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REVIEW

Evidence Summary for Self-Management Education in Patients with Non-Alcoholic Fatty Liver Disease

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Purpose: To systematically summarize domestic and international evidence on self-management education for patients with non-alcoholic fatty liver disease (NAFLD), and to provide an evidence base for nurses to deliver health education and guide patient self-management.

Patients and Methods: The evidence summary adhered to the standards issued by the Fudan University Center for Evidence-based Nursing.Guided by the "6s" evidence pyramid, a top-down search was conducted of evidence related to self-management education in patients with NAFLD. Sources included clinical decision-support tools, guidelines, best practice documents, systematic reviews, evidence summaries, expert consensus statements and randomized controlled trials. The following databases and resources were systematically searched: BMJ Best Practice, Up To Date, PubMed, Web of Science, the Cochrane Library, CINAHL, CNKI, the Wanfang Database and relevant guideline websites. The search period covered the time from the beginning of the database up to August 2025.

Results: 19 articles met the inclusion criteria, comprising 6 guidelines, 4 systematic reviews, 5 expert consensus statements, 2 randomized controlled trials and 2 evidence summaries. Thirty pieces of evidence were generated in five domains: (1) disease monitoring and assessment; (2) weight and nutritional management; (3) exercise and physical activity management; (4) self-monitoring and health education; and (5) social support systems. Most evidence was of moderate-to-high quality and showed good consistency.

Conclusion: The synthesized evidence on self-management education for patients with NAFLD provides a reference for clinical practice. It can support nurses in developing scientific, individualized self-management education plans according to patients' characteristics, thereby improving the quality of long-term disease management and health outcomes.

Keywords: non-alcoholic fatty liver disease, self-management, education, evidence summary, evidence-based nursing

Introduction

Non-alcoholic fatty liver disease (NAFLD) is a chronic progressive liver disease that arises in genetically susceptible individuals as a consequence of insulin resistance and excess caloric intake.[1] With lifestyle changes and population aging, the global prevalence of NAFLD is steadily increasing and has reached approximately 32% worldwide.[2,3] NAFLD not only increases the risk of cirrhosis, hepatic decompensation and hepatocellular carcinoma, but is also closely associated with type 2 diabetes, cardiovascular disease, cerebrovascular disease and chronic kidney disease, imposing a considerable burden on individuals, families and healthcare systems.[4–7]

Currently there is no widely accepted, specific pharmacotherapy for NAFLD. Domestic and international guidelines consistently identify lifestyle modification, with a focus on weight reduction, dietary optimization and increased physical activity, as the cornerstone of NAFLD management.[8] However, sustained adherence to healthy lifestyle behaviours is

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challenging in routine clinical practice. Patients' self-management capacity, treatment adherence, psychological status and social support, as well as the availability and quality of professional education, all directly influence the effectiveness of lifestyle interventions.[9] Studies have shown that many patients lack adequate understanding of disease risks and the importance of lifestyle change, and often encounter multiple barriers when attempting to translate recommendations into daily routines, resulting in fragmented and short-lived behavior change.[10]

Self-management education, as an approach delivered by nurses, aims to enhance patients' disease-related knowledge, skills and self-efficacy, and to support them in incorporating symptom management, lifestyle adjustment and emotional coping into everyday life.[11–13] For NAFLD, high-quality self-management education has the potential to improve risk perception, promote the adoption and maintenance of healthy behaviours and delay disease progression. Although existing guidelines, expert consensus statements, and intervention studies have provided valuable recommendations on diet, exercise, weight reduction, and health monitoring, the current evidence base still shows several important limitations. First, relevant recommendations are dispersed across different types of evidence and lack a unified framework specifically oriented toward self-management education. Second, most existing studies emphasize isolated intervention components, such as dietary advice or exercise programmes, whereas less attention has been paid to how these components should be systematically combined into a structured educational pathway that can support long-term self-management. Third, current evidence is still insufficient in guiding nurses on how to strengthen adherence, promote self-monitoring, and translate knowledge into sustained behaviour change in routine clinical settings.[14] Consequently, there remains a lack of integrated, evidence-based guidance on what content should be prioritized, how educational interventions should be delivered, and how self-management support should be tailored to patients' actual needs.

In this context, the present study used an evidence-based nursing framework to systematically retrieve, appraise and synthesize domestic and international evidence related to self-management education for patients with NAFLD. The aim was to construct an evidence framework covering disease monitoring and assessment, weight and nutritional management, exercise and physical activity management, self-monitoring and health education and social support systems, thereby providing a scientific basis for designing and implementing individualized self-management education in clinical practice.

Materials and Methods

Currently, there is no widely accepted guideline for reporting evidence summaries. The Fudan University Center for Evidence-based Nursing developed a reporting standard grounded in the JBI methodology for constructing evidence summaries. This reporting standard includes problem establishment, literature retrieval, literature screening, literature evaluation, the summary and grading of evidence and the formation of practical suggestions. The present evidence summary was reported in accordance with this framework from the Fudan University Center for Evidence-based Nursing.[15]

Problem Establishment

Population (P): patients diagnosed with NAFLD.

Intervention (I): self-management education-related measures, including educational content and strategies on disease cognition, lifestyle management, self-monitoring and social support.

Professional (P): healthcare professionals in clinical or community settings (for example physicians, nurses, dietitians and exercise rehabilitation therapists) involved in delivering self-management education.

Outcomes (O): changes in liver function and metabolic indicators; self-management ability and self-efficacy; adherence to lifestyle and treatment recommendations; health-related quality of life; and incidence of adverse outcomes, including progression of liver fibrosis, cirrhosis, hepatocellular carcinoma, cardiovascular events and mortality.

Setting (S): outpatient clinics, inpatient wards, community healthcare institutions and home-based settings.

