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Original Article

High-quality nursing intervention can effectively improve blood glucose level, treatment compliance and quality of life in patients with diabetic retinopathy

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Abstract: Objective: To investigate the effect of high-quality nursing on blood glucose, treatment compliance and quality of life (QOL) in patients with diabetic retinopathy (DR). Methods: One hundred and forty-four DR patients treated in our hospital from 2017 to January 2019 were enrolled. Among them, 66 patients received routine care and were set as the regular group, and the remaining 78 patients received high-quality care and were included in the premium group. After intervention, blood glucose levels were measured in both groups, and psychological negative emotions were assessed using a self-rating anxiety scale (SAS) and a self-rating depression scale (SDS). Patients' nursing compliance was evaluated by the treatment compliance questionnaire. Self-care ability was assessed by the self-care agency scale (ESCA), quality of life was assessed by the quality of life questionnaire (QLQ-C30), and nursing satisfaction was assessed by the nursing satisfaction questionnaire. Results: The post-nursing blood glucose, 2 h postprandial blood glucose (2hPBG) and glycosylated hemoglobin (HbA1c) levels in the premium group were lower than those in the regular group. The premium group presented lower SAS and SDS scores, as well as higher treatment compliance, ESCA scores, QOL and nursing satisfaction than the control group after nursing intervention. Conclusion: Compared with the conventional management scheme, a high-quality nursing mode can alleviate adverse psychological moods of DR patients, and enhance their treatment compliance and self-management ability, thereby helping them regulate their heath.

Keywords: High-quality nursing, diabetic retinopathy, blood glucose level, treatment compliance, quality of life

Introduction

Diabetes is one of the most common metabolic diseases, it has an increasing prevalence, and as such it poses a grave threat to human life and health [1]. It is reported that approximately 415 million people worldwide suffered from diabetes in 2015, and this number may exceed 640 million people by 2040 [2]. Diabetic retinopathy (DR) is one of the most serious complications of diabetes, which, if left untreated, may lead to progressive visual impairment and eventual blindness [3]. With the increasing number of diabetes patients, the incidence of DR is also on the rise, which seriously affectes people's physical and mental health and quality of life (QOL) [4]. Currently, blood glucose control is a primary measure to prevent and delay the occurrence and progression of DR [5]. However, blood glucose is affected by many factors such as patients' negative psychological moods, inadequate self-management ability and poor disease awareness, resulting in patients' blood glucose control not being ideal, leading to various adverse outcomes [6, 7]. Therefore, it is high time to strengthen the care for DR patients and help them slow down disease progression.

High-quality nursing is a patient-centered nursing mode, which helps patients recover through scientific and comprehensive nursing measures to meet their psychological and health care needs [8, 9]. Existing evidence shows that high-quality nursing can provide more satisfactory care for patients, with broad application prospects. For example, research results have shown that compared with routine nursing, high-quality nursing can improve the adverse emotions, activities of daily living and QOL of

liver cancer patients during radiotherapy, as well as reduce adverse reactions [10]. Other scholars have revealed that, high-quality nursing can more efficiently relieve anxiety and depression in MRI examination of patients with acute stroke in comparison with routine nursing, thereby improving examination completion rate, shortening examination time, and improving nursing satisfaction, which promotes good application value [11]. In addition, in uremia nursing, the effect of high-quality nursing is also better than that of routine nursing [12]. However, as far as we know, there is a lack of research data on the application value of quality care in DR treatment.

Therefore, 144 DR patients admitted to our hospital were respectively given routine care and high-quality care, and the application value of these two nursing methods in DR patient care was compared, aiming to find a better nursing plan for DR patients.

Materials and methods

Study participants

One hundred and forty-four patients with DR who were treated in the Central Hospital of Wuhan, Tongji Medical College, Huazhong University of Science and Technology between 2017 and January 2019 were selected and allocated into the regular group (n = 66) and the premium group (n = 78) according to the nursing methods adopted. Inclusion criteria: Patients diagnosed with DR, who could independently complete the treatment of this study, and those with complete clinical data were enrolled. Informed consent was signed by both the patient and his/her guardian. Exclusion criteria: Those with severe systemic diseases; those with other severe complications of diabetes; those with difficulty in communication; those with mental illness; those who withdrew halfway; those who could not take care of themselves. This study was approved by the Ethics Committee of the Central Hospital of Wuhan, Tongji Medical College, Huazhong University of Science.

