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Original Article

Effects of high-quality nursing on improving the quality of life and preventing complications of diabetic nephropathy patients undergoing hemodialysis

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Abstract: Objective: This study was designed to determine the effects of high-quality nursing on quality of life and complications of patients with diabetic nephropathy (DN) undergoing hemodialysis. Methods: A total of 168 DN hemodialysis patients admitted to our hospital from September 2015 to June 2018 were selected as the study subjects, among whom 90 cases treated with routine nursing were assigned into the control group, and the other 78 received high-quality nursing were enrolled in the research group. The anxiety, depression, blood glucose index, DN-related knowledge familiarity, nursing satisfaction, complications and quality of life before and after nursing were compared between the two groups. Results: Compared with the control group, the research group presented significantly lower SAS and SDS scores after nursing ($P<0.05$). In addition, the fasting blood glucose, 2 h postprandial blood glucose, glycosylated hemoglobin and other blood glucose indexes in the research group were significantly lower than those in the control group ($P<0.05$). Moreover, the scores of DN-related knowledge familiarity, nursing satisfaction and quality of life in the research group were significantly higher than those in the control group ($P<0.05$). Conclusion: Compared with routine nursing, high-quality nursing can not only alleviate the adverse emotions of DN patients, effectively control blood sugar, help patients master DN related knowledge more skillfully, but also improve nursing satisfaction, reduce the risk of complications and improve the quality of life, which is worthy of clinical promotion.

Keywords: High-quality nursing, diabetic nephropathy, hemodialysis, complications, quality of life

Introduction

The rapidly growing prevalence of diabetes has posed a major health problem worldwide. Estimated by the international diabetes federation that the diabetes will affect 592 million in 2035 [1]. While as one of the serious complications of diabetes, diabetic nephropathy (DN) goes in parallel with the increase of the incidence of diabetes. In addition, DN remains the primary cause of disability and premature death, bringing a huge burden to individuals and the health care system [2, 3]. DN is the leading cause of end-stage renal disease in adults, which, without effective intervention, progresses 14 times faster than other renal diseases [4, 5]. Currently, hemodialysis is one of the most frequently applied methods for DN treatment, which can slow down the progression of DN and maintain the life of patients, a straw that patients can rely on for long-term survival [6]. However, every coin has two sides; long-term hemodialysis may induce great resistance and complicated emotions in patients as well as various complications, which will enormously jeopardize patients' quality of life [7]. Therefore, high-quality nursing care for DN hemodialysis patients plays an important part in reducing complications and improving their quality of life.

Quality care is a novel mode of nursing that comes with the continuous improvement of medical level and the increasing demand of patients for medical level and service. Different from the traditional one, high-quality nursing is systematic nursing model, which is people-oriented, with cleared nursing philosophy and responsibility, and provide a scientific and efficient nursing for patients with professional

knowledge, operation and attitude, to achieve the need of facilitating patients' recover [8, 9]. At present, high-quality nursing has been applied in all kinds of disease cares and turned out to be beneficial. As indicated by some studies, the proportion of patients receiving anti-rheumatism drugs increased significantly through the implementation of high-quality nursing for elderly patients with rheumatoid arthritis [10]. Some others have shown that compared with routine nursing, high-quality nursing can improve the home-stay independence of dementia patients, improve the quality of life and nursing, and reduce the overall medical care cost for patients [11].

Today, the research on the application of high-quality nursing in DN hemodialysis patients is limited and incomplete. Therefore, high-quality nursing intervention for DN hemodialysis patients was conducted in this study to explore its clinical value involved, aiming to provide a high-quality nursing intervention for DN hemodialysis patients.

Materials and methods

General information

Totally 168 DN hemodialysis patients admitted to our hospital from September 2015 to June 2018 were selected as the study subjects, among whom 90 cases received routine nursing were included in the control group, and the remaining 78 cases treated with high-quality nursing were assigned into the research group. Inclusion criteria: patients with primary school education or above, who meet the diagnostic criteria for DN [12], have no contraindication of hemodialysis or communication disorder, and voluntarily signed the informed consent were included in this study. The exclusion criteria were as follows: patients with malignant tumor, accompanied by serious psychological diseases such as depression and anxiety, and those who dropped out halfway were excluded. The study was approved by the ethics committee of our hospital.