Type of evidence (T): clinical decision tools, recommended practice, best practice documents, evidence summaries, guidelines, systematic reviews, expert consensus statements, meta-analyses and randomized controlled trials.

This evidence summary was registered with the Fudan University Centre for Evidence-based Nursing (registration No. ES20258826).

#1	NAFLD[Mesh]
#2	non-alcoholic fatty liver disease OR MAFLD OR Metabolic Associated Fatty Liver Disease OR MASLD OR Metabolic Dysfunction-Associated Steatotic Liver Disease OR fatty liver [Title/Abstract]
#3	#1 OR #2
#4	Exercise OR Physical Activity OR Aerobic Exercise OR Diet OR Nutrition OR Weight Management OR Education OR support OR Self-Management OR Self-Care OR Symptom Management OR Emotional Management[Title/Abstract]
#5	Systematic Review OR Guideline OR Consensus OR Evidence-Based Practice OR Recommendations OR Evidence Summary OR Meta-Analysis OR Randomized Controlled Trial[Title/Abstract]
#6	#3 AND #4 AND #5

Figure 1 PubMed search strategy.

Literature Retrieval Method

Top-down retrieval was performed using the "6S" evidence source pyramid.[16] The following sources were searched: BMJ Best Practice, Up To Date, the UK's National Institute for Health and Care Excellence (NICE), the Scottish Intercollegiate Guidelines Network (SIGN), Guidelines International Network (GIN), JBI Evidence-based Healthcare Database, American Association for the Study of Liver Diseases(AASLD), European Association for the Study of the Liver(EASL), Korean Association for the Study of the Liver(KASL), the Registered Nurses' Association of Ontario (RNAO), Chinese Society of Hepatology(CSH), Chinese Society of Infectious Diseases(CSID), the Asian Pacific Association for the Study of the Liver(APASL), the World Health Organization (WHO) and Medlive Clinical Guidelines.

Bibliographic databases searched included PubMed, Web of Science, the Cochrane Library, CINAHL, CNKI, the Wanfang Database, the VIP Database and SinoMed. Reference lists of all included articles were screened manually to identify additional eligible evidence. The search period extended from inception of each database to August 2025.

English search terms included combinations of: "non-alcoholic fatty liver disease", "NAFLD", "MAFLD", "Metabolic Associated Fatty Liver Disease", "MASLD", "Metabolic Dysfunction-Associated Steatotic Liver Disease", "fatty liver"; "exercise", "physical activity", "aerobic exercise", "diet", "nutrition", "emotional management", "weight management", "education", "support", "self-management", "self-care"; "symptom management", "systematic review", "guideline", "consensus", "evidence-based practice", "recommendations", "evidence summary", "meta-analysis", "randomized controlled trial". Search strategies were adapted to the indexing terms and syntax of each database. An example of an English database search using PubMed with the corresponding search strategy is shown in Figure 1.

Inclusion and Exclusion Criteria

The inclusion criteria were as follows: (i)Study population: patients with NAFLD or related metabolic dysfunction-associated fatty liver disease(MASLD). (ii)Studies that involved self-management education or self-management-related educational/support components as part of NAFLD management. (iii)Articles published in Chinese or English.

The following were the exclusion criteria: (i)Duplicated publications. (ii)Full text unavailable. (iii)Conference abstracts, topic abstracts, study protocols, or documents with incomplete information, or outdated versions that had been superseded by updated guidelines.

Literature Screening

The obtained literatures were imported into NoteExpress4.1.0 and duplicates were deleted. Two researchers trained in evidence-based medicine independently screened the literatures. Titles, abstracts, and keywords were examined in the initial screening. Next, the full texts were read and rescreened, and the quality of the rescreened literatures were evaluated. When there was disagreement or uncertainty about whether a literature should be included, the article was discussed with a third reviewer who is an experienced evidence-based nursing expert and can make the final decision on inclusion.

Literature Quality Evaluation Criteria

Quality appraisal tools were selected according to the type of evidence:

The evaluation of guidelines was performed using the Appraisal of Guidelines for Research and Evaluation II (AGREEII),[17] which is an evaluation system developed by experts from 13 different countries. The present study used the AGREEII that was updated in 2017 and the scoring criteria included 23 items across six fields, including scope, purpose, participants, etc. On the AGREEII scale, a score of 1 corresponds to strongly disagree and 7 to strongly agree for the evaluation of each item. Standardized scores in each field = [(actual score evaluated − lowest possible score)/(highest possible score − lowest possible score)] × 100%. The guidelines recommend division of the standardization score into three grades: if 6 items score ≥60%, it is recommended as a grade A; if ≥3 items score ≥30% with some items with scores <60%, it is recommended as a grade B after modification and improvement; and ≥3 areas with scores <30% are excluded as grade C.

Expert consensus statements were appraised using the JBI critical appraisal checklist for text and expert opinion. Currently, the JBI standard is used to evaluate the methodological quality of expert opinion and professional consensus articles. The evaluation tool consists of six items, and each item is judged with "yes", "no", "unclear", and "undetermined".[18]

Clinical decision-making traces the source of evidence to the original research and uses bias/quality tools that match the research design to evaluate its quality.

