JURNAL ILMIAH ILMU KEPERAWATAN INDONESIA
Indonesian Nursing and Scientific Journal

Volume: 12
Issue: 01
Years: 2022

Research Article

Analysis of Nursing Management Unstable Blood Glucose Levels in Type 2 Diabetes Mellitus Patients

Sulastri[1], Harjati[2]
[1,2]Akper Yaspen Jakarta
Jl. Batas II No.54, RW.9, Baru, Kec. Ps. Rebo, Kota Jakarta Timur, Daerah Khusus Ibukota Jakarta 13780, Indonesia
Email Corespondent: sulastri@akperyaspen.ac.id

OPEN ACCESS

Editor: KS
Received: 08/02/2022
Accepted: 16/03/2022
Published: 29/03/2022
Available Article :
10.33221/jiiki.v12i01.1742

Conflict of interest statement: I declare that the research I am conducting is free from conflicts of interest, both individuals and organizations.

Funding: The financial source of this research comes from the annual budget for the field of research and community service at the Akper Yaspen Jakarta.

Abstract

Background: Diabetes Mellitus (DM) is a clinical syndrome of impaired metabolic secretion, insulin action, or both characterized by hyperglycemia. Various nursing problems can occur due to hyperglycemic conditions that are not handled properly. The instability of blood glucose levels is a major problem that occurs in uncontrolled DM patients. This condition can lead to various complications and complications so comprehensive treatment management is needed.

Objectives: This study aims to explore and analyze the nursing management of unstable blood glucose levels in type 2 DM patients who were hospitalized.

Methods: This study is a qualitative study using an exploratory case study method in diabetes mellitus patients type 2 who were hospitalized. The data obtained were processed and analyzed based on theories that explain the occurrence of the problem of instability in blood glucose levels and the nursing management carried out in patients with type 2 diabetes mellitus.

Results: The results of this study indicate that the main problem in patients with type 2 diabetes mellitus is the instability of blood glucose levels which is characterized by hyperglycemia. Nursing management carried out is monitoring blood glucose level laboratory results, management of hyperglycemia, medication management, nutrition/diet management, treatment, and care education programs can reduce blood glucose levels.

Conclusion: The problem of blood glucose instability is a priority problem in type 2 diabetes mellitus and comprehensive nursing management will determine the success of controlling blood glucose levels so that they are normal and stable.

Keywords: diabetes mellitus, unstable blood glucose, nursing management.

Introduction

Diabetes Mellitus (DM) is a chronic metabolic disease or disorder with multiple etiologies characterized by high blood glucose levels accompanied by impaired carbohydrate, lipid, and protein metabolism as a result of insulin function insufficiency.[1] DM is a group of metabolic diseases characterized by hyperglycemia that occurs due to defects in insulin secretion, insulin action, or both.[2] DM is a chronic disease characterized by blood glucose levels that exceed normal values or chronic hyperglycemia.[3] Hyperglycemia is a condition in which fasting blood glucose levels 126 mg/dl and blood glucose when 200 mg/dl.[2] The highest prevalence of DM is type 2 DM with an incidence presentation of 90%-95%.[4,5] According to WHO new cases of DM will reach 80% in developing countries by 2025.[6] The International Diabetes Federation (IDF) shows that in 2015 the number of DM patients in the world will reach 415 million people. If DM handling is not handled optimally, the number of cases is estimated to increase to 642 million in 2040.[6]

The risk of type 2 DM rises steadily with increasing body weight and those with morbid obesity have the highest risk of the disease. Excess body weight, related to physical inactivity and over-nutrition, results in the accumulation of fat mainly in the abdomen and visceral tissues. This abdominal and visceral adiposity, in turn, modulates several hormonal and chemical mediators in the body that result in 'diabesity', the term coined to interlink diabetes about obesity. The 'metabolically obese' phenotype having normal body weight and normal or low body mass index (BMI), but increased abdominal obesity, is another underestimated risk group for the development of type 2 DM. Free fatty acids derived from visceral adipose tissues reduce the insulin sensitivity and impair β-cell function (lipotoxicity), resulting in the development of type 2 DM.[7] Pancreatic beta-cell failure and insulin resistance as pathophysiology central damage in type 2 diabetes, leading to instability of glucose levels hyperglycemic blood.[8] Insulin deficiency causes the use of glucose by cells to decrease so that the sugar level in the plasma becomes high (hyperglycemia).[7,8] If the hyperglycemia is severe and exceeds the renal threshold, glucosuria develops. This glucosuria causes an osmotic diuresis which will increase the excretion of urination (polyuria) and thirst (polydipsia) resulting in dehydration. In disorders of excessive insulin secretion, glucose levels will be maintained at normal or slightly elevated levels. But, if the beta cells are not able to compensate for the increased need for insulin, blood glucose levels increase. Improper diet can also affect the instability of glucose levels blood in patients with type 2 DM.[8] Diabetes Mellitus is known as the silent killer because this disease can about all organs of the body and gave rise to various complaints. Diseases that will be caused include visual Impairment, cataracts, disease heart disease, kidney disease, sexual impotence, wounds difficult to heal and rot/gangrene, infection lungs, blood vessel disorders, stroke, etc. Not infrequently, DM patients who have undergone severe amputation members of the body because it happened decay.[10] To reduce the incidence and the severity of type 2 diabetes mellitus preventive measures such as style modification life and treatment like oral medicine hyperglycemia and insulin.[11]

