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Original Article

Effects of targeted nursing intervention on rehabilitation of diabetic patients with diabetic retinopathy

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Abstract: Objective: The aim of this study was to examine the effects of targeted nursing intervention on the quality of life of diabetic patients with diabetic retinopathy. Methods: A total of 90 patients, diagnosed with type-2 diabetes and diabetic retinopathy, were selected. They were randomly divided into group A (N=45) and group B (N=45). Patients in group B received routine nursing, while patients in group A were given targeted nursing intervention. Blood glucose control, rehabilitation effects (visual improvement), nursing satisfaction, and quality of life of the two groups were compared. Results: After nursing, fasting blood glucose (FBG), 2 hours post-glucose load glycemia (2hPG), and glycated hemoglobin (HbA1c) levels in group A were significantly lower than those in group B (P<0.001). Rehabilitation effects of group A were significantly better than those of group B (P<0.001). Nursing satisfaction in group A was significantly higher than that in group B (P<0.001). Quality of life scores in group A were significantly higher than those in group B (P<0.001). Conclusion: Targeted nursing intervention promotes the rehabilitation of diabetic patients with diabetic retinopathy and is worthy of clinical application.

Keywords: Diabetes with diabetic retinopathy, nursing, mental status, quality of life

Introduction

Diabetes, a metabolic disease, is a common and frequently-occurring disease, threatening the health of people and exerting a great burden on families and society [1, 2]. Regarding complications of diabetes, diabetic retinopathy is one of the most common, with specific fundus lesions. It is an important cause of blindness [3]. Early clinical symptoms of diabetic retinopathy are not obvious, usually minor visual problems that eventually may lead to blindness. Blindness rates caused by diabetic retinopathy in diabetic patients are much higher than in non-diabetic patients [4]. Visual loss from diabetic retinopathy is both preventable and treatable. Effective and consistent medical management reduces incidence and progression of retinopathy. Risk of visual loss from diabetic retinopathy is reduced by intervention, falling into 3 categories: primary prevention of microvascular complications, early detection of retinopathy, and effective treatment of established disease. Early detection, diagnosis, active treatment, and targeted nursing could minimize patient suffering [5].

With changes in living habits, the number of diabetes patients and diabetic complications has grown rapidly [6, 7]. Glucocorticoids are often applied to treat diabetic retinopathy [8]. Related reports have indicated that the application of massive glucocorticoids may destroy the autoimmunity of the human body, have a negative impact on the immune system, and finally induce serious infections in diabetic patients [9]. High glucocorticoid application may also lead to blood glucose increases, as well as affect the clinical efficacy of treatment, consequently causing the aggravation of conditions [10].

With the development of nursing concepts, targeted nursing intervention is given to the patients, aiming to improve treatment compliance, improve adverse emotions, and improve the quality of life of patients [11]. Targeted nursing is based on the 'society-psychology-biology' medical pattern, showing the 'integrated, high-quality, continuous' nursing concept. It has achieved positive effects in multiple fields. This study aimed to examine the effects of targeted nursing intervention on the quality of life and

emotions of diabetic patients with diabetic retinopathy.

Materials and methods

A total of 90 patients, diagnosed with type-2 diabetes accompanied by diabetic retinopathy, were selected. These patients were randomly divided into groups A (N=45) and B (N=45). Patients in group B were given routine nursing, while patients in group A were given targeted nursing intervention.

Inclusion and exclusion criteria: (1) All patients that met the diagnostic criteria for II stage diabetic retinopathy of type 2 diabetes and received fundus examinations or fundus fluorescein angiographies [12] were included; (2) Patients with neurological disorders, including cognition disorder, motor disorder, and language disorders; Patients with coagulopathy or other infectious diseases or other diabetic complications were excluded. All patients and family members provided informed consent.

