The Impact of Carbohydrate Low Absorption Diet Nursing on the Quality of Life of Elderly Patients with Type 2 Diabetes

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Abstract: Objective: To explore the effect of carbohydrate low absorption diet nursing on elderly patients with type 2 diabetes, analyzing their quality of life and incidence of hypoglycemia. Methods: A retrospective analysis was conducted on 100 elderly patients with type 2 diabetes at our hospital from January 2024 to December 2024. Patients were divided into two groups based on different nursing measures: 50 cases in the control group received routine diabetes diet nursing, and 50 cases in the observation group received carbohydrate low absorption diet nursing. The quality of life, blood glucose levels, and hypoglycemia incidence were observed and compared. Results: After 3 months of nursing, the quality of life score in the observation group was higher than that in the control group ($P < 0.05$); blood glucose indicators in the observation group were lower than those in the control group after 3 months of nursing ($P < 0.05$); the hypoglycemia incidence was 2.00% in the observation group, which was lower than the 18.00% in the control group ($P < 0.05$). Conclusion: Carbohydrate low absorption diet nursing can reduce the incidence of hypoglycemia in elderly patients with type 2 diabetes, improve their quality of life, and enhance blood glucose control.

***Keywords*:** type 2 diabetes; carbohydrate low absorption diet nursing; quality of life; blood glucose management; hypoglycemia

1. Introduction

For the elderly population, type 2 diabetes is a common chronic metabolic disease caused by factors such as poor sleep, malnutrition, and lack of exercise. It severely impacts the patient's physical health and quality of life, while also leading to metabolic disorders of carbohydrates and fats [1]. If not treated in time, the condition may worsen and cause damage to the heart and kidneys. Oral hypoglycemic drugs and insulin injections are conventional treatments. However, due to limited understanding, long treatment periods, and poor adherence, patients often experience strong negative emotions during treatment. Clinical research has confirmed that diabetes is closely related to the patient's daily diet. A carbohydrate low absorption diet can help control blood glucose levels, reduce the occurrence of hypoglycemia, and improve quality of life and sleep quality in elderly type 2 diabetes patients. However, due to the influence of long-standing dietary habits, it is challenging to restrict carbohydrate intake. Therefore, dietary nursing must be carefully managed to avoid excessive restriction of carbohydrate intake in elderly type 2 diabetes patients while controlling blood glucose. Based on this, a carbohydrate low absorption diet nursing intervention was applied to 100 elderly type 2 diabetes patients. Data analysis for the period from January 2024 to December 2024 is as follows:

2. Research Subjects and Methods

2.1 General Information

A total of 100 elderly patients with type 2 diabetes were included from January 2024 to December 2024. Inclusion criteria: Age ≥ 60 years, all elderly patients; disease duration ≤ 10 years, not receiving insulin treatment; postprandial 2-hour blood glucose ≥ 11.1 mmol/L; normal cognitive function and communication ability; all patients voluntarily participated in the study; fasting blood glucose ≥ 7.0 mmol/L; no other diseases interfering with the study; meeting the diagnostic criteria for type 2 diabetes in the Guidelines for Integrative Medicine Treatment of Type 2 Diabetes [2]. Exclusion criteria: History of hormone therapy; presence of diabetic foot, ketoacidosis; severe primary diseases such as liver, kidney, or cardiovascular and cerebrovascular dysfunction; abnormal coagulation function; low compliance; unclear consciousness or abnormal cognitive function. The subjects were randomly assigned into the control group (33 male, 17 female, disease duration 2-9 years, average (7.88 ± 0.48) years, age 60-89 years, average (68.89 ± 4.22) years, HbA1c (11.22 ± 2.33)%, BMI 22.32-27.66 kg/m², average (24.11 ± 0.92) kg/m²) and the observation group (35 male, 15 female, disease duration 2-9 years, average (7.89 ± 0.46) years, age 60-90 years, average (68.88 ± 4.15) years, HbA1c (11.10 ± 2.66)%, BMI 22.35-27.44 kg/m², average

(24.25 ± 0.95) kg/m²). No statistically significant difference in baseline data was found between the two groups (P > 0.05).

2.2 Methods

Control Group: Routine diabetes diet nursing. The nursing staff provided systematic education on physical exercise, medication, and daily diet, guiding patients to engage in activities such as walking and Tai Chi, with the intensity and duration adjusted according to each patient's tolerance. The nursing staff also distributed a diabetes health diet manual to the patients, with continuous intervention for 3 months.

Observation Group: Carbohydrate low absorption diet nursing. A professional nutritionist designed personalized dietary plans based on the patient's weight, age, gender, dietary preferences, and blood glucose levels. The dietary plan included:Meal Planning: A small meal, multiple times approach, with 5-6 meals per day—three main meals and three snacks. Food Pairing: Each meal should include protein, vegetables, and appropriate healthy fats. The daily intake of staple foods and side dishes was 150-200g per person, with poultry and fish as the main sources of meat, and vegetable intake ranging from 500-1000g.Monitoring and Adjustment: Regular monitoring of the patient's physical response and nutritional status, ensuring that the intake of vitamins, carbohydrates, fats, and proteins was balanced. The dietary plan was adjusted flexibly to ensure that carbohydrate absorption was controlled while meeting the patient's nutritional needs. Both groups were required to limit saturated fat intake to below 10% of total daily calories. The recommended daily caloric intake was 1400-1800 kcal, with continuous intervention for 3 months.

