


Papers from the 2nd International Consortium for Musculoskeletal Mental and Social Health  
Guest Editors: David Ring MD, PhD and Ana-Maria Vranceanu PhD

# A Qualitative Study of Psychosocial Factors in Patients With Knee Osteoarthritis: Insights Learned From an Asian Population

Su-Yin Yang PhD Health Psych (CPsychol)<sup>1</sup>, Eugene Yong Sheng Woon MMC<sup>2</sup>, Konstadina Griva PhD<sup>2</sup>, Bryan Yijia Tan MBBS, MRCS(Edin), MMed(Ortho), FRCS(Ortho)<sup>3</sup> 

Received: 4 June 2022 / Accepted: 21 November 2022 / Published online: 29 December 2022  
Copyright © 2022 by the Association of Bone and Joint Surgeons

## Abstract

**Background** A patient's experience with knee osteoarthritis (OA) is influenced by many psychosocial contributors that can influence the impact of pain. Such factors are known to explain some of the discordance between objective clinical parameters and patient-reported levels of disability and treatment effectiveness. However, few data are available to help clinicians understand the psychosocial factors that apply to the

world's many Asian populations. Insights gained from a qualitative study in such a population may support targeted interventions.

**Questions/purposes** In this qualitative study involving a group of Asian patients with knee OA in Singapore, we asked: (1) What psychologic factors contribute to patients' experiences, rehabilitation, and recovery? (2) What social factors contribute to patients' experiences, rehabilitation, and recovery?

**Methods** Semistructured interviews eliciting broad patient experiences of managing knee OA were conducted in an urban, referral-based tertiary hospital in central Singapore. Patients were recruited if they met either of the following criteria: Kellgren-Lawrence grade  $\geq 3$  (minimum of one knee); Knee Injury and Osteoarthritis Outcome Score  $\leq 60$ ; or the Pain average (P), interference with Enjoyment of life (E), and interference with General activity (G) (PEG)  $\geq 5$ . All patients had a clinical diagnosis of knee OA, were ambulatory in the community with or without a walking aid, had not undergone partial arthroplasty or TKA, were prescribed nonsurgical treatment, and were conversant in either English or Mandarin. Forty-six patients (30 women and 16 men, mean age 64 years old) were recruited for this study. A thematic analysis with elements of grounded theory and framework analysis was performed using a deductive approach. Psychologic influences specific to patients' behavioral and emotional responses to pain, as well as social factors known to have an impact on the experience of managing knee OA, were identified in the interview transcripts and coded according to established factors from earlier research. An inductive thematic analysis was then applied to the remaining transcripts to identify new themes that

---

This research was funded by the Rehabilitation Research Institute of Singapore (award number RRG4/2001).

Each author certifies that there are no funding or commercial associations (consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted article related to the author or any immediate family members.

All ICMJE Conflict of Interest Forms for authors and *Clinical Orthopaedics and Related Research*® editors and board members are on file with the publication and can be viewed on request. Ethical approval for this study was obtained from the National Healthcare Group Domain Specific Review Board, Singapore, Singapore (number 2020/00067).

This work was performed at Tan Tock Seng Hospital, Singapore.

---

<sup>1</sup>Psychology Service, Woodlands Health, National Health Group, Singapore, Singapore

<sup>2</sup>Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore, Singapore

<sup>3</sup>Department of Orthopedic Surgery, Woodlands Health, National Healthcare Group, Singapore, Singapore

B. Y. Tan, Department of Orthopedic Surgery, Woodlands Health, National Healthcare Group, 11 Jalan Tan Tock Seng, Singapore 308433, Singapore, Email: btanyj@hotmail.com

emerged from the data. Thematic saturation was attained when study team members agreed data and thematic sufficiency were met in the 46 transcripts. The study team discussed and deemed the 46 transcripts to contain sufficient insights for a reasonably clear understanding of the codes and development of themes to answer the study's research questions.

**Results** Six main themes related to psychosocial influences on pain emerged. Psychologic factors were "loss of face" because of knee OA, anticipation and avoidance of pain and suffering, and a vicious cycle of negative emotional experiences. The social factors we identified were social and family support, workplace environment and employment uncertainty, and built environment (patients' ability to navigate manmade structures and facilities).