In Indonesia, in 2000 there were 8.4 million DM patients and it is projected that in 2030 there will be 21.3 million.[12] DM treatment aims to control blood glucose levels. Blood glucose control is influenced by several factors, namely the physiological balance of hormones that can reduce blood glucose levels, namely insulin, and hormones that can increase blood glucose levels, namely glucagon, epinephrine, glucocorticoids, and growth hormones.[13] Blood glucose levels are also influenced by diet, obesity, physical activity, and emotional balance or stress. Stress is one of the factors that are difficult to avoid and affects blood glucose levels. Stress causes an overproduction of the hormones glucagon and cortisol which can increase the production of glucose by the liver and interfere with the use of glucose in muscle and fat tissue.[9] The global prevalence of diabetes, especially type 2 diabetes mellitus, has reached epidemic proportions in the last few decades of the 20th century because of the obesity pandemic resulting from adverse lifestyles.[19] Diabetes as a consequence of obesity (diabesity), continues to increase exponentially in the 21st century.[19]

Although there is a multitude of drugs for the effective management of diabesity with modest benefits, most patients will require insulin for control of diabetes at some stage that would worsen obesity, and thereby diabesity. Therefore, effective non-pharmacological therapy needs to be expedited in all patients with diabesity. These measures include medical nutrition interventions, change of lifestyles, and bariatric surgery. Non-pharmacological interventions are also useful for the

effective management of even type 1 diabetes mellitus when used along with insulin therapy, especially in those with obesity. This review summarises the current evidence base for the non-pharmacological interventions in the management of diabetes.[7] Good management is needed to control blood glucose levels in DM patients so that it does not cause various complications, both acute and chronic complications.[11] Some of the acute complications that often occur are hypoglycemic coma, ketoacidotic hyperglycemia, and non-ketoacidosis. Comprehensive and awareness-building treatment and form good habits must be done to change bad habits into good habits because the individual is shaped by what the individual does repeatedly. Blood glucose control in DM must be carried out comprehensively including 5 pillars that can be grouped into pharmacological and non-pharmacological therapies.[15] Pharmacological therapy in DM patients is oral hypoglycemic drugs (OHO) and insulin. Non-pharmacological therapy that can be done is diet and physical exercise.[14,15] Various kinds of non-pharmacological therapies continue to develop, including Regular monitoring of blood glucose levels, education and counseling are important things that must be done to control blood glucose levels.[7] Obesity has become a global epidemic over the past few decades due to unhealthy dietary habits and reduced physical activity. Hypertension and diabetes are quite common among obese individuals and there is a linear relationship between the degree of obesity and this disease. Lifestyle interventions such as dietary modifications and regular exercise are still important and safe first steps for treatment.[7,15]

Efforts to control blood glucose levels in type 2 DM patients at a hospital in East Jakarta include the provision of OHO, insulin, diet management, and education. Research has not been done to obtain problem analysis and nursing management of blood glucose level instability in type 2 DM patients at this hospital and the need for comprehensive care management, in carrying out nursing care this research is needed as an effort to improve problem analysis and nursing skills management in type 2 DM patients with nursing problems of blood glucose level instability.

Methods

This study was qualitative research with an exploratory case study method in patients with type 2 diabetes mellitus who are treated in the treatment room at a hospital in East Jakarta. The number of respondents was 2 people who were treated with the same medical diagnosis, namely, type 2 diabetes mellitus with a nursing diagnosis of blood glucose level instability. The researchers obtained the required data through various ways, starting from interviews, physical examinations, and documentation studies of patient status. The data obtained were processed and analyzed based on existing theories that explain the occurrence of the problem of unstable blood glucose levels in patients with type 2 diabetes mellitus and the treatment management of these problems.

Results

The results of the case studies are described into the characteristics of respondents, focus data, nursing diagnoses and nursing management carried out on respondents.

Respondent characteristics

Characteristics of respondents can be seen in the table below.