Intervention

Nursing intervention began with the admission of the patient and lasted for 3 months. Patients in group B were given regular diabetes diet care, including reduced fat intake, control of total calorie intake, with an adequate supply of protein and food fiber in the diet. They were encouraged to do basic exercises, such as medium to low intensity aerobic exercise. They avoided weightlifting and other exercises requiring them to hold their breath. They were prescribed insulin, lipid-lowering drugs, and drugs for retinal diseases. They were assisted by regular ophthalmologic examinations.

Patients in group A were cared for as follows: (1) Dietary nursing: a reasonable diet is critical to the nursing of diabetic eye disease. The medical staff reported the importance of diet therapy to the patients and their family members, strictly implementing diabetic diet measures. The appropriate quantity of vitamins, minerals, and trace elements were supplemented to their foods, with rich fiber recommended.

(2) Psychological nursing and education on diabetes: medical workers analyzed the psychological status of patients with diabetic retinopathy, in a detailed way, actively providing counseling service. Patients and their family members were given the knowledge of diabetes, including complications of diabetic retinopathy, to establish their confidence in defeating the disease. Targeted nursing intervention began with the admission of the patient and lasted for 3 months. When they were released from the hospital, patients still received nursing through the telephone, wechat, and QQ guidance, since these interventions could be completed at home.

Specific nursing

Nurses assisted patients with regular ophthalmologic examinations and supervised the patients, following the advice of doctors. Basic eye care measures, such as one towel for one person, was advocated. Patients were encouraged to quit smoking, avoiding progression of the disease. Fundus fluorescein angiographies, visual acuity, and visual fields were re-examined every two weeks or four weeks, within six months after the operation.

Evaluation of rehabilitation effects

Rehabilitation effects were evaluated on the 1st day at admission and 3 months after intervention. Efficacy criteria after nursing were as follows: [13] Excellence: visual improvement ≥4 lines and clinical symptoms improved significantly; Effectiveness: visual improvement ≥2 lines and clinical symptoms improved to some extent; Ineffectiveness: failure to satisfy the above criteria. The degree of improvement of patient clinical symptoms was judged by the attending physician. Changes in blood glucose indicators [14], including FBG mmol/L, 2hPG mmol/L, and HbA1c%, were used to analyze levels of blood sugar control.

Quality of life in patients with type 2 diabetes was assessed by DMQLS, including disease, psychological, physical, and social scores. Higher scores indicate a lower quality of life [15].

Statistical methods

SPSS 17.0 (Biz Insight Information Technology Co., Ltd.) software was adopted for statistical analysis. Count data are expressed as [n (%)] and comparisons between the 2 groups were performed by X^2 test. Measurement data are expressed as mean±standard deviation. Before/after comparisons, within the group, were

Table 1. General clinical data

Group	A group (n=45)	B group (n=45)	t/X^2	*P*
Gender			0.179	0.673
Male	25 (55.56)	23 (51.11)		
Female	20 (44.44)	22 (48.89)		
Age (years)	55.01±4.14	55.03±5.23	0.020	0.984
Weight (Kg)	60.16±5.78	60.36±5.57	0.167	0.868
Diabetic retinopathy type			0.179	0.673
Non-proliferative diabetic retinopathy	20 (44.44)	22 (48.89)		
Proliferative diabetic retinopathy	25 (55.56)	23 (51.11)		
Routine blood				
Hb (gm/dl)	9.67±1.70	12.03±3.24	4.327	<0.001
RBC ($\times10^{12}$/L)	4.90±0.49	5.82±0.51	8.726	<0.001
PLT ($\times10^{9}$/L)	159.25±31.43	149.55±26.13	1.592	0.115
Liver function				
ALT (U/L)	22.06±10.27	20.37±10.69	0.765	0.447
AST (U/L)	19.47±5.49	18.48±7.24	0.731	0.467
Renal function				
TP (g/L)	130.68±14.18	79.38±14.23	17.130	<0.001
UREA (mmol/L)	7.99±2.15	5.12±4.82	3.648	<0.001
CRE (μmol/L)	183.26±30.42	94.58±20.17	16.300	<0.001
UA (μmol/L)	587.34±60.48	352.77±36.13	22.340	<0.001

performed by paired t-test. Independent sample t-test was adopted for comparisons at the same time points between groups. P<0.05 indicates statistical significance.