**Conclusion** Psychosocial factors have an important impact on patients' physical, psychologic, and social functioning. Although several of our findings have been addressed previously, the phenomenon of loss of face and the wide spectrum of social and family support dynamics found in our Asian patients with knee OA were new findings. With loss of face, patients were concerned about how others would view the change in them, including movement changes because of knee OA. They appeared to associate the use of walking canes with major disability, loss of respect, and being discriminated against by others, motivating patients to "save face" by dissociating themselves from those stigmas, even at the cost of mobility and independence. An interplay of complex cultural processes (perceived social roles and contributions to family, desire to avoid burdening family, help-seeking behavior, and the preference for unsolicited social support) underpinned by the value of collectivism impacted the behaviors and choices patients exhibited.

**Clinical Relevance** With knowledge about the impact of culturally relevant psychosocial factors on the experience and outcomes of patients with knee OA, clinicians will be able to screen and actively explore these factors more effectively. Especially important themes include pain perception (paying close attention to signs of pain catastrophizing and negative affect), presence of chronic illness shame associated with a diagnosis of knee OA (including the stigma associated with using a walking aid), and level of social support received and contributions of a patient's built environment to kinesiophobia. For patients who are still working, the presence of workplace stressors and management of these stressors should also be explored. Where possible, screening tools that measure psychosocial factors such as pain catastrophizing and emotional distress can also be used as an added layer of screening in busy clinical settings.

## Introduction

The management of knee osteoarthritis (OA), as with many other conditions that cause chronic pain, is complex. This is especially true when discordance between objective clinical parameters and patient-reported pain and disability [17], as well as individual differences in the experience of OA for patients with similar joint abnormalities [16], are part of the clinical picture. Recent research suggests that understanding the influence of psychosocial factors on patients' experiences may account for some of this discordance [14, 25]. Historically, a biomedical model of care has been used to guide the treatment of patients with knee OA, with a predominant focus on pathologic findings [47]. However, pathologic processes cannot account for individual differences in each patient's general makeup or social and environmental influences; because of this, perhaps there is a great deal of unaccounted-for variance in clinical outcomes after procedures such as knee arthroplasty [46]. Thus, the biopsychosocial model of illness is gaining traction. This model includes an appreciation of psychologic and social factors and their influences beyond the biological presentation of patients with knee OA. This approach may help surgeons arrive at more-effective treatments by focusing more on the person than on the joint or disease causing the pain [41]. Psychologic factors such as depression [2], pain catastrophizing [36], and fear avoidance behaviors [54] are associated with more severe pain and a greater risk of pain in patients with knee OA [63].

Additionally, cultural identity is known to exert an important influence on how people think, feel, and behave. Culture-specific constructs and concepts allow an individual to adapt and function in life [22]. Cultural factors can determine how physical health is perceived, experienced, and acted upon. Cross-cultural research has demonstrated that similar psychosocial factors experienced in different cultures have varying degrees of association with knee OA symptoms such as pain sensitivity and function [15, 60, 61], suggesting that psychosocial factors can be protective against or function as risk factors [54] among different cultures and clinical contexts.

The impact of these factors on the pain and function of patients with knee OA is well established in Western cultures; most qualitative studies that have evaluated psychosocial factors in patients with knee OA have been based on research involving White patients or studies comparing White patients with Latino or Black patients [67]. Little is known about the influence of psychologic factors on patients with knee OA in Asia. Broadening these lines of research to this large patient population would inform culturally sensitive care and treatment for many patients.

**Table 1.** Demographic characteristics of the patients (n = 46)

Characteristic	Value
Age in years	
50 to 59	9 (4)
60 to 69	43 (20)
70 to 79	41 (19)
80 +	7 (3)
Women	65 (30)
Ethnicity	
Chinese	96 (44)
Malay	2 (1)
Indian	2 (1)
Employment	
Full-time	26 (12)
Part-time	7 (3)
Retired	54 (25)
Homemaker	13 (6)
Education	
No formal	6 (3)
Primary	9 (4)
Secondary	52 (24)
Postsecondary	22 (10)
Tertiary	11 (5)
K-L (left)	
0	37 (17)
2	9 (4)
3	35 (16)
4	19 (9)
Mean	2
K-L (right)	
0	26 (12)
2	15 (7)
3	44 (20)
4	15 (7)
Mean	2
PEG	5.03 ± 1.94
KOOS	57.53 ± 10.86

Data are presented as % (n) or mean ± SD. K-L = Kellgren-Lawrence grade; PEG = Pain average (P), interference with Enjoyment of life (E), and interference with General activity (G), scored from 0 (no pain or interference) to 10 (maximum pain intensity and interference); KOOS = Knee Injury and Osteoarthritis Outcome Score, scored from 0 to 100 (maximum function).

