Factors Influencing Care-Seeking Behavior among Chinese Older Adults with Knee Osteoarthritis: A Mixed Methods Study

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Abstract: Early care-seeking behavior enables older adults to recognize initial symptoms, identify knee osteoarthritis, access appropriate healthcare, and improve health outcomes. A concurrent mixed-methods research design, incorporating cross-sectional and descriptive qualitative study phases, provides valuable insights into the factors influencing and perceptions of care-seeking behavior among Chinese older adults with knee osteoarthritis. Based on Andersen's Behavioral Model, this study aimed to examine how factors such as knowledge of knee osteoarthritis symptoms, social support, stoicism, aging expectations, health insurance coverage, past experiences, pain severity, and comorbidities influence care-seeking behavior among 239 Chinese older adults with knee osteoarthritis across three communities in Dalian City, Liaoning Province, China. Data were collected using both questionnaires and in-depth interviews. Quantitative data were examined through descriptive statistics, Pearson's correlation analysis, and hierarchical multiple regression analysis, while qualitative data were analyzed through content analysis. The findings were synthesized using a side-by-side comparison approach.

The converged results confirmed that strong social support and higher pain severity enhance professional care-seeking behavior, while a stoic attitude and lack of health insurance coverage diminished it. Additionally, qualitative findings highlighted unpleasant experiences in past care-seeking as barriers, whereas gaining more knowledge about knee osteoarthritis, having a comorbid condition, and expecting healthy aging emerged as facilitators. Insights from this theoretically grounded research can inspire and inform clinical nurses to promote early and professional care-seeking behavior, thereby preventing the progression of knee osteoarthritis.

Keywords: Care-seeking behavior, Chinese older persons, Knee osteoarthritis, Mixed methods

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Introduction

China's aging population is growing rapidly, with the proportion of individuals aged 60 and over projected to increase from 12.4% in 2010 to 28% by 2040.[1] Knee osteoarthritis (OA) has become the most common chronic joint disease among older adults, affecting approximately 37.5 million people in China.[2] It poses significant health risks, including functional decline, depressive symptoms, dementia, and increased mortality.[3-5] Beyond health issues, knee OA heavily burdens patients. China ranks fourth globally in Years Lived with Disability (YLDs) due to knee OA among individuals aged 50-69.[6] Additionally, 33.4% of Chinese adults aged 50 or older leave the workforce prematurely due to knee OA, the leading cause among osteoarthritis cases.[7] As China's population ages, the social and economic burden of knee OA is expected to intensify. Preventing its progression is essential to mitigate this impact.

In line with the "Medium-to-Long Term Plan for Chronic Disease Prevention and Treatment" policy issued by the Chinese government, early diagnosis and treatment are crucial to reduce risks among high-risk groups.[8] Knee OA often remains unnoticed for long periods, leading to delayed recognition and severe knee damage. To address this issue, Chinese guidelines advocate care-seeking behavior (CSB), which aims to facilitate early disease diagnosis, detect disabilities promptly, and prevent long-term complications.[9] Following a knee OA diagnosis, professional rehabilitation assessments are crucial for identifying functional impairments and establishing clear rehabilitation goals.

In Chinese culture, some older individuals view knee pain as an inevitable part of aging and endure it without seeking care, missing crucial treatment opportunities.[10] This can result in a 1.3-fold increase in joint destruction and further complications.[11] Many older Chinese adults with knee OA rely on traditional remedies, such as moxibustion, acupuncture, or massage. However, these methods lack robust evidence due to methodological limitations.[12] Furthermore, given the complexity of managing exercise among older adults, patients should seek a definitive diagnosis from healthcare professionals and adhere to their guidance.

In light of the delayed and suboptimal CSB observed among older adults with knee OA in China, it is crucial to investigate the factors influencing their decisions to seek initial professional healthcare.

Review of Literature and Conceptual Framework

CSB involves actions taken by individuals to address perceived ill-health.[13] The study of CSB helps understand how people seek help to prevent illness within their socio-cultural, economic, and demographic contexts.[14] In this study, CSB focuses on older adults seeking professional help to prevent knee OA. Andersen's Behavioral Model (ABM) enhances understanding of motivations by considering contextual factors in three domains: predisposing, enabling, and need factors.[15]

Predisposing characteristics include demographic traits, social structure, and health beliefs, influencing an individual's inclination to seek healthcare. Social structure was assessed through social networks and interactions, measured by social support in this study.[15] Studies found that social interaction increased CSB, while mere financial assistance led to a decline in CSB.[16,17] This highlights the need to reassess how social support functions in this context.

Health beliefs encompass the attitudes, values, and knowledge individuals possess regarding health and healthcare services, influencing their views on the necessity and utilization of healthcare.[15] The ABM is useful for specific diseases and cultural contexts. In this study, we examined stoicism, expectations regarding aging (ERA), and knowledge of knee OA symptoms. Research has shown a correlation between stoicism and CSB. For example, rural residents in Australia who adopted a stoic attitude toward mental

health issues demonstrated a negative correlation with CSB.[18] When older adults view health issues as inevitable with aging, they are less likely to adopt CSB. ERA was found to correlate positively with general CSB engagement in older individuals.[19] It is important to investigate if this relationship applies to CSB related to knee OA in Chinese older adults. Poor knowledge of subtle symptoms was found to be associated with reluctance to professional CSB, while another study found that a better understanding of tuberculosis symptoms increased CSB.[20,21] The discrepancy likely stems from differences in public awareness and perception of symptom severity. This study investigated how knowledge of knee OA symptoms affects CSB.

Enabling factors support an individual's care-seeking needs. Measuring health insurance coverage is essential to understanding the potential importance of personal enabling resources.[15] It leads to increased chances of CSB for medical check-ups.[22] Experiences such as waiting times and access to healthcare are also important indicators. A mixed-methods study reported that previous healthcare experience affects a patient's subsequent CSB.[23] However, the underlying motivations behind these enabling factors have garnered relatively limited attention, especially in studies focusing on Chinese older adults with knee OA.

