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Self-Management Experiences and Challenges in Patients with Metabolic Dysfunction-associated Steatotic Liver Disease: A Qualitative Study Guided by Pender's Health Promotion Model

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Abstract: *Objective*: The study aims to explore experiences of patients with metabolic dysfunction–associated steatotic liver disease (MASLD) in self-management, identify the challenges they encountered and their needs during the self-management process. *Methods*: This qualitative study was conducted at an integrated tertiary hospital between March and May 2025. Semi-structured interviews with 15 participants were analyzed using Colaizzi's seven-step method, and the resulting themes were mapped onto the constructs of the Pender health promotion model (HPM). *Result*: Three themes and nine sub-themes were mapped onto the HPM as challenges and obstacles in the self-management process of patients with MASLD. The themes encompass individual characteristics and negative experiences (personal factors and previous experiences with weight loss and rebound), cognitive and emotional deficits in self-management behaviors (insufficient recognition of the benefits of self-management, lack of interpersonal and situational support, negative emotional impact related to behavior, and low self-efficacy), and temporary needs and compromises with hobbies (unhealthy dietary preferences and long-term dietary habits, behavioral compromises in social situations, and temporary needs conflicting with healthy behaviors). *Conclusion*: Healthcare professionals should comprehensively assess the individual characteristics of patients with MASLD and provide personalized dietary and exercise management tailored to their lifestyle and behavioral preferences, while also paying close attention to their psychological and emotional well-being. Addressing patients' behavioral, psychological, and social needs enhance the feasibility and sustainability of lifestyle changes, thereby promoting more effective and long-term self-management.

Keywords: Metabolic dysfunction–associated steatotic liver disease; Pender health promotion model; Self-management; Lifestyle intervention; Qualitative research; Patient experience

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1. Introduction

In 2023, a multi-society consensus statement, spearheaded by the American Association for the Study of Liver Diseases, recommended renaming nonalcoholic fatty liver disease (NAFLD) as metabolic dysfunction–associated steatotic liver disease (MASLD). MASLD is a chronic progressive liver disease whose pathogenesis is closely related to genetics, environment, and metabolic stress. Its main characteristic is the occurrence of fatty degeneration and fat accumulation in liver parenchymal cells in the absence of a history of excessive alcohol consumption [1]. Additionally, at least one metabolic risk factor must be present, including obesity, dyslipidemia, type 2 diabetes, hypertension, and metabolic syndrome [2]. Currently, MASLD has become the predominant cause of chronic liver disease, with a prevalence rate approximately 30% [3]. MASLD is the most common type of chronic liver disease. Still, it has also emerged as the primary cause of abnormal liver biochemical indicators in health check-up populations, presenting a significant public health challenge [4]. The increasing global prevalence and mortality of MASLD, together with escalating healthcare expenditures and reduced health-related quality of life, raise serious concerns [5].

Several guidelines emphasize the significance of targeting lifestyle behavior change in all patients with MASLD, regardless of disease severity [6,7]. Lifestyle intervention remains the first-line treatment for MASLD. Promoting and maintaining healthy behaviors through a balanced diet, regular physical activity, and behavioral modification is crucial to improving overall health [8]. The effectiveness of such interventions relies heavily on patients' capacity for effective self-management [9]. Nonetheless, evidence indicates that the overall self-management status among individuals with MASLD remains suboptimal [10,11]. Existing studies have predominantly focused on the current status of self-management among patients with MASLD and its influencing factors, with limited in-depth exploration of patients' subjective experiences and challenges during the self-management process.

The Pender health promotion model (HPM) provides a systematic theoretical framework for analyzing individual health behaviors, emphasizing that the formation of health behaviors is influenced by three dimensions: individual characteristics and prior experiences (including personal factors and previous related behaviors), behavior-specific cognitive and affective factors (including the perceived benefits of behavior, perceived barriers of behavior, perceived self-efficacy, activity-related affect, and interpersonal and situational influences), and behavioral outcomes (temporary needs and hobbies and commitment action plan). The model has been extensively utilized in the fields of chronic disease management and health behavior intervention research, where it has demonstrated notable effectiveness in enhancing patients' self-management capacity, treatment adherence, and overall quality of life [12–14]. Therefore, this study is based on the HPM and employs a semi-structured, in-depth interview method to explore experiences of patients with metabolic dysfunction–associated steatotic liver disease (MASLD) in self-management, identify the challenges they encountered and their needs during the self-management process.