2.3 Observation Indicators

(1) Quality of Life [3]: The World Health Organization Quality of Life Assessment-BREF (WHOQOL-BREF) was used to assess the patients' quality of life before and 3 months after nursing. It includes 26 items covering four domains: social, physical, environmental, and psychological. The higher the quality of life, the higher the score. The total score is 100 points.

(2) Blood Glucose Indicators [4]: Blood glucose was assessed before and 3 months after nursing. The following indicators were analyzed: postprandial 2-hour blood glucose (2hPBG), hemoglobin A1c (HbA1c), and fasting blood glucose (FPG).

(3) Hypoglycemia: The incidence of hypoglycemia was calculated as the number of hypoglycemia cases/total number of samples * 100%.

2.4 Statistical Methods

Data on general information, blood glucose indicators, hypoglycemia incidence, and quality of life scores were entered into SPSS 25.0 statistical software.Count data are expressed as percentages (%), and x2 test is used.. Measurement data were expressed as mean ± standard deviation (±s), and t-tests were used. P < 0.05 was considered statistically significant.

3. Results

3.1 Comparison of Quality of Life Between the Two Groups

After 3 months of nursing, the quality of life in the observation group was higher than that in the control group (P < 0.05). See Table 1.

Table 1. Comparison of Quality of Life Between the Two Groups (x±s, points)

Group	Sample Size	Before Nursing	After Nursing
Observation Group	50	57.54±2.03	92.22±4.19*
Control Group	50	57.68±2.16	82.07±3.13*
t-value		0.334	13.723
P-value		0.739	0.000

Note: Compared with before nursing, *P < 0.05

3.2 Comparison of Blood Glucose Indicators Between the Two Groups

After nursing, the observation group showed lower levels than the control group (P < 0.05). See Table 2.

Table 2. Comparison of Blood Glucose Indicators Between the Two Groups (x±s)

Group	Sample Size	HbA1c(%)		2hPBG(mmol·L^{-1})		FPG(mmol·L^{-1})	
		Before Nursing	After Nursing	Before Nursing	After Nursing	Before Nursing	After Nursing
Observation Group	50	11.22±2.33	6.52±1.11*	13.62±3.15	7.32±2.17*	11.69±2.11	6.34±1.42*
Control Group	50	11.10±2.66	8.46±2.24*	13.55±3.44	9.22±2.08*	11.55±2.78	8.22±2.35*
t-value		0.240	5.487	0.106	4.469	0.284	4.842
P-value		0.811	0.000	0.916	0.000	0.777	0.000

Note: Compared with before nursing, *P < 0.05

3.3 Hypoglycemia Incidence After Intervention in Both Groups

The incidence of hypoglycemia in the observation group (2.00%) was lower than that in the control group (18.00%) (P < 0.05). See Table 3.

Table 3. Hypoglycemia Incidence [n(%)]

Group	Sample Size	Hypoglycemia Cases	Total Incidence Rate (%)
Observation Group	50	1(2.00)	1(2.00)
Control Group	50	9(18.00)	9(18.00)
X^2-value			7.111
P-value			0.008

4. Discussion

For patients with type 2 diabetes, hyperglycemia is a primary characteristic. If not managed effectively, it can lead to hypoglycemia, which, in severe cases, may result in coma or death. Analysis of the pathological mechanisms of type 2 diabetes reveals common pathogenic factors, such as genetic factors, microbial infections, toxins, and immune system disorders. It is generally believed that the condition is caused by glucose metabolism imbalance in the body, leading to endocrine dysfunction [5]. The treatment process becomes complex due to individual differences among patients, and long-term medication use to maintain blood glucose levels may lead to drug resistance. Therefore, combining dietary management is crucial for enhancing patients' daily blood glucose control capabilities.

A reasonable dietary plan can help stabilize blood glucose levels, ensure sleep quality, and significantly improve the quality of life. It can also reduce patients' body weight and increase their metabolic rate. In this study, the low-carbohydrate absorption dietary intervention primarily refers to limiting the intake of carbohydrates to no more than 45% of total daily caloric intake, or to a range of 30-200g per day, and maintaining energy balance by increasing the intake of proteins and fats. In China, people typically consume carbohydrates daily, and excessive restriction is not advisable. Personalized guidance should be provided according to the dietary preferences of elderly type 2 diabetes patients, gradually reducing carbohydrate intake to control their blood glucose levels.

The results of this study show that, after 3 months of nursing care, the observation group had higher quality of life scores than the control group; the blood glucose indicators in the observation group were lower than those in the control group; and the hypoglycemia rate in the observation group was 2.00%, significantly lower than the 18.00% in the control group. The reasons for these results can be analyzed as follows: In elderly type 2 diabetes patients, controlling carbohydrate intake and emphasizing foods rich in fiber can lower postprandial blood glucose peaks and fluctuations. The foods consumed not only increase satiety but also delay sugar absorption, further improving blood glucose management. Long-term adherence to a low-carbohydrate absorption diet can improve insulin sensitivity, facilitate weight management, reduce abdominal fat accumulation, and enhance quality of life [6]. Moreover, this dietary model helps reduce rapid increases and extreme fluctuations in blood glucose levels, ensuring optimal blood glucose control while limiting the intake of high glycemic index foods. This model also encourages increased dietary fiber intake, which helps stabilize blood glucose and reduce the risk of hypoglycemia.

In conclusion, for elderly patients with type 2 diabetes, adopting a low-carbohydrate absorption dietary intervention leads to a lower incidence of hypoglycemia, improved blood glucose levels, and enhanced quality of life. This approach is suitable for clinical application and promotion.

References

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