Analysis of the Effect of Integrated Extended Care Model in Improving the Quality of Life of Elderly Patients with Type 2 Diabetes Mellitus

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Abstract: *Objective:* To analyze the impact of an integrated extended care model on improving the quality of life of elderly patients with Type 2 Diabetes Mellitus (T2DM). *Methods:* A total of 176 patients admitted to the hospital from March 2015 to February 2018 were selected and randomly assigned to an observation group and a control group, with 88 patients each. The control group implemented conventional nursing interventions, and the observation group carried out an integrated extended-care model. The level of glycemic control, quality of life, and daily medication adherence between both groups were compared. *Results:* The observation group showed significant improvement in the level of glycemic control, and their fasting blood glucose, 2-hour postprandial blood glucose, and glycated hemoglobin levels were significantly lower as compared with those in the study group ($P < 0.05$). The quality of life of the patients in the observation group was higher than that of the control group ($P < 0.05$). The observation group had a higher compliance score (95.48 ± 7.45) than the control group (81.31 ± 8.72) ($t = 8.909$, $P < 0.05$). *Conclusion:* The integrated extended care model allows patients to receive comprehensive and individualized nursing services after discharge, which improves the effect of drug therapy and the quality of life of patients.

Keywords: Integrated extended care model; Elderly type 2 diabetes mellitus; Quality of life

1. Introduction

Type 2 Diabetes Mellitus (T2DM) has become a chronic metabolic disease with a high incidence worldwide. With the aging of the population, the incidence of diabetes in the elderly population has been increasing, rendering the management of T2DM in the elderly increasingly complex and challenging [1]. Traditional healthcare models have limitations in addressing these challenges, as well as focusing solely on patient care during hospitalization and losing relevant care services once patients are discharged from the hospital. Hence, it is urgent to develop an integrated and personalized care model [2]. This study aims to explore the potential value of the integrated extended care model in the management of elderly patients with T2DM and to analyze its effect on improving the patient's quality of life.

2. Data and methods

2.1. Clinical information

The study was approved by the Ethics Committee of our hospital. Inclusion criteria: (1) Patients who meet the clinical diagnostic criteria of diabetes mellitus (DM) [3]. (2) patients with symptoms such as fatigue, polydipsia, and polyuria; (3) patients without cognitive dysfunction; (4) stable condition. Exclusion criteria: (1) Patients with other serious diseases (such as advanced cancer, severe heart disease, liver and kidney dysfunction, etc.; (2) pregnant or breastfeeding women; (3) severe mental disorders; (4) those who cannot be followed up for a long time. Taking March 2015 to February 2018 as the study timeframe, 176 patients were selected and divided into a control group and an observation group of 88 patients each. The clinical data of the two groups are shown in **Table 1**.

Table 1. Patient clinical data of the two groups

Group	Cases, n	Age (years)	Average age (years)	Weight (kg)	Duration of illness (years)	Average duration of illness (years)	Gender	
							Male	Women
Observation group	88	60–82	71.66 ± 11.51	60.45 ± 10.77	2–10	5.45 ± 0.23	48	40
Control group	88	61–81	71.56 ± 11.47	60.32 ± 10.68	7–16	5.41 ± 0.21	45	43
χ^2/t	-	-	0.058	0.080	-	1.205	0.205	
P	-	-	> 0.05	> 0.05	-	> 0.05	> 0.05	

2.2. Methods

The control group received routine nursing intervention. During hospitalization, routine health education, drug guidance, and psychological guidance were provided to the patients. They were also informed of the precautions to be taken after discharge.

