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Application of the ADOPT Problem-Solving Model: An Integrated Care Framework for the Continuous Nursing Management of Diabetic Foot Patients

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Abstract: ***This study aims to explore the effect of the ADOPT problem-solving model on self-management ability, quality of life, and self-care ability in patients with diabetic foot disease. A total of 67 patients with diabetic foot admitted to the Department of Endocrinology, Affiliated Hospital of Youjiang Medical University for Nationalities between February 2023 and February 2025 were enrolled. Participants were assigned to two groups based on nursing method: the control group (n=33) received conventional continuous nursing care, while the intervention group (n=34) received continuous nursing intervention guided by the ADOPT problem-solving model. Self-management ability, quality of life, and self-care ability scores were compared between the two groups. At 3 and 6 months after discharge, the intervention group showed significantly higher scores in self-management ability, quality of life, and self-care ability compared to the control group (P < 0.05). The ADOPT problem-solving model can effectively improve glycemic control, enhance self-management and self-care abilities, and promote quality of life in patients with diabetic foot disease, providing a useful nursing strategy for long-term disease management.***

Keywords: ADOPT problem-solving mode, Diabetic foot, Continuing care, Self-management, Quality of life.

1. Introduction

Diabetic foot disease is one of the most serious and expensive chronic complications in diabetic patients. Its high disability rate and high mortality rate impose heavy economic burdens on families and society [1-2]. Effective blood glucose control and foot self-management are the keys to preventing the occurrence and development of diabetic foot disease. However, after discharge, patients often experience a decline in self-management ability due to knowledge forgetting, poor compliance and a lack of professional guidance, which results in repeated or even deteriorated conditions. Therefore, the implementation of systematic and effective continuous nursing is very important to improve the long-term prognosis of patients. The ADOPT problem-solving model is an innovative intervention framework oriented toward solving practical problems. Its core goal is to stimulate the internal motivation of patients by building a partnership between nurses and patients to guide and support them in taking the initiative to take care of themselves [3-4]. This model has positive effects on the

management of various chronic diseases, such as bladder cancer urinary tract stoma [5], coronary heart disease [6] and hypertension [7]. The purpose of this study is to introduce the ADOPT problem-solving model into the continuous nursing of diabetic foot patients and explore its application value in improving the level of blood glucose control, self-management ability and quality of life of patients to provide an empirical basis for building a more scientific and efficient long-term nursing system for diabetic foot patients.

2. Data and Methods

2.1 General Information

From February 2023 to February 2025, 67 patients with diabetic foot who were hospitalized in the Department of Endocrinology of the Affiliated Hospital of Youjiang Medical University for Nationalities were selected as research subjects. They were grouped according to different nursing methods. Among them, 33 patients in the control group received routine continuous care; 34 patients in the intervention group received continuous nursing intervention in the ADOPT problem-solving mode. This study was approved by the Ethics Committee of Youjiang Medical College for Nationalities (Approval No. 2021062609). In the control group, there were 21 males and 12 females, with an average age of 56.79 ± 6.70 years. There were 20 people with junior high school education or below, 9 people with high school or technical secondary school education, and 4 people with college education or above. Course of disease: 10 years, 7 people. The baseline data of the two groups were comparable ($P > 0.05$).

2.2 Inclusion and Exclusion Criteria

2.2.1 Inclusion criteria:

1) Patients who meet the diagnostic criteria of diabetic foot patients and Wagner grades 1--3 [8]. 2) Clear consciousness, with basic reading, understanding and communication skills, can lead to the use of smartphones for online communication. Patients fully understood the purpose, process and potential risks of this study, voluntarily agreed and signed written informed consent forms.

2.2.2 Exclusion criteria:

1) Patients who have severe heart, lung, kidney, brain or other important organ failure or whose expected survival period is less than 6 months; severe diabetic foot ulcers (Wagner 4--5) require immediate major surgery or long-term hospitalization. 2) Patients with a clear history of mental illness, severe cognitive dysfunction caused by Alzheimer's disease, stroke sequelae, etc., could not understand and perform self-management tasks in the ADOPT model. 3) There were serious visual or hearing impairments, which could not be effectively compensated by auxiliary equipment, resulting in the inability to participate in online guidance or complete relevant assessments. 4) Pregnant or lactating women. 5) those who had participated in other research projects that may affect blood glucose control or self-management before enrollment. Owing to language barriers, geographical distance, etc., it is impossible to effectively receive intervention or follow-up.