Nursing methods

The control group received routine nursing, including basic dietary nursing, medication nursing, hemodialysis nursing and vascular access maintenance.

Whereas, high-quality nursing was performed in the research group, whose services mainly covered following aspects: (1) Psychological nursing: on the one hand, customized psychological counseling program, which mainly includes the elucidation of high DN and hemodialysis related knowledge, was developed according to the patient's condition, personality and psychological quality, so that patients have a certain understanding of the disease and treatment process, and to eliminate patients' adverse emotions such as anxiety and fear for unknown things. On the other hand, nursing staff instructed patients to release bad emotions through actively communication with patients, and divert patients' attention, alleviate patients' bad mood by using entertainment programs, chat and other ways. (2) Dietary nursing: a scientific dietary program was formulated according to the patient's dietary habits, intake, physical condition and other conditions. Eating mini meals was adopted to maintain to nutritional balance, which was prioritized by high-protein diet, and the daily intake of calories, protein and cholesterol was controlled. (3) Health education: nursing staff took the advantage of lectures, books, film and television materials to explain hemodialysis and DN related knowledge, precautions and complication prevention to patients and their guardians, so as to enhance their self-protection awareness. Besides, a nursing hotline was established to understand patients' needs. (4) Exercise intervention: reasonable and scientific exercise programs were developed based on patient's physical condition to improve their physical resistance, giving priority to slow movements, such as walking, arm swinging and leg stretching. The amount of exercise increased gradually, and no sharp increase of activity within a short period was allowed. (5) Prevention of complications: patients' physical indicators and common complications, such as hypertension, hypotension, infection, hypoglycemia, bleeding and arrhythmia, were strictly and closely monitored. Once abnormal physiological indicators or severe adverse symptoms were found, symptomatic treatment was immediately adopted. (6) Environmental nursing: strictly control the flow of people in dialysis room, ventilate regularly, and sterilize regularly with ultraviolet lamp. The duration of high-quality nursing was two months.

Observation indicators

Self-rating anxiety scale (SAS) [13] was employed to evaluate the anxiety status of patients before and after nursing. On a 100-point scale, 50-70 points indicated mild anxiety, 71-90 points indicated moderate anxiety, and >90 points indicated severe anxiety.

The depression status of patients before and after nursing was determined by Self-rating depression scale (SDS) [14]. With a total score of 100 points, the score and corresponding depression evaluation was as follows: 50-70 points for mild depression, 71-90 points for moderate depression, >90 points for severe depression.

Fasting blood glucose (FBG), 2 h postprandial blood glucose (2 h PG), glycosylated hemoglobin (HbA1c) and other blood glucose indexes were monitored in the two groups.

One day before the end of nursing, patients' DN-related knowledge was assessed with the self-made questionnaire of DN-related knowledge familiarity, which included dietary knowledge, hemodialysis-related knowledge, sports and exercise knowledge and DN-related knowledge. There were 15 questions in each section, each of which scored 1 point, totally 60 points. The higher the score, the higher the familiarity.

The self-made nursing satisfaction questionnaire was adopted to identify the nursing satisfaction of patients, mainly including attitude, personality, wearing, and operating proficiency. There were 20 questions, each of which scored 5 points. The score and corresponding satisfaction evaluation was as follows: <70 points for unsatisfactory, 70-89 points for basic satisfaction and ≥90 points for satisfaction.

By referring to Quality of Life Questionnare-Core 30 (QLQ-C30) [15], the quality of life of patients in 3 months after the nursing care was assessed, including the following 4 items: disease control, life behavior, exercise and psychological emotional change. On a 100-point scale of each item, the higher the score, the better the quality of life.

Statistical analysis

In this study, the collected data were statistically analyzed with SPSS19.0 software (Shanghai Yiyun Information Technology Co., Ltd.), and plotted by GraphPad Prism 7. The counting data were expressed as number/percentage (n/%) and were compared using a Chi-squared test. The measurement data were expressed as mean ± standard deviation (x ± sd). A t test was employed for the inter-group comparison, and a paired t test was used for the comparison before and after treatment within the group. P<0.05 was considered statistically significant.

Results

Comparison of general data between the two groups

No significant differences were observed in general data between the two groups, including gender, age, weight, course of disease, educational level, dietary preference, residence, exercise habits, marital status, smoking history and drinking history (P>0.05) (**Table 1**).

