Standardized Nutritional Care Process in Type 2 Diabetes Mellitus Patients with Stroke: Low Carbohydrate, Fat and Salt Diet

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ABSTRACT

Diabetes Mellitus is a non-communicable disease with a high prevalence in Indonesia, as reported by Riskesdas 2018. Uncontrolled glucose levels can cause microvascular damage such as retinopathy, nephropathy and neuropathy, as well as increasing the risk of cardiovascular disease, stroke and decreased quality of life. Management of diabetes mellitus consists of four main pillars: education, diet, physical exercise/physical activity, and medication. In terms of diet, management is carried out using the 3J principle (Type, Amount, Schedule) to ensure food intake meets the patient's needs and prevent complications. Three diabetes mellitus patients with stroke complications experienced nutritional problems, namely insufficient oral food intake and lack of knowledge during hospitalization with a diagnosis of type 2 DM and stroke. To overcome this problem, a low carbohydrate, low fat and low salt diet is given with variations in the type and form of food according to the patient's abilities. Collaboration with the doctor in charge and education to the patient's family is important to increase their understanding and motivation in maintaining health after hospitalization. The results of this intervention showed significant improvements in the nutritional problems of diabetes mellitus patients with complications of stroke and hypertension.

Keywords : Nutrition Care, Nutrition, Diabetes, Stroke complications

INTRODUCTION

Diabetes mellitus (DM) is a chronic, progressive disease characterized by the body's inability to metabolize carbohydrates, fats and proteins(Jiantari et al., 2021; Sari et al., 2023). This metabolic disease occurs due to high blood glucose levels (hyperglycemia)(Lede et al., 2018). Hyperglycemia plays an important role in the development of DM-related complications. Increased glucose levels can pose a risk of microvascular damage (retinopathy, nephropathy and neuropathy) and can cause cardiovascular disease, stroke, peripheral blood vessels and decreased quality of life.(Definition, 2006). Nearly 80% of people who have a history of diabetes will die, usually due to cardiovascular disease, especially hypertension and stroke, in patients

who have a history of diabetes and develop hypertension.(Tadesse et al., 2018).

Based on 2018 WHO data, it is explained that there are 422 million people suffering from diabetes mellitus in the world and will continue to increase by around 8.5% per year. The largest number of DM sufferers according to the IDF (International Diabetes Federation) is around 40-59 years old, while according to the Ministry of Health in 2020, most diabetes mellitus sufferers are aged 20-79 years.(L'heveder & Nolan, 2013). The prevalence of DM based on Perkeni 2015 in the adult population continues to increase to 10.9%. The incidence of DM in East Java is also high and is ranked fifth with a prevalence of diabetes mellitus of 2.6%. This is also supported by 2018 Riskesdas data, which explains that the prevalence of diabetes mellitus in East Java continues to increase.(Association, 2014)

Efforts to control the increase in disease prevalence with pharmacological therapy and non-pharmacological therapy. Non-pharmacological management for people with diabetes is used so as not to worsen the condition of diabetes and not to aggravate the complications. Eating management in diabetes mellitus (DM) sufferers can be one way of preventing complications. Therefore, people with diabetes or people with diabetes can follow a DM diet which has the 3J principle (schedule, amount and type). Efforts are made to use the 3J principles to ensure a regular diet for people with diabetes. The DM diet takes into account that the food portions for people with diabetes should not be too much or too little, the eating schedule for people with diabetes must be on schedule or regularly to avoid hypoglycemia or hyperglycemia. Choosing the right type of food can affect blood glucose levels, especially the type of carbohydrate(PG Indonesia, 2019).

RESEARCH METHODS
Case

The patient, Mrs MST, is 54 years old. The patient is a housewife. The patient was referred from the community health center and came to the hospital with complaints of weakness in half of the body since ± 2 days ago, dizziness and slurred speech. The patient's medical history includes diabetes mellitus and hypertension but he does not seek treatment or control his disease regularly. If the patient is sick, seek treatment at the nearest independent health practice. The patient was diagnosed with CVA Infarction, DM Hyperglycemia and Hypertension.

