

Self-Management Behaviors in Patients with Hip Osteoarthritis

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Abstract

Background: Hip osteoarthritis (HOA) causes joint destruction, resulting in hip pain, limited range-of-motion, claudication, and joint deformity. In the conservative treatment of HOA, self-management is important to manage symptoms and control disease progression. In a previous study, the researchers conducted a conceptual analysis of 43 foreign studies on self-management during conservative therapy for patients with HOA. The results revealed a definition of self-management during conservative therapy for patients with HOA. However, because that study analyzed only the foreign literature, it remains unclear whether the findings reflect the characteristics of the Japanese health-care delivery system, health-care insurance system, or the lifestyles and cultural characteristics of Japanese patients with HOA. **Objective:** We aimed to clarify the self-management behaviors of patients with HOA. **Methods:** Semi-structured interviews were conducted with five patients diagnosed with HOA, and the results were subjected to inductive qualitative analysis. **Results:** Six categories of self-management behaviors were extracted for patients with HOA: [active information gathering about HOA], [personalized pain and weight management, and strategies for reducing hip joint load], [reflection on living conditions with individuals and professionals, and determination for future efforts], [continuation of exercise and weight management based on personal strengths and achievements, and mutual support with others], [co-existence with HOA while managing negative feelings], and [choosing treatment methods by trusting doctors while struggling with personal needs]. **Conclusion:** These findings suggest the need to develop health guidance and educational programs for patients with HOA that focus on how to prevent disease progression and cope with symptoms.

Keywords

Self-Management, Hip Osteoarthritis, Health Behavior, Qualitative Research,

Conservative Treatment

1. Introduction

Osteoarthritis (OA) is a common, painful, and disabling condition that affects approximately one-third of older adults [1]. It is ranked as the 11th leading cause of disability worldwide, with the knee and hip joints being the most commonly affected [2]. The symptoms of OA include joint pain, tenderness, limited range of motion, clicking sounds, and varying degrees of localized inflammation. These symptoms often make it difficult for individuals to carry out normal daily activities [3] [4]. OA is also a major contributing factor to the rise in healthcare costs, with the increase in joint replacements significantly contributing to the surge in these expenses [5]. Japan, as one of the world's leading super-aged societies, is expected to continue experiencing rising longevity. As a result, hip osteoarthritis (HOA), which progresses with aging, is anticipated to become a major social issue that hinders the extension of healthy life expectancy. Patients with HOA often experience chronic pain, functional limitations, anxiety, depression, sleep disorders, decreased work productivity, and overall reduced quality of life (QOL) [6]-[10].

Treatment for HOA is chosen based on the disease stage, symptoms, and patient needs. In advanced stages, surgical treatments such as joint replacement are considered, while conservative treatments are applied in early stages or when symptoms are mild. The primary goals of conservative treatment are pain relief and functional improvement [11] [12]. However, research on conservative treatment in Japan is limited, and there are insufficient guidelines or methods for adjusting treatment to individual patients' needs based on their lifestyles and psychological backgrounds [13] [14].

In the United States, the concept of individuals taking responsibility for their own health is highly valued, and self-management is considered a critical component in the treatment of people living with chronic diseases [15]. Barlow [16] defines self-management as "an individual's ability to manage the symptoms, treatment, physical and psychosocial impacts, and lifestyle changes inherent in living with a chronic condition." For patients with chronic diseases, actively managing their symptoms is crucial for maintaining long-term independence and a good QOL [17]. HOA is a progressive disease that requires long-term care; therefore, self-management plays an essential role in achieving treatment goals.

The complexity of many chronic diseases requires a patient-centered care delivery system, which is characterized by long-term coordination among various healthcare professionals. Through this coordination, patients are provided with the information and skills necessary to actively engage in their care, resulting in optimized health outcomes [18].

Research on non-surgical treatments for HOA in Japan is limited and primarily

focuses on treatment outcomes. Although there are studies on the effectiveness of conservative therapy [13] and long-term radiographic progression [19], detailed analysis of factors influencing long-term outcomes is lacking. Current treatment guidelines [14] focus on treatment effectiveness but lack specific guidance on individualized treatment and enhancing self-management capabilities. For instance, there is insufficient clarification of predictive factors for conservative therapy, and methods for adjusting treatment based on patients' lifestyles and psychological backgrounds are not well established. Furthermore, there is a lack of well-established self-management support programs to assist patients in continuing their treatment independently. These gaps hinder the maximization of treatment effectiveness and improvement of QOL. To maintain long-term effects, it is crucial to establish methods for supporting patients' self-management.

In other words, while research on non-surgical treatments for HOA is progressing, there is still insufficient identification of factors affecting treatment outcomes, and further research is needed on individualized treatment and support methods. For HOA patients in Japan, the development of guidelines for effective conservative therapy and practical treatment methods remains a critical challenge.

Nishimura *et al.* [20] conducted a concept analysis of self-management during conservative therapy for HOA patients based on 43 international studies. Their results clarified the definition of self-management during conservative therapy and identified six key attributes: "decision-making and acceptance of illness," "acquisition of knowledge and skills for treatment and care," "refinement of coping methods for issues," "coping with negative emotions," "adjustment of social roles," "utilization of resources and information," and "collaboration with healthcare providers." However, since this analysis was based on international studies, it remains unclear whether the findings reflect the characteristics of the Japanese healthcare system, insurance system, or the lifestyles and cultural aspects of Japanese HOA patients. Therefore, the goal of this study is to clarify how Japanese patients with HOA perceive and engage in self-management.

