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### Original Article

# Barriers and Facilitators of Self-Management Among Older Adults with Knee Osteoarthritis in Thailand

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### Abstract

Knee osteoarthritis (KOA) is a chronic condition that significantly impacts the quality of life among older adults, who lack adequate care or fail to engage in appropriate self-management practices. This study explored the perceptions of older adults with KOA in Thailand concerning the barriers and facilitators associated with self-management strategies designed to reduce the severity of knee osteoarthritis. This qualitative research employs a case study approach involving 10 older adults residing in Thailand, selected through purposive sampling. In-depth interviews were conducted using semi-structured interview guidelines. The interviews were transcribed verbatim and continued until data saturation was achieved. Data were analyzed using content analysis. The results showed that eight primary themes served as both barriers and facilitators in reducing the severity of KOA. These barriers included physical problems, lack of motivation, lack of time, and unsuitable environment, while the facilitators encompassed knowledge about weight control, social support, hope for good health, and accessible exercise opportunities. These findings offered valuable insights into the specific challenges and facilitators that affected self-management among older adults with KOA, guided the development and implementation of targeted interventions to enhance their self-management activities, and contributed to the theoretical knowledge in behavioral science. This will serve as a reference for improving self-management practices among these patients and support primary healthcare efforts to prevent the severity of KOA.

Knee osteoarthritis, a prevalent joint disorder among the elderly population, exhibited a significant upward trend over recent years (Long et al., 2022). Globally, knee osteoarthritis affected a substantial portion of individuals aged 60 years and older, encompassing an estimated 242 million people, constituting approximately 10-15% of the total population (Hawker & King, 2022). The global prevalence rates for knee and hip osteoarthritis were reported at 1,700 and 2,693 cases per 100,000 population, respectively (Centers for Disease Control and Prevention, 2020). In the context of Thailand, data from 2018 to 2020 revealed that a significant number of elderly individuals sought treatment for knee osteoarthritis, with reported figures of 203,733, 226,923, and 210,668, respectively (Open Government Data of Thailand, 2021). Additionally, during this period, Phetchaburi Province, located in the central region of Thailand, compiled statistics on patients with osteoarthritis. These statistics indicated a noticeable increase in the number of patients seeking treatment at provincial hospitals, which were classified as tertiary healthcare facilities specializing. In the context of Thailand, data from the years 2018, 2019, and 2020 revealed a substantial number of elderly individuals seeking medical treatment for knee osteoarthritis. The reported figures for each respective year were as follows: 203,733 in 2018, 226,923 in 2019, and 210,668 in 2020 (Phra Chom Klao Hospital

Statistics Center, 2021). These findings suggested a rise in the number of elderly patients and individuals diagnosed with knee osteoarthritis in Phetchaburi province, particularly in urban areas. Failing to prevent or manage this issue could have led to adverse consequences in various aspects. In the early stages of knee osteoarthritis, individuals experienced knee pain during activities such as walking, climbing stairs, or bending the knee. These symptoms often improved when the joint was at rest but could be accompanied by joint stiffness, especially after prolonged periods of inactivity. Ultimately, many of these patients might have required knee replacement surgery (Hawker et al., 2008; Hunter et al., 2008). These issues could have affected the economy and quality of life of the elderly.

Older adults with knee osteoarthritis who did not receive adequate care or engage in appropriate self-management practices were susceptible to severe joint damage. Pain intensified, and inflammation could lead to swelling, warmth, and the accumulation of fluid in the joint (Hsu & Siwec, 2022). The progression of the disease typically occurred gradually but worsened over time, resulting in diminished physical mobility and subsequent disability, significantly impacting the quality of life for individuals with knee osteoarthritis (Centers for Disease Control and Prevention, 2020). Therefore, the promotion of self-management behaviors to prevent knee osteoarthritis and the adoption of effective self-management practices to delay disease progression were imperative. Self-management for preventing knee osteoarthritis encompassed three main aspects: dietary habits, weight control, and exercise to manage weight and strengthen leg muscles, accompanied by lifestyle modifications that minimized stress on the knee (Roos & Arden, 2016). Encouraging behavior change as a means to prevent and delay the progression of knee osteoarthritis among older adults in the community had proven effective (Ariie et al., 2023).

Based on a literature review, the behavior change wheel, developed by Michie et al. (2011), served as a framework that elucidated the factors influencing individual behaviors through the components of capability, opportunity, and motivation (COM-B). These components were pivotal in understanding behavior change (Michie et al., 2014). Consequently, this qualitative research study aimed to explore the barriers and facilitators of self-management to reduce the severity of knee osteoarthritis among older adults, utilizing the behavior change wheel framework. Behavioral science perspectives on self-management could play a crucial role in reducing the severity of knee osteoarthritis in older adults. Self-management referred to the ability of individuals to take an active role in their own care and make informed decisions to manage their condition effectively. When it came to knee osteoarthritis, self-management involved adopting behaviors and strategies that promoted joint health, reduced pain, and enhanced overall well-being (Lawless et al., 2021; Wu et al., 2022). Several behavioral science perspectives could be applied to empower older adults in managing their knee osteoarthritis. Overall, applying behavioral science perspectives to self-management in older adults with knee osteoarthritis could enhance their ability to manage the condition effectively, reduce pain and disability, and improve their overall quality of life. Combining these perspectives with medical treatments and guidance from healthcare professionals could lead to more positive outcomes for individuals with knee osteoarthritis. The findings of this study will contribute to the development of a suitable program to promote behavior change and prevent or delay the progression of knee osteoarthritis among older adults in the community. This program will involve selecting intervention types linked to the COM-B components, drawing from studies on barriers and facilitators in self-management that specifically target elderly KOA patients to mitigate the severity of knee osteoarthritis. The data to be obtained from these studies will help align the theoretical domains framework (TDF) with the needs of individuals, families, and community contexts.