Randomized controlled trials were assessed using the Cochrane risk-of-bias tool. This tool assesses the risk bias of the research in six main areas, and each indicator is classified as "low bias", "unclear" or "high bias".[18]

For evaluating the quality of systematic reviews with meta-analysis, we used the AMSTAR (A Measurement Tool to Assess systematic Reviews)-2, which consists of 16 items, of which the responses to seven key items (items 2, 4, 7, 9, 10, 11, 13, and 15) were "yes", "Partial Yes" and "no". The quality of the evaluation was classified as "high", "moderate", "low", and "critically low".[19]

Evidence summaries were appraised using the Critical Appraisal for Summaries of Evidence (CASE) tool. The CASE worksheet was developed with 10 questions, which fall under four headings: summary topic, summary methods, summary content, and summary application. The included questions could be answered with a "yes", "no", or "not completely".[20]

Process of Literature Quality Evaluation

Two researchers trained in evidence-based methodology independently performed quality appraisal of each included document and compared their assessments. Any disagreements were resolved through discussion or, when necessary, consultation with a third expert in evidence-based nursing. When there are conflicts in the recommendation opinions, the evidence will be screened based on the principle of giving priority to the latest published and high-quality evidence. For example, regarding alcohol management, "the recommendation that patients with MAFLD should be encouraged to avoid alcohol of any type and in any amount" was derived from the expert consensus,[21] whereas the recommendation that patients' alcohol consumption should be assessed and avoidance of alcohol should be advised, with complete abstinence being particularly applicable to those with advanced fibrosis or cirrhosis was derived from the guideline.[22] As the latter was based on a more recent clinical practice guideline with greater methodological rigor and a more robust evidence-grading framework than the expert consensus, the guideline recommendation was prioritized.

Evidence Classification and Recommendation Level Judgement

The JBI 2014 evidence grading and recommendation system was used to classify evidence levels and recommendation strength.[23] The strength of the recommendation was based on the JBI "Feasibility, Appropriateness, Meaningfulness, and Effectiveness (FAME)" comprehensive judgment. If the majority of dimensions were met and the evidence was consistent, it was rated as A;Otherwise, it was rated as B. The results were divided into grades 1 to 5, with more rigorous research designs having higher evidence levels. Grade 1a was the highest level and grade 5c was the lowest.[23]

Results

Search Outcome

A total of 4,498 records were initially retrieved. After removal of duplicates and screening of titles and abstracts, 155 records were selected for full-text review. Following detailed assessment and quality appraisal, 19 articles met the inclusion criteria: six clinical practice guidelines,[22,24–28] five expert consensus statements,[21,29–32] two evidence summaries,[33,34] four systematic reviews,[35–38] and two randomized controlled trials.[39,40]

The literature screening process followed PRISMA principles and can be summarized as: initial identification, duplicate removal, title and abstract screening, full-text assessment, quality appraisal and final inclusion. The general characteristics of the included documents, including publication year, source, target population and main focus, were organized into a summary table The literature screening process is shown in Figure 2, and the general characteristics of the included literature are presented in Table 1.

Results of Literature Quality Evaluation

Quality Evaluation Results of Guidelines

A total of six guidelines were included in this study.[22,24–28] The quality appraisal results are presented in Table 2 and indicate that the overall quality of these guidelines was good; all were retained for evidence synthesis.

Quality Evaluation Results of Expert Consensus

Five expert consensus statements were also included.[21,29–32] For the consensus statements by Zeng et al[21] and Keating et al,[31] all appraisal items were rated "yes", and the positions were clearly expressed; both were included For the consensus statements by Long et al,[29] Younossi et al[30] and the Chinese Society of Endocrinology of the Chinese Medical Association,[32] all items were rated "yes" except item 6, "Is the position presented clearly different in any way from that of previous literature?", which was rated "unclear" Overall, the methodological quality of these documents was high, and all were included.

Quality Evaluation Results of Evidence Summaries

Two evidence summaries were included.[33,34] For the evidence summaries by Zhang Xue Ling et al[33] and Wang Nan et al,[34] except for the evaluation result of item 3 "Was the reviewer or editor of the evidence summary clear and transparent?" which was "Not Completely", the evaluation results of the other items were all "Yes" The overall quality of the literature was high and it was approved for inclusion.

Quality Evaluation Results of the Systematic Reviews

Four systematic reviews were included in this study.[35–38] In the review by Albhaisi et al,[35] all AMSTAR-2 items were rated "yes" except item 3, "Did the review authors explain their selection of the study designs for inclusion in the review?", which was rated "no" In the review by Huang et al,[36] all items were rated "yes" except item 7, "Was a list of excluded studies provided and reasons for exclusion given?", which was rated "Partial Yes" In the review by Kong Tingting et al,[38] all items were rated "yes" except item 7, "Was a list of excluded studies provided and reasons for exclusion given?", which was rated "Partial Yes" In the review by Zafar et al,[37] all items were rated "yes", and the conclusions were clearly presented; the review was therefore included Overall, the methodological quality of the systematic reviews was high, and all were retained.

Quality Evaluation Results of Randomized Controlled Trials

Two randomized controlled trials were included in this study.[39,40] In the trial by Altay et al,[39] item 2, "allocation concealment", and item 3, "blinding of participants and personnel", were rated "unclear", whereas the remaining domains were judged to be at low risk of bias The study design was complete, the overall quality was high and the trial was included. In the trial by Nourian et al,[40] item 3, "blinding of participants and personnel", was rated "unclear", and all other domains were judged to be at low risk of bias The overall quality of this trial was also high, and it was included.

