

## Article

# Investigation and Analysis on Self-Management Behaviors and Influencing Factors of Elderly Patients with Type 2 Diabetes in Communities

Jing Yu<sup>1,\*</sup>, Wenhao Xie<sup>1</sup> and Shuhua Wang<sup>1</sup>

<sup>1</sup> Hainan Vocational University of Science and Technology, Haikou, China

\* Correspondence: Jing Yu, Hainan Vocational University of Science and Technology, Haikou, China

**Abstract:** Objective: To investigate the current status of self-management behaviors and influencing factors among community-dwelling elderly patients with type 2 diabetes in Chongqing, so as to provide evidence for improving patients' self-management and preventing or delaying the development of diabetic complications. Methods: A cross-sectional study was conducted using questionnaire survey, literature review and statistical analysis. Results: The total self-management score of participants was (53.71 ± 7.26), the self-efficacy score was (30.85 ± 7.06), and the total diabetes distress score was (40.0 ± 7.6). Living conditions showed significant effects on multiple dimensions of self-management. Economic status was significantly associated with blood glucose management and foot-care sub-dimensions rather than the overall self-management score. Exercise, diet and blood-glucose-control sub-dimensions of self-efficacy, as well as emotional burden, doctor-related distress and life-regularity-related burden of diabetes distress were significant predictors of self-management behaviors. Conclusions: Self-management behaviors of the sampled community-dwelling elderly patients with type 2 diabetes were at a low level, accompanied by poor self-efficacy. Life-regularity-related burden was the primary source of diabetes-related distress in this cohort. Living status had an impact on patients' self-management, while household income only influenced partial self-management domains. Both self-efficacy and diabetes distress were important factors affecting self-management behaviors. Targeted community interventions should focus on boosting self-efficacy and relieving diabetes distress for this population.

**Keywords:** old age; Type 2 diabetes mellitus; self-management; influencing factors; community

## 1. Introduction

### 1.1. Research Background

Diabetes is a global disease. The rising prevalence brings huge challenges for clinical and community health services. China boasts a large elderly population with high diabetes prevalence, and the elderly constitute the main diabetic population in China. Relevant reports indicated that China had 140.9 million diabetic patients in 2022, accounting for 26.2% of global cases. Despite expected slower growth driven by improved public health awareness, the number will keep rising to 164.1 million by 2030 and 174.4 million by 2045 [1, 2].

Type 2 diabetes mellitus is a metabolic disorder characterized by hyperglycemia caused by impaired insulin secretion, defective biological function of insulin, or both. Persistent hyperglycemia triggers chronic damage and dysfunction of eyes, kidneys, heart, blood vessels and nerves. China has the world's largest diabetic population. Although health authorities have promoted diabetes management, complications and poor self-management remain prevalent among elderly patients. Since diabetes cannot be completely cured, long-term self-management is essential for patients. With population aging, diabetes incidence will keep increasing in the next 15 years, imposing heavy burdens on public health and social economy.

Received: 17 November 2025

Revised: 02 January 2026

Accepted: 12 January 2026

Published: 15 January 2026



**Copyright:** © 2026 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

### 1.2. Research Significance

According to *Chinese Clinical Guidelines for the Prevention and Treatment of Type 2 Diabetes in the Elderly (2022 Edition)*, the number of elderly type 2 diabetic patients has increased rapidly with population aging [1]. Diabetic complications are the leading causes of disability and death among patients. Effective self-management helps stabilize blood glucose, delay disease progression and reduce complication risks.

Existing domestic studies on diabetes self-management are abundant, yet few focus specifically on community-dwelling elderly patients with type 2 diabetes. Therefore, this study investigates self-management behaviors and influencing factors of this group. It provides theoretical evidence for community-based health education, identifies key influencing factors, improves patients' disease cognition and self-efficacy, and motivates positive disease coping. The findings can support community health service stations to formulate targeted intervention strategies to standardize patients' self-management.

### 1.3. Domestic and Foreign Research Status

#### 1.3.1. Domestic Research Status

Since the mid-1990s, diabetes self-management health education in China was mostly hospital-based passive knowledge infusion. Drawing on foreign experience, numerous domestic studies have been carried out in recent years. Most domestic research reveals that diabetes self-management remains at moderate-to-low levels and needs improvement.