## Literature Review

This section provides an overview of the relevant literature, theories, concepts, and previous studies that supported self-management among patients with knee osteoarthritis. It also explores the relationship between the behavior change wheel and self-management

## **The Self-Management**

Knee osteoarthritis (OA) is a prevalent condition in the elderly, characterized by joint pain, stiffness, and functional limitations (Hunter et al., 2008). In addressing these challenges, self-management has proven essential, offering significant improvements in mitigating the effects and symptoms of knee OA. Consequently, effective self-management involves individuals proactively taking control of their health and adhering to recommended treatments. This includes behaviors such as medication adherence, following dietary guidelines, engaging in regular physical activity, and adeptly managing symptoms (Grady & Gough, 2018; Putri et al., 2021). However, both barriers and facilitators significantly influence the self-management process, especially in the context of chronic knee osteoarthritis, making it crucial to consider the challenges encountered in daily life.

### ***Barriers to Self-Management***

However, the path of self-management for older adults with knee OA was fraught with significant barriers. One prominent obstacle was the limited access to healthcare services, including specialist care and physical therapy, potentially impeding self-management implementation (Kooranian et al., 2012; Egerton et al., 2017). Additionally, within the capability layer of behavior change, substantial barriers included a lack of knowledge about self-management techniques and inadequate skills for exercises or symptom management (Hurley et al., 2018).

### ***Facilitators to Self-Management***

On the other hand, despite these challenges, several facilitators contributed to the success of self-management among older adults with knee OA. Access to accurate knowledge about knee OA, its management strategies, and available resources empowered individuals to make informed health decisions (Egerton et al., 2017). Educational interventions, patient-centered counseling, and the provision of written materials played instrumental roles in enhancing knowledge acquisition and fostering self-management behaviors (Hurley et al., 2018).

## **The Behavior Change Wheel Model and Self-Management**

In the comprehensive exploration of facilitators and barriers to self-management behavior among older adults with knee OA, and in the pursuit of designing effective interventions, the behavior change wheel model (BCW) was employed. Developed by Michie et al. (2011), this theoretical framework offered a systematic approach to understanding and influencing behavior change. It comprised three primary layers: capability, opportunity, and motivation (COM-B model), crucial in categorizing and analyzing factors influencing self-management (Michie et al., 2011).

### ***Capability***

This layer focused on an individual's psychological and physical capacity to engage in self-management behaviors. For older adults with knee OA, capability factors included their knowledge about the condition, understanding of self-management techniques, and skills for exercises or symptom management (Michie et al., 2011).

### ***Opportunity***

The opportunity layer pertained to external factors enabling or hindering self-management behaviors. For knee OA self-management, opportunity factors encompassed environmental elements, social influences, and resource accessibility (Michie et al., 2011).

### ***Motivation***

The motivation layer centered on cognitive and emotional factors driving behavior change. In the knee OA context, motivation factors involved beliefs, attitudes, emotions, and social norms (Michie et al., 2011).

The behavior change wheel provides a structured framework for examining factors that influence self-management. Utilizing the COM-B model allows researchers and practitioners to systematically design interventions that address barriers and amplify facilitators, thereby fostering effective self-management for KOA (Michie et al., 2011). This study sought to understand the perceptions of older adults with KOA in Thailand regarding barriers and facilitators linked to self-management strategies intended to mitigate the severity of knee osteoarthritis.

## Method

### Participants

The participants were purposively selected from primary care settings in Phetchaburi, Thailand, known for a high prevalence of joint replacement surgery. To be eligible, participants had to be older adults diagnosed with knee osteoarthritis, demonstrate a high level of adherence to preventive behaviors for knee osteoarthritis (with scores ranging from 56 to 76) or a moderate level of adherence (with scores ranging from 42 to 55), with five participants falling into each category. Additionally, five participants were included who exhibited behaviors indicating a need for improvement in preventive behaviors for knee osteoarthritis, scoring at a low level (scores  $\leq 41$ ). The assessment of preventive behaviors for knee osteoarthritis was conducted using the Pitsamai et al. (2012) tool, which demonstrated a Cronbach's alpha coefficient of .76. All participants were proficient in the Thai language, had no intellectual or hearing impairments, and willingly provided individual in-depth interview data.

**Table 1**

*Demographic Characteristics of Participants (n = 10)*

Participant	Age/Year	Sex	Duration of illness/Years	BMI kg/m <sup>2</sup>	The severity levels of knee osteoarthritis	Level of preventive behaviors for knee osteoarthritis*
Case 1	69	Female	10	25.71	Severe	41
Case 2	70	Female	8	27.64	Severe	40
Case 3	73	Female	10	27.24	Severe	39
Case 4	68	Female	3	27.34	Severe	35
Case 5	72	Female	5	24.22	Severe	40
Case 6	75	Female	5	19.72	Mild	70
Case 7	67	Female	3	21.63	Mild	65
Case 8	68	Female	5	23.66	Moderate	45
Case 9	67	Female	5	18.75	Mild	69
Case 10	63	Male	1	21.97	Mild	72

*Note.* \* A high score indicates favorable preventive behaviors for knee osteoarthritis, while a low score suggests unfavorable preventive behaviors

### Instruments

The data collection method used in this study involved semi-structured interviews with open-ended questions. The interview guide was carefully designed and included important components such as interviewer instructions, key thematic areas, essential questions, and follow-up probes, following Creswell's (2014) guidelines. These interview questions were specifically tailored to explore factors affecting weight control through exercise and dietary management, as well as the impact of daily lifestyle choices on knee health. A set of questions was created to investigate barriers and facilitators to self-management, such as "How did you manage the severity of knee osteoarthritis, and what self-care methods did you use?" and "Can you describe any challenges you faced while managing your knee osteoarthritis symptoms and how you addressed them?" To ensure the interview guide's content validity and linguistic appropriateness, a panel of three experts specializing in geriatric nursing, qualitative research, and behavioral science conducted a thorough review. Based on their valuable feedback, the guide was refined before implementation.

