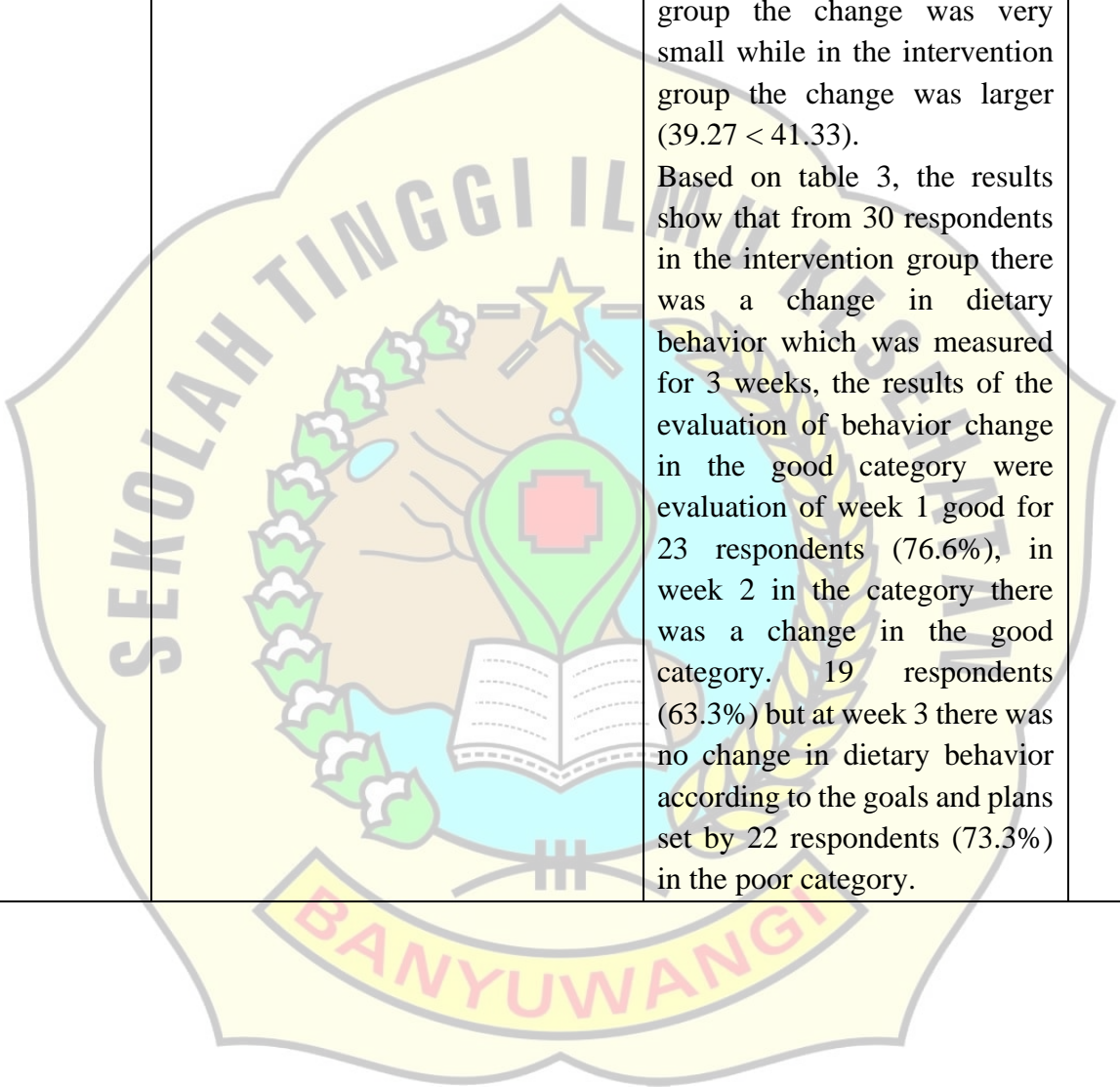| Number	Title, Author, and Year	Method (Design, Sample, Variable, Instrument, Analysis)	Result	Conclusion
	The Effect of Self Management on Control of Blood Sugar Levels in Patients with Type II Diabetes Mellitus in the UPTD Diabetes Center, Ternate City (Yusnita & Rosmila Tuharea, september 2021)	**Design**: Quasi Experiment, Non-Equivalent Groups Pretest-Posttest **Sample:** *n*: 31 respondents **Variable**: The Independent Variable in this study is Control of Blood Sugar Levels, The dependent variable in this study is Self Management **Instrument**: 1.) Stress data obtained through interview method using PSS 2). Self Management data, which measures blood sugar control, diet, exercise or physical activity and medication adherence using the DSME (Diabetes Self Management Education) questionnaire. **Data analysis:** Pared test Sample t test, Uji Wilcoxon Test	Based on table 3, it can be seen that the blood sugar examination prior to self-management training in the uncontrolled category had a higher presentation than the controlled category with a presentation of 51.6%. Meanwhile, after the training, the results showed that the controlled category had the highest distribution compared to the controlled category with a presentation of 54.8%.	There is no difference in blood sugar control before and before being given blood sugar control self management training, the results of the sig value (2 tailed) 0.100> 0.05.