Results

Baseline clinical

There were no significant differences in baseline data (P>0.05). The two groups were comparable (**Table 1**).

Blood glucose levels before and after nursing

FBG levels before and after nursing in the two groups: FBG before and after nursing in group A were, respectively, (13.04±6.12) mmol/L and (5.34±2.05) mmol/L, while FBG before and after nursing in group B were (13.46±7.18) mmol/L and (10.24±5.57) mmol/L, respectively. Intra-group comparisons suggest that FBG after nursing was significantly lower than that before nursing, in both groups, and differences were statistically significant (P<0.05). Comparisons between groups showed that FBG differences between group A and group B, before nursing, were not statistically significant (P> 0.05). However, FBG, after nursing, in group A was significantly lower than that of group B. Differences were statistically significant (P< 0.001). Taken together, results suggest that nursing intervention will exert a greater impact on the declination of fasting blood glucose levels in diabetic patients with diabetic retinopathy (**Table 2** and **Figure 1**).

2hPG levels before and after nursing in two groups: 2hPG levels, before and after nursing, in group A were, respectively, (20.48±5.18) mmol/L and (7.87±2.46) mmol/L. The 2hPG, before and after nursing, in group B were (19.89±6.24) mmol/L and (15.64±4.28) mmol/L, respectively. Intra-group comparisons suggest that 2hPG, after nursing, was significantly lower than that before nursing, in both groups, and differences were statistically significant (P<0.001). Comparisons between the two groups showed that 2hPG differences between group A and group B, before nursing, were not statistically significant (P>0.05). The 2hPG, after nursing, in group A was significantly lower than that of group B. Differences were statistically significant (P<0.001). Taken together, results suggest that targeted nursing intervention will exert a greater impact on the declination of 2hPG levels in diabetic patients with diabetic retinopathy (**Table 3** and **Figure 2**).

Table 2. Changes in FBG (mmol/L) before and after nursing intervention

Group	A group (n=45)	B group (n=45)	t	*P*
Before the intervention	13.04±6.12	13.46±7.18	0.299	0.766
After the intervention	5.34±2.05*,#	10.24±5.57*	5.537	<0.001
t	8.003	2.377		
P	<0.001	0.020		

Note: * indicates that the indicator level of this group is significantly lower than that before intervention, while # indicates that the index level of group A intervention is significantly lower than that of group B, and the difference is statistically significant (P<0.05).

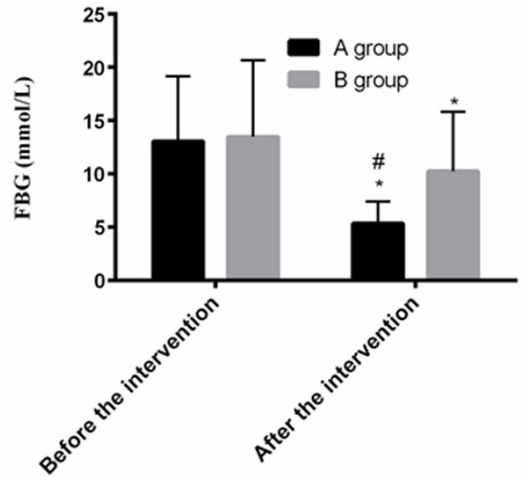

Figure 1. Changes in FBG before and after nursing in two groups. The intra-group comparison showed that FBG after nursing was significantly lower than that before nursing, in both groups, and differences were statistically significant (P<0.05). The FBG in group A was significantly lower than that in group B after nursing and the difference was statistically significant (P<0.001). Note: * represents that the level of indicator in this group after nursing was significantly lower than that before nursing, while # represents that the level of index in group A after nursing was significantly lower than that in group B, and the difference was statistically significant (P<0.05).