Table 1. Respondent characteristics

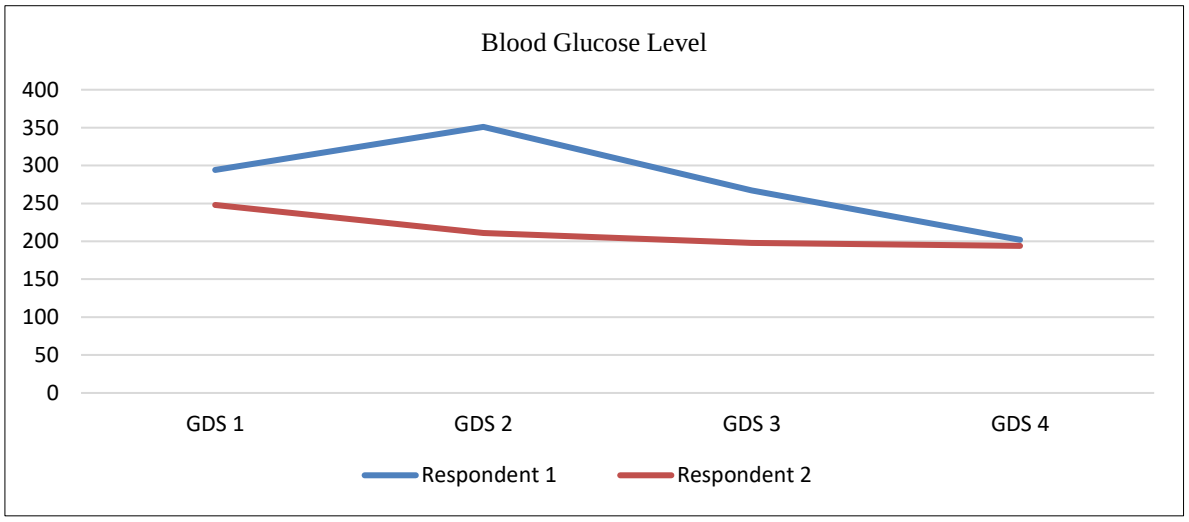
	Medical diagnosis	Gender	Age	Educational Level	Profession	Long-DM
Respondent 1	DM T2+ hypertension	Female	55 years	Senior High School	Housewife	6 years
Respondent 2	DM T2+ hypertension	Female	60 years	Senior High School	Housewife	10 years

Focus Data

Respondent 1. Subjective data, the respondent said weakness and pain in the right abdomen, intermittent pain, pain scale 3. She said he had a history of DM since 6 years ago and was often thirsty, appetite increased, ate out 1 portion. The respondent said there was a decrease in body weight in these 5 months as much as 6 kg. Objective data, the respondent looked weak and pale, drank frequently, weight before treatment 68 kg, weight after treatment 61 kg, height 159 cm, BMI 24 kg/m², LILA 33 cm, waist circumference: 112 cm, hip circumference 115 cm, abdominal circumference 107 cm, laboratory results Hb 12.4 g/dl, Ht 35%, lymphocytes 16%, tongue looks dirty, conjunctiva anemic, dry lip mucosa, GDS on 06-10-19: 294 mg/dl, GDS 07-10-19: 351 mg/dl, GDS on 08-10-19: 267 mg/dl, GDS on 09-10-19: 202 mg/dl. BP 160/80 mmHg, pulse 110 x/m, T 36,5°C and RR 20 x/m.

Respondent 2, the respondent said that her appetite had increased, she had eaten 1 serving, but her weight had decreased in the past 4 months by 7 kg. The respondent said she had a history of DM since 10 years ago, she was often thirsty, often urinated, the body felt weak, the respondent said she did not understand the proper DM diet and was worried about unstable blood glucose. Objective data, the respondent looks weak, the face looks pale weight before treatment 55 kg, weight after treatment 48 kg, height 150 cm, BMI 21 kg/m2, LILA 23 cm, waist circumference 97 cm, hip circumference 100 cm, abdominal circumference 96 cm, results in laboratory Hb 12.9 g/dl, GDS on 14-10-19: 249 mg/dl, 15-10-19: 211 mg/dl, 16-10-19: 198 mg/dl, 17-10-19: 194 mg/dl, results in BP 180/90 mmHg, pulse 90 x/m, T 36.2°C, RR 20 x/m, she seems to be asking about the right DM diet and said did not understand how to control blood glucose

Figure 1. Respondent's Blood Glucose Level



Medical Management

Respondent 1, oral therapy: braxidine 3x1 (5mg), sucrafat 4x1 (500mg), rebamipid 2x1 (100mg), PCT 3x1 (500mg), amlodipine 1x10mg, glimepiride 1x2mg. Parenteral therapy: OMZ 2x40mg, ranitidine 2x50mg, ondansetron 3x4mg, keterolac 1x30mg, novorapid 3x8 ui/sc/8hour, infusion fluid Nacl 0.9%/8hour, DM diet 1700 kcal.

Respondent 2, oral therapy: PCT 3x1 (500mg), laxadine syrup 3x20ml, spironolactone 1x25mg, furosemide 1x40mg, foress 2x1 (500mg), mecobalamine 2x1 (500mg), ramipril 1x5mg. Parenteral therapy: OMZ 2x40mg, ranitidine 2x50mg, novorapid 3x20 ui/sc/8hours, dextrose 40% (extra), Nacl infusion fluids 0.9%/12 hours, DM diet 1800 kcal.

Nursing diagnoses

Nursing diagnoses related to unstable blood glucose levels in both patients were the same, namely unstable blood glucose levels associated with hyperglycemia, pancreatic dysfunction, and insulin resistance.[14,15]

Subjective data: the repondent complained of weakness, frequent headaches, dry mouth, thirst, hunger, frequent urination and frequent drowsiness. Objective data: eat out 1 portion, respondent 1 experienced weight loss 6 kg and respondent 2 experienced weight loss 8 kg within 3 months of being sick, GDS responden 1 on 06-10-19: 294 mg/dl, GDS on 07-10-19: 351 mg/dl, GDS on 08-10-19: 267 mg/dl, GDS on 09-10-19: 202 mg/dl. GDS responden 2 on 14-10-19: 219 mg/dl, GDS on 15-10-19: 211 mg/dl, GDS on 16-10-19: 198 mg/dl, 17-10-19: 194 mg/dl.

