

Assessing The Status of Self-care Behavior in Patients with Type 2 Diabetes in Binzhou City: A Cross-sectional Study

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Abstract

Worldwide, diabetes is a silent epidemic that claims 4.2 million lives worldwide each year. Experts predict that by 2045, one in 10 people will be affected by the disease. In China, with the change of lifestyle in recent years, the number of obese and overweight people is increasing, and the incidence of diabetes is also rising year by year, which makes the health education of diabetic patients particularly important. The purpose of this study was to assess self-care behavior and its influencing factors. This study is an analytical cross-sectional study. Data will be collected through questionnaires. Participants will be divided into two groups based on the questionnaire results: high adherence and low adherence. In this group of questionnaires, the Chinese version of the Diabetes Self-care Questionnaire (DSMQ) ($r > 0.60$, Cronbach's $\alpha = 0.764$) will be used, and another questionnaire which will determine the influencing factors will be designed by the author. The convenience sampling method will be used to select the survey objects. The minimum sample size for this study will be 384. Of the 377 participants, 171 (45.36%) were female and 296 (54.64%) were male. The mean HbA1C was $8.807\% \pm 3.975\%$. The average BMI was 22.198 ± 2.940 kg. The self-care behavior score of the subjects was 4.368 ± 2.388 , which was in the sub-optimal nursing level.

Keywords: self-care behavior, T2DM

1. INTRODUCTION

Worldwide, diabetes is a silent epidemic that claims 4.2 million lives worldwide every year - almost three times as many deaths as COVID-19. Diabetes is spreading, with experts predicting that one in 10 people will be affected by the disease by 2045. Diabetes is on the rise worldwide and was responsible for 4.2 million deaths in 2019. The greatest increases have occurred in low - and middle-income countries. More than 460 million people already have diabetes. By 2045, more than 700 million people will have diabetes (Saeedi et al., 2019). In China, in recent years, with the change of lifestyle, the number of obese and overweight people has increased, and the incidence of diabetes in China has increased year by year. According to Jiang and Jiang (2021), the incidence of diabetes in Chinese

adults has reached 12.8%, and 1 in 9 people will have diabetes by 2030. Professor Teng and his team have identified three issues of concern. Firstly, the incidence of diabetes is increasing year by year, which is positively correlated with obesity. Second, almost half of the people in this country have abnormal blood glucose. Finally, they also found significant regional differences in the prevalence of diabetes in China, with the highest prevalence in northern China. (Li et al., 2020)

Binzhou City in Shandong Province is a city in northern China with high prevalence of diabetes. In 2015, residents over 18 years old were selected from a center for disease control and prevention in Binzhou City, and their fasting blood glucose was measured. The results showed that the overall prevalence of diabetes was 7.83%, 8.09% in males and 7.56% in females. The rate of impaired glucose regulation was 11.83%, which increased significantly with age. The rate of impaired glucose tolerance was significantly higher than that of impaired fasting glucose (Su, 2015). A study conducted in 2021 showed that the survey indicated that among the 6777 adult residents in Binzhou City, the prevalence of diabetes was 9.3% (Ke et al., 2021). The target population of this study has many problems in diet, exercise, medication, foot care, blood sugar monitoring and other aspects. As a traditional northern town, Binzhou city has a high-fat and high-salt diet, mainly pasta, rice and rice noodles, salt, animal meat, edible oil and fried food. (Li & Ma, 2023) In terms of exercise, it can be inferred from studies in many places across the country that patients with type 2 diabetes have a weak grasp of exercise knowledge and poor continuity and standardization of exercise, and this research result is universal. (Dai, et al. 2012) The drug treatment compliance of diabetic patients in Shandong Province still needs to be improved. Improving patients' cognition level and attitude towards drug therapy is helpful to improve drug treatment compliance. It is necessary to strengthen health knowledge education for diabetic patients and change their attitude towards drug treatment. The self-management status of elderly type 2 diabetes patients is not ideal (Zhang, et al. 2022), among which taking medicine as prescribed by doctors is the best, while foot care and blood glucose monitoring are the worst (Liu, et al. 2013). Some of the above research results have been long, so we can only know the results of previous studies in this aspect. With the development of The Times, people's living standards and lifestyles have undergone great changes, which will inevitably affect the group of type 2 diabetes patients. Therefore, issues related to self-care behavior of type 2 diabetes patients in this region are indeed an issue worthy of investigation.