Research has found that 74.6% of type 2 diabetic patients had moderate-to-low self-management. Living alone aggravates psychological and life burdens, while co-habitation provides life, emotional and economic support and facilitates better self-management [3]. It has also been reported that better family function and stronger health beliefs correspond to higher self-management levels [4]. Self-efficacy has been proposed to act as a mediating variable: enhanced self-efficacy encourages positive disease coping and improves self-management [5]. A mixed-method study of suburban patients showed overall moderate-to-poor self-management, with medication compliance relatively good but foot care and blood glucose monitoring inadequate [6].

Previous domestic studies have identified risk factors for poor self-management: low education level, negative disease perception, defective family function, long disease course, low self-efficacy, insufficient social support, diabetes distress and depression [7, 8]. Self-efficacy refers to individuals' belief in their capacity to achieve specific goals, and it is closely associated with better chronic disease self-care [9]. It serves as a protective factor for patients under depression and stress and should be prioritized in intervention programs [10, 11]. Chinese scholars have analyzed self-management from perspectives of lifestyle, health belief, family function and self-efficacy, reflecting nationwide attention to this issue. Nevertheless, studies targeting community-dwelling elderly type 2 diabetic patients are still insufficient.

#### 1.3.2. Foreign Research Status

Foreign research on diabetes self-management started early and has formed sound theoretical systems. International standards of diabetes care are updated annually and provide comprehensive self-management recommendations. Improved self-management support yields positive effects on lifestyle and health outcomes, reduces complications and cuts treatment costs. Current guidelines tend to be overly standardized and lack personalized guidance for diet, exercise and medication [12]. The willingness to prevent complications is a major driving force for self-management; health educators should therefore improve patients' practical skills and self-efficacy [13]. Good self-management correlates with ideal glycemic control, whereas low education and low income produce adverse impacts [14]. Structured group education improves blood pressure and glycemic status and reduces fear of complications; a positive mentality promotes self-management while negative emotion hinders behavioral adherence [15].

To sum up, foreign literature confirms that sound self-management prevents complications, and positive mentality together with social support motivates persistent self-care. Plenty of studies have explored type 2 diabetes self-management, but fewer researches focus on community-living elderly patients. This study supplements relevant empirical evidence for this special population.

#### *1.4. Definition of Relevant Concepts*

**Concept of Self-Management Behavior:** The concept of self-management originates from psychological-behavior theories and was put forward in the 1970s. Lorig from Stanford University further developed it and launched the Chronic Disease Self-Management Program (CDSMP) in the 1990s, verifying its positive effects on health behaviors and health outcomes of chronically ill patients. Corbin and Strauss defined self-management as patients' active participation in treatment covering three categories: medical management such as medication and dietary compliance; behavioral management for adopting new habits under chronic disease background; emotional management for coping with frustration, fear and despair caused by chronic diseases. Tang Haiqin reported that self-care theory could improve management behaviors among elderly diabetic patients.

Diabetic self-management is not merely individual behavior but also requires participation of community medical staff. Its ultimate goal is to enable patients to play active roles in treatment, emotion regulation and role adaptation. In this research, diabetes self-management behaviors include blood glucose monitoring, foot care, diet management, medication adherence, exercise management and emotion management.

## **2. Research Objects and Methods**

### *2.1. Research Objects*

#### *2.1.1. Selection of Research Objects*

Adopting random sampling, this study selected 130 elderly patients aged  $\geq 65$  years diagnosed with type 2 diabetes who received treatment in a community in Chongqing from August 2022 to December 2022. One-on-one questionnaire surveys were conducted for data collection.

#### *2.1.2. Inclusion and Exclusion Criteria*

Inclusion criteria: 1 Age  $\geq 65$  years old; 2 Clinically diagnosed with type 2 diabetes; 3 Clear consciousness without intellectual defects, capable of cognition and communication; 4 Voluntary participation with informed consent.

Exclusion criteria: 1 Patients with mental disorders; 2 Subjects with cognitive or perceptual impairment; 3 Patients with severe aphasia, intellectual, hearing or memory disorders who cannot communicate verbally.

### *2.2. Research Methods*

#### *2.2.1. Literature Review*

Literature review was used to collect, identify and sort out domestic and foreign documents concerning elderly diabetes and self-management. It helped clarify research progress, understand research objects comprehensively and provide reference for analytical frameworks.