Nursing Management

Nursing management in the case study is described in the nursing intervention below:[20]

1. Monitoring laboratory results

   Observation measures include identifying the necessary laboratory tests (blood and urine glucose, hematocrit, blood ketones, etc.), monitoring laboratory results as needed, checking the suitability of laboratory results with the patient's clinical condition. Therapeutic measures include taking samples (eg blood, urine), interpreting the results of laboratory tests. Collaborative actions include collaborating with doctors if laboratory results require medical action.

2. Hyperglycemia management

   Observation activities include identifying possible causes of hyperglycemia, identifying situations that cause insulin requirements to increase (e.g., relapsing disease), monitoring blood glucose levels, monitoring signs and symptoms of hyperglycemia (e.g. polyuria, polydipsia, polyphagia, weakness, malaise, blurred vision, headache), monitor fluid intake and output, monitor urine ketones, blood gas analysis results, electrolytes, orthostatic blood pressure, pulse. Therapeutic measures include oral fluid intake, consultation with a doctor if signs and symptoms of hyperglycemia persist or worsen, outpatient facilities if there is orthostatic hypotension. Educational actions include recommending avoiding exercise when blood glucose levels are more than 250 mg/dL, encouraging self-monitoring of blood glucose levels, encouraging adherence to diet and exercise, teaching the indications and importance of urine ketone testing, if necessary, teaching diabetes management. e.g use of insulin, oral medication, monitoring of fluid intake, carbohydrate replacement, and the assistance of a healthcare professional). Collaborative actions include the collaboration of oral hypoglycemic drugs, a collaboration of insulin administration collaboration of IV fluid administration, collaboration of potassium administration, if necessary.

3. Nutrition management

   Observation actions include identifying nutritional status, food allergies, and intolerances, identifying favorite foods, calorie needs, and types of nutrition, identifying the need for NGT use, monitoring food intake, weight, and laboratory test results. Therapeutic actions include performing oral hygiene before eating, facilitation in determining dietary guidelines (eg paramide food), serving food attractively and at an appropriate temperature, providing high-fiber foods to prevent constipation, providing high-calorie and high-protein foods, providing dietary supplements, if necessary, discontinue NG administration if oral intake can be tolerated. Educational actions include recommending a sitting position if able, teaching a programmed diet. Collaborative Actions include collaborative pre-meal administration of medications (eg antiemetics, insulin, pain medications), if necessary, collaborating with a dietician to determine the number of calories and the type of nutrition needed.

4. Medication management

   Observation measures include identifying the use of drugs according to prescriptions, drug expiration dates, knowledge, and ability to undergo treatment programs, monitoring the effectiveness and side effects of drug administration, monitoring signs and symptoms of drug poisoning, monitoring blood serum (electrolytes, prothrombin, if necessary), monitoring

adherence to a treatment program. Therapeutic activities include facilitating changes to the treatment program, providing visual and written sources of information on treatment programs, facilitating respondents and families to make lifestyle adjustments as a result of the treatment program. Educational actions include teaching patients and families how to administer drugs (dose, storage, route, and timing of drug administration), teaching how to handle or reduce side effects if they occur, recommending contacting health workers if there are drug side effects.

5. Diet education

   Observation measures include identifying the patient's and family's ability to receive information, identifying the current level of knowledge, current, and past eating habits, identifying respondent and family perceptions of the programmed diet. Identifying financial limitations to provide food. Analysis Nursing Problems and Management of Instability of Blood Glucose Levels in Type 2 Diabetes Melitus. Therapeutic actions include preparing materials, media, and props, scheduling appropriate times to provide health education, providing opportunities for respondents and families to ask questions, providing meal and diet plans. Education includes explaining the purpose of dietary adherence to health, informing food that is allowed and prohibited, informing about possible drug and food interactions, recommending maintaining a semi-Fowler position 20-30 minutes after eating, recommending changing food ingredients according to a programmed diet, encouraging exercise according to tolerance, teaching how to read labels and choose the right food, how to plan meals according to the program, recommend food recipes according to diet. Collaborative actions include referring to a nutritionist and involving the family.

6. Treatment program education

   Observation measures include identifying knowledge about the recommended treatment, identifying the use of traditional medicine, and the possible effects of treatment. Therapeutic actions include facilitating written or graphic information to improve understanding, providing support to undergo a treatment program properly and correctly, involving families to provide support to respondents during treatment. Educational actions include explaining the benefits and side effects of treatment, explaining strategies for managing drug side effects, explaining how to store, refill/or repurchase and monitor drug residues, explaining the advantages and disadvantages of treatment programs, inform health facilities that can be used during treatment, promote progress in monitoring the effectiveness of treatment programs, recommend taking medicine according to indications, encourage asking if there is something that is not understood before and after treatment, teach the ability to do self-medication

7. Nutrition counseling

   Observation measures include identifying eating habits and eating behavior to be changed, identifying progress on regular diet modifications, monitoring intake and output, hemoglobin values, blood pressure, weight gain, and food buying habits. Therapeutic actions include establishing a therapeutic relationship, agreeing on the length of time for counseling, setting realistic short-term and long-term goals, using nutritional standards according to the diet program in evaluating the adequacy of food intake, considering factors that affect nutritional needs (e.g. age, stage of growth and development, disease). Educational actions include informing matters relating to diet modification (eg: weight loss or gain, sodium and fluid restriction, cholesterol reduction, calorie restriction, etc.). Collaborative actions include referring to a nutritionist