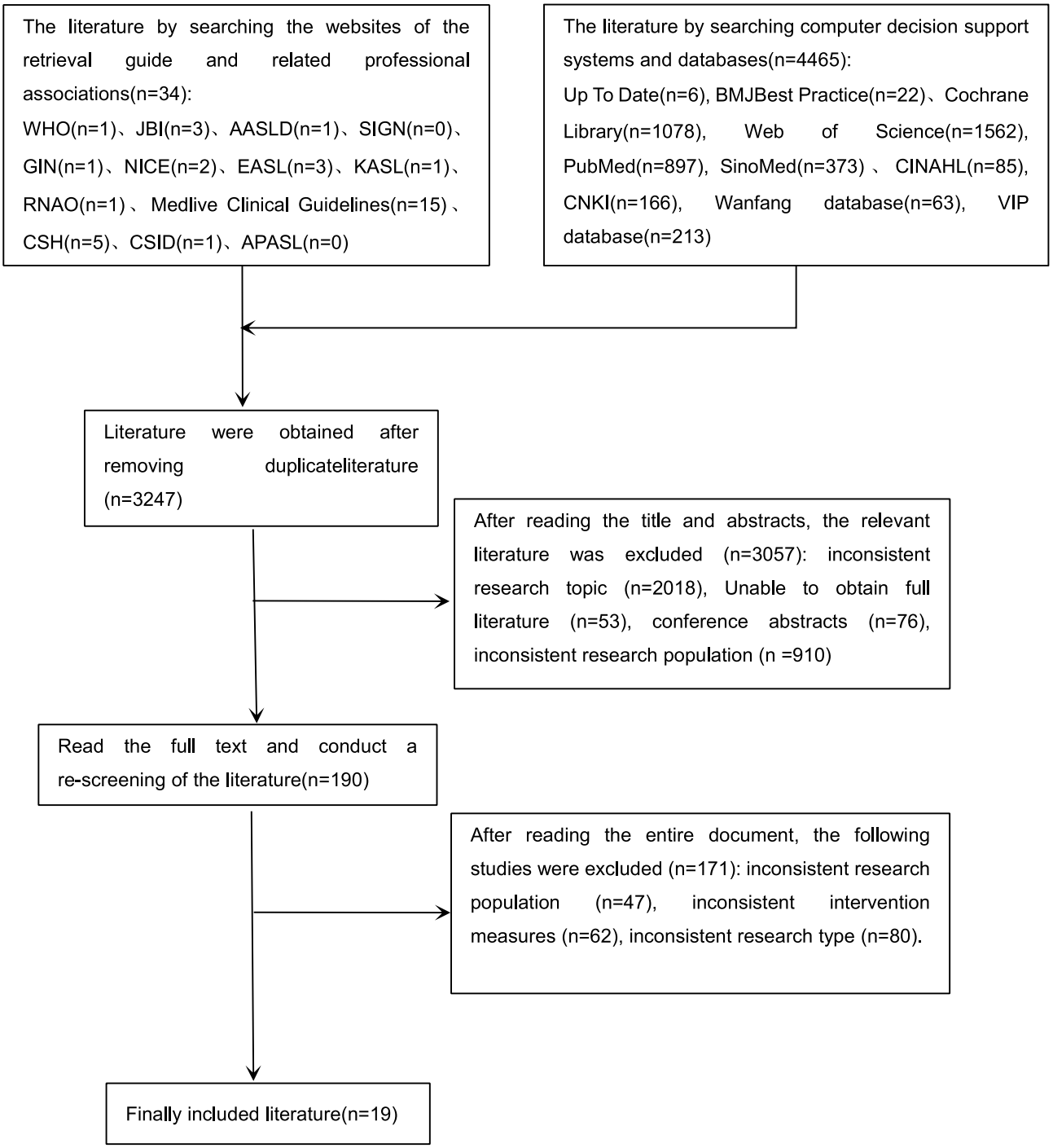

Figure 2 Literature screening flow chart.

Evidence Synthesis and Description

In total, 30 pieces of evidence were synthesized across five domains: disease monitoring and assessment, weight and nutritional management, exercise and physical activity management, self-monitoring and health education and social support systems (Table 3).

Table 1 Sources and General Characteristics of the Included Literature (n=19)

Included Literature	Year of Publication (Year)	Literature Reference	Type of Literature	The Literature Theme
RNAO[24]	2010	RNAO	Guideline	Chronic disease self-management support
Chinese Association of Gerontology and Geriatrics[25]	2022	Wanfang database	Guideline	Management of non-alcoholic fatty liver disease in older adults
Kenneth et al[26]	2022	PubMed	Guideline	Diagnosis and management of non-alcoholic fatty liver disease
Rinella et al[27]	2023	AASLD	Guideline	Assessment and clinical practice in non-alcoholic fatty liver disease
EASL et al[22]	2024	EASL	Guideline	Clinical practice for metabolic dysfunction-associated fatty liver disease
Chronic Disease Management Branch of China Medical Biotechnology Association[28]	2025	Wanfang database	Guideline	Primary care diagnosis and treatment of metabolic-associated fatty liver disease
Long et al[29]	2022	PubMed	Expert consensus	Diagnosis and management of lean fatty liver disease
Younossi et al[30]	2021	PubMed	Expert consensus	Lifestyle-based weight loss interventions for non-alcoholic fatty liver disease
Keating et al[31]	2023	PubMed	Expert consensus	Exercise management in adults with metabolic-associated fatty liver disease
Zeng et al[21]	2024	PubMed	Expert consensus	Dietary modification for metabolic dysfunction-associated fatty liver disease
Chinese Society of Endocrinology[32]	2021	Wanfang database	Expert consensus	Management of type 2 diabetes with coexisting non-alcoholic fatty liver disease
Zhang et al[33]	2023	CNKI	Summary of evidence	Exercise management in non-alcoholic fatty liver disease
Wang et al[34]	2025	CNKI	Summary of evidence	Nutritional management of adults with metabolic-associated fatty liver disease
Albhaisi et al[35]	2024	PubMed	Systematic review	Effectiveness of digital therapeutics in patients with metabolic dysfunction-associated fatty liver disease
Huang et al[36]	2024	PubMed	Systematic review	Exercise management in non-alcoholic fatty liver disease
Zafar et al[37]	2025	PubMed	Systematic review	eHealth management of patients with metabolic dysfunction-associated fatty liver disease
Kong et al[38]	2023	Wanfang database	Systematic review	Self-management needs of patients with non-alcoholic fatty liver disease
Altay et al[39]	2024	PubMed	Randomized controlled trials	Effectiveness of exercise and nutrition education for non-alcoholic fatty liver disease
Nourian et al[40]	2020	PubMed	Randomized controlled trials	Effectiveness of lifestyle health education for non-alcoholic fatty liver disease