2. Materials and Methods

2.1. Definition of Terms

In this study, based on the results of previous research, self-management during conservative therapy for patients with HOA is defined as "a process in which patients, in collaboration with medical professionals, actively participate in their own treatment and make regular, intentional, and continuous efforts toward goals aligned with their individual needs by utilizing their own abilities. Patients acquire knowledge about HOA and its treatment, take responsibility for healthy behaviors, and independently refine coping methods while learning skills to manage the disease, their emotions, and their social roles." ([20], p. 387)

2.2. Study Design

Qualitative descriptive study.

2.3. Study Participants

This study targeted individuals diagnosed with HOA who were outpatients at Hospital A in Yamagata Prefecture. The selection criteria for participants included the following conditions:

- A diagnosis of HOA.
- Participants in the stage 2 - 4 of HOA (The Japanese Orthopaedic Association diagnostic criteria).
- Participants who possess the language skills necessary for understanding and answering the self-management behavior questions.
- No history of rheumatoid arthritis, mental disorders, or dementia.
- No other serious health conditions (e.g., heart disease or diabetes) that may interfere with self-management of HOA.

Exclusion criteria included individuals who were unable to respond to the questions or who were deemed incapable of participating in the study. The selection of eligible participants was conducted by orthopedic specialists at the target facility based on the above criteria, and patients who agreed to participate were selected through a research explanation and informed consent form.

2.4. Data Collection Methods and Content

The data collection period was from May 1 to 31, 2023. Orthopedic specialists at the target facility were asked to select patients who met the criteria mentioned above as potential study subjects. Participants who agreed to cooperate in the study were selected using a research explanation and consent form. This study was conducted in a private room to ensure the privacy of the participants. Initially, the definition of self-management behaviors in this study was explained. Then, the participants were asked to discuss freely their daily self-management behaviors that fit this definition. The interviews were recorded using an IC recorder with the participants' permission.

2.5. Data Analysis Methods

The analysis method was based on the qualitative descriptive study design described by Gregg *et al.* [21]. First, the interview data were transcribed verbatim, and statements regarding the self-management behaviors of patients with HOA were summarized into concise sentences as codes. The codes were then grouped into categories based on their meanings, similarities, and homogeneity. Additionally, the relationships between categories were examined using Glaser's [22] coding families, which consist of the "six Cs": Causes, Contexts, Contingencies, Consequences, Covariances, and Conditions. A relational diagram was created while scrutinizing the interrelationships between categories, such as "Does this category act as the cause of another category?"

To ensure the privacy of the participants, the study was conducted in a private room. Initially, the definition of self-management behaviors in this study was explained. Then, the participants were asked to freely discuss their daily self-

management behaviors that fit this definition. The interviews were recorded using an IC recorder with the participants' permission.

2.6. Ethical Considerations

This study was approved by the Ethics Committee of the Yamagata University School of Medicine (approval No.: 2022-313). Additionally, the study purpose and methods were explained to the hospital director and nursing administrators at Hospital A, and permission to conduct the study was obtained from the hospital director.

The researchers also explained the purpose of the research to the study participants, as well as the content of the interviews, the time required for the interviews, that participation in the research was voluntary, that they would not be disadvantaged if they wished to withdraw or interrupt their participation at any time, that their privacy would be protected, and that this study was unrelated to treatment and not intended to assess self-management abilities. This explanation was given both verbally and in writing. After confirming the participants' willingness to participate in the study and obtaining their consent, the interviews were conducted. At the beginning of each interview, the researchers reviewed the above information again and obtained a signed consent form. This study was supported in part by a Grant-in-Aid for Scientific Research (Grant-in-Aid for Scientific Research C 23K09925).

3. Results

3.1. Overview of the Study Participants

The study participants consisted of one man and four women (age range, 20 - 85 years; median age, 57 years). Two of the participants had a history of total hip arthroplasty. The duration since diagnosis ranged from 1.5 to 56 years, with a median of 18.0 years (**Table 1**).

Table 1. Background characteristics of the study participants.

Participant	Age (years)	Sex	Years since diagnosis	Diagnosis side	Experience with total hip arthroplasty
A	44	F	1.5	Both sides	No
B	34	M	18	Left side	No
C	57	F	7	Left side	No
D	74	F	26	Both sides	Yes
E	70	F	56	Both sides	Yes

3.2. Self-Management Behaviors of Patients with HOA

A total of 112 codes representing the self-management behaviors of patients with HOA were analyzed, resulting in 17 subcategories and six categories (**Table 2**).

3.2.1. Active Gathering of Information about HOA

This category shows how patients actively collect information about their condition and treatment methods, and engage proactively in self-management. Specifically, they investigate ways to reduce the load on the hip joint and HOA on their own, and the knowledge and information they acquire significantly influence their treatment decisions. As a result, patients are able to choose the most appropriate treatment and management strategies, thereby enhancing their self-management abilities.

Table 2. Self-management behaviors of patients with HOA.

Categories		Subcategories	
1	Active gathering of information about hip osteoarthritis (HOA)	1.1.	I research tips on my own to reduce the burden on HOA and my hip joint.
		1.2.	I regularly learn exercises and information tailored to my hip condition from experts.
		1.3.	I share information about HOA with other patients.
2	Personalized pain and weight management, and strategies for reducing hip joint load	2.1.	I adjust the timing of my medications according to my pain.
		2.2.	I reduce symptoms through movement and rest.
		2.3.	I reduce activities that are more stressful on the hip joint based on my experience.
		2.4.	I adapt exercise and nutritional management to suit my needs.
		2.5.	I incorporate professionally advised exercises and lifestyle tips into my daily life.
		2.6.	I utilize the help available to me in daily living situations and social services.
3	Reflection on living conditions with individuals and professionals, and determination for future efforts	3.1.	I decide to lose weight based on changes in pain and weight.
		3.2.	I consult with a professional and reflect on my exercise and living situation.
4	Continuation of exercise and weight management based on personal strengths and achievements, and mutual support with others	4.1.	I continue to manage exercise and weight loss results as motivation.
		4.2.	I continue to exercise and manage weight by mutually supporting others through sharing and interacting.
5	Coexistence with HOA while managing negative feelings	5.1.	I deal with negative feelings through the support and interests of others.
		5.2.	I continue to exercise and manage weight to maintain life while struggling with HOA and symptoms.
6	Choosing treatment methods by trusting doctors while struggling with personal needs	6.1.	I make treatment decisions while struggling with current symptoms and life changes after surgery.
		6.2.	I trust the doctor's suggestions and let them make decisions about treatment options.