Discussion

Hyperglycemia

Both respondents experienced hyperglycemia. Occurrence of hyperglycemia due to insulin resistance and impaired pancreatic beta-cell function. Insulin resistance is a condition when the body's cells ignore or reject signals from the hormone insulin. As a result, the body does not respond properly to this hormone. Insulin resistance is a condition that usually occurs in people who are overweight or obese. Insulin cannot work optimally in muscle, fat, and liver cells, forcing the

pancreas to compensate to produce more insulin. When pancreatic beta cells are unable to produce insulin in sufficient quantities to compensate for the increase in insulin resistance, there will be an increase in blood glucose levels, resulting in chronic hyperglycemia. This situation will further damage beta cells in type 2 DM, on the one hand, and worsen insulin resistance on the other. This situation triggers type 2 DM disease is increasingly progressive.[18,19] Several theories explain how beta-cell damage occurs in type 2 diabetes, including the theory of glucotoxicity, lipotoxicity, and amyloid accumulation. The effect of hyperglycemia on pancreatic beta cells can occur in several forms. The first is pancreatic beta-cell desensitization, which is a temporary disruption of beta cells stimulated by repeated hyperglycemia. This situation will return to normal when blood glucose is normalized. The second is the loss of pancreatic beta cells, which is a reversible disorder and occurs earlier than glucotoxicity. The third is persistent beta-cell damage. In type 2 diabetes, pancreatic beta cells exposed to hyperglycemia will produce reactive oxygen species (ROS). An excessive increase in ROS will cause pancreatic beta-cell damage. Chronic hyperglycemia is a condition that can lead to reduced insulin synthesis and secretion on the one hand and the other hand, gradual destruction of beta cells.[16,17]

Environmental factors also play an important role in the occurrence of type 2 DM. These environmental factors are obesity, eating a lot, and lack of physical activity. Weight gain is a risk factor for type 2 diabetes. However, most of the obese population does not suffer from type 2 diabetes. Research has examined the relationship between type 2 diabetes and obesity involving proinflammatory cytokines, namely tumor necrosis factor-alpha (TNFα) and interleukins. -6 (IL-6), insulin resistance, fatty acid metabolism disorders, cellular processes such as mitochondrial dysfunction, and endoplasmic reticulum stress.[18,19] Based on the results of the study and the discussion above, the researcher assumes that hyperglycemia is the main sign of type 2 diabetes in the second respondent. This has been proven by increased blood glucose levels and symptoms that occur as a result of hyperglycemia, namely feeling weak, losing weight, often thirsty and abdominal pain.

Risk factors for imbalanced blood glucose levels

Several risk factors trigger the occurrence of unstable blood glucose levels in respondents 1 and 2. These risk factors consist of non-modifiable and modifiable risk factors. Non-modifiable risk factors include a family history of DM, age > 45 years (increases with age). Both patients had been diagnosed with type 2 DM since 4-5 years ago. Respondent 1 was diagnosed with type 2 DM when she was 49 years old and respondent 2 was diagnosed with type 2 diabetes when she was 53 years old. Both respondents had a family history of DM. Where someone who has a history of DM in the family has a greater risk than those who do not have a history of DM in the family. [2,4,5]

Meanwhile, the modifiable risk factors in respondents 1 and 2 related to a healthy lifestyle including excess body weight (BMI 23 kg/m²), lack of physical exercise, hypertension (> 140/90 mmHg), abnormal blood lipid profile (HDL < 35 mg/dL, and/or triglycerides > 250 mg/dL), and the habit of consuming a high-sugar and low-fiber diet. In addition, someone who has impaired fasting blood glucose and glucose tolerance, has metabolic syndrome (high blood pressure, elevated blood cholesterol, high blood sugar, obesity) or has a history of stroke or coronary heart disease, and has a higher risk of developing diabetes.[2,4,5]

Signs and symptoms of imbalanced blood glucose levels

The clinical manifestations of DM depend on the level of hyperglycemia experienced by the patient. DM manifestations, in general, are polyphagia (a lot of eating), polydipsia (a lot of drinking), polyuria (often urinating). These symptoms were experienced by both respondents where complaints of the frequent feeling of hunger, thirst, and frequent urination were found. Frequent feeling of hunger occurs because the process of glycogenesis decreases so that the glucose that reaches the cells is not sufficient as the main source of cell nutrition. Complaints of thirst occur due to an increase in blood glucose levels which causes an increase in osmotic pressure which draws the fluid from the cells into the blood vessels and is followed by an osmotic diuresis condition due to glucose leakage in the glomerulus that exceeds the kidney threshold so that it draws fluid out into the tubules and causes fluid loss through urine that is excessive. characterized by frequent urination (polyuria).[4,16]

DM sufferers also experience other symptoms, namely weight loss, fatigue, weakness, etc. This was also experienced by both respondents. The occurrence of weight loss in diabetics, as a result, insulin needs cannot be met by the body so that the body's cells cannot get glucose from the blood to be converted by the body's cells into energy. When this happens, the body looks for other materials to burn into energy. The body then begins to burn fat and muscle for energy. This condition occurs for a long time, causing weight loss and fatigue due to a lack of energy.[18]

Based on the research results, the researchers assumed that the risk factors for diabetes in both respondents were by the theory, including age over 45 years, family history of diabetes, and lifestyle. Respondent 1 is 55 years old and respondent 2 is 60 years old. Both respondents had a history of diabetes in their parents. Both respondents also have an uncontrolled diet and like to eat high-carbohydrate foods and never exercise.