Relationship of Family Support to Self Management and Blood Sugar Levels in Diabetes Patients (Laurentia Galuh & Dewi Prabawati, 1 April, 2021)	**Design**: quantitative cross-sectional, **Sample:** *n*: 60 respondents **Variable**: The Independent Variable in this study is self management and blood sugar levels, The dependent variable in this study is family support **Instrument**: Hensarling Diabetes Family Support Scale, Diabetes Self-management Questioners and glucometer **Data analysis:** chi-square test	Table 2 explains that respondents with good self-management on average have good family support (70%) while poor self-management tend to have poor family support (83.3%). The results of the chi square statistical test analysis obtained p value = 0.000 which indicates that there is a relationship between family support and self-management Based on table 3, it is known that respondents with normal blood sugar levels on average have poor family support (50.0%), while respondents with blood sugar checks when they are more than normal have good family support (53.3). %). Statistical tests showed that there was no relationship between family support and	Based on the results of the research obtained there is a meaningful relationship between family support with self- management (p value 0.00), but not there is a family support relationship with blood sugar levels (p value >0.05) in Roworejo Village Health Center, Lampung.

			blood sugar levels with p value > 0.05.	
	Overview of Self-Management in Type II Diabetes Mellitus Patients at Tarogong Public Health Center, Garut Regency (Citra Windani, M. S, Mohammad Abdul, Z. S, Udin Rosidin, 1 Maret 2019)	**Design**: quantitative descriptive **Sample:** *n*: 138 respondents **Variable**: self-management in patients with type 2 diabetes mellitus **Instrument**: Diabetes Self-Management Instrument (DSMI) **Data analysis:** frequency distribution based on variable question items.	This study was conducted in an effort to find "Self-management description in Type 2 Diabetes Mellitus Patients at Tarogong Health Center, Garut Regency." Self-management behavior based on diet was in the good (14.5%), moderate (48.6%), bad (37.0) categories. %) for self-management behavior based on treatment in good category (44.2%), moderate (16.7%), bad (39.1%), self-management behavior based on physical exercise in good category (1.4%), moderate (98.6%), and none is bad, Self-management behavior based on blood sugar monitoring is in the good (16.7%), moderate (50.0%), bad (33.3%) and self-behavior categories. -	The results of this study show that self-management in type 2 DM patients in Tarogong Garut Health Center in general is self-management behavior in aspects of diet, exercise, blood sugar monitoring, foot care that still need to be improved again.

		management based on foot care. in the good (4.3%), moderate (94.9%), bad (7%) categories.	
The Relationship between Self-Management Behavior and Blood Glucose Level in Diabetes Mellitus Type 2 Patients in Pucang Sewu Health Center, Surabaya (Milda Hidayah, 2019)	**Design**: cross sectional approach **Sample:** *n*: 79 respondents **Variable**: self-management on diabetes Type 2 Diabetes mellitus patient **Instrument**: SDSCA (The Summary of Self Care Activities) questionnaire developed by the General Service Administration (GSA) Regulatory Information Service Center (RISC). **Data analysis:** chi-square test	The research found that some respondents had a good level of self-management (59.5%). In several aspects such as settings of diet, and medication compliance, most respondents were included in the good category, but in physical activity/ exercise, self/foot care, and monitoring of blood sugar aspect were still in the less category. In addition, most of the respondents had normal blood glucose levels (50.6%).	The results of this study show that The application of diabetic self-management behavior can be affects blood sugar levels in diabetic patients type 2 Mellitus in The Occupationing Area of Pucang Sewu Health Center Surabaya. The majority of respondents had a good level of diabetic self-management but in there are still some aspects of this. Which falls into the lesser category.
Self Management of Diabetes Mellitus Patients with Cardiovascular Complications and Its Implications for Clinical Indicators	**Design:** correlation **Sample:** n: 123 respondents **Variable:** The Independent Variable in this study is self management and blood sugar levels, The dependent variable in this study is family support	In this study, low self-management was mostly found in DM patients who had blood sugar, cholesterol and blood pressure results that were higher than the target. Further analysis also found that	The results showed that most patients have self-management low, especially in the aspect of monitoring. This study also found that patients who have GDS levels (> 200 mg%) significantly have more self-management behavior