2. Materials and methods

2.1. Study design

This study adopted a descriptive phenomenological methodology rooted in Husserl's philosophy, which emphasizes returning "to the things themselves" and grounding knowledge in lived experience rather than abstract theorization [15]. By suspending preconceived notions and focusing on participants' narratives, this method

allows for an in-depth understanding of their subjective experiences. This theoretical framework aligns with the objectives of this study, which seeks to capture the authentic lived experiences and challenges encountered by patients with MASLD in the context of self-management. Data is collected through semi-structured interviews, enabling participants to engage in in-depth exploration while allowing them to express their perspectives flexibly and comprehensively. This study was approved by the Ethics Committee of the Affiliated Hospital of Hangzhou Normal University (2025E2-KS-098). All participants provided informed consent before the study.

2.2. Participant selection

Two researchers recruited potential participants from the Hepatology Outpatient Clinic of the Affiliated Hospital of Hangzhou Normal University between March and May 2025. A maximum variation sampling strategy was employed, encompassing diverse genders, ages, educational levels, occupations, and other characteristics, to ensure a comprehensive and rich understanding of the difficulties and obstacles faced by patients with MASLD in self-management.

2.2.1. Inclusion criteria

(1) Individuals aged 18 years or older, possessing adequate comprehension and language expression abilities;
(2) Diagnosed with MASLD according to the Guidelines [7]
(3) Provided informed consent and volunteered to participate in this study

2.2.2. Exclusion criteria

(1) Having hepatitis B or C virus;
(2) Being diagnosed with cirrhosis or hepatocellular carcinoma

2.2.3. Study design

In this study, all patients with MASLD were classified based on liver fat content and fibrosis stage measured by FibroScan. Based on controlled attenuated parameter (CAP) values, hepatic steatosis was categorized into three grades: mild hepatic steatosis: 248–268 dB/m; moderate hepatic steatosis: 269–294 dB/m; severe hepatic steatosis: > 294 dB/m. The degree of hepatic steatosis corresponds to the severity of fatty liver disease.

2.3. Data collection

The hepatologist referred patients with MASLD who met the inclusion criteria from their daily outpatient clinics to the researchers, who then established good relationships with the interviewees. Before the interviews, the researchers explained the purpose, importance, and main questions of the study to the patients to ensure their complete understanding and voluntary participation. After obtaining their consent, H.J. conducted face-to-face semi-structured interviews. The time and location of each interview were mutually agreed upon by the participants and researchers. To ensure a quiet and private environment, all interviews were conducted face-to-face in a hospital conference room. The interviews were conducted using on-site recording, each lasted between 30 to 45 minutes. Data collection persisted until thematic saturation was achieved, characterized as the juncture at which no additional themes, sub-themes, or notable variants surfaced from the data [16]. To protect participant privacy and ensure data authenticity, numerical codes were used in place of names.

The interview outline was developed based on a literature review and the HPM. It was finalized after group

discussions and consultation with a hepatology expert (PhD, with over 20 years of experience in liver disease treatment). The finalized interview outline is:

(1) How did you previously manage your MASLD?
(2) What benefits do you see in self-management behaviors such as controlling your diet and increasing physical activity? What difficulties or obstacles have you encountered during the self-management process?
(3) In the process of self-management, how have your family and friends supported or influenced you?
(4) How does your living environment influence your self-management behaviors?
(5) What feelings and experiences arise during the process of self-management? How does it impact your health behaviors?
(6) How confident are you in your ability to consistently and effectively practice self-management?
(7) In daily life, what temporary needs or personal preferences influence your self-management behaviors?
(8) Regarding managing MASLD, in which aspects would you most like to make further progress or changes?

