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Effectivenessitas of Nutritional Management in Diabetes Mellitus Type II Nursing Care with Nutrition Deficit Nursing Problems

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ABSTRACT
Type II Diabetes Mellitus is a chronic condition caused by impaired carbohydrate metabolism, which leads to insufficient insulin production. This study aims to assess the effectiveness of tailored nutritional interventions in improving the nutritional status and blood glucose control of patients. Using a descriptive design case study approach to explore the implementation of nutrition management in nursing care in type II diabetes mellitus patients with nutritional deficit problems. The study shows that that most respondents were between the ages of 51-60 years who were predominantly female indicating that lifestyle and hormonal factors may contribute to a higher risk of diabetes complications in women. Therefore, the importance of a comprehensive approach to nutrition management, tailored to the specific metabolic needs of patients, and underscores the important role of nurses in promoting integrated nutrition care.

Keyword: *Diabetes Mellitus, Nutrition Management, Nursing Care, Nutritional Deficit, Type II Diabetes*

INTRODUCTION

Diabetes mellitus is a chronic disease caused by a disruption in carbohydrate metabolism. This condition occurs when the pancreas fails to produce enough insulin to meet the body's needs. Common symptoms of diabetes include blurred vision, rapid weight loss, overeating (Polipagio), excessive drinking (Polydipsi), and excessive urination (Polyuria) by Lukman, dkk. (2023). Type II diabetes is a prevalent global health issue, with an estimated 537 million people affected in 2021 and a projected increase to 783 million by 2045 (Indonesian Ministry of Health, 2021). This disease is a leading cause of death and disability. One major challenge for diabetes patients is maintaining a

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balanced diet, as dietary imbalance can worsen their metabolic status and lead to nutritional deficiencies.

The problem of nutritional deficiencies in patients with type II diabetes arises from impaired glucose metabolism, which causes the body to use fat and protein reserves as a source of energy. This condition affects weight loss, physical weakness, and increases the risk of complications such as diabetic ketoacidosis (Smeltzer & Bare, 2020). This situation requires a comprehensive approach through appropriate nutritional management, including the regulation of carbohydrate, protein, and fat intake tailored to specific metabolic needs. In terms of nursing care, nurses have an important role to play in promoting integrated nutrition management, particularly for patients who are experiencing care problems related to nutritional deficits.

According to several studies, an unbalanced diet, especially an imbalance between protein, carbohydrate and energy intake, has been shown to significantly increase the risk of diabetes mellitus. Research by Widiastuti et al. showed that a high-carbohydrate, low-protein diet can trigger blood sugar spikes and obesity, which are major risk factors for diabetes (Widiastuti et al., 2024). In addition, nutritional imbalances, such as excessive carbohydrate intake, can lead to elevated blood glucose levels and trigger diabetic complications.

A balanced diet that includes the right proportion of protein, carbohydrates and energy is essential to prevent diabetes, while an irregular and unbalanced diet can increase the risk of this disease. An understanding of good nutrition and dietary management also plays an important role in managing the profile of diabetic patients, as revealed by (Rahmatiah et al., 2022). Type II Diabetes Mellitus is twice as likely to occur in those with high BMI compared to those with low BMI (Susanti, Shobur & Retno, 2021).

Nutritional management in patients with type II diabetes mellitus has been the subject of several studies. According to Alfian et al. (2022), nutrition education for individuals with type II diabetes can considerably enhance nutritional status and blood sugar control. The significance of a customized approach to nutrition management that takes the patient's preferences and energy requirements into account was emphasized in another study carried out by the American Diabetes Association (2023). However, these studies frequently overlook the incorporation of nutrition management into comprehensive nursing care in favor of concentrating solely on medical interventions or educational components.

In terms of providing nursing care for diabetes mellitus, particularly diabetes mellitus with nutritional deficit issues, nurses are crucial to the disease's treatment and recovery. According to the aforementioned figures, the number of individuals with diabetes mellitus has been rising annually. Therefore, the authors are interested in carrying out the Implementation of Nutritional Management in Type II Diabetes Mellitus Nursing Care with Nutrition Deficit Nursing Problems at Puding Health Center, Muaro Jambi Regency.

METHODS

This study used a descriptive design with a case study approach to explore the implementation of nutritional management in nursing care for patients with type II diabetes mellitus

with nutritional deficit problems at Puding Health Center, Muaro Jambi Regency. The research subjects were patients with type II diabetes mellitus who experienced nutritional deficits, who were purposively selected with the inclusion criteria of being ≥18 years old, diagnosed with type II diabetes, and willing to participate in the study. The research procedure began with data collection through in-depth interviews with patients and nurses, direct observation of the implementation of nutrition management interventions, and review of medical records to obtain data on the nutritional status of patients. The instruments used in this study include semi-structured interview guidelines, observation sheets, and nutritional status checklists that refer to international standards (WHO, 2021). The data collected was then analyzed qualitatively using the thematic analysis method to identify themes related to the effectiveness of nutritional management and changes in patients' nutritional status. Data validity was ensured by triangulation of methods and member checking.

