

A Qualitative Study of Exercise Participation Intentions Among Patients Undergoing Maintenance Hemodialysis

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Introduction. Exercise improves physical function and quality of life in patients undergoing maintenance hemodialysis (MHD). However, exercise participation remains suboptimal in this population. This study explored factors influencing exercise participation intentions among patients undergoing MHD to provide evidence for developing targeted interventions.

Methods. A qualitative study was conducted using purposive sampling to recruit 16 patients undergoing MHD. Data were collected through semi-structured interviews and analyzed using Colaizzi's phenomenological method. Themes were identified based on the Capability, Opportunity, Motivation–Behavior (COM-B) model.

Results. Three major themes and 12 subthemes were identified. Capability included insufficient exercise-related knowledge, limited self-management skills, and poor perceived physical condition. Opportunity comprised the need for individualized exercise prescriptions and professional guidance, limited opportunities for exercise, positive social support, and social isolation. Motivation encompassed fear of exercise, recognition of the value of exercise, previous exercise habits and experiences, expectations of exercise benefits, and strengthened role identity. These factors collectively influenced patients' willingness to participate in exercise.

Conclusions. Exercise participation intentions among patients undergoing MHD are shaped by multiple capability-, opportunity-, and motivation-related factors. Healthcare professionals should strengthen exercise education, provide individualized exercise prescriptions and professional guidance, enhance social support, offer timely feedback on exercise outcomes, and implement multidimensional strategies to improve patients' self-efficacy and motivation, thereby promoting greater participation in regular exercise.

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INTRODUCTION

The common complications observed in patients undergoing maintenance hemodialysis (MHD), including gastrointestinal dysfunction, depression, malnutrition, sarcopenia, and cognitive impairment, have significantly compromised their physical and

mental health as well as their overall quality of life.¹⁻³ A substantial body of research indicates that



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exercise not only enhances the physiological function and quality of life in patients undergoing MHD, but also improves their dialysis adequacy.^{4,5} Both domestic and international expert consensus and guidelines also recommend and encourage exercise for MHD patients without contraindications.^{6,7} However, only 42.57% of patients were willing to participate in exercise.⁸ Although some studies showed that the overall willingness to exercise was high, only 40% of the patients could actually exercise regularly, and their willingness to exercise did not match their exercise behavior.⁹ It can be seen that the overall exercise situation of MHD patients is still not optimistic.⁸⁻¹¹ At present, most studies related to exercise in MHD patients focus on exercise prescription and exercise experience, and pay relatively little attention to exercise willingness. The willingness to exercise is complex and diverse, focusing on the participant's perspective and experience, and can predict the future exercise behavior. More autonomous and voluntary exercise will make patients better participate in and persist in exercise.¹² Understanding and enhancing the exercise willingness of MHD patients, promoting the change of their exercise behavior and improving exercise compliance are important prerequisites to maximize the benefits of exercise. The core of the trans-theoretical model (TTM) posits that behavior change has five stages: precontemplation, contemplation, preparation, action, and maintenance,¹³ which can be used to reflect an individual's willingness to engage in physical activity.¹⁴ Michie *et al.*¹⁵ introduced the Capacity, Opportunity, Motivation-behavior (COM-B) model in 2011 to elucidate the relationship between individual intentions and behaviors. This model serves as a valuable tool for identifying both individual and contextual factors that influence behavioral change. Therefore, this study investigated patients' willingness to exercise based on TTM, guided by the COM-B model, and adopted qualitative research methods to understand the factors affecting patients' willingness to exercise, so as to provide a basis for formulating intervention programs to promote MHD patients' exercise behavior.