2.4. Data collation and analysis

Interview data were transcribed verbatim within 24 hours and double-coded by two independent researchers to ensure reliability and accuracy. This study utilized NVivo 15.0 software and applied Colaizzi's seven-step analysis method to analyze the interview data [17]. First, two researchers carefully read and repeatedly reviewed the interview transcripts to gain a comprehensive understanding of the participants' narratives. Second, the interview transcripts were imported into NVivo software, which was used to conduct a verbatim analysis of the data to identify and extract important and meaningful statements related to participants' self-management experiences. One researcher extracts meaningful statements relevant to the theme, while the other researcher verifies them. Third, one researcher codes the statements that appear repeatedly. Fourth, two researchers categorize the codes with common characteristics to form themes. At this stage, three themes and nine subthemes were identified. Fifth, the identified themes were continuously compared against the original data to ensure that they accurately reflected the participants' experiences. Sixth, the fundamental structure of participants' self-management experiences were described through interpretations of themes, thematic clusters, and participant quotes. Finally, the findings were returned to participants to verify their accuracy and authenticity. During member checking, participants were informed that the process aimed solely to confirm the correctness of the data and the researchers' interpretation, rather than to introduce new insights or alternative explanations. They were only requested to point out factual inaccuracies or misunderstandings. No modifications were suggested in this study.

2.5. Reflexivity

(1) To ensure study rigor, interviews were conducted by an expert with over ten years of interview experience and a nurse with three years of nursing experience;
(2) Data processing was performed using triangulation, with two researchers independently analyzing and extracting valuable data information to improve the objectivity of data analysis. During the analysis process, the results were compared with the original interviews, and the organized findings were fed back to the patients for verification to ensure the authenticity of the study;
(3) All researchers received systematic training in qualitative research methods, were proficient in interview

techniques, and contributed to the development of the interview guide and the refining of coding results;

(4) This study complied with the Comprehensive Standards for Reporting Qualitative Research guidelines, ensuring dependability and transparency in the procedures of the data collection, analysis, and reporting [18].

3. Result

3.1. Study participant characteristics

This study included 15 participants, ranging in age from 20 to 68 years (mean = 40.4, SD = 15.5). Among them, 66.7% were married. The mean Body Mass Index (BMI) was 28.2 kg/m^2 (SD = 3.3). The duration of MASLD among the participants varied from a diagnosis within the last two months to as long as ten years. **Table 1** illustrates the characteristics of the 15 participants.

Table 1. General information about the study population

Code	Gender	Age	Educational level	Marital status	Career	Duration of MASLD (month)	Severity of MASLD	BMI (kg/m^2)
P1	**Male**	32	Middle school	Married	Self-employed	96	Severe	29.23
P2	Male	40	High school	Unmarried	Skilled worker	84	Moderate	26.03
P3	Male	20	Undergraduate	Unmarried	Student	11	Severe	34.72
P4	Female	55	Primary school	Married	No work	120	Moderate	32.17
P5	Male	22	Undergraduate	Unmarried	Student	14	Mild	24.80
P6	Female	50	Middle school	Married	Self-employed	96	Severe	27.93
P7	Female	25	Junior college	Unmarried	Office worker	3	Mild	25.15
P8	Male	61	Undergraduate	Married	Teacher	17	Moderate	25.81
P9	Male	47	High school	Married	Office worker	120	Severe	28.09
P10	Male	58	Primary school	Married	No work	13	Moderate	27.05
P11	Male	38	High school	Married	Self-employed	24	Moderate	26.12
P12	Female	39	Junior college	Married	Self-employed	12	Moderate	25.06
P13	Male	68	Primary school	Married	Retired	7	Severe	28.96
P14	Male	26	Junior college	Unmarried	Office worker	2	Severe	34.69
P15	Male	25	Junior college	Unmarried	Student	17	Severe	27.60

Abbreviations: kg, kilogram; BMI, Body Mass Index

3.2. Interview data analysis results

Based on the research results, three central themes were identified through data analysis. Researchers summarized three themes and nine sub-themes regarding the difficulties and obstacles these patients face in self-management:

(1) Individual characteristics and negative experiences;

(2) Cognitive and emotional deficits in self-management behaviors;

(3) Temporary needs and compromises with hobbies.