Examination Results Supporting an imbalance of blood glucose levels

1. Blood glucose levels examination

   This examination aims to determine whether the therapeutic target has been achieved and to adjust the drug dose if the therapeutic target has not been achieved. The timing of the blood glucose examination is checking fasting blood glucose levels, glucose 2 hours after eating, or blood glucose at other times periodically as needed. To monitor the results of treatment, it can be done by using a capillary blood glucose examination using a glucometer.

   In both respondents after the 3rd day of treatment, there was still a hyperglycemic condition but gradually started to decline characterized by GDS glucose levels on 06-10-19: 294 mg/dl, GDS on 07-10-19 19: 351 mg/dl, GDS on 08-10-19: 267 mg/dl, GDS on 09-10-19: 202 mg/dl on Respondent I. Likewise with respondent II, GDS results on 14-10-19: 219 mg/dl, GDS on 15-10-19: 211 mg/dl, GDS on 16-10-19: 198 mg/dl.

2. HbA1C examination.

   The respondents were not tested for HbA1C, which should have been done. This test is a glycosylated hemoglobin test, also known as glycohemoglobin, or glycosylated hemoglobin (abbreviated as HbA1C), which is a method used to assess the effect of changing therapy 8-12 weeks earlier.

   To see the results of therapy and plan to change therapy, HbA1c is checked every 3 months, or monthly in very high HbA1c conditions (> 10%). In patients who have achieved therapeutic goals with stable glycemic control, HbA1C is checked at least 2 times in 1 year. HbA1C cannot be used as a tool for evaluation in certain conditions such as anemia, hemoglobinopathy, history of blood transfusion in the last 2-3 months, other conditions that affect erythrocyte age, and impaired kidney function.[2]

   Based on the results of the study, the researchers assumed that the diabetes investigations on the two respondents were not fully by the theory. Both respondents only had their blood glucose levels checked, but not for HbA1C. Whereas HbA1C examination is important to do to see the effectiveness of treatment in the last 8-12 weeks. The results of the HbA1C examination can be used as a reference in providing appropriate education and treatment.

Management of unstable blood glucose levels

Management of respondent 1 associated with controlling blood glucose levels was glimepiride 1x2 mg, Novo rapid 3x8 ui/sc/8 hours, Nacl infusion fluids 0.9%/8 hours, DM diet 1700 kcal. As for the Management of respondent 2 were Novo rapid 3x20 ui/sc/8 hours, dextrose 40% (extra), intravenous fluids: Nacl 0.9%/12 hours, diet NB DM 1800 kcal. Respondent 1 received Glimepiride therapy. Glimepiride belongs to the sulfonylurea class of antidiabetic drugs. This drug works by encouraging the pancreas to produce insulin and helps the body maximize insulin action. That way, blood sugar levels can be better controlled and the risk of complications due to type 2 diabetes can be reduced. This step is carried out if the blood glucose level of DM patients has not been achieved with nutritional therapy and physical exercise. Both respondents also received Novo rapid therapy given via subcutan. Novorapid is a preparation containing insulin as part which is included in the fast-acting insulin analog group (Rapid-Acting). According to the theory, insulin is required at

HbA1c > 9% with metabolic decompensation conditions, rapid weight loss, severe hyperglycemia accompanied by ketosis, hyperglycemic crisis, failure to combine an optimal dose of OHO, severe stress (systemic infection, major surgery, acute myocardial infarction, stroke), pregnancy with uncontrolled gestational diabetes mellitus/DM with meal planning, severe renal or hepatic function impairment, contraindications and/or allergy to OHO, perioperative conditions according to the type and duration of insulin action.

Regulation of nutrition/diet and physical activity is important in the management of DM, but if necessary it can be done simultaneously with the administration of single or combined oral antihyperglycemic drugs early on. Administration of oral antihyperglycemic drugs or insulin always starts with a low dose and then increases it gradually according to the response to blood glucose levels. Combination therapy of oral antihyperglycemic drugs, either separately or fixed-dose combination, must use two drugs with different mechanisms of action. In certain circumstances, if the target blood glucose levels have not been achieved with a combination of two drugs, a combination of two antihyperglycemic drugs with insulin can be given.[2,11] On respondent 1 received a combination therapy of diet management, oral hypoglycaemic drugs, and insulin to control glucose levels more effectively. Respondent 2 only got but diet and insulin regulation. Both respondents received 0.9% NaCl infusion fluid therapy to meet the respondent's fluid needs because based on subjective complaints, both respondents experienced an increase in
urine volume, often felt thirsty, and had a dry throat. The TTV is still within normal limits and the hematocrit examination is still within normal limits, urine glucose examination is not carried out. In addition to receiving therapy to control glucose levels, both respondents also received antihypertensive therapy. Hypertension can occur as a complication of long-term hyperglycemia. On respondent, I received amlodipine 1x10 mg therapy because she has a history of hypertension on admission to the hospital with a blood pressure of 160/90 mmHg.