MATERIALS AND METHODS

Research Objects

Patients who underwent maintenance

hemodialysis at the blood purification center of a Grade III hospital between April and June 2024 were included in this study. Inclusion criteria: 1) MHD treatment ≥ 3 months, 2) age ≥ 18 years, 3) be conscious and able to communicate normally, 4) Voluntarily participate in the study and agree to the interview and recording. Exclusion criteria: Contraindications to exercise, including conditions such as angina pectoris, atrial fibrillation, tachycardia, and other significant arrhythmias; frequent hypotension during dialysis; and other relevant factors. The purposive sampling method was employed to account for aspects such as gender, age, culture, and duration of dialysis among the interviewees. This approach aimed to enhance the representativeness of the sample participants. The sample size was determined based on the principle of information saturation, ensuring that no new themes emerged during data analysis. Additionally, three extra subjects were interviewed. Finally, a total of 13 patients were included in the study, identified as P1 through P13. Their ages ranged from 25 to 70 years, with dialysis durations spanning from 2 to 13 years. Among these participants, 62% were female. Educational attainment varied, with seven individuals holding a high school diploma or higher. Employment status showed diversity: seven participants were unemployed, two worked as freelancers, two were employed in regular positions, and two were retirees. The willingness to engage in exercise was categorized into five distinct groups corresponding to the pre-intention stage, intention stage, preparation stage, action stage, and retention stage, with a distribution of 5, 2, 3, 1, and 2 cases respectively. The general data are shown in Table 1. This study was reviewed and approved by the Ethics Committee of Lianyungang First People's Hospital (KY-20240409001-02).

Study Methods

Prepare an interview outline. The data collection was conducted utilizing a semi-structured interview outline. Based on a thorough literature review and discussions with the research team regarding the objectives of the study, we developed an initial interview guide. Prior to the formal interviews, adjustments were made based on pre-interviews conducted with two patients to refine

Basic Characteristics of Interviewees

ID	Age (year)	Gender	Dialysis Duration (years)	Education level	Marriage	Occupation	Comorbidity	Willingness to exercise
P1	40	male	3	High school	Married	Freelance	hypertension	Preintention stage
P2	60	male	3	Junior high school	Married	Unemployed	High blood pressure, type 2 diabetes	Intention stage
P3	52	female	5	Junior high	Married	Unemployed	hypertension	Preintention stage
P4	42	female	5	Junior college	Married	Unemployed	High blood pressure, type 2 diabetes	Action phase
P5	39	female	3	Junior college	unmarried	Unemployed	High blood pressure, post-parathyroidectomy	Preintention stage
P6	36	female	4	Undergrad	Divorced	Designers	High blood pressure, liver cysts, secondary hyperparathyroidism	Preparation stage
P7	66	male	13	Junior high	Married	unemployed	Grade 3 hypertension, chronic left heart dysfunction	Stage of intention
P8	50	female	3	Elementary school	Married	Unemployed	Diabetes, high blood pressure, heart dysfunction	Maintenance phase
P9	25	male	2	High school	unmarried	Unemployed	hypertension	Preintention stage
P10	28	female	3	Undergraduate course	unmarried	Public servants	High blood pressure, hypertensive retinopathy	Preparation stage
P11	70	female	4	Elementary school	Married	Retired	Nothing	Preintention stage
P12	31	male	9	Undergrad	Married	Freelance	Nothing	Holding stage
P13	57	female	5	Junior high	Married	Retired	hypertension	Holding stage

Note. Pre-contemplation Stage: The patient exhibits no intention to engage in physical activity within the next six months; Contemplation Stage: The patient is considering a change but has not yet committed to it; Preparation Stage: The patient intends to take action within the next 30 days and has initiated some preparatory steps; Action Stage: The patient has commenced physical activity, although this engagement has lasted less than six months and lacks stability; and Maintenance Stage: The patient's physical activity behavior has been sustained for at least six months.

and finalize the interview outline.