RESULTS

1. Respondent Characteristics

Characteristics of respondents consisting of age, gender, nutritional status, and disease duration are presented in Table 1 as follows:

Table 1. Characteristics Respondent

Characteristics	Frequency (n)	Percentage (%)
Age		
40-50 years old	8	26,7
51-60 years old	14	46,7
>60 years old	8	26,7
Gender		
Laki-laki	12	40
Perempuan	18	60
Nutritional Status (BMI)		
Kurang Gizi (<18,5)	7	23,3
Normal (18,5-24,9)	20	66,7
Overweight (>24,9)	3	10
Duration of Diabetes		
<5 years	9	30
5-10 years	14	46,7
>10 years	7	23,3

The results of this table show that the majority of respondents were in the 51–60 age group (46.7%) and were female (60%). Most respondents had normal nutritional status (66.7%), with others experiencing malnutrition (23.3%) and overweight (10%). Based on the duration of diabetes, the majority of respondents had suffered from it for 5–10 years (46.7%). This illustrates that the respondents were predominantly middle-aged, female, with normal nutritional status, and had been living with diabetes for quite some time.

2. Nutritional Status After and Before Intervention

Changes in patients' nutritional status were measured based on BMI, HbA1c levels, and body weight before and after the implementation of nutritional management, which are presented in Table 2:

Table 2. Nutritional Status After and Before Intervention

Indikator	Before Intervention (Mean ± SD)	After Intervention (Mean ± SD)	p-Value
BMI (kg/m²)	18,6 ± 2,4	20,1 ± 1,9	<0,05
HbA1c (%)	8,2 ± 1,3	7,3 ± 1,1	<0,01
Body weight (kg)	48,3 ± 4,0	51,2 ± 3,5	<0,05

The results of this table indicate that there was an improvement in the patient's nutritional status after the nutrition management intervention. This was indicated by an increase in BMI from 18.6 to 20.1 and weight gain from 48.3 kg to 51.2 kg ($p<0.05$), as well as a decrease in HbA1c levels from 8.2% to 7.3% ($p<0.01$). These results indicate that the intervention was effective in improving the patient's nutritional status and glycemic control.

3. Effectiveness of Nutrient Management

The effectiveness of nutritional management shows changes in the level of patient compliance with nutritional management after nutrition education and dietary management interventions. Compliance was measured based on diet, physical activity, and nutrition education provided to patients, which is presented in Table 3 as follows:

Table 3. Effectiveness of Nutrient Management

Intervention Aspect	Compliance Before (%)	Compliance After (%)	Increase (%)
Dietary compliance	50	85	35
Physical activity	40	75	35
Nutrition education	60	90	30

The results of this table indicate that nutritional management is effective in improving patient compliance. This is evident in the increase in adherence to diet from 50% to 85% (a 35% increase), physical activity from 40% to 75% (a 35% increase), and understanding through nutrition education from 60% to 90% (a 30% increase). Overall, the intervention significantly improved patient compliance across all aspects.

4. Monitored Complications

Complications observed in patients with type II diabetes mellitus after the implementation of nutritional management showed a decrease in the number of complications related to nutritional status. Table 4 illustrates the changes in the number of patients who experienced complications such as physical weakness, drastic weight loss, and hypoglycemia.

Table 4. Monitored Complications

Intervention Aspect	Compliance Before (%)	Compliance After (%)	Increase (%)
Dietary compliance	50	85	35
Physical activity	40	75	35
Nutrition education	60	90	30

The results from this table indicate that after implementing nutritional management, there was a significant improvement in patient compliance with diet, physical activity, and nutrition education, increasing by 35%, 35%, and 30%, respectively. This increased compliance contributed to a decrease in complications in patients with type II diabetes mellitus, such as physical weakness, drastic weight loss, and hypoglycemia. This indicates that nutritional management is effective in improving patient health while reducing the risk of complications.

DISCUSSION

Based on the results of the analysis presented, it shows that the implementation of nutritional management has a positive impact on nutritional status, patient compliance, and a decrease in complications in patients with type II diabetes mellitus. The following is a more detailed discussion of the results of this study.

1. Characteristics of Respondents

Based on the results of the study, most respondents were 51-60 years old (46.7%). This shows that type II diabetes mellitus is more common in the middle-aged to elderly age group. The aging process contributes to insulin resistance and decreased pancreatic function, which can increase the risk of developing type II diabetes mellitus (ADA, 2020). In addition, 60% of the respondents were female, which is supported by other studies showing that women have a higher susceptibility to type II diabetes mellitus due to hormonal factors and metabolic changes, especially after menopause.