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Table 2 Quality Evaluation Results of Guidelines (n=6)

Guideline	Standardised Scores in Various Domains (%)						≥60	≥30	Quality Evaluation
	Scope and Purpose	Stakeholder Involvement	Rigour of Development	Clarity of Presentation	Applicability	Editorial Independence			
RNAO[24]	86.11	72.22	64.58	77.78	77.08	83.33	6	6	A
Chinese Association of Gerontology and Geriatrics[25]	86.11	58.33	56.25	80.56	68.75	37.50	3	6	B
Kenneth et al[26]	94.44	77.78	77.08	94.44	75.00	83.33	6	6	A
Rinella et al[27]	91.67	75.00	79.17	91.67	64.58	83.33	6	6	A
EASL et al[22]	94.44	94.44	77.08	94.44	83.33	91.67	6	6	A
Chronic Disease Management Branch of China Medical Biotechnology Association[28]	91.67	70.83	75.00	86.11	83.33	54.17	5	6	B

Table 3 Evidence Summary for Self-Management Education in Patients with Non-Alcoholic Fatty Liver Disease

Category	Content of Evidence	Level	Recommendation Level
Disease monitoring and assessment	1. Under the guidance of healthcare professionals, use the fibrosis-4 (FIB-4) index to stratify liver fibrosis risk and explain the score and its implications to patients[25,29,30]	I	A
	2. It is recommended that body mass index (BMI), blood glucose, blood lipids, transaminases and other metabolic indicators be monitored systematically every 6–24 months; patients with progression of liver fibrosis should receive at least one comprehensive assessment per year[22,25,31,32,34]	I	A
	3. Patients should actively participate in screening and management of comorbidities such as type 2 diabetes, hypertension and dyslipidaemia, and incorporate the results into their personal follow-up records[25–28,30]	I	A
Weight and nutritional management	4. Lifestyle intervention is recommended as the first-line treatment strategy for patients with NAFLD[22,25–27,31,34,36]	I	A
	5. Patients are encouraged to follow Mediterranean or DASH dietary patterns, increasing intake of vegetables, fruits, whole grains and nuts and reducing intake of processed and high-fat foods[22,25–31,34]	I	A
	6. It is recommended that patients limit their total daily energy intake to approximately 1,200–1,500 kcal, or reduce their usual intake by 500–1,000 kcal, in order to achieve sustained weight loss[27,30,34,38]	I	A
	7. Patients should set weight-loss goals according to their own conditions and break them down into achievable short-term targets; a weekly weight loss of about 0.5–1.0 kg is recommended[22,26,27,29,30,34]	I	A
	8. For lean NAFLD, targeted nutritional education should be provided. It is recommended that they lose 3–5% of their body weight and limit the intake of fructose and high-sugar beverages[29]	5	B
	9. Patients are advised to use smart scales/tape measures and diet-recording applications to record body weight and waist circumference 2–3 times per week, and to record each meal daily by photographs or checklists; these records should be presented at follow-up visits to facilitate clinical decision-making[37,38]	5	B
	10. Carry out education on the hazards of alcohol, clearly informing the negative effects of alcohol on the liver, and recommend strict limitation or complete cessation of alcohol consumption[21,22,28]	5	B
Exercise and physical activity management	11. Patients are recommended to perform moderate-intensity aerobic exercise for at least 150 minutes per week, in combination with resistance training where possible[22,27,28,31]	I	A
	12. Patients should be encouraged to use regular physical activity as a means of relieving anxiety and depressive symptoms and enhancing self-management capacity, and to choose individualized forms of exercise according to their personal preferences[30–33]	5	B
	13. Patients may use smart devices to help monitor their physical activity, changes in body weight and metabolic parameters, thereby facilitating communication with physicians and adjustment of treatment plans[35–37]	5	B
	14. Implement exercise safety and supervision education for the children and their caregivers to ensure that the exercise is effective and controllable[33]	5	B
	15. For elderly or frail patients, a step-by-step progressive strategy should be adopted. An individualized prescription should be formulated based on the patient's exercise tolerance, clearly specifying the starting intensity, the rules for increasing the intensity, and the risk warnings[24,33]	5	B
	16. Prolonged sedentary behaviour should be avoided; patients are advised to stand up and move for about 5 minutes every hour[28,33]	5	B
	17. Patients are advised to maintain regular sleep-wake patterns and obtain sufficient sleep in order to improve metabolism and liver function[22]	I	A

(*Continued*)

Table 3 (Continued).

Category	Content of Evidence	Level	Recommendation Level
Self-monitoring and health education	18. Nurses are recommended to use eHealth nutrition education, digital reminders and tracking-and-feedback tools to help patients improve dietary behaviour and weight management, and to provide individualized health feedback and guidance via electronic platforms and interactive patient groups[37,38]	5	B
	19. Short message or app-based push notifications may be used appropriately to remind patients and maintain long-term engagement[35]	2	B
	20. Nurses are advised to apply motivational interviewing techniques to enhance patients' willingness to change health behaviours[24,38]	1	B
	21. Patients should be encouraged to actively learn about fatty liver disease, including its definition, risk factors, treatment options and prognosis[25–27]	1	A
	22. During follow-up, nurses should provide feedback, particularly positive reinforcement regarding patients' progress in weight, blood glucose, diet and physical activity[25,31,34]	5	A
	23. Healthcare professionals should provide regular emotional support and psychological counselling; patients are advised to record mood changes, maintain a positive attitude and seek psychological support when they encounter difficulties in self-management[24,25,27,38–40]	1	A
	24. Educational and support strategies should be tailored to patients' cultural and social backgrounds[28,30]	5	B
	25. Patients should be taught to monitor body weight, waist circumference, diet and physical activity, and to adjust their lifestyle regularly based on these results; they should bring their records to follow-up visits to support shared decision-making[28,30,34,35]	5	B
	26. During health education, attention should be paid to maintaining patients' motivation and self-efficacy, with the aim of gradually cultivating their capacity for long-term health management[24–26,39]	1	A
Social support systems	27. It is recommended to establish a multidisciplinary management team — including hepatologists, dietitians, exercise rehabilitation therapists, psychologists and other professionals — to regularly evaluate treatment effectiveness, guide management of metabolic comorbidities, reduce the risk of complications and promptly adjust plans according to changes in health status[21,25–34,37,39,40]	1	A
	28. Nurses are advised to collaborate with patients in setting goals and formulating feasible action plans; for patients with advanced liver fibrosis, multidisciplinary management and support and continuous monitoring of disease progression are particularly important[24,26–28]	1	A
	29. Family members should be encouraged to participate in patient management, providing supervision and support for the implementation of healthy diets and regular exercise[25,31,38,39]	1	A
	30. Peer-support activities are recommended; through experience sharing and mutual encouragement, patients' confidence in disease self-management can be strengthened[37,38]	2	A

