

Analysis of The Effect of Comprehensive Nursing Intervention on Improving Blood Sugar Levels and Treatment Compliance in Elderly Patients with Diabetes

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Abstract: *Objective:* To analyze the effect of comprehensive nursing intervention on improving blood glucose levels and treatment compliance in elderly patients with diabetes. *Methods:* One hundred and forty-eight elderly patients with diabetes were selected and randomly divided into a control group and an observation group, with 74 cases each. The control group received routine nursing intervention and the observation group received comprehensive nursing intervention. The blood sugar levels, treatment compliance, and nursing satisfaction of the two groups of patients before and after intervention were compared. *Results:* After the intervention, the fasting plasma glucose (FPG) ($t = 7.729$), 2 hours postprandial glucose (PPG) ($t = 8.343$), and HbA1c ($t = 6.929$) levels of patients in the observation group were significantly lower than those in the control group ($P < 0.001$). The observation group (71/95.95%) had a higher compliance rate than the control group (54/72.97%) ($\chi^2 = 14.877$, $P < 0.001$). The comprehensive nursing satisfaction rate of the observation group (73/98.65%) was higher than that of the control group (56/75.68%) ($\chi^2 = 17.451$, $P < 0.001$). *Conclusion:* In caring for elderly patients with diabetes, comprehensive nursing intervention effectively reduced patients' blood sugar levels and improved treatment compliance and nursing satisfaction.

Keywords: Elderly; Diabetes; Blood sugar; Compliance; Comprehensive nursing intervention

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1. Introduction

With the development of society and the acceleration of population aging, managing geriatric diseases has become one of the major challenges faced by the public health field. As a chronic metabolic disease, the incidence of diabetes mellitus (DM) is increasing globally, especially among the elderly. Due to the combined effects of physiological, psychological, and social factors, elderly patients with DM have particularly prominent problems with blood sugar control and treatment compliance^[1]. Poor blood sugar control will not only aggravate the complications of diabetes, such as cardiovascular disease, nephropathy, and retinopathy but also significantly

reduce the patient's quality of life and increase their medical burden ^[2]. Recently, comprehensive nursing intervention, as a comprehensive and multi-faceted management strategy, has been confirmed by several studies to significantly improve blood sugar levels and improve treatment compliance in DM patients ^[3]. This intervention includes not only traditional blood glucose monitoring and drug treatment but also health education, psychological support, diet, exercise guidance, etc., aiming to improve the patient's self-management abilities and promote the development of healthy behaviors. Given the special challenges faced by elderly patients with diabetes in terms of blood glucose control and treatment compliance, this study aims to improve the blood glucose control level and treatment compliance of elderly patients with diabetes by exploring the improvement effect of comprehensive nursing intervention in elderly patients with diabetes, thereby improving its quality of life.

2. Materials and methods

2.1. General information

This study included 148 elderly patients with DM who were randomly divided into a control group and an observation group of 74 patients each. Exclusion criteria: (1) Below 60 years old; (2) serious complications such as diabetic nephropathy and diabetic foot; (3) other serious diseases or health problems such as cardiovascular disease and malignant tumors (4) cognitive impairment and unwillingness to participate in this study. Inclusion criteria: (1) Aged 60 years and above; (2) meet the diagnostic criteria for diabetes established by the World Health Organization (WHO); (3) diabetes duration is more than 3 months; (4) able to communicate properly and consented.

2.2. Method

The control group received routine nursing intervention. The patient's condition and blood sugar were monitored. Promotional materials about diabetes were distributed to patients and they were guided on medication.

The observation group received a comprehensive nursing intervention that included the following aspects. The causes, symptoms, complications, and prevention methods of diabetes were explained to the elderly patients and their families to improve their understanding of the disease. The patients were taught how to use blood glucose monitoring equipment correctly, including the use of blood glucose meters, blood glucose recording methods, and normal identification of the blood sugar range. The mechanism of action, usage, and precautions of various types of anti-diabetic drugs were explained to the patients, as well as the possible adverse reactions and countermeasures. Media platforms such as WeChat and Douyin were used for promoting related information.

Detailed medication records for elderly patients were established, including drug names, dosage, and time of drug administration, to ensure patients adhered to the medication instructions. The reactions of elderly patients after taking medication were closely monitored, especially for common adverse reactions such as hypoglycemia, and prompt measures were taken when necessary. The importance of regular medication was emphasized, and patients were educated to avoid arbitrarily increasing or decreasing drug dosage or discontinuing medication without prior consultation.