	(Titis Kurniawan, Citra Windani Mambang Sari, Iis Aisyah, 2020)	**Instrument:** self-management questionnaire for DM patients (The Summary of Diabetes Self-care Activities (SDSCA) **Data analysis:** descriptive analysis	patients with blood sugar levels > 200 mg% had significantly lower (worse) self-management scores than those with blood sugar levels < 200 mg%.	lower than those who reach the target GDS. Thus, it is important for officer health and the hospital for improve efforts to improve self management which has been carried out on DM patients who have cardiovascular complications, especially in the monitoring aspect. In addition, there is a need further research using measuring instruments who have better psychometric indicators, a wider range of respondents, as well as use of HbA1c levels to assess blood sugar control.
	Diabetes Self Management in Diabetes Mellitus Patients with Diabetic Ulcers at Jagir Health Center Surabaya (Hendro Djoko Tjahjono, 2017)	**Desain**: cross-sectional, **Sample:** n: 50 respondents **Variable**: self management (SMD) in DM patients **Instrument**: SMD questionnaire **Data analysis**: descriptive	Based on table 3, it shows that the respondents have suffered from diabetes mellitus for 1-2 years, 9 people (50%), 3-4 years 4 people (22%), 5-6 years 5 people (28%). According to Fatimah (2016) states that there is a significant relationship between duration of suffering	Research results Smd patients DM is a category of enough as many as 10 people (56%). Health centers and health occopationers can be a means and facilitator for people with DM in improving the ability of SMD through education, promotion

		from DM and diabetes self-management (p-value = 0.02) This study states that the duration of diabetes mellitus causes a person to have poor self-management, where cell damage and functions in the body occur. so it is easy to arise various physical and metabolic disorders.	health periodically and continuously to the patient and also to the family as a patient support system in support of various related matters DM management.
	Self Management With Dietary Behavior Diabetes mellitus Patients In Community Health Center (Syarifah Atika, Mudatsir, Endang Mutiawati, 2019)	**Desain**: cross-sectional, **Sample:** *n*: 60 respondents **Variable**: self management (SMD) in DM patients **Instrument**: SMD questionnaire **Data analysis:** descriptive	Table 2 of the results of the study on the analysis of the effect of self-management between the intervention group and the control group showed a significant difference between the pretest and post-test of the intervention group and the control group before and after self-management was carried out, a smaller mean value showed a better change in behavior, the control group (44.53 < 44.97) in the control	Based on the results of the study, it can be concluded that there is a significant difference in the dietary behavior of DM patients in the intervention group before and after being given a self-management program (p value = 0.01), namely there is an influence of self-management on the dietary behavior of people with diabetes mellitus.

| | | | group the change was very small while in the intervention group the change was larger $(39.27 < 41.33)$.

Based on table 3, the results show that from 30 respondents in the intervention group there was a change in dietary behavior which was measured for 3 weeks, the results of the evaluation of behavior change in the good category were evaluation of week 1 good for 23 respondents (76.6%), in week 2 in the category there was a change in the good category. 19 respondents (63.3%) but at week 3 there was no change in dietary behavior according to the goals and plans set by 22 respondents (73.3%) in the poor category. | |

CHAPTER 3

CONCEPTUAL FRAMEOCCOPATION AND HYPOTHESIS

3.1 Conceptual Frameoccopation

Keterangan:

| | : The variables are researched |

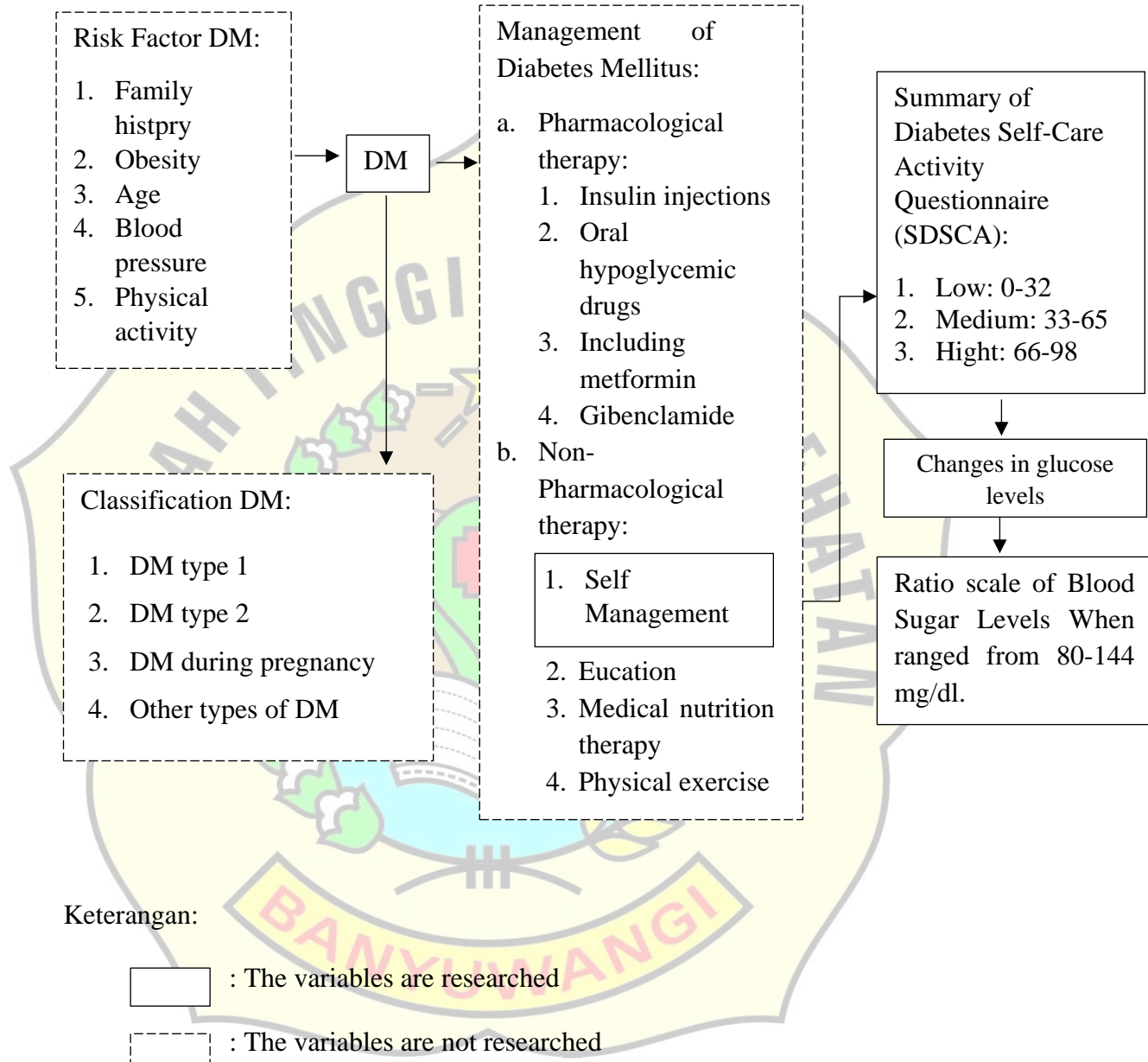| | : The variables are not researched |

Chart 3.1: Conceptual Frameoccopation: The Correlation Between Self Management Level

and Blood Glucose in Type 2 Diabetes Mellitus at Klatak Community Health

Center in Banyuwangi 2022.

3.2 Hypothesis

Hypothesis is a temporary answer to the formulation of the problem for research questions. Hypothesis is a statement of assumptions about the relationship between two or more variables that are expected to answer a question in research (Nursalam, 2016).

The hypothesis in this study is The Correlation Between Self Management Level and Blood Glucose in Type 2 Diabetes Mellitus at Klatak Community Health Center in 2022.

CHEPTER 4

RESEARCH METHODOLOGY

4.1 Type of Research and Research Design

The research design is the final result of a decision stage made by the researcher related to how a research can be applied (Nursalam, 2017).

This type of research is a strategy to achieve the research objectives that have been set and acts as a guide or closure for researchers in the entire research process (Nursalam, 2017). In this study, the type of research used is a correlation study. According to Nursalam, correlational research is research that examines the relationship between variables and aims for researchers to be able to find, explain a relationship, estimate, and test based on existing theories (Nursalam, 2015).

Research design is a strategy used in research that is used to design and identify problems in data collection and is used to define the structure of the research to be carried out (Nursalam, 2016). In this study, researchers used a cross-sectional research design to determine whether or not there was The Correlation Between Self Management Level and Blood Glucose in Type 2 Diabetes Mellitus at Klatak Community Health Center in 2022.

