

# Review for Chinese Medicine-Specific Health Management in Middle-Aged and Elderly Patients with Type 2 Diabetes Mellitus

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**Objective:** To search, evaluate and summarize the evidences of health management in middle-aged and elderly patients with type 2 diabetes with traditional Chinese medicine (TCM) characteristics, so as to provide evidence-based basis for improving patients' participation initiative and implementing personalized health management practice for community medical staff.

**Methods:** Based on evidence-based nursing methods, The domestic and foreign evidence-based resource databases including UpToDate, Elsevier, Web of Science and Cochrane were searched Library, RNAO, PubMed, Medline, CINAHL, Embase, BMJ British Medical Journal, Medical Pulse Guide Network, Chinese Medical Association, Diabetes Society, CMA Chinese Medical Association, OVID database, JBI evidence-based Health Care Center database, Chinese Traditional Medicine Database, Chinese Biomedical Literature Xian database, Wanfang database, VIP database and China National Knowledge Infrastructure. Two researchers based on the critical appraisal for summaries of evidence, CASE) appraisal of guidelines for research and evaluationII (AGREEII) independently assessed the quality of the included literature, and extracted and summarized the literature evidence that met the criteria.

**Results:** A total of 10 guidelines, 6 expert consensus, 3 evidence summaries, and 2 Meta-analysis summarized four dimensions, namely nutrition management, exercise management, TCM diet management, and TCM emotional management, with a total of 35 pieces of evidence.

**Keywords:** middle-aged and older adults, type 2 diabetes, evidence-based nursing, health management, Chinese traditional medicine, TCM, literature review

## Introduction

Type 2 diabetes mellitus (T2DM), as a group of metabolic diseases characterized by hyperglycemia due to defective insulin secretion or insulin resistance, is often associated with severe systemic tissue and organ insufficiency, which affects the quality of life of patients and even threatens their lives, causing a great deal of direct and indirect economic burden, and has become a public health problem that needs to attract special attention. It has become a public health problem that requires special attention.<sup>1</sup> According to the 10th edition of the International Diabetes Federation's Diabetes Atlas, the number of diabetes cases in China will reach 140.9 million in 2022, ranking first in the world, with more than 90% of the cases being type 2 diabetes, and by 2045, about 783 million people around the globe will be suffering from diabetes, and T2DM is mostly found in middle-aged and older people over 40 years old, and the problem is not cured.<sup>2</sup> It is noteworthy that effective health management can reduce blood glucose levels in patients, improve adverse health outcomes, and enhance quality of life.<sup>3</sup> Health management refers to the comprehensive control of health risk factors affecting individuals or populations, aiming to shift from passive disease treatment to proactive managed care.<sup>4</sup> For middle-aged and elderly patients with type 2 diabetes, the prolonged rehabilitation period makes interventions targeting daily behaviors and lifestyle habits—such as traditional Chinese medicine (TCM), dietary regulation, and emotional

well-being—particularly suitable for the long-term management of this chronic condition. Central to TCM health management is the principle of “preventing disease before it occurs”, which emphasizes early intervention to eliminate potential disorders, address incipient conditions, and prevent progression before serious complications arise. Furthermore, TCM syndrome differentiation aligns well with individual patient variability in type 2 diabetes. Compared to the toxicities, side effects, and drug-induced complications associated with conventional pharmacotherapy, TCM-based health management offers distinct resource advantages.<sup>5,6</sup> Hu, Zhang and Liu.<sup>7–9</sup> have demonstrated that TCM interventions—including Tai Chi, dietary management, and emotional regulation—effectively lower blood glucose levels and improve mood, sleep quality, and energy levels in patients. Therefore, this study employed evidence-based nursing methodologies to systematically search, extract, and synthesize both domestic and international evidence regarding home-based health management and TCM regimens for middle-aged and elderly patients with type 2 diabetes, with the aim of providing a scientific, evidence-based foundation for clinical and community healthcare professionals in delivering effective, personalized health management strategies. Therefore, this study uses evidence-based nursing methodology to systematically search, extract summarize and summarize evidences of health management of middle-aged and elderly type 2 diabetes patients at home and abroad, to provide an evidence-based basis for the scientific health management of such patients by clinical and community medical personnel.

## Information and Methods

### Study Design

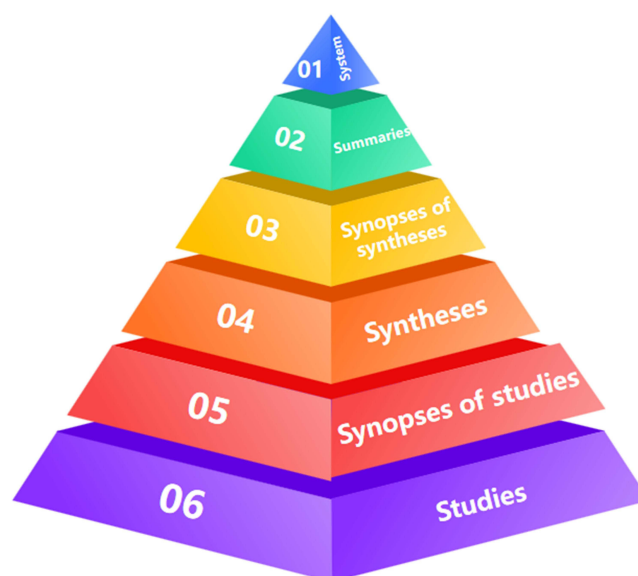
**Establishment of evidence-based questions** The evidence summary has been registered with the Center for Evidence-Based Nursing at Fudan University (ES20246077). Evidence-based questions were identified according to the PIPOST tool from the Centre for Evidence-Based Health Care, Joanna Briggs Institute (JBI), Australia.<sup>10</sup> The initial problem was defined according to the PIPOST model, target population (population, P): middle-aged and elderly people with type 2 diabetes; intervention (intervention, I): health management and interventions; implementer (professional, P): caregivers; outcome (outcome, O): fasting glucose level, mental status level quality of life; place of application (setting, S): ward, community, or patient’s home; type of resource (typeofev-idence, T): recommended practice, guidelines, expert consensus, evidence summaries, systematic evaluations, clinical decision analyses, clinical evidence manuals, health technology assessments, and original research.