The mental state of elderly patients was regularly assessed to understand their concerns and needs, and emotional support was provided to relieve the patient's negative emotions such as anxiety and depression. The patient's confidence and treatment compliance were then enhanced. The elderly patient's bad mentality was corrected and a positive attitude towards life was established through cognitive behavioral therapy.

Personalized exercise plans were developed based on the physical condition and athletic ability of elderly patients, including exercise type, intensity, and frequency. The elderly patients were educated on how to avoid injuries during exercise, such as choosing appropriate sports shoes, wearing appropriate clothing, and avoiding fasting exercises. The exercise effects of elderly patients were regularly evaluated and the exercise plans were adjusted based on their feedback to ensure the safety and effectiveness of exercise.

Personalized diet plans were developed based on the nutritional needs and blood sugar status of elderly patients, including meal arrangements, food types, and calorie intake. The patients were advised to consume low-sugar, low-fat, and high-fiber foods. Elderly patients were encouraged to develop healthy eating habits through education and guidance, such as eating regularly, chewing slowly, and avoiding overeating.

Before the elderly patients are discharged from the hospital, the precautions to be taken at home, including guidance on diet, exercise, and medication were explained in detail. A follow-up plan was developed, including follow-up time, location, and methods, to ensure that the elderly patients received continuous health guidance and support after discharge. The elderly patients and their families were also educated on how to respond to emergencies such as hypoglycemia and hyperglycemia, and in preparing emergency medication and seeking timely medical assistance.

2.3. Observation indicators

In this study, fasting blood glucose (FPG), 2-hour postprandial blood glucose (P2HPG), and glycated hemoglobin (HbA1c) were used to evaluate the patient's blood sugar levels. A self-made compliance scale was used to evaluate the patient's treatment compliance and a self-made questionnaire was used to survey the patient's satisfaction with care.

2.4. Statistical methods

The SPSS 20.0 software was used to analyze the research data. The measurement data were expressed as mean \pm standard deviation and the count data were expressed as %. Measurement data were analyzed using a *t*-test, and count data were analyzed using a chi-squared (χ^2) test. Results were considered statistically significant at $P < 0.05$.

3. Results

3.1. Comparison of blood glucose levels between the two groups of patients

As shown in Table 1, after the intervention, the FPG, P2HPG, and HbA1c of patients in the observation group were significantly lower than those in the control group ($P < 0.001$).

Table 1. Comparison of blood glucose levels between the two groups of patients, (mean \pm standard deviation)

Blood sugar index	Time	Control group (<i>n</i> = 74)	Observation group (<i>n</i> = 74)	<i>t</i>	<i>P</i>
FPG (mmol/L)	Before intervention	8.75 \pm 1.59	8.79 \pm 1.62	0.152	0.880
	After intervention	7.53 \pm 0.85	6.59 \pm 0.61	7.729	0.000
P2HPG (mmol/L)	Before intervention	14.63 \pm 1.65	14.65 \pm 1.68	0.073	0.942
	After intervention	10.43 \pm 1.38	8.65 \pm 1.21	8.343	0.000
HbA1c (%)	Before intervention	8.62 \pm 1.29	8.63 \pm 1.28	0.047	0.962
	After intervention	7.16 \pm 0.79	6.38 \pm 0.56	6.929	0.000

3.2. Comparison of treatment compliance between the two groups of patients

As shown in **Table 2**, the observation group had a higher rate of compliance (71/95.95%) as compared to the control group (54/72.97%) ($\chi^2 = 14.877$, $P < 0.001$).

Table 2. Comparison of treatment compliance between the two groups of patients, ([n (%)])

Adherence indicators	Control group (n = 74)	Observation group (n = 74)	χ^2	P
Excellent compliance	22 (29.73%)	58 (78.38%)	-	-
Good compliance	32 (43.24%)	13 (17.57%)	-	-
Poor compliance	20 (27.03%)	3 (4.05%)	-	-
Excellent compliance rate	54 (72.97%)	71 (95.95%)	14.877	0.000

3.3. Comparison of nursing satisfaction between the two groups of patients

As shown in **Table 3**, the comprehensive nursing satisfaction rate of the observation group (73/98.65%) was higher than that of the control group (56/75.68%) ($\chi^2 = 17.451$, $P < 0.001$).