4.2 Frame Occupation

| **Population** |
| There are 346 Diabetes Mellitus at the Klatak Health Center |

↓

| **Sampling Technique** |
| Accidental Sampling |

↓

| **Sample**: 35 Diabetes Mellitus Patients at the Klatak Public Health Center |

↓

| Research Design: Cross Section |

↓

| Informed consent |

↓

| Data collection: The first variable uses a questionaire and the second variable uses a Glucometer |

↓

| Data management and data analysis: Editing, Coding, scoring, tabulating using Rank Spearman using SPSS 25 for windows |

↓

| Research Report |

↓

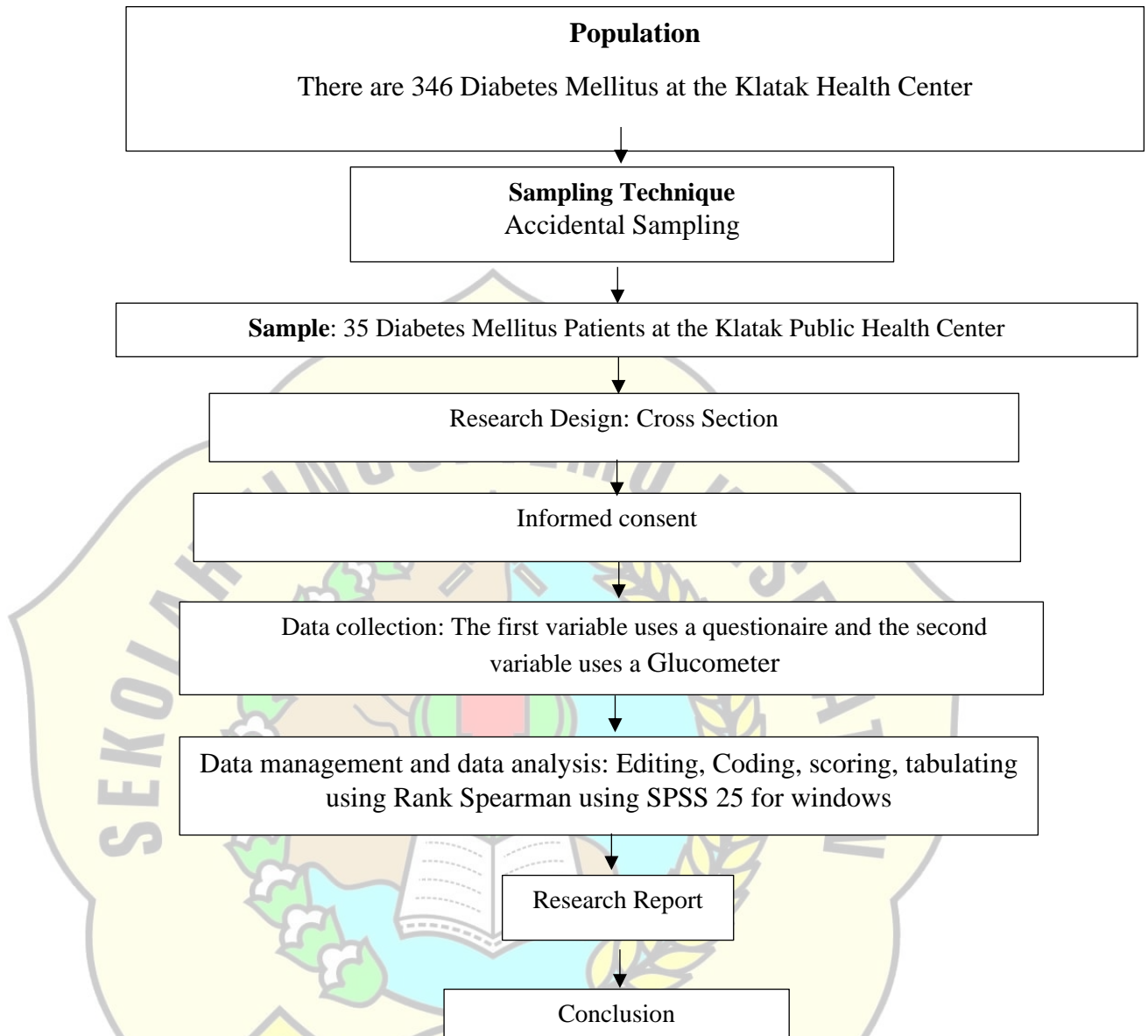| Conclusion |

Figure 4.1 The Correlation Between Self Management Level and Blood Glucose in

Type 2 Diabetes Mellitus at Klatak Community Health Center in 2022.