### Search Strategy

**Literature search strategy** In accordance with the top-down principle of the “6S” model of evidence-based resource search<sup>11</sup> Figure 1, a total of databases were searched: BMJ British Medical Journal, Web of science, UpToDate, Elsevier, MediPulse.com, CMA, Diabetes Section, Chinese Medical Association, OVID database, JBI Evidence-Based Health Care Center database, Cochrane Library, RAO, PubMed, Medline, CINAHL, Em-base, China Traditional Chinese Medicine Database, China Biomedical Literature Database, Wanfang Database, Wipo Database, China Knowledge, and other relevant literature. The search terms were: “type 2 diabetes” “health management/management/nursing management/nursing intervention” “exercise management” “TCM emotional management” “Food and Nutrition” “TCM health preservation” “Recommended Practice” “Guidelines” “Expert Consensus” “Evidence Summaries” “Systematic Evaluations” “Clinical Decision Analysis” “Clinical Evidence Handbook” “Health Technology Assessment”.

### Inclusion and Exclusion Criteria

**Literature Inclusion and Exclusion Criteria** Inclusion Criteria: ① The study subjects were adults with type 2 diabetes; ② Relevant studies involving health management, exercise management, dietary management, Chinese medicine and emotional management; ③ The types of studies were Recommended Practices, Guidelines (in the last 10 years), Expert Consensus, Systematic Evaluations, Clinical Decision Analysis, Clinical Evidence Handbook, Health Technology Assessment, Primary Research; ④ The language of the studies was: Chinese or English. Exclusion criteria: ① duplicate publication, guideline interpretation literature or proposal; ② only containing abstracts, study design protocols, or the original text could not be obtained; ③ studies that failed the literature quality evaluation.



**Figure 1** The 6s pyramid model of evidence-based medicine.

## Quality Evaluation of the Literature

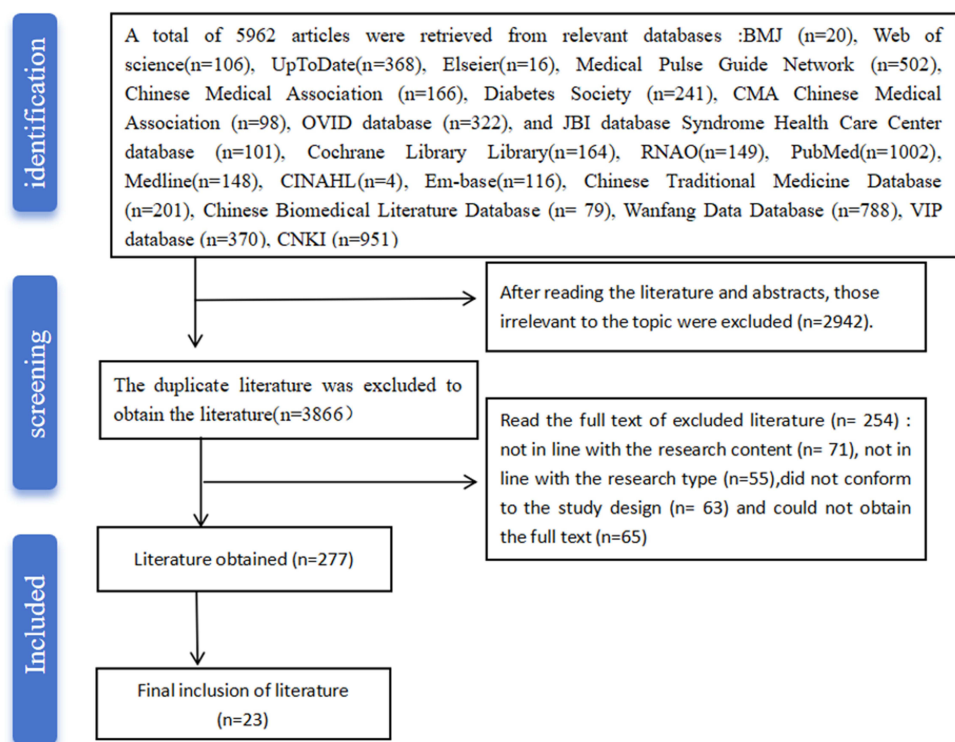
Literature quality evaluation The critical appraisal for summaries of evidence (CASE)<sup>12</sup> was used to evaluate the quality of the included clinical decisions. The quality of the included guidelines was evaluated using the Appraisal of Guidelines for Research and Evaluation II (AGREE II)<sup>13</sup>, which has 6 domains and 23 entries. Each entry was scored on a scale of 1 to 7 (1 being “strongly disagree” and 7 being “strongly agree”), The maximum score within a single domain is calculated by multiplying the number of items by the number of evaluators; and the minimum score is calculated by multiplying the number of entries by the number of evaluators, with each domain score is equal to the sum of the scores of each entry in the domain and normalized to the highest possible percentage of scores for that domain, calculated as (actual score - minimum possible score)/(maximum possible score - minimum possible score) × 100%. In this case, the number of domains with a standardized percentage ≥60% was 6 then the recommended grade was A, 3–5 then the recommended grade was B, and the rest was C. The quality of the included systematic evaluations, expert consensus, and original studies was evaluated using the Australian JBI Centre for Evidence-Based Health Care Literature Quality Evaluation Criteria<sup>14</sup>. Their original literature was traced and the recommended practices were judged by selecting the appropriate evaluation indicators according to the type of literature.