Amlodipine is a Calcium Channel Blockers (CCB) antihypertensive drug or a calcium antagonist of the Dihydropyridine class. This drug is used to treat hypertension or high blood pressure and help prevent chest pain in patients with angina pectoris. Amlodipine works by blocking calcium from entering the smooth muscle cells in the walls of the heart's blood vessels. Calcium is a substance that plays a role in muscle contraction. With calcium inhibition, the amount of calcium that enters muscle cells is reduced and blood vessels become more relaxed and dilated, thereby increasing the supply of blood and oxygen to the heart. Furthermore, there will be a decrease in strength and heart rate, resulting in a decrease in blood pressure which is useful in preventing chest pain. However, Amlodipine is not intended for the treatment of angina attacks. As a result, lowering blood pressure prevents the occurrence of angina.

Respondent 2 received therapy with spironolactone 1x25 mg, furosemide 1x40 mg, ramipril 1x5 mg. Spironolactone is a drug used to lower blood pressure in hypertension. Where the respondent's BP is 180/90 mmHg, pulse 90 x/m, the ECG results show inferior infarction. This drug can also be used in the treatment of heart failure, hypokalemia, cirrhosis, edema, or conditions when the body produces too much of the hormone aldosterone (hyperaldosteronism). Spironolactone belongs to a type of potassium-sparing diuretic drug. This drug works by inhibiting the absorption of excess salt (sodium) into the body and keeping potassium levels in the blood from getting too low, so blood pressure can be lowered. Furosemide is a diuretic drug that is useful for removing excess fluid from the body through urine. This drug is often used to treat edema (buildup of fluid in the body) or hypertension (high blood pressure). Furosemide works by blocking the absorption of sodium in the kidney tubular cells and increasing the amount of urine produced by the body. This drug is available in tablet and injection form.

Respondent 2 also received Ramipril, an ACE inhibitor class drug that works by inhibiting the conversion of angiotensin I to angiotensin II. Ramipril and ramiprilat inhibit the angiotensin-converting enzyme (ACE). ACE is a peptidyl dipeptidase that catalyzes the conversion of angiotensin I to the vasoconstrictor substance, angiotensin II. Angiotensin II stimulates aldosterone secretion by the adrenal cortex. Inhibition of ACE causes a decrease in plasma angiotensin II, which results in reduced vasopressor activity and decreased aldosterone secretion. Loss of the negative feedback loop of angiotensin II on renin secretion results in an increase in plasma renin activity. Increased plasma renin activity and reduced aldosterone cause vasodilation, thus providing a hypotensive effect and a

beneficial effect in heart failure.

Health education for DM is an important component, respondents have an important role in self-management besides being supported by the health team, family, and people around them. Health education conducted on both respondents include education on diet, nutrition, medication and physical activity. The ADA has recorded behavioral changes expected from the existence of self-management education programs, namely: level of knowledge, attitudes and beliefs, psychological status, physical condition, and a healthy lifestyle.[2,11] Educational materials carried out at the advanced level include recognizing and preventing acute complications of DM, knowledge about chronic complications of DM, management of DM while suffering from other diseases, plans for special activities (eg sports achievements), special conditions encountered (eg pregnancy, fasting, sick days), research results and current knowledge and cutting-edge technology about DM, foot care or care

Based on the results of the research above, the researcher assumes that the diabetes management of both respondents is by the theory. Respondent 1 related to controlling blood glucose levels was glimepiride 1x2 mg, Novo rapid 3x8 ui/sc/8 hours, NaCl infusion fluids 0.9%/8 hours, DM diet 1700 kcal. The management of respondent 2 is Novo rapid 3x20 ui via SC/8 hours, dextrose 40% (additional), intravenous fluids: NaCl 0.9%/12 hours, diet NB DM 1800 kcal.

Nursing diagnosis of unstable blood glucose levels

Nursing diagnoses for both respondents were related to an imbalance in blood glucose levels, namely the instability of blood glucose levels in the form of hyperglycemia conditions. 2 hours after the Oral Glucose Tolerance Test (OGTT) with a glucose load of 75 grams and a plasma glucose test when 200 mg/dl.

This is evidenced by the patient's glucose levels above normal. This condition occurs due to the failure of pancreatic beta cells and insulin resistance as the pathophysiology of central damage in Type II DM, which triggers the instability of hyperglycemic blood glucose levels. Insulin deficiency causes the use of glucose by cells to decrease, so that blood sugar levels become high (hyperglycemia). If the hyperglycemia is severe and exceeds the renal threshold, glucosuria develops. This glucosuria causes an osmotic diuresis which will increase urinary output (polyuria) and thirst (polydipsia) resulting in dehydration.[2,4] In disorders of excessive insulin secretion, glucose levels will be maintained at normal levels or slightly increased. However, if the beta cells are unable to keep up with the increased need for insulin, blood glucose levels rise. Improper diet can also affect the instability of blood glucose levels in patients with type 2 diabetes.[19]

Based on the results of the research above, the researcher assumes that the priority nursing diagnoses related to diabetes in both respondents are by the theory. The nursing problem that arises is the instability of blood glucose levels related to pancreatic dysfunction and insulin resistance which is characterized by hyperglycemia conditions.