2.3 Intervention Methods

Patients in both groups received routine treatment and standardized health education for diabetic foot disease during hospitalization, including basic knowledge of diabetes, dietary guidance, exercise

guidance, foot care, medication guidance, and prevention and treatment of hypoglycemia. After discharge, the two groups received different continuous nursing intervention programs for 6 months.

2.3.1 One day before discharge, the patients in the control group were given one-to-one discharge guidance by the responsible nurse, and the ' diabetic foot home care manual ' was issued to the patients to guide them in providing home care. An electronic follow-up file was established for each patient, and the responsible nurse of the patient conducted routine telephone follow-up at 1 week, 1 month, 3 months and 6 months after discharge.

2.3.2 Intervention group. The experimental group implemented continuous nursing interventions based on the ADOPT problem-solving mode on the basis of routine continuous nursing in the control group.

(1) Establish a positive treatment attitude (Attitude, A). 1 Establishing a multidisciplinary team. A core communication team consisting of 2 endocrinologists and 5 nurses with more than 5 years of clinical experience in endocrinology was established to ensure professionalism and authority. (2) Patient admission interviews were conducted. Within 24 hours of admission, a 45~60-minute interview was conducted by the responsible nurse. The interview content included collecting the patient's personal medical history, treatment process, family role, living habits, work pressure, etc., and establishing a trust relationship with the patient. 3 Psychological counseling and confidence building for patients. Combined with the interview content, the psychological state of the patients was evaluated. Successful patients with similar conditions and good prognoses should be targeted to eliminate patients' fear of disease. At the same time, patients are guided to express their concerns about the disease, and through empathy and active guidance, patients help establish a belief in defeating the disease. 4 Structured education. Health education should be integrated into daily care. Daily use of the department involves 3–5 minutes of short video, graphic manuals and other tools for patients with 1--2 rounds of approximately 20 minutes of health education, arranged 1--2 times, each time 20 minutes. The contents include the causes of diabetic foot and the key points of daily nursing. The feedback method can be used to educate and evaluate the mastery of the knowledge taught by patients.

(2) Estimate the influencing factors (Definition, D). From the second day of hospitalization, medical staff talked with patients face-to-face to discuss how to treat and improve the impact of foot lesions on physical function and daily life. The patient's own and social factors are used to assess the factors affecting treatment. From the third day of hospitalization, the patients and their families were guided to judge and intervene in the skin and its complications at the lesion site.

(3) Open mind (O). Medical staff actively encourage patients to open their minds through the content of the previous stage of evaluation, combined with the patient's own factors, to discuss and formulate targeted interventions. During this period, medical staff can encourage patients and their families to actively participate and express their own ideas and expectations, as well as opinions or suggestions for medical staff and overall intervention measures.

(4) Making a nursing plan (planning, P). Medical staff combined the patient's individual specific conditions to develop personalized intervention programs, such as regular daily blood glucose tests and the use of insulin and hypoglycemic drugs, and followed the doctor's advice to help patients adapt to the symptoms of diabetic foot disease.

(5) Try it out (T). The medical staff distributed a personalized diary and health knowledge manual made by the Department of Endocrinology to each patient and analyzed the main problems affecting their

health together with the patient. The patient can record his own thoughts and recovery process in a personalized diary at any time.

(6) Follow-up after discharge, the responsible nurse conducted telephone or WeChat follow-up twice a month to check the patient's recovery and the effect of home care, emphasized the importance of correct medication and regular examination of blood glucose and blood pressure, informed them to maintain good diet and work and rest habits, and discussed follow-up intervention plans with patients and their families. Three months and 6 months after discharge, the effect of home care was evaluated again, and targeted rehabilitation training was formulated according to the progress of the patient's course of disease.

2.4 Evaluation Indicators

(1) Self-management behavior. The diabetes self-management behavior scale [9] was used to evaluate the self-management behavior of diabetic foot patients. The scale has 5 dimensions and 13 items, including diet control and regular exercise, with a total score of 0--91 points. The higher the score is, the stronger the self-management ability of diabetic foot patients. The Cronbach's coefficient of the scale was 0.88.

(2) Quality of life. The quality of life of patients with diabetic foot disease was evaluated with a type 2 diabetes quality of life scale [10] from five aspects, namely, physiology, disease, psychology, society and satisfaction, which included 39 items. Each item was scored on a 5-point Likert scale, with a total score ranging from 39--195 points. The higher the score is, the better the quality of life of diabetic patients. The Cronbach's α coefficient of the scale was 0.862.

