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Original Article

The value of high-quality nursing and health education in elderly patients with diabetes mellitus

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Abstract: This study aimed to investigate the effect of high-quality nursing and health education on glucose and lipid metabolism and quality of life in elderly patients with diabetes. A total of 99 elderly patients with diabetes admitted to our hospital from December 2016 to April 2019 were enrolled and divided into an observation group (57 cases) and a control group (42 cases) according to different nursing methods. The nursing satisfaction, self-management ability, blood lipid index, and negative emotions of the two groups of patients before and after nurse intervention were evaluated. After nursing, the fasting blood glucose level of the two groups of patients decreased 2 hours after a meal, and the level in the observation group was lower than that of the control group. After nursing, the Self-Rating Depression Scale (SDS) and Self-rating Anxiety Scale (SAS) scores of the two groups of patients decreased, and the scores of the observation group were lower than those of the control group. Before nursing intervention, there was no significant difference in the quality of life scores between the two groups, while after it, the quality of life scores of the two groups increased, and the scores of the observation group were higher than those of the control group. Moreover, after nursing, serum triglyceride (TG), cholesterol (TC), and low density lipoprotein cholesterol (LDL-C) in the observation group were significantly lower than those of the control group, while serum high density lipoprotein cholesterol (HDL-C) in the observation group was significantly higher than that of the control group. Furthermore, the nursing satisfaction and the self-management score were also significantly higher in the observation group. High quality nursing can significantly improve glucose and lipid metabolism levels and quality of life in elderly patients with diabetes, and is worthy of clinical application.

Keywords: High-quality nursing intervention, diabetes in the elderly, quality of life, sugar metabolism, lipid metabolism

Introduction

Diabetes is a chronic disease that seriously threatens human health, with characteristics of a long course of disease, repeated attacks, and lifelong treatment [1]. As another important disease that endangers the health of the elderly along with cardiovascular and cerebrovascular diseases and tumors, it affects many patients. The International Diabetes Federation (IDF) estimated that the global number of patients with diabetes would reach 451 million in 2017, with a prevalence rate of 8.4%. According to conservative forecasts, the number of patients will increase to 693 million in 2045, and almost half (49.7%) of the patients have not been clearly diagnosed [2, 3]. Diabetes is a major risk factor for death and many non-fatal complications, which will impose a huge burden on patients, their families, and the medical system [4]. Due to a series of factors such as the increased aging population and its proportion of the total population, improvement of living standards and changes of lifestyle, the incidence rate of diabetes is gradually increasing in the elderly [5, 6]. Therefore, the health problems of elderly patients with diabetes deserve attention from medical workers around the world [7].

Previous studies have shown that nursing plays an important role in controlling the disease in elderly diabetic patients [8]. High-quality nursing and health education is a safe and patient needs-oriented medical service, based on routine nursing to further optimize the quality of

nursing, strengthen basic nursing, improve patient satisfaction, and provide a safe medical environment [9].

This study investigated the clinical value of high-quality nursing and health education intervention in the treatment of elderly diabetic patients by comparing the effects of high-quality nursing and health education intervention and conventional nursing intervention on the quality of life and physical and mental state of elderly diabetic patients.

Data and methods

General information

From December 2016 to April 2019, 99 elderly diabetic patients were selected and divided into an observation group (57 cases) and a control group (42 cases) according to different nursing methods. The observation group consisted of 32 males and 25 females, aged from 61-80 years old, with an average age of (66.78±10.26) years old, and an average course of disease of (12.47±3.65) years (3-22 years). The control group consisted of 27 males and 15 females, aged 60 to 81 years old, with an average age of (67.98±11.54) years old, and an average course of (12.86± 3.77) years (4-20 years). There was no significant difference in general data between the two groups ($P > 0.05$). Patients and their families were informed of the research process and signed a consent form. This study was approved by the Ethics Committee of Wuhan Fifth Hospital (No. WH150387F).