- 1) Are you familiar with the concept of sports rehabilitation? Additionally, do you know which types of exercise are appropriate for patients undergoing dialysis?
- 2) Do you believe that your current physical condition is conducive to engaging in exercise? Are you aware of the numerous benefits that regular exercise can provide for your overall well-being?
- 3) Do you engage in regular physical exercise? If so, what factors motivate you to maintain this habit? Conversely, if you do not exercise regularly, what barriers prevent you from doing so?
- 4) What kind of exercise do you usually do? Do your family, friends or medical staff support your exercise? How do they support you?
- 5) Do you know what is exercise in dialysis? What are the ways?
- 6) Would you be willing to participate in a sports rehabilitation program if our dialysis center

offers one in the future?

- 7) What are the main obstacles that you do not want to participate in? Under what circumstances would you be willing to participate?

Data Collection Methods. The interview was conducted collaboratively by two researchers. Prior to the interview, the researchers explained the purpose of the study to the participant and obtained written informed consent. Following an established interview outline, targeted questions were posed, with certain inquiries explored in greater depth based on specific circumstances. Concurrently, non-verbal behaviors and emotional responses of the participants were observed and documented, along with detailed records of the interviews. Each session lasted between 20 to 30 minutes, and all interviews were audio-recorded with the participants' consent.

Data Analysis Methods. According to the sequence of interviews, the participants were designated as P1 through P13. The data were analyzed by two researchers utilizing Colaizzi's

seven-step method,¹⁷ which includes: 1) becoming thoroughly acquainted with the interview data; 2) identifying significant statements that hold meaning; 3) constructing units of meaning; 4) organizing these into themes and categories; 5) defining and describing each theme; 6) forming a foundational structure; and 7) providing feedback on the results to respondents for verification of authenticity.

RESULTS

Based on the COM-B model, themes were identified and synthesized to establish the analytical framework. A total of three primary themes and twelve sub-themes were delineated.

Ability factors: This category encompasses three sub-themes: a lack of sports-related knowledge, insufficient self-management skills, and poor physical awareness.

Opportunity factors: This category includes personalized exercise prescriptions and guidance, limited access to exercise facilities, strong social support, and the impact of social distancing—comprising four sub-themes.

Motivation factors: This category consists of five sub-themes: fear of sports participation, identification with the value of sports, established sports habits and experiences, anticipated benefits from engaging in sports activities, and reinforcement of role cognition.

Ability Factors

Lack of sports-related knowledge. The lack of knowledge regarding exercise and the understanding of its importance significantly influence patients' willingness to engage in physical activity. During interviews, it was revealed that most patients were unaware of suitable modes, types, and intensities of exercise. Additionally, they had limited knowledge about the benefits associated with long-term regular physical activity. Many believed that exercise offered little advantage for their current health status and felt there was no necessity to engage in it. P1: "I don't know what kind of exercise is appropriate for us; I think my body isn't suited for it, so I don't exercise myself. I can't see any benefit—it doesn't manifest itself in me anyway." P2: "Playing sports certainly isn't suitable because there's a fistula on my arm; I'm

afraid to move too vigorously. As for what might be appropriate, I'm not clear on that—so walking will have to suffice." P10: "I don't pay attention to which sports are suitable; I assume as long as I move a bit it's fine. I usually take occasional walks—small amounts of exercise don't seem very beneficial and aren't worth overthinking." P6: "It's definitely beneficial for cardiopulmonary function. Patients in our group who have been on dialysis for an extended period have shared this information with me, so I'm eager to give it a try." P12: "I understand that exercising is good for me—I can find all the information online. I wouldn't persist with exercising."

Lack of self-management skills. Some patients who express a willingness to engage in physical activity but have not yet adopted regular exercise habits report that they are uncertain about how to exercise. They find it challenging to select an appropriate form of exercise and often forget to participate in physical activities for various reasons. P2: "When you wish to engage in exercise, it is advisable to do so twice. At times, there may be an overwhelming number of thoughts that hinder your ability to exercise." P6: "We have fistulas in our arms, which complicates our ability to select various sports activities, such as kettlebell swings. Is this permissible? If there are clear guidelines available, I would have no concerns." Patients who possess good habits and self-management skills tend to remain more active. P12: "My typical forms of exercise include jogging and climbing. I generally opt for physical activity after waking up in the morning and approximately half an hour after dinner. Additionally, I consistently wear a fitness tracker to monitor my condition and review my exercise records to ensure that I meet my daily workout goals."