(3) Self-care ability. The self-care ability of diabetic foot patients was evaluated via the self-care ability measurement scale [11]. The scale consists of 4 dimensions and 43 items. Each item is scored on a 5-point Likert scale, with a total score of 0–172 points. Among them, 0--57 points indicate that self-care ability is low, 58--115 points indicate medium-level self-care ability, and 116--172 points indicate high-level self-care ability. The higher the score is, the stronger the self-care ability of diabetic foot patients. The Cronbach's α coefficient of the scale ranged from 0.86--0.92.

2.5 Statistical Analysis

SPSS 25.0 software was used for data analysis. The measurement data are expressed as the means ± standard deviations. Independent sample t tests and repeated measures analysis of variance were used for comparisons between groups. Count data are expressed as frequencies and percentages. The test standard: $\alpha = 0.05$.

3. Results

3.1 Comparison of Self-management Ability Scores Between the Two Groups of Patients

The results revealed that the scores of self-management ability in the intervention group were significantly greater than those in the control group at 3 months and 6 months after discharge ($P < 0.05$). The results of the overall analysis revealed statistically significant differences in the self-management ability scores between the two groups in terms of time, group and interaction ($P < 0.05$). The self-management ability scores of the two groups of patients at 3 and 6 months after discharge were greater than those before the intervention, and the self-management ability scores at 6 months after discharge

were greater than those at 3 months after discharge. The difference was statistically significant ($P < 0.05$) (Table 1).

Table 1: Comparison of self-management ability scores between the two groups of patients

peer group	number of samples (n)	Before intervention	Discharged for 3 months	Discharged for 6 months.
control group	33	55.00±4.37	64.70±3.98 [a]	72.52±3.39 [ab]
interventional group	34	54.82±4.67	72.50±6.49 [a]	75.41±4.09 [ab]
t		0.160	5.193	3.150
P		0.874	＜0.001	0.002

注: F_{time}=5.5.422, P=0.000; F_{groups}=16.188, P=0.000; $F_{reciprocation}$=21.207, P=0.000; Compared with the group before intervention, [a]$P < 0.05$; compared with 3 months after discharge, [b]$P < 0.05$.

3.2 Comparison of Quality of Life Scores Between the Two Groups of Patients

The results revealed that the quality of life scores of the intervention group were significantly greater than those of the control group at 3 months and 6 months after discharge ($P < 0.05$). The overall analysis results revealed that the quality of life scores of the two groups were significantly different in time and between groups ($P < 0.05$). The self-management ability scores of the two groups of patients at 3 and 6 months after discharge were higher than those before the intervention, and the quality of life scores at 6 months after discharge were higher than those at 3 months after discharge. The difference was statistically significant ($P < 0.05$) (Table 2).

Table 2: Comparison of quality of life scores between the two groups of patients ($\bar{x} \pm s$)

peer group	number of samples (n)	Before intervention	Discharged for 3 months	Discharged for 6 months.
control group	33	109.55±4.28	120.70±3.80 [a]	130.36±3.79 [ab]
interventional group	34	110.44±5.44	124.38±5.19 [a]	134.53±6.57 [ab]
t		0.748	3.323	3.192
P		0.457	0.002	0.002

注: F_{time}=469.896, P=0.000; F_{groups}=11.334, P=0.001; $F_{reciprocation}$=2.893, P=0.071; Compared with the group before intervention, [a]$P < 0.05$; compared with 3 months after discharge, [b]$P < 0.05$.

3.3 Comparison of Self-care Ability Scores Between the Two Groups of Patients

The results revealed that the scores of self-care ability in the intervention group were significantly greater than those in the control group at 3 months and 6 months after discharge ($P < 0.05$). The results of the overall analysis revealed statistically significant differences in the self-care ability scores between the two groups over time and between groups ($P < 0.05$). The self-care ability scores of the two groups of patients at 3 and 6 months after discharge were greater than those before the intervention, and the self-care ability scores at 6 months after discharge were greater than those at 3 months after discharge. The difference was statistically significant ($P < 0.05$) (Table 3).

Table 3: Comparison of self-care ability scores between the two groups of patients ($\bar{x} \pm s$)

peer group	number of samples (n)	Before intervention	Discharged for 3 months	Discharged for 6 months.
control group	33	73.27±3.09	89.15±9.40[a]	111.48±10.77 [ab]
interventional group	34	74.74±3.59	100.21±9.71 [a]	119.59±8.21 [ab]
t		1.787	4.732	3.468
P		0.079	＜0.001	0.001

注: F_{time}=866.525, P=0.000; F_{groups}=18.633, P=0.000; $F_{reciprocation}$=12.124, P=0.000; Compared with the group before intervention, [a]$P < 0.05$; compared with 3 months after discharge, [b]$P < 0.05$.