Evaluation process of the quality of the literature. The quality evaluation was independently completed by two master’s degree students who were systematically trained in evidence-based nursing, and the literature with conflicting evaluation opinions was discussed with the evidence-based nursing experts and agreed upon; when there was a conflict of evidence in different literatures, the first priority was to choose the high-quality evidence, and the most recently published authoritative journal literature. The evidence were classified as 1 to 5 according to the type of study: level 1 for randomized controlled trials/experimental studies; level 2 for experimental-like studies; level 3 for observational-analytical studies; level 4 for observational-descriptive studies; and level 5 for expert opinion/basic studies.<sup>15</sup>

## Results

### Results of Literature Screening

Literature Screening A total of 5962 relevant literatures were searched and screened based on the inclusion and exclusion criteria, and further screened by checking the weights and reading the abstracts of the titles, and finally 23 literatures were included, including 10 guidelines<sup>16–25</sup>, 6 expert consensus,<sup>26–31</sup> 2 Meta-analyses,<sup>32,33</sup> 2 systematic evaluations,<sup>34,35</sup> and 3 evidence summaries.<sup>36–38</sup> The literature search and screening process is illustrated in Figure 2, while the basic characteristics of the included literature are shown in Table 1.



**Figure 2** Literature search process.

## Results of Literature Quality Evaluation

A total of 10 guidelines were included, and the standardization percentages and recommendation levels for each domain are shown in Table 2.

Results of quality evaluation of expert consensus A total of 6 expert consensus articles<sup>26–31</sup> were included, of which the entry “Transparency of search” in the study by Zou Dajin et al<sup>31</sup> was no, and the literature search strategy was not clearly described. “Clarity of conclusions and recommendations” was no, and areas lacking clear evidence were not clearly graded as strong or weak. The rest of the entries were evaluated as “yes” to the high quality of the literature and were approved for inclusion. Quality of evidence summaries Three evidence summaries were included,<sup>36–38</sup> of which the evidence from the study “The effect of a very low-carbohydrate diet on renal function” by Bento Zeng et al<sup>36</sup> lacked a clear indication of risk. The remaining entries met the criteria of the JBI Center for Evidence-Based Health Care and were accepted for inclusion. Quality assessment results of systematic evaluations A total of two Meta-analyses<sup>32,33</sup> and two systematic evaluations<sup>34,35</sup> were included. Among the included Meta-analyses, the study by Dong Jiayi et al<sup>29</sup> did not explicitly state “Whether or not a quality assessment was conducted when citing different Meta-analyses”, and the rest of the entries were “Whether or not a quality assessment was performed”, and the rest of the entries were “The effect of very low carbohydrate diet on renal function” and the rest of the entries were “yes”. In the systematic evaluation for inclusion, all the entries were evaluated as “yes”, the literature was of high quality, and inclusion was granted.

## Evidence Summary

After literature analysis, evidence extraction and summarization, 35 pieces of evidences were finally included in this study, involving nutrition management, exercise management, TCM dietary management, and TCM emotional management, as shown in Table 3. The 35 pieces of evidence were based on the Joanna Briggs Institute (JBI) evidence hierarchy using a grading scale for the effectiveness of interventions, level 1 for randomized controlled trials/experimental studies; level 2 for experimental-like studies; level 3 for observational-analytical studies; level 4 for observational-descriptive studies; and level 5 for expert opinion/basic studies.<sup>15</sup>