HbA1c levels before and after nursing in the two groups: Plasma HbA1c levels, before and after nursing, in group A were (9.24±0.17)% and (6.07±0.43)%, respectively. HbA1c levels, before and after nursing, in group B were (9.19±0.25)% and (8.01±0.35)%, respectively. Intra-group comparisons suggest that HbA1c levels, after nursing, were significantly lower than those before nursing, in both groups, and differences were statistically significant (P< 0.001). Comparisons between groups showed that HbA1c differences between group A and group B, before nursing, were not statistically significant (P>0.05). HbA1c, after nursing, in group A was significantly lower than that of group B. Differences were statistically significant (P<0.001). Results suggest that targeted nursing intervention will exert a greater impact on the declination of HbA1c levels in diabetic patients with diabetic retinopathy (**Table 4** and **Figure 3**).

Rehabilitation after nursing in the two groups of patients

Rehabilitation rates of excellence and rehabilitation rates of effectiveness between the two groups, after nursing, were not statistically different (P>0.05). Rehabilitation rates of ineffectiveness, after nursing, in group A were significantly lower than those in group B. Differences were statistically significant (P<0.05). Total rehabilitation effective rates, after nursing, in group A were significantly higher than those in group B. Differences were statistically significant (P<0.05). Results suggest that targeted nursing intervention will improve total rehabilitation effective rates of patients with diabetic retinopathy, to some degree (**Table 5**).

Comparison of quality of life and nursing satisfaction between the two groups of patients

Comparisons of quality of life, before and after nursing, between the two groups of patients were conducted. Scores on the dimensions of disease, psychology, physiology, and society in group A were not statistically different from those in Group B, before nursing (P>0.05). Scores on dimensions of disease, psychology, physiology, and society, after nursing, were significantly lower than those before nursing in group A. Differences were statistically significant (P<0.05). Scores on dimensions of disease, psychology, physiology, and society, after nursing, were not statistically different from those before nursing in group B (P>0.05). Scores on dimensions of disease, psychology, physiology, and society in group A were statistically lower than those in group B, after nursing (P<0.05) (**Table 6**).

Comparisons of nursing satisfaction between the two groups of patients were conducted. Nursing satisfaction of patients in group A was

Table 3. Changes in 2hPG (mmol/L) before and after nursing intervention

Group	A group (n=45)	B group (n=45)	t	*P*
Before the intervention	20.48±5.18	19.89±6.24	0.488	0.627
After the intervention	7.87±2.46*,#	15.64±4.28*	10.560	<0.001
t	14.750	3.768		
P	<0.001	<0.001		

Note: * indicates that the indicator level of this group is significantly lower than that before intervention, while # indicates that the index level of group A intervention is significantly lower than that of group B, and the difference is statistically significant (P<0.05).

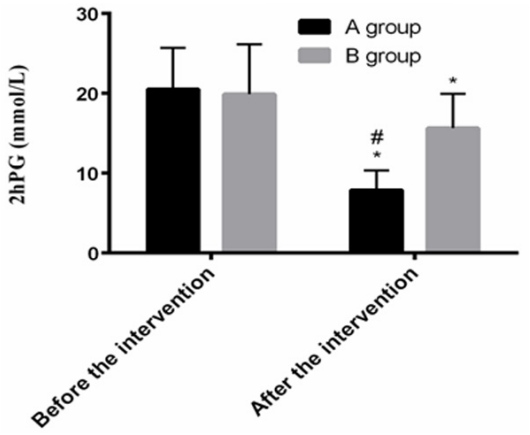

Figure 2. Changes in 2hPG before and after nursing in both groups. The intra-group comparison showed that the 2hPG in both groups, after nursing, was significantly lower than that before nursing. The difference was statistically significant (P<0.001). The 2hPG in group A was significantly lower than that in group B after nursing and the difference was statistically significant (P<0.001). Note: * represents that the level of indicator in this group after nursing was significantly lower than that before nursing, while # represents that the level of indicator in group A after nursing was significantly lower than that in group B and the difference was statistically significant (P<0.05).

significantly higher than that in group B, while nursing dissatisfaction in group A was significantly lower than that of group B. Differences were statistically significant (P<0.05). Results suggest that targeted nursing intervention was highly acceptable among all patients with diabetes and diabetic retinopathy (**Table 7**).