The patient said he had difficulty moving his body, especially the right side of his body, his ability to swallow/chew food was reduced and he sometimes choked when drinking water, this was because his tongue became stiff/sluggish. However, the patient still has enthusiasm to consume the diet presented.
Before being diagnosed with diabetes mellitus, the patient was overweight and now this can be seen from his body shape, where his weight has decreased by 10-15 kg. During the observation, the results of anthropometric measurements based on % LILA were

96.98 (normal nutritional status) and knee height was 45 cm so the estimated TB was 154.27 cm (Arisman, 2009)

When the initial examination was carried out on admission to the hospital, it was found that blood pressure was: 212/119 mmHg, pulse: 120 beats/min, GCS 456, CT scan results showed acute ischemic infarct. Biochemical results are GDA: 348 mg/dL, cholesterol: 362 mg/dL, triglycerides: 187 mg/Dl, Bun 36.28 mg/Dl, Creatinine 2.24 mg/dL

The 1x24 hour recall results at the start of hospital admission included severe deficits. Average patient food intake <60%. Previously, the patient's eating history often consumed sweet foods and drinks, rarely consumed vegetables and fruit and sometimes drank herbal medicine and the processing process was often fried.

RESULTS AND DISCUSSION
Nutritional Diagnosis
Based on the cases above, a nutritional diagnosis can be made in the patient, namely:

NI-2.1 Deficiency in oral food and drink intake related to limited food intake due to decreased ability to swallow/chew, indicated by intake before MRS less than standard requirements, namely energy 53.8%, protein 53.9%, fat 61.6%, KH 50 .6%.

NI-5.4 Decreased need for specific nutrients for simple carbohydrates related to endocrine metabolic disorders characterized by GDA 348 mg/dL.

NI-5.4 Decreased need for the specific nutrient sodium related to hypertension as indicated by the results of a clinical physical examination, blood pressure of 212/119 mmHg.

NC-2.2 Changes in laboratory results related to special nutrients related to kidney function disorders are characterized by abnormal BUN and creatinine levels.

NB-1.1 The patient's family's lack of knowledge regarding food and nutrition is related to the patient's family having never received nutrition education, indicated by a history of frequent consumption of sweet foods and drinks, the processing method is often fried.

Nutritional intervention
Energy is given gradually according to the patient's needs and ability to accept food, helping to achieve blood sugar and blood pressure levels within normal limits and avoiding acute complications, provided the diet is met.

Energy is calculated according to needs based on basal energy with an activity factor for bed mobilization patients (10%), a stress factor for complicated DM patients (30%) and a correction for age (10%) of 1625 kcal(PE Indonesia, 2021).

Carbohydrates are given at 65% of total energy, namely 264 grams. Sucrose (sugar) ± 5% of total energy, namely 20 gr and fiber 25 gr/day.

Protein is given at 10% of the total requirement, namely 40.63 grams.

Fat is given at 25% of total energy of 45 grams and cholesterol in the menu is <300 mg/day.

Sodium intake is limited to ≤ 1500 mg/day, adjusted for the severity of salt, water retention and hypertension.

Consume 39 mg/kg BW/day of potassium to help lower blood pressure

Vitamins and minerals are given according to recommended nutritional adequacy.

Liquids in drinks or food sauce are sufficient to be ± 2 liters/day.

The form of food is appropriate to the patient's abilities. Process the menu by reducing table salt, replacing it with spices and garlic.

Reduce consumption of sweet, savory foods, preserved/canned foods, biscuits, crackers, sweet soy sauce. Patient's understanding of nutrition and proper food with the 3J principle (Schedule/j)

Apart from dietary interventions, patients are also given education and counseling to increase knowledge and type/quantity) as well as safe processing methods.