## Data Collection

From November to December 2022, the researchers conducted in-depth interviews using a structured format with predetermined questions. Each session lasted 45 to 60 minutes. The recordings were then transcribed verbatim and summarized. To ensure accuracy and credibility, the summarized data was shared with participants for verification.

## Data Analysis

This qualitative study employs employed content analysis following the framework by Miles and Huberman (1994). The research process includes data organization, display, and subsequent stages of drawing conclusions, interpreting findings, and verifying results. To ensure trustworthiness, the researcher follows followed principles of credibility, transferability, confirmability, and dependability proposed by Lincoln and Guba (1985).

## Ethical Considerations

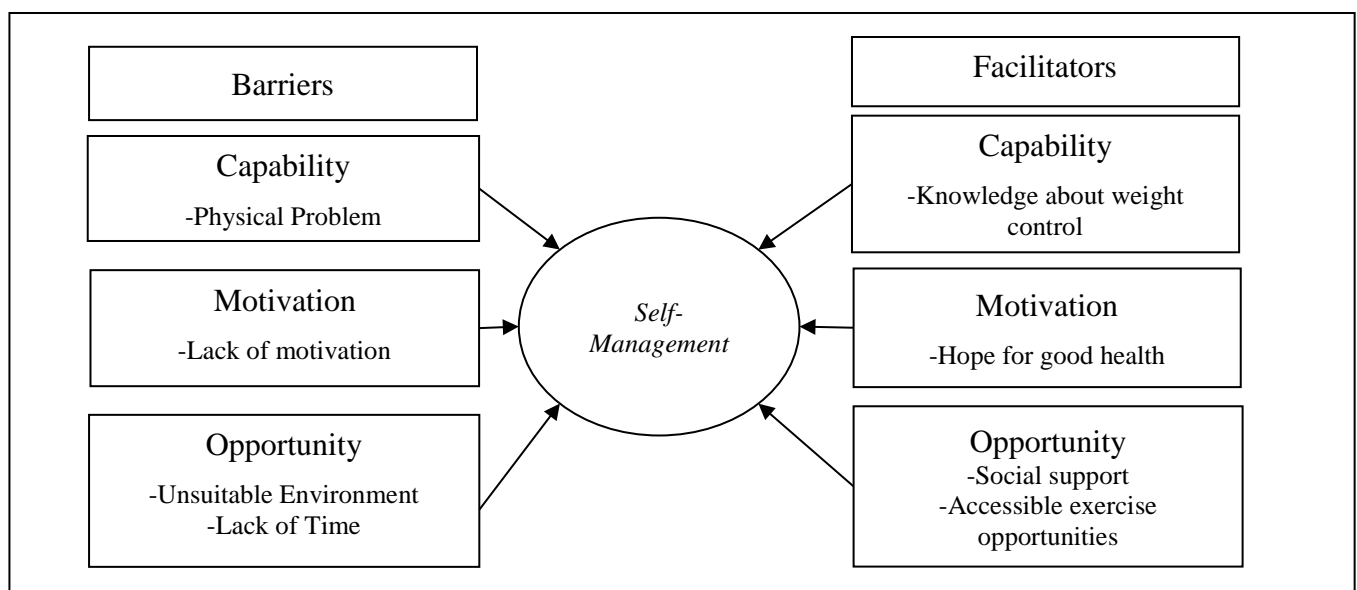
This research study was granted ethical approval by the Ethics Committee for Medical and Public Health Research, Phetchaburi Province, under PBEC No. 30/2565, on October 11, 2022. Prior to their involvement in the study, all participants provided informed consent, ensuring they had a comprehensive understanding of the research's objectives, procedures, as well as potential risks and benefits. The informed consent process also assured participants of anonymity and confidentiality, with the researchers committed to safeguarding their privacy and confidentiality throughout the study. Additionally, participants were informed of their right to withdraw from the study at any time without facing any adverse consequences.

## Results

The analysis of interviews conducted with older individuals suffering from knee osteoarthritis revealed significant challenges in the realm of self-management, particularly concerning weight control through exercise and dietary regulation, as well as the performance of daily living activities. These challenges had a detrimental impact on the condition of their knees, highlighting the importance of understanding the barriers and facilitators that influenced weight management and the ability to engage in daily activities without exacerbating knee issues. To ensure the research objectives were met, the researcher classified the findings into two distinct sections, namely barriers and facilitators, drawing upon the COM-B model for categorization (Figure 1).

**Figure 1**

*Barriers and facilitators of Self-Management to Reduce Severity of Knee Osteoarthritis.*



## **Barriers of Self-Management to Reduce Severity of Knee Osteoarthritis.**

Barriers to self-management had a profound impact on reducing the severity of knee osteoarthritis among older adults. Therefore, it was crucial to identify and address these barriers to promote effective self-management strategies. This section highlights some common barriers encountered by older adults in their self-management journey.

### ***Physical Problems***

Among older adults, physical problems presented significant challenges to self-management efforts aimed at reducing the severity of knee osteoarthritis. These themes collectively shed light on the intricate relationship between knee pain and an individual's motivation to engage in physical activities. They took into account factors like the intensity of pain and concurrent health conditions, providing a comprehensive understanding of this complex issue.