Nursing methods

Patients in the regular group were given routine nursing, mainly including basic diet nursing, medication guidance and blood glucose detection.

Patients in the premium group were treated with high-quality nursing, primarily covering the following aspects. (1) Diet management: The patient was informed of the importance of a scientific and reasonable diet, and a reasonable diet plan was formulated according to his/her physical condition to avoid the intake of high-fat, high-sugar and irritating food. In addition, the patient was urged to develop the habit of viewing the nutritional composition table of the food eaten before meals, thereby avoiding the patient's unintentional intake of foods that adversely affect blood sugar. (2) Life intervention: While actively communicating with the patient's family for assistance and support, the patients' adverse life schedule was pointed out and a corresponding correction plan was developed, in a combined effort to help the patient correct bad habits. Besides, an online management hotline was opened to timely solve problems and emergencies encountered by patients. Moreover, patients were required to check blood glucose levels regularly, and were instructed to pay attention to eye hygiene and control the time of eye use. (3) Health education: By holding regular lectures on diabetes and DR, distributing health education materials and organizing patients and family members to watch disease-related videos, patients were able to have a deeper understanding of the disease itself and related treatments, thereby reducing their anxiety and fear caused by lack of disease-related knowledge, and prompting them to correct their own bad eating habits and lifestyles. (4) Psychological counseling: While actively communicating with patients' families to provide psychological support for patients, patients were encouraged to build confidence both in treating diseases and in adhering to regular treatment. (5) Medication guidance: The drug use plan and matters needing attention were explained to patients, and the possible adverse reactions were informed in detail. Meanwhile, patients were urged to adhere to their medication as prescribed by the doctor.

Outcome measures

Fasting plasma glucose (FPG), 2 h postprandial blood glucose (2hPG) and glycosylated hemoglobin (HbA1c) were measured before and 6 months after nursing.

Self-rating anxiety scale (SAS) [13] and self-rating depression Scale (SDS) [14] were employed

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

Groups	Regular group (n = 66)	Premium group (n = 78)	χ^2/t	P
Gender			1.949	0.163
Female	27 (40.91)	41 (52.56)		
Male	23 (59.09)	21 (47.44)		
Average age (years old)	58.98±6.98	57.38±6.11	1.467	0.145
BMI (kg/m^2)	23.2±2.33	23.66±2.18	1.196	0.234
Course of disease (year)	2.45±1.11	2.65±1.32	0.974	0.332
Dietary preference			0.504	0.478
Light	46 (69.70)	50 (64.10)		
Greasy	20 (31.30)	28 (35.90)		
Residence			0.719	0.396
Urban	36 (54.55)	48 (46.54)		
Rural	30 (45.45)	30 (38.46)		
Drinking history			0.340	0.527
Yes	27 (40.91)	36 (46.15)		
No	39 (59.09)	42 (53.85)		
Exercise habits			0.327	0.568
Yes	24 (36.36)	32 (41.03)		
No	32 (63.64)	44 (58.97)		
Marital status			0.619	0.432
Married	48 (72.73)	52 (66.67)		
Single	18 (27.27)	26 (33.33)		
Retinopathy stage			0.327	0.568
I-II	42 (63.64)	46 (58.97)		
III-IV	24 (36.36)	32 (41.03)		

for anxiety and depression assessment of patients before and 6 months after nursing, each with a total score of 100 points. A higher the score, indicates more serious anxiety or depression.

Six months after nursing, the "Treatment Compliance Questionnaire" compiled by our hospital was used to evaluate the treatment compliance of patients in both groups. The survey contents included five aspects, including reasonable diet, regular exercise, standardized medication, living habits and regular monitoring of blood glucose, totaling 100 points. According to the scores, the patients were classified in noncompliance (< 70 points), basic compliance (70-85 points), and compliance (> 85 points). The total compliance rate = (basic compliance + compliance)/total number of cases ×100%.

The exercise of self-care agency scale (ESCA) [15], including four dimensions of skills, knowledge, responsibility and self-concept, was used to evaluate the self-care ability of patients in the two groups before and 6 months after intervention. A lower the score indicates worse self-care ability.