Table 3. Comparison of nursing satisfaction between the two groups of patients, ([n (%)])

Satisfaction	Control group (n = 74)	Observation group (n = 74)	χ^2	P
Very satisfied	24 (32.44%)	61 (82.43%)		
Generally satisfied	32 (43.24%)	12 (16.22%)		
Not satisfied	18 (24.32%)	1 (1.35%)		
Overall satisfaction rate	56 (75.68%)	73 (98.65%)	17.451	0.000

4. Discussion

DM is a chronic metabolic disease that is mainly characterized by hyperglycemia. It is caused by the impairment of insulin secretion, resulting in the body's inability to fully utilize glucose, which in turn triggers a series of physiological and pathological changes. Symptoms often include polyuria, thirst, hunger, and weight loss. In addition, patients may also experience symptoms such as blurred vision, fatigue, and an increased susceptibility to infection. These symptoms are caused by damage to various body systems due to high blood sugar. DM is divided into type 1 diabetes, type 2 diabetes, and gestational diabetes, with type 2 diabetes being the most common. Elderly diabetes usually refers to diabetic patients aged 60 and above. The characteristics of diabetes in this group include insidious onset, atypical symptoms, prone to hypoglycemic reactions, and many serious complications, which are often accompanied by other chronic diseases.

The risks of diabetes for the elderly are multifaceted. Firstly, elderly DM patients tend to have a longer disease duration or poor blood sugar control, which puts them at higher risk for complications. These complications may include heart disease, cerebrovascular disease, eye disease (such as cataracts), kidney disease (which may lead to proteinuria and uremia), and diabetic foot. Secondly, the elderly are usually less aware of hypoglycemia, which severe hypoglycemic events may occur when medications are used inappropriately or with irregular diets. Hypoglycemia may lead to confusion, coma, or even life-threatening conditions. At the same time, as the elderly have a lower ability to accept new things or have limited educational levels, they may make mistakes when taking oral medications, which may lead to increased unwanted drug side effects or hypoglycemic events. Furthermore, the elderly often suffer from multiple diseases, thus complicating the

treatment and management of DM. The coexistence of multiple diseases may increase the risk of target organ damage and worsen the patient's health status. Therefore, it is crucial to control blood sugar in elderly patients with DM. Routine nursing mainly adopts a standardized nursing process with less attention catered to the patient's differences and needs, resulting in unsatisfactory nursing outcomes. At the same time, routine nursing often only focuses on blood sugar control and ignores other underlying chronic diseases. Routine nursing also lacks psychological care and is usually provided during the patient's hospitalization. Hence, there is a lack of continuous health guidance and monitoring after discharge, resulting in unstable blood sugar control. This way, the advantages of comprehensive care can be highlighted ^[4].

The comprehensive nursing intervention model is a comprehensive and multi-dimensional nursing method that integrates knowledge and resources from multiple fields, such as medicine, nursing, nutrition, psychology, and social support, to provide patients with personalized, continuous, and comprehensive care ^[5]. For elderly patients with DM, the comprehensive nursing intervention model needs to specifically consider the physiological characteristics, comorbidities, and cognitive functions of the elderly. For example, exercise plans suitable for the elderly can be developed, diet plans can be recommended to suit their digestive abilities and health education can be provided in a way that is easily understood. The integrated nursing intervention model also emphasizes the importance of patient education. By holding lectures, distributing educational materials, and one-on-one consultations, the patient's understanding of diabetes can be improved and their self-management abilities can be enhanced. In addition, comprehensive nursing intervention also pays attention to the patient's mental health, where psychological counseling and psychological support are provided to help patients cope with the psychological pressure caused by the disease. At the same time, the importance of social support is emphasized and patients are encouraged to participate in social activities and establish a support network.

In short, the comprehensive nursing method covers multiple aspects of diabetes management, which not only effectively reduces the patient's blood sugar level but also improves the patient's treatment compliance and nursing satisfaction. In this study, the observation group had a more obvious decrease in blood sugar, better treatment compliance, and better nursing satisfaction as compared to the control group. This was consistent with other studies ^[6-8]. Numerous studies have demonstrated significant benefits of this approach in the care of other patients, not just those with diabetes. For example, Wang discussed the application effect of comprehensive nursing intervention in migraine patients ^[9]. She pointed out comprehensive nursing intervention improved the patients' negative emotions and treatment compliance. She proposed that comprehensive nursing intervention improved the symptoms, nursing efficiency, and satisfaction of tuberculosis patients ^[10]. Xu also proposed that comprehensive nursing intervention improved the patient's quality of life and achieved good results in postoperative care for thyroid cancer ^[11]. These findings illustrated the advantages of comprehensive nursing intervention compared with routine care in the treatment of elderly patients with DM.

5. Conclusion

Comprehensive nursing intervention effectively reduced the blood sugar levels of elderly patients with DM, improved treatment compliance, and increased nursing satisfaction.

Disclosure statement

The author declares no conflict of interest.

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