The World Health Organization defines self-care behavior as "the ability of individuals, families, and communities to promote health, prevent disease, maintain health, and cope with illness and disability, with or without the support of health workers." According to this definition, self-care includes everything related to maintaining good health, including hygiene, nutrition, and seeking medical care when needed. This is all the steps a person can take to manage the stressors in his or her life and take care of his or her own health and well-being. At present, domestic researchers mainly use the Knowledge, Attitude and Behavior (KAB) assessment form and the Diabetes Self-Care Behavior Scale (DSBS) to investigate and evaluate the self-care behavior of type 2 diabetes patients. Studies have generally shown that patients diagnosed with type 2 diabetes lack self-care knowledge, tend to have a positive attitude toward self-care, but their self-care behavior is not optimistic (Liu et al., 2018).

There are many factors that affect their self-care behavior, such as age, gender, education level, etc. There are many studies on the management model of diabetic patients, such as the holistic health education model (Yu, 2019). Empowering education model (Liu et al., 2020); Team management model (Zhou, 2020); Collaborative nursing service model (Wang, 2021); Continuous nursing model (Zhang, 2020); Diet intensive management combined with impedance training model (Liu, 2020), et al. Although there are many kinds of research on the management model, the general tendency is to study the education model, focusing on what kind of education service is provided, but ignoring that the educated is the real actor. In addition, most researchers did not categorize the subjects, which makes the findings untargeted.

Diabetes as a chronic metabolic disease, due to the lack of self-care plan, diabetes patients are unable to control blood sugar, which will greatly affect the quality of life of patients and increase the burden of disease.

The evaluation of self-care behaviors such as diet, exercise, medication, foot care and blood glucose control in type 2 diabetes patients can reflect the strength of the group's compliance. At the same time, studies have shown that the self-care behavior of people with type 2 diabetes is related to a number of socio-clinical-demographic variables, such as age, sex, citizenship, education, employment status, medication duration, blood glucose monitoring, medical insurance, and glycosylated hemoglobin testing. The self-care behavior score of elderly diabetic patients was significantly affected by gender, educational level, economic status and religious belief. Social support, education level and duration of diabetes significantly influenced self-care behavior, accounting for 35.6% of the total variance. (Bai, et al, 2009) Patients with type 2 diabetes have a high perception of behaviors related to drug use, but a low perception of behaviors related to diet and exercise. (Gatt & Sammut, 2008) In another study, it was shown that the more educated the participants, the more frequently they participated in exercise, healthy eating and foot care, and that women engaged in SMBG more frequently than men. (Mogre, et al, 2017) Due to the difficult-to-treat nature of diabetes and the potential for serious complications, targeted prevention measures, including self-care behaviors, play a vital role in controlling blood sugar, reducing complications, and improving quality of life. (Wajid Syed et al., 2022) The objective of this study was to assess self-care behavior in patients with type 2 diabetes. This study will further deepen the understanding of the demographic characteristics and influencing factors of self-care behavior of type 2 diabetes patients, and further enrich the theory of self-care behavior of type 2 diabetes patients. This will provide a reference for public health workers in the region to conduct self-care education and intervention for patients with type 2 diabetes, which is conducive to improving patients' awareness of self-care behavior and diabetes management, promoting their health and reducing the burden of diabetes.

2. STUDY OBJECTIVES

2.1. General Objective

This study aims to assess self-care behaviors among individuals with type 2 DM in Binzhou City, China.

2.2. Specific Objectives

Guided by the overall objective, the study specifically aims to:

1. Describe socio-clinical demographic characteristics of study participants (age, gender, education level, BMI, HbA1c testing,).
2. Describe the level of self-care activity of diabetic participants: glucose management(GM), dietary control(DC), physical activity(PA), and health-care use(HU).