Need factors are the most immediate drivers of CSB, primarily related to knee OA, and include the severity of pain (individual pain experiences) and comorbidity (professional assessments of health status) in this study.[15] Individuals experiencing severe knee pain were 1.29 times more likely to exhibit CSB than those with less severe pain.[24] However, the lack of standardized measures to quantify knee pain severity limits evidence supporting this relationship. A positive association between comorbidity and CSB was identified among older Chinese individuals.[25] Nevertheless, this association becomes insignificant when focusing on older adults with knee OA.[26] Further research is needed to evaluate this relationship in older Chinese adults with knee OA.

Empirical research findings indicate that the association between social support, knowledge of knee OA symptoms, and CSB varies across different diseases and populations. Furthermore, the predictive power of stoicism, ERA, past care-seeking experience, health insurance coverage, severity of pain, and comorbidity for CSB is limited. Another significant gap in previous studies is their reliance solely on quantitative methods, which may not fully address the specific needs of the local Chinese context. Hence, we undertook a mixed-methods study.

Study Aim and Questions

This study evaluated how specific factors correlate with culture and individual perceptions by studying the influencing factors of CSB and perceptions of these among Chinese older adults with knee OA.

Methods

Design: This study addresses the research gap by employing a convergent mixed-methods design to comprehensively investigate and understand the factors influencing CSB among Chinese older adults with knee OA. A cross-sectional study was utilized to examine the predictive power of various factors on CSB among Chinese older adults with knee OA. A descriptive qualitative approach was employed to achieve a comprehensive understanding of how these factors were perceived by older individuals with knee OA within the Chinese context.[35] The researchers followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist for the cross-sectional study and the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist for the descriptive qualitative phase, ensuring high-quality reporting standards throughout the study.

Sampling and Setting: The study was conducted in three communities in Dalian, China, between June 2023 and January 2024. According to Tabachnick

and Fidell,[27] a minimum sample size of 20 times the number of variables is required for reliable regression analysis. For this study, which included eight variables, we set the sample size to 25 times the number of variables, accounting for potential attrition. In the cross-sectional study, 240 participants were recruited from three communities, with the proportion of 110, 90, and 40 participants from each community. Participants in each community were initially identified from electronic health records based on self-reported, physician-diagnosed knee OA and aged 60 or older. Simple random sampling was subsequently employed to select individuals, who were then contacted by telephone to confirm their willingness to participate. Eligible participants were required to agree to join the study and achieve a score of 8 or above on the 6-item Cognitive Impairment Test. Those unable to complete all procedures or with insufficient Chinese proficiency (due to hearing or speech impairments) were excluded. Participants were selected from the larger quantitative sample for the qualitative phase based on their willingness and availability. After conducting ten interviews, data saturation was attained. This aligns with the principle that greater similarity among samples enhances comparison effectiveness.

Ethical Considerations: The study design and protocols were approved by the Research Ethics Committee of the Faculty of Nursing, Chiang Mai University (Approval No. 2566-EXP020). Participants were informed about the research objectives and voluntarily provided written informed consent. Participants were informed that they could refuse involvement or discontinue their participation in the study at any point, with no adverse effects. All data were anonymized before analysis to ensure confidentiality, and no personal identifying information was included.

Data Collection: A researcher who had undergone comprehensive research training conducted the data collection procedure. A *demographic data form* was developed to collect participant characteristics, including age, gender, marital status, educational level, personal income, health insurance coverage, religion, comorbidity, and past care-seeking experiences. The form also included a multiple-choice question to assess knowledge of knee OA symptoms.

For the quantitative phase, *the General Help-Seeking Questionnaire*[28] assessed participants' CSB from professional help sources, specifically doctors. Responses were rated on a 7-point scale, ranging from 1 ("Extremely unlikely") to 7 ("Extremely likely"), with greater values reflecting more of CSB. Stoicism was measured using the *Pathak-Wieten Stoicism Ideology Scale*, developed by Pathak et al.[29] Participants rated their responses on a scale ranging from -2 ("Strongly disagree") to +2 ("Strongly agree"), yielding scores ranging from -24 to 24. A score of 0 indicated a neutral stance, while positive scores reflected an affinity for stoic ideology, and negative scores indicated rejection of stoic ideology.

Expectations regarding aging were evaluated using *the 12-Item Expectations Regarding Aging (ERA) Scale* developed by Sarkisian et al.[30] Participants evaluated each item using a scale that ranged from 1 ("Definitely true") to 4 ("Definitely false"), producing a total score range of 12 to 48. Lower overall scores reflected expectations of decline in older age, while higher scores indicated more positive expectations. These three questionnaires were translated into Chinese following WHO guidelines,[31] with original developers' permission to ensure linguistic and cultural equivalence. To establish reliability, the questionnaires were tested in a pilot study involving 15 participants who met the same criteria as the primary research sample but were not included in the main investigation. Cronbach's alpha coefficients for the questionnaires were 0.84, 0.82, and 0.85, respectively.

The Chinese version of *the Duke Social Support Index*[32] was used to evaluate social support. This index includes six items measuring social satisfaction and four items measuring social interaction. The comprehensive scores fall between 10 and 30, where higher values reflect more substantial social support.

The severity of pain was assessed using the pain subscale in the Chinese version of *the Knee Injury and Osteoarthritis Outcome Score (KOOS).*[33] This

subscale comprises nine items designed to evaluate knee pain, with standardized response options presented on a 5-point Likert scale. The total score for all items was computed, falling within the range of 0 to 36, with higher scores indicating greater pain severity. In the pilot study, the Cronbach's alpha coefficients for these scales were 0.82 and 0.92, respectively, demonstrating good reliability.