"I have knee pain that makes me reluctant to move. It hurts a lot when I walk, so I prefer not to move. I try to move as little as possible." (Case 2)

"It hurts a lot when I walk downhill... When going down the stairs, I used to exercise by walking fast or jogging lightly, but it would cause pain, so I'm hesitant to walk too much." (Case 3)

"There are multiple conditions, including diabetes. I'm afraid to exercise because I'm worried about developing foot ulcers." (Case 5)

### ***Lack of Motivation***

Lack of motivation can profoundly affect self-management efforts to reduce knee osteoarthritis severity in older adults, as it is crucial for sustaining behavior change and consistent engagement in exercise, diet, and medication adherence.

"I am already old, and I will die eventually, so I just live my life as it is, eating whatever I want. This whole idea of controlling my diet feels suffocating." (Case 1)

"It's not a big deal for me, just a slight discomfort. I can still walk normally, and only on days when I walk a lot, I experience a little pain, but it goes away with rest." (Case 2)

"I think it's unnecessary to take special care. It's just a little knee pain. I can still go on trips and do regular activities without any issues." (Case 4)

### ***Lack of Time***

The lack of time presents a substantial obstacle to self-management efforts aimed at reducing the severity of knee osteoarthritis among older adults. These quotes exemplify the challenges individuals encounter in managing their time and energy due to commitments, work-related exhaustion, caregiving duties, and household chores, all of which affect their capacity to prioritize exercise and self-care.

"I can't go exercise every day because I have commitments that prevent me from managing my time." (Case 2)

"I have to go sell goods, and when I come back home, I feel exhausted and unintentionally fall asleep. I want to rest, so I don't have time to allocate for exercising or follow the doctor's recommendations." (Case 4)

"I don't have much time to take care of myself because I have to take care of my disabled grandchild at home. There are also many household chores to do. After taking care of my grandchild, I'm so exhausted from the housework that I don't have any time left for anything else." (Case 5)



### ***Unsuitable Environment***

Unsuitable environment could significantly affect self-management efforts aimed at reducing knee osteoarthritis severity in older adults, highlighting various factors that influenced exercise habits such as time management, weather conditions, home infrastructure, finances, social aspects, and the impact of the COVID-19 pandemic.

"I can't go exercise every day. Besides being busy, there's also the issue of rainy weather." (Case 1)

"At home, we have a squat toilet and I don't have the money to change it to a Western-style toilet. I don't know how to deal with it." (Case 3)

"Before, I used to exercise regularly with friends at the outdoor fitness area. But since the COVID-19 outbreak, they canceled the group exercise sessions at the park, so there's no place to exercise anymore." (Case 4)

### **Facilitators of Self-Management to Reduce Severity of Knee Osteoarthritis.**

Facilitators played a crucial role in supporting older adults in their self-management efforts to reduce the severity of knee osteoarthritis. These facilitators helped overcome barriers and enhanced the effectiveness of self-management strategies. Here are some key facilitators.

#### ***Knowledge About Weight Control***

Knowledge about weight control was a crucial facilitator in supporting older adults' self-management efforts to reduce the severity of knee osteoarthritis. Understanding the link between weight and knee osteoarthritis empowered individuals to make informed decisions and take proactive steps towards weight management as part of their self-management strategy.

"Most of the time, I cook my own meals. I'm getting older, and the digestive system of older adults is not as good. Therefore, I should avoid fried foods and minimize the use of cooking oil as it is not good for my health." (Case 6)

"I eat everything without any restrictions, but I eat on schedule because I have to go out to work in the garden. I don't snack between meals." (Case 8)

"I reduce the amount of flour and focus on eating vegetables. I don't eat more than one serving per meal." (Case 9)

#### ***Social Support***

Social support, including emotional and informational aspects such as medical advice, temple accessibility, and community support, played a pivotal role in facilitating self-management efforts to reduce knee osteoarthritis severity among older adults.

"When I go to the temple, even though I have to sit on the floor, I have to make an effort because I'm afraid others will think I'm sitting higher than the monks. But other people are eager to find a chair for me to sit on because they are worried I might hurt my knees. When they do that, I feel relieved that I won't be criticized for sitting higher than the monks." (Case 7)

"The nurse advised me not to squat and to exercise my knees to increase their strength. They also recommended weight management to reduce the pressure on the knees." (Case 8)

"When I go to the temple, I sit on a chair during ceremonies such as meditation. Other people in the temple are very helpful. Even the abbot allows older adults to sit on chairs. The temple prepares chairs for senior citizens. I think going to the temple is not an obstacle that causes knee problems." (Case 10)

### ***Hope for Good Health***

Having hope for good health played a significant role in the self-management of knee osteoarthritis among older adults. Hope could be defined as a positive expectation and belief in the possibility of achieving desired outcomes, including improved health and well-being. When individuals held onto a sense of hope, it served as a powerful motivator and catalyst for engaging in self-management practices and reducing the severity of knee osteoarthritis.

"I have a goal to be healthy and strong, so I set a goal that if I don't have any commitments, I must exercise at least three days a week." (Case 6)

"I don't want to be a burden to my children and grandchildren, so I diligently exercise regularly. I want to be able to walk and perform daily tasks normally, and I have my children and grandchildren supporting me." (Case 7)

"I am single and don't have children or grandchildren to take care of me. That's why I am determined to take care of my health regularly until it becomes a habit. It has had a positive impact on my overall well-being, including keeping my knees healthy and preventing deterioration." (Case 10)

### ***Accessible Exercise Opportunities***

Creating exercise opportunities was essential for older adults with knee osteoarthritis, as it constituted a crucial component of self-management. Older adults employed various strategies to maintain regular exercise, including exercising at home regardless of weather conditions, integrating exercise into daily activities, and promoting sustainable mobility and neighborhood engagement.