Perceiving poor physical condition. Fatigue and weakness are prevalent co-occurring symptoms among patients undergoing MHD, with their effects being most pronounced on dialysis days. In the interview, the majority of patients expressed that they were inclined to engage in exercise only when they felt rested and perceived their dialysis condition as favorable. Otherwise, they did not consider participating in physical activity. P1: "Engaging in even a small amount of strenuous

exercise can lead to panting. When you experience panting and fatigue, how likely are you to consider exercising?" P2: "On dialysis days, I refrain from walking if I'm feeling tired or unwell. I prefer to rest at home and focus on recovering my strength." P6: "Currently, I've noticed an increase in body fat. While I can manage half an hour of aerobics, after just five minutes of jumping, I find myself fatigued and slightly out of breath; this discourages me from continuing as my physical stamina seems insufficient." P9: "I used to exercise regularly before falling ill. However, after becoming sick, prolonged exercise now leaves me feeling dizzy and bloated, with elevated blood pressure that makes me reluctant to move." P13: "I undergo dialysis on Tuesdays, Thursdays, and Saturdays. If I'm feeling overly fatigued or have not recovered well the following day, I will abstain from exercising; I only engage in physical activity when I'm in good condition."

Chance Factors

Personalized exercise prescription and instruction. Simple, safe and effective exercise prescription and scientific guidance of medical staff can mobilize the enthusiasm of patients to exercise, on the contrary, patients will be discouraged and lose interest. P1: "I don't like too complicated sports, the brain is not as good as before, we are already very busy, who is willing to bother to remember complex actions"; P2: "the movement is not so simple as the mouth says, it should consider physical strength and time, but also consider safety, it must vary from person to person, and if I do not do the action in place, there is no effect, it is better not to move"; P4: "I hope the medical staff can give some simple guidance, one can learn, do not trouble you the kind, I may be more active."

Limited exercise conditions. Good condition support is the promoting factor to enhance patients' willingness to exercise. In this study, the majority of patients indicated that they had no condition to exercise. P1: "My own time is limited, I don't want to spare some time to exercise"; P3: "Take up time to go home"; P10: "I come to dialysis three times a week, plus work, the day of the week only weekend is my own, I must first want to lie at home and rest,

do not want to exercise"; P2: "At home, I can go to the small park to use the exercise equipment, but you can see that the bed I lie on during dialysis does not have any exercise conditions, and I cannot insist on stretching my arms and legs by myself." Inconvenient transportation and inclement weather can also affect patients' willingness to exercise. P4: "I do not exercise when it is raining, windy or cold, and I am afraid of catching a cold. Moreover, I live in a mountain, and it is difficult to climb hills, so I have no place to move when I want to exercise. But now that it's getting warmer, I'm sure I'll walk more than before."

Good social support. The importance medical staff attaches to exercise affects patients' enthusiasm for exercise. P8: "The medical staff did not require me to exercise, so I did not pay attention to it. But they were strict with me in terms of diet and water control, so I paid more attention to diet and water control." P5: "There will be doctors and nurses to do some exercise appropriately, but it is like a mantra to 'exercise more', I did not say how to do it, I did not take it seriously"; P10: "The nurse sister said that my poor emotional state was due to lack of exercise, and I often joked that it was better for me to 'go to the field to do farm work', so I did not reject exercise". The support, encouragement and companionship from family and friends improved the patient's exercise compliance and became an important factor affecting the patient's willingness to exercise. P2: "My family members will accompany me to go out more when they are free, and going out for exercise can help me communicate with others and kill the boring time"; P8: "If the family is free from pressure and happy in body and mind, then we are definitely willing to go dancing or something"; P10: "We have a group of patients who share sports knowledge, introduce some experiences, and encourage us to do more sports. My family members will drag me to do sports together." However, it was found in the interview that excessive family support became a stumbling block that hindered the patients from doing exercise. P5: "My two children are very filial, and they all rush to do their work at home. My husband also does housework and doesn't let me do anything. Every day, I just lie down or sit at home and have nothing to do"; P11: "When I am