The subcategories demonstrate specific actions in the process of information gathering, highlighting how active involvement contributes to self-management behaviors.

The subcategories are as follows:

- **I research tips on my own to reduce the burden on the HOA and hip joint.**

Patients use the internet and social media to research ways to reduce the load on their hip joint and HOA. This investigation enables them to better understand their condition and take crucial steps toward finding effective treatment methods and preventative measures.

- **I regularly learn exercises and information tailored to my hip condition from experts.**

Patients receive guidance from doctors and physical therapists to learn exercise therapy for HOA. Expert recommendations for exercises are effective in reducing the load on the hip joint and slowing the progression of symptoms. Patients prioritize attending facilities with specialists, regularly receiving the latest and accurate advice on exercise and lifestyle modifications.

- **I share information about HOA with other patients.**

Patients exchange experiences and information with others who have the same condition, offering mutual support. Information sharing among patients provides a space for encouragement and learning about new treatment options, enhancing their motivation for self-management. By sharing treatment information at patient meetings or with other HOA patients post-surgery, patients engage more actively in managing their own health.

These subcategories show how proactive information collection influences the patients' behaviors. Additionally, the subcategories are interrelated, and by receiving guidance from experts and exchanging information with other patients, the process of deepening self-management behaviors is evident. It is crucial for patients to actively apply the knowledge they gain and engage in improving their treatment and lifestyle.

3.2.2. Personalized Pain and Weight Management, and Strategies for Reducing Hip Joint Load

This category illustrates how patients tailor pain management, weight control, and joint load reduction strategies based on their individual circumstances. Specifically, it includes actions such as taking pain relievers when pain intensifies and predicting pain patterns to take preventive measures. Furthermore, patients adjust their daily activities and rest periods to minimize the load on the hip joint. By doing so, patients manage their symptoms and maintain their quality of life in a way that best suits them. The subcategories show specific actions related to pain management, weight control, and joint load reduction, highlighting how active patient involvement contributes to their self-management and treatment outcomes.

The subcategories are as follows:

- **I adjust the timing of my medications according to my pain.**

Patients take pain relievers when pain intensifies and also predict pain patterns throughout the day to take preventive action. For example, they may take pain relievers before work to prevent pain from developing. Some also take pain medication before bed as nighttime pain tends to worsen.

- **I reduce symptoms through movement and rest.**

When pain is severe, patients take rest and avoid pushing themselves too hard. They take breaks while walking or moving around at work to avoid overloading the hip joint. Additionally, patients adjust their posture, such as avoiding prolonged kneeling and shifting weight to the unaffected side to reduce strain on the joint.

- **I reduce activities that are more stressful on the hip joint based on my experience.**

Based on previous experiences, patients avoid activities that increase load on the hip joint. For instance, they avoid heavy lifting or squatting, as these activities cause pain. They may also reduce the intensity or frequency of certain exercises or hobbies that exacerbate symptoms. For example, some patients stopped doing intense sports like kickboxing after experiencing worsened pain, while others abandoned activities that put strain on their joints.

- **I adapt exercise and nutritional management to suit my needs.**

Patients adjust their eating habits, such as reducing snacking, limiting fat and alcohol intake, and increasing protein consumption. They also monitor food labels to avoid high sugar content. For weight management, some patients use methods like cutting back on carbohydrates or skipping meals after overeating. In terms of exercise, they limit the workout to a manageable routine, ensuring they can maintain it regularly. Some patients also continue attending health promotion centers to manage their exercise routine and maintain their weight.

- **I incorporate professionally advised exercises and lifestyle tips into my daily life.**

Patients incorporate advice given by doctors and physiotherapists into their daily routines. They continue water exercise and strength training at recommended health promotion centers and avoid exercises that professionals have advised against. They also follow lifestyle recommendations such as avoiding heavy lifting and being mindful of their weight.

- **I utilize the help available to me in daily living situations and social services.**

Patients rely on family, friends, or other support networks to help with tasks that put too much strain on the hip joint. For example, they may ask someone else to carry heavy objects or drive long distances. Tasks like gardening or walking the dog may also be delegated. Additionally, some patients have applied for and hold a disability card, allowing them to access various social services. They also explore and utilize available welfare resources as needed.

These subcategories demonstrate how patients actively engage in managing their pain, weight, and joint load, tailoring their strategies to their specific

circumstances. The interconnected nature of the subcategories shows how patients manage their symptoms in the most effective way possible for their lifestyle, contributing significantly to their overall self-management and improvement in quality of life.

3.2.3. Reflection on Living Conditions with Individuals and Professionals, and Determination for Future Efforts

This category demonstrates how HOA patients reflect on their weight management and exercise results, assess their lifestyle, and make decisions for improvement. Specifically, patients observe changes in their pain and weight and, as a result, become more aware of the need to lose weight, which leads to improvements in their quality of life. The subcategories highlight how patients adjust their exercise and lifestyle based on their physical condition, reflecting on their progress with the help of healthcare professionals.