**Table 1** Include Literature (n=23)

Included Literature	Source of Literature	Type of Literature	Subject of Literature	Year of Publication (Year)
National Center for Geriatrics et al <sup>16</sup>	China Knowledge Network	Guidelines	Exercise therapy for type 2 diabetes mellitus in China	2024
Tong Xiaolin et al <sup>17</sup>	Wanfang	Guidelines	Integrated management of type 2 diabetes mellitus with Chinese and Western medicine	2024
Thomas Skurk et al <sup>18</sup>	Medical Pulse	Guidelines	Dietary recommendations for patients with type 2 diabetes	2024
Chinese Society of Gerontology and Geriatrics <sup>19</sup>	China Knowledge Network	Guidelines	Exercise Diet Emotional Management of Type 2 Diabetes Mellitus in the Elderly	2023
National Health Commission <sup>20</sup>	China Knowledge Network	Guidelines	Diabetes Dietary Guidelines for Adults	2023
Jun Sung Moon et al <sup>21</sup>	Medical Pulse	Guidelines	Nutritional Exercise Guidelines for Diabetes Mellitus in Korea	2023
Edoardo Mannucci et al <sup>22</sup>	Medical Pulse	Guidelines	Italian guidelines for the management of type 2 diabetes	2023
NICE et al <sup>23</sup>	Guidelines for the management of type 2 diabetes in Italy	Guidelines	Guidelines for the management of type 2 diabetes in adults	2022
Chinese Medical Association Diabetes Section <sup>24</sup>	Pubmed	Guidelines	Guidelines on Dietary Nutrition for Patients with Diabetes Mellitus	2022
Eiichi Araki et al <sup>25</sup>	Medical Pulse	Guidelines	Guidelines for the management of diabetes mellitus in Japan	2019
Ibrahim Elsherif et al <sup>26</sup>	Em-base	Expert consensus	Expert consensus on diabetes management in the Arab region	2024
Yang Xiao et al <sup>27</sup>	Em-base	Expert Consensus	Exercise intervention for lipid management in Chinese diabetic patients	2024
Expert Group on Chinese Expert Consensus on Exercise Prescription <sup>28</sup>	China Knowledge	Expert Consensus	Chinese Expert Consensus on Exercise Prescription	2024
W. David Strain et al <sup>29</sup>	UpToDate	Expert Consensus	Management of type 2 diabetes in older adults	2021
JILLANaley et al <sup>30</sup>	Medical Pulse	Expert Consensus	Knowledge of Exercise for People with Type 2 Diabetes in the United States	2021
ZOU Dajin et al <sup>31</sup>	Wanfang	Expert consensus	Alleviating diabetes in middle-aged and elderly patients over 40 years of age	2021
Junya Hironaka et al <sup>32</sup>	OVID	Meta-analysis	Low-carbohydrate diet in patients with type 2 diabetes	2024
Dong Jiayi et al <sup>36</sup>	Chinese Medical Association	Meta-analysis	Diet and primary prevention of type 2 diabetes mellitus	2023

(Continued)

**Table 1** (Continued).

Included Literature	Source of Literature	Type of Literature	Subject of Literature	Year of Publication (Year)
Zeng Bentuo et al <sup>37</sup>	Wanfang	Summary of evidence	Low-carbohydrate diets for patients with type 2 diabetes mellitus	2022
Cao, Yannan et al <sup>38</sup>	Chinese Medical Association	Evidence Summary	Dietary management of patients with type 2 diabetes mellitus	2021
Zhu, Miao Miao et al <sup>34</sup>	Chinese Medical Association	Evidence Summary	Exercise program for patients with type 2 diabetes mellitus	2019
Tonga E et al <sup>35</sup>	Em-base	Systematic of evaluation	Physical activity in type 2 diabetes	2024
Shanshan Ma et al <sup>39</sup>	Wanfang	Systematic of evaluation	Effectiveness of low-carbohydrate diet on glycemic management in patients with type 2 diabetes mellitus	2016

## Discussion

### Current Limitations in T2DM Nutritional Management

Scientific nutritional management can reduce the insulin burden of diabetic patients, enhance the body's antioxidant capacity, control total calorie intake, and maintain nutritional balance. This contributes to the health management of patients with type 2 diabetes mellitus (T2DM).<sup>39</sup> Based on evidence 1–15, two dietary plans were summarized: a Mediterranean diet integrated with traditional Chinese medicine (TCM) concepts and a high-protein (See Table 4), muscle-protecting diet suitable for elderly patients at risk of sarcopenia. (See Table 5). However, more than half of the evidence lacks support from high-quality randomized controlled trials (RCTs), especially evidence 4. Although abstinence from alcohol and sugar meets the clinical consensus, it ignores the positive impact of occasional small consumption on patients' quality of life, reflecting the lack of humanized recommendations. The Mediterranean diet is rich in plant foods and healthy fats, is recommended by many international guidelines, and its composition of anti-inflammatory and antioxidant components improves metabolic indicators.<sup>40</sup> However, its ingredients and cooking methods differ significantly from traditional Chinese cuisine, limiting its practicality. Evidence 3 and 12 focus on elderly patients but lack coverage of nutritional problems related to geriatric syndromes, such as frailty, chewing and swallowing disorders, and polypharmacy. Compared to the recommendation of 1.2–1.5 g/kg/d of protein supplementation for frail elderly patients in the 2024 Chinese Guidelines for Exercise Treatment of Type 2 Diabetes, there is a significant gap in nutritional management for sarcopenia and diabetes comorbidity in the elderly. Additionally, the concept of “homologous medicine and food” in traditional Chinese medicine has not been integrated with modern nutritional macronutrients, and standardized recipes are lacking. In the future, we should pay attention to how different dietary patterns affect long-term prognosis, muscle mass, and quality of life in elderly patients. The “Oriental healthy diet model”, based on Chinese food culture, should be developed. The principles of the Mediterranean diet should be translated into specific programs applicable to local ingredients and cooking habits. Practical training for primary medical care providers and patients should be strengthened, and digital tools should be used to intervene in the chewing control and meal order of elderly patients. TCM syndrome differentiation should be combined with modern nutritional assessment to create a standardized, generalized dialectical feeding path.