old, my children are afraid of falling and no one will take care of them, so I am asked to take more rest at home. Every time I come for dialysis, I am sent to the door, so I really have little chance to exercise". Some patients also expressed their concern about the extra cost of exercise rehabilitation. P8: "We spend a lot of money, if there is any extra cost for this exercise rehabilitation, I am definitely not willing to participate in it."

Social distancing. Social alienation refers to the patient's perception of negative treatment from the outside world when participating in social interaction, resulting in natural alienation¹⁹ from social relations, reduced social activities of the patient, and withdrawal behavior, resulting in decreased physical activity and low motivation for sports. In this interview, it was found that some patients had a low sense of social participation, resulting in a sense of social alienation. P8: "My reaction is a little slow now, I can't see people greeting me all the time, which is very embarrassing. After a long time, people will ignore me, thinking that I don't care about people, and I don't want to say hello to others, so I don't want to go out and walk around for fear of meeting acquaintances"; P11: "Since I got sick, I don't sociate with others. I come for dialysis three days a week and have no time, so I don't want to go out. I can only talk with my old man and son at home every day, mixing it up day by day."

Motivation Factors

Fear of sports. Patients have doubts about the safety of exercise and worry about new symptoms or aggravating the progression of the disease and bringing unnecessary injuries to themselves. P1: "I heard that creatinine is produced during exercise, like our own creatinine is high, isn't exercise even higher? Is it safe "; P8: "I have a fistulous hand, the doctor asked me not to use too much strength, cannot lift things, in addition to walking, other hand sports I certainly cannot do it, if the fistula is broken, then I do not have more than the loss." The patient's fear of exercise is widespread, which hinders the patient's willingness to exercise to a certain extent. P3: "I dare not think, I will be tired after dialysis, and exercise will definitely aggravate my symptoms, I am not willing to take risks"; P4:

"Especially after dialysis, I feel so tired that I can hardly walk home without falling down. I am not even able to walk steadily, let alone do sports. I am afraid that sports will bring more fatigue"; P6: "Because I easily lose blood pressure, so I do not dare to try, I am afraid that the blood pressure will drop faster if I toss again, so I dare not"; P7: "Walking too fast will make the heart a little vague and uncomfortable, if you do strenuous exercise, you can only take a walk." Some patients said that under the premise of safety and security, they may be willing to try to exercise. P10: "If you can guarantee my safety, supervise me and monitor my vital signs, I will dare to exercise."

Recognition of the value of exercise. Patients' disidentification of sports value leads to their rejection of sports. P1: "Why do you have to force yourself to do some exercise, cannot achieve any effect, exercise cannot take medicine, no injections, no dialysis? Do not want to fix these bells and whistles". And the recognition of the value of exercise is the basis for cultivating the awareness of exercise and promoting the change of patients' behavior. P2: "Exercise is good for health and makes people feel happy, so I am definitely willing to take part in it." P8: "I am not in good health, but exercise is definitely good for me, and I must do something good for my health."

Exercise habits and experience. Inherent exercise habits can bring comfortable inner experience to patients. In this study, it was found that patients with exercise habits have a strong willingness to exercise, otherwise, they have a psychological rejection of exercise. P5: "I didn't like sports before I got sick. Without that habit, I was busy making a living, so I didn't have the leisure to take special exercise"; P7: "I still like sports very much, have the habit of walking, although not regular, but as long as I have time I still love to go out for a walk"; P12: "I like sports. In the past, I played ball games, then I climbed mountains and ran. I am not used to doing sports, so sports are not difficult for me. And positive exercise feedback can stimulate patients' willingness to participate in sports. P2: "I feel that after exercise, blood pressure can be lowered, blood sugar is good, and blood circulation can be increased"; P4: "I used to walk stably, but I feel lighter than before

after slow exercise.” And my appetite is much better than before; Many indicators are better than before, and the number of falls is less.” P8: “I feel good after exercise, and I can sweat more, which is metabolized from the skin, so that less water can be removed during dialysis”; P12: “Because of regular exercise, so I feel my physical strength is better than other friends; I sweat through exercise, so I can drink a little more water.”