In this qualitative study, we therefore asked, (1) What psychologic factors contribute to patients' experiences, rehabilitation, and recovery? (2) What social factors contribute to patients' experiences, rehabilitation, and recovery?

## Patients and Methods

### Study Design and Setting

This qualitative study, which was conducted in an urban, referral-based tertiary hospital in Singapore, was embedded in a larger study that qualitatively evaluated data from a randomized controlled trial (RCT) [58] and explored the treatment experience and beliefs of patients with knee OA. The RCT evaluated the effectiveness of a community-based multidisciplinary intervention compared with usual care for patients with knee OA.

### Sampling Strategy and Participants

As a nested study, the current study used convenience sampling of patients from the RCT. Because psychosocial data started generating after the initial interview, this study became embedded in the larger qualitative study. To lend rigor to this study, the following criteria were used to recruit suitable participants: Kellgren-Lawrence grade ≥ 3 (minimum of one knee); Knee Injury and Osteoarthritis Outcome Score (KOOS) ≤ 60; the Pain average (P), interference with Enjoyment of life (E), and interference with General activity (G) (PEG) [35] scale score ≥ 5. The PEG is a three-item measure derived from the Brief Pain Inventory (BPI) [11] that measures average pain intensity (one item) and pain interference (two items). Patients rate their pain intensity on a numerical rating scale from 0 (no pain) to 10 (pain as bad as you can imagine) and pain interference with enjoyment of life and general activity from 0 (does not interfere) to 10 (completely interferes). Because a principal component analysis showed that all three items loaded on one factor, an average score of the three items contributed to an overall PEG score. This is because patients with high Kellgren-Lawrence grade, low KOOS score, or moderate pain score are likely to experience or be affected by underlying or arising emotional distress. The sample consisted of 30 women and 16 men with a mean age of 64 ± 2 years (Table 1). All patients were at least 45 years old, had a clinical diagnosis of knee OA, were ambulatory in the community with or without a walking aid, had not undergone partial knee arthroplasty or TKA, were prescribed nonsurgical treatment, and were conversant in either English or Mandarin. Patients were receiving treatment in either the hospital or community or were self-managing after completing their treatment. One participant was scheduled for surgery in November 2020.

A research assistant approached the patients and provided a verbal explanation of the study. Eligible participants were also recruited via telephone. As part of the main study, all 86 patients were contacted. Fifty-five patients responded, 16% of whom (nine patients) dropped

out. Thus, 84% (46 patients) contributed data. All participants provided informed consent to participate in the study, after which face-to-face interviews were arranged at a time convenient to patients. Only two participants were accompanied by their caregivers during the interviews, who were foreign domestic workers. The caregivers' presence did not influence the participants or the interview process.

### *Thematic and Data Sufficiency*

The researchers discussed and determined the 46 transcripts contained sufficient insights for a reasonably clear understanding of the codes and development of themes to answer the exploratory study's research questions (hybrid inductive thematic sufficiency and data sufficiency [50]). Despite its gold standard status in qualitative research, there is uncertainty about identifying, using, and declaring thematic saturation [23, 27] because of concerns about the "unobserved based on the observed" [50], as well as criticisms about saturation being the only criterion for adequacy in data collection and analysis [9]. Because it was deemed to be counter-productive to continue sampling [55], recruitment stopped upon thematic and data sufficiency, as perceived by the study team.

### *Data Collection and Management*

Interviews were conducted by a bilingual research assistant experienced in using qualitative methods and conducting semistructured interviews. There was no prior relationship between the interviewer and interviewees.

Interviews were conducted between April 2020 and July 2020 in a quiet private clinic consultation room in our hospital. All interviews were audio recorded and lasted between 30 and 80 minutes. Memoranda were made to record participants' nonverbal communications, the interviewer's thoughts, analytical notes, and potential biases that could contribute to data analysis. All interviews were conducted in English and were transcribed verbatim into a Microsoft Word document. The transcripts were deidentified and labeled with the interviewee's assigned subject code. Interviews conducted in Mandarin were translated to English before data analysis.