For the qualitative phase, willing participants underwent in-depth interviews to explore their thoughts and feelings about how various factors influenced their CSB. The in-depth interview guidelines, which were developed based on the concepts of CSB and ABM and validated by six dissertation advisory committees and one expert in qualitative research for accuracy and comprehensiveness, were rigorously adhered to, and there were two main questions:

1. How do you think care-seeking for your knee OA can be enabled? (e.g., knowledge about knee OA, ERA, social support, severity of knee pain, comorbid conditions).

2. How would you describe the obstacles to care-seeking for your knee OA? (e.g., health insurance coverage, past care-seeking experiences).

Trustworthiness: The study employed strategies to ensure trustworthiness based on Lincoln and Guba's criteria,[34] encompassing credibility, transferability, dependability, and confirmability. Credibility was established via peer debriefing sessions to validate the coding, categories, and subcategories. Transferability was achieved by providing detailed descriptions of the study's background, participants, data collection methods, analysis process, and a comprehensive presentation of findings supported by relevant quotations. Dependability and confirmability were ensured through meticulous documentation of the research process and the creation of an audit trail.

Data Analysis: Descriptive statistics were employed to analyze the demographic characteristics of the sample, encompassing frequency, range, percentages, means, and standard deviations. The study met all assumptions, including normality, homoscedasticity, residual normality, linearity, and absence of multicollinearity and outliers. Significant predictors were identified via hierarchical multiple regression. Qualitative data were captured through audio recordings and transcribed verbatim. Content analysis was employed to analyze data and identify prominent themes and categories systematically.[35] The researcher first translated the recordings from the participants' language into English. The interviews were carefully reviewed multiple times to obtain a comprehensive understanding. Meaning units pertinent to the study's objective were identified, extracted, and summarized. These units were coded by the first author with support from two others. The codes were analyzed to determine their similarities and differences, and similar contents were grouped into subcategories. Subcategories were abstracted into broader final categories. Patterns were identified by iterating between text units and categories, and themes were formulated. We then used a side-by-side comparison approach to integrate the quantitative and qualitative results, identifying three relationships: confirmation, disconfirmation, and expansion.[36]

Results

Demographic characteristics of the participants: From the three communities, 239 participants joined the study, yielding a response rate of 99.58% (one dropout due to incomplete data). The mean age of the participants was 67.91 ± 6.31 years, with the majority being female (70.7%) and holding a secondary school diploma (58.6%). Most participants (71.1%) reported having Urban Employees' Basic Medical Insurance (UEBMI), and 92.9% had a monthly income exceeding 1,000 CNY (138 USD). Additionally, 65.7% of participants identified as having comorbidities, and 61.5% reported past care-seeking experience. A total of 10 respondents were recruited from a quantitative participant pool to participate in in-depth interviews. The mean age of these respondents was 69.20 ± 7.32 years. Demographic data for both the larger quantitative sample (N = 239) and the interview participants (n = 10) are summarized in **Table 1**.

Table 1. Demographic characteristics of participants (N = 239, n = 10)

Demographic characteristics	Frequency (%)	
	N = 239	n = 10
Age (years)		
60-69	152 (63.6)	5 (50)
70-79	72 (30.1)	3 (30)
80	15 (6.3)	2 (20)
Gender		
Female	169 (70.7)	8 (80)
Male	70 (29.3)	2 (20)
Education level		
Primary school	53 (22.2)	1 (10)
Secondary school	140 (58.6)	6 (60)
Graduate or more	46 (19.2)	3 (30)
Income (per month)		
less than1000 CNY (138 USD)	17 (7.1)	0 (0)
1000-3000 CNY (138-414 USD)	113 (47.3)	5 (50)
more than 3000 CNY (414 USD)	109 (45.6)	5 (50)
Health Insurance Coverage		
UEBMI	170 (71.1)	6 (60)
NCMS	17 (7.1)	0 (0)
URBMI	39 (16.3)	3 (30)
None	13 (5.4)	1 (10)
Past care-seeking experience		
Yes	147 (61.5)	8 (80)
No	92 (38.5)	2 (20)
Comorbidity		
Yes	157 (65.7)	10 (100)
No	82 (34.3)	0 (0)

Note. UEBMI = Urban Employees' Basic Medical Insurance, NCMS = New Rural Cooperative Medical Scheme, URBMI = Urban Resident's Basic Medical Insurance, None = No health insurance

Quantitative findings: Influencing factors of CSB among Chinese older persons with knee OA

A high level of CSB was observed for seeking professional assistance from a doctor (mean = 5.95, SD = 1.47). As shown in **Table 2**, when classifying dependent variables into low, moderate, and high levels, the scores for social support, stoicism, and knowledge of knee OA symptoms were at a moderate level, with means of 22.15 (SD = 3.46), 4.15 (SD = 5.75), and 3.13 (SD = 1.48), respectively. In contrast, the scores for expectations regarding aging and severity of pain were low, with means of 22.69 (SD = 5.53) and 9.19 (SD = 6.54), respectively. Health insurance coverage, past care-seeking experience, and comorbidity have been described in the demographic part.

Prior to conducting multiple regression, the correlation between selected variables and CSB was explored. The following variables were significantly associated with CSB: social support ($r = 0.19$, $p < 0.01$), stoicism ($r = -0.21$, $p < 0.01$), knowledge of knee OA symptoms ($r = 0.23$, $p < 0.01$), expectations regarding aging (ERA) ($r = 0.16$, $p < 0.01$), the severity of pain ($r = 0.22$, $p < 0.01$), health insurance coverage ($r = 0.25$, $p < 0.01$), and past care-seeking experience ($r = 0.22$, $p < 0.01$). However, comorbidity ($r = 0.04$, $p > 0.05$) was not significantly associated with CSB.