Expected Benefits of exercise. Having a positive expectation of the outcome of exercise is an important promoter of willingness to exercise, and some patients indicated that they would be willing to try exercise if they knew the expected benefit of exercise. P1: “If exercise is helpful to the condition, safe and effective, and the effect is foreseeable, it can be considered”; P3: “If exercise can help me not take medicine, reduce my inflammation index, and improve my dialysis adequacy, then I will be willing to get up and move; If all the work is useless, then I would rather rest.” P6: “If it helps me lose weight, I should be able to keep going”; P10: “I am a little anxious, and if exercise can improve this state, I am willing to exercise more actively.”

Enhancement of role cognition. Patients’ different cognition of their roles affected their willingness to exercise. In the interview, it was found that the negative role cognition hindered the patients’ willingness to exercise. P1: “I have been in this state. I used to exercise before I got sick, but now I don’t move much and I don’t have expectations”; P6: “After a day’s work, all the energy has been used up, and I am physically and mentally exhausted at home. I am already a patient, so I feel at ease that I will not think about exercising anymore”; P11: “I am so old, why do I exercise?” When young people move, it makes sense, so I don’t need to do it anymore.” However, positive role cognition can promote the patients’ willingness to exercise. P9: “After all, I am a young person, and I am the only child in the family. I can’t lie down like a disabled person all the time, but I still want to be active.” P12: “I have to take my wife to exercise, she wants to lose weight, in order to motivate her, I also have to move; And if I can get other patients to start exercising, I’m happy to do that too.”

DISCUSSION

Improve the Patient’s Motor Ability and Build Motor Belief

This study shows that most patients do not know enough about exercise, do not have a comprehensive understanding of the benefits of exercise, and think that their physical state is not suitable for exercise. However, the symptoms of fatigue and weakness often associated with MHD patients aggravate their negative disease perception and lead to their low willingness to exercise, which is consistent^{20,21} with the results of previous studies, and is manifested as a lack of awareness and confidence to participate in sports. Although some patients have the willingness to exercise, they are often unable to change from the intention stage to the action stage due to the lack of certain motor skills and self-management ability. This suggests that medical staff should use a variety of information channels to show patients the positive outcome related to exercise, the choice of exercise mode, intensity judgment, the use of auxiliary equipment and other guidance, strengthen patients’ recognition of the value of exercise, help patients establish the belief in exercise, help stimulate their exercise motivation.²²

Provide Environmental Resources and Social Support to Enhance Self-efficacy

From the results of this study, it can be seen that the lack of personalized exercise guidance and appropriate exercise conditions will make patients afraid of difficulty. There are also patients who think that medical staff pay more attention to their diet and water control, and pay less attention to exercise, which affects their attention to exercise. The interview found that patients with a strong willingness to exercise were usually encouraged and supported by family members and medical staff, while patients with excessive²¹ protection from family members gradually became dependent and formed a sedentary habit due to the inclusion of daily household activities, and their willingness to exercise was generally low. In the interview, it was also found that some patients had a sense of social alienation, resulting in the reduction of their social activities and negative emotions, and their willingness to exercise was not optimistic.