Table 1. Monitoring and Evaluation

| Parameters/indicators	Target	Execution time
Food intake	Intake is increased gradually from 50% to 60%, then to 80% according to the patient's ability	Every day for 3 days
Physical-clinical		Every day
Vital signs: blood pressure, pulse	Vital signs: within normal range	
Patient complaints: nausea, vomiting, dizziness, difficulty swallowing/chewing, sluggishness, hemiparesis	Patient complaints: improved or reduced	
Biochemistry: GDA, creatinine	In normal vulnerability	During hospitalization
Knowledge	There is an increase in knowledge and patients apply it to the patient's next diet	Every day

Discussion

Implementation of the intervention was carried out for 3 days, where on the first

day of intervention, patients were given food with a target intake of >60% orally in soft (porridge) and chopped (side dishes) because the patient experienced nausea, vomiting, dizziness and decreased ability to swallow and chew. . The diet provided is low in simple carbohydrates, low in fat and low in salt, to help lower the patient's blood sugar and blood pressure. The frequency given is 3 x main meals and 3 x snacks.

On the second day of implementation, clinical physical complaints such as difficulty swallowing, nausea began to decrease so that food intake began to increase. And patients begin to learn to mobilize (sit/stand) around the bed and nutrition education regarding nutrition begins to be given gradually. It is hoped that patients can begin to understand the patient's eating arrangements from the diet presented.

On the third day of implementation, the diet order was given in a somewhat rough form in the form of team rice but still a simple low carbohydrate and low salt diet. The patient's intake began to increase to (>70%). Changes to the patient's diet are always coordinated with the doctor, nurse, waiter, patient and patient's family. The results of monitoring the patient's food intake for 3 days can be seen in graph 1.
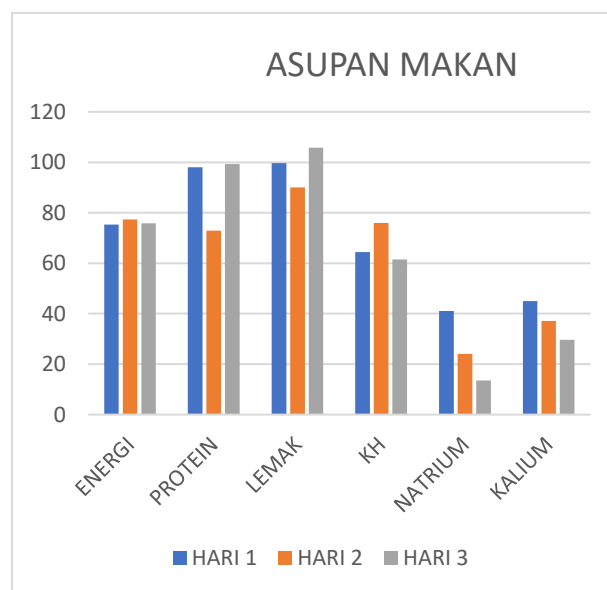
Graph 1. Monitoring Food Intake

Based on graph 1 showing the comparison of patient food intake during 3 days of observation, it can be seen that the average patient food intake is still in the moderate deficit and normal categories. Energy intake 76.16% (moderate deficit), protein 90.09% (normal), fat 98.5 (normal) and KH 67.3 (severe deficit). The results of calculating the patient's needs are 1625 kcal of energy, 61 grams of protein, 36 grams of fat, 264 grams of carbohydrates.

Patients received a simple low carbohydrate diet intervention of 1700 kcal, Low Salt and Low Fat. The hospital diet presented still uses simple carbohydrates but is still

in accordance with the patient's needs and is balanced. According to the ADA (2015), carbohydrate consumption depends on the amount of intake and type of food consumed per day. The amount of carbohydrate consumed from main meals and snacks is more important than the source or type of carbohydrate.

From the results of the 24-hour recall carried out at the beginning of admission to the hospital and the results of monitoring the patient's intake for 2 days, it was found that the percentage of the patient's food consumption was increasing because the patient's condition began to improve day by day, although the increase in intake was still gradual. For monitoring, intake on day 3 experienced a slight decrease because the form of food was replaced with a coarser one, namely from rice porridge to rice. It can be seen that the patient's swallowing and chewing condition has not yet completely improved, but the patient's food intake motivation is still good. Difficulty swallowing liquids and/or food often occurs in stroke patients, where there is dysfunction and incoordination of the pharyngeal and central nervous muscles which result in loss of control over swallowing function.(Gold et al., 2014).