"To be honest, even when it's raining or the sun is out, I can still exercise at home. It may not be as enjoyable as exercising outdoors and meeting friends, but I try to find opportunities for regular exercise." (Case 6)

"I have an exercise bike set up in front of the television, so I can pedal continuously while watching TV. It allows me to combine watching TV and exercising." (Case 7)

"I have reduced my driving and try to find opportunities for exercise, such as cycling around the neighborhood, especially when I need to run errands or visit neighbors." (Case 10)

## **Discussion and Conclusion**

This study focused on exploring the perceptions of older adults with knee osteoarthritis (OA) regarding barriers and facilitators to self-management. These challenges significantly impacted their knee conditions, underscoring the importance of understanding factors that influenced weight management and daily activities without exacerbating knee problems. The exploration of older adults' perspectives on self-management revealed various obstacles, including physical problems, lack of motivational, lack of time, and unsuitable environments. Conversely, facilitators were identified as knowledge about weight control, social support, hope for good health, and accessible exercise opportunities. The research analyzed these barriers and facilitators using the behavior change wheel concept, which explained how the COM-B influenced individual health behaviors (Michie et al., 2011). The study's findings were discussed accordingly.

### **Capability**

Capability can be divided into two types: physical capability and psychological capability. Physical capability refers to the ability to perform physical movements and exercise to the fullest extent, while psychological capability encompasses factors such as physical strength, stamina, and skills. This study



identifies conditions related to preventive behaviors against severe knee osteoarthritis, including the severity level of the disease and knowledge about weight control.

### ***Physical Problem***

The severity level of knee osteoarthritis significantly impacts physical mobility, representing a physical capability factor. Individuals with knee osteoarthritis often avoid daily activities and exercise due to this limitation (Wojcieszek et al., 2020). The behavior change wheel framework, employing the COM-B model, underscores the critical components influencing behavior change. In this framework, "C" stands for capability, representing an individual's physical ability and readiness to embrace behavioral changes. The severity level of knee osteoarthritis has been shown to affect physical capability (Susko & Fitzgerald, 2013; Hsu et al., 2022). These studies indicate that disease severity, including symptoms like knee stiffness and pain, influences the choice of exercise-based physical therapy as a treatment.

Similarly, Luan et al. (2022) discovered a correlation between the severity level of the disease and the physical activity levels in elderly individuals with knee osteoarthritis. Additionally, a study by Hawker and King (2022) delved into the relationship between self-management practices and knee osteoarthritis severity among older adults, revealing that individuals who effectively engaged in self-management practices exhibited lower levels of knee osteoarthritis severity. These findings suggest that possessing the capability to engage in self-management practices, such as exercise and weight management, significantly contributes to reducing the severity of knee osteoarthritis.

### ***Knowledge about Weight Control***

Psychological capability, such as knowledge about weight control, plays a pivotal role in understanding behavior modification, specifically related to food intake regulation and engagement in physical exercise. This knowledge is particularly relevant as it serves as a preventive health measure against the severity of knee osteoarthritis (Kooranian et al., 2022). The study identified that individuals with low awareness of disease severity faced a higher risk of developing knee osteoarthritis and experiencing more severe symptoms. Conversely, elderly individuals with improved health-related knowledge about knee osteoarthritis made a substantial impact on the self-management practices of older knee osteoarthritis patients (Kamsan et al., 2020; Yeh et al., 2020; Duwao et al., 2022).

By considering capability factors such as the severity level of knee osteoarthritis and knowledge about weight control, interventions were designed to enhance individuals' physical and psychological capabilities, promoting preventive behaviors against severe knee osteoarthritis. These findings supported the importance of education and interventions that addressed both physical limitations and knowledge gaps to improve self-management practices and reduce the severity of knee osteoarthritis among older adults.

### ***Opportunity***

Opportunity was categorized into two types: physical and social. Physical opportunity related to the environment and supported physical activity and healthy behaviors, such as having access to exercise locations, resources, and instructional guides. Social opportunity referred to opportunities arising from interpersonal relationships and interactions within the social context, influenced by social cues and cultural norms. This study identified conditions related to preventive behaviors for knee osteoarthritis, including an unfavorable daily living environment, social support, time management for exercise, and self-generated opportunities for physical activity.

### ***Unsuitable Environment***

In Thailand, exercise wasn't commonly part of daily life. The climate often deterred people from exercising because it made them feel uncomfortable. The daily living environment, both at home and in the community, posed challenges that impacted regular activities (Liangruenrom et al., 2018). For instance, there were inconvenient squat toilets, tasks that necessitated sitting on the floor, and a lack of exercise space

or equipment. Over time, if these unfavorable conditions weren't adjusted to encourage preventive behaviors, they could lead to the progression of severe knee osteoarthritis. This observation was consistent with a study by Bethancourt et al. (2014). They explored factors influencing physical activity in older adults and found a link between the availability of exercise equipment, access to public exercise spaces, and guidance from health professionals and local authorities.

### ***Social Support***

Social support represented a social opportunity referring to the support received from interpersonal relationships, such as family members, and interactions within the immediate social circle. For instance, family members played a pivotal role in promoting healthy behaviors by purchasing exercise equipment or offering alternatives to sitting on the floor during meals. Furthermore, community-based initiatives organized by local networks or primary healthcare centers also contributed support through health promotion activities. Social support played a significant role in self-care and long-term outcomes, including behavior modification and the management of disease severity in cases of severe knee osteoarthritis. This was underscored by studies that highlighted the positive association between family support and self-care behaviors aimed at preventing knee osteoarthritis among older adults, as well as the predictive role of social support in self-management behaviors among older adults with knee osteoarthritis (Schlenk et al., 2021; Kooranian et al., 2022).

### ***Lack of Time***

Time management for exercise was a physical opportunity related to the allocation of time. It involved planning and organizing exercise time to ensure convenience and regularity. Effective time management for exercise was crucial for weight control, which was an important health behavior in preventing severe knee osteoarthritis. Poor time management could lead to difficulties in sustaining regular exercise routines, which could affect weight management and disease severity. This finding aligned with the study conducted by Dismore et al. (2020), which identified time management as a significant predictor of self-management behaviors among older adults with knee osteoarthritis.