The observation group received integrated extended care intervention. Before discharge, the patients were given a detailed physical examination, including the measurement of blood glucose, blood pressure, blood lipids, and other physiological indicators. The patient's medical history was studied and the process in which they developed DM was understood. Through communication, the psychological state of the elderly patients was assessed, as well as the risk factors of daily life. The patient's family situation and dietary habits were also assessed. Based on the assessment results, a personalized extended care plan was developed, where goals for daily glycemic control, dietary plans, and daily planning of exercise regimens were implemented. The patients were encouraged to put forward suggestions and needs in the process of developing the care plan and regular follow-up time points were set to monitor the patient's changes. An extended care team was formed comprising of nursing staff, physicians, rehabilitation physicians, and psychologists. Regular group meetings with clear meeting agendas were set up to ensure that each member is involved in the development of the patient's post-discharge care plan and promote recovery. Regular professional training was also organized to maintain the professionalism of team members [4]. The frequency and purpose of home follow-up visits were clarified in the care plan, which was flexibly adjusted according to the patient's condition and needs. The patient was contacted in advance to make an appointment for follow-up visits. During the follow-up visit, the patient's physiological parameters were measured, such as blood glucose and blood pressure, and at the same time, a physical examination was carried out. Additionally, the general health status and the risk of complications were also analyzed. The patient's daily drug reserves were observed to confirm whether the use of drugs was following the given medical advice and the patient was provided with information on drug therapy. They were informed of the time of medication, dosage, and other information. The patient's life situation during follow-up, including

diet, exercise, and sleep status was understood and personalized lifestyle advice was provided. At the end of the follow-up visit, the patient's physiological indicators, nursing measures, and recommendations were recorded promptly, and the electronic health record was updated to ensure that all members of the nursing team had access to the most up-to-date patient information. Educational materials about diabetes management were sent to patients and their families regularly using WeChat public numbers or group sharing to raise their level of awareness of the disease. The WeChat video call function was used to conduct real-time follow-up calls, which allows nurses to intuitively understand the patient's life status, carry out face-to-face communication, and answer questions. In addition, the symptoms, medication use, and other relevant information were shared through WeChat to carry out timely communication and understand the patient's emotional state and life changes. Daily dietary guidance was provided according to the patient's physical condition, weight goals, and nutritional needs. They were encouraged to consume vegetables, fruits, whole grains, and high-quality proteins, in small portions, which will help to control blood glucose. Subsequently, an individual exercise plan was formulated and the patients were instructed to perform aerobic exercises, such as yoga, brisk walking, swimming, and cycling for at least 150 minutes per week. Door-to-door follow-up visits were carried out and the patients were reminded to exercise every day and avoid prolonged sedentary activities. The patients were also told to monitor the blood glucose changes before and after exercise and to gradually increase the amount of exercise [5].

2.3. Observation indicators

The patient's fasting blood glucose, postprandial 2h blood glucose, and glycated hemoglobin level were measured. The quality of life scores were assessed using the standard quality of life assessment tool (GQOL) [6]. It included four dimensions: somatic function, psychological function, social function, and material life. Each dimension is converted to 100 points, and the higher the score, the better the quality of life. The patient's compliance score was analyzed using the medication adherence questionnaire [7]. The total score was 100 points, and the score and adherence were positively correlated.

2.4. Statistical analysis

Data was analyzed using the SPSS 23.0 software. Measurement data were expressed as mean ± standard deviation and the count data were expressed as %. Measurement data were analyzed using a t-test, and count data were analyzed using a chi-squared (χ^2) test. Results were considered statistically significant at $P < 0.05$.

3. Results

3.1. Analysis of blood glucose indicators

As shown in **Table 2**, the fasting blood sugar, 2-hour postprandial blood glucose, and glycosylated hemoglobin of the observation group after nursing care were lower than those in the control group ($P < 0.05$).

Table 2. Blood glucose indicators between the two groups

Group	Cases, n	Fasting blood sugar (mmol/L)		2-hour postprandial blood glucose (mmol/L)		Glycosylated hemoglobin (%)	
		Pre-intervention	Post-intervention	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Observation group	88	9.35 ± 2.27	7.54 ± 2.12	15.14 ± 3.33	10.01 ± 2.52	9.95 ± 2.13	6.54 ± 2.13
Control group	88	9.38 ± 2.31	9.13 ± 2.15	15.17 ± 3.28	12.82 ± 4.15	9.97 ± 2.21	7.88 ± 2.17
t	-	0.065	3.724	0.045	4.092	0.046	3.116
P	-	0.948	< 0.05	0.964	< 0.05	0.963	< 0.05

3.2. Quality of life scores

As shown in **Table 3**, the quality of life scores of the observation group were higher than those in the control group ($P < 0.05$).