The subcategories are as follows:

- **I decide to lose weight based on changes in pain and weight.**

Patients track their weight and observe changes, which prompt them to recognize the need for weight loss. For example, they may measure their weight at the gym and use apps to track these changes. Additionally, patients monitor daily metrics such as weight, blood pressure, and temperature to review trends and make adjustments. The realization to lose weight often occurs when pain increases or weight gain is noticed. Some patients decide to lose weight after experiencing relief from pain following weight loss, while others are prompted by the need to avoid further weight gain.

- **I consult with a professional and reflect on my exercise and living situation.**

Patients consult physical therapists or other specialists to reflect on their exercise routines and lifestyle. For instance, patients discuss their exercise plans with physical therapists at sports centers or talk to staff at health promotion facilities about their symptoms and concerns. These consultations help patients gain insights and refine their exercise and lifestyle strategies. Reflecting on advice and feedback helps patients stay on track with their self-management and health goals.

These subcategories illustrate how patients reflect on their weight and exercise progress based on changes in their pain and condition. Through consultations with healthcare professionals, patients receive valuable guidance and make improvements to their lifestyle, ultimately contributing to better health management.

3.2.4. Continuation of Exercise and Weight Management Based on Personal Strengths and Achievements, and Mutual Support with Others

This category demonstrates how patients continue their self-management by maintaining motivation based on goals, weight loss achievements, their own strengths, and connections with others. The focus is not solely on curing HOA, but on maintaining health and improving quality of life. The subcategories illustrate how patients utilize their strengths and relationships with others to persist

in self-management.

The subcategories are as follows:

- **I continue to manage exercise and weight loss results as motivation.**

Patients maintain motivation for self-management by experiencing the effects of weight loss and exercise. For example, achieving weight loss encourages the continuation of exercise and healthy eating habits. By experiencing strength gains from muscle training, patients feel motivated to continue. Rather than focusing on recovery from treatment, patients continue their efforts daily to maintain their lifestyle and reduce hip joint load. They persist in making adjustments without setting specific goals, continuing daily efforts to maintain their health and reduce the strain on their hips. Previous exercise experiences or hobbies act as strengths, helping patients to persist in their exercise routines. Their endurance and mental strength gained through past activities support their current self-management. Connections with friends and acquaintances, such as meeting people at exercise facilities, provide encouragement for continued exercise. Participating in community exercises, such as weekly town hall fitness sessions, becomes an enjoyable reason to keep exercising.

- **I continue to exercise and manage weight by supporting each other through sharing and interacting with others.**

Patients seek to share their frustrations or efforts with others in similar situations for mutual encouragement. The difficulty of seeing immediate results can lead patients to share their struggles with others who can offer support, increasing motivation. Additionally, patients may seek out groups of people who are experiencing similar hip joint issues, particularly those who are working in similar age groups. After surgery, patients find joy in meeting others in patient support groups and sharing information. These connections provide encouragement and support, helping to sustain their self-management efforts.

These subcategories show how patients continue self-management by leveraging their strengths and connections with others. The process through which patients find motivation to maintain their lifestyle, continue exercise, and adhere to treatment is clearly depicted.

3.2.5. Coexistence with HOA While Managing Negative Feelings

This category demonstrates how patients navigate and manage their negative emotions related to HOA symptoms and lifestyle restrictions while striving to maintain a positive outlook. The patient actively seeks ways to organize their feelings through hobbies and support from others, maintaining quality of life despite pain and limitations. They also explore practical strategies for coexisting with HOA by continuing exercise and weight management.

The subcategories are as follows:

- **I deal with negative feelings through the support and interests of others.**

Patients manage stress by overindulging in food or engaging in hobbies, which helps them reorganize their emotions. Talking to others helps ease anxiety, enabling them to process and shift negative feelings toward HOA.

- **I continue to exercise and manage weight to maintain life while struggling with HOA and symptoms.**

Despite enduring pain and symptoms, patients persist with exercise and weight management to maintain daily life. By accepting HOA as something unavoidable, they continue their activities within their limits, finding ways to adapt and move forward.

These subcategories illustrate how patients actively manage their emotions and symptoms while seeking ways to preserve their quality of life. By leveraging external support and personal management, patients strive for coexistence with HOA, demonstrating a proactive approach to improving their health and well-being.

3.2.6. Choosing Treatment Methods by Trusting Doctors While Struggling with Personal Needs

This category reflects patients' decisions to trust their doctors' recommendations regarding treatment, despite conflicting feelings or concerns about the outcomes. Patients wrestle with the impact of symptoms and potential lifestyle changes after surgery, yet ultimately choose a treatment path based on trust in their doctor's expertise.

The subcategories are as follows:

- **I make treatment decisions while struggling with current symptoms and life changes after surgery.**

Patients weigh the implications of surgery, considering limitations like the recovery time or the risk of severe pain. Some patients avoid surgery initially, managing pain through medication, while others, unable to endure the pain any longer, decide to undergo surgery.

- **I trust the doctor's suggestions and let them make decisions about treatment options.**

Patients put their trust in their doctor's expertise, deferring decisions such as the timing of surgery or choosing between treatment options. They rely on their doctor's advice and follow through with the suggested course of action without dissatisfaction.

These subcategories highlight how patients, even in the face of personal doubts or discomfort, place their trust in their doctor's professional judgment. This trust influences their treatment decisions, leading to actions that align with the doctor's advice and ultimately support their health management.

3.2.7. Examination of Inter-Categorical Relationships

The relationships between the six categories discussed so far were illustrated in a relational diagram based on the coding families proposed by Glaser [22] (Figure 1).