The QOL of patients 6 months after nursing, included disease control, life behavior, exercise and psychological emotional changes, which were evaluated according to the Quality of Life Questionnaire-Core 30 (QLQ-C30) [16]. The score of each item was 100 points, and the score was in proportion to the QOL of the patient.

One day before the end of nursing, the self-made nursing satisfaction questionnaire, which mainly covering attitude, personality, appearance, and operating proficiency, was adopted to identify the nursing satisfaction of patients. There were 20 questions in total, each scored with 5 points. On a 100-point scale, < 70 points indicated dissatisfied, 70-89 points indicated basicly satisfied and ≥ 90 points indicated satisfied.

Statistical analysis

The data were statistically processed and visualized by SPSS 25.0 and GraphPad Prism 7, respectively. The counting data were compared by either Chi-square test or Fisher exact test. For measurement data, inter-group and intra-group comparisons were respectively done by independent t-test and paired t-test, and multi-group comparisons and the verification were conducted by one-way analysis of variance (ANOVA) and post-tests. *P* value < 0.05 indicated a statistically significant difference.

Results

Comparison of general data

Patient characteristics showed no significant differences between the two groups in terms of

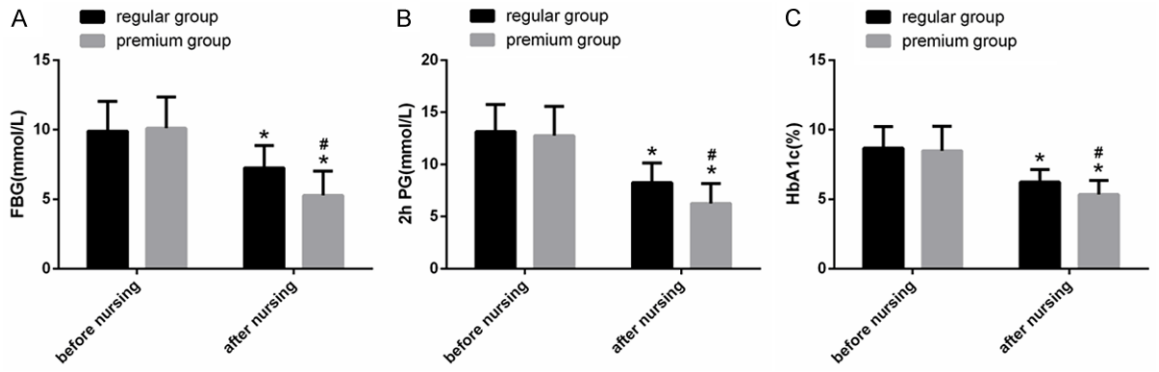

Figure 1. Comparison of blood glucose levels. A. Comparison of FBG levels between the two groups before and after nursing. B. Comparison of 2hPG levels between the two groups before and after nursing. C. Comparison of HbA1c levels between the two groups before and after nursing. *indicates P < 0.05 compared with that before nursing; #indicates P < 0.05 compared with the regular group.

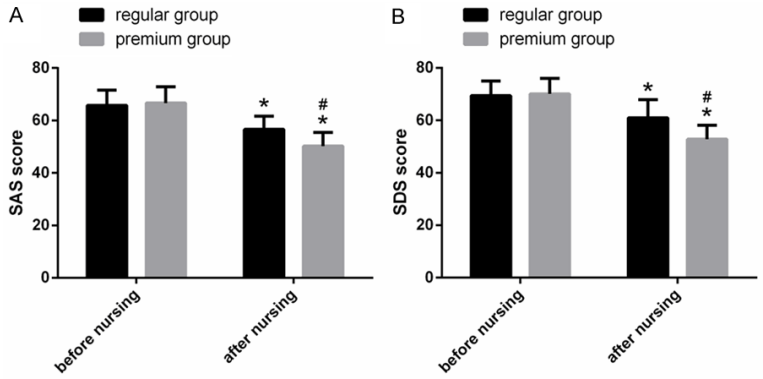

Figure 2. Comparison of SAS and SDS scores. A. Comparison of SAS scores between the two groups before and after nursing. B. Comparison of SDS scores between the two groups before and after nursing. *indicates P < 0.05 compared with that before nursing; #indicates P < 0.05 compared with the regular group.

gender, age, BMI index, course of disease, dietary preferences, residence, exercise habits, drinking history, marital status and retinopathy stage (P > 0.05) (**Table 1**).