Discussion

Disease Assessment, Metabolic Monitoring, and Comorbidity Management Should Be the Starting Point of Self-Management Education

Evidence 1–3 indicates that effective self-management education for patients with NAFLD should begin with structured disease assessment and ongoing metabolic monitoring rather than with general lifestyle advice alone. Existing studies have shown that NAFLD usually has an insidious onset and slow progression, so patients often have limited awareness of their own health status. At the same time, the implementation rate of behaviours such as self-monitoring of body weight, keeping dietary records and documenting physical activity is generally low, and lifestyle changes tend to be fragmented and short-lived.[10,41] Consequently, educational interventions that are not linked to objective indicators of disease severity are less likely to generate durable behavioural engagement. More importantly, when self-management education is grounded in standardized assessment findings, risk communication becomes more specific, individualized, and clinically persuasive, thereby providing a more robust rationale for long-term behaviour change.

Among the available assessment domains, liver fibrosis is a key pathological stage in the progression of NAFLD and an important predictor of liver-related outcomes.[10] Existing evidence suggests that early screening for liver fibrosis may reduce the risk of progression to cirrhosis or hepatocellular carcinoma in patients with NAFLD.[42] Contemporary practice recommendations consistently support the use of simple non-invasive tests, such as the fibrosis-4 index, as a first-step stratification tool, followed, where appropriate, by second-tier assessment including elastography.[22,25–28] Thus, the value

of fibrosis assessment extends beyond diagnostic categorization. This, in turn, may reduce the tendency to trivialize the condition, and enhance the legitimacy of subsequent educational recommendations.

Furthermore, the present findings suggest that effective self-management education in NAFLD should not remain confined to liver-specific parameters. Rather, it should be embedded within a broader cardiometabolic framework. NAFLD is regarded as a systemic metabolic disease and is closely associated with multiple metabolic disorders. At present, type 2 diabetes (T2D) and cardiovascular disease (CVD) are considered the two most important extrahepatic diseases related to NAFLD; through mechanisms such as visceral adiposity and insulin resistance, these comorbidities interact with NAFLD and jointly accelerate disease progression, and CVD, as the leading cause of death in patients with NAFLD, markedly increases overall health risk.[43] On the basis of such assessment, nurses should help patients understand the bidirectional relationships between NAFLD, T2D, and CVD, and guide them to participate actively in blood glucose and blood pressure monitoring, medication adherence, and other risk-reduction behaviours. Furthermore, risk stratification can build on this comprehensive metabolic assessment and provide a practical basis for tailoring self-management education and follow-up planning. Patients with higher fibrosis risk or greater cardiometabolic burden may require more intensive risk communication, closer monitoring of metabolic indicators, and earlier multidisciplinary referral. In this way, liver-related management can be more effectively integrated with broader cardiometabolic care, thereby helping to reduce disease burden and improve long-term health outcomes.[44]

Implementing Individualized Dietary Interventions to Optimize Nutritional Structure and Weight Control and Improve Hepatic Metabolic Status

Evidence 4–10 summarize strategies for weight management and nutritional intervention in patients with NAFLD. Available studies generally indicate that weight management and nutritional intervention play a central role in the comprehensive management of NAFLD and are among the non-pharmacological management strategies with relatively robust evidence at present.[22,25,39] Multiple studies have shown that achieving a 5%-10% reduction in body weight through dietary and exercise interventions can reduce liver fat content, improve insulin resistance and lower liver enzymes in most patients, whereas greater weight loss may be required to achieve more substantial histological benefits, including improvement in steatohepatitis and fibrosis.[45,46] Therefore, within self-management education, dietary counselling should not be framed as a short-term weight-control strategy, but as a structured intervention aimed at reaching specific therapeutic thresholds and maintaining them over time.[22,27]

Importantly, the available evidence suggests that dietary quality may matter in addition to calorie reduction. In a randomized crossover trial, Ryan et al reported that, compared with a low-fat/high-carbohydrate diet, a Mediterranean diet produced a significantly greater reduction in hepatic steatosis and improved insulin sensitivity in individuals with NAFLD, despite no significant between-group difference in weight loss.[47] This finding is noteworthy because it suggests that the metabolic benefit of dietary intervention may not be fully explained by body weight reduction alone. Similarly, subsequent randomized and meta-analytic evidence has continued to support the potential value of Mediterranean-style dietary patterns for improving steatosis and insulin resistance.[48,49] Although the Mediterranean diet has repeatedly shown benefit, not all comparative evidence suggests a clear superiority over other structured dietary approaches in every context. More recent evidence has indicated that Mediterranean and low-fat dietary strategies may yield broadly comparable short-term improvements in liver enzymes and liver fat content,[50] suggesting that adherence and sustained energy control may, in some circumstances, be as important as the specific diet model itself.

Furthermore, the rapid emergence of novel dietary strategies in recent years has expanded the options available for NAFLD management. In the randomized clinical trial, Wei et al found that, among adults with obesity and NAFLD, time-restricted eating did not confer additional benefit over daily calorie restriction for reducing intrahepatic triglyceride content, body fat, or metabolic risk factors after 12 months.[51] However, findings across studies are not entirely consistent. Feehan et al, in a smaller randomized crossover trial, reported significant improvements in hepatic steatosis, body weight, and waist circumference with time-restricted fasting compared with standard care.[52] Taken together, these findings do not support time-restricted eating as a clearly superior first-line strategy, but suggest that it may be a feasible alternative for selected patients who have difficulty sustaining conventional continuous restriction.[53]

In addition, subgroup considerations further complicate the nutritional management of NAFLD. For lean patients with NAFLD, although body weight is within the normal range, visceral adiposity is often increased. Fracanzani et al showed in a multicentre Italian cohort that, although lean patients had lower rates of hypertension, diabetes, and advanced liver injury than overweight or obese patients overall, a substantial proportion still exhibited steatohepatitis and fibrosis.[54] These findings suggest that normal body weight should not be equated with low educational need. Accordingly, dietary education for lean NAFLD should place greater emphasis on central adiposity, dietary composition, and metabolic monitoring, rather than on simple weight-loss messaging alone.

Finally, dietary structure modification alone is often insufficient to ensure long-term effectiveness. Adherence, self-monitoring, and ongoing feedback are critical to intervention success. Relevant studies have shown that smart scales, dietary recording applications and online feedback systems can improve adherence to dietary recommendations.[37] Nurses should provide guidance and feedback, identify unhealthy eating patterns and offer individualized advice that takes cultural dietary habits into account. Overall, individualized dietary intervention should combine energy restriction, dietary quality optimization, and behavioural support to improve long-term hepatic and metabolic outcomes in patients with NAFLD.

Conducting Exercise Behaviour Management Education to Promote Sustained Lifestyle Improvement

Evidence 11–17 summarize strategies for exercise behaviour management and education in patients with NAFLD. Previous studies have shown that patients with NAFLD generally have insufficient physical activity, low exercise adherence and poor persistence of behaviour, whereas systematic exercise education and behaviour management can significantly enhance patients' ability to participate actively in disease control.[55,56] Current evidence generally recommends that patients perform moderate-intensity aerobic exercise (such as brisk walking, cycling or swimming) for at least 150 minutes per week and, where possible, combine this with resistance training in order to achieve synergistic metabolic benefits.[33] A study by Khalafi reported that high-intensity interval training ranked highest for reducing intrahepatic lipid content, followed by aerobic training, combined aerobic and resistance training, and resistance training.[57] However, the overall evidence still indicates benefit across several exercise forms rather than a single universally superior modality. This interpretation is supported by a 24-week randomized trial showing that both high-intensity interval training and moderate-intensity continuous training significantly reduced hepatic steatosis, with no significant between-group difference in liver fat reduction.[58] Notably, high-intensity interval training produced greater improvement in cardiorespiratory fitness. Taken together, these findings suggest that exercise education should emphasize individualized implementation and long-term adherence rather than the identification of a single "best" exercise prescription.

At the same time, attention needs to be paid to the adverse effects of prolonged sedentary behaviour. Studies have found that sitting for more than eight hours per day is significantly associated with an increased risk of NAFLD, whereas breaking up sedentary time by standing up and moving for about five minutes every hour can improve metabolic status.[59] Nursing education should therefore guide patients to identify feasible alternatives to prolonged sitting in occupational and home environments, such as taking the stairs instead of the lift or replacing purely sedentary leisure with light household chores, so that abstract recommendations are translated into concrete daily behaviour patterns and sustained habits.

With the development of digital technology, exercise management is becoming more intelligent and continuous. Wearable devices and health applications can monitor exercise intensity, step counts and energy expenditure in real time, provide immediate feedback and enhance patients' awareness of their own behaviour.[35] Nurses can use these data to offer individualized guidance and support, transforming exercise education from static instruction into a dynamic, data-driven process of self-management support. In summary, systematic exercise behaviour management education can promote self-regulation, reduce sedentary behaviour and, when combined with digital monitoring, help patients with NAFLD achieve sustained lifestyle improvement and health promotion.

Providing Health Education to Stimulate Patient Initiative and Encourage Self-Monitoring and Recording

Evidence 18–26 summarize the central role of self-monitoring and health education in the management of NAFLD. Studies have shown that although patients often actively engage in self-monitoring and adjust behaviours based on feedback at the early stage of interventions, their level of engagement frequently declines over time.[60] Therefore, health education should not be regarded as a single educational event, but as a continuous process involving repeated reinforcement, behavioural review, and adaptive support. In this context, the value of self-monitoring lies not merely in recording behaviours, but in strengthening patients' awareness of disease-related risks and enhancing their capacity for self-regulation. Existing evidence indicates that the use of body weight records, dietary logs, physical activity tracking, and regular metabolic monitoring can facilitate behavioural adjustment and improve adherence.[31] However, self-monitoring is unlikely to be effective in isolation. Its clinical value depends on whether the recorded information is interpreted, reviewed, and incorporated into subsequent education and follow-up. Accordingly, self-management education should integrate monitoring, feedback, and behavioural guidance into a coherent process rather than treating them as separate components.