The core factor in self-management behaviors for HOA patients is their efforts to manage pain, control weight, and reduce stress on the hip joint. This strategic approach is strengthened through "active gathering of information about HOA" and "reflection on living conditions with individuals and professionals, and

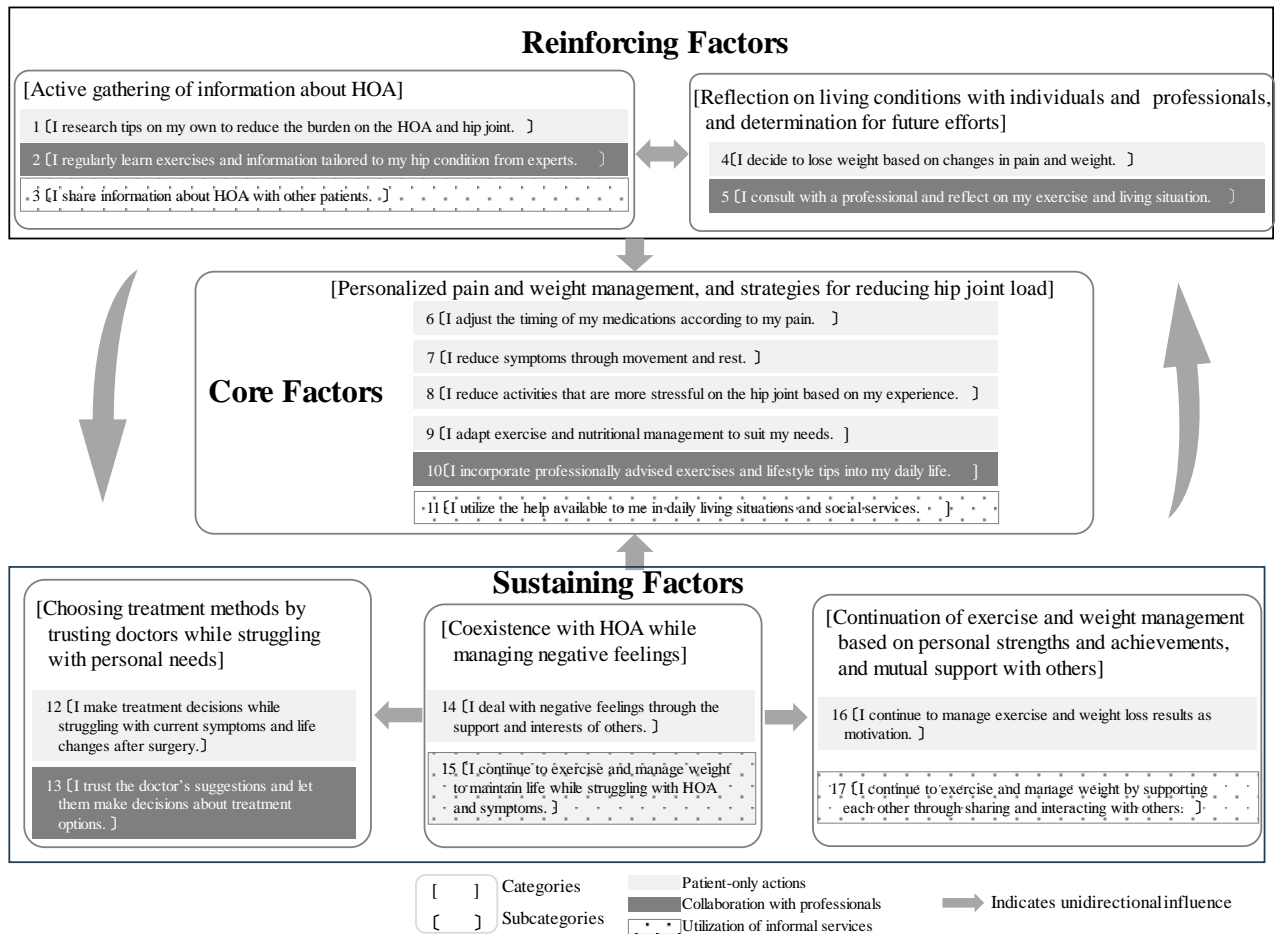


Figure 1. Diagram showing the related self-management behaviors of patients with hip osteoarthritis (HOA).

determination for future efforts,” helping patients deepen their knowledge and understanding in order to find and implement the best methods for managing their symptoms. Specifically, patients gather information about HOA and deepen their knowledge to select the treatment that best fits their symptoms and lifestyle. This knowledge is applied to treatment strategies through communication with doctors and physical therapists, strengthening treatment options and enhancing the effectiveness of self-management.

The efforts related to pain management, weight control, and reducing hip joint load are further influenced by sustaining factors. In particular, the action of “choosing treatment methods by trusting doctors while struggling with personal needs” plays an important role in how patients decide on treatment options. By selecting treatment based on their symptoms and living environment and building a trusting relationship with their doctor, patients can receive treatment at the most optimal time. In this process, patients make decisions about their treatment plan while balancing their needs with the doctor’s suggestions.

Additionally, “coexistence with HOA while managing negative feelings” is also an essential element in maintaining treatment behaviors. To alleviate the anxiety

and stress related to the chronic nature of HOA and continue living positively while accepting the disease, psychological support is crucial. Spending time with family, friends, and fellow patients helps patients organize their negative emotions arising during treatment and self-management, allowing them to maintain a positive mindset.

Finally, “continuation of exercise and weight management based on personal strengths and achievements, and mutual support with others” serves as the driving force for sustaining patient behavior. Past successes in weight management and exercise build confidence, motivating patients to continue working toward their next goal. This behavior is carried out continuously with support from others and gradually becomes ingrained as a self-management practice.