Comparison of SAS and SDS scores before and after nursing in the two groups

The SAS and SDS scores did not differ markedly between the two groups before nursing (P>0.05). While after that, SAS and SDS scores of patients in both groups decreased significantly, and the scores in the research group were significantly lower than those in the control group (P<0.05) (**Table 2**).

Comparison of blood glucose indexes before and after nursing in two groups

There was no significant difference in FBG, 2 h PG and HbA1c levels between the two groups before nursing (P>0.05). While after that, the levels of FBG, 2 h PG and HbA1c in the two groups decreased remarkably, and those of the research group were significantly lower than the control group (P<0.05) (**Table 3**).

Comparison of DN-related knowledge familiarity between the two groups

The scores of DN-related knowledge familiarity in the control group and the research group were 41.13±7.24 and 54.24±5.35 respectively. It was obvious that the score of DN-related knowledge familiarity in the research group was significantly higher than that in the control group (P<0.05) (**Figure 1**).

Table 1. Comparison of general data between the two groups [n (%)] (x ± sd)

Groups	The control group (n=90)	The research group (n=78)	X^2/F	P
Gender			1.079	0.299
Male	53 (58.89)	52 (66.67)		
Female	37 (41.11)	26 (33.33)		
Age (years)	54.34±9.98	57.23±8.98	1.960	0.052
Weight (kg)	64.24±10.66	65.56±9.89	0.828	0.409
Course of disease (years)	8.67±5.57	7.81±4.67	1.075	0.284
Education level			1.554	0.213
< high school	33 (36.67)	36 (46.15)		
≥ high school	57 (63.33)	42 (53.85)		
Dietary preferences			0.558	0.455
Light	57 (63.33)	45 (57.69)		
Greasy	33 (36.67)	33 (42.31)		
Residence			3.573	0.059
Urban	32 (35.56)	39 (50.00)		
Rural	58 (64.44)	39 (50.00)		
Exercise habits			1.476	0.224
Yes	43 (47.78)	30 (38.46)		
No	47 (52.22)	48 (61.54)		
Marital status			2.270	0.321
Married	78 (86.67)	62 (78.49)		
Single	3 (3.33)	2 (2.56)		
Divorced	9 (10.00)	14 (17.95)		
Smoking history			0.222	0.638
Yes	54 (60.00)	44 (56.41)		
No	36 (40.00)	34 (43.59)		
Drinking history			0.008	0.929
Yes	49 (54.44)	43 (55.13)		
No	41 (45.56)	35 (44.87)		

Table 2. Comparison of SAS and SDS scores before and after nursing between the two groups (points, x ± sd)

Groups	SAS score		SDS score	
	Before nursing	After nursing	Before nursing	After nursing
The control group (n=90)	55.78±5.78	47.62±4.65*	59.58±5.54	51.94±4.89*
The research group (n=78)	56.66±6.56	41.23±5.11*	60.11±4.89	44.84±5.34*
t	0.924	8.484	0.653	8.993
P	0.357	<0.001	0.515	<0.001

Note: *indicates the intra-group comparison with that before nursing, P<0.05.

Comparison of nursing satisfaction between the two groups

The score of nursing satisfaction in the study group (93.44 ± he score of nursing satisfaction in the study group (93.44 knowledge ± he score <0.05) (see **Figure 2**).

Comparison of complications between two groups

In the control group, there were 29 cases of hypertension (32.22), 24 cases of hypotension (26.67), 19 cases of infection (21.11), 12 cases of hypoglycemia (13.33), 5 cases of arrhythmia

Table 3. Comparison of blood glucose indexes before and after nursing of patients in the two groups (x ± sd)

Groups	Timing	The control group (n=90)	The research group (n=78)	t	P
FBG (mmol/L)	Before nursing	9.89±3.17	10.71±2.53	1.834	0.069
	After nursing	7.25±1.61*	5.27±1.12*	8.655	<0.001
2 h PG (mmol/L)	Before nursing	13.14±2.45	12.67±2.68	1.187	0.237
	After nursing	8.55±1.89*	6.67±1.34*	7.331	<0.001
HbA1c (%)	Before nursing	7.67±1.78	7.48±1.44	0.753	0.453
	After nursing	5.93±0.91*	5.22±0.89*	5.059	<0.001

Note: *indicates the intra-group comparison with that before nursing, P<0.05.