**Table 2** Results of the Quality Evaluation of the Guidelines (n=10)

Percentage of Standardized Scores for Each Domain (%)										
Included Literature	Source	Scope and Purpose	Participants	Rigor	Clarity	Applicability	Editorial Independence	≥60% Number of Domains	≥30% Number of Domains (pcs)	Recommendation Level (Level)
National Center for Geriatrics and others <sup>16</sup>	China Knowledge Network	100.00	88.89	91.67	100.0	66.67	83.33	6	6	B
Tong Xiaolin et al <sup>17</sup>	Wanfang	88.57	62.28	74.28	85.71	57.14	47.14	4	6	B
Thomas Skurk et al <sup>18</sup>	Medical Pulse	66.67	50.00	44.44	66.67	33.33	28.57	3	5	B
Chinese Society of Gerontology and Geriatrics <sup>19</sup>	China Knowledge Network	100.00	72.22	66.67	100.00	50.00	66.67	5	6	B
National Health Council <sup>20</sup>	China Knowledge Network	85.71	64.29	71.43	92.86	78.57	42.86	5	6	B
Jun Sung Moon et al <sup>21</sup>	Medical Pulse	100.00	80.59	71.43	95.24	53.57	71.43	5	6	B
Edoardo Mannucci et al <sup>22</sup>	Medical Pulse	83.33	83.33	66.67	83.33	50.00	95.00	5	6	B
NICE et al <sup>23</sup>	Medical Pulse	85.71	57.14	85.71	85.71	57.14	71.43	4	6	B
Chinese Medical Association Diabetes Section <sup>24</sup>	Pubmed	85.71	71.43	85.71	100.00	71.33	57.14	5	6	B
Eiichi Araki et al <sup>25</sup>	Chinese Journal of Diabetes	88.89	71.43	80.56	100.00	72.22	64.28	6	6	A

**Table 3** Summary of Best Evidence for Health Management of Middle-Aged and Older Adults with Type 2 Diabetes Mellitus (n=35)

Item	Content of Evidence	Level of Evidence (Grade)
Nutrition management	1. It is recommended that overweight/obese middle-aged and older adults with diabetes mellitus should be on a short-term (<1 year) low-calorie diet ie, energy intake should be controlled at 800~1500 kcal/d, and body weight should be reduced at a rate of 1~2 kg per month. <sup>17,18,20,24</sup>	I
	2. For normal-weight patients, energy intake is calculated using the generalized coefficient method, ie, 105~126 KJ (25~30 kcal)-kg <sup>(-1)</sup> (standard body mass)-d <sup>-1</sup> , taking into account disease status, age, body composition, adherence, and metabolic status. <sup>17,18,23,24,31,37</sup>	I
	3. The recommended protein intake for middle-aged patients aged 40~60 years is 10~25% of dietary energy <sup>18,31</sup> . 15~25% for elderly patients over 60 years of age with intact renal function and stable weight. At any stage of impaired renal function, protein is guaranteed to be at least 0.8g/kg body weight, protein intake does not need to be restricted. <sup>17,18,21,29,31</sup>	I
	4. Diabetics should abstain from alcohol and sugar. <sup>18,32,37</sup>	5
	5. Daily carbohydrate energy ratio should be 45%~60%, with whole grain carbohydrates replacing some refined grains. Carbohydrates should be consumed as fiber-rich whole grains, legumes, vegetables, fresh fruits and dairy products <sup>18,21~24,32,333</sup>	5
	6. A diet high in dietary fiber (25~36 g/d or 12~14 g/1000 kcal) is recommended for patients with diabetes mellitus, while soluble dietary fiber intake should be ensured (10~20 g/d), and cholesterol intake should be reduced in diabetic patients with dyslipidemia. <sup>18,21~24</sup>	5
	7. It is recommended that 20% of total energy should be supplied from total dietary fat~30% per day. Limit the intake of saturated fatty acids and trans fatty acids, with saturated fatty acid intake not exceeding 12% of total energy and trans fatty acids not exceeding 2%. <sup>17,20,24,27</sup>	5
	8. The amount of cooking oil used should be limited to 25 g per day, and the amount of salt should not exceed 5 g per day. <sup>16,17,31</sup>	5
	9. It is recommended to consume low glycemic index (GI) foods, such as wheat, buckwheat, black rice, oats, barley, corn, low-grain bran corn kernel porridge, oatmeal porridge, soybeans, black beans, green peas, kidney beans, apples, pears, peaches, plums, bananas, strawberries, tofu, powdered milk, yogurt, yogurt, nuts, peanuts, cashews, etc, but should not be overdone. <sup>16,27</sup>	5
	10. Normal-weight middle-aged and elderly patients can be put on a short-term energy-restricted diet (CRD), ie, reduce energy intake by a certain percentage (30%~50%) or reduce energy intake by about 500 kcal per day on the basis of the target energy intake, and it is recommended that the energy-restricted diet be combined with the Mediterranean diet. <sup>27</sup>	I
	11. Mediterranean diet (60%-70%plant foods supplemented by a moderate amount of animal foods 10~20% and healthy fats 10~20%), vegan diet (70~80% plant foods, 10~20% plant proteins, and 10~20% healthy fats) <sup>18,21,22,40.</sup>	I
	12. Dietary management for elderly patients should focus on maintaining independence and avoiding malnutrition and hypoglycemia. <sup>18</sup>	3
	13. Appetite management in middle-aged and elderly patients, ie, slowing down the speed of meals and increasing the number of chews by chewing 20~40 times for each mouthful of food; pausing between meals to reduce the size of each mouthful, and using chopsticks in a non-dominant hand or using a fork. <sup>31,37</sup>	5
	14. It is recommended to drink water before meals and eat a small amount of nuts, such as 10 almonds and 20 peanuts, before meals to reduce appetite. <sup>31</sup>	5
	15. Arrange the order of meals reasonably: ① Drink soup before meals, easy to produce satiety. ② Vegetables, low-sugar fruits, large volume, low energy, slow down the absorption rate, inducing satiety. ③ Meat dishes and meat have high energy, and are placed in the third place to further increase satiety. ④ At the end of the meal, a small amount of staple food and carbohydrates are eaten to slow absorption and reduce postprandial blood glucose fluctuations. <sup>31</sup>	5