In this way, the core factors of pain management, weight control, and reducing hip joint stress are established, supported by reinforcing factors (such as information gathering and reflections with experts) and sustaining factors (such as treatment choices, emotional management, and mutual support with others). These factors interact, reinforcing the patient’s self-management behaviors in a cyclical process. By repeating this process, patients can continue living with HOA while maintaining improved self-management.

4. Discussion

4.1. Patients’ Self-Management Behaviors and Associated Factors

In this study, we identified the self-management behaviors of patients with HOA. Patients with HOA viewed pain and weight management, coping with symptoms by reducing hip load, and preventing the progression of HOA as self-management behaviors. These behaviors were reinforced and sustained by not only the patients themselves, but also the use of informal services such as medical and exercise professionals, family members, and others with the same disease.

Factors influencing the reinforcement of self-management behaviors in patients with HOA included active information gathering and feedback from professionals, as well as innovations based on their own experiences. These factors played a role in promoting patients’ proactive behaviors and enhancing the quality of their self-management. Next, factors that influenced the continuation of self-management behaviors among patients with HOA included personal cognitive and psychological management behaviors such as the choice of the treatment plan and conflicts associated with the acceptance process of HOA. These factors maintained patient motivation and supported the practice of long-term self-management.

Self-management of chronic illness is defined in various ways [16] [23]. Self-management includes three tasks: medical or behavioral management of an illness, role management, and emotional management [24] [25]. Bandura further stated that, “self-management functions through a series of psychological sub-functions. People need to learn how to monitor their health behaviors and the circumstances in which they occur, motivate themselves with approximate goals,

and guide their actions” ([26], p. 151). In addition, Barlow [16] calls self-management “competence”, and Richard *et al.* [27] list “competence”, “awareness”, “execution”, and “decision-making” as attributes of self-management, which they see as the practical ability to recognize problems and act while making decisions, and view self-management as the practical ability to recognize and act on problems while making decisions [28]. This framework aligns with the results of this study, which suggest that personal innovation and decision-making play a crucial role in achieving self-management.

In the context of the “self-management of well-being” theory, Steverink *et al.* [29] identified abilities potentially important to the achievement and maintenance of well-being in chronically ill patients, including self-efficacy (belief in one’s ability to achieve specific goals), proactivity (self-motivation, or playing a role in one’s physical and mental QOL), and investment in resources to achieve long-term benefits (e.g., health, interests, supportive social relationships). Similar behaviors to these self-management capacities were found in the present study, suggesting that self-management capacities may focus and act on an individual’s reserve capacity to achieve and maintain QOL, rather than on the process of coping with the loss and experience of living with HOA. These results are consistent with previous studies on self-management, suggesting that self-management may contribute to symptom improvement.

On the other hand, in a conceptual analysis of self-management during conservative treatment of patients with HOA in the international literature [20], the following six attributes were extracted: [decision-making and acceptance of illness], [acquisition of knowledge and skills of treatment and regimen], [refinement of coping skills], [coping with negative emotions], [adjustment of social roles], [use of resources and information], and [collaboration with medical personnel]. Compared with the results of the present study, the process of self-management in that previous study [refinement of ways of coping with problems] showed the following specific stages: (1) goal setting, (2) planning, (3) practice, and (4) adjustment. D’Zurilla and Goldfried [30] described the social problem-solving process as (1) Problem orientation, (2) Problem definition and formulation, (3) Generation of alternatives, (4) Decision-making, and (5) Solution implementation and verification. Richardson *et al.* [31] suggested that self-management involves the patient taking an active role in managing their chronic condition in a real-world situation. They argued that self-management should be viewed as empowering patients to be proactive and motivated in managing their chronic condition in real-life situations. The results of this study suggest that even when patients do not engage in goal setting, adaptive coping strategies and resource utilization can still occur, which aligns with the realistic application of self-management. Theoretical concepts such as goal-oriented care [32] [33], which asserts the need to evolve from medical management to broader behavioral management, are also considered important. On the other hand, the results of the present study were ambiguous in that there was no goal-setting process or planning for [personalized

pain and weight management, and strategies for reducing hip joint load] or [reflection on living conditions with individuals and professionals, and determination for future efforts]. These results may have been influenced by factors such as the clarity of information, personal experiences, motivation for self-management, medical and social support, and cultural backgrounds. The sections that follow discuss the characteristics of and support for individual and environmental/social factors.

4.2. Relationship between Patients with HOA and Personal Health-Care Providers and Treatment Choices

In the present study, HOA patients' decision-making process during treatment selection and the way they faced HOA showed different characteristics depending on their age group. First, with regard to older patients who had been postoperative for several decades, because they had limited means to gather information on their own, compliance behaviors (*i.e.*, "trust the doctor", "follow the doctor", and "follow the doctor's instructions") [34]-[37], in which the medical provider determines the treatment plan and the patients act accordingly, were prominent. This is consistent with the "omakase" tendency in Japanese culture, where patients often delegate decision-making to the doctor and comply quietly. This may have been influenced by the cultural characteristics of Japan, *i.e.*, the tendency for patients to leave decision-making to themselves and tacitly comply [38] for various reasons, such as traditions that value harmony, the importance of family members' and doctors' views, and the expression of trust.

On the other hand, younger patients receiving conservative treatment made decisions regarding treatment selection based on their own life situation, such as "did not undergo surgery because of postoperative activity limitations" or "did not undergo surgery because it was difficult to take 6 months off work after surgery". In this group of young patients, a strong tendency was seen for adherence behavior (patients' positive and proactive attitudes toward treatment) [34] [39] based on information provided by the health-care provider. This reflects the "shared decision-making" approach, where the patient actively engages in discussions with the healthcare provider regarding treatment. This concept is based on the premise of a partnership relationship between the health-care provider and the patient, with decision-making being done jointly [40]. In other words, they valued their own lives and wanted to make treatment choices together with their health-care provider.