Table 3. Quality of life scores between the two groups (points)

Group	Cases, *n*	Materialistic life	Social function	Body function	Mental function
Observation group	88	73.44 ± 5.27	72.29 ± 5.14	71.72 ± 6.03	72.43 ± 5.04
Control group	88	61.18 ± 4.42	65.88 ± 4.03	65.26 ± 5.24	63.11 ± 6.97
t	-	16.239	8.941	7.367	9.872
P	-	< 0.05	< 0.05	< 0.05	< 0.05

3.3. Patient compliance score

As shown in **Table 4**, the observation group had a higher compliance score than the control group ($P < 0.05$).

Table 4. Patient compliance score between the two groups (mean ± standard deviation, score)

Group	Cases, *n*	Compliance score
Observation group	88	95.48 ± 7.45
Control group	88	81.31 ± 8.72
t		8.909
P		< 0.05

4. Discussion

The daily care of elderly patients with T2DM involves many aspects. There are various challenges in the nursing process, especially after the patients are discharged. This is because elderly patients may suffer from multiple chronic diseases simultaneously, which may require a more complex treatment plan [8]. Hence, multiple aspects of daily life such as medication management, dietary modification, and exercise programs need to be carried out synergistically. Some elderly patients may be limited by their physical condition or other chronic diseases and cannot carry out exercises. Hence, it is a challenge to design an appropriate exercise program that also ensures their safety [9]. Traditional nursing interventions have fewer out-of-hospital measures for patients, so they are unable to meet the patient's daily needs. The integrated extended care model is a comprehensive medical care model that aims to provide patients with multi-level out-of-hospital care services by integrating different professional knowledge to comprehensively care for the physiological, psychological, and social needs of patients after discharge. This model also aims to extend in-hospital care to provide patients with more comprehensive, personalized, and continuous medical care services [10].

In this study, the implementation of an integrated extended care model for elderly patients with T2DM was compared with patients who received traditional care. It was concluded that patients in the observation group showed significant improvement in the level of glycemic control, and their fasting blood glucose, 2-hour postprandial blood glucose, and glycated hemoglobin levels were reduced significantly compared with the control group ($P < 0.05$). It is confirmed that the implementation of integrated extended care can effectively reduce the daily blood glucose level of elderly patients, and the reason for this is that the integrated extended care team is composed of healthcare personnel from various professional fields, which comprehensively cares for the

physiological and psychological needs of patients. Furthermore, the multidisciplinary nursing team works in collaboration to improve the efficiency of nursing care, reduce the risk factors, and maximize the effect of daily medication treatment for the patients, to ensure that the patients receive all-around medical services [11]. At the same time, the quality of life scores of patients in the observation group was higher than those of the control group ($P < 0.05$). With this, personalized treatment plans are formulated by comprehensively evaluating the physiological, psychological, and social needs of the patients to more accurately meet their daily health needs. Regular follow-up of patients is achieved through door-to-door follow-up and micro-letter methods to allow for timely adjustments of the treatment plan if necessary. The observation group had a higher compliance score than the control group ($t = 8.909$, $P < 0.05$). Development of the treatment plan together with the patients promoted the active participation of the patients and enhanced their confidence in the treatment. Comprehensive education and support were also provided to help patients better manage the disease and improve medication adherence [12].

5. Conclusion

The integrated extended care model allowed patients to receive comprehensive and individualized care services after discharge, which improved the effect of drug therapy and patient's quality of life.

Disclosure statement

The author declares no conflict of interest.

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