Exercise management	16. Necessary health assessment and exercise capacity assessment prior to exercise can help to ensure the safety and scientific validity of exercise therapy, and all exercise is recommended to be performed after meals. <sup>17,23,30</sup>	1
	17. High levels of low-intensity physical activity (e.g. brisk walking can be one hour a day) after meals. <sup>18,31</sup>	1
	18. Exercise at least 150 minutes per week (eg, 30 minutes 5 days per week) Moderate-intensity (50% to 70% maximal heart rate, a little effort when exercising, heartbeat and breathing faster but not rapid) aerobic exercise, eg, walking, tai chi, bicycling, ping pong, badminton, and golf. Even if short bursts of physical activity (eg, 10 minutes) are performed on 1 occasion, a cumulative total of 30 minutes/day is beneficial. <sup>17,20,22,31,34</sup>	1
	19. For patients who are often sedentary, high-intensity exercise for 10–20 minutes 3 times is recommended, eg, fast-paced dance, aerobics, swimming, cycling uphill, soccer, basketball, etc. <sup>17,20,22,26–29,31,38</sup>	1
	20. Middle-aged patients are advised to perform one high-intensity interval circuit exercise session in the afternoon after a meal, ie, training at an intensity of 65–90% of maximal oxygen uptake or 75–95% of maximal heart rate for 10 seconds to 4 minutes, followed by 12 seconds to 5 minutes of active or passive recovery. <sup>30</sup>	1
	21. If there are no contraindications, it is recommended that elderly patients preferably perform resistance exercise 2 to 3 times per week (≥48h between exercises) to build muscle strength and endurance. The exercise area should include the upper limbs, lower limbs, trunk and other major muscle groups, and the training intensity should be moderate. <sup>17,20,23,30</sup>	1
	22. After the patients master the basic movements of Taiji, Qigong, and Baduanjin, choose a suitable place for training according to the patients' time. Wear comfortable shoes and clothes, do a 5-minute warm-up activity in advance, and practice 3 to 5 days a week, 1 to 3 times a day for a total of 60 minutes <sup>17,24,30</sup>	5
	23. Exercise programs should be compatible with the patient's age, condition, preferences, and physical tolerance, and should be evaluated regularly to adjust the exercise program as appropriate. The use of exercise wearable devices (eg, pedometers) or self-monitoring of heart rate by pressing the radial artery pulse at the wrist can help to improve exercise compliance. <sup>17,28</sup>	5
	24. Blood glucose monitoring should be strengthened before and after exercise, and patients should be advised to temporarily adjust their dietary regimen to avoid hypoglycemia during heavy or intense exercise. During exercise, patients should pay attention to timely hydration <sup>21,24,32,40</sup>	5
	25. Diabetic patients should choose more foods that generate fluids and clear heat, nourish yin and benefit qi, such as: winter melon, carp, radish, etc. <sup>17</sup>	5
	26. For the evidence of yin deficiency and heat, the dietary principle should be to nourish yin and clear heat. Cooking methods to choose can mix not fried, can fry not fried, avoid help fire heat, can choose mulberry leaves, cassia seeds, lotus seeds, lily, bamboo, honeysuckle, chrysanthemum, dendrobium, drink chrysanthemum tea, silver ear lotus seed soup, etc.; medicinal soup congee can be selected smallpox pollen congee, pig pancreas cornhusk soup, spinach and silver ear soup. <sup>20</sup>	5
	27. qi and yin deficiency, dietary principles of replenishment of qi, nourishing qi, spleen, stomach, lungs and kidneys should be supplemented, nourishing yin and clearing heat. Choose astragalus, mulberry, wolfberry, Pueraria lobata, Chinese yam, poria, hen's gold, malt, coix seed. Medicinal soup porridge can choose yellow essence porridge, barley porridge, pumpkin can be added to the porridge or steamed with yam, one or two meals a day. <sup>20</sup>	5
	28. Yin and Yang deficiency, dietary principles should nourish Yin and help Yang. Increase the intake of foods that warm kidney yang and nourish kidney and yin, such as eel, dog meat, pigeon meat, mutton, beef, and other warming and nourishing foods such as cornelian cherry, cistanchiachia, yam, poria, cinnamon, perilla seeds, dried ginger, black pepper, and peppercorns. Medicinal soup congee can choose cinnamon yellow porridge, Gorgon fruit walnut porridge, rabbit chicken stewed wolfberry soup. Tea drink with berries, Yizhi kernel, golden cherry; increase the intake of pork kidney, walnuts, etc.; medicines to be taken with warm water, prohibit cold food. Avoid eating cold food, pickled food. <sup>20</sup>	5
29. Mental health status assessment, Screening of psychological status by patient health questionnaire, diabetes quality of survival scale, whether psychological intervention is needed. <sup>19</sup>	5	

(Continued)

Table 3 (Continued).