Discussion

Treatment of diabetic patients with diabetic retinopathy is to relieve the symptoms of disease, prevent complictions, and control blood glcose levels. More importantly, it aims to improve the daily quality of life of patients and boost the mental status of patients during treatment [16]. Medical workers, during nursing care, not only play the role of care providers, but also integrate the responsibilities of medical treatment, nursing, rehabilitation, and health education. They are the health manager, health consultant, and health educator of the patients and family members [17]. Targeted nursing protocols, centered on patients with diabetes and diabetic retinopathy, are made and systematic nursing intervention is implemented. In addition to therapy efficacy, psychological health and social function improvements of the patients are paid significant attention [18]. Studies have shown that nursing intervention based on conventional therapy given to the patients with visual impairment will not only comfort the patients psychologically, but also improve the mood and mental status of patients, maximizing the rehabilitation effects [19]. The current study aimed to analyze the effects of targeted nursing intervention on treatment efficacy, daily activities, and quality of life of diabetic patients with diabetic retinopathy.

This study monitored blood glucose levels of the two groups. Results suggest that the differences in FBG, before nursing, between group A and group B were not statistically significant. After nursing, FBG, 2hPG, and HbA1c levels, in both groups, were significantly lower than those before nursing. The FBG in group A was significantly lower than that in group B, after nursing, and differences were statistically significant. Currently, changes in FBG, 2hPG, and HbA1c are important indicators of diabetic diagnosis [20]. In the prevention and treatment of diabetic complications, abnormalities of FBG, 2hPG, and HbA1c are risk factors of diabetic macroangiopathy and microangiopathy [21]. Therefore, it is believed that targeted nursing intervention may lead to a greater declination in fasting blood glucose levels for patients with diabetes and diabetic retinopathy. Studies on regulation of blood glucose in

Table 4. Changes in HbA1c (%) before and after nursing intervention in the two groups

Group	A group (n=45)	B group (n=45)	t	*P*
Before the intervention	9.24±0.17	9.19±0.25	1.109	0.270
After the intervention	6.07±0.43*,#	8.01±0.35*	23.470	<0.001
t	45.990	18.400		
P	<0.001	<0.001		

Note: * indicates that the indicator level of this group is significantly lower than that before intervention, while # indicates that the index level of group A intervention is significantly lower than that of group B, and the difference is statistically significant (P<0.05).

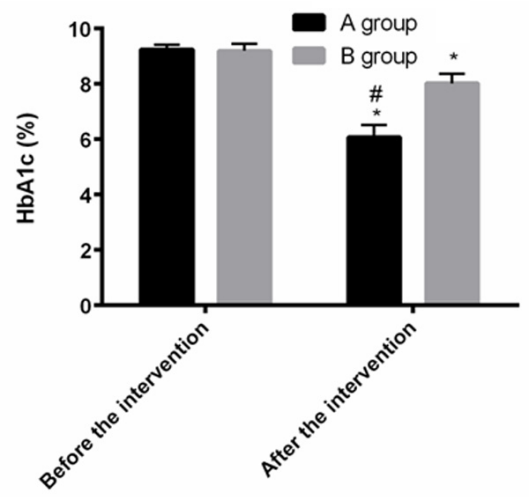

Figure 3. Changes in HbA1c before and after nursing in both groups. The intra-group comparison showed that HbA1c levels, after nursing, were significantly lower than those before nursing in both groups. The difference was statistically significant (P<0.001). The HbA1c in group A was significantly lower than that in group B, after nursing, and the difference was statistically significant (P<0.001). * represents that the level of indicator in this group after nursing was significantly lower than that before nursing, while # represents that the level of indicator in group A after nursing was significantly lower than that in group B and the difference was statistically significant (P<0.05).