The accuracy of transcription and translation was checked by comparing the transcription with the corresponding audio recording. Transcripts were not returned to interviewees for comments and correction; the interviewees were contacted only once for the study. Care was taken during the interview to clarify and follow-up on the points raised to ensure accuracy of understanding and adequacy of elaboration or insight.

The study closely observed the ethics board's protocol on research data management. The audio recordings, deidentified transcripts, and participant identifiers (password

protected) were stored in a password-protected laptop stored at the study site. Only members of the study team had access to the relevant data and files.

### *Primary and Secondary Study Outcomes*

Our primary research goal was to identify psychological factors contributing to patients' experiences, rehabilitation, and recovery through qualitative semistructured interviews. Our secondary study goal was to identify the social factors that contribute to patients' experience, rehabilitation, and recovery.

### *Ethical Approval*

We obtained ethical review board approval for this study.

### *Data Analysis*

A framework analysis was selected as the method for analysis because it can manage large datasets and provide a comprehensive and descriptive outline of the dataset, and its spreadsheet approach [18] allowed us to use Microsoft Excel for data management and analysis. Additionally, an experienced qualitative researcher (S-YY) supervised the study's use of framework analysis [18].

The main study from which these data were extracted was designed to elicit broad views of patients' experiences with knee OA. A deductive approach was adopted to guide the initial phase of data analysis in which pre-established codes derived from concepts commonly discussed in other studies (for example, negative affect or catastrophizing) [26, 32] were identified and formed the first tier of analysis. Inductive thematic analysis [4] and elements of grounded theory [19] followed with familiarity of the data. Framework analysis was applied to the coding process. Two researchers (EYSW and LTH) randomly picked the first five transcripts and independently coded them line by line. EYSW was the primary coder and LTH was the secondary coder. Through constant comparison, the two researchers ensured codes reflected the data, with common codes agreed on before they were applied to the remaining transcripts. Microsoft Excel was used to manage the coded data and facilitate further analysis. Familiarization and coding were repeated to refine existing codes and emerging categories as meanings become more precise. The coding manual was updated when new codes that emerged from the remaining transcripts were identified. All authors contributed to an iterative data analysis process to ensure diverse viewpoints, reconcile disputes in the analysis, and explore irregularities in the data before agreeing on the final codes and themes that were most reflective of the data. A

sampling of the coding scheme includes deductive themes derived from other studies, the theme derived from the current study, subthemes, and an example of participant codes to support each theme and subtheme (Supplemental Table 1; <http://links.lww.com/CORR/A1000>). The frequency of codes that support the main themes derived from this study have been reported to add further clarity to the strength of each theme (Supplemental Table 2; <http://links.lww.com/CORR/B2>).

## Results

### *Psychologic Factors Affecting Experience, Rehabilitation, and Recovery*

Three factors, specifically loss of face because of knee OA, anticipation and avoidance of pain and suffering, and vicious cycle of negative emotions, were common psychologic factors affecting participants' experience with knee OA, rehabilitation, and recovery. Participants shared their shame and embarrassment with being diagnosed with knee OA and their struggle with a change in their outer appearance because of changes in their gait and speed as well as potentially needing to rely on a walking aid to support their mobility. This sense of shame or embarrassment is colloquially termed "loss of face." Anticipation and avoidance of pain and suffering can be thought of as a shared universal experience among people with pain. Participants candidly shared their fear of pain, how they avoided doing things and reduced their levels of daily activity, and how these changes impacted their general mood, leading to a "vicious cycle of negative emotions."

### **Loss of Face Because of Knee OA**

Patients tended to identify mobility with normalcy and walking aids with inadequacy and illness. They described their unusual gait, slow walking speed, and use of walking aids to be "Quite embarrassing because I didn't like the idea of people seeing me with a walking stick, because it's like your weakness" (Patient 14). Participants did not want to be perceived as having a problem when they walked with less speed and to be negatively viewed by others; one shared, "I don't want people to know that I'm already so old, half-handicapped" (Patient 21). Collectively, participants with knee OA perceived that losing face had an impact on their mood and affected their social relationships, and they chose to isolate from social engagement. A patient described her preference to stay home: "Very low self-esteem, kept staying at home and don't want to meet anyone...I don't even feel like going out even when others asked. I just don't want to step out of my home" (Patient 45).

