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Randomized Controlled Trial

**Community public health care on the treatment effect, cognition and self -
management of patients with type 2 diabetes**

Community nursing on T2DM patients.

Abstract

BACKGROUND

At present, China has become the country with the largest number of DMs in the world, with a total number of patients of as many as 140 million, of which the number of patients of Type 2 Diabetes Mellitus (T2DM) patients is the highest. Based on conventional nursing methods, strengthening community home care has important clinical significance in controlling blood sugar and disease progress.

AIM

To explore the impact of community public health nursing on treatment, diabetes cognition, and self-management of type 2 diabetes patients.

METHODS

100 T2DM patients were selected as the research subjects. The patients were divided into two groups using the random number table method. The conventional group (50 cases) was given routine care, and the other group (50 cases) received community public health care based on conventional group. The excellent and good blood glucose control rate, fasting blood glucose before and after care, 2-hour postprandial blood glucose, diabetes cognition and self-management ability, and patient satisfaction were compared between the two groups.

RESULTS

The CN group had a higher rate of excellent blood sugar control than the Conventional group (88% VS 70%, $P < 0.05$). Before care, there was no significant difference in fasting blood glucose and 2-hour postprandial blood glucose between the two groups of patients, and they were comparable ($P > 0.05$). After nursing, fasting blood glucose and 2-hour postprandial blood glucose were reduced to varying degrees in both groups, and both blood glucose levels in the CN group were lower than those in the Conventional group ($P < 0.05$). Compared with before care, the diabetes cognitive level

scores and self-management ability scores of both groups improved aftercare. Moreover, the cognitive level and self-management ability of patients in the CN group were higher than those in the Conventional group ($P < 0.05$). The overall satisfaction of the CN group is better than that of the conventional group (98% VS 86%, $P < 0.05$).

CONCLUSION

Community public health care based on the conventional care of type 2 diabetes patients can achieve better blood sugar control, improve their health cognitive level and self-management abilities.

Key Words: Community public health care; Type 2 diabetes; Blood sugar control; Self-management ability

Core Tip: The treatment effect, cognition, and self-management changes of T2DM patients after strengthening community public health care. Establish the foundation for the optimization of community health management in the future. Based on this, this study we used two type of Intervention methods and compared Excellent and good blood sugar control rate, and Use the T2DM health cognitive knowledge scale self-made by our center for evaluation, the Self-Management Ability Scale for T2DM Patients designed by Zhenwei Dai to evaluate patients' self-management ability. And the statistics of nursing satisfaction are based on the center's self-made questionnaire to know the satisfaction.

INTRODUCTION

Diabetes Mellitus (DM) is one of the fastest-growing global disease burdens in the 21st century. DM is mainly due to a metabolic disease caused by insulin secretion or a metabolic disease caused by insulin biological effects and has a high rate of incidence among middle-aged and elderly people. The newly released 10th edition Global DM map released by the International Diabetes Federation (IDF) shows that in 2021, the

world's 20-79-year-old adult DM patients have reached 536.6 million (estimated to be a prevalence of 10.5%). It is speculated that by 2045, this number will increase to 783.2 million (12.2%)^[1]. For more than 30 years, the prevalence of DM in China has continued to rise, from 0.67% in 1980 to 10.9% in 2013, and in 2018, this number has increased to 12.4%^[2,3]. At present, China has become the country with the largest number of DMs in the world, with a total number of patients of as many as 140 million, of which the number of patients of Type 2 Diabetes Mellitus (T2DM) patients is the highest^[4]. T2DM's clinical manifestations can produce symptoms such as drinking more, food, urine, and physical quality. There will be many complications in the progress of the disease, which seriously endangers the quality of life and health of the elderly^[5]. Patients with T2DM have high risks of microvascular and large vascular complications. For T2DM treatment not only requires effective methods but also needs to cooperate with reliable care at the same time to achieve the purpose of better control of blood sugar. Clinical data show that due to the long course of diabetes, the disease changes are more complicated. In addition, patients with type 2 diabetes are too old, do not have professional diabetes-related health knowledge, have weak self-management ability, and the difficulty of controlling blood sugar is relatively large^[6,7]. The prevention and treatment of T2DM requires measures such as diet therapy, exercise therapy, drug control, and blood sugar monitoring and comprehensive use. It requires long-term self-management of diabetic patients^[8,9]. Self-management ability is the ability to manage symptoms, treatment, physiology and psychological changes, and lifestyle changes in patients ^[10]. The latest diabetes prevention guide pointed out that the key ⁸ to preventing acute complications of diabetes and reducing the risk of long-term complications is to strengthen self-management education in patients with diabetes^[11]. Based on conventional nursing methods, strengthening community home care has important clinical significance in controlling blood sugar and disease progress. Community care, as a web position in the public service network system, played a basic role in public health services^[12]. Community nursing is a new type of nursing discipline integrating modern nursing, prevention medicine, management, and related humanities

and social sciences. It is centered on promoting the health of the community population, with family as the unit, society as the scope, and nursing procedures as working methods to carry out the physical and mental health of individuals, families, and people. And organically combine nursing, prevention, treatment, health care, rehabilitation and health education, and integrate physical care with group care^[13]. Be able to discover, treat early, and prevent early prevention, reduce the waste of medical resources caused by minor illnesses delayed into major illnesses, reduce the economic burden of residents, and obtain economic, continuous, and convenient health services^[14].

Therefore, this study aims to explore the treatment effect, cognition, and self-management changes of T2DM patients after strengthening community public health care. Establish the foundation for the optimization of community health management in the future.

MATERIALS AND METHODS

Normal information

Selected 100 patients with T2DM were admitted to this community health service center from October 2022 to December 2023 as the research object, and they were divided into two groups by the random digital table method, with a Conventional group 50 cases and a Community nursing group (CN group) 50 cases. This study was approved by the medical ethics committee.

Inclusion criteria

1) Following the "Standards of medical care for type 2 diabetes in China 2019"^[15] related diagnostic standards

2) Age ≥ 18 years old

3) The mental state and cognitive function are normal

4) Knowing the content of this research

Exclusion criteria

① None craniocerebral trauma.

- ② There are those with damage or dysfunction with other organs, and systems.
- ③ Those with nice and malignant tumor diseases.
- ④ Those who lack clinical data are caused by various reasons.

Nursing method

Both groups are combined with the patient's condition to give the same medicinal hypoglycemic solution in accordance with the "Guidelines for the Prevention and Treatment of Diabetes"^[15].

Conventional group: The control group is given conventional care. It is mainly to formulate scientific and reasonable nursing methods based on the actual situation of the patient, and guide patients to use medicine and diet correctly in accordance with the doctor's advice to help patients develop good living habits and facilitate the control of the patient's blood sugar value.

Community nursing group (CN group) : The CN group adds community public health care based on the conventional group.

① Health Education: Promote the relevant knowledge of T2DM in the community, help patients fully understand their diseases, actively and patiently answer patients' questions, and help patients solve doubts. According to the patient's questions, the corresponding care methods are recommended to the patient according to their conditions. Regular telephone follow-up or family follow-up of patients can understand and judge the current blood glucose level and blood glucose control through follow-up and judge the patient's current blood glucose level. Instruct it to watch some related videos of diabetic care, to answer questions about patients and their families in the face of community care. In addition, relevant experts can be hired to go to the corresponding lectures regularly, introduce basic diabetes treatment and nursing methods, *etc.*, and encourage patients to ask questions and give corresponding answers.

② Diet care: Community nursing staff collect patients' basic information, master the patient's weight, height, and other basic information, and actively communicate with patients and their families to understand the patients' daily eating habits. Nursing staff guide patients to eat reasonably, control the amount of food they eat, and design a diet

plan together with patients and their families. The diet plan can be personalized according to the patient's condition and family's economic conditions to ensure that the diet plan is reasonable. Nursing staff instruct patients to keep a light diet as much as possible and encourage patients to eat more whole grains and vegetables. Nursing staff explain in detail to patients the importance of dietary control in maintaining relative health and ensure that patients understand the necessity of a reasonable diet. The nursing staff instructs the patient to eat regularly and quantitatively, instructs the patient to eat strictly according to the diet plan, and instructs the patient's family to supervise the patient's reasonable diet. Recommend patients eat high-protein, high-fiber, and rich-vitamin foods. It is not advisable to eat high-sugar and high-cholesterol foods. Drinking should be lighter, and avoid spicy tobacco and alcohol^[16].

③Exercise care: Community nurses guide patients to exercise reasonably and design appropriate exercise plans based on the patient's physique and condition. When designing an exercise plan, nursing staff can first understand the patient's preferences and try to include the patient's favorite exercise methods, such as Tai Chi, dancing, jogging, walking, *etc.* The nursing staff designs the exercise intensity based on the patient's pulse rate and instructs the patient to maintain each exercise time within 0.5 to 1 h. The nursing staff explains the benefits of moderate exercise to the patient, instructs the patient to carry a disease card and a card with contact information and home address when engaging in outdoor exercise, and asks the patient to prepare sugary foods and eat in time if symptoms of hypoglycemia occur.

④Psychological care: Community nursing staff actively communicate with patients to understand their mental state and understand the reasons for their negative emotions. If the patient questions the efficacy of the treatment plan, the nursing staff should promptly explain the purpose of the treatment plan and the main functions of the drug to the patient to eliminate the patient's doubts. If the patient is worried about the unstable condition of the disease and has fear, the nursing staff will comfort the patient promptly and actively encourage the patient to build confidence in maintaining their health level. The nursing staff explains to the patient the possible impact of bad

emotions, informs the patient of the important role of maintaining a good and stable psychology, and allows the patient to relax as much as possible. Medical staff actively communicate with patients' families, inform patients' families to communicate more with patients, and guide patients' families to help and support patients to keep patients happy.

⑤Life management: Strengthen the management of patients to help them develop good health and laws. Under the premise of their own supervision and family members' urging, correct their current bad lifestyle, and strictly quit smoking and alcohol. In terms of exercise, you can encourage them to participate in various types of sports activities and exercise in combination with the individual conditions of patients and their preferences. It is necessary to avoid strenuous exercise, to gradually increase the amount of exercise and operation intensity^[17].

⑥Disease monitoring: Community nursing staff regularly visit patients to check their blood sugar levels, and record the time and results of blood sugar tests in detail in their health records. Diabetes experts consult patients' health files in a timely manner and promptly modify and supplement nursing intervention measures based on the patient's condition. The nursing staff instructs the patients to strictly follow the doctor's instructions for self-management, and informs the patients of the important role of good self-management in maintaining good health. Nursing staff instruct patients to contact medical staff directly if there are any abnormalities.

⑦Medication guidance: Community nurses explain the actual effects of various drugs to patients in detail, inform patients of possible adverse effects of taking the drugs, and guide patients to use drugs correctly. The nursing staff instructs the patients not to change the medication time and dosage at will, and informs the patients of the adverse consequences if they do not follow the doctor's instructions. If the patient needs to inject insulin for a long time, the nursing staff should inform the patient about the storage method of insulin, teach the patient and the patient's family how to use insulin injection tools correctly, and guide the patient to reasonably choose the injection site.

Observation

indicators

Compare the excellent and excellent blood sugar control rate, fasting blood sugar before and after care, 2-hour postprandial blood sugar, diabetes cognition, and self-management ability of the two groups of patients.

a. Excellent and good blood sugar control rate: Excellent: the patient's glycated blood sugar protein is < 6.5%. Good: The patient's glycated blood sugar protein is controlled at 6.5%~8%. Poor: The patient's glycosylated glycemic protein is >8%. Excellent and good rate = excellent rate + good rate^[18].

b. Use the T2DM health cognitive knowledge scale self-made by our center for evaluation. This scale has been tested for validity and reliability, with Cronbach's $\alpha=0.921$. It includes a total of 23 items, each item adopts a 0-1 Level scoring method, 0 is incorrect, 1 is correct, and the full score is 23 points. The higher the score, the better the patient's health knowledge.

c. Use the Self-Management Ability Scale for T2DM Patients designed by Zhenwei Dai to evaluate patients' self-management ability^[19]. The scale includes 11 items in total, including 3 dimensions: information, motivation, and behavioral skill. Each item adopts a 1 to 5-level scoring method. The higher the score, the stronger the patient's self-management ability.

d. The statistics of nursing satisfaction are based on the center's self-made questionnaire.

Statistical analysis

The data in this study were analyzed and processed by SPSS21.0 statistical software, the measurement data was expressed as (average \pm SD), the t-test was used, and the count data was expressed as a rate (%). The χ^2 test was adopted, $P<0.05$ means the difference is statistically significant.

RESULTS

Comparison of clinical data

We selected 100 patients with T2DM admitted to our community health service center from October 2022 to December 2023. The two groups of patients were comparable in gender, course of disease, BMI, and age ($P>0.05$) (Table 1).

Comparison of excellent and good blood glucose control rates

In order to observe the nursing effect on blood sugar control, we compared the overall blood sugar control of the two groups. The results showed that the CN group had a higher rate of excellent blood sugar control than the Conventional group (88% VS 70%, $P<0.05$) (table 2).

Comparison of blood sugar levels between the two groups of patients

We measured the patient's fasting blood glucose and 2-h postprandial blood glucose levels (Table 3). The results showed that before care, there was no significant difference in fasting blood glucose and 2-hour postprandial blood glucose between the two groups of patients, and they were comparable ($P>0.05$). After nursing, fasting blood glucose and 2-hour postprandial blood glucose were reduced to varying degrees in both groups, and both blood glucose levels in the CN group were lower than those in the Conventional group ($P<0.05$). This suggests that the nursing effect of Community nursing is better than that of conventional nursing.

Comparison of diabetes cognition and self-management ability between the two groups of patients

We assessed diabetes cognition and self-management abilities in both groups before and after care (table 4). The results showed that before care, there was little difference in diabetes cognition and self-management ability scores between the two groups of patients and they were comparable ($P>0.05$). After care, compared with before care, the diabetes cognitive level scores and self-management ability scores of both groups improved. Moreover, the cognitive level and self-management ability of patients in the CN group were higher than those in the Conventional group ($P<0.05$).

Nursing satisfaction comparison

After the study was completed, to understand the patients' actual feelings about community nursing in this study, nursing questionnaires were distributed to the two groups of patients (table 5), and according to the specific information of the questionnaire, the results showed that the overall satisfaction of the CN group is better than that of the conventional group (98% VS 86%) ($P < 0.05$).

DISCUSSION

With the development of society and the improvement of quality of life, people's dietary structure and daily life behaviors have changed. The incidence of endocrine diseases such as T2DM has shown an increasing trend year by year, which has also had a greater impact on patient's quality of life. However, the progression of the disease can be controlled through drug treatment. Because this type of patient mostly occurs in middle-aged and elderly people, there is little knowledge about DM. Moreover, patients with T2DM have the poor self-management ability, long disease course, and complex disease changes, and routine care can no longer meet patients' needs for blood sugar control^[20,21]. Therefore, providing more active and effective care to such patients has important clinical significance. Community public health nursing is a reliable nursing strategy for patients with long-term T2DM to control disease progression and prevent various complications while recuperating in the community. During the implementation period, nursing knowledge and public health are safely integrated. During the implementation period, community health service centers are used to serve patients in the community, thereby providing patients with personalized disease care and fundamentally improving the health and safety of patients^[22,23]. Nursing staff will actively understand the patient's basic information, such as weight, height, living habits, *etc.*, and design a reasonable diet and exercise plan based on the patient's economic conditions, so that the patient can maintain a reasonable diet and exercise state, thereby improving the patient's quality of

life.

Based on previous clinical data, it can be seen that effective community nursing has the following advantages: ①It can provide patients with continuous medical care, enable patients to still receive complete care after discharge, and increase the sense of security of patients and their families in a familiar environment. ②It can significantly reduce the re-hospitalization rate and medical consultation rate of patients during their stay in the community. ③Fundamentally improve patients' quality of life and encourage patients to learn and master more self-care methods. ④Reduce the distance that patients and their families have to travel to and from the hospital, and reduce the financial burden on patients during home treatment. ⑤Significantly shortened the length of stay for patients, and also increased the turnover rate of hospital beds to a certain extent. ⑥It has a great promotion effect on the development of the community nursing profession and also expands the professional field^[24,25,26].

In this study, our center analyzed the impact of community nursing on diabetes cognition and self-management of T2DM patients. The results showed that the excellent and excellent blood glucose control rate in the CN group was higher than that in the Conventional group ($P<0.05$). After nursing, the fasting blood sugar and 2-hour postprandial blood sugar of the CN group were lower than those of the Conventional group ($P<0.05$), confirming that the application of community nursing significantly adjusted the patients' blood sugar control level. At the same time, the results of this study showed that after nursing, the diabetes cognitive level scores and self-management ability scores of both groups improved, and the CN group was higher than the Conventional group ($P<0.05$). It can be seen that after corresponding care, the patient's health cognition level is also higher, and his self-management ability is also significantly improved, which confirms the application advantages of community nursing and is basically consistent with previous clinical studies^[27,28]. The reason is that the application of community nursing combines the onset characteristics, clinical symptoms, and nursing needs of patients with type 2 diabetes to provide targeted nursing strategies. It not only improves the overall nursing service level but also better

meets the patient's nursing needs, thereby improving the patient's medical compliance behavior and ultimately achieving the purpose of effectively controlling the patient's blood sugar level^[29,30]. In addition, community nursing increases communication and communication with patients through health education and builds a relatively harmonious nurse-patient relationship. It also significantly improves patients' understanding of the disease, improves medical compliance, and significantly improves self-management ability^[31].

In this study, the patient satisfaction rate before and after care was also compared. The satisfaction rate of patients in the CN group with nursing services was 98% (49/50), which was higher than that in the conventional group, 86% (43/50). This suggests that community care improves patient satisfaction, resulting in higher patient compliance and psychological adaptation, and is worthy of promotion. This study also has some limitations. ⁵ The sample size of this study was too small and it was a single-center study. In the future, relevant research can be conducted by combining collections from multiple centers. In this study, most of the patients with diabetes were elderly patients, but as chronic diseases are now becoming younger and younger, we also need to explore the effect of care in relatively young people.

CONCLUSION

In summary, adding community care during the routine care of T2DM patients can achieve better blood sugar control effects, promote patients to improve their health cognition and self-management abilities, and promote patient recovery. In subsequent studies, ² the sample size can be further expanded, observation indicators increased, and follow-up time extended, to judge the application advantages of community nursing more scientifically and effectively.

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