Table 2. Range, mean, and standard deviation of the study variables (N = 239)

Variables	Possible Range	Actual Range	Mean	SD	Level
Social support	10-30	14-30	22.15	3.46	Moderate
Stoicism	-24-24	-10-20	4.15	5.75	Moderate
Knowledge	0-6	0-6	3.13	1.48	Moderate
ERA	12-48	12-36	22.69	5.53	Low
Severity of pain	0-36	1-26	9.19	6.54	Low

Note. Knowledge = Knowledge of knee osteoarthritis symptoms, ERA = Expectations regarding aging

Using ABM as a framework, hierarchical multiple regression was performed, and a significant regression equation was found $F(7, 231) = 10.07$, $p < 0.01$. The model achieved an adjusted R^2 value of 0.21, accounting for 21% of the variance, as shown in **Table 3**. Knowledge of knee OA symptoms, social support, stoicism, health insurance coverage, and severity of pain were identified as predictors of CSB among Chinese older adults with knee OA. Among these variables, social support ($\beta = 0.22$, $p < 0.01$), health insurance coverage ($\beta = 0.20$, $p < 0.01$), and stoicism ($\beta = -0.18$, $p < 0.01$) emerged as the strongest predictors. These findings demonstrate that these factors effectively predicted CSB among Chinese older adults with knee OA.

Table 3. Hierarchical multiple regression analysis for variables predicting CSB

Variables	Model 1			Model 2			Model 3		
	B	SE	β	B	SE	β	B	SE	β
Knowledge	0.24	0.06	0.24**	0.18	0.06	0.18**	0.16	0.06	0.16**
Stoicism	-0.06	0.02	-0.24**	-0.06	0.02	-0.21**	-0.05	0.02	-0.18**
ERA	0.03	0.02	0.12*	0.03	0.02	0.11	0.02	0.02	0.08
Social support				0.08	0.03	0.18**	0.10	0.03	0.22**
Insurance				0.27	0.39	0.19**	1.33	0.39	0.20**
Experience				0.44	0.18	0.14*	0.28	0.19	0.09
Severity of pain							0.04	0.02	0.16*
R^2		0.13			0.21			0.23	
Adjusted R^2		0.12			0.19			0.21	
F		11.32**			10.55**			10.07**	

Note. Knowledge = Knowledge of knee osteoarthritis symptoms, ERA = Expectations regarding aging, Insurance = Health insurance coverage, Experience = Past care-seeking experience, *p < 0.05, **p < 0.01

Qualitative findings: Perspectives of factors related to CSB among Chinese older persons with knee OA

The findings were categorized into two main themes (facilitators of CSB, which refer to experiences that promote CSB, and barriers to CSB, which encompass experiences that hinder its development). These themes were further divided into five categories for facilitators and three for barriers.

Facilitators of CSB: Participants revealed that getting social support for CSB, gaining more knowledge about knee OA, expecting healthy aging, experiencing severe knee pain, and having comorbid conditions could enhance their CSB.

Category 1: Getting social support for CSB. Interacting with family members and relatives, as well as receiving their positive suggestions and support, could facilitate CSB among participants.

Subcategory 1.1: Receiving suggestions from relatives. Some participants decided to seek care for their knee OA after considering the advice provided by their relatives.

> *"I didn't understand it at first, but a relative came to my house and told me that this situation was quite dangerous and there might be a risk of disability. After that, I was a little fearful. I immediately went to the hospital to find a specialist."* I1P2

Subcategory 1.2: Being urged by family members. Some participants initially did not plan to seek help; however, due to encouragement from their family members, they decided to seek professional assistance for their knee OA.

> *"I still felt the pain was terrible, and my family also felt my pain. They said you should go to the hospital to take a check. In case of lying in bed in the future, you should receive treatment in time... If they hadn't urged me, I would still be staying at home."* I3P2

Category 2: Gaining more knowledge about knee OA. Some participants expressed a preference for seeking professional help to gain a better understanding of how to diagnose and treat knee OA.

Subcategory 2.1: Seeking professional diagnosis. Participants often perceive themselves as lacking professional medical knowledge. Consequently, when they experience knee issues, they tend to visit hospitals to obtain expert advice and a professional diagnosis of knee OA.

> *"Since we are not experts, even if I think I know what's wrong, it's best to go to the hospital just to be safe... If something feels off, I usually look it up online to see what might be going on with my knee. Then, I hurry to the hospital to talk to a doctor and get a proper diagnosis..."* I3P1

Subcategory 2.2: Acquiring knowledge for treatment. Despite some participants expressing knowledge of knee OA symptoms, they still require professional assistance to gain a deeper understanding of its treatment.

> *"I will learn about the symptoms of knee OA, pain and swelling, which are the two most important, as well as some abnormal sounds. But how to maintain it, how to treat it, I know a little. I need professional help to teach me how to treat."* I5P2

Category 3: Expecting healthy aging. When participants hold positive expectations, such as anticipating their health to be comparable to that of younger individuals, they are more likely to address illnesses promptly to maintain good health.

Subcategory 3.1: Expecting health to be the same as young. When participants expect health to be maintained in a youthful state, they may prefer engaging in CSB to preserve their well-being.

> *"I've heard that it (knee OA) is a degenerative disease. Just like machines, our bodies start to wear out as we get older, especially our joints. But I still hope my health stays the same. I try to keep myself in good shape by following the doctor's advice on my diet."* I1P3

Subcategory 3.2: Taking early action to maintain health. Some participants believe that taking prompt action to address illnesses is essential for maintaining their usual health.

> *"I think it's better to go for an early check-up for the health problems. After finding the causes and treatments, as long as the problem is solved, the body is still fine."* I2P4

Category 4: Experiencing serious knee pain. Most participants reported that they would seek treatment for their knee OA if the pain worsened, interfered with their mobility, or became recurrent.