### **Anticipation and Avoidance of Pain and Suffering**

Most participants believed that through avoiding movement, they could avoid experiencing movement-related pain; one said, "if I move it's going to cause me pain. The most basic instinct for a person is to avoid the pain" (Patient 11). Participants explained their attempt to reduce movement to minimize their experience of pain is a common-sense response; one said, "I do not want to make my leg worse... (and) let my leg rest" (Patient 3). There was a common perception that "walking means pain" (Patient 18); hence, participants would "avoid walking" and "seldom go out unnecessarily (Patient 6). If travel was needed, some participants chose to take a taxi rather than the bus or train as a mode of transportation. As a result, participants were physically, emotionally, and socially limited by their fear of engaging in movement; for example, one patient stated, "When I need to set appointments, I don't feel like doing it because...I know when I return home after going out, my leg will definitely suffer...When your leg hurts, it affects your feelings, and your mood and willingness to work. This is why I don't feel like making appointments" (Patient 18). A few patients shared they would choose to stay home to avoid triggering pain; one said, "when my friends say they want to go for a walk, I'll try not to go and if I have to go, I will just walk a little bit then rest. Just unwilling to move around too much" (Patient 27), and another said, "I don't really dare to go out. Sometimes my leg suddenly hurts before I want to go out, so I tend to stay home" (Patient 10).

### **Vicious Cycle of Negative Emotional Experiences**

Many patients recalled experiencing different unpleasant emotions such as agitation, frustration, and sadness secondary to their condition; one said, "I was so depressed! I cried because I cannot walk" (Patient 16). A common feeling among the patients was their worry over permanent loss of mobility because of knee OA, which was perceived to lead to a loss of independence and their current active lifestyle. For example, one patient stated, "I only felt scared... I was worried that I will have to rely on a wheelchair or a walking stick to walk in [the] future" (Patient 12) and another said, "I was worried because I have a very active lifestyle... I dread that if I could not move my legs, then that's the end of my life..." (Patient 14). Negative mood had varying impacts; participants described the vicious cycle of their mood impacted their motivation to engage in activities that in turn maintained their low mood and choice to socially withdraw. One patient said, "Because you stay at home you are very suffocated, you don't feel like doing anything... a couple of times, [I thought] I might as well die now, don't feel like

living.” (Patient 19), and another stated, “My mood is very bad when my leg hurts... before anyone calls, I don’t even want to talk” (Patient 45). Conversely, a small group of participants shared that worrying was not helpful. Instead, there were similar sentiments that when they “accept pain as part of...process of aging” (Patient 14), they should “think positive...don’t worry so much” (Patient 13) and “just live each day” (Patient 17). Patients remained cheerful and optimistic with the hope that their condition would get better and the pain would become more manageable.

### *Social Factors Affecting Experience, Rehabilitation and Recovery*

Participants shared their thoughts on different aspects of social support that included a fear of being a burden, their avoidance of seeking help, and elements of social isolation. They also shared their employment concerns while navigating the work environment and how the built environment contributed to their overall experience with knee OA and the rehabilitation process. We identified three themes related to social factors that affected patients with knee OA: social and family support, workplace environment and employment uncertainty, and built environment (defined as patients’ ability to navigate manmade structures and facilities).

#### **Social and Family Support: A Wide Spectrum**

Social support is known to support better outcomes, provides emotional or tangible assistance, and has been identified as a coping strategy. Social support also is known to mediate the relationship between pain and depressive symptoms. Of interest, participants were not consistent in their perceptions about support. Instead, a broad range of responses were elicited. Some participants felt they needed support but it was not available to them, while others chose to self-support. One patient reported: “Want to do something, also cannot... Go out shopping with people? You also cannot go. We elderly, don’t really have much friends, some passed away, some moved away... The young, see us, don’t want to talk to you” (Patient 15). Participants who engaged in self-support explained that they “do not want to or try not to burden anybody” (Patient 21) and “didn’t want to worry anybody” (Patient 14). Hence, they chose to keep to themselves. In addition, patients expressed an unwillingness to complicate their children’s lives by burdening them with their health problems; one patient said, “Children are very busy with work... cannot help you much, really must depend on myself. I won’t talk about it to other people, my own problems are mine to solve...” (Patient 20). Only a few patients, that is, those with more severe symptoms, expressed