These findings underscore the multifactorial challenges faced by patients with MASLD in terms of self-management.

3.3. Individual characteristics and negative experiences

3.3.1. Personal factors

Individual factors include the patient's gender, age, occupation, educational level, sleep quality, and physiological characteristics, all of which are correlated with participants' self-management capabilities.

P1: "I work as a chef and usually spend about 12 hours a day on the job. I'm so busy that I hardly do any exercise".

P4: "I'm from the countryside and didn't receive much education. We can't acquire seafood like shrimp in the countryside".

P10: "I have synovitis in my legs, so I can't do strenuous exercise".

P11: "I don't do much physical labor. I usually sit while I work".

P14: "I sometimes don't want to exercise when I've had too little sleep".

3.3.2. Previous experiences with weight loss and rebound

Some participants have attempted weight loss through dietary control and exercise, but they commonly experience significant initial results followed by difficulty maintaining the regimen over the long term. Additionally, certain patients encounter weight rebound after initial weight loss, significantly compromising the durability and efficacy of self-management approaches.

P1: "I've been losing weight faster lately, down about five kilograms. At this stage, most of the weight loss is likely water weight".

P5: "I was losing weight in the first half of last year, and I was at my thinnest around November. I tend to consume food excessively and hastily, which has resulted in weight gain once more".

P9: "I lost weight once about ten years ago, dropping ten kilograms. Now I still want to get back to around 80 kilograms".

P15: "I previously participated in a weight loss experiment and lost about ten kilograms, but then I didn't control my diet and gained it all back".

3.4. Cognitive and emotional deficits in self-management behaviors

3.4.1. Insufficient recognition of the benefits of self-management

The HPM posits that patients' perception of positive outcomes from healthy behaviors is beneficial in promoting changes in their health behaviors [19]. This study found that some participants were aware that they had MASLD, but their understanding of the disease was flawed, and they exhibited a deficiency in self-awareness regarding their health.

P1: "I found out I had MASLD eight years ago, but I believed I was merely overweight, so I didn't take it seriously".

P7: "I've had MASLD for two years now. I didn't think it had much impact on my life, so I never bothered to manage it".

P14: "I know how many calories are in food, but I don't usually pay attention to it".

3.4.2. Lack of interpersonal and situational support

Effective social support can alleviate patients' stress responses, improve their perception of their illness, and increase their proactive disease management behaviors [20]. Some participants' families are able to provide them

with familial and situational support.

P3: “My mother supervises me and cooperates with me in terms of diet. She cooks relatively light meals”.

P7: “My family also exercises with me. Two years ago, I bought a treadmill for our home, and my sister runs with me”.

In addition, some participants may lack understanding and support from family members, and their living environment may be devoid of a conducive cultural atmosphere, which could weaken their willingness to self-manage and increase the probability of discontinuing self-management behaviors.

P4: “No one in my family exercises. There is no environment for exercise and no fitness equipment nearby”.

3.4.3. Negative emotional impact related to behavior

The HPM suggests that positive behavioral emotions toward a specific behavior can reinforce behavioral motivation, prompting patients to continue engaging in it. Conversely, negative behavioral emotions can make them more likely to abandon the behavior and even develop avoidance tendencies [21]. In this study, some participants experienced negative emotions such as anxiety, irritability, depression, and resentment during the process of self-management, which in turn diminished their motivation to persist with self-management behaviors.

P1: “I even had depression two years ago. My mental state hasn’t been perfect. I am employed in the restaurant industry; however, if I cease smoking and consuming alcohol, how can I maintain social interactions when I go out?”

P4: “Initially, I kept exercising for a while, but then my family said no one could watch my kids. I was really upset about that”.

P12: “I feel exhausted, and my sleep quality isn’t excellent, which makes me somewhat anxious”.