4. Discussion

In this study, the ADOPT problem-solving model was applied to the continuous nursing of diabetic foot patients. Compared with those of the control group receiving routine continuous nursing, the self-management ability, quality of life and self-care ability of the patients in the intervention group were significantly improved at 3 months and 6 months after discharge. This result confirms that the ADOPT problem-solving model, as a structured and patient-centered intervention strategy, has clear application value and promotion prospects in the long-term management of diabetic foot disease.

4.1 ADOPT Problem-Solving Model Can Improve the Self-management Ability of Diabetic Foot Patients

The results of this study revealed that the self-management ability scores of the intervention group were significantly higher than those of the control group at 3 months and 6 months after discharge, indicating the effectiveness of the ADOPT problem-solving model in transforming knowledge into specific actions. Traditional health education is often limited by scattered information and a lack of personalized guidance, which makes it difficult to mobilize the initiative and enthusiasm of patients' self-management [4]. The ADOPT model provides patients with a clear behavioral framework through its structured process, enabling them to systematically identify problems, develop personalized programs, and continue to adjust, thereby implementing abstract health recommendations into daily diet, exercise, and blood glucose monitoring practices. The results revealed that the self-management ability scores of the two groups of patients were significantly different in terms of time, group and interaction, indicating that the intervention effect of the ADOPT model not only existed but also deepened over time. Compared with that of the control group, the self-management ability score of the intervention group increased, reaching a higher level at 6 months after discharge. This shows that the ADOPT model brings not only short-term behavior changes but also the continuous enhancement of internal beliefs.

4.2 ADOPT Problem-Solving Model Can Improve the Quality of Life of Patients with Diabetic Foot Disorders

The results of this study confirmed that the ADOPT problem-solving model can effectively improve the long-term quality of life of patients, which is highly consistent with the conclusions of previous studies [4,12-13]. The quality of life scores of the intervention group at 3 months and 6 months after discharge were significantly better than those of the control group, and this improvement continued to increase over time, highlighting the long-term benefits of the model. Chronic wounds in patients with diabetic foot damage the quality of life of patients in a variety of ways, which manifests as limited mobility, sensory loss, sleep disorders, and odor caused by braking [14]. As a comprehensive index to evaluate the effectiveness of chronic disease management, the improvement in quality of life is due mainly to the enhancement of patients' self-management ability. Through systematic goal setting and problem solving, the ADOPT model helps patients change from passive coping to active control. This sense of control directly reduces the anxiety and fear caused by the uncertainty of the disease, thus improving the mental health dimension.

4.3 ADOPT Problem-solving Model Can Improve the Self-care Ability of Patients with a Diabetic Foot

Previous studies have shown that [15], the foot self-care behavior scale score of patients with diabetic foot risk is at a medium level, and foot self-care behavior needs to be improved. The results of this study

clearly show that the ADOPT problem-solving model can significantly improve the self-care ability of diabetic foot patients. The self-care of diabetic foot patients is a complex and highly compliant task involving daily foot examination, correct foot washing, footwear selection and timely medical treatment. The advantages of the ADOPT model lie in its systematization and individualization. It guides patients to actively assess their own foot risk, identify specific problems, set clear goals, formulate executable plans, and finally consolidate their behavior through tracking. Problem-based interventions can enhance patients' self-confidence and sense of control by continuously solving practical problems, thus forming a positive feedback loop and internalizing self-care from passive tasks to active habits [16]. Therefore, the ADOPT model not only provides knowledge but also, more importantly, cultivates the core ability of patients to independently manage foot health and provides a sustainable solution for preventing the recurrence and deterioration of the diabetic foot. In addition, the quality of life of the two groups of patients in this study improved over time, possibly because of the short-term effects of conventional discharge guidance, but the significant advantages of the intervention group proved that the ADOPT model is superior to conventional continuous care.

In summary, continuous nursing based on the ADOPT problem-solving model can improve self-management ability and self-care ability and improve quality of life. Through structured steps, empowered partnerships and personalized problem-solving strategies, the model successfully transforms knowledge into action and passive compliance into active management. Therefore, the ADOPT problem-solving model is scientific, effective and worthy of clinical promotion as a diabetic foot continuation nursing strategy, which provides new ideas and methods for optimizing chronic disease management.

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