receptiveness and appreciation toward receiving support from their family. For example, one patient reported, “They were all quite nice to accompany me, give me encouragement, give me morale...my sisters take leave to go polyclinic with me” (Patient 23). In reciprocation, participants felt the need to attend to the needs of their family members despite their pain. More pain was sometimes triggered in the process. Some participants shared that seeking emotional support would not have much benefit for their knee OA; one patient said, “talk to others cannot relieve the pain... call people tell how you feel, I don’t think is good, so I didn’t do that” (Patient 19), and another said, “only I know my own pain, other people won’t understand” (Patient 34). Participants who were religious drew support and comfort from their faith to cope with their pain; for example, one patient reported, “I just pray for miracle. I turn to the Lord, can You help my knee?” (Patient 23), and another said, “let it go, turn to God for help, this is the only answer. Everything pray, pray for the Lord to protect my leg” (Patient 2).

#### **Workplace Environment and Employment Uncertainty**

A few patients expressed wanting to stay in the workforce. However, they felt uncertainty about their job security. One patient said, “My colleagues, their knee never recovered... they even got medical bought out from the company with some compensation” (Patient 36), and another said, “It’s not about whether I can walk or not, it’s whether my company is willing to employ me or not. They suspect my working abilities, whether I can carry on working or not. If I don’t force myself... my company will terminate or re-trench me” (Patient 3). A participant shared her appreciation for having an understanding boss: “My boss is quite understanding. Fortunately, I got a good boss. He didn’t penalize me” (Participant 12). As a result, her pain condition had little impact on her work. Several patients believed that having supportive workplace relationships is important. Poor relationships with colleagues were workplace stressors that made patients feel unsupported, rejected, and more inclined to leave their job. The type of work participants were involved in was equally important. Participants with more sedentary jobs were less concerned about the impact of pain on work because there was less risk of any physical movement related to their job role that would likely trigger pain. One patient said, “I am in programming...don’t need to walk so much...so don’t affect the present work I am doing” (Patient 21).

#### **Built Environment**

The built environment surrounding patients’ living areas was a challenge. Because of perceived difficulty with

navigating stairs, many participants chose to avoid stair climbing. Several participants expressed a strong dislike of stairs and overhead bridges. One stated, “I hate going over overhead bridge but I had no choice because the mall is opposite my house and there’s no traffic light... Nowadays, I take a bus home even though it’s just opposite my house... if only they give me a traffic light junction or underpass... if you give me a flight of steps with no railing I won’t attempt it because it’s too dangerous... falling is something that you really don’t want” (Patient 37). While navigating their built environment, participants’ self-confidence about being independent in the community was also affected. For example, one patient said, “People look at me, then I don’t want to attempt (climbing the overhead bridge) already” (Patient 23) and another said, “What if halfway and the pain comes? What do I do? I’m neither up, neither down. I won’t want to be stuck in that position” (Patient 38).

## Discussion

Understanding the psychosocial needs of patients with knee OA in a cultural context provides for a deeper understanding of the role these factors play in patients’ clinical presentation and barriers to treatment. Little is known about this topic in an Asian context and culture, which is the gap this study sought to fill. In a reasonably large (46 patient) qualitative study in Singapore, six psychosocial factors were identified among patients with knee OA: anticipation and avoidance of pain and suffering, vicious cycle of negative emotional experiences, loss of face because of knee OA, social and family support, workplace environment and employment uncertainty, and built environment. Knowledge of the potential influence of these culturally relevant psychosocial factors in patients with knee OA can enable clinicians to actively screen, explore, and address these factors during clinic consultations. Clinicians could ask patients about their pain perception (looking out for signs of pain catastrophizing and negative affect), self-esteem (identity affected by shame about chronic illness and stigma associated with the use of a walking aid), the level of social support they are receiving, and the physical environment the patient lives or works in. Screening tools measuring psychosocial factors such as pain catastrophizing (Pain Catastrophizing Scale), fear avoidance (Tampa Scale for Kinesiophobia), and emotional distress (Patient Health Questionnaire) can serve as an added layer of prescreening in a busy clinical setting. These will provide the clinician with a holistic understanding of the circumstances that perpetuate patients’ pain experiences. With this understanding, effective treatment can be tailored to meet patients’ needs, potentially in partnership with the patient’s family and/or social worker that is aligned with the patient’s values, needs, goals, and circumstances.

