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Original Article

The intervening efficacy of health management based on family and organization on elderly diabetic patients

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Abstract: Objective: To study the nursing efficacy of health management based on family and organization on elderly diabetic patients. Methods: We collected clinical data from 126 elderly diabetic patients treated in our hospital from March 2018 to March 2019. The patients were divided into a control group and a study group by random number table method, with 63 cases in each group. The control group adopted routine nursing intervention, while the study group adopted the family and organization health education model. We compared the nursing intervention effects of the two groups and evaluated psychological states, blood glucose and quality of life. Results: After nursing intervention, the study group's nursing efficacy and blood glucose volatility indexes were significantly better than those of the control group ($P<0.05$). There were significant differences between the SAS and SDS scores of the two groups before and after treatment ($P<0.05$). Both groups' life quality scores were significantly higher after nursing intervention ($P<0.05$), and the study group's score was much higher ($P<0.05$). After nursing intervention, the study group's blood glucose level was significantly lower than that of the control group ($P<0.05$). Conclusion: The family and organization health education model is satisfactory in elderly diabetic patients. It can effectively improve patients' medication compliance, reduce the incidence of hypoglycemia, boost patients' quality of life and psychological states, and stabilize blood glucose.

Keywords: Family and organization, health management, elderly diabetes

Introduction

As the social economy thrives, aging population has become an increasingly urgent problem in China. Diabetes has become a high-incidence disease for elderly patients. It is reported that the incidence rate of diabetes has been gradually increasing in recent years, which negatively influences people's daily life [1]. At present, medication is the primary treatment used to control blood glucose level clinically. Many elderly patients take hypoglycemic medications all year round, which causes unbearable pressure on patients both physically and mentally [2]. Due to the nature of diabetes, patients' lifestyle, diets, and physical exercises must be strictly controlled, and it is a big challenge for the elderly patients. Along with the emphasis on health education management of elderly diabetes, family and organization nursing intervention has become an important part of it. However, the community nursing model is not systematic, and there exists certain problems. Previous studies [3, 4] reported that in the process of long-term hypoglycemia, effective family and organization nursing intervention and health education can help improve patients' blood glucose level and their life quality [5]. Based on the clinical outcomes from recent years, this study selected 126 elderly diabetic patients treated in our hospital as the research subjects and explored the nursing efficacy of family and organization health education model on elderly diabetic patients.

Materials and methods

Clinical data and information collection

We collected clinical data from 126 elderly diabetic patients treated in our hospital from March 2018 to March 2019. The patients were divided into a control group and a study group by random number table method, with 63 cases

in each group. The study group included 38 male and 25 female between 60 to 83 years old with an average age of 68.1±5.7 years. The course of disease was from 1 to 13 years with an average term of 8.9±3.1 years. The control group included 33 male and 30 female between 61 to 82 years old with an average age of 68.9±4.6 years. The course of disease was from 1 to 13 years with an average term of 8.5±3.2 years. There were no significant differences in general clinical data between the two groups (P>0.05).

Inclusion criteria and exclusion criteria

Inclusion criteria: (1) patients met the diagnostic criteria in line with *Guidelines for the Prevention and Treatment of Type II Diabetes in China* [6], with fasting blood glucose (FBG) ≥ 7.0 mmol/L, 2-hour postprandial blood glucose (PBG) ≥ 11.1 mmol/L, and glycated hemoglobin (GHb) ≥ 6.5%; (2) patients ≥ 60 years old; (3) patients with education background above primary school. The study obtained the approval from our hospital's ethics committee. Patients and their family members knew the research's process and purpose and signed the informed consent form.

Exclusion criteria: (1) patients with cognitive disorder or impaired verbal communication; (2) patients with other organ tissues lesions like brain, heart, kidney and liver; (3) patients with acute complications of diabetes, such as ketoacidosis, lactic acidosis, diabetic nonketotic hyperosmolar syndrome (DNHS), etc.

Methods

The control group: Community and organization staff gave out *Diabetes Knowledge Manual* to patients to encourage them to learn about diabetes spontaneously; medical staff and doctors organized Diabetes Knowledge Lecture once every two weeks; provided patients with systematic knowledge about diabetes, and talked about their diabetic conditions; answered the frequently asked questions, instructed on patients' diets, medication requirements, and physical exercises; supervised patients to strictly follow doctors' advice [5, 7].