4.3 Population, Sample and Sampling Technique

4.3.1 Research Population

The population is a subject that meets predetermined criteria (Nursalam, 2016). The population in this study was about 346 people who routinely received therapy at the Klatak Health Center.

4.3.2 Research Sample

Sampling with a population exceeding 100 people can be taken 10-15% or 20-25% of the sample (Arikunto, 2016). Based on the total population as many as 346 people with DM. So the study used 10% of the population calculation, namely as many as 35 DM patients. Sample Criteria are divided into:

a. Inclusion Criteria

Inclusion criteria are general characteristics of research subjects from the target population that are affordable and will be studied (Nursalam, 2016). The inclusion criteria in this study consisted of:

1. Type 2 DM patients recorded at the Klatak Health Center in 2022.

2. Type 2 DM patients who seek treatment at the Klatak Health Center.

3. Type 2 DM patients who are willing to be respondents.

4. The patient is able to perform activities independently.

b. Exception Criteria

Exclusion criteria are eliminating or removing subjects who do not meet the inclusion criteria from the study for various reasons (Nursalam, 2016). The exclusion criteria in this study consisted of:

1. Type 2 DM patients with complications that may interfere with the study (chronic kidney failure, heart failure, visual impairment, etc.)

2. Elderly people with type 2 diabetes mellitus with hearing and memory impairment.

3. Type 2 diabetics who have physical, mental or cognitive limitations that may interfere with research (visual impairment, hearing impairment, mental impairment).

4.3.3   Sampling Technique

Sampling is the process of selecting a portion of the population that can represent the existing population (Nursalam, 2015). Sampling techniques are the methods taken in taking samples, in order to obtain samples that are truly in accordance with the overall research subject (Sastroasmoro & Ismail, 1995 & Nursalam, 2008) (Nursalam, 2015).

The sampling technique used in this research is Non Probability Sampling with a accidental sampling according is a sampling technique based on chance, that is, anyone who coincidentally/incidentally meets a researcher can be used as a sample, if it is seen that the person who happened to be met matches the data source (Sugiyono, 2018).

4.4 Variable Identification

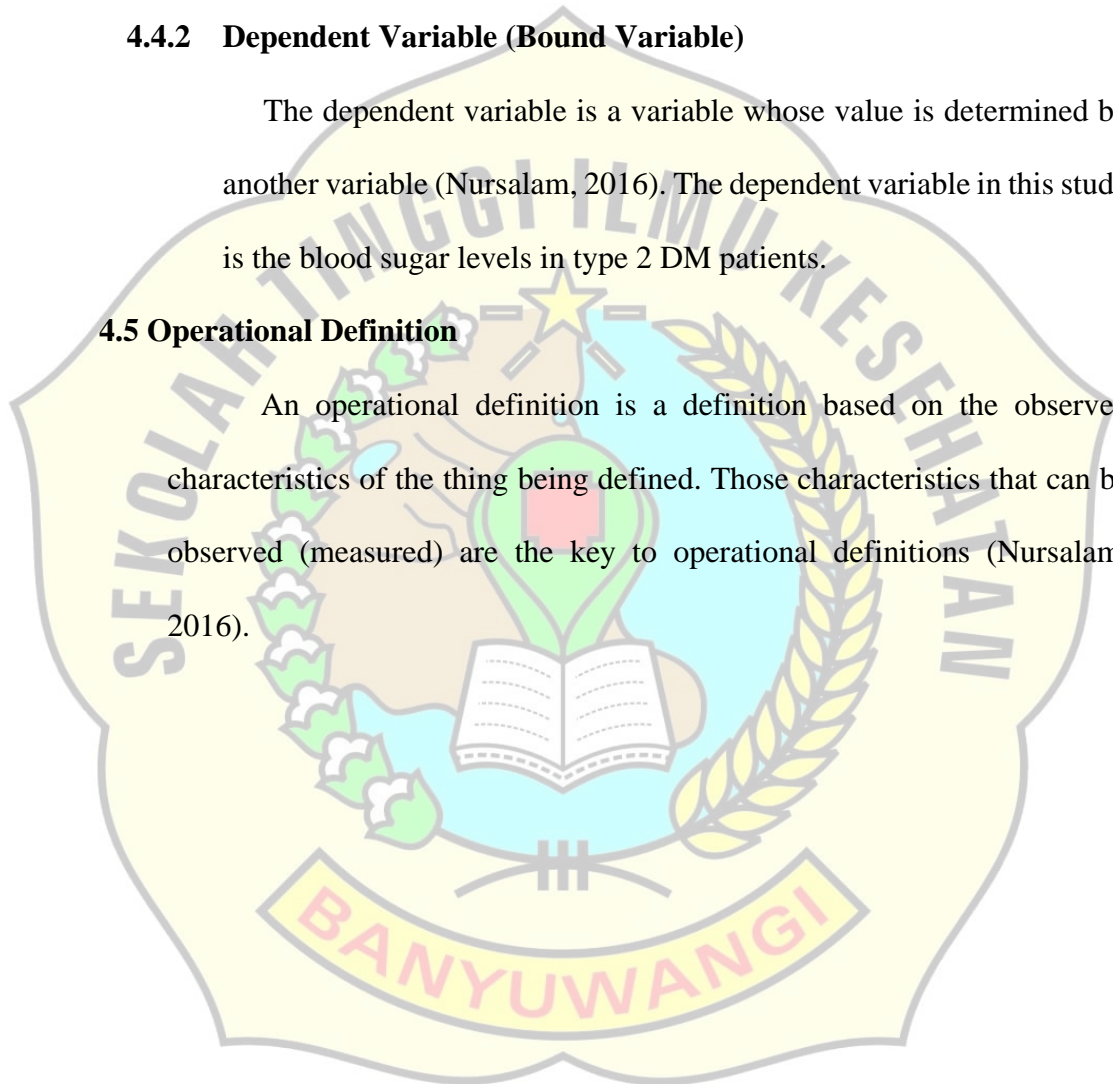### 4.4.1 Independent Variable (Independent Variable)