## Limitations

A limitation of this study is that it is a nested study drawn from a separate randomized controlled trial. The intervention and control arms were used for convenience sampling in this study, but with an additional criterion to recruit suitable participants who were more likely to have emotional distress (more severe radiographic findings, lower KOOS score, or moderate or high pain intensity and pain interference for this analysis). Although we were uncertain whether data saturation was reached, limitations to the definition of traditional data saturation have been highlighted, and one study recommended that the type of saturation be operationalized based on the research question, theoretical position, and analytic framework [50]. In this study, hybrid inductive thematic sufficiency and data sufficiency was reached by consensus among the research team, and we felt that the 46 transcriptions contained sufficient insights for a reasonably clear understanding of the codes and development of themes. In addition, our study sample of 46 patients is large compared with other qualitative studies.

Our study recruited participants who were predominantly of Chinese ethnicity. Although the Chinese ethnicity forms most of the population of Singapore [13], Singapore is a multicultural society with other ethnic groups such as Malays and Indians, which might yield other findings if these ethnicities were sampled to a greater degree. We believe, however, these findings can be applied to Asian patients wherever they are seeking care because cultural values often transcend geographic boundaries. For example, similar cultural values have been seen in Asian American patients seeking care for their mental health [34]. Similarly, the gender distribution in our sample was predominantly women, which was expected given the gender bias of knee OA in women. Further sampling of men might have yielded other findings, but our study did not note any differences in the themes generated for either gender.

## A Common Culture of Pain Experience

In this study, anticipating and avoiding pain and suffering and a vicious cycle of negative emotional experiences converged with crosscultural research on pain catastrophizing and negative affectivity [54]. Crosscultural studies suggest there is a culture of pain that universally influences pain experiences across cultures [5, 24, 54]. Patients with knee OA often experience fear responses to pain, which can be understood as a commonsense or instinctual response to a threatening pain experience. Evidence has shown that avoiding or reducing activities to decrease pain temporarily alleviates discomfort but reinforces maladaptive responses. Repeated avoidance of tasks then

reinforces learned behavior toward pain and contributes to increased disability in the long term [25]. This eventually entraps patients in a vicious cycle of learned maladaptive avoidance, unsustainable alleviation of pain, and increased disability. It is critical that clinicians make every effort during consultations with patients to recognize signs of pain catastrophizing and negative affect, potentially using screening questionnaires, if necessary. This will allow the clinician to support these patients by helping them to understand, interpret, and reframe their pain experiences, break the vicious cycle, and shift away from maladaptive responses through a transdisciplinary team approach with psychologists and social workers, if necessary [21]. Addressing key misconceptions around knee OA is a crucial part of this effort. Common misconceptions around identity, causes, consequences, timeline, and treatment beliefs in knee OA [6] can serve as a framework for clinicians in identifying and addressing factors perpetuating a patient's fear avoidance behaviors.

#### *Loss of Face and Social Support From an Asian Perspective*

Loss of face was a salient theme that emerged from patients' responses. "Face" is a Chinese and Asian cultural concept that consists of relation-oriented (*mianzi*) and individual-oriented (*lian*) aspects that represent an entity's external self-image, ability, and respectability as crucial elements of internal value [69]. Patients described that the use of visible compensatory strategies, such as changes to gait and the use of a walking aid, precipitated feelings of embarrassment and judgment by others. Although a previous study of 10 White patients with OA identified embarrassment-related experience in activity engagement and avoidance [30], this study uncovered a deeper perception in which patients appeared to associate the use of walking canes with major disability, loss of respect, and being discriminated against by others. This seemed to motivate patients to save face and preserve their public appearance of self or family [34] by dissociating themselves from those stigmas even at the cost of mobility and independence [38]. This appeared to be consistent with behaviors shared by patients in this study. Participants stated they withdrew from social interactions to hide their physical disability and avoid judgement from others.