#### *2.2.2. Questionnaire Survey*

(1) General Information Questionnaire. Designed referring to previous literature, it covers demographic items (age, education, gender, marital status, living situation, household income) and disease-related information (medical payment mode, disease course, diabetes knowledge mastery, complications and family history of diabetes).

(2) The Self-Efficacy for Diabetes Scale (SED). Originally developed by Lorig, this study adopted the Chinese version translated by Sun Shengnan. It contains 8 items with good reliability and validity, suitable for elderly groups. It involves diet, exercise and blood glucose management. It adopts a 10-point scoring system ranging from 1 (no

confidence at all) to 10 (complete confidence). Total scores range from 8-80; below 40 points represents low level, 40-59 points moderate level, and above 60 points high level.

(3) The Diabetes Self-Management Questionnaire (DSMQ). Developed by Hurley and adapted into the Chinese version, it includes 26 items with Likert 5-point scoring from "completely unable to do" to "completely able to do", total score range 26-130. Score below 60 means low level, 60-79 moderate level, above 80 high level.

(4) Diabetes Distress Scale (DDS). The Chinese version of the scale has a Cronbach's  $\alpha$  coefficient of 0.95 and a test-retest correlation coefficient of 0.85. It has 17 items divided into four dimensions: emotional burden, doctor-related distress, life-regularity-related distress and interpersonal distress. Each item is scored from 1 to 6. Higher scores indicate more serious psychological distress. Total score ranges from 17-102. Total score  $\geq 51$  points or average item score  $\geq 3$  suggests severe diabetes distress.

(5) Sample size calculation. According to the requirement of multiple linear regression, sample size should be 5-10 times the number of variables. There were 25 variables in total, so the theoretical sample size was 125-250 cases. Considering invalid questionnaires, 130 subjects were finally recruited.

### 2.3. Statistical Analysis

SPSS 26.0 software was applied for data processing. Descriptive statistics including percentage, mean and standard deviation described demographic characteristics and current situation. Independent-samples t-test and one-way ANOVA compared self-management differences among groups. Pearson correlation analysis explored correlations among diabetes distress, self-efficacy and self-management. Multiple linear regression was used to identify significant influencing factors for self-management.

## 3. Research Results

### 3.1. General Information of Research Objects

A total of 130 valid samples were collected. Males accounted for 53.1 % and females 46.9 %. The 76-80 age group took the largest proportion (33.8 %), and the 81-and-above group accounted for 10.8 %. Most respondents had primary school or lower education (59.2 %). 76.2 % were married. 42.3 % lived with spouses, 23.1 % lived with children, 24.6 % lived with spouses and children, and 10.0 % lived alone. Retirees made up 46.2 %. Monthly income  $\leq 2500$  RMB accounted for 49.2 %. 63.1 % were covered by resident medical insurance. Only 11.5 % had good mastery of diabetes knowledge. 40.8 % had disease course  $\leq 5$  years. 42.3 % had no complications, while over half suffered from one or more complications. 55.4 % had no family history of diabetes.

### 3.2. Status of Self-Efficacy, Diabetes Distress and Self-Management

#### 3.2.1. Status of Subjects' Self-Efficacy

The total self-efficacy score was  $(30.85 \pm 7.06)$ . The blood-glucose-management dimension obtained the highest score while the diet dimension scored the lowest. 87.6 % of participants were at low self-efficacy level, 12.4 % at moderate level, and none reached high-efficacy level. Generally speaking, self-efficacy of this community sample was poor.

#### 3.2.2. Status of Subjects' Diabetes Distress

The total diabetes distress score was  $(40.0 \pm 7.6)$ . Life-regularity-related distress obtained the highest dimension score, and interpersonal-related distress was the lowest. 90 % of subjects experienced slight or no diabetes distress, and 10 % reported severe disease distress.

#### 3.2.3. Status of Subjects' Self-Management Behaviors

The overall self-management total score was  $(53.71 \pm 7.26)$ . Blood glucose management got relatively high scores, while medication adherence obtained the lowest score. 75.3 % of patients were at low self-management level, 24.6 % at moderate level, and no participants achieved high-level self-management. The overall self-management status was unsatisfactory.

### 3.3. Influences of General Information on Subjects' Self-Management Behaviors

#### 3.3.1. Different Living Conditions

One-way ANOVA indicated that living conditions exerted statistically significant influences on diet management, medication adherence, blood glucose monitoring, foot care and total self-management score ( $P < 0.05$ ). Patients living alone had significantly lower scores in each dimension compared with those living with family members. No significant difference was found in exercise management dimension.

#### 3.3.2. Different Economic Conditions

Economic status produced significant differences in blood glucose management and foot-care dimension ( $P < 0.05$ ). Patients with higher monthly income achieved better performance in blood glucose management and foot care. No significant group differences were seen in exercise, diet, medication adherence and total self-management score.

### 3.4. Correlations among Diabetes Distress, Self-Efficacy and Self-Management

#### 3.4.1. Correlation between Self-Management and Diabetes Distress

Pearson correlation analysis showed significant negative correlations between each dimension and total score of self-management and diabetes distress. Higher diabetes distress corresponded to poorer self-management performance. Emotional burden, doctor-related distress and life-regularity-related distress were closely correlated with self-management. The correlation between interpersonal distress and self-management was not statistically significant.

#### 3.4.2. Correlation between Self-Management and Self-Efficacy

Each dimension and total score of self-efficacy presented significant positive correlations with self-management dimensions. Higher self-efficacy was accompanied by better self-management behaviors. Exercise, diet and blood-glucose-control self-efficacy all positively promoted self-management.

#### 3.4.3. Correlation between Self-Efficacy and Diabetes Distress

Self-efficacy and its sub-dimensions were significantly negatively correlated with emotional burden, doctor-related distress, life-regularity-related distress and total diabetes distress. No significant correlation existed between self-efficacy and interpersonal distress. Lower self-efficacy tended to go together with more serious diabetes distress.

### 3.5. Regression Analysis of Self-Efficacy, Diabetes Distress and Self-Management

#### 3.5.1. Influence of Various Dimensions of Self-Efficacy on Self-Management

Taking exercise dimension, diet dimension and blood-glucose-control dimension of self-efficacy as independent variables and self-management total score as dependent variable, multiple linear regression model was established. The model fitted well with  $R^2 = 0.568$ ,  $F = 25.322$ ,  $P < 0.001$ . VIF values of all independent variables were below 5 without multicollinearity. Exercise dimension ( $\beta = 0.287$ ,  $P < 0.05$ ), diet dimension ( $\beta = 0.218$ ,  $P < 0.05$ ) and blood-glucose-control dimension ( $\beta = 0.163$ ,  $P < 0.05$ ) all exerted significant positive effects on self-management.

#### 3.5.2. Influence of Various Dimensions of Diabetes Distress on Self-Management

Emotional burden, doctor-related distress, life-regularity-related distress and interpersonal distress were set as independent variables and self-management as dependent variable.  $R^2 = 0.693$ ,  $F = 35.745$ ,  $P < 0.001$ . No multicollinearity existed. Emotional burden ( $P < 0.05$ ), doctor-related distress ( $P < 0.05$ ) and life-regularity-related distress ( $P < 0.05$ ) significantly negatively predicted self-management. Interpersonal distress showed no significant predictive effect ( $P = 0.552 > 0.05$ ).

## 4. Discussion

### 4.1. Analysis on General Demographic Data of Patients with Type 2 Diabetes

Among the 130 elderly subjects, males slightly outnumbered females. The 76-80 age group had the largest proportion. Most participants received only primary school or below education, consistent with the general educational background of contemporary elderly population. Retirees constituted the largest proportion. Most participants were married. Nearly half had monthly income  $\leq 2500$  RMB, which was related to the loss of working capacity in old age. Most were covered by resident medical insurance, reflecting the improvement of China's medical security system. Disease course was mostly within 10 years. Most patients lived with spouses or children, and only a small number lived alone. Most respondents only had general understanding of diabetes knowledge, limited by access channels and overly specialized professional content. More than half had no family history of diabetes, suggesting that acquired unhealthy living habits were important causes of diabetes for this sample.

#### *4.2. Analysis on Current Self-Management Behaviors of Elderly Type 2 Diabetic Patients*

##### *4.2.1. Overall Status of Self-Management Behaviors*

The total self-management score was  $(53.71 \pm 7.26)$ . 75.3 % of patients were at low self-management level, and no subject reached high level. This result was consistent with previous domestic research. Uneven development of community health services and imperfect chronic disease management systems lead to poor self-management among community elderly diabetic patients. The score in this study was slightly lower than some hospital-based studies, possibly because all subjects in this paper were elderly community residents. In general, self-management of this community sample was unsatisfactory.

##### *4.2.2. Item-Wise Analysis of Self-Management Behaviors*

Medication adherence and foot care obtained relatively low scores, which was in line with many domestic studies. Diet management and blood-glucose-monitoring dimensions got relatively high scores. The common knowledge that diet adjustment helps blood-glucose control may contribute to this phenomenon. Medication adherence was the lowest-scoring dimension. Elderly patients may forget medication due to aging memory or misunderstanding of medication regimens. Foot care was also poor; many elderly lack awareness of diabetic foot risk and ignore daily foot inspection and protection.

#### *4.3. Analysis on Influencing Factors for Self-Management among Elderly Type 2 Diabetic Patients*

##### *4.3.1. Influence of General Information on Self-Management*

Living conditions significantly affected self-management. Patients living alone got lower scores in multiple dimensions. Diabetes is a lifelong chronic disease; long-term self-management requires external supervision and support. Without family supervision and help, patients living alone find it difficult to stick to long-term behavioral requirements. Therefore, community health workers should design personalized intervention schemes for solitary elderly diabetic patients.

Economic status significantly influenced blood glucose management and foot care. Patients with higher income performed better. Diabetes requires lifelong treatment; expenses for blood-glucose meters, test strips and drugs bring economic pressure for low-income groups. Economic burden generates negative emotions and hinders self-management. Health education and intervention should give special attention to low-income elderly diabetic residents.

##### *4.3.2. Influence of Diabetes Distress and Self-Efficacy on Self-Management*

Significant negative correlations existed between diabetes distress and self-management. Regression results showed that emotional burden, doctor-related distress and life-regularity-related distress could negatively predict self-management. When patients suffer heavy psychological distress caused by diabetes, they tend to be reluctant to adhere to diet, exercise and monitoring requirements. Reducing diabetes distress helps promote self-management behaviors. Community medical staff should pay attention to patients' psychological status and relieve their disease-related distress in daily work.

Self-efficacy significantly positively predicted self-management. Stronger confidence in diet, exercise and blood-glucose management contributed to better self-management. This indicated that improving self-efficacy is a key intervention target. Communities can carry out diabetes knowledge lectures, set up peer-support groups, and encourage family members to provide psychological support. Interventions should help elderly patients build confidence in disease management, correct cognitive misunderstandings, guide them to transform passive treatment into active self-management, and finally delay complications and improve quality of life.

## 5. Conclusions and Prospects

### 5.1. Conclusions

This study investigated 130 community-dwelling elderly patients with type 2 diabetes in Chongqing by adopting general information questionnaire, diabetes self-management scale, self-efficacy scale and diabetes distress scale. Main conclusions are as follows.

First, self-management behaviors of the surveyed elderly patients with type 2 diabetes were at a low level. Economic status, living conditions and self-efficacy (exercise, diet and blood-glucose-control dimensions) exerted positive influences on self-management. Diabetes distress produced negative effects on self-management. Self-efficacy acted as a direct significant influencing factor.

Second, self-efficacy of the sample was generally low. Poor diet control, insufficient exercise and severe diabetes distress were risk factors for low self-efficacy. Optimizing diet, regular exercise and mitigating diabetes distress are effective approaches to improve self-efficacy.

Third, subjects suffered moderate diabetes distress. Life-regularity-related burden and emotional burden constituted major sources of diabetes distress.

Interventions should focus on enhancing self-efficacy and alleviating diabetes distress for community elderly patients with type 2 diabetes, so as to improve self-management, reduce complication risks and elevate quality of life.

### 5.2. Limitations

Restricted by academic capacity, time and energy, this research has several limitations. First, this study mainly adopted questionnaire surveys. The sample was from one single community with limited sample size, and questionnaire data were subject to subjective bias. Second, although multiple influencing factors were included, some potential important variables were not incorporated into analysis. Third, cross-sectional research cannot observe dynamic changes of self-management behaviors over time, so causal relationships cannot be fully confirmed.

### 5.3. Prospects

Future research should expand sample size and conduct multi-site investigations to enhance representativeness. More potential influencing factors should be explored to deepen research breadth and depth. Longitudinal studies can be adopted to observe behavioral changes and further clarify causal relationships among variables.

## Appendix A. Questionnaire

Dear respondents, I am a student from Hainan Vocational University of Science and Technology. I sincerely invite you to fill in this anonymous questionnaire. This survey aims to understand self-management behaviors and influencing factors of elderly patients with type 2 diabetes. All collected data will be strictly confidential and only used for academic research. Your answers are of great value to this study. Thank you for your participation.

1. Gender: Male Female
2. Age: 65-70 71-75 76-80  $\geq 81$

3. Educational level: Primary school or below Junior high school Senior high school / technical secondary school Junior college Bachelor or above
4. Marital status: Married Unmarried Separated, divorced or widowed
5. Living situation: Living alone Living with spouse Living with children Living with spouse and children
6. Occupation: On-the-job Retired Others
7. Monthly household income:  $\leq 2500$  RMB 2500-4000 RMB 4001-5500 RMB  $\geq 5501$  RMB
8. Medical payment mode: Employee medical insurance New rural cooperative medical insurance Resident medical insurance Self-pay
9. Mastery of diabetes knowledge: Poor understanding General understanding Relatively good understanding Very good understanding
10. Diabetes disease course:  $\leq 5$  years 6-10 years 11-15 years  $\geq 16$  years
11. Whether you have developed diabetic complications: Yes No
12. Number of complications: 1 kind 2 kinds or more
13. Family history of diabetes: Yes No

#### **Appendix B** the Diabetes Self-Management Questionnaire (DSMQ)

(1-5 points: from completely unable to do to completely able to do)

1. I spare time for physical exercise even when I am busy.
2. I keep regular physical exercise more than three times per week, 20-40 minutes each time.
3. I still do physical exercise for diabetes management even if I do not feel like exercising.
4. I keep doing exercise even on weekends.
5. I follow diabetic dietary principles when dining at friends' homes.
6. I follow diabetic dietary principles when dining in unfamiliar places.
7. I stick to diabetic dietary principles in daily meals.
8. I can follow dietary requirements even on holidays, birthdays or social banquets.
9. I can skillfully apply food exchange lists.
10. I have meals on time every day.
11. I take anti-diabetic medicine according to medical advices.
12. I take medicine on time when I go out.
13. I take anti-diabetic drugs at the dosage instructed by medical staff.
14. I test blood glucose or urine glucose when I go out.
15. I test blood glucose or urine glucose at time points suggested by doctors.
16. I record every result of blood-glucose or urine-glucose test.
17. I test blood-glucose or urine-glucose more frequently when I feel unwell.
18. I wear suitable shoes and socks according to doctors' suggestions.
19. I wear proper shoes and socks at banquets or during trips.
20. I examine my feet and apply suitable lotion according to medical advice.
21. I trim toenails following diabetic nursing requirements.
22. I seek medical treatment in time when foot problems such as wounds, redness, swelling, heat or pain occur.
23. I consult doctors when blood-glucose control is unsatisfactory.
24. I take proper emergency measures once hypoglycemia symptoms such as cold sweat, dizziness and fatigue appear.
25. I take correct measures when blood glucose rises obviously.
26. I take precautions against hypoglycemia during physical exercise following doctors' suggestions.

#### **Appendix C** Diabetes Distress Scale (DDS)

(1-6 points: from no influence to extremely serious)

1. I feel that my doctor lacks sufficient knowledge of diabetes care.
2. Diabetes consumes plenty of my energy every day.

3. I feel unconfident in handling daily diabetes work.
4. I feel angry, frightened or depressed when thinking about living with diabetes.
5. My doctor fails to clearly explain diabetes management knowledge to me.
6. I find it difficult to test blood glucose frequently.
7. I fear that long-term complications will ruin my life no matter what I do.
8. Trivial things related to diabetes often make me frustrated.
9. Family members and friends give insufficient support for my diabetes management.
10. It feels like diabetes is controlling my life.
11. My doctor does not take my worries seriously.
12. I cannot stick to a good dietary plan.
13. Family and friends cannot understand how tough life with diabetes is.
14. Requirements brought by diabetes make me feel overwhelmed.
15. I do not have a doctor who pays regular attention to my diabetes condition.
16. I lack initiative in maintaining diabetes self-management.
17. Family and friends cannot provide the emotional support I expect.

#### Appendix D the Self-Efficacy for Diabetes Scale (SED)

(1-10 points: from no confidence at all to complete confidence)

1. How confident are you to have three meals at fixed time and fixed portion every day?
2. How confident are you to stick to your own diet quantity and categories when dining together with non-diabetic people?
3. How confident are you to select suitable snacks when you feel hungry?
4. How confident are you to do exercise for 15-30 minutes, 4-5 times per week?
5. How confident are you to avoid hypoglycemia during physical exercise?
6. How confident are you to make proper responses when your blood glucose rises or drops?
7. How confident are you to judge physical changes and seek medical treatment timely?
8. How confident are you to control diabetes so that it will not interfere with daily life?

#### References

1. "Chinese Clinical Guidelines for the Prevention and Treatment of Type 2 Diabetes in the Elderly (2022 Edition)," *Chinese Journal of Diabetes*, vol. 30, no. 1, pp. 2–51, 2022.
2. F. Wang and W. Wang, "Interpretation of \*Chinese Clinical Guidelines for the Prevention and Treatment of Type 2 Diabetes in the Elderly (2022 Edition)\*," *Journal of Hebei Medical University*, vol. 43, no. 12, pp. 1365–1370, 2022.
3. J. Du, Y. Li, H. Li, et al., "Analysis on Current Status and Influencing Factors of Self-Management Behaviors among Patients with Type 2 Diabetes," *Nursing Research*, vol. 36, no. 16, pp. 2904–2908, 2022.
4. C. Liu, H. Zhao, and R. Hu, "Correlation between Self-Management Behaviors, Health Beliefs and Family Function among Patients with Type 2 Diabetes," *Medical Journal of Chinese People's Liberation Army*, vol. 43, no. 11, pp. 989–990, 2018.
5. G. Liu, J. Huang, N. Cao, et al., "Study on Relationships among Self-Efficacy, Social Support and Self-Management KAP among Patients with Type 2 Diabetes," *Journal of Nursing Administration*, vol. 18, no. 10, pp. 689–693, 2018.
6. H. Wang, Z. Zhang, Y. Sun, et al., "Analysis Current Status and Influencing Factors of Self-Management Behaviors among Middle-aged Patients with Type 2 Diabetes in Suburbs of Beijing," *Journal of Chinese People's Liberation Army Nursing*, vol. 37, no. 7, pp. 15–19, 2020.
7. S. Hao, Q. Gao, and X. Jia, "Prevention, Improvement and Treatment of Type 2 Diabetes among the Elderly," *Yishou Baodian*, no. 14, pp. 41–43, 2022.
8. S. Li, Q. Gong, S. Wang, et al., "Anxiety Status and Correlates among Community-dwelling Elderly Patients with Type 2 Diabetes," *Chinese Mental Health Journal*, vol. 36, no. 7, pp. 576–581, 2022.
9. L. Kong, H. Zhao, Y. Liu, et al., "Status and Influencing Factors of Cognitive Frailty among Community-dwelling Elderly Patients with Type 2 Diabetes," *Journal of Nursing Science*, vol. 35, no. 7, pp. 89–92, 2020.
10. X. Geng, "Current Status and Countermeasures of Self-Health Education Management for Diabetic Patients," *Chinese Pharmacological Bulletin*, vol. 38, no. 5, p. I0008, 2022.
11. Y. Lu, M. Lai, J. Liu, et al., "Mediating Effect of Social Support between Self-Efficacy and Subjective Well-being among Elderly Patients with Type 2 Diabetes," *China Medicine and Pharmacy*, vol. 12, no. 10, pp. 17–20+29, 2022.
12. A. N. Van Smoorenburg, D. F. L. Hertroijs, T. Dekkers, et al., "Patients' perspective on self-management: type 2 diabetes in daily life," *BMC Health Services Research*, vol. 19, no. 1, p. 605, 2019.

13. M. J. Kim, U. G. Bronas, L. Quinn, et al., "Cognitive Function and Self-Management Behaviors in Older Adults with Type 2 Diabetes," *Nursing Research*, 2022.
14. M. A. Rossaneis, S. M. Andrade, R. Gvozdz, et al., "Factors associated with glycemic control in people with diabetes mellitus," *Ciência & Saúde Coletiva*, vol. 24, no. 3, pp. 997–1005, 2019.
15. L. Adam, C. O'Connor, and A. C. Garcia, "Evaluating the Impact of Diabetes Self-Management Education Methods on Knowledge, Attitudes and Behaviours of Adult Patients With Type 2 Diabetes Mellitus," *Canadian Journal of Diabetes*, vol. 42, no. 5, pp. 470–477.e2, 2018.

**Disclaimer/Publisher's Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of Publisher and/or the editor(s). Publisher and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.