Comparison of blood glucose levels

FBG, 2hPG and HbA1c differed insignificantly before nursing (P > 0.05), while their levels decreased remarkably in both groups after nursing, and those in the premium group were noticeably lower compared with the regular group (P < 0.05) (**Figure 1**).

Comparison of SAS and SDS scores

Before nursing, there were no significant differences in SAS and SDS scores between the two groups (P > 0.05). However, the SAS and SDS scores reduced notably in both groups after nursing, and the scores were lower in the premium group as compared to the regular group (P < 0.05) (**Figure 2**).

Comparison of treatment compliance of patients

The treatment compliance of the two groups was evaluated 3 months after nursing. The evaluation in the regular group was as follows: compliance: 28 patients (42.42%), basic compliance: 22 patients (33.33%), non-compliance: 16 patients (24.24%), and the total compliance rate was 75.76%. While the results in the premium group were compliance: 52 patients (66.67%), basic compliance: 18 patients (23.08%), non-compliance: 8 patients (10.26%), with a total compliance rate of 89.74%. The data identified a higher total compliance rate in the premium group than in the regular group (P < 0.05) (**Table 2**).

Comparison of ESCA scores

The ESCA score did not identify any noteworthy difference between the two groups before nursing (P > 0.05). While after nursing, the ESCA score elevated remarkably in both groups, and the increase was more evident in the premium group than in the regular group (P < 0.05) (**Figure 3**).

Table 2. Comparison of treatment compliance of patients

Groups	Compliance	Basic compliance	Non-compliance	Total compliance
Regular group (n = 66)	28 (42.42)	22 (33.33)	16 (24.24)	50 (75.76)
Premium group (n = 78)	52 (66.67)	18 (23.08)	8 (10.26)	70 (89.74)
χ^2	-	-	-	5.035
P	-	-	-	0.029

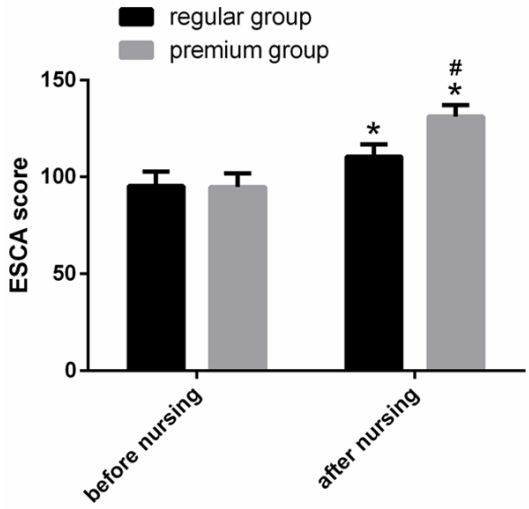

Figure 3. Comparison of ESCA scores between the two groups before and after nursing. The ESCA score increased significantly in both groups after nursing, and the score in the premium group was higher than that in the regular group. *indicates $P < 0.05$ compared with that before nursing; #indicates $P < 0.05$ compared with the regular group.

Comparison of QOL

Compared with the regular group, the scores of QLQ-C30, including disease control, life behavior, exercise and psychological mood were statistically higher in the premium group after nursing ($P < 0.05$) (**Table 3**).

Comparison of nursing satisfaction

Concerning patients' satisfaction with nursing, it was found that 23 patients (34.85%) in the regular group were very satisfied, 39 patients (59.09%) were basically satisfied, and 14 patients (21.21%) were dissatisfied, with a satisfaction rate of 79.79%. In the premium group, 42 patients (53.85%) were very satisfied, 30 patients (38.46%) were basically satisfied, and 6 patients (7.69%) were dissatisfied, with a satisfaction rate of 92.31%. The satisfaction in the premium group was higher than that in the regular group ($P < 0.05$) (**Table 4**).

Discussion

The results of this study demonstrated that compared with the routine nursing mode, the high-quality nursing mode could provide DR patients with more satisfactory nursing quality, which was reflected by the premium group being superior to the regular group in blood glucose control, psychological mood, treatment compliance, self-management ability and self-efficacy, as well as QOL and nursing satisfaction.