P14: “If I don’t consume enough carbohydrates on the day I exercise, I feel irritable”.

3.4.4. Low self-efficacy

Patients with higher self-efficacy have greater confidence and perseverance in completing tasks and are more proactive in acquiring disease-related knowledge and participating in their health management [22]. This study revealed that, although some participants were aware of the importance of a nutritious diet and regular exercise, they frequently struggled to adhere to these practices in reality due to insufficient confidence or diminished willpower.

P8: “Sometimes it’s just impossible to stick with it. Many people know about nutrition, but it’s difficult to put it into practice in terms of behavior and attitude”.

P10: “Doctors always tell us how to manage our diet and exercise, but we rarely do it”.

P15: “I know I should eat less and exercise, but I don’t have the confidence to stick with it”.

3.5. Temporary needs and compromises with hobbies

3.5.1. Unhealthy dietary preferences and long-term dietary habits

This study revealed that specific participants, swayed by individual taste preference, long-term unhealthy eating patterns, and familial dietary culture, persistently ingested high-fat, high-salt, or high-sugar foods. This makes it difficult to adhere to nutritionally balanced meal plans, thereby posing a significant obstacle to effective self-management.

P1: “I’m a chef, so the dishes I prepare are usually quite oily. Being from the north, I also tend to use more

salt in my daily diet".

P13: "All of my family members have a strong preference for meat. So when I cook, I just make whatever we feel like eating".

P14: "I usually eat many desserts. I can't maintain a low-sugar diet for a long time".

3.5.2. Behavioral compromises in social situations

During social activities such as holidays, gatherings with friends, and work entertainment, many participants are often influenced by external environments and find it difficult to adhere to their predetermined self-management plans, leading to interruptions or adjustments in their healthy behaviors.

P1: "On New Year's Day, my son wanted to take the family out for barbecue, so I had to go. And when we host friends and guests, I have to join them for food and drinks".

P8: "When you're away on business for a long time, it's difficult to manage your health".

3.5.3. Temporary needs conflicting with healthy behaviors

Due to heavy workloads, frequent family matters, and other temporary demands, some participants are often forced to sacrifice their original healthy lifestyle habits, such as maintaining a balanced diet, exercising regularly, and adhering to a regular sleep schedule.

P2: "When I work the night shift, I usually arrive home after midnight, which makes it tough to wake up in the morning, and I often end up missing breakfast".

P5: "When preparing for exams, I become so busy that I don't feel like exercising. When I'm under a lot of pressure, I want to eat more".

P6: "I planned to exercise in the evenings, but occasionally my son needs help with his homework, which prevents me from doing so".

P7: "Work pressure or work-related issues may interfere with my normal exercise plans".

P9: "Work or children may get in the way, so I really have to sacrifice my time".

4. Discussion

This study aims to utilize the HPM to analyze the difficulties and barriers encountered by patients with MASLD during the process of self-management. All the obstacles identified in this study could be organized and explained according to the three components of the HPM.

4.1. Strengthen personalized management and cognition to improve compliance

Findings from this study indicate that patients with MASLD demonstrate considerable heterogeneity across various dimensions, including occupational type, educational level, family and social background, and physiological status. This is consistent with the present study, in which most participants engaged in sedentary occupations and reported conflicts between their health behaviors and work schedules. Moreover, higher education levels are usually associated with greater risk awareness and a greater emphasis on disease treatment. This finding is consistent with prior research, which further identified marital status, smoking history, and the severity of fatty liver disease as additional factors influencing patients' self-management capacity [23]. This study found that although several participants achieved short-term weight loss through temporary interventions or individual

efforts, these results were frequently unsustainable due to unscientific approaches or limited disease-related knowledge, sometimes even leading to weight rebound. Such setbacks negatively influenced patients' motivation and compliance with following self-management practices. These findings correspond with previous research, which has identified insufficient knowledge and limited awareness of MASLD as key factors contributing to patients' difficulty in achieving and maintaining successful weight loss [24,25]. During the interviews, certain patients exhibited a deficiency in comprehension concerning their situation and self-management strategies. In alignment with other studies, patients reported that the self-management guidance provided by healthcare professionals was perceived as overly general and insufficiently tailored to their needs [26]. The HPM emphasizes the importance of individual characteristics and prior experiences in shaping health behaviors, suggesting that effective self-management support must be tailored to patients' lifestyles, disease awareness, and past experiences [21]. In practice, healthcare professionals should assess patients' behavioral characteristics and individual factors, develop personalized management plans, and establish interactive feedback mechanisms to optimize interventions. Combining health education with motivational interviewing can help identify reasons for past failures and provide targeted support [27].