The study group: The community and organization health education model was adopted in the study group. Apart from the routine methods taken for the control group, patients' family members were also involved. (1) Divided patients into several health education groups and customized health education plan based on patients' conditions, backgrounds and personalities [8]. (2) Evaluated patients' overall conditions, guided patients on the use of medicine and monitored their blood glucose level. (3) Organized health education regularly, communicated timely with patients, and understood their personalities and psychological states after discharge [9, 10]. (4) Paid home visits according to patients' conditions and their families' conditions, customized education plan, informed their families of the details of implementation of the education plan, and strictly recorded and controlled patients' insulin injections and oral drugs. While focusing on patients' health education, regular health related knowledge lecture for their family members was organized as well [11]. The health education management in both groups continued for 12 months.

Outcome measures

The health management efficacy after intervention was evaluated, including the medication compliance rate, incidence of hypoglycemia, mastery degree of diabetes knowledge, and nursing satisfaction.

Before and after nursing intervention, patients' blood glucose concentration was recorded by continuous glucose monitoring system (CGMS) every 10 minutes. Volatility indexes, including mean blood glucose (MBG), mean amplitude of glycemic excursions (MAGE), standard deviation of blood glucose (SDBG) and mean absolute difference of blood glucose (MADBG) were calculated.

The self-rating anxiety scale (SAS) and self-rating depression scale (SDS) before and after nursing intervention were analyzed. A higher score indicates a severe psychological state.

The quality of life was assessed using the Shot Form 36 Health Survey Questionnaire (SF-36), including cognitive level, physical activity, social activities, and role function, with a total score of 100. The higher the score, the better the patients' life quality.

The blood glucose level before and after nursing intervention was compared, including FBG level, 2 h PBG level and GHb level.

Table 1. Comparison of two groups' nursing efficacy after intervention

Group	Number	Medication compliance rate	Incidence of hypoglycemia	Mastery rate of diabetes knowledge	Nursing satisfaction
control group	63	61 (96.8)	2 (3.2)	58 (92.1)	63 (100)
study group	63	55 (87.3)	13 (20.6)	46 (73.0)	56 (88.9)
X^2		3.91	9.157	7.93	7.41
P		0.048	0.002	0.005	0.006

Table 2. Comparison of blood glucose volatility indexes before and after intervention (n=63)

Groups	MBG (mmol/L)		MAGE (mmol/L)		SDBG (mmol/L)		MADBG (mmol/L)	
	before	after	before	after	before	after	before	after
study group	12.12±2.41	6.22±1.68	8.01±1.33	3.71±0.93	2.89±0.61	1.09±0.47	6.02±1.32	2.24±0.67
control group	11.98±3.39	7.63±1.55	7.97±1.42	4.61±1.02	2.93±0.56	1.63±0.52	5.99±1.41	3.09±0.63
t		4.89		5.17		6.11		7.34
P		<0.001		<0.001		<0.001		<0.001

Table 3. Comparison of SAS and SDS scores before and after intervention (n=63)

Group	SAS		t	P	SDS		t value	*P* value
	before intervention	after intervention			before intervention	after intervention		
study group	56.99±5.26	23.15±4.27	11.24	<0.001	52.13±4.03	21.69±3.11	12.33	<0.001
control group	55.89±6.03	34.48±5.11	8.99	<0.001	52.34±4.96	35.51±4.22	9.85	<0.001
t	4.36	3.55			5.12	4.66		
P	0.754	0.01			0.658	0.03		

Statistical analysis

Statistical analysis was performed using the SPSS statistical software 20.0. The enumeration data were examined by χ^2 and represented by [n (%)]. The measurement data were examined by t test and represented by ($\bar{x} \pm sd$). When *P<0.05,* the difference was considered as statistically significant.

Results

Comparison of nursing efficacy after intervention

After nursing intervention, the study group's nursing efficacy was markedly better than that of the control group (P<0.05). See **Table 1**.

Comparison of blood glucose volatility indexes before and after intervention

After nursing intervention, the study group's MBG was 6.22±1.68 mmol/L, MAGE was 3.71±0.93 mmol/L, SDBG was 1.09±0.47 mmol/L, and MADBG was 2.24±0.67 mmol/L, while the control group's MBG was 7.63±1.55 mmol/L, MAGE was 4.61±1.02 mmol/L, SDBG was 1.63±0.52 mmol/L, and MADBG was 3.09±0.63 mmol/L. The differences in each index between the two groups were statistically significant (P<0.05). See **Table 2**.

Comparison of SAS and SDS scores before and after intervention

Notable differences were observed in SAS and SDS scores between the two groups before and after treatment (P<0.05). See **Table 3**.

Comparison of quality of life score before and after intervention

Before intervention, there was no significant difference between the two groups' quality of life score (P>0.05). After intervention, both groups' quality of life scores were significantly higher than before (P<0.05), and the study group's score was much higher (P<0.05). See **Table 4** and **Figures 1**, **2**.

Comparison of blood glucose level before and after intervention

Before intervention, the blood glucose level in the two groups was similar (P>0.05). After nurs-

Table 4. Comparison of quality of life scores after intervention (n=63)

Groups	Cognitive level	Physical activity	Social activities	Role function
study group	(82.7±3.11)	(82.3±2.49)	(81.7±2.79)	(82.7±2.65)
control group	(72.5±3.24)	(71.1±2.36)	(73.2±2.55)	(75.1±2.71)
t	18.03	25.91	17.85	15.92
P	<0.001	<0.001	<0.001	<0.001

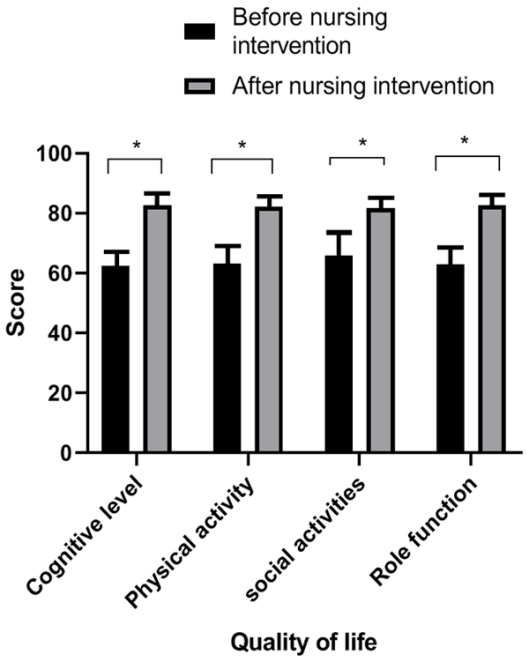

Figure 1. The study group's life quality score before and after intervention. Note: The horizontal axis stands for the quality of life, including cognitive level, physical activity, social activities, and role function. The vertical axis stands for the score. For the study group, the scores of the 4 dimensions before treatment were 62.5±3.16, 63.1±4.17, 65.9±6.88 and 62.9±4.65 respectively. After treatment, the scores of the 4 dimensions were 82.7±3.11, 82.3±2.49, 81.7±2.79 and 82.7±2.65 respectively. The symbol * stands for the significant difference in quality of life in the study group before and after intervention (P<0.05).

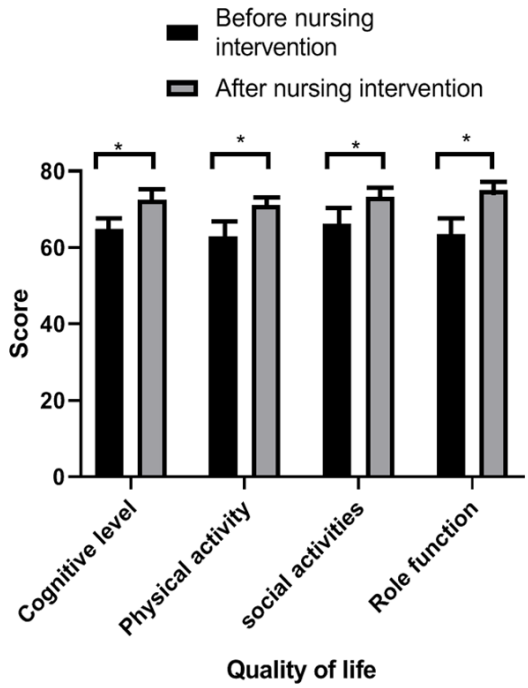

Figure 2. The control group's life quality score before and after intervention. Note: The horizontal axis stands for the quality of life, including cognitive level, physical activity, social activities, and role function. The vertical axis stands for the score. For the control group, the scores of the 4 dimensions before treatment were 64.9±3.44, 62.9±4.07, 66.3±5.68 and 63.4±4.38 respectively. After treatment, the scores of the 4 dimensions were 72.5±3.24, 71.1±2.36, 73.2±2.55 and 75.1±2.71 respectively. The symbol * stands for the significant difference in life quality score before and after intervention in the control group (P<0.05).

ing intervention, the study group's FBG level, 2-hour PBG level and GHb level were significantly lower than those of the control group (P<0.05). See **Table 5**.

Discussion

Diabetes is a common metabolic disease in elderly, and it is mainly caused by insulin deficiency or disorder. It usually results in metabolic disorders and abnormal hyperglycemia [12]. The constant high blood glucose level can impair tissues and organs, cause cardiovascular, eye and kidney diseases. In severe cases, it will even be life-threatening. In terms of clinical therapeutics, there is no radical treatment for diabetes at present. Patients are required to take hypoglycemic drugs regularly, and they are strictly controlled in many aspects like diet, which severely affect their life qualities and mental states [8, 13]. As a key link in the prevention and treatment of diabetes, health education management can provide patients with

Table 5. Comparison of the blood glucose level before and after intervention (n=63)

Groups	FBG (mmol/L)		2-hour PBG (mmol/L)		GHb (mmol/L)	
	before	after	before	after	before	after
study group	11.2±3.6	6.7±1.7	14.4±4.2	8.2±2.8	8.2±0.8	6.4±0.5
control group	12.3±3.6	10.5±1.9	15.5±4.4	13.0±2.6	8.3±0.6	7.2±0.6
t		11.82		9.97		8.13
P		<0.001		<0.001		<0.001

related knowledge and prevention methods, raise patients' awareness of diabetes, improve their life habits, regulate their diet and drug use, and help patients control blood glucose level effectively [14, 15].

According to the study conducted by Kim el al. [16], family-community health education model on elderly diabetic patients can help improve their psychological states and effectively control blood glucose concentration. Because this nursing intervention is a multi-dimensional and customized nursing plan based on patient's individual needs, it can realize the goal of more scientific and reasonable interventions [13, 17]. The innovation of this research is that the family and organization health education model can bring the patients together and perform health education in a planned, organized, systematic, multi-level and multi-faceted manner. In addition, the family and organization health education model can provide targeted diet, exercise and related knowledge guidance according to the patient's conditions, and guide them out of the misunderstanding of type 2 diabetes treatment. And due to the bad mood during the illness, loss of treatment confidence, lack of treatment initiative, the blood glucose concentration will constantly increase, resulting in poor treatment effect. With family and organization management and support, patients' routine nursing can be ensured and improved. Through health education, their blood glucose level can be effectively controlled in the long run, and consequently their health conditions can be improved [18-20]. In this study, we analyzed and compared patients' medication compliance rate, incidence of hypoglycemia, mastery degree of diabetes knowledge and nursing satisfaction. And we found that family and organization nursing intervention exhibited a better nursing efficacy, because it contributes to understanding of the disease-related knowledge, and helps patients form a good habit. Meanwhile, regarding blood glucose volatility indexes and blood glucose level, the present study revealed that family and organization nursing intervention helps stabilize patients' blood glucose and improves their life qualities and psychological states.

In conclusion, family and organization health education model on elderly diabetic patients is satisfactory. It can enhance patients' awareness of health education management, improve their lifestyles and life qualities, form positive mentality, and stabilize blood glucose level. Therefore, the family and organization model should be widely applied and promoted. However, the limitation of the present study lies in the lack of follow-up observational research, and thus it is impossible to assess the impact of family and organization health education model on the long-term efficacy of elderly diabetic patients. Follow-up trials will be carried out in the future.

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Disclosure of conflict of interest

None.

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