Conclusion

In this study, the nursing problem of unstable blood glucose levels is the main nursing problem in type 2 DM patients. This problem occurs because type 2 DM patients experience insulin resistance conditions or pancreatic beta-cell damage as the main cause of type 2 diabetes. in systemic health disorders. Nursing management of the problem of unstable blood glucose levels in type 2 DM patients in this study included monitoring blood glucose levels, management of hyperglycemia, drug management, education, and counseling about diet, drugs, activities in type 2 DM patients. monitored in a planned manner by taking a history, physical examination, and supporting examinations. Supportive examinations that can be carried out are blood glucose, HbA1C, independent blood glucose monitoring (PGDM). Glycated Albumin (GA) Monitoring. Management of hyperglycemia can include observational, therapeutic, educational, and collaborative measures.

The results of this study can be used as a reference in providing nursing care for diabetes in overcoming the problem of unstable blood glucose levels so that various complications can be prevented early.

Conflict of Interest Declaration

I declare that the research I am conducting is free from conflicts of interest, both individuals and organizations

Acknowledge

Thank you to participants and all those who have contributed to this research.

Funding

The financial source of this research comes from the annual budget for the field of research and community service at the Akper Yaspen Jakarta.

References

1. Word Health Organitation. Classification of Diabetes Mellitus. 2019 Apr; 36. https://www.who.int/publications/i/item/classification-of-diabetes-mellitus.
2. Soelistijo, et. al. Konsensus Pengelolaan dan Pencegahan Diabetes Melitus tipe 2 di Indonesia 2015. Jakarta: Perkeni; 2015.
3. Kementerian Kesehatan RI. Penyakit Diabetes Melitus. 2018. http://www.p2ptm.kemkes.go.id/infographic-p2ptm/penyakit-diabetes-melitus/page/10/1p1-itu-penyakit-dibetes-melitus-dm.
4. Ramachandran A. Know the signs and symptoms of diabetes. Indian J Med Res. 2014:140(5): 579–581. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4311308/
5. Skyler, JS. et al. Differentiation of Diabetes by Pathophysiology, Natural History, and Prognosis Diabetes. ADA. 2017:66(2): 241-255. https://pubmed.ncbi.nlm.nih.gov/27980006/
6. Kahn SE, Cooper ME, Stefano D. Pathophysiology and Treatment of type 2 Diabetes: Perspectives on The Past, Present and Future. Lancet. 2014: 383(9922):1068-1083.
7. Cerf ME. Beta Cell Dysfunction and Insulin Resistance. Frontier in Endocrinology. 2013 Mar;4. https://www.frontiersin.org/articles/10.3389/fendo.2013.00037/full.
8. American Diabetes Association. Standards of Medical Care in Diabetes-2019. Diabetes Care. 2019; 38 (Sppl 1): S1-S87. https://www.piedmont.org/media/file/PAR-CME-Diabetes-Blair-ADA-Update-2019.pdf
9. Febrinasari RP, Sholikah TA, Pakha DN, Putra, SE. Buku Saku Diabetes Melitus Untuk Awam. Surakarta: UNS Press; 2015.
10. Yehuda H, et al. American Association of Clinical Endocrinologists and American College of Endocrinology. Clinical Practice Guidelines for Developing a Diabetes Mellitus Comperehensive Care Plan. Endocrinbe Practice. 2015;21 (sppl 1):1-87. https://pubmed.ncbi.nlm.nih.gov/25869408/
11. Fitri S, Daryani D, Marwanti M, Danang A. Penatalaksanaan 5 Pilar Pengendalian DM terhadap Kualitas Hidup Pasien DM tipe 2. Jurnal Ilmiah STIKES Kendal. 2019; 9(4) : 311-318.
12. Ackley BJ, Ladwig GB. Makic Mary BF. Nursing diagnosis hand book an evidence-based guide to planning care. 11th Ed. St. Louis: Elsivier; 2017.
13. Silva LHA et al. Nursing diagnoses of diabetic patient medical charts: A descriptive study. Online Brazilian Journal of Nursing. 2017; 12(1):62-72.
14. PPNI. Standar Diagnosa Keperawatan Indonesia: definisi dan indicator diagnosis. 1 st Ed. Jakarta: DPP PPNI; 2017.
15. Smeltzer SC, Bare BG. Buku Ajar Keperawatan Medical Bedah-Brunner dan Suddarth. Vol 1. Jakarta: EGC; 2013.
16. Manurung N. Keperawatan Medikal Bedah. 1st Ed. Jakarta: Trans Indo Media; 2018.
17. Black JM, Hawk JH. Keperawatan Medikal Bedah. 8th Ed. Jakarta: Elsevier; 2014.
18. Khardori R. Type 2 Diabetes Mellitus. Emedicine Mescape. 2021 https://emedicine.medscape.com/article/117853-overview.
19. PPNI. Standar Luaran Keperawatan Indonesia: definisi dan kriteria hasil keperawatan. 1 st Ed. Jakarta: DPP PPNI; 2018.
20. PPNI. Standar Intervensi Keperawatan Indonesia. 1 st Ed. Jakarta: DPP PPNI; 2018.