patients with diabetes and diabetic retinopathy have shown that reasonable nursing intervention would help to decrease levels of FBG, 2hPG, or HbA1c and alleviate symptoms of eye diseases to a greater extent [22]. Three months after nursing, the current study compared the rehabilitation of both groups. It was found that nursing given to patients with diabetes and diabetic retinopathy improved the rehabilitation of these patients, to some extent. Total rehabilitation effective rates, after nursing, in group A were significantly higher than those in group B. Many studies have demonstrated the importance of nursing care in the treatment of patients with diabetes and diabetic retinopathy, showing that reasonable nursing care is helpful to the rehabilitation of patients [23]. Regarding comparisons of quality of life between both groups, this study adopted the DMQLS to evaluate the quality of life of patients with diabetic retinopathy. Results show that scores on dimensions of disease, psychology, physiology, and society, after nursing, were significantly lower than those before nursing in both groups. Scores, after nursing, in group A were significantly lower than those in group B and the differences werestatistically significant. This suggests that quality of life of patients was improved with targeted nursing intervention [15]. Finally, this study evaluated the nursing satisfaction of the two groups of patients through follow-ups. Results suggest that targeted nursing intervention was highly accepted by patients with diabetic retinopathy. With the progress of medical levels, nursing work keeps improving. Appropriate and high-quality nursing has become more and more demanding, proving the significant effects of nursing intervention on rehabilitation of patients [24].

This study focused on patient retinopathy but did not accurately record the duration of illness. The nursing design of this study was subject to the influence of the nursing management system in the hospital. This may be subjective and not perfect. In addition, present assessment of the quality of life was relatively simple and unique, possibly leading to the contingency of research results.

In summary, targeted nursing intervention is highly accepted by patients. Reasonable nursing intervention in diabetic patients with diabetic retinopathy will help control blood glucose levels of patients more effectively, improve total rehabilitation rates of patients with diabetic retinopathy, and upgrade their quality of life.

Disclosure of conflict of interest

None.

Table 5. Comparison of rehabilitation effects after nursing intervention in two groups of patients [n (%)]

Group	n	Significant effect	Effective	Invalid	Total efficiency
A group	45	35 (77.78)	9 (20.00)	1 (2.22)	44 (97.78)
B group	45	30 (66.67)	8 (17.78)	7 (15.56)	38 (84.44)
X^2		1.385	0.073	4.939	4.939
P		0.239	0.788	0.026	0.026

Table 6. Comparison of DMQLS scores before and after nursing intervention in two groups of patients

	A group		B group	
	Before the intervention	After the intervention	Before the intervention	After the intervention
Disease latitude	51.78±7.24	42.55±7.58*,#	51.36±7.18	49.01±7.03*
Psychological latitude	50.19±8.25	40.78±7.82*,#	50.86±8.02	49.67±7.16*
Physiological latitude	51.47±7.55	42.44±8.56*,#	51.22±7.42	50.14±7.15*
Social latitude	50.63±8.10	40.13±7.24*,#	50.90±8.03	49.18±7.15*

Note:*, indicates that the indicator level of this group is significantly lower than that before intervention, while #, indicates that the index level of group A intervention is significantly lower than that of group B, and the difference is statistically significant (P<0.05).

Table 7. Nursing satisfaction of the two groups of patients [n (%)]

	n	Great satisfaction	Satisfied	Not satisfied	Total satisfaction
A group	45	34 (75.56)	10 (22.22)	1 (2.22)	44 (97.78)
B group	45	20 (44.44)	18 (40.00)	7 (15.56)	38 (84.44)
X^2		9.074	3.318	4.939	4.939
P		0.003	0.069	0.026	0.026

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