### ***Accessible Exercise Opportunities***

Opportunities for physical exercise are influenced by factors such as location, time, and available resources. Consistently engaging in physical activity can become a regular part of one's routine. On days when external factors, like weather, hinder outdoor activities, it's advantageous to use resources at home for exercises aimed at weight control. Studies have demonstrated that creating personal exercise opportunities not only fosters healthy behaviors but also aids in preventing severe knee osteoarthritis (Kanavaki et al., 2017; Bunthan & Kompayak, 2020; Dismore et al., 2020; Moore et al., 2020; Akesson et al., 2022). These research works emphasize that when older adults engage in exercise safely and effectively, they establish consistent routines. The ability to overcome barriers is crucial for maintaining these habits. Moreover, it's vital to adapt to challenges, such as efficiently managing time and adjusting workloads, especially when faced with factors like adverse weather or limited time.

### ***Motivation***

Motivation was the driving force behind self-improvement and the development of a positive attitude toward challenges, fueled by emotions, efforts, and desires. It involved reflective thinking and was linked to self-care or self-evaluation plans. Reflecting on one's thoughts about beneficial or detrimental actions and initiating automatic actions to change behavior were manifestations of motivation. This study identified conditions related to preventive behavior for knee osteoarthritis, including having hope for good health and lacking motivation to change behavior.

### ***Hope for Good Health***

Having hope for good health was a reflective characteristic that extended beyond short-term success and emphasized long-term well-being and fulfillment. It involved desiring good health not only for oneself

but also for loved ones, driven by the intention to avoid financial burdens, time constraints, and unpleasant experiences associated with illness and self-care. This automatic process prompted self-behavior change and supported the development of healthy behaviors and the adoption of preventive behaviors for knee osteoarthritis. This finding aligned with the study conducted by Dismore et al. (2020), which investigated the perception of benefits, problems, and exercise behavior among the elderly. The study revealed that perceiving the benefits of exercise led to regular physical activity and improved physical condition.

### ***Lack of Motivation***

A lack of motivation was characterized by the absence of emotional stimulation, effort, and the driving force for self-improvement through reflective thinking. This resulted in a disconnection from self-care or self-evaluation plans, as well as a failure to reflect on the impact of actions, both beneficial and detrimental, and the absence of automatic actions to change behavior. This lack of motivation hindered the development of healthy behaviors and affected the adoption of preventive measures for knee osteoarthritis. Studies conducted by Phulkerd et al. (2021) and Dismore et al. (2020), which explored factors related to weight loss behavior and life satisfaction, supported the significant influence of motivation on weight control behavior. Similarly, Chaichana et al. (2018) investigated the effects of a motivation-enhancing program and peer support on preventive behavior for knee osteoarthritis among overweight women. Their findings indicated that the experimental group, after the intervention, demonstrated a significantly higher average score for preventive behavior for knee osteoarthritis compared to both their pre-intervention scores and the control group.

### **Implications for Behavioral Science**

This study, set to utilize the COM-B framework, will deepen the understanding of behavior change mechanisms in knee osteoarthritis self-management among older individuals, highlighting the pivotal roles of capability, opportunity, and motivation. Moreover, these insights, grounded in the principles, will provide a foundation for future targeted interventions (Michie et al., 2014). Subsequently, for individuals, the findings will emphasize the importance of addressing capability, opportunity, and motivation for effective self-management of knee osteoarthritis. This approach will not only empower individuals to participate actively in behavior change but also enhance their overall well-being. In relation to practitioners, the findings will suggest that healthcare professionals harness these insights to develop interventions for older patients with knee osteoarthritis, focusing on the three key components. This approach, in turn, will likely enhance the efficacy of self-management programs. Finally, from a policy perspective, as an implication of the aforementioned findings, policymakers will be positioned to develop policies and programs promoting efficient self-management among the elderly. By emphasizing capability, opportunity, and motivation, they will guide the design of initiatives with a higher likelihood of success.

### **Limitations and Future Research Directions**

This study offered valuable insights, but it had limitations, particularly the absence of healthcare professionals' perspectives, which were crucial for a comprehensive understanding. These limitations highlight the importance of conducting further research to enhance knowledge of self-management strategies for knee osteoarthritis in older adults.

### **Conclusion**

The findings of this study emphasized the importance of incorporating the COM-B intervention function into the design and development of self-management programs aimed at improving knee osteoarthritis severity among older individuals. These recommendations were informed by existing scholarly works (Michie et al., 2011; Michie, 2014) that highlighted three critical intervention functions: capability, opportunity, and motivation. These functions played a crucial role in shaping the development of effective self-management strategies for older individuals with knee osteoarthritis.