Item	Content of Evidence	Level of Evidence (Grade)
<b>TCM Emotional management</b>	30. Five-tone therapy, music with the "moonlit night of the autumn lake", "birds casting forests", "Idle Habitat Yin" and other Gong-tone music, let the patient listen to the melodious Gong-tone music after meals, five times a week, each lasting 30 minutes, the volume is controlled at 30 to 40 decibels, specific to the patient to feel comfortable, pleasing to the ear to the degree of the patient, and at the same time, should be avoided in the process of listening to the music of a variety of interferences, the patient is instructed to close their eyes, adjust their breathing, and immerse themselves wholeheartedly in the The five elements of music in the mood. <sup>17</sup>	3
	31. Reasoning and enlightenment, nursing staff according to the patient's cultural level, knowledge acceptance ability and disease cognition, etc, to explain to the patient in detail the cause of the disease and the prognosis, so that the patient correctly understand and face the disease, and at the same time build up confidence in overcoming the disease. <sup>19</sup>	5
	32. To overcome emotions with emotions, according to the theory of the five elements of Chinese medicine, to regulate the patient's psychological state, ie, joy is better than sorrow, anger is better than thought, thought is better than fear, sorrow is better than anger, fear is better than joy. <sup>19</sup>	5
	33. Empathize with patients, understand and cultivate their interests, encourage them to participate in cultural and sports activities, such as dancing, playing chess, tai chi, practicing qigong, planting flowers, painting, listening to music, etc, so as to divert patients' attention and alleviate their bad moods, thus prompting them to accept the treatment in a positive and optimistic waybelow. <sup>19</sup>	5
	34. Follow the feelings from the desire to meet the reasonable needs of patients, for some unrealistic requirements, patiently explain, strive for patients' understanding and support, while often caring, considerate patients. <sup>19</sup>	5
	35. Cognitive-behavioral and psychological interventions, adjusting the patient's living environment and psychological state, helping the patient to understand and recognize the management of body mass, obesity and its hazards, so as to make behavioral changes. These include self-monitoring, eating control, coping with temptation, cognitive restructuring and relaxation techniques. Listen carefully to patients and build trust, and do not ignore any small progress to give timely and appropriate rewards and praise. <sup>31</sup>	3

**Table 4** A Mediterranean Diet Plan

<b>Breakfast</b>	<b>50g of whole wheat steamed buns, one small bowl of yam porridge, cold cucumber and black fungus salad.</b>
Lunch	75g of mixed grain rice (black rice and buckwheat), 100g of steamed sea bass, winter melon soup and stir-fried spinach.
Snack	100g of yogurt or one apple.
Dinner	50g of oatmeal porridge, 80g of steamed chicken breast with mushrooms and cold kelp salad.
Cooking features	Alternate use of olive oil and camellia oil, with daily cooking oil $\leq$ 25g; make good use of cooking methods such as steaming, boiling and blanching.

**Note:** GI  $\leq$  55 for low GI foods.

**Table 5** A High-Protein Muscle-Protecting Diet Plan

<b>Breakfast</b>	<b>Two egg custard, one piece of whole wheat bread and 200mL milk.</b>
Lunch	Soft rice 50g, tofu steaming Patty (tofu 50g and lean pork 50g) and garlic broccoli.
Snack	Nuts 15g or special nutritional supplements.
Dinner	Taro rice 50g, tomato braised fish fillet 100g and soup mustard.
Cooking features	Focus on the soft rotten degree of food ingredients, a small amount of multiple meals, to ensure high-quality protein intake.

## Future Recommendations for Optimizing T2DM Exercise Programs

Exercise can significantly enhance pancreatic function and improve glucose regulation by increasing insulin sensitivity and metabolism.<sup>35</sup> Based on evidence 16–24, we developed an exercise program integrating modern exercise science and TCM concepts (see Table 6). All exercise recommendations are based on comprehensive health and exercise capacity assessments, enabling precise classification of exercise intensity. These recommendations include moderate-intensity aerobic exercise, high-intensity interval training, and resistance training. They are tailored to meet the diverse needs of individuals across different age groups and physical conditions. However, compared with advanced clinical guidelines, such as the 2024 Edition of the Exercise Treatment Guidelines for Type 2 Diabetes in China,<sup>12</sup> Evidence 21 lacks specific recommendations for adjusting exercise regimens for older adults with geriatric syndromes, such as frailty and balance impairment. Additionally, the 150-minute weekly exercise prescription outlined in Evidence 18 has limited applicability to middle-aged and elderly populations in rural China due to barriers to adherence. Future iterations should establish core objectives focused on fall prevention and functional preservation for frail elderly individuals and incorporate low-threshold, accessible exercise programs. These programs could include chair-based exercises and wall-supported

**Table 6** Exercise Programs for the Two Different Groups of People

<b>Intended Population</b>	<b>Patients with Advanced Age, Frailty or Complications</b>	<b>Middle-Aged Patients with Good Fitness</b>
Monday/ Wednesday/ Friday	Baduanjin for 15 minutes and slow walking for 10 minutes	Moderate-intensity aerobic exercise (40 minutes of vigorous walking, evidence 18) and high-intensity interval cycling (4 sets of 30-second bicycle sprinting)
Tuesday/ Thursday	Tai Chi in a seated position for 20 minutes (focusing on lower limb stability training)	Resistance training (squat, push, etc, 60% 1-RM) and Tai Chi Yunshou for 10 minutes
Sunday	10 minutes of respiratory guidance; 15 minutes of lower extremity resistance training (elastic band)	Sustained low-intensity activities (gardening, mountain climbing, etc).