Inclusion criteria: patients who received blood glucose examination after admission; patients whose results showed fasting blood glucose ≥ 7.0 mmol/L and 2 hour postprandial blood glucose ≥ 11.1 mmol/L; patients whose blood glucose conformed to the diagnostic criteria for diabetes stipulated by the World Health Organization (WHO) [10], patients aged 60 or above, and hospitalized patients.

Exclusion criteria: patients with severe heart, liver, kidney or other organ failure; patients with comorbid cognitive impairment; patients with senile dementia; patients with severe cerebral infarction or cerebral hemorrhage; patients with severe diseases of heart or other organs; pregnant and lactating women; patients with mental diseases; and those who dropped out of treatment midway.

Nursing methods

All patients were treated with the same blood glucose control therapy (subcutaneous insulin injection and oral hypoglycemic drugs). The control group received traditional nursing intervention during hospitalization, including regular and quantitative insulin injection, diabetes-related health education, and blood sugar level monitoring. During hospitalization, the observation group received high-quality nursing and health education intervention on the basis of traditional nursing. Specifically, high-quality nursing and health education plans were formulated for patients according to their specific conditions: (1) Blood sugar monitoring: the blood sugar control targets were formulated for patients. Fasting blood sugar control range was set at 4.0-6.1 mmol/L, blood sugar was set at less than 10 mmol/L 2 hours after meal, and blood sugar was detected for 5 times/d. For patients with unsatisfactory blood sugar control, the dosage should be appropriately adjusted according to doctor's advice. (2) Health education: according to the patient's education level, health education was carried out for each patient in simple and understandable language. The importance of blood sugar control was explained, and relevant matters needing attention in the blood sugar control process were assessed. Health education was carried out for the patient by publicity posters and videos. (3) Dietary intervention: according to the patient's weight, height, sex, daily eating habits and other assessment of their nutritional status, a targeted diet plan was formulated for each of them, and their families were asked to supervise them. (4) Exercise intervention: according to the patient's exercise tolerance, a reasonable exercise plan was made, and the patients were urged to complete it. (5) Psychological intervention: the patients' thoughts and concerns were understood, their unhealthy psychological emotions were guided and relieved, some support and encouragement were given, their confidence in treatment was promoted, and psychological adjustment was carried out through emotional transfer, and deep breathing. (6) Medication guidance: the patients and their families were guided correctly to master insulin injection methods, such as replacement of insulin refills and other operations.

Table 1. Comparison of basic data between two groups of patients

Group	Observation group (n = 57)	Control group (n = 42)	T/χ^2 value	P
Gender			0.666	0.414
Male	32 (110.34)	27 (112.5)		
Female	25 (86.21)	15 (62.5)		
Age (years)	66.78±10.26	67.98±11.54	0.545	0.587
Smoking history			0.846	0.358
Yes	27 (93.1)	16 (66.67)		
No	30 (103.45)	26 (108.33)		
Exercise habit			1.256	0.262
Yes	18 (62.07)	9 (37.5)		
No	39 (134.48)	33 (137.5)		
Residence			0.130	0.718
Urban	21 (72.41)	14 (58.33)		
Rural	36 (124.14)	28 (116.67)		
History of drinking			0.308	0.579
Yes	16 (55.17)	12 (50)		
No	31 (106.9)	30 (125)		
Course of disease	12.47±3.65	12.86±3.77	0.518	0.606
TG (mmol/L) at admission	1.95±0.41	1.98±0.42	0.356	0.723
TC (mmol/L) at admission	4.36±0.51	4.40±0.52	0.383	0.703
LDL-C (mmol/L) at admission	2.76±0.50	2.79±0.55	0.283	0.778
HDL-C (mmol/L) at admission	1.10±0.12	1.13±0.13	1.187	0.238