These backgrounds are influenced by the changing perspectives on medical care. In Japan, there has been a shift from the traditional "omakase medicine" to "patient-centered medicine" that emphasizes self-determination [41]. Since the late 2000s, the relationship between patients and healthcare providers has transitioned from "conflict" to "collaboration," and from "self-determination" to "shared decision-making," where the process of making decisions, including treatment and information, is done collaboratively and shared [42]. Recently, the

concept of concordance (where both the patient and the provider share equality and mutual respect in the decision-making process, based on the respect for values and lifestyles) has been proposed. In deciding behavioral goals, it has been found that aligning with one's own values (self-concordance) is beneficial for the retention of behavior and achieving desired outcomes, and is considered a key concept for supporting self-care formation [43].

Furthermore, the internet has increased the ways to gather information on HOA and its treatment. Patients are now able to prioritize their quality of life (QOL) according to their living conditions and the severity of their symptoms, and select treatment methods in consultation with their healthcare provider. Thus, an approach that is appropriate to the patient's age and individual needs must be adopted.

In addition, in the communication within the clinical setting between patients and healthcare providers, it is necessary to generate common understanding about the current state of HOA and health issues, premises, values, and treatment goals through mutual exchange of the respective backgrounds of the patient and healthcare provider. Both parties should understand and share each other's perspectives to build an effective treatment approach.

4.3. Environmental Factors and Support Systems for Patients with HOA

The results of this study suggest that [active gathering of information about HOA], [personalized pain and weight management, and strategies for reducing hip joint load], and [reflection on living conditions with individuals and professionals, and determination for future efforts] by patients with HOA are factors that improve the quality of self-management, which indicates the importance of the role played by professionals.

Among conservative therapies, regular exercise is considered a core treatment for OA and is universally recommended in treatment guidelines for all affected patients, regardless of individual symptoms [12] [44] [45]. Exercise has many potential benefits, including improvements in pain [46] [47], physical function [48], and mood [49]. On the other hand, there is a risk that overloading or a lack of necessary activity and range-of-motion training can worsen symptoms and medical conditions such as joint contractures, muscle weakness, and accelerated disease progression; thus, education is needed to emphasize that an appropriate level of exercise is safe [50]. It is also recommended that exercise therapy be provided by a health-care professional, such as physical therapists, who regularly reassess progress and modify training parameters (factors to adjust content and intensity) to manage and limit worsening symptoms [51]-[54]. We believe that it is necessary to provide patient education on information literacy and the selection of appropriate information after consultation with specialists. In recent years, with the increasingly widespread use of the Internet, the general public can gather information about diseases and their treatment easily. We believe that it is necessary to

provide patient education on information literacy and the selection of appropriate information after consultation with specialists.

Furthermore, the Japanese HOA guidelines on patient education, including weight management (nutrition and diet management) other than exercise therapy, state that symptom relief can be expected when used in combination with exercise therapy [14] [55]-[58]. None of the interviewees in the present study had received specific guidance on nutrition and weight management, or interventions from professionals other than physicians, physical therapists, or exercise-related specialists. Kigawa *et al.* [59] concluded that in patients with HOA aged from 18 to 40 years, the provision of guidance focusing on management, including visits to appropriate medical facilities, is necessary, and that the content of such guidance should be considered with respect to the patients' QOL. In addition, after the age of 50 years, continuous intervention by specialists is desirable. Japanese culture is characterized by integrating individuals into a larger whole and valuing indirect communication without burdening others. This attitude influences the behavior of patients as persons who prioritize harmony and submit quietly, avoiding confrontation and maintaining power structures [38]. As a result, many patients require instruction. Therefore, it is necessary to develop an educational program that combines exercise therapy and patient education so that patients can learn from nutritionists and nurses with expertise in locomotion. In addition, it is necessary to establish a good relationship between patients and health-care providers so that they can consult with each other easily, and to create an environment in which patients and health-care providers can work together to deal with HOA. Health-care professionals should provide appropriate information and encouragement to patients to support their continued self-management.

In the present study, "Personalized pain and weight management, and strategies for reducing hip joint load" indicated that patients with HOA cope with the progression of HOA symptoms and disease stage by using informal services to help them perform unavoidable, heavy-load activities in their daily lives. These informal services include family members, neighbors, and friends with whom they live. The use of informal services was defined as having people who are close to the patient perform activities of daily life and instrumental activities of daily life in place of the patient in daily life and work situations, and included having people who are close to the patient perform heavy lifting, elevated work, heavy labor, and other hip-intensive tasks on the patient's behalf.

These backgrounds were characterized by the perception of the disease by patients with HOA and their family members and friends. In many cases, patients have had symptoms such as acetabular dysplasia since birth or early childhood, or family members with a history of HOA or total hip arthroplasty. In addition, family members who support patients with HOA often consider their condition to be "natural" and accept that they are "not carrying heavy things" or performing ADLs and household roles that place a high load on the hip joints. Kigawa *et al.* [59] stated that patients with HOA over the age of 18 years need to provide

information about the changes in their lives resulting from HOA to those around them. In addition, because self-management is performed by utilizing human resources, reliable and supportive family members, acquaintances, and medical care providers are considered to exist around the patients [60]-[64]; the presence of such supporters is important in the self-management of chronic diseases [15] [27] [65]. The present results suggest that the presence of family members and neighbors who can perform certain ADLs that tend to put stress on the hip joints plays an important role in the daily lives of patients. On the other hand, patients who do not have access to informal services face numerous difficulties in their daily lives. There have been cases in which patients with HOA are forced to be caregivers, and some patients have reported financial hardship as they are forced to quit their jobs because of the limitations in physical activity caused by their symptoms. The lack of access to public care and welfare services is also a problem, especially for patients in prime age. The improvement of the environment thus remains an important issue for the future.