**Table 7** TCM Dialectical Diet

TCM Syndrome Type	Food and Medicine Substance
Yin deficiency heat excess syndrome	Mulberry leaves, Cassia seeds, lotus seeds, lily, jade bamboo, honeysuckle, chrysanthemum, Officinale.
Qi and Yin deficiency syndrome:	Astragalus, mulberry, Wolfberry, Gegen, yam, Poria, chicken gold, malt, Coix seed.
Yin and Yang deficiency syndrome	Dogwood, Cistanche, yam, Poria, cinnamon, Perilla seeds, dried ginger, black pepper, Sichuan pepper.

activities such as seated quadriceps leg raises, seated stepping for cardiorespiratory conditioning, and seated rowing with elastic bands to strengthen the back muscles. To optimize the benefits and minimize the risks of traditional Chinese exercises, we adapted Baduanjin into a seated format, referred to as “Armchair Baduanjin”. We modified all eight movements to be performed either in a seated position or with hand support from a chair. This preserves key elements such as breath coordination, rhythmic movement, and flexibility while eliminating high-risk components involving large shifts in center of gravity or single-leg standing. Thus, stability and safety are ensured.

## A Data-Driven and Accessible Future for TCM Diabetes Care

Evidence 25 to 35 systematically establishes a traditional Chinese medicine (TCM) health management framework for middle-aged and elderly patients with type 2 diabetes mellitus (T2DM). This framework covers unique interventions, such as TCM dialectically differentiated feeding, TCM five-tone therapy, and emotional counterbalance. Together, these studies reflect the holistic principles of “the origin of medicine and food being the same” and “the unity of body and spirit” in traditional Chinese medicine. This concept not only serves as a control index but also represents a healthy state that allows individuals to achieve balance in their bodies and minds. There are three common TCM subtypes of diabetes mellitus, and appropriate TCM diets are selected for dialectical treatment<sup>41</sup> (see Table 7). This approach aligns with traditional Chinese food culture and can facilitate treatment and recuperation through daily diet. Unfortunately, inconsistencies in syndrome differentiation among doctors, a lack of objective diagnosis, and failure to establish exact correlations with HbA1c, islet function, inflammatory indicators, and other modern medical parameters lead to the separation of traditional Chinese and Western medical management. The high cost of some medicinal ingredients limits their popularity. Five-tone therapy requires 30 to 40 decibels of volume for emotional therapy, and the quality of delivery is not guaranteed in community and family settings. To address these challenges, a clinical decision support system that integrates artificial intelligence and multimodal data could be developed in the future. This system would incorporate patients’ TCM data, including tongue images, pulse waveforms, and inquiry responses, alongside modern medical indicators, such as HbA1c, C-peptide levels, inflammatory markers, and gut microbiota reports. The AI model uses a core algorithm to compute the probability that a patient belongs to a specific TCM syndrome pattern. A physician then validates the output to formulate a personalized, scientifically grounded management plan. Furthermore, five-tone therapy could be scaled up from individual, home-based practice to community-level health interventions. For example, a silent concert hall could be established in a community health center where trained instructors would lead 30–35 participants in group sessions of the evidence-based “music-breathing-micro-movement” integrated intervention, thereby ensuring high adherence and implementation fidelity.

## Limitation

This study included a total of 35 pieces of evidence, which may be insufficient and incomplete for patients with different cultural backgrounds and medical configurations.

## Conclusion

This preliminary study summarizes nutrition, traditional Chinese medicine (TCM) diet, exercise, and emotional management programs for middle-aged and elderly patients with type 2 diabetes. A combination of a holistic approach and individualized intervention may improve glycemic control and quality of life; however, this study has certain limitations.

The summarized recommendations still need to be verified in terms of their specific implementation conditions, cultural adaptability, and long-term effects. Compared with modern diabetes prevention and treatment guidelines, this evidence system has obvious gaps in quantitative guidance, standardized pathways, and integrated medical models. TCM-specific interventions have not yet been integrated into mainstream treatment plans and remain in an auxiliary position in clinical practice. This study provides a preliminary framework for the integrated management of diabetes using traditional Chinese and Western medicine, but much work remains to achieve the “Healthy China 2030” goal. In the future, rigorous, pragmatic research must be carried out, TCM health management programs must be standardized and popularized, and a path of deep integration with modern medicine must be established.

## Data Sharing Statement

All relevant data is provided within the manuscript.

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## Author Contributions

(Yao Rui) was responsible for the Conceptualization, Investigation, Software, Writing the original draft and Reviewing with Editing. (Lin Cuixia) participated in the Funding acquisition, Project administration, Supervision, Resources. (Lin Shuang) was involved in the Data curation and Visualization. (Yang Yanhui, Zhu Jie, Jiang Mingqian, Yang Ran) participated in the Formal analysis, Methodology and Validation. All authors took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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## Disclosure

The authors declare that they have no potential conflicts of interest with respect to the research, authorship, or publication of this article.

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