3. METHODS

3.1. Study Design and Locale

3.1.1. Study Design

This is an analytical cross-sectional study. The study will be conducted over a three-month period. An analytical cross-sectional study is a quantitative, non-experimental research design. These studies attempt to "collect data from a group of subjects at some point in time." Cross-sectional studies typically use surveys or questionnaires to collect data on participants. The main objective of this study was to assess the current self-care behavior of patients with type 2 diabetes. The sampling time span of this study is short, which accords with the attribute of cross-sectional study. In this study, participants were divided into two groups according to the results of DSMQ: the sub-optimal care group and the optimal care group. According to the scoring guide of DSMQ questionnaire, 6.0 is cut-off. Participants with a DSMQ score of 0-6.0 will be assigned to sub-optimal care group, and participants with a DSMQ score of ≥ 6.01 will be assigned to optimal care group.(Schmitt,et al., 2013)Age, gender, education level and BMI will be selected as independent variables. Quantitative analysis was performed to determine the quantitative relationship between the four independent variables and the scores of "Glucose management", "diet control", "physical activity", and "healthcare use". Critical ratio method (t test) and correlation coefficient method were used to analyze the scale items, and the correlation and difference between blood glucose management, diet control, physical activity and health care use and age, sex, education level and BMI were quantitatively studied in the two groups.

3.1.2. Locale

The sampling site of this study was Binzhou City, Shandong Province. This is a small city in northern China. It is a prefecture-level city in the northern part of Shandong Province. The city borders across the Yellow River north and south. The longest longitudinal distance between north and south is 175 kilometers, the largest span between east and west is 120 kilometers, and the total area is 9660 square kilometers. Binzhou City is located in the middle latitude, four distinct seasons, mild climate. The city has jurisdiction over 2 districts, 4 counties and 63 townships. In 2014, China proposed to cancel the distinction between the nature of agricultural hukou and non-agricultural hukou, and unified registration as resident hukou, aiming to eliminate identity division and discrimination, and gradually realize the household registration system and social management of urban and rural integration. With the advancement of urban-rural integration and the development of the household registration system reform, it is impossible to accurately distinguish urban and rural residents from the nature of household

registration. The overall economic development level of Binzhou city belongs to the middle and low level in Shandong Province. According to data from the Shandong Provincial Bureau of Statistics, the per capita disposable income of residents in 2021 ranked ninth among 16 prefecture-level cities in Shandong Province, belonging to the middle and lower levels. In the GDP ranking of the first quarter of 2024, Binzhou ranked 13th among the 16 prefecture-level cities, belonging to the bottom level. However, with the realization of the goal of building a well-off society in an all-round way, the living standard of the local people has been greatly improved. People blindly pursue the satisfaction of desire, but the requirements for quality have not kept up. A study conducted in 2019 showed that the survey indicated that among the 6777 adult residents in Binzhou City, the prevalence of diabetes was 9.3% (Ke Changrong et al., 2021). Therefore, the need for health guidance is more urgent. This study focuses on the self-management behavior and related influencing factors of patients with type 2 diabetes in Binzhou city, Shandong Province.

3.2. Study Participants

3.2.1. Sample Size and Sampling

A convenient sampling method will be used to select the target population. Using RaoSoft, the researchers used a confidence level is 95%, margin error of 5%, with the total number of patients with type 2 diabetes is calculated as 131599 (This data is the number of management indicators of type 2 diabetes patients in 2023 of Binzhou Municipal Health Commission, the local health authority. Of these, 70,405 are urban residents and 61,194 are rural residents), and response distribution of 50%. Based on these data, the minimum sample size computed for the study will be 384.

Convenience sampling techniques will be used to select target participants. The survey was conducted in the form of questionnaires and face-to-face/online meetings. The questionnaire is made in two forms: paper questionnaire and electronic questionnaire. Participants can choose one form to fill in according to their own situation. Sampling will be conducted in three teaching hospitals affiliated to a medical university in Binzhou City. These three hospitals are all Grade 3 A hospitals with stable diagnosis and treatment level and large number of patients, which is convenient for sampling work. In data collection, three research assistants will be recruited to work on data collection at each of the three hospitals. The three research assistants are all undergraduate students in the School of Public Health of the university, and they have certain professional knowledge and skills to complete the work well. When sampling, stratified sampling is adopted, and the stratification is based on "current residence". The reason for adopting this stratified sampling is that according to the current household registration system in China, it is impossible to accurately judge the long-term residence of the respondents from the household registration territory, so it is impossible to accurately distinguish urban residents from rural residents, and the use of "current residence" as the basis for stratification can effectively distinguish them.

3.2.2. Inclusion and Exclusion Criteria

Inclusion

The target participant must meet all four criteria:

1. A long-time resident. Long-term residents will be selected to facilitate and guarantee the implementation and evaluation of follow-up health guidance measures. To qualify as a long-term resident, respondents should have a permanent residence in the area and have lived there for at least one year. This content will be verified in the questionnaire.
2. Patients with type 2 diabetes aged over 18 years will be selected as participants.
3. Participants will be required to have the complete civil capacity. Because the target participants must be able to clearly express their ideas and understanding.
4. Participants select Chinese citizens based on their ID cards.

Exclusion

The following will be excluded from the study:

1. Participants who have not signed and agreed to the informed consent form
2. Participants who were not tested for HbA1c
3. Participants with other underlying conditions

3.3. Research Instruments

The questionnaire used in this study is a composite questionnaire. The questionnaire is divided into two parts. The first part is the assessment of the participants' basic information. The second part refers to the Chinese version DSMQ ($r > 0.60$, Cronbach's $\alpha = 0.764$) tested by scholars for reliability and validity. (Li, 2018)

PART 1: The assessment of the basic information of the participants

The basic information of the patients evaluated refers to the demographic data of the patients, such as gender, age, weight, marital status (married, single, widowed), education level (nine year compulsory education, high school, college and above, no school education), employment status (employed, retired, unemployed), current residence, duration of diabetes treatment etc.

PART 2: The assessment of the Chinese version of DSMQ

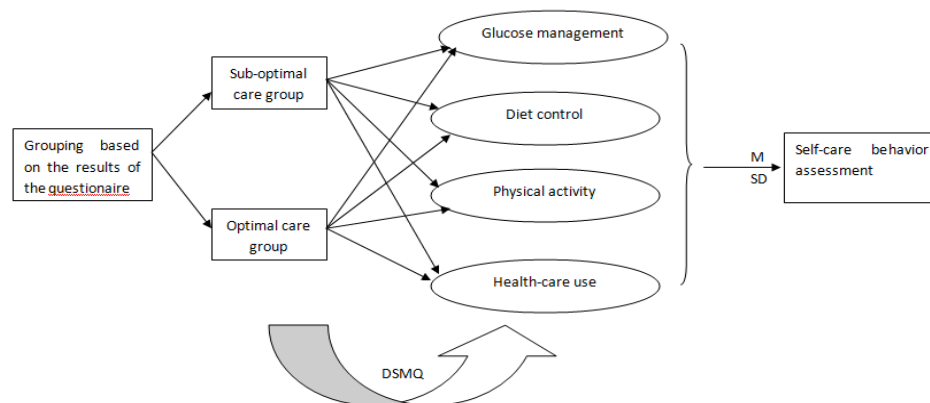
On the basis of literature review and factor analysis, scholar Schmitt summarized the factors of self-management behavior affecting HbA1c. On this basis, the Diabetes Self-Management Scale (DSMQ) was developed. (Schmitt et al., 2013) The scale has 4 dimensions and 16 items, including blood sugar management (5 items), diet control (4 items), physical exercise (3 items), and medical care application (3 items). Likert 4-point scoring method is adopted (0= not applicable, 1= somewhat applicable, 2= largely applicable). 3= Very applicable). According to the scoring guide of DSMQ questionnaire, the highest score of this scale is 10. The higher the score, the higher the level of self-management. The scale has good reliability and validity in patients with type 1 and type 2 diabetes with different treatment modalities. The Cronbach's α coefficient of each subscale ranges from 0.60 to 0.77, and the Cronbach's α coefficient of the total scale is 0.84. Both exploratory factor analysis and confirmatory factor analysis support the four-factor structure. The correlation between DSMQ and HbA1c was higher than that between SDSCA and HbA1c ($r = -0.40$). At present, DSMQ has been gradually promoted and applied in various countries. Researchers from different countries adapted DSMQ across cultures and tested its

applicability to form versions suitable for their own countries. Chinese researcher Li Chaoqun carried out the Sinicization of the scale in his master's degree graduation thesis, and tested its reliability and validity.

3.4 Data Collection

In this study, the Affiliated Hospital of Binzhou Medical College, Binzhou People's Hospital and Binzhou Hospital of Traditional Chinese Medicine of Binzhou City, Shandong Province were recruited by convenient sampling method to recruit type 2 diabetes patients who had completed HbAc1 test within one week. First, communicate with the target medical institutions, set up recruitment sites in their hospitals, and carry out mobile publicity within the hospitals. In the process of investigation, questionnaires and number scales will be distributed to patients on site to explain and guide the significance and methods of this study. After the patients completed the questionnaire, the researchers checked to make sure there were no missing items in each form. The duration of this survey is planned to be three months (depending on the sample collection). During the investigation, the contact information of the respondents was collected on a completely voluntary basis, including telephone number, email address, fax and other effective contact information, so as to facilitate follow-up.

3.5 Study framework



4. STATISTICAL ANALYSIS OF DATA

The collected data will be analyzed through SPSS22.0. Descriptive statistics, such as frequency and percentage, will be used to summarize the data. The average score of each question in DSMQ questionnaire and the average total score of each subject were calculated, and the variance was used to evaluate the discreteness of the data.

5. RESULTS

5.1 Socio-demographic and 2 type diabetes self-care profile of the participants

Data collection for this study began on July 1, 2024 and ended on July 31, 2024. Out of the 384 participants who answered the research instrument, there were a total of 377 valid questionnaires and 7

invalid questionnaires. The effective rate of the questionnaire was 97.18%, with a moderate proportion of men and women (45.36% of males and 54.64% of females). Nearly half (49.34%) of the participants had an education level of 9-12 years. More than half of the participants were over 50 years old (58.09%). The BMI group with the highest proportion (19.82-23.40kg/m²) was 40.85%. Nearly one-third of the participants (32.36%) had HbA1c > 9.0%. The results of statistical analysis on the 377 questionnaires are shown in Table 1.

Statistical analysis of the diabetes self-care profiles of the participants in Table 1 showed that most participants were sub-optimal in the four aspects of glucose management, diet control, physical activity and healthcare use, with sub-optimal results of 65.78%, 67.90%, 76.92% and 76.78%, respectively. More than two-thirds of respondents (52.3%) said the results were sub-optimal.

Table 1: Socio-demographic and 2 type diabetes self-care profile of the participants.

	n (%)
Socio-demographic profile	
Age	
• 18-35 years old	74(19.63)
• 36-49 years old	84(22.28)
• 50-70 years old	112(29.71)
• >70 years old	107(28.38)
Sex	
• Female	206(54.64)
• Male	171(45.36)
Educational Level	
• <9 years	108(28.65)
• 9-12 years	186(49.34)
• >12 years	83(22.01)
BMI	
• ≥23.41kg/m ²	122(32.36)
• 19.82-23.40kg/m ²	154(40.85)
• <19.82 kg/m ²	101(27.39)
HbA1c Testing	
• 6.5-7.5%	121(32.10)
• 7.6-8.9%	134(35.54)
• >9.0%	122(32.36)
Diabetes self-care profile	

Glucose management(GM)	
• Sub-optimal	248(65.78)
• Optimal	129(34.22)
Diet control(DC)	
• Sub-optimal	256(67.90)
• Optimal	126(32.10)
Physical activity(PA)	
• Sub-optimal	290(76.92)
• Optimal	87(23.08)
Healthcare use(HU)	
• Sub-optimal	297(78.78)
• Optimal	80(21.22)
Overall	
• Sub-optimal	280(74.27)
• Optimal	97(25.73)

5.2 Respondents' Level of Self-care Behavior

Overall, people with type 2 diabetes in the region generally had Suboptimal level of self-care (M=4.368, SD=2.388). In the subscale, dietary control (DC) score was the highest (M=4.779; SD=2.583), indicating that the respondent was definitely able to complete the task. The second was blood glucose control (GM) (M= 4.727; SD=2.713), physical exercise (PA) (M = 4.064; SD=2.584). The lowest score was Health-care Use(HU)(M= 3.996; SD = 2.684). For details, see Table 2.

Table 2: Respondents' level of self-care behavior

Variables	Mean	SD
GM	4.727	2.713
DC	4.779	2.583
PA	4.064	2.584
HU	3.996	2.684
SS	4.368	2.388

6. DISCUSSION

Type 2 diabetes (T2DM) has become a silent epidemic affecting the world. Every year, a large number of patients around the world lose their lives due to this disease. Studies have shown that the disease is closely related to a poor lifestyle. Today, China is in a period of rapid economic development and great changes in people's lives, and changes in lifestyle may put people at risk of type 2 diabetes. Patients with type 2 diabetes must do a good job in blood sugar management, diet control, physical exercise, health care application and other self-care behaviors, in order to effectively control the development of the

disease and improve the quality of life. Therefore, the study to assess the level of self-care behavior of local type 2 diabetes patients is of great significance for understanding the status quo of local type 2 diabetes patients' self-care behavior and improving their quality of life. In view of this, this study was conducted in Binzhou, Shandong Province, to assess the level of self-care behavior in patients with type 2 diabetes.

6.1 Demographic profiles of the participants

The socio-demographic data of the participants in this study showed that women were slightly higher than men in terms of gender parameters. Regarding age parameters, most participants were over 50 years old. Most of the respondents had a high school level of education, and the highest proportion of patients had the BMI in the 19.82-23.40kg/ m² range. In terms of HbA_{1c} parameters, there was no significant difference in the number of participants among the three groups.

6.2 Level of self-care behavior

Schmitt developed the Diabetes Self-management Scale (DSMQ) based on the factors affecting HbA_{1c} in self-management behaviors. (Schmidt et al., 2013) Chinese researcher Li Zhaoqun carried out the Chinese version of the scale in his master's degree graduation thesis and tested its reliability and validity. The answers to the objectives of this study are obtained through the Chinese scale. The scale measured recent self-care behavior among study participants. The results showed that people with type 2 diabetes in the region had moderate levels of self-care behavior (based on average scores). The findings of this study are very similar to those of SUKARNO (2024), who also reported moderate levels of self-care behavior in the Factors Associated with Self-care Performance in Indonesian patients with type 2 diabetes. (Sukarno et al., 2024)

In the subscale, dietary control (DC) score was the highest (M=4.779; SD=2.583), indicating that the respondent was definitely able to complete the task. This means that they tend to make choices that are conducive to achieving ideal blood sugar levels, avoid eating large amounts of sweets or other carbohydrate-rich foods, and rarely overeat without being hypoglycemic. Similarly, Toobert et al. found that participants reported higher levels of dietary control than other self-care behaviors. (Toobert et al., 2000)

The second was blood glucose control (GM) (M= 4.727; SD=2.713), the results of this survey are similar to the results of diet control, indicating that although the blood glucose control of the participants in this study is better than physical exercise and health care application, the overall level is still moderate, and the behavior of blood glucose monitoring is far from universal. This is similar to Alhaiti's reported blood glucose monitoring (M = 4.15, SD = 2.42) being at an average level. (Alhaiti et al., 2020)

The lowest sub-scale score was Health-care Use(HU)(M= 3.996; SD = 2.684). This suggests that behavioral ratings of health care use were also moderate, but lower than those for diet control, blood sugar management, and physical activity. This means that participants in the study did not follow their doctor's orders well or visit their diabetes doctor often. Medication compliance is an important aspect of

following the doctor's order. The participants did not follow the doctor's order well, indicating that their medication compliance was poor. This is inconsistent with Roxas reporting that of the seven self-care behaviors identified, most participants had good adherence to five behaviors, with medication adherence being the highest (76.2%). (College of Medicine, University of the Philippines-Philippine General Hospital, Manila et al., 2013) This difference may be due to differences in participants' choices. The participants of this study lived in areas with less economic development, relatively poor health education, and relatively poor cognition of disease prevention and treatment; The latter selected patients in the outpatient department of the Philippine General Hospital, which is located in Manila, the capital of the Philippines, and patients have relatively high awareness of disease prevention and treatment. In addition, a qualitative study of factors influencing self-care behavior in patients with type 2 diabetes identified irregular monitoring and missed follow-up as the most frequently cited noncompliance behaviors and identified them as important future interventions to improve compliance in this group of patients. (Peng et al., 2022)

6.3 Self-care behaviors of T2DM patients

Glucose management

The study found that participants' compliance with glucose management was poor. Nevertheless, glucose management had the lowest rate of suboptimal relative to self-care levels in diet control, physical activity, and health-care use. This indicates that among the four aspects of the survey analysis, blood glucose management performed best in the self-care behavior of patients with type 2 diabetes. In a study of self-care behavior in people with type 2 diabetes between the ages of 45-64, it was revealed that many people with diabetes have poorly controlled blood sugar levels and need to improve self-care behavior to improve blood sugar control. (Dewi et al., 2023) Some patients have poor blood sugar control due to lack of regular blood sugar monitoring. (Syed et al., 2022) Studies have shown that a significant proportion of diabetic patients (usually 40%-60%) have poor blood sugar control. This is the case in all regions of the world, in both high-income and low-income countries. (Blonde et al., 2017)

Diet control

Participants' diabetes self-care profiles showed sub-optimal results for dietary control parameters. This finding can be attributed to economic development, changes in people's lifestyle and eating habits, and dietary structure. Research supports the conclusion that eating habits and sedentary lifestyles are major factors behind the rapid rise in diabetes rates in developing countries. (Sami & Ansari, 2017) A high-carbohydrate diet is a typical dietary feature in northern China. Studies have shown that the majority of people's carbohydrate intake comes from refined grains (i.e. white rice and refined wheat products), and high refined grain intake is a major dietary risk factor for the diabetes burden in China. (Yu et al., 2018)

Physical activity

Participants' diabetes self-care profiles showed suboptimal results for physical activity parameters. Although there is evidence that exercise is beneficial for people with type 2 diabetes, most of them are

still not guaranteed good exercise, or even in a state of inactivity. (Heiss & Petosa, 2014) For example, data from a national health survey in the United States showed that less than one-third of adults with diabetes who voluntarily exercised met the recommended level of physical activity. (Resnick et al., 2006) At the same time, studies have shown that diabetic patients are less likely to meet the recommended level of physical activity than non-diabetic patients. (Zhao et al., 2008) Furthermore, people with type 2 diabetes are more likely to return to a sedentary state. (Krug et al., 1991) A prospective study showed an association between physical activity and sedentary leisure time and the incidence of diabetes. (Bennett et al., 2019)

Health-care use

The participants' diabetes self-care profiles showed that the health care use parameter also received sub-optimal results and was the worst outcome of the four parameters. This suggests that the level of health care use among people with type 2 diabetes in the area where this study took place is very unsatisfactory. The reason for this phenomenon may be the imperfection of the medical insurance system brought about by the medical reform or the unreasonable allocation of patients in different levels of hospitals. (Wang et al., 2010)

7. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the study, it can be concluded that self-care behaviors of people with type 2 diabetes in the region are generally suboptimal. Therefore, it is particularly important to provide self-care behavior guidance for type 2 diabetes patients in this region.

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