DR is one of the common microangiopathy in patients with diabetes, which may lead to vision loss and blindness [17]. Due to the extremely long treatment cycle of DR and the lack of disease awareness, many patients will experience bad psychological emotions such as fear, anxiety, depression and uneasiness during treatment, which will lead to the decrease of patients' treatment compliance, affecting the control of the disease [18, 19]. Therefore, in the nursing process, we should care about the psychological and emotional changes of DR patients, timely channel their bad psychological emotions, and establish their confidence in facing the disease. In the present study, measures such as targeted psychological care, health education and medication guidance were taken to improve the adverse psychological mood and treatment compliance of patients in the premium group. As expected, the SAS and SDS scores were notably lower and the total compliance rate was higher in the premium group in comparison with the regular group. Self-management, vital in the care of chronic diseases such as diabetes, however, is seriously deficient in DR patients [20, 21]. To effectively control the progression of the disease, patients need to strengthen their self-management ability to correct their bad habits. This study assessed the self-management ability of patients in the two groups and found that after nursing, the ESCA score of patients in the two groups was

Table 3. Comparison of QOL scores between the two groups (x ± SD)

Groups	Disease control	Life behavior	Exercise	Psychological mood
Regular group (n = 66)	75.57±5.11	73.87±4.98	72.83±5.46	75.67±5.99
Premium group (n = 78)	81.54±5.42	79.55±5.35	78.87±6.11	82.67±5.77
t	6.760	6.551	6.204	7.128
P	< 0.001	< 0.001	< 0.001	< 0.001

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

Groups	Very satisfied	Basically satisfied	Dissatisfied	Satisfaction
Regular group (n = 66)	23 (34.85)	39 (59.09)	14 (21.21)	52 (79.79)
Premium group (n = 78)	42 (53.85)	30 (38.46)	6 (7.69)	72 (92.31)
χ^2	-	-	-	5.464
P	-	-	-	0.019

increased compared with that before nursing, but the improvement was more significant in the premium group, indicating that the high-quality nursing can significantly improve adverse psychological moods, treatment compliance and self-management ability of DR patients compared with routine nursing.

Helping patients control blood glucose level is the top priority in DR care because reasonable control of blood glucose level can delay the progress of DR [18, 22]. Whereas, in the long process of controlling blood glucose, patients will suffer from unhealthy psychological emotions, declined self-management ability and decreased treatment compliance that are not conducive to blood glucose control. The routine nursing model mainly revolves around the disease itself, but pays insufficient attention to the psychological changes and individual needs of patients, which cannot help patients control the progress of the disease for a long time. On the contrary, high-quality nursing, as a people-oriented nursing model, can utilize professional knowledge, operations and attitude to carry out comprehensive intervention measures against factors that are not conducive to patients' blood glucose control, so as to help patients control the progression of the disease [8, 9]. The results of this study showed that after nursing, FPG, 2hPG and HbA1c levels in the premium group were evidently reduced and were all lower than those in the regular group. The reason is that compared with routine nursing, high-quality nursing can significantly improve the adverse psychological mood, treatment compliance and self-management ability of DR patients, so as to help them control blood glucose more effectively. At the end of this study, the QOL and nursing satisfaction of the patients were also assessed. Unsurprisingly, the QLQ-C30 score and nursing satisfaction were higher in the premium group than in the regular group. It suggests that routine nursing mode can no longer meet the nursing needs of DR patients, while high-quality nursing modes are recognized by more patients and can be promoted and applied in clinical practice.

However, there are still some deficiencies in this study. First of all, this study evaluated patients' treatment compliance and nursing satisfaction by the self-made evaluation methods of our hospital, which may affect the credibility to a certain extent. Secondly, with the younger onset age of diabetes, DR onset also tends to be younger; but the participants included in this study are all older, so it is not clear whether high-quality nursing can be better than the conventional nursing in the younger population with DR. It is hoped that we can address these deficiencies in the follow-up experiments to improve our research.

Collectively, compared with the conventional management scheme, high-quality nursing can resolve the adverse psychological mood of DR patients, and improve their treatment compliance and self-management ability, thereby helping them control their conditions.

Disclosure of conflict of interest

None.

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