The behavioral attitude of medical staff and family members is the main external motivation that affects patients' willingness to participate in sports. Therefore,^{11,23} medical staff should encourage and urge patients to participate in sports, provide them with personalized exercise programs, help patients solve their perceived movement disorders, and help patients gradually adapt to exercise intensity and build self-confidence. Similarly, the support of the patient's family can enhance the patient's willingness to exercise, and ensure the safety of the patient, strengthen social support, so that the patient has the intention^{24,25} to participate in sports rehabilitation. Dialysis units should actively carry out exercise in dialysis if conditions permit, which can not only improve the dialysis adequacy of patients, but also enable patients to obtain higher exercise self-efficacy through more communication, fully mobilize patients' subjective initiative,²⁶ strengthen exercise willingness, and promote the establishment of regular²⁷ exercise behavior.

Overcome the Fear of Exercise and Promote the Participation in Exercise

Sports fear refers to an excessive, irrational fear of exercise due to the fear²⁸ of injury or re-injury. The interview results showed that some patients questioned the safety of exercise, and worried that exercise would aggravate their existing symptoms and bring unnecessary trouble to their families and themselves, which became the most important factor affecting their willingness to exercise. The elderly patients in this interview also showed the fear of falling, which is consistent with other research results, and this psychology is one of the factors that reduce their physical activity.²⁹ Tao Ying *et al.*³⁰ found that 67.97% of 256 MHD patients had exercise fear. The reduction of exercise led to the decline of motor function, and the decline of motor function further increased the fear of exercise, forming a vicious circle. Therefore, in the future, professional exercise therapists and psychological counselors should be included in the exercise management team of MHD patients, and multi-disciplinary cooperation should be carried out to reasonably assess the exercise risk of patients, increase the concern about the level of exercise fear and the fear of falling, actively find out the causes,

help them overcome the fear of exercise, eliminate the safety concerns of patients, and prevent and improve the current situation of patients' falls. On the premise of ensuring the safety of exercise, improve the quality of exercise and promote the active participation of the patients.

Multi-dimensional Effective Incentives to Guide the Formation of Exercise Habits

Studies have shown that habits can bring comfortable experience and internal satisfaction²³ to patients, and the positive experience actually perceived after exercise may be an important factor³¹ for patients to adhere to long-term exercise. This study found that patients with exercise habits and positive experience of exercise had stronger exercise willingness and higher compliance. Similarly, patients who did not start regular exercise but had high expectations for the benefits of future exercise were more likely to shift their exercise willingness to the intention stage or the action stage. Encouraging patients to use low-cost wearable devices (such as pedometers and accelerometers) or smartphone apps to record and track actual steps can improve their exercise levels.³² Therefore, medical staff can take multi-dimensional measures such as wechat group reminder, exercise punch, and exercise during dialysis to help patients establish exercise habits, and set goals step by step according to patients' exercise ability, increase exercise prescriptions consistent with patients' exercise habits as much as possible, pay attention to patients' feedback during exercise, timely detect patients' adverse emotions and assist in adjustment. Actively guide patients to perceive the benefits of exercise. At the same time, patients who perceive the benefits can be encouraged to show the positive results related to exercise to their patients, such as the improvement of physical function, the adjustment of psychological state, the reduction of disease symptoms, etc., stimulate the interest of patients, mobilize the enthusiasm for sports participation, help patients have the willingness to exercise independently, and further promote the generation and maintenance of patients' exercise behavior.

CONCLUSIONS

Through a descriptive study, this research

investigated the factors that influence the willingness of patients undergoing MHD to engage in exercise. It identified three primary themes—ability, opportunity, and motivation—and delineated twelve sub-themes based on the COM-B model. The findings led to specific recommendations aimed at informing intervention strategies designed to enhance exercise behavior among MHD patients, ultimately improving their adherence to physical activity. As a single central qualitative study, this research does not allow for definitive conclusions regarding the overall characteristics of exercise willingness among MHD patients. Furthermore, it did not examine the extent to which various factors—including ability, opportunity, and motivation—influence patients' willingness to exercise nor did it explore the dynamic process by which their willingness may change over time. To address these limitations, future studies should consider expanding the sample size and conducting hybrid research that integrates longitudinal qualitative methods with quantitative approaches for a more comprehensive analysis.

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