An independent variable is a variable that affects or its value determines another variable (Nursalam, 2016). The independent variable in this study is self management.

4.4.2 Dependent Variable (Bound Variable)

The dependent variable is a variable whose value is determined by another variable (Nursalam, 2016). The dependent variable in this study is the blood sugar levels in type 2 DM patients.

4.5 Operational Definition

An operational definition is a definition based on the observed characteristics of the thing being defined. Those characteristics that can be observed (measured) are the key to operational definitions (Nursalam, 2016).

No	Variable	Operational definition	Indicator	Measuring instrument	Measuring Scale	Scoring
1.	Independent: Self management	Diabetes self-management is an individual's actions to control diabetes including treatment and prevention of complications.	Aspects of self management: 1. Diet 2. Exercise 3. Blood sugar monitoring 4. Medication compliance 5. Foot care	Summary of Diabetes Self-Care Activity (SDSCA) Questionnaire	Ordinal	Summary of Diabetes Self-Care Activity Questionnaire (SDSCA): Low: 0-32 Medium: 33-65 Hight: 66-98
2.	Dependent: Blood sugar	Blood sugar levels are an increase after eating and a decrease in the morning after waking up. Blood sugar in the body increases above normal when a person experiences	Using Random blood sugar levels. Normal Random blood sugar levels (GDS) are 80-144 mg/Dl.	SOP (Standard Operating Procedure) Glucometer Informed consent	Ratio	The results of the measurement of blood sugar levels in mg/Dl units.

		hyperglycemia, while hypoglycemia is when there is a decrease in blood sugar values below normal.				

Table 4.2 Operational Definition the Correlation Between Self Management Level and Blood Glucose in Type 2 Diabetes Mellitus at the Community Health Center in Klatak in 2022.

4.6 Research Instruments

Research instruments are tools used by researchers to obtain or collect data in solving a research problem (Alfianika, N 2016). The instrument in this study used self-management is Summary of Diabetes Self-Care Activity Questionnaire (SDSCA) and glucometer to assess blood sugar levels in type 2 DM patients.

4.7 Research Location and Time

4.7.1 Research Locations

The place of this research was carried out at the Community Health Center in Klatak.

4.7.2 Research Time

Research Time The research will be conducted on May 11 th – May 23 rd, 2022.

4.8 Data Collection Process

Data collection is a process of approaching the subject and the process of collecting the subject required in a study (Nursalam, 2013).

Data collection techniques in this study include:

1. Researchers submit an application to conduct a preliminary study at LPPM STIKES Banyuwangi.

2. The researcher submitted a letter of request for initial data to the Banyuwangi Health Office and the Klatak Banyuwangi Health Center.

3. The researcher coordinated with the head of the Klatak Banyuwangi Public Health Center.

4. Researchers provide informed consent sheets to respondents

5. Researchers check blood sugar levels and provide a self-management questionnaire sheet, the questionnaire that will be given to respondents is the SDSCA questionnaire.