Moreover, current evidence indicates that educational effectiveness is influenced not only by knowledge acquisition but also by motivational and psychological factors. Studies have shown that a positive emotional state and the ability to regulate emotions are crucial for improving adherence, especially in the long-term management of chronic diseases, where patients often experience psychological distress such as anxiety, frustration and mood fluctuations.[61] Anxiety and depressive symptoms not only interfere with the performance of health behaviours, but may also aggravate the progression of NAFLD through mechanisms such as sleep disturbance and inflammatory activation.[62] Therefore, effective education should incorporate strategies that reinforce self-efficacy, address perceived barriers, and support problem-solving, so that patients can maintain engagement even when progress is slow or non-linear.

Furthermore, systematic reviews and meta-analyses have shown that eHealth, mobile health, and web-based lifestyle interventions can improve body weight, BMI, and liver enzyme outcomes, while also helping to overcome common barriers such as limited time, travel distance, and difficulties in maintaining regular contact with healthcare providers.[63] Such approaches help mitigate "educational forgetting" and "behavioural fatigue" that develop over time and can significantly enhance long-term engagement.[64] However, these approaches should be regarded as adjuncts rather than substitutes for professional support, as their effectiveness depends on integration with individualized educational planning and ongoing follow-up. From a nursing perspective, the value of digital education lies not merely in broadening information delivery, but in facilitating a structured process of knowledge reinforcement, skills training, self-monitoring, and feedback. In this way, digital support may strengthen long-term adherence and improve the practical effectiveness of NAFLD self-management.

In summary, in the long-term management of NAFLD, systematic health education, structured emotional support and scientific self-monitoring should be integrated to jointly promote improvements in treatment adherence and self-management capacity.

Effective Self-Management Throughout the Course of NAFLD Relies on Robust Social Support Systems

Evidence 27–30 summarize the key role of social support in the self-management of patients with NAFLD. In real-world settings, patients with NAFLD often face complex psychological and social pressures. Surveys have shown that some patients experience self-blame, shame and perceived discrimination due to labels such as "fatty liver" and "obesity". These perceived stigmas are significantly associated with reduced health-related quality of life and are important contributors to delayed healthcare seeking, reduced social participation and avoidance of help-seeking.[65,66] Thus, a lack of social support not only means the absence of emotional comfort, but also aggravates feelings of isolation, thereby weakening patients' motivation to participate in and persist with self-management.

A sound social support system should include three levels: family support, peer support and professional support. The synergy of these three levels can help patients maintain a positive attitude and sustained motivation when facing

challenges in disease management. Family support is indispensable in NAFLD self-management. Active involvement of family members can provide emotional support and, through participation in goal setting and in concrete steps such as supervising diet and exercise, shift disease management from an individual responsibility to a shared family task, thereby fostering more stable healthy behaviour patterns.[67] By exchanging management experiences with peers, patients can deepen their understanding of the disease and receive encouragement from others in similar situations, which increases their enthusiasm and confidence in self-management.[38]

Because NAFLD is a systemic metabolic disease, comprehensive management is difficult to achieve within a single discipline. Establishing a multidisciplinary management team can provide integrated care from multiple perspectives, ranging from disease monitoring and dietary intervention to exercise guidance and psychological support. Nurses can play a central coordinating role in self-management education, responsible for integrating information on nutrition, exercise and psychological interventions and for dynamically assessing patients' social support and educational needs during follow-up. This model not only enhances the professionalism of care, but also facilitates timely adjustment of intervention plans according to changes in patients' health status.[27]

Within such a multi-level social support system that integrates the strengths of families, peers and professionals, patients are more likely to receive timely feedback and encouragement in their daily contexts, to buffer disease-related stress and experiences of stigma and to enhance the practical effects of self-management education. This, in turn, promotes the long-term maintenance of key behaviours such as dietary control and adherence to exercise and lays the groundwork for improved prognosis in NAFLD.

Conclusions, Implications of the Study and Directions for Future Research

This study systematically summarized 30 pieces of the best evidence for self-management education for patients with NAFLD across five core domains: disease monitoring and assessment, weight and nutritional management, exercise and physical activity management, self-monitoring and health education and social support systems. These findings provide an evidence-based foundation for clinical nursing practice and can effectively guide patients in self-management and improve disease prognosis.

In clinical practice, the present evidence may help healthcare professionals, especially nurses, move self-management education from general lifestyle advice to a more targeted, standardized and patient-centred intervention process. Future research should place greater emphasis on stratified self-management guidance for patients with NAFLD. In particular, tailored management strategies should be developed according to patients' disease severity, body weight phenotype, metabolic comorbidity profile, age, and physical function. For example, patients with obesity, lean NAFLD, advanced fibrosis risk, or multiple metabolic comorbidities may require different priorities in dietary guidance, exercise prescription, weight-management goals, and follow-up intensity. Older adults and physically frail patients may also benefit from more individualized and gradual intervention plans. In addition, future studies should further clarify how different education methods, digital support tools, family involvement, and follow-up approaches can be matched to specific patient subgroups in order to improve adherence and long-term self-management outcomes.

Strengths and Limitations of This Study

This study possesses several key strengths. First, it synthesized evidence from multiple source types, which allowed for a relatively comprehensive overview of self-management recommendations for patients with NAFLD. Second, the processes of literature retrieval, quality appraisal, and evidence synthesis were conducted in a structured manner using established methodological tools, which enhanced the transparency of the review process. Third, by integrating currently available evidence into a practical summary, this study may provide useful support for the development of self-management education and clinical practice in patients with NAFLD.

This study also has several limitations. Only studies published in Chinese and English were included, and relevant evidence in other languages may therefore have been missed. In addition, the included evidence came from different source types, and some variation in evidence characteristics was unavoidable. Although standardized appraisal tools were used and cross-checking was performed during the review process, a certain degree of judgement was still required when assessing some documents, particularly guidelines and expert consensus statements. Furthermore, as this study focused

on evidence synthesis, the feasibility and effectiveness of applying these recommendations in specific clinical settings still need to be further examined.

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