The nutritional status of the respondents indicated that the majority exhibited a normal body mass index (BMI) (66.7%), while 23.3% were undernourished and 10% were overnourished.Malnutrition in diabetics has been demonstrated to exert a detrimental effect on metabolic balance, to compromise immune system function, and to elevate the risk of hypoglycaemia due to diminished energy reserves in the body. Conversely, overnutrition or obesity in diabetics can worsen insulin resistance, increase the risk of complications such as heart disease, hypertension, and diabetic neuropathy (Indriasari, 2019).Research by Purnawati (2019) states that nutritional deficits in diabetics often occur due to metabolic disorders that cause the body to use more energy reserves from fat and protein.In addition, the duration of the disease showed that most respondents had lived with diabetes for 5-10 years (46.7%). Indriasari's research (2019) posits that the duration of diabetes impacts the likelihood of complications arising from metabolic imbalances and uncontrolled blood glucose levels. Consequently, the maintenance of optimal nutritional status emerges as a pivotal component in diabetes management, aiming to avert the onset of severe complications.

2. Nutritional Status Before and After Intervention

A nutritional management intervention constitutes a comprehensive approach involving dietary adjustments, nutrition education, and monitoring of nutrient intake with the aim of improving the nutritional status of diabetic patients.The results demonstrated that this intervention had a significant impact on nutritional status, as evidenced by an increase in Body Mass Index (BMI), a decrease in HbA1c levels, and an increase in body weight. The increase in BMI from 18.6 ± 2.4 to 20.1 ± 1.9 kg/m² showed a statistically significant improvement in nutritional status ($p < 0.05$), indicating that the nutritional intervention helped patients with malnutrition achieve a healthier weight. This finding is in line with a study by Franz et al. (2015), which showed that appropriate nutritional interventions can improve the BMI of malnourished diabetic patients.

The decrease in HbA1c levels from 8.2 ± 1.3% to 7.3 ± 1.1% ($p < 0.01$) further corroborates the efficacy of nutrition education in regulating blood sugar levels, which is a crucial component in the management of diabetic patients, as it has been shown to reduce the risk of long-term complications. The findings of the present study are corroborated by those of the study by Evert et al. (2019), which states that adherence to a healthy diet contributes to a reduction in HbA1c levels by 0.3-1.0%.

In addition to improvements in BMI and blood sugar control, the nutritional management intervention also resulted in an increase in patient weight from 48.3 ± 4.0 kg to 51.2 ± 3.5 kg ($p < 0.05$). This suggests that patients with chronic energy deficit can experience improved nutritional status with the right nutritional approach. A study by Sari et al. (2023) found that nutrition education involving patients and families not only improved their understanding of diabetes management, but also contributed to a decrease in blood sugar levels from an average of 299 mg/dL to 202 mg/dL after the intervention.

Consequently, nutrition management interventions that incorporate education, suitable diet planning, and regular monitoring have been identified as pivotal in enhancing the nutritional status and optimising metabolic control of diabetic patients, thereby reducing the risk of long-term complications.

3. Effectiveness of Nutrition Management in Improving Adherence

After the intervention, dietary compliance increased from 50% to 85% (+35%), physical activity compliance increased from 40% to 75% (+35%), and nutrition education increased from 60% to 90% (+30%). These improvements suggest that nutrition education and dietary management can improve patients' awareness and compliance in managing their diabetes. Research by Jafar et al. (2019) showed that continuous nutrition education can deepen patients' understanding of the importance of diet and physical activity in controlling diabetes.

4. Decrease in Complications After Intervention

The decline in the prevalence of adverse outcomes, including physical weakness (-62.5%), extreme weight loss (-66.7%), and hypoglycaemia (-62.5%), underscores the significance of adequate nutritional management in mitigating the risk of complications in individuals with type II diabetes mellitus (DM). Effective nutritional management not only addresses the energy and nutritional

requirements of patients but also contributes to the maintenance of stable blood glucose levels, thereby reducing the likelihood of long-term complications.

Research conducted by Lukman et al. (2021) demonstrates the efficacy of nutritional management in type II DM nursing care in overcoming nutritional deficits and preventing complications. Furthermore, research by Retno et al. (2020) also found that optimal nutritional management can help reduce the incidence of hypoglycaemia and improve metabolic stability in diabetic patients.

To ensure the validity of the research results regarding the effectiveness of nutritional management in reducing diabetes complications, a triangulation approach was employed, combining various data collection methods, such as in-depth interviews with patients and medical personnel, direct observation of changes in patient conditions, and analysis of medical records. This triangulation approach allows for a more accurate evaluation of the impact of nutritional interventions, ensuring that the observed reduction in complications is truly due to the proper implementation of nutritional management. This finding serves to further substantiate the evidence that a meticulously formulated and scientifically substantiated nutritional approach contributes to enhancing the quality of life of patients with type II DM and mitigating the risk of complications that can exacerbate their health condition.

CONCLUSIONS

The results of this study show that the implementation of nutrition management plays a significant role in improving nutritional status, patient compliance, and reducing complications in patients with type II diabetes mellitus. Interventions in the form of nutrition education and dietary management proved effective in increasing adherence to a healthy diet and physical activity, which in turn had a positive impact on controlling HbA1c levels, increasing BMI, and improving body weight. In addition, the decreased incidence of complications such as physical weakness, drastic weight loss, and hypoglycemia indicates that nutritional management can play a role in preventing the long-term negative effects of diabetes mellitus. Therefore, nutritional interventions should be an integral part of diabetes management to improve patients' quality of life.

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