Furthermore, in the present study, [active gathering of information about HOA] and [continuation of exercise and weight management based on personal strengths and achievements, and mutual support with others] included mutual assistance through peer support. It has been reported that patients with OA of the hip and knee do not engage in sufficient physical activity [66] [67], and consequently, in many cases, continuity in self-management becomes difficult. In such cases, it is important to utilize peer support from other patients with the same disease. As it is difficult to set goals, and daily efforts are often unrewarded [68], such patients are more prone to mental stress. In such situations, relationships with others who share the same problems and concerns play an important role in maintaining self-management.

The impact of environmental and social support is a key factor in promoting self-management behaviors. Recent studies have pointed out the increasing isolation and the importance of social connections, confirming that participation in social activities positively affects the health of older adults. Specifically, community involvement and the use of the internet have been shown to contribute to the functional ability and health behaviors of elderly individuals [69] [70]. Additionally, the spread of SNS and the internet has introduced new promoting factors for self-management behaviors. Through SNS, patients can quickly access health information and improve their knowledge necessary for self-management. For example, health-related communities and information exchange on SNS often have a positive impact on patients' motivation and actions. Moreover, digital healthcare systems, especially healthcare apps, are said to play an important role in promoting self-management behaviors in older adults [71]. However, the penetration rate of digital healthcare systems in Japan is low compared to the global average [72], and there are expectations for future development and spread.

The present findings indicate the need to improve the support environment for patients with HOA by providing mutual assistance through peer support and

information about exercise and HOA to family members as environmental factors to support the continuation of self-management behaviors.

The above findings may contribute to the improvement of support methods for patients with HOA. Health-care providers should establish educational programs and support systems to encourage patients to self-manage their own health, which could be expected to enhance patients' ability to manage their own health and improve their QOL.

4.4. Practical Recommendations

This study provided a deeper understanding of self-management behaviors in patients with HOA. Specifically, it became clear that a patient-centered approach is crucial during the process where patients actively gather information and collaborate with healthcare providers to choose treatment methods. These findings offer important insights for reassessing the role of patients in managing chronic diseases such as HOA.

Practical Recommendations:

- **Development of Educational Programs for HOA Patients**

It is necessary to provide educational programs that enable HOA patients to actively learn about their condition and treatment options. This will enhance patients' self-management awareness and strengthen collaboration between healthcare institutions and patients.

- **Enhancement of Healthcare Providers' Training**

Training programs for healthcare providers are essential to enable them to communicate effectively with patients and support them in choosing the most appropriate treatment options. There is a need to improve skills that promote patient-centered care.

- **Establishment of Social and Medical Support Systems**

To support patients' self-management behaviors, it is necessary to establish a collaborative support system involving the local community, family members, and healthcare institutions. Additionally, it is recommended to actively promote networks where patients can mutually support each other, such as online resources and patient groups.

5. Limitations and Future Challenges

This study has several limitations. First, the sample size was small, with only five participants, which may not fully capture a wide range of diverse experiences. It is important to exercise caution when generalizing the results to broader populations. Future studies should consider selecting participants from more diverse demographics and recruiting from multiple hospitals. Additionally, since this study relied on self-reported data, it may be subject to memory bias or insincere responses. Future research will need to conduct cross-sectional surveys on the categories and subcategories extracted in this study and analyze self-management behaviors in more detail. Furthermore, conducting comparative studies in different

cultural and environmental contexts will be crucial for examining the universality of the findings.

6. Conclusions

The following self-management behaviors of patients with HOA were identified in the present study: [active information gathering about HOA], [personalized pain and weight management, and strategies for reducing hip joint load], [reflection on living conditions with individuals and professionals, and determination for future efforts], [continuation of exercise and weight management based on personal strengths and achievements, and mutual support with others], [coexistence with HOA while managing negative feelings], and [choosing treatment methods by trusting doctors while struggling with personal needs]. These findings suggest that environmental factors, such as relationships with medical care providers and others with the same disease, are important for strengthening and sustaining the self-management behaviors of patients with HOA.

Based on these findings, it is necessary to develop HOA patient education programs to support active information gathering and establish patient groups and support networks for mutual peer support. To promote patient-centered care, it is important to implement a team-based approach in healthcare institutions and reflect the importance of patient education in policy. Additionally, strengthening communication with patients and supporting self-management in healthcare professionals' training would be effective. There is a need to establish social and medical frameworks that support these self-management behaviors.

Authors' Contributions

Y.N., M.F.: Conception and design of the study; Y.N.: Data collection; Y.N., M.F.: Analysis and interpretation of results; Y.N., M.F.: Drafting of the paper.

Ethics Approval and Consent to Participate

This study was approved by the Ethics Committee of the Yamagata University School of Medicine (approval No.: 2022-313). Additionally, the study was explained to the hospital director and nursing administrators at Hospital A, and permission to conduct the study was obtained from the hospital director.

Human and Animal Rights

All procedures in this study involving human participants were performed in accordance with the ethical standards of institutional and/or research committees and the 1975 Declaration of Helsinki, as revised in 2013.

Consent for Publication

All patients were informed of the aims of this study and the terms of participation through a consent form.

Availability of Data and Materials

The data that support the findings of this study are available upon reasonable request from the corresponding author [Y.N.]. The data are not publicly available because they contain information that could compromise the privacy of the research participants.

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Appendix

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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List of Abbreviations

OA	Osteoarthritis
HOA	Hip osteoarthritis
QOL	Quality of life
THA	Total hip arthroplasty
ADL	Activities of daily living