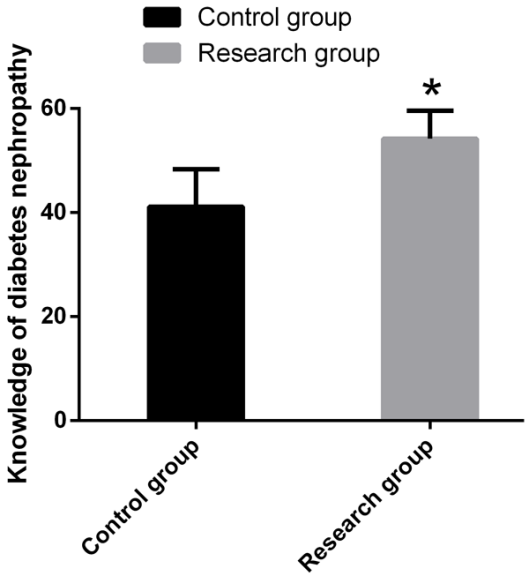

Figure 1. Comparison of familiarity of DN related knowledge between the two groups. The score of DN knowledge familiarity in the study group was markedly higher than that in the control group (P<0.05). Note: * indicated P<0.05 when compared with the control group.

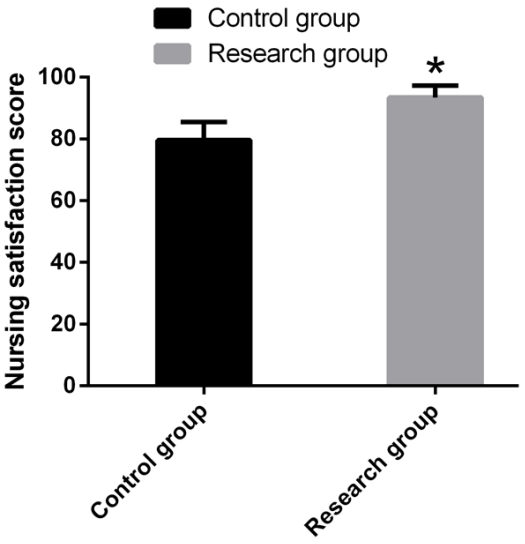

Figure 2. Comparison of nursing satisfaction between the two groups. The nursing satisfaction score of the study group was significantly higher than that in the control group (P<0.05). Note: * indicated P<0.05 when compared with the control group.

(5.56), and 6 cases of hemorrhage (6.67). While the cases/percentage of hypertension, hypotension, infection, hypoglycemia, arrhythmia and hemorrhage in the research group were 13/16.67%, 10/12.82%, 5/6.41%, 2/2.56%, 1/1.28% and 3/3.85% respectively. The incidences of hypertension, hypotension, infection and hypoglycemia in the research group was significantly lower than those in the control group (P<0.05), while the incidences of arrhythmia and hemorrhage in the two groups identified no significant difference (P>0.05) (**Table 4**).

Comparison of quality of life after nursing between the two groups

The QLQ-C30 score of the research group calculated by the scores of disease control, life behavior, exercise and psychological emotional change after nursing was significantly better than that of the control group (P<0.05) (**Table 5**).

Discussion

DN was generated from various factors, including hyperglycemia, hypertension, obesity, sedentary life, heredity, smoking and age growth [16]. Hemodialysis outperforms kidney transplantation in that the former presents simpler operation and relatively low price, which earns its place in clinic and ranks it as one of the main clinical methods for treating DN patients [17]. However, hemodialysis can lead to various complications, causing patients to suffer from anxiety, insecurity and other adverse emotions,

Table 4. Comparison of complications between the two groups [n (%)]

Groups	The control group (n=90)	The research group (n=78)	X^2	P
Hypertension	29 (32.22)	13 (16.67)	5.393	0.020
Hypotension	24 (26.67)	10 (12.82)	4.963	0.026
Infection	19 (21.11)	5 (6.41)	7.375	0.007
Hypoglycemia	12 (13.33)	2 (2.56)	6.344	0.012
Arrhythmia	5 (5.56)	1 (1.28)	2.216	0.137
Hemorrhage	6 (6.67)	3 (3.85)	0.656	0.418