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## References

- Akesson, K. S., Beckman, A., Stigmar, K., Sundén, A., & Ekwall Hansson, E. (2022). Physical activity and health-related quality of life in men and women with hip and/or knee osteoarthritis before and after a supported self-management program—a prospective observational study. *Disability and Rehabilitation*, 44(16), 4275–4283. <https://doi.org/10.1080/09638288.2021.1900417>
- Ariie, T., Takasaki, H., Okoba, R., Chiba, H., Handa, Y., Miki, T., Taito, S., Tsutsumi, Y., & Morita, M. (2023). The effectiveness of exercise with behavior change techniques in people with knee osteoarthritis: A systematic review with meta-analysis. *Physical Medicine and Rehabilitation*, 15(8), 1012–1025. <https://doi.org/10.1002/pmrj.12898>
- Bethancourt, H. J., Rosenberg, D. E., Beatty, T., & Arterburn, D. E. (2014). Barriers to and facilitators of physical activity program use among older adults. *Clinical Medicine & Research*, 12(1–2), 10–20. <https://doi.org/10.3121/cmr.2013.1171>
- Bunthan, W., & Kompayak, J. (2020). *Paṭchai ng̣rankhai th̄i k̄eokhōng kap phruttikam k̄an ‘ōk kamlang k̄ai pen prācham khōng phūsūng ‘āyu nai chumchon* [Conditional factors associated with regularly exercise behavior of the community-dwelling elderly]. *Warasan Phayaban*, 69(4), 1–10. <https://he02-old.tci-thaijo.org/index.php/TJN/article/view/241249/168986> [in Thai]
- Centers for Disease Control and Prevention. (2020). *Osteoarthritis*. <https://www.cdc.gov/arthritis/basics/osteoarthritis.htm>
- Chaichana, N., Lagampan, S., & Rawiworakul, T. (2021). *Phon khōng prōkrēm sāng rēng ch̄hūng ch̄ai rōwō bōk̄an sām rēng ch̄āk phūan tō phruttikam k̄an pōngkan khō khao sūam nai phūying th̄i nak k̄an* [Effect of Protection Motivation and Peer Support Program on Knee Osteoarthritis Prevention Behaviors among Overweight Women]. *Warasan Satharanasuk Sat*, 51(2), 127–138. <https://he02.tci-thaijo.org/index.php/jph/article/view/116019/118424> [in Thai]
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed method approaches* (4th ed.). Sage.
- Dismore, L., Hurst, C., Sayer, A. A., Stevenson, E., Aspray, T., & Granic, A. (2020). Study of the older adults’ motivators and barriers engaging in a nutrition and resistance exercise intervention for sarcopenia: An embedded qualitative project in the MILKMAN pilot study. *Gerontology and Geriatric Medicine*, 6, 1–9. <https://doi.org/10.1177/2333721420920398>
- Duwao, N., Chintanawat, R., & Suwankruhasn, N. (2022). *Paṭchai thamnāi k̄an ch̄atk̄an ton ‘ēng nai phūsūng ‘āyu rōk khō khao sūam* [Predictive factors for self-management amongst older persons with knee osteoarthritis]. *Warasan Sapha Kan Phayaban*, 37(3), 75–92. <https://he02.tci-thaijo.org/index.php/TJONC/article/view/258081> [in Thai]
- Egerton, T., Nelligan, R., Setchell, J., Atkins, L., & Bennell, K. (2017). General practitioners’ perspectives on a proposed new model of service delivery for primary care management of knee osteoarthritis: A qualitative study. *BMC Family Practice*, 18, 85. <https://doi.org/10.1186/s12875-017-0656-7>
- Grady, P. A., & Gough, L. L. (2014). Self-management: a comprehensive approach to management of chronic conditions. *American Journal of Public Health*, 104(8), e25–e31. <https://doi.org/10.2105/AJPH.2014.302041>
- Hawker, G. A., & King, L. K. (2022). The burden of osteoarthritis in older adults. *Clinics in Geriatric Medicine*, 38(2), 181–192. <https://doi.org/10.1016/j.cger.2021.11.005>
- Hawker, G. A., Stewart, L., French, M. R., Cibere, J., Jordan, J. M., March, L., Suarez-Almazor, M., & Gooberman-Hill, R. (2008). Understanding the pain experience in hip and knee osteoarthritis – an

- OARSI/OMERACT initiative. *Osteoarthritis and Cartilage*, 16(4), 415–422.  
<https://doi.org/10.1016/j.joca.2007.12.017>
- Hsu, H., & Siwiec, R. M. (2023). Knee osteoarthritis. In *StatPearls*. StatPearls Publishing.  
<https://pubmed.ncbi.nlm.nih.gov/29939661>
- Hsu, W. C., Chou, L. W., Chiu, H. Y., Hsieh, C. W., & Hu, W. P. (2022). A study on the effects of Lateral-Wedge Insoles on plantar-pressure pattern for medial knee osteoarthritis using the Wearable Sensing Insole. *Sensors*, 23(1), 84. <https://doi.org/10.3390/s23010084>
- Hunter, D. J., McDougall, J. J., & Keefe, F. J. (2008). The symptoms of osteoarthritis and the genesis of pain. *Rheumatic Diseases Clinics of North America*, 34(3), 623–643.  
<https://doi.org/10.1016/j.rdc.2008.05.004>
- Hurley, M., Dickson, K., Hallett, R., Grant, R., Hauari, H., Walsh, N., Stansfield, C., & Oliver, S. (2018). Exercise interventions and patient beliefs for people with hip, knee or hip and knee osteoarthritis: A mixed methods review. *Cochrane Database of Systematic Reviews*, 2018(4), CD010842.  
<https://doi.org/10.1002/14651858.CD010842.pub2>
- Kamsan, S. S., Singh, D. K. A., Tan, M. P., & Kumar, S. (2020). The knowledge and self-management educational needs of older adults with knee osteoarthritis: A qualitative study. *PLOS ONE*, 15(3), e0230318. <https://doi.org/10.1371/journal.pone.0230318>
- Kanavaki, A. M., Rushton, A., Efstathiou, N., Alrushud, A., Klocke, R., Abhishek, A., & Duda, J. L. (2017). Barriers and facilitators of physical activity in knee and hip osteoarthritis: a systematic review of qualitative evidence. *BMJ Open*, 7(12), e017042. <https://doi.org/10.1136/bmjopen-2017-017042>
- Kooranian, F., ParsaYekta, Z., & Rassouli, M. (2022). Barriers and challenges to self-care among older adults with knee osteoarthritis: A qualitative study. *Ethiopian Journal of Health Sciences*, 32(5), 963–974. <https://doi.org/10.4314/ejhs.v32i5.12>
- Lawless, M. T., Tieu, M., Feo, R., & Kitson, A. L. (2021). Theories of self-care and self-management of long-term conditions by community-dwelling older adults: A systematic review and meta-ethnography. *Social Science & Medicine*, 287, 114393.  
<https://doi.org/10.1016/j.socscimed.2021.114393>
- Liangruenrom, N., Suttikasem, K., Craike, M., Bennie, J. A. Biddle, S. J. H., & Pedisic, Z. (2018). Physical activity and sedentary behaviour research in Thailand: A systematic scoping review. *BMC Public Health*, 18(733), 1–24. <https://doi.org/10.1186/s12889-018-5643-y>
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic Inquiry*. Sage. [http://dx.doi.org/10.1016/0147-1767\(85\)90062-8](http://dx.doi.org/10.1016/0147-1767(85)90062-8)
- Long, H., Liu, Q., Yin, H., Diao, N., Zhang, Y., Lin, J., & Guo, A. (2022). Prevalence trends of site-specific osteoarthritis from 1990 to 2019: Findings from the global burden of disease study 2019. *Arthritis Rheumatol*, 74(7), 1172–1183. <https://doi.org/10.1002/art.42089>
- Luan, L., El-Ansary, D., Adams, R., Wu, S., & Han, J. (2022). Knee osteoarthritis pain and stretching exercises: A systematic review and meta-analysis. *Physiotherapy*, 114, 16–29.  
<http://doi.org/10.1016/j.physio.2021.10.001>
- Michie, S. (2014). Implementation science: Understanding behavior change and maintenance. *BMC Health Services Research*, 14(Suppl 2), O9. <http://www.biomedcentral.com/1472-6963/14/S2/O9>
- Michie, S., Atkins, L., & West, R. (2014). *The behavior change wheel: A guide to designing interventions*. Silverback Publishing.
- Michie, S., Van Stralen, M. M., & West, R. (2011). The behavior change wheel: A new method for characterizing and designing behavior change interventions. *Implementation Science*, 6(1), 42.  
<http://www.implementationscience.com/content/6/1/42>
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage.
- Moore, A. J., Holden, M. A., Foster, N. E., & Jinks, C. (2020). Therapeutic alliance facilitates adherence to physiotherapy-led exercise and physical activity for older adults with knee pain: A longitudinal qualitative study. *Journal of Physiotherapy*, 66(1), 45–53. <https://doi.org/10.1016/j.jphys.2019.11.004>