Subcategory 4.1: Feeling too painful to walk. Most participants only decided to seek medical assistance when knee pain significantly restricts their mobility.

> *"I think it's going to get to a point where the pain is so bad that I can't walk and then go to the hospital."* I5P2

Subcategory 4.2: Experiencing recurring pain. Participants may seek medical consultation to determine the underlying causes when knee pain recurs and remains severe.

> *"...But if I keep feeling that this place is uncomfortable and the pain keeps coming back, I'll have to go see a doctor to figure out what's wrong."* I10P2

Category 5: Having a comorbid condition. Participants reported that comorbidities led to concerns about their overall health. Moreover, individuals who had previously experienced successful treatment for a comorbid condition were more likely to engage in CSB.

Subcategory 5.1: Being concerned about comorbid conditions. Sometimes, it is only when a comorbid condition arises that participants begin to worry about their health status and initiate CSB.

> *"After half a month, my knee began to swell, swollen like a big steamed bun, and it was not easy to walk. I have high blood pressure, so I feared I would get a cerebral thrombosis and rushed to the hospital to check."* I7P1

Subcategory 5.2: Having experiences treating comorbidities. Successful management of comorbidities is likely to increase patients' confidence in their doctors when addressing new health issues.

> *"I had really bad chest pain, so I headed to the hospital to see a doctor. He checked me out and said my chest and lungs looked good but recommended I get my heart checked right away. They kept me overnight and ended up doing a stent surgery. If it wasn't for that doctor, I might not be here today. So, whenever I have any health issues, I make sure to see a doctor ASAP."* I5P1

Barriers to CSB: Lacking health insurance coverage, maintaining a stoic attitude, and gaining unpleasant experiences in past care-seeking are the main obstacles to CSB.

Category 1: Lacking health insurance coverage. Health insurance typically reimburses patients for a portion of their medical expenses, while individuals without health insurance must bear the full cost of medical treatments. Some individuals may be discouraged from seeking treatment for knee OA due to concerns about high out-of-pocket expenses and low reimbursement rates.

Subcategory 1.1: Paying all medical expenses by themselves. Participants without health insurance coverage may need to bear all medical expenses out of pocket, which could lead them to forgo CSB.

> *"...I have people around me, some rural registered residences do not have any insurance, considering the cost. They will be told to spend so much money and not go (to hospital). They go to the pharmacy to buy some drugs"* I6P3

Subcategory 1.2: Worrying about low reimbursement. Participants with low-reimbursement health insurance coverage may worry that hospital visits will result in costs beyond their means, potentially hindering their CSB.

> *"It's totally normal to think about your living conditions and health based on your financial situation. I've got insurance, so if I'm not feeling well, I'll head to the hospital. But if the insurance doesn't cover much and I can't afford the treatment, I'd just focus on taking good care of myself and exercise myself."* I3P3

Category 2: Maintaining a stoic attitude. Most participants stated that they preferred to endure knee pain and did not express their discomfort to anyone. They felt uncomfortable when others perceived them as being ill. Some participants wanted to maintain a self-reliant state and were afraid of causing trouble or transferring negative energy to others.

Subcategory 2.1: Being in fear of trouble. Concerned about causing trouble or burdening others, participants often choose to endure their pain in silence.

"The children have been working all day during the day, and we also want the children to have a good mood and not to make the children upset. I always say that I am uncomfortable, and the atmosphere at home will be not happy... You said that the child worked, and you asked the child to take a day off to accompany us to seek the doctor, it was not so easy. Especially if you didn't find any problems. I don't want to cause more trouble to my children. If I don't have a serious illness, I won't go to the hospital." I7P2

Subcategory 2.2: Maintaining a self-reliant state. Some participants aspire to maintain a state of self-reliance, preferring not to depend on others and seeking to overcome their pain independently.

"When I have suffering, I definitely bear it myself, I will never tell everyone that my suffering is, as long as I can overcome it, as long as I can get up, I can do it myself, I will definitely not need others." I2P4

Subcategory 2.3: Worrying about others' thoughts. Participants often refrain from expressing their pain and discomfort to others, preferring not to be perceived as unwell.

"It may have something to do with my personality. As a man should not always say pain. I have not lowered my health requirements, but I am not happy to talk about my physical problems, I feel bad, I feel bad about others thinking you are sick, you are not healthy." I5P2

Category 3: Gaining unpleasant experiences in past care-seeking. Participants with past care-seeking experiences expressed that visiting a doctor in a hospital was too troublesome. Moreover, encountering doctors' lack of responsibility and experiencing unsuccessful care-seeking efforts that failed to improve their knee condition caused them to lose confidence in continuing CSB.

Subcategory 3.1: Undergoing excessive physical examinations. Patients who have undergone numerous hospital examinations often refrain from further CSB due to the inconvenience of waiting in long queues for tests.

"I feel that seeking professionals in hospitals is too troublesome. It takes a long time. You have to queue up (for a doctor). There are many kinds of examinations in the hospital that are too troublesome. If you need to do one, you have to queue again, a whole morning is not enough. When the report came out, I had to register again to see the specialist. There were many people at the hospital, and you had to wait again." I1P2

Subcategory 3.2: Experiencing the irresponsibility of doctors. Some participants have reported encountering irresponsible doctors in the past, leading them to exercise caution with CSB.

"Now, I think the doctor was irresponsible. She didn't ask me about my body condition, less than a minute, just asked me to do a body examination directly. I refused." I1P2

Subcategory 3.3: Losing confidence due to failed treatment. Due to unsuccessful outcomes from previous treatments for knee OA, participants may believe that knee OA is incurable, leading them to refuse further CSB.