4.2. Provide emotional and social support to enhance behavioral motivation

The findings show that social support from family, friends, and the living environment influences self-management in patients with MASLD. This result is in accordance with previous studies [28]. Supportive relationships facilitate behavior maintenance, whereas a lack of support or negative environments can reduce motivation, with family involvement additionally helping to alleviate negative emotions and promote disease awareness [29]. Numerous participants indicated that although they possessed fundamental health knowledge and recognized the positive significance of lifestyle changes for MASLD management, they generally lacked confidence and experienced wavering willpower, primarily stemming from insufficient self-efficacy. This aligns with prior research [30,31]. Disease severity further shapes self-management experiences: patients with mild MASLD often show limited risk awareness and undervalue long-term management, while those with moderate to severe disease are more prone to negative emotions such as anxiety and irritability. Consequently, the severity of the disease may influence patients' emotional conditions, risk perception, and adherence to self-management behaviors. These findings align with other research [32,33]. Moreover, previous research indicated a substantial correlation between severe hepatic steatosis and mood problems, including anxiety [34]. Evidence also suggests a bidirectional relationship between MASLD and mental health, whereby MASLD may elevate the risk of depression and anxiety, and psychological well-being may, in turn, influence disease progression and behavioral management [35]. According to the HPM, interventions should target behaviors patients can control independently, as confidence in goal achievability strengthens self-efficacy and promotes sustained behavior change [13]. Strategies include setting incremental goals, providing visual feedback, integrated shared decision-making, collaborative meal planning, creating home exercise corners, leveraging peer role models, and emphasizing positive behaviors. Ongoing self-management can be further improved by the implementation of reward mechanisms, consensus on healthy routines, and emotional support from healthcare professionals and family.

4.3. Guiding the adjustment of temporary needs to promote continuous self-management

Through the interviews, we found that the majority of participants were frequently distracted by immediate needs such as dietary temptations, social engagements, work pressure, and mood fluctuations during the process of

self-management. These distractions frequently resulted in disruptions to food compliance, regular exercise, and sleep management. Such temporary needs typically arise from the pursuit of instant gratification or psychological comfort, which may undermine patients' commitment to long-term health goals. This discovery is consistent with prior research, which has demonstrated that patients' temporary requirements, long-standing unhealthy dietary patterns, and diverse cultural backgrounds pose significant obstacles to self-management [36]. Future interventions should balance patients' life contexts with behavioral priorities through individualized assessments that identify high-risk situations and inform tailored coping strategies. Techniques such as dietary adjustments, behavioral substitution, and interest diversion can help align immediate preferences with long-term health goals. Co-creating self-management plans with patients enhances participation, strengthens intrinsic motivation, and supports the sustainability of healthy behaviors.

5. Conclusion

Guided by the HPM, the present study employed qualitative interviews to examine the specific challenges that patients with MASLD face during the self-management process. To address these challenges, future interventions should focus on identifying behavioral triggers, aligning healthy behaviors with lifestyle preferences, and stimulating patients' subjective motivation. Strengthening doctor-patient collaboration, optimizing social and family support systems, and incorporating digital health tools may further improve the sustainability of healthy behaviors and open new avenues for MASLD management. Additionally, integrating the perspectives of family caregivers and healthcare professionals could provide a more comprehensive understanding of patient needs and barriers. Finally, stratified analyses based on disease severity may offer valuable insights for designing stage-specific, targeted interventions that support long-term lifestyle modification and overall disease management.

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