Our findings also contribute to an awareness of the different manifestations and nuances of support-seeking behaviors. An interplay of complex cultural characteristics such as collectivism values underlies expectations and behaviors individuals exhibit and relate to. In the collectivistic Asian culture, individuals value interdependence [10] and have clearly defined social roles they are expected to commit to in order to maintain harmonious social dynamics [34]. For

example, grandparents are expected to provide care for their grandchildren while the children are working [8, 34]. Expectations to maintain harmony also extend to minimizing a patient's negative impact on their social network by limiting their relatives' involvement in their troubles [33, 59]. This is consistent with the results of the present study; patients were expected to provide childcare support, despite suffering from knee OA, and preferred to solve their health problem independently. Patients' unwillingness to ask for assistance may be attributed to either a fear of burdening their children [68] or guilt about causing worry or complicating their children's lives [7]. Past research has also demonstrated that in Asian culture, there is a preference for unsolicited social support [33, 43] and a preference for practical rather than emotional support [10]. Older Asian patients might perceive unsolicited support as acts of thoughtfulness or filial piety. Social support has been shown to be beneficial to the care receiver [7] and moderates health outcomes [42]. However, patients who need help may not find it culturally appropriate to actively seek help and support. Kramer et al. [34] noted that when exploring cultural factors influencing the mental health of Asian American patients, social stigma, shame, and saving face often prevented Asian American patients from seeking care.

The findings of this study could guide clinicians in actively exploring and addressing culturally relevant psychosocial factors. For example, shame related to chronic illness could be explored as part of consultations with Asian patients to provide patient-centered care by tailoring treatment based on the patient's values and goals. Discussions on the use of a walking aid should be conducted tactfully by being mindful of and aligning with the patient's values. In instances where walking aids are necessary, the walking aid could be disguised as an umbrella to minimize perceived or associated stigma. Given the complex interplay between social support and cultural characteristics such as collectivism in Asian patients, it may be prudent to involve an Asian patient's family early in the treatment process to align the patient's and family's expectations and facilitate joint treatment decision-making, provided the patient consents to the family's involvement. In situations where there are deeper psychosocial complexities or family support is lacking, there may be a need for an integrated multidisciplinary care model to support patients through their treatment and recovery journey.

#### *Screening and Measuring Psychosocial Factors Through Quantitative Tools*

Quantitative measurement tools or patient-reported outcome measures based on the psychosocial factors identified in this study can be used in clinical practice as screening tools and for future research. For example, the PHQ-4 is an established



screening tool for depression and anxiety that has been shown to predict outcomes in patients with OA [51]. The Tampa Scale of Kinesiophobia, a validated measure of kinesiophobia, has been shown to correlate with pain intensity and functional performance [1]. A shortened OA-specific version of the Tampa Scale of Kinesiophobia has also been validated as the Brief Fear of Movement Scale [52]. Further efforts can be made to validate existing scales or develop scales appropriate for use in people with OA. For example, the chronic illness shame score [62] is a tool that quantitatively measures embarrassment and shame in chronic illness and was validated in patients with inflammatory bowel disease but not those with OA. Precision medicine via a stratified care model for patients with knee OA based on psychosocial phenotypes can be provided through studies that establish the impact of psychosocial factors on short-term and long-term clinical outcomes. This qualitative study has served as the foundation for a large prospective cohort study in knee OA through informing the choice of quantitative measurement tools [12].

#### *System-level Psychosocial Factors: Built Environment and Workplace Policies*

Other factors such as job security and built environment moderate a patient's ability to cope with physical changes and experiences with knee OA. Evidence has shown individuals who have been out of work or are in unsupportive working environments experienced increased loneliness, hypersensitivity to stressful life events, and psychologic vulnerability [44, 45, 48]. When treating patients who are employed, particularly those involved in heavy manual work, it is prudent for clinicians to explore the impact knee OA has on the patient's ability to function at work and workplace stressors that can potentially threaten job security. In certain instances, clinicians may need to involve a social worker to engage employers or facilitate the transition toward a less physically demanding occupation.

Asian societies with highly urbanized environments such as Tokyo and Hong Kong have numerous high-rise buildings and overhead bridges. Patients have shared navigating stairs is a barrier to mobility. This perception likely perpetuated their negative pain experiences and choice to stay home to avoid pain-triggering activities. Beyond stairs, the key role of a built environment in supporting OA management and its impact on clinical outcomes has been explored [3]. It would be prudent for clinicians to explore with patients how their neighborhood or workplace environment (including structures such as stairs and overhead bridges) can impede physical activity and drive kinesiophobia, fear avoidance behavