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Original Article

Clinical effect of individualized nursing care in diabetic nephropathy patients undergoing hemodialysis

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Abstract: Objective: To analyze the clinical value of individualized nursing care in diabetic nephropathy patients undergoing hemodialysis. Methods: In this prospective study, 220 diabetic nephropathy patients requiring hemodialysis were divided into a control group (n=110, received routine nursing care) and an observation group (n=110, received individualized nursing care) according to a random number table method. The primary outcome was blood glucose management. Secondary outcomes were Katz indexes after 3 months of intervention, patients' quality of life (36-Item Short Form Survey (SF-36) scores), and the patients' satisfaction level of the nursing. Results: The Katz indexes, blood glucose and lipid indexes, SF-36 scores, satisfaction rate, and the compliance scores of the patients in the observation group were significantly better than those in the control group (all $P<0.05$). Conclusion: In the hemodialysis treatment of patients with diabetic nephropathy, individualized nursing care can help to stabilize their condition, improve their quality of life, emotional stability, and compliance.

Keywords: Hemodialysis, individualized nursing, clinical effect, diabetic nephropathy

Introduction

In recent years, with the development of higher living standards and living environment, the incidence of diabetes in China is increasing year by year and has reached a peak in recent years. Once diabetes progresses to the later stage, the prognosis is poor, with high mortality and long treatment time [1, 2]. According to statistics, 6.9 million people in the United States suffered from diabetic nephropathy between 2005 and 2008 [3]. By 2050, the number of patients with diabetes or diabetic nephropathy is expected to increase substantially [4]. Though diabetes will not directly affect the life and health of the human body, patients may develop many complications as the disease progresses, such as hypoglycemia, hypertension, hypotension, etc., with poor prognosis and risk of death [5].

Diabetic nephropathy is a very common complication. In clinical practice, hemodialysis is usually used to remove harmful substances from the blood of patients, so as to help patients recover their health as soon as possible [6]. At present in China, increasing numbers of patients suffer from diabetic nephropathy, which is the second pathogenic factor (15%) for end-stage renal disease (ESRD). Diabetic nephropathy is also a major cause of clinical mortality. Because of late detection, most patients often need hemodialysis [7].

Individualized nursing has better nursing effects than normal nursing as the former can provide targeted nursing by evaluating and understanding the specific situation of each patient [8]. A study has shown that breast cancer has become one of the major diseases threatening women's health, and shows a trend of affecting younger women. This disease does not have clear symptoms in the early stages, but needs surgical treatment in the later stage, which can bring certain psychological negative effects to patients. Individualized nursing can help patients eliminate negative emotions and improve rehabilitation quality [8]. This study aimed to analyze the clinical effect of individualized nursing on diabetic nephropathy patients undergoing hemodialysis.

Material and methods

General information

The study was approved by the Ethics Committee of Yi'nan Maternal and Child Health Hospital, and informed consent forms were signed by patients or their families.

In this study, 220 diabetic nephropathy patients who were admitted to Yi'nan Maternal and Child Health Hospital for hemodialysis from January 2018 to August 2019 were enrolled and randomly divided into the control group (n=110) and observation group (n=110) according to a random number table method. The control group received routine nursing, while the observation group received individualized nursing. Relevant data were compared and analyzed to ensure the reliability of this study.

Inclusion and exclusion criteria

Inclusion criteria: Patients: 18≤ age <70; patients diagnosed with type 2 diabetes according to 1999 WHO Diagnostic Criteria for Diabetes; patients only treated with insulin to reduce blood glucose; patients who had received routine dialysis for more than 3 months, with relatively stable conditions; patients with hemoglobin >60 g/L; patients who volunteered for the study.

Exclusion criteria: Patients who had acute secondary complications of diabetes, such as ketoacidosis, hyperosmolar coma, etc.; patients who had co-infections without control; patients who were unable to eat; patients accompanied by malignant tumors, moderate and severe cardiovascular and cerebrovascular diseases and other serious diseases; patients who had a history of mental disorders; patients who were participating in other research projects.

Methods

Control group: All patients in this group received routine nursing, mainly including nursing about diet, skin, medication, and hemodialysis. During the hemodialysis, the patients' blood pressure was stabilized at 130-140/80-90 mmHg, and glucose solution was injected when necessary to avoid hypoglycemia. Meanwhile, regular psychological counseling was conducted to help patients reduce their psychological burden and negative emotions towards the disease, so that patients could be more comfortable.

Observation group: In addition to the above nursing measures, the patients in this group received individualized nursing. The patients' conditions were observed in time. For possible complications, the main nursing measures were as follows:

First, risk assessment. Nursing staff communicate humanely with the patients, take initiative to know about the patient's treatment and recovery conditions, closely observe their symptoms, actively understand their feelings and deficiencies during the treatment, so as to develop and improve the relevant treatment plans [9]. Second, regular psychological intervention. Nursing staff conduct psychological counseling and support and comfort the patients throughout the whole treatment to enable them to understand the knowledge about diabetic nephropathy, hemodialysis, etc., and enhance their confidence in the treatment [10]. Through regular communication, nursing staff spot the patients' negative emotions in a timely manner, like anxiety and depression, understand the causes, and take appropriate measures to relieve them. Third, rehabilitation guidance. The nursing staff reasonably arrange the patients' daily diet and schedule to ensure adequate nutrition and sleep [11], help them control relevant indexes to reduce post-dialysis complications, and improve their rehabilitation and quality of life.

Evaluation indexes

In this study, the relevant clinical indicators of the nursing of the patients in the two groups were observed and recorded in detail.

Katz indexes (designed and developed by Katz et al.) of the patients in the two groups after three months of nursing were compared. The Katz index aims to evaluate the independence in activities of daily living, including six functions: feeding, dressing, continence, going to toilet, bathing, and transferring [12].

Glycosylated hemoglobin (HbAlc), urinary microalbumin-creatinine ratio (mALB/Cr), and prealbumin (PA) were compared between the two groups before and 3 months after nursing. HbAlc was detected by DIaSTAT automatic glycosylated hemoglobin analyzer and its support-

Table 1. Comparison of the basic data between the two groups ($\bar{x}$ ± sd)

Basic data	Observation group	Control group	t/χ^2	P
Age (year)	66.6±5.3	67.0±5.1	0.570	0.596
Gender (male/female)	61/49	62/48	0.152	0.892
Diabetic nephropathy course (year)	10.8±6.5	10.5±6.7	0.337	0.735
Term of dialysis (month)	6.95±2.81	7.03±2.41	0.381	0.674
BMI (kg/m^2)	18.69±1.38	18.74±1.36	1.002	0.846
MMSE score	26.46±2.51	26.77±2.74	1.086	0.663

Note: MMSE: Mini-Mental State Examination; BMI: Body Mass Index.

Table 2. Comparison of Katz indexes between the two groups ($\bar{x}$ ± sd)

Group	Katz index	
	Before the treatment	After the treatment
Observation group (n=110)	8.3±0.6	1.4±1.2[a]
Control group (n=110)	8.2±0.6	3.2±2.1[b]
t	0.0073	13.0435
P	0.9320	0.0003

Note: Compared with the same group before the treatment, [a]P<0.05, [b]P<0.05.

ing reagents (microcolumn assay) produced by BIO RAD, USA. Radioimmunoassay was adopted for mALB/Cr detection. The detection instrument was DFM296 multi-tube radioimmunoassay counter (produced by Hefei Zhongcheng Electromechanical Technology Development Co., Ltd., a Chinese company), and the reagent was produced by HTA Co., Ltd.; Prealbumin (PA) was monitored by HITACHI 7600010 automatic biochemical analyzer.

A self-designed questionnaire, 36-Item Short Form Survey, was used to investigate and compare the satisfaction, compliance and self-evaluation scores of the patients in the two groups, with a full score of 100.

Statistical analysis

All research data were analyzed by the SPSS 22.0 statistical software (IBM, USA). Measurement data were tested for normality, and the data in normal distribution were expressed as mean ± standard deviation ($\bar{x}$ ± sd). t-test was used for comparison between the two groups. The enumeration data were expressed as the number of cases/percentage (n/%). The comparison between groups adopted Chi Square test. If P<0.05, the difference was considered statistically significant.

Results

Basic data between the two groups

Through the research, it was found that there was no statistical difference in the age, sex, disease duration, dialysis duration, etc. between the two groups (all P>0.05, **Table 1**).

Patients with individualized nursing had better Katz indexes

Katz index of the observation group was significantly better than that of the control group after the treatment (P<0.05, **Table 2**).

Patients with individualized nursing had better blood glucose and blood lipid levels

The indexes of blood glucose and blood lipids were significantly better in the observation group than in the control group after the treatment (P<0.05, **Table 3**).

Patients with individualized nursing had higher SF-36 scores

The SF-36 scores in the observation group were significantly higher than those in the control group after the treatment (P<0.05), as shown in **Table 4**.

Patients with individualized nursing had higher satisfaction rates

The satisfaction rate was significantly higher in the observation group than in the control group after the treatment (P<0.05, **Figure 1**).

Patients with individualized nursing had better compliance

Patients' compliance in the observation group was significantly better than that in the control group (P<0.05, **Figure 2**).

Table 3. Comparison of blood glucose and blood lipid indexes between the two groups ($\bar{x}$ ± sd)

Group	HbA1c (%)		TC (mmol/L)		TG (mmol/L)		LDL-C (mmol/L)	
	Before the treatment	After the treatment	Before the treatment	After the treatment	Before the treatment	After the treatment	Before the treatment	After the treatment
Control group (n=110)	8.0±1.1	7.5±0.2[a]	7.91±2.91	5.83±1.94[a]	2.39±1.61	1.89±1.21[a]	4.52±2.14	3.62±1.92[a]
Observation group (n=110)	8.0±0.9	7.1±0.3[b]	7.82±3.21	4.81±1.42[b]	2.44±1.30	1.41±1.00[b]	4.34±2.33	2.92±1.51[b]
t	0.388	10.497	0.247	4.451	0.253	3.209	0.596	3.162
P	0.691	0.001	0.826	0.001	0.801	0.001	0.553	0.003

Note: HbAlc, glycosylated hemoglobin; TC, total cholesterol; TG, triglyceride; LDL-C, low-density lipoprotein cholesterol. Compared with the same group before the treatment, [a]P<0.05, [b]P<0.05.

Table 4. Comparison of SF-36 scores between the two groups ($\bar{x}$ ± sd, point)

		Observation group	Control group	t	P
Physiological function	Before the intervention	78.1±3.3	78.1±3.2	0.001	0.996
	After the intervention	86.4±2.7[a]	81.9±3.1[b]	11.480	0.001
Role physical	Before the intervention	64.8±5.3	64.1±5.3	0.979	0.327
	After the intervention	81.6±4.7[a]	73.8±4.5[b]	12.571	0.001
Body pain	Before the intervention	67.9±4.6	67.8±4.7	0.159	0.874
	After the intervention	82.1±4.7[a]	74.2±4.5[b]	12.733	0.002
Overall health	Before the intervention	53.5±5.1	53.4±5.2	0.144	0.884
	After the intervention	67.9±5.0[a]	59.8±5.1[b]	11.894	0.004
Life vitality	Before the intervention	48.7±3.5	48.8±3.6	0.207	0.831
	After the intervention	52.3±5.0[a]	65.2±4.8[b]	19.521	0.001
Social function	Before the intervention	46.7±4.1	46.8±4.2	0.178	0.856
	After the intervention	61.4±4.6[a]	71.4±5.1[b]	15.271	0.002
Role emotional	Before the intervention	54.6±5.2	54.5±5.3	0.141	0.788
	After the intervention	66.0±5.7[a]	79.0±5.4[b]	15.982	0.002
Mental health	Before the intervention	42.7±4.8	42.8±4.7	0.156	0.812
	After the intervention	49.9±3.7[a]	66.4±4.7[b]	18.931	0.001

Note: Compared with the same group before the treatment, [a]P<0.05, [b]P<0.05.

Discussion

Previous study has shown that during dialysis treatment for diabetic nephropathy patients, individualized nursing intervention can reduce the mortality rate of the disease, improve treatment compliance, and have a significant clinical effect [12]. In another study, 180 diabetic nephropathy patients were given individualized nursing intervention during dialysis treatment and the authors found that individualized nursing could improve the Katz index and patients' compliance [13]. In addition, results of other relevant research also indicated that individualized nursing could help patients boost their confidence in treatment, improve patients' symptoms and Katz indexes, and thus improve the effects of dialysis [14]. In our study, the Katz index of the observation group was also better than that of the control group, which is consistent with the above reports, indicating that individualized nursing had good effects for diabetic nephropathy patients undergoing hemodialysis.

Suffering from long-term and severe proteinuria, diabetic nephropathy patients are prone to malnutrition, which may lead to infections and other complications. Nursing staff provide patients with dietary therapy according to their personal conditions, and try to prevent adverse phenomena in patients as much as possible [15]. A previous study has shown that patients' blood glucose level could be controlled by strengthening diet intervention; hypoglycemia could be avoided through reasonable arrangements of exercise time and amount in the later stage, following doctors' directions when taking medications, teaching patients how to monitor their blood sugar levels [16]. In this study, the

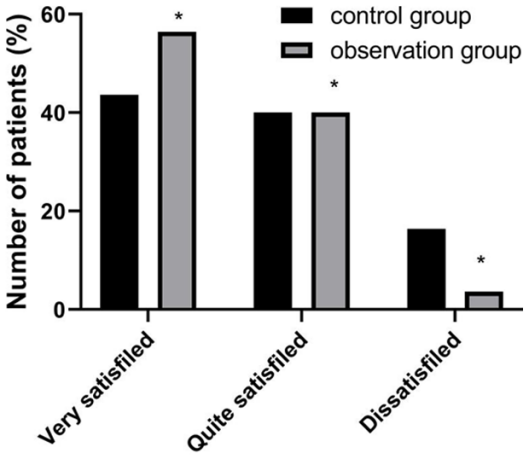

Figure 1. Comparison of patient satisfaction between the two groups. Compared with the control group, *P<0.05.

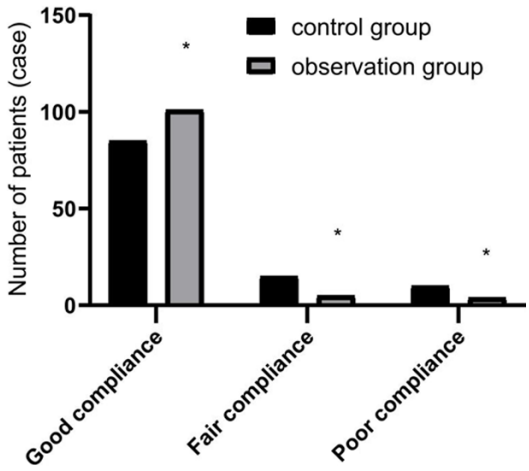

Figure 2. Comparison of patient compliance between the two groups. Compared with the control group, *P<0.05.

indexes of blood glucose and blood lipids in the observation group were better than those in the control group, showing that appropriate nursing has a positive significance for diabetic nephropathy patients, which is consistent with the results of other research.

Studies have shown that patients' quality of life was significantly better in the individualized nursing group than in the traditional nursing group, and the score of self-tested psychological depression was lower than that in the traditional nursing group; although patients in the individualized nursing group and the traditional nursing group all received the routine treatment and nursing of maintenance hemodialysis, including the management of physical symptoms and complications, and health education [17-19]. Results of two studies showed that after nurse staff reasonably arranged patients' daily diet and schedule according to their conditions, the patients' SF-36 scores were improved and theses researchers believed that individualized dietary nursing improved the patients' nutritional status, and dietary nursing combined with the exercise significantly improved the treatment effects [20, 21]. In this study, the SF-36 scores were also better in the observation group than in the control group, which is consistent with the results of other research, indicating that individualized nursing could improve the life quality in diabetic nephropathy patients on hemodialysis.

However, the short observation time of this study limited the evaluation effects of some main indicators, so that we are unable to evaluate the long-term benefits of individualized nursing. In addition, the sample size of this single-center study was small, so in the future, larger sample size and multi-center cooperation are needed for further research.

In conclusion, individualized nursing can help to control the conditions of diabetic nephropathy patients, improve their quality of life, stabilize their mood, and improve their treatment compliance.

Disclosure of conflict of interest

None.

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