Average fat intake and protein intake are in the normal category. This is because the animal and vegetable side dishes given by the patient are consumed well. The side dishes are given to patients in chopped form, making it easier for patients to consume them. Apart from this, the patient's food processing process does not use too much oil or coconut milk, where the diet given is low in fat. Diets tend to be high in protein, fat and high in calories but low in fiber, which will lead to an imbalance in nutritional intake. This condition is a risk factor for stroke and diabetes mellitus. There is a relationship between fat intake and blood sugar levelsblood of diabetes mellitus sufferers(Widyasari et al., 2022).

Based on the graph above, it can be seen that sodium intake for 3 days is a deficit/still below the threshold limit, namely the standard low salt diet≤1500mg (AHA, 2020). Sodium intake needs to be limited to reduce blood pressure and disease severity. Setting a low salt diet is very important for stroke sufferers who have a history of hypertension. For patients who are given a low salt diet, more education is needed so that it does not reduce their appetite. The implementation of a low salt diet can be implemented well if hypertension sufferers have good knowledge, attitudes and family support regarding the implementation of a low salt diet and have the awareness to control their blood pressure.(Zahidah, 2020).

Based on the graph above, the average potassium intake for 3 days is still classified as a deficit compared to the standard. Food sources that contain more potassium are vegetables and fruit. In presenting the patient's diet, the portion of vegetables and fruit is still considered insufficient because the patient's condition is still difficult to swallow (has not fully recovered) and it is difficult to consume coarse/fibrous foods.

The average amount of fiber in the hospital diet served to Mrs MST for 3 days was 10.8

grams. Consuming 25 grams of fiber per day is useful for helping lower blood sugar levels, namely by increasing feelings of fullness for longer and preventing constipation and cholesterol. Too much cholesterol in the blood vessels will inhibit blood flow, resulting in an increase in blood pressure(Waloya et al., 2013).

From the results of the clinical data examination above, there are changes in the patient's blood pressure which have decreased but have not yet reached normal. For physical data, it is known that the patient's general condition has begun to improve gradually, although the physical symptoms are still there, such as the patient's body is still weak and he cannot sit or stand independently and his speech is still slurred. Uncontrolled and untreated diabetes mellitus can cause complications. The main complications that can arise are heart attack, kidney failure, gangrene and stroke (Price & Wilson, 2006).

From the results of the examination above, it can be concluded that the GDA, GDP and 2JPP values have decreased but have not yet reached normal. This indicates that the medical therapy and nutritional care provided can change the patient's blood sugar values for the better. In principle, diabetes mellitus sufferers must adjust their diet. This can be done by paying attention to the number of calories and nutrients needed, the type of food ingredients, etcrate of regularity of eating schedule(Susilowati & Waskita, 2019). A bad diet will cause an increase in glucose levels in the blood and if this continues for a long time it can cause complications(Widiyoga et al., 2020).

Nutrition diagnosis in overcoming patient disease problems through a standardized nutritional care process (PAGT) during the 3 day intervention, namely the lack of oral intake has improved and the problem of lack of knowledge related to nutrition can be improved. This can be known from the patient's knowledge based on daily education and nutritional counseling. Patients and their families enthusiastically ask questions and can mention foods that need to be avoided and limited for patients with diabetes mellitus complicated by stroke as well as regulatory principleseat 3J (amount/type/schedule). Furthermore, while at home, further monitoring of compliance and implementation of the recommended diet is required. The research results show that there is a strong relationship between diet and the 3J principles which will affect the blood sugar of people with diabetes mellitus(Bistara, 2018).

CONCLUSION

The intervention given for 3 days in the form of diet and education can change the patient's general condition for the better. There was an increase in food intake, clinical physical and biochemical values improved. Nutritional diagnosis for intake and knowledge can be carried out and completed. Patient knowledge based on education and counseling can be said to increase because patients can mention foods to avoid or consume. We conducted this research only over a period of 3 days, the data we collected was incomplete so the discussion was not yet sharp. In the future, interventions and

longer observations of patients can be carried out so that sharper discussions provide more benefits for researchers and society.

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