- Open Government Data of Thailand. (2021). *Dataset: Rate of knee replacement surgeries in individuals aged 60 and above, Universal Coverage Scheme of the providing hospital, 2017–2020*. [https://data.go.th/dataset?groups=doi&res\\_format=XLSX&organization=nhso](https://data.go.th/dataset?groups=doi&res_format=XLSX&organization=nhso)
- Phra Chom Klao Hospital Statistics Center, Thailand (2021). *Knee osteoarthritis data, 2018–2021*. (unpublished raw data). [in Thai]
- Phulkerd, S., Thapsuwan, S., Chamrathirong, A., & Gray, R. S. (2021). Influence of healthy lifestyle behaviors on life satisfaction in the aging population of Thailand: A national population-based survey. *BMC Public Health*, 21(1), 43. <https://doi.org/10.1186/s12889-020-10032-91-10>
- Pitsamai, B., Therawiwat, M., Iamee, N., & Aree-ue, S. (2012). *Paṭhai thī mī phon tō phruttkam k̄n̄chatk̄n ton ‘ēng khōng phū thī pen rōk khō khao s̄am* [Factors related to self-management behaviors for persons with osteoarthritis]. *Journal of Public Health*, 42(2), 54–67. <https://he02.tci-thaijo.org/index.php/jph/article/view/7943> [in Thai]
- Putri, S. E., Rekawati, E., & Wati, D. N. K. (2021). Effectiveness of self-management on adherence to self-care and on health status among elderly people with hypertension. *Journal of Public Health Research*, 10(s1), jphr.2021.2406. <https://doi.org/10.4081/jphr.2021.2406>
- Roos, E. M., & Arden, N. K. (2016). Strategies for the prevention of knee osteoarthritis. *Nature Reviews Rheumatology*, 12(2), 92–101. <https://doi.org/10.1038/nrrheum.2015.135>
- Schlenk, E. A., Sereika, S. M., Martire, L. M., & Shi, X. (2021). Older adults’ social network and support and its association with physical activity. *Geriatric Nursing*, 42(2), 517–523. <https://doi.org/10.1016/j.gerinurse.2020.09.006>
- Susko, A. M., & Fitzgerald, G. K. (2013). The pain-relieving qualities of exercise in knee osteoarthritis. *Open Access Rheumatology: Research and Reviews*, 5, 81–91. <https://doi.org/10.2147/OARRR.S53974>
- Wojcieszek, A., Kurowska, A., Majda, A., Liszka, H., & Gądek, A. (2022). The Impact of chronic pain, stiffness, and difficulties in performing daily activities on the quality of life of older patients with knee osteoarthritis. *International Journal of Environmental Research and Public Health*, 19(24), 16815. <https://doi.org/10.3390/ijerph192416815>
- Wu, Z., Zhou, R., Zhu, Y., Zeng, Z., Ye, Z., Wang, Z., Liu, W., & Xu, X. (2022). Self-management for knee osteoarthritis: A systematic review and meta-analysis of randomized controlled trials. *Pain Research and Management*, 2022, 2681240. <https://doi.org/10.1155/2022/2681240>
- Yeh, W. L., Tsai, Y. F., Hsu, K. Y., Chen, D. W., Wang, J. S., & Chen, C. Y. (2020). Weight control in older adults with knee osteoarthritis: A qualitative study. *BMC Musculoskeletal Disorders*, 21, 504. <https://doi.org/10.1186/s12891-020-03480-2>