Table 5. Comparison of quality of life scores between the two groups (points, x ± sd)

Groups	Cases	Disease control	Life Behavior	Exercise	Psychological Emotion
The control group	90	76.57±4.78	73.57±5.45	69.56±4.46	75.57±5.99
The research group	78	83.54±5.45	81.29±6.45	75.45±6.11	86.45±5.44
t		8.831	8.409	7.198	12.250
P		<0.001	<0.001	<0.001	<0.001

reducing patients' daily physical activity and physical performance, and severely affecting their quality of life [18]. Therefore, strengthening the clinical nursing of DN hemodialysis patients has important clinical significance to reduce complications and improve the quality of life of patients.

Long-term hemodialysis patients often suffer from anxiety, depression, fear and other adverse emotions, which have a serious negative impact on patients' quality of life and treatment compliance [19]. Studies have shown that maintaining optimistic and confident thinking may be of great help in treating various diseases, and diminishing negative emotions is associated with reducing the risk of depression [20]. The results also showed that mental health care for patients with diabetes can reduce their long-term negative emotions, promote their self-management ability and gain stronger willpower, so as to improve their quality of life and disease control ability [21]. In this study, the customized psychological counseling program was developed based on patients' condition, personality and psychological quality, in an attempt to help patients release their bad emotions, solve their problems with professional knowledge, and remove their bad emotions. The results showed that after nursing, the SAS scores and SDS scores of the research group were significantly lower than those of the control group, indicating that compared with routine nursing, high-quality nursing can effectively eliminate the anxiety, depression and other negative emotions of DN hemodialysis patients.

Poor blood glucose control has always been one of the main difficulties in the management of diabetes [22]. Studies have suggested that all patients with diabetes adopt moderate intensity aerobic exercise and low-protein diet to improve blood glucose control and cardiovascular risk [23]. Therefore, this study designed a humanized regimen for diet and exercise in the research group, and the results showed that FBG, 2 h PG and HbA1c levels were significantly lower than those in the control group. As a lifelong disease, diabetes is an enduring battle. Therefore, setting up a positive and healthy attitude for patients and carrying out health education on them play an important role in improving patients' self-efficacy. Studies have shown that health education for the elderly with hypertension can effectively control systolic blood pressure and improve the self-efficacy of exercise and health-related life quality [24]. The present study demonstrated that the DN-related knowledge familiarity score of patients in the research group was significantly higher than that in the control group, indicating that high-quality nursing can help patients master DN-related knowledge more proficiently, thus strengthening patients' self-management ability. What's more, this study evaluated the patients' satisfaction with the two nursing modes, and the results revealed that the high-quality of nursing satisfaction was better than conventional one.

Complications caused by hemodialysis have always been one of the main reasons leading to decreased quality of life in DN patients, some serious complications, such as infection and cardiovascular diseases, may even pose serious threats to patients' lives [25, 26]. Therefore, it is particularly important to reduce the complication rate of DN hemodialysis patients. Some

research results have revealed that, compared with conventional nursing, professional internal fistula nursing can provide better nursing services for patients with chronic renal failure treated with arteriovenous fistula maintenance hemodialysis, including reducing complications caused by maintenance hemodialysis, extending the use time of fistula, and improving the quality of life [27]. In this study, the possible complications of patients in the research group were provided with preventive care and dialysis room environment. It was found that the research group displayed remarkably lower incidence of hypertension, hypotension, infection and hypoglycemia than the control group. In addition, QLQ-C30 scores of the research group were significantly better than those of the control group, indicating that compared with routine nursing, high-quality nursing can effectively reduce complications caused by hemodialysis in DN patients and improve their quality of life.

There are still some shortcomings in this study, such as: we did not monitor the dynamic blood glucose of patients, and the two groups of nurses were not the same group, resulting in some limitations. The scores of DN related knowledge and quality of life were not evaluated before treatment, which led to one-sided results.

To sum up, compared with routine nursing, high-quality nursing can not only eliminate the adverse emotions of DN patients, effectively control blood sugar, help patients to master DN related knowledge more proficiently, but improve patients' nursing satisfaction, reduce the risk of complications and improve their quality of life, which is worth promoting in clinical application.

Disclosure of conflict of interest

None.

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