6. Researchers recapitulate research results and process research results

4.9 Data Processing

Data analysis is a very important part to achieve the main goal of research, which is to answer research questions that reveal phenomena (Nursalam, Nursing Research Methodology, 2017). Prior to analysing the data, the data that has been collected sequentially will go through an editing process, namely coding, scoring, and tabulating. Editing is attempts to re-check the correctness of the data obtained or collected. Editing can be done at the data collection stage or after the data has been collected (Nursalam, Nursing Research Methodology, 2013). There are editing including:

1. Coding

Coding is coding on data intended to translate data into codes which are usually in the form of numbers (Nursalam, 2013).

Coding self management level:

1. Low:1

2. Medium: 2

3. Height: 3

2. Scoring

Scoring is an activity to add up the scores obtained from respondents from data collection sheets (Nursalam, 2017).

Self Management Level scoring:

1. Low: 0-32

2. Medium: 33-65

3. Hight: 66-98

3. Tabulating

Tabulating is the presentation of data in the form of a table, which consists of several rows and several columns. Tables can be used to present several variables from observations, surveys or research so that the data is easy to read and understand (Nursalam, 2017).

4.10 Statistical analysis

The data that has been collected is then analysed for the relationship between the level of self-management using an ordinal scale and blood sugar levels in people with diabetes mellitus type 2 using a ratio scale, after the data is collected it will be processed using the relevant statistical test, namely the Spearman rank test. to determine the relationship between the independent variable and the dependent variable with the ordinal and ratio data scale using a contingency table using SPSS 25 for Windows. If the value obtained in the statistical test shows p value <0.05 then there is a significant relationship between the level of self-management and blood sugar levels in type 2 diabetes mellitus patients, in other words Ho is rejected, whereas if $p \geq 0.05$ means Ho is accepted or there is no significant relationship between the level of self-management with blood sugar levels in patients with diabetes mellitus type.

To give an interpretation of the correlation coefficient, the writing uses guidelines that refer to Sugiono (2014) as follows:

Correlation Value	Interpretation
0.00-0.199	Very low
0.20-0.399	Low
0.40-0.599	Currently
0.60-0.799	Strong
0.80-1.00	Very strong

Tebel 4.3 Interpretation of Correlation Value

According to Arikunto (2014) the scale interpretation of the frequency distribution is as follows:

Whole   : 100%

Almost entirely   : 76%-99%

Most of the   : 51%-79%

Half   : 50%

Almost half   : 26%-49%

None   : 0%

4.11 Research Ethics

Before conducting the research, the researcher gave a research application permit to the public health center in Klatak by taking into account research ethics, which include (Nursalam, 2016):

1. Informed consent (Research Consent Sheet)

    Informed consent is a form of agreement between the researcher and research respondents by providing a consent form. The informed

consent was given before the study by providing a consent form to become a respondent. The goal is that the subject understands the aims and objectives of the study. If the subject is willing, the respondent must sign the consent form, if the respondent is not willing, the researcher must respect the respondent's rights.

2. Anonymity (without name)

   In using the research subject, it is done by not giving or including the name of the respondent on the questionnaire sheet and only writing the code on the data collection sheet or research results to be presented.

3. Confidentiality (confidentiality)

   Researchers guarantee the confidentiality of research results, both information and other issues related to respondents. Only certain groups of data will be reported in the research results.

4. Rights to self determination

   Rights to self determination is the respondent is asked to be a participant respondent in this study and if the respondent agrees, the respondent is welcome to sign a letter of consent. As for signing of the respondent in a calm state, enough time to think and understand it.

5. Honesty (veracity)

   The veracity principle is the principle of truth/honesty. The principle of veracity relates to one's ability to tell the truth. The researcher will provide true information that the respondent

experiences so that the relationship between the researcher and the respondent can be developed properly and this research can run well (Hidayat, 2017).

6. Taking into account the benefits and losses caused (Balancing harm and benefits)

The principle implies that every research must consider the maximum benefit for the research subject and the population in which the research results will be applied (beneficence). Then minimize the risk / adverse impact on research subjects (normal efficiency). This principle must be considered by researchers when submitting research proposals to obtain ethical approval from the research ethics committee. Researchers must consider the ratio between the benefits and disadvantages/risks of the research (Dharma, 2017).

4.12   Research limitations:

a. Researchers are not allowed to check their own blood sugar.

b. At the time of the research, which was supposed to follow the schedule for the Elderly Posyandu in the Klatak Health Center Work Area, it changed to the Klatak Health Center service work schedule because the pandemic was still increasing.