Outcome measures

The glucose metabolism level of the two groups of patients was observed and compared, and the control of glucose metabolism level was measured, including fasting blood glucose and postprandial blood glucose. The Self-rating Anxiety Scale (SAS) and Self-Rating Depression Scale (SDS) were used to score the two groups before and after nursing [11]. SAS and SDS had a total of 40 items, each with 20 items, and each item with 1 to 4 points. SAS score less than 50 points indicates no anxiety; SAS score between 50 and 59 indicates mild anxiety; SAS score between 60 and 69 indicates moderate anxiety; SAS score of 70 or above indicates severe anxiety; SDS score less than 50 points indicates no depression, SDS score between 50 and 59 indicates mild depression; SDS score between 60 and 69 indicates moderate depression; SDS score of 70 or more indicates severe depression. The quality of life of patients was assessed with full-time assessors according to the Generic Quality of Life Inventory (GQOL) [12], mainly covering physical function, psychological function, social function, and vitality. Each item scores 100 points. The score is positively related to the quality of life. The blood lipid index level of the two groups of patients after nursing was observed. In addition, the self-made nursing satisfaction questionnaire from our hospital was used to evaluate the nursing satisfaction of the two groups of patients, and the evaluation criteria based on full score of 100 points were satisfactory: more than 80 points; basically satisfactory: 60-80 points; unsatisfactory: below 60 points. The self-management behavior of patients in the two groups before and after the intervention was evaluated by the Summary of Diabetes Self Care Activities Scale (SDSCA) [13]. The scale aims to measure the self-care behavior of patients within 7 days, with a total score of 77 points. A high score indicates high self-care ability. A score between 42 and 56 points is regarded as medium, and below 42 is regarded as poor.

Statistical methods

The SPPSS22 statistical software was used to process the data. The measured data were expressed as mean ± standard deviation (mean ± sd) and compared using t test. The counted data were expressed by n (%) and compared using χ^2 test. $P < 0.05$ indicated statistical significance.

Results

Comparison of basic data between the two groups of patients

The basic data of the two groups were compared. Results showed that the two groups of patients showed no significant difference in sex, age, smoking history, exercise habits, residence, drinking history, triglycerides (TG), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), and high density lipoprotein cholesterol (HDL-C) ($P > 0.05$), as shown in **Table 1**.

Table 2. Comparison of glucose metabolism indexes between the two groups (x ± sd)

Group	Fasting plasma glucose		Blood sugar 2 hours after meal	
	Before intervention	After intervention	Before intervention	After intervention
Observation group (n = 57)	10.28±3.46	8.41±3.27*	11.83±3.41	9.85±3.16*
Control group (n = 42)	10.34±3.53	6.51±2.89*	11.76±3.24	8.17±2.16*
t value	0.085	2.990	0.103	2.970
P	0.933	0.003	0.918	0.004

Note: *indicates compared with before nursing intervention, P < 0.05.

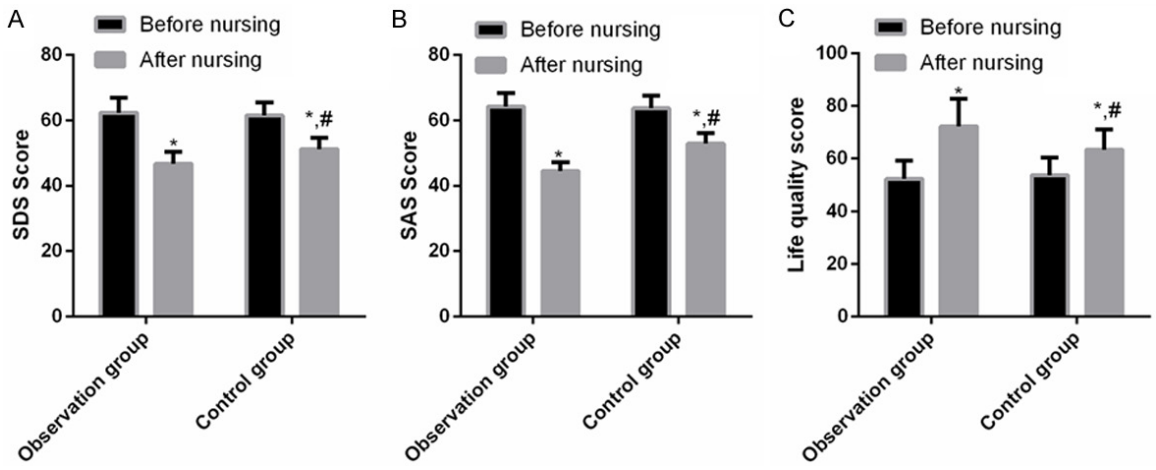

Figure 1. Comparison of negative emotions and quality of life scores between two groups of patients before and after nursing intervention. Before intervention, there was no significant difference in SDS scores between the two groups (P > 0.05). After intervention, the SDS scores of the two groups of patients decreased significantly, and the SDS score of the observation group was lower than that of the control group (P < 0.05) (A); Before intervention, there was no significant difference in SAS scores between the two groups (P > 0.05). After intervention, the SAS scores of the two groups of patients decreased, and the SAS scores of the observation group were lower than those of the control group (P < 0.05) (B). There was no significant difference in the quality of life score between the two groups before intervention (P > 0.05). The quality of life score of the two groups after intervention was higher than that before, and the observation group was higher than the control group (P < 0.05) (C). *P < 0.05 *vs.* the same group before nursing intervention. #P < 0.05 *vs.* the observation group after intervention.

Comparison of glucose metabolism level between the two groups before and after nursing

Before intervention, there was no significant difference in fasting blood glucose and 2-hour postprandial blood glucose between the two groups (P > 0.05). After nursing, fasting blood glucose and 2-hour postprandial blood glucose of both groups decreased, and the levels in the observation group were lower than those of the control group (P < 0.05). See **Table 2**.

Comparison of negative emotions between the two groups before and after nursing intervention

The negative emotions of the two groups before and after intervention were compared. Before intervention, there was no significant difference in SDS and SAS scores between the two groups (P > 0.05), while after nursing, the SDS and SAS scores of both groups decreased, and the scores of the observation group were lower than those of the control group (P < 0.05). See **Figure 1A**, **1B** and **Table 3**.

Comparison of quality of life scores between the two groups of patients before and after nursing intervention

Before intervention, there was no significant difference in the quality of life scores between the two groups (P > 0.05), while after nursing intervention, the quality of life scores of the two groups increased, and the score of the observation group was higher than that of the control group (P < 0.05), as shown in **Figure 1C**.

Table 3. Comparison of negative emotions between the two groups of patients before and after nursing (x ± sd)

Group	SDS score		SAS score	
	Before intervention	After intervention	Before intervention	After intervention
Observation group (n = 57)	62.31±4.64	46.72±3.68*	64.21±4.09	44.54±2.71*
Control group (n = 42)	61.47±4.05	51.23±3.48*	63.72±3.86	52.87±3.21*
t value	2.550	4.868	5.309	3.155
P	0.012	< 0.01	< 0.01	< 0.01

Note: *indicates compared with before nursing intervention, P < 0.05.

Table 4. Comparison of blood lipid indices between the two groups of patients after nursing (x ± sd, mmol/L)

Group	TG	TC	LDL-C	HDL-C
Observation group (n = 57)	1.34±0.41	2.35±0.76	1.33±0.73	1.54±0.36
Control group (n = 42)	1.72±1.02	3.39±1.35	1.98±0.36	1.28±0.46
t	2.280	4.492	5.835	3.040
P	0.025	< 0.01	< 0.01	0.003

Comparison of blood lipid indexes between the two groups of patients after nursing

The comparison of blood lipid indexes between the two groups after nursing showed that after nursing, serum TG, TC, and LDL-C in the observation group were significantly lower than those in the control group (P < 0.05), while serum HDL-C in the observation group was significantly higher than that in the control group (P < 0.05). See **Table 4**.

Comparison of nursing satisfaction between the two groups of patients

The comparison of nursing satisfaction between the two groups showed that the nursing satisfaction of the observation group was significantly higher than that of the control group (P < 0.05), as shown in **Table 5**.

Comparison of self-care ability between two groups of patients

Before nursing, there was no significant difference in self-care ability scores between the two groups (P > 0.05), while after nursing, the self-care ability scores of the two groups of patients increased significantly (P < 0.05), and scores of the observation group were significantly higher than those of the control group (P < 0.05) as shown in **Table 6**.

Discussion

Diabetes is a common metabolic disease characterized by hyperglycemia due to impaired insulin biological function or insulin secretion deficiency [14]. As a chronic disease, it has the characteristics of incurability, requirement of long treatment, and many complications. If patients do not pay attention to their hyperglycemia or have poor blood sugar control, their quality of life will be seriously affected [15, 16]. Especially for elderly patients, they often have comorbidities due to lower body function than the young and middle-aged patients, so ineffective controlled blood sugar will endanger their life safety [17, 18]. Therefore, the implementation of effective and reasonable nursing intervention for elderly diabetic patients is crucial to reduce the blood sugar level and improve their quality of life [18].

In recent years, as the demand for medical services has increased, people's concept and demand for nursing have been constantly changing, and the modern concept of nursing has gradually developed in depth [20]. Personalized nursing, psychologic nursing, comprehensive nursing, high-quality nursing, and health education and other nursing modes have been continuously developed and applied in clinical practice [21]. In a sense, routine health education forcibly instills knowledge into patients, which may cause them to have a rebellious mentality, further compromising their compliance with treatment and nursing measures. However, high-quality nursing focuses on health education. Under high-quality nursing, the nursing staff are arranged to adopt different education and guidance methods for different patients and make the patients fully aware of the importance of the guidance measures before implementation, thus improving their compliance and making them more willing to initiate self-care. The whole process of nursing intervention is more

Table 5. Comparison of nursing satisfaction between the two groups of patients [n (%)]

Group	Unsatisfactory	Basically satisfactory	Satisfactory	Satisfaction
Observation group (n = 57)	2 (3.51)	27 (47.37)	28 (49.12)	55 (96.49)
Control group (n = 42)	7 (16.67)	21 (50)	16 (38.1)	37 (88.1)
χ^2				4.704
P value				0.0301

Table 6. Comparison of self-care ability scores between the two groups of patients

Group	Before intervention	After intervention
Observation group (n = 57)	39.42±2.97	53.87±7.33*
Control group (n = 42)	39.31±3.12	42.09±5.21*
T value	0.178	0.859
P	8.887	< 0.01

Note: *indicates compared with before nursing intervention, P < 0.05.

comprehensive, rigorous, purposeful, and targeted than traditional nursing [22, 23]. In this study, the intervention effect of conventional nursing and high-quality nursing and health education on elderly diabetic patients was compared. The results showed that after the intervention, the fasting blood glucose, 2-hour postprandial blood glucose, and blood lipid index levels of the two groups of patients declined significantly, and those in the observation group were significantly lower than those of the control group (P < 0.05). The results showed that high-quality nursing and health education intervention has good effects on blood sugar and blood lipid control of elderly diabetic patients. With support and encouragement from family and society, the elderly diabetic patients' negative emotions were obviously relieved, positive treatment confidence was established, and treatment compliance and coordination were significantly improved. In addition, reasonable exercise and diet intervention could help patients develop good living habits, maintain healthy weight, improve body function and resistance, and help to control blood sugar better and faster, thus improving their quality of life [24, 25]. In this study, the SDS and SAS scores of the two groups of patients decreased after nursing, and those of the observation group were lower than those of the control group. Quality of life covers physical health, physiological health, and material life, which is an important manifestation of patients' recovery. The quality of life score and nursing satisfaction of the observation group were significantly higher than that of the control group (P < 0.05). The self-care score of the observation group was significantly higher than that of control group after nursing intervention. This indicated that high-quality nursing and health education can better control patients' negative emotions and improve patients' self-care ability and satisfaction compared to conventional nursing. In many studies, the important role of high-quality nursing in various aspects such as orthodontic medicine and sanatoriums has been verified [26, 27], and the results are similar to ours.

This study comprehensively compared conventional nursing and high-quality nursing and health education in elderly diabetic patients, but did not conduct a long-term follow-up investigation on the prognosis of patients. Therefore, there are still some limitations, and we hope to further address these in future studies.

Conclusion

The implementation of high-quality nursing and health education intervention for elderly diabetic patients exerts a good effect on blood sugar control, quality of life of patients, and clinical nursing effectiveness, and is worthy of promotion and application.

Disclosure of conflict of interest

None.

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