"It still hurts to walk. I've tried all the methods I can try, and I don't think it's useful. Now I think it's useless, listening to nothing will cure the problem, and now I have lost all confidence in this treatment." II7P1

Mixed-methods analysis: The merged analysis identified four confirmed results and four expanded results: Strong social support and higher pain severity increased professional CSB. At the same time, a stoic attitude and lack of health insurance decreased it. Additionally, qualitative findings highlighted that unpleasant past care experiences acted as barriers, while greater knowledge about knee osteoarthritis, comorbid conditions, and expectations of healthy aging served as facilitators (see **Table 4**).

Table 4. Joint display of perspectives of factors influencing CSB

Quantitative findings	Qualitative findings	Mixed methods inferences
1. Knowledge of knee OA symptoms could positively predict CSB ($\beta = 0.16$, $p < 0.01$).	Gaining more knowledge about knee OA was perceived as a facilitator of CSB. Such knowledge included: Professional diagnosis. *"... If something feels off, I usually look it up online to see what might be going on with my knee. Then, I hurry to the hospital to talk to a doctor and get a proper diagnosis..."* I3P1 Knowledge for treatment. *"I will learn about the symptoms of knee OA, pain and swelling, which are the two most important, as well as some abnormal sounds. But how to maintain it, how to treat it, I know a little. I need professional help to teach me how to treat."* I5P2	**Expansion**: The questionnaire focused solely on knee OA symptoms knowledge. The interview expanded that older adults need to gain more knowledge to better understand diagnosing and treating knee OA.
2. Whether having comorbidity was unrelated to CSB ($p = 0.55$).	Having a comorbid condition was perceived as a facilitator of CSB: Comorbidities led to concerns about overall health. *"...my knee began to swell... it was not easy to walk. I have high blood pressure, so I feared I would get a cerebral thrombosis and rushed to the hospital to check."* I7P1 Successful management of comorbidities increased CSB. *"I had really bad chest pain, so I headed to the hospital to see a doctor... recommended I get my heart checked right away... and ended up doing a stent surgery. If it wasn't for that doctor, I might not be here today. So, whenever I have any health issues, I make sure to see a doctor ASAP."* I5P1	**Expansion**: Although whether had comorbidity lost significance in quantitative study, qualitative findings reported that comorbidities raised health concerns, and those who had successfully treated a comorbid condition were more likely to engage in CSB.
3. ERA was positively related to CSB ($r = 0.16$, $p < 0.01$), while lost significance in predicting CSB ($p = 0.08$).	Expecting healthy aging was perceived as a facilitator of CSB: Expecting health to be the same as young. *"...I still hope my health stays the same. I try to keep myself in good shape by following the doctor's advice on my diet."* I1P3 Taking early action to maintain health. *"I think it's better to go for an early check-up for the health problems. After finding the causes and treatments, as long as the problem is solved, the body is still fine."* I2P4	**Expansion**: Qualitative findings significantly extended the understanding of ERA's physical health dimension as a CSB facilitator.
4. Social support could positively predict CSB ($\beta = 0.22$, $p < 0.01$).	Getting social support for CSB is perceived as a facilitator of CSB: Receiving suggestions from relatives. *"a relative came to my house and told me that this situation was quite dangerous and there might be a risk of disability. After that, I was a little fearful. I immediately went to the hospital to find a specialist."* I1P2 Being urged by family members. *"...my family also felt my pain. They said you should go to the hospital to take a check... If they hadn't urged me, I would still be staying at home."* I3P2	**Confirmation**: Robust social interaction and high satisfaction with social support were essential in enhancing CSB.

Table 4. Joint display of perspectives of factors influencing CSB (Cont.)

Quantitative findings	Qualitative findings	Mixed methods inferences
5. The severity of pain score could positively predict CSB ($\beta = 0.16$, $p < 0.01$).	Experiencing serious knee pain was perceived as a facilitator of CSB: Feeling too painful to walk. *"I think it's going to get to a point where the pain is so bad that I can't walk and then go to the hospital."* I5P2 Experiencing recurring pain. *"...But if I keep feeling that this place is uncomfortable and the pain keeps coming back, I'll have to go see a doctor to figure out what's wrong."* I10P2	**Confirmation:** Higher severity of pain-inducing CSB, particularly when the pain worsened, interfered with mobility, or became recurrent.
6. Past care-seeking experiences were positively related to CSB ($r = 0.22$, $p < 0.01$), while lost significance in predicting CSB ($p = 0.09$).	Gaining unpleasant experiences in past care-seeking was perceived as a barrier to CSB: Undergoing excessive physical examinations. "*There are many kinds of examinations in the hospital that are too troublesome. If you need to do one, you have to queue again, a whole morning is not enough...*" I1P2 Experiencing the irresponsibility of doctors. "*The doctor was irresponsible. She didn't ask me about my body condition, less than a minute, just asked me to do a body examination directly. I refused.*" I1P2 Losing confidence due to failed treatment. "*I've tried all the methods I can try, and I don't think it's useful...I have lost all confidence in this treatment.*" II7P1	**Expansion:** The qualitative findings elaborated on how unpleasant experiences during past care-seeking processes serve as significant barriers.
7. With health insurance coverage could positively predict CSB ($\beta = 0.20$, $p < 0.01$).	Lacking health insurance coverage was perceived as a barrier to CSB: Concerning paying all medical expenses. "*Some rural registered residences do not have any insurance, considering the cost. They will be told to spend so much money and not go (to hospital).*" I6P3 Worrying about low reimbursement. "*If the insurance doesn't cover much and I can't afford the treatment, I'd just focus on taking good care of myself and exercise myself.*" I3P3	**Confirmation:** The absence of health insurance coverage would impede CSB by exacerbating the burden of high medical expenses and low reimbursement rates.
8. Stoicism could negatively predict CSB ($\beta = -0.18$, $p < 0.01$).	Maintaining a stoic attitude was perceived as a barrier to CSB: Being in fear of troubles. "*I don't want to cause more trouble to my children. If I don't have a serious illness, I won't go to the hospital.*" I7P2 Maintaining a self-reliant state. "*I will never tell everyone that my suffering is, as long as I can overcome it, as long as I can get up, I can do it myself.*" I2P4 Worrying about other's thoughts. "*I feel bad about others thinking you are sick, you are not healthy.*" I5P2	**Confirmation:** A stoic attitude significantly reduced CSB, particularly in the dimensions of endurance, taciturnity, and serenity.

Discussion

To the best of our knowledge, this study is among the first to integrate qualitative and quantitative findings using a convergent mixed methods approach to elucidate the factors influencing CSB among older individuals with knee OA. Based on the ABM, each factor is discussed in detail below.

The integrated results revealed that strong social support enhances CSB. Within the ABM framework, social support, assessed through social networks and interactions, was a key predisposing focus.[15] In Eastern cultural contexts, the self is conceived as a "relational self" characterized by a heightened awareness of social interactions with others and a dependence on all other selves. The ideal self is attained through harmonizing one's everyday communication with others within broader societal networks.[37] The study found moderate social support among participants, with qualitative and quantitative data highlighting its critical role in improving CSB. Effective social support enhances individuals to cope with health challenges by influencing cognition, emotions, and behaviors. In-depth interviews revealed that family encouragement led some older adults to seek professional help for knee OA despite initial hesitation.

Stoicism, expectations regarding aging, and knowledge of knee OA symptoms were categorized as attitudes, values, and knowledge, respectively, within the health beliefs in ABM. In Chinese culture, expressing pain has traditionally been seen as a sign of weakness, while stoic endurance is highly valued. In this study, those with knee OA exhibited moderate stoicism, which was consistently identified as a significant barrier to CSB. Emphasis on "harmony" in Chinese cultural contexts may lead individuals to exercise greater caution when disclosing personal problems as they seek to avoid disrupting this harmonious relationship.[38] Interviews in this study also revealed that older adults feared becoming a burden to others and felt uncomfortable being perceived as unwell, often preferring to endure pain silently. Furthermore, some individuals prioritized self-reliance and chose to manage their pain independently. Collectively, these factors significantly impede CSB.

Expectations about aging reflect beliefs in maintaining physical and cognitive health. These expectations can influence motivation to seek healthcare. While this study found a positive association between aging expectations and CSB, consistent with Sarkisian et al.,[19] we observed a positive association between expectations regarding aging and CSB. However, this association did not reach statistical significance in our predictive analysis of the knee OA population. Participants generally exhibited low expectations regarding aging. Nonetheless, interviews revealed that expectations of healthy aging promote adherence to CSB, especially when older adults anticipate staying youthful and healthy. Participants also stressed the importance of prompt action to address illnesses for overall health.

Knee OA symptom knowledge enables individuals to recognize and understand signs of knee OA. Quantitative analysis showed that greater knowledge about knee OA symptoms increases CSB, consistent with Thomas et al.'s findings.[21] However, aging is associated with pain experience and changes in functioning, which may lead to misinterpretation of knee OA symptoms.[39] By accessing services, older people could receive clear information that may facilitate appropriate health decisions. Accordingly, qualitative findings expanded that participants with some knowledge of knee OA symptoms preferred engaging in CSB to obtain accurate diagnostic information and guidance on treatment options. These findings highlight the significant relationship between inadequate symptom recognition and reliance on CSB.

In ABM, health insurance coverage and past care-seeking experiences underscore the significance of personal enabling resources. Health insurance typically covers part of medical expenses, providing financial security against illness costs. Studies show that health insurance is crucial for enhancing CSB by reducing medical financial burdens.[22] Among the three primary health insurance schemes in China—Urban Employees'

Basic Medical Insurance (UEBMI), New Rural Cooperative Medical Scheme (NCMS), and Urban Residents' Basic Medical Insurance (URBMI) - the UEBMI and URBMI offer more substantial reimbursement percentages in comparison to the NCMS. In this study, over 10% of participants reported low reimbursement rates or lack of health insurance. The findings confirm that high out-of-pocket expenses and inadequate reimbursement deter individuals from seeking treatment for knee OA. These results align with previous research by Zeng et al.[14] Interviews revealed that older adults without insurance often bear full medical costs, neglecting care. Those with low-reimbursement insurance worry about exceeding their financial means, further hindering their willingness to seek treatment.

Past care-seeking experience refers to participants' prior interactions with healthcare services. In this study, 61.5% of participants reported previous care-seeking experiences for knee OA, which were correlated positively with CSB but lost significance in predictive analysis. Qualitative findings showed that negative past experiences hindered continued CSB. A previous study explained that if participants felt the effort to access healthcare outweighed the expected benefits, it would impede subsequent CSB.[40] Interview data corroborated this; some older adults also encountered irresponsible doctors or experienced unsuccessful treatments, leading them to believe knee OA is incurable and discouraging further CSB. These insights underscore the need to improve healthcare quality to encourage timely and consistent CSB among older adults.

Need factors influencing perceptions of disease severity include both individual and contextual aspects. In this study, we assessed pain severity at the individual level and used diagnosed comorbidities as an indicator of objective health status. Knee pain is a primary symptom of knee OA in older adults, significantly impacting the development of CSB. Research indicates that severe pain correlates with the belief in medication's appropriateness for treatment. Both qualitative and quantitative findings indicated that severe pain was the primary factor contributing to the development of CSB, aligning with prior research.[24] Furthermore, the qualitative results revealed that older adults seek treatment for knee OA when pain limits mobility or recurs severely. These findings highlight the importance of pain management in healthcare interventions for older adults with knee OA.

In this study, 63.6% of participants were aged 60 to 69, and 65.7% had one or more comorbidities. Quantitative analysis showed no significant link between comorbidities and seeking care for knee OA, consistent with prior Malaysian research.[26] Qualitative findings suggested that managing comorbidities can boost patients' confidence in healthcare providers when addressing new health issues. Comorbidities also increase concerns about overall health, potentially raising the likelihood of CSB. However, older adults may prioritize treating comorbidities over knee problems, especially if they view the comorbidity as more serious. Participants would consult healthcare providers about knee issues only if they believed the comorbidity was related to knee OA. These results emphasize the need for integrated care approaches to simultaneously address comorbidities and knee OA, improving healthcare outcomes for older adults.

Limitations

The findings of this study are subject to some limitations. First, the study was conducted in one city across three communities in northern China, potentially limiting the generalizability due to location-specific factors. Second, data were collected via self-reported health records, which allowed identification of participants diagnosed with knee OA but not their specific stages. This may have hindered the exploration of CSB at different stages of knee OA.

Conclusions and Implications for Nursing Practice

From this mixed-methods study, we provide a more comprehensive understanding of these factors by examining the relationships with CSB and exploring

how they work within the actual Chinese context. We found that strong social support and higher pain severity increase CSB, while a stoic attitude and lack of health insurance decrease it. Comorbid conditions and expectations of healthy aging facilitate CSB, whereas unpleasant past care-seeking experiences hinder it. This new theoretical-based knowledge can offer valuable insights for identifying variables in future studies, enhancing our understanding of the factors influencing CSB. Considering these findings, advancing nursing science by improving CSB could be achieved through targeted interventions, such as strengthening social support and addressing stoic attitudes in older Chinese individuals with knee OA.

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ปัจจัยที่มีอิทธิพลต่อพฤติกรรมการแสวงหาการดูแลในผู้สูงอายุชาวจีนที่เป็นโรคข้อเข่าเสื่อม : การศึกษาแบบผสมผสาน

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บทคัดย่อ : พฤติกรรมการแสวงหาการดูแลในระยะเริ่มต้นช่วยให้ผู้สูงอายุตระหนักถึงอาการเริ่มแรก ระบุการเป็นโรคข้อเข่าเสื่อมเข้าถึงการดูแลสุขภาพที่เหมาะสม และปรับปรุงผลลัพธ์ทางสุขภาพให้ดีขึ้น การศึกษานี้ใช้รูปแบบการวิจัยแบบผสมผสานเชิงพร้อมกัน ประกอบด้วยการศึกษาเชิงปริมาณแบบภาคตัดขวางและการศึกษาเชิงคุณภาพแบบพรรณนา เพื่อให้ได้ข้อมูลเชิงลึกเกี่ยวกับปัจจัยที่มีอิทธิพลและการรับรู้เกี่ยวกับพฤติกรรมการแสวงหาการดูแลในผู้สูงอายุชาวจีนที่เป็นโรคข้อเข่าเสื่อม โดยอ้างอิงจากแบบจำลองพฤติกรรมของแอนเดอร์สัน การศึกษานี้มีวัตถุประสงค์เพื่อศึกษาปัจจัยต่างๆ ได้แก่ ความรู้เกี่ยวกับอาการของโรคข้อเข่าเสื่อม การสนับสนุนทางสังคม ความอดทนอดกลั้น ความคาดหวังต่อการสูงวัย ความคุ้มครองด้านประกันสุขภาพ ประสบการณ์ในอดีต ความรุนแรงของความปวด และการมีโรคร่วม ว่ามีอิทธิพลอย่างไรต่อพฤติกรรมการแสวงหาการดูแลในผู้สูงอายุชาวจีนที่เป็นโรคข้อเข้าเสื่อม จำนวน 239 คนใน 3 ชุมชนของเมืองต้าเหลียน มณฑลเหลียวหนิง ประเทศจีน รวบรวมข้อมูลโดยใช้แบบสอบถามและการสัมภาษณ์เชิงลึก ข้อมูลเชิงปริมาณวิเคราะห์ด้วยสถิติเชิงพรรณนา การวิเคราะห์สหสัมพันธ์ของเพียร์สัน และการวิเคราะห์ถดถอยพหุแบบลำดับขั้น ขณะที่ข้อมูลเชิงคุณภาพวิเคราะห์ด้วยการวิเคราะห์เชิงเนื้อหา แล้วนำผลลัพธ์ทั้งสองส่วนมาสังเคราะห์เปรียบเทียบเชิงขนาน

ผลการศึกษาที่ได้ยืนยันว่า การได้รับการสนับสนุนทางสังคมที่เข้มแข็งและความรุนแรงของความปวดในระดับสูง ช่วยส่งเสริมพฤติกรรมการแสวงหาการดูแลจากผู้เชี่ยวชาญ ในขณะที่ทัศนคติที่ยึดถือความอดทนอดกลั้นและการขาดความคุ้มครองด้านประกันสุขภาพส่งผลให้พฤติกรรมดังกล่าวลดลง นอกจากนี้ ผลการศึกษาเชิงคุณภาพยังพบว่า ประสบการณ์ที่ไม่พึงประสงค์ในอดีตเป็นอุปสรรคสำคัญต่อการแสวงหาการดูแล ขณะที่การมีความรู้เพิ่มขึ้นเกี่ยวกับโรคข้อเข่าเสื่อม การมีโรคร่วม และความคาดหวังที่จะมีสุขภาพดีในวัยสูงอายุ กลับเป็นปัจจัยส่งเสริมพฤติกรรมดังกล่าว ข้อมูลเชิงลึกจากการศึกษานี้ซึ่งมีพื้นฐานจากทฤษฎีสามารถสร้างแรงบันดาลใจและแนวทางสำหรับพยาบาลผู้ปฏิบัติงานทางคลินิกในการส่งเสริมพฤติกรรมการแสวงหาการดูแลจากผู้เชี่ยวชาญตั้งแต่เนิ่น ๆ เพื่อป้องกันไม่ให้โรคข้อเข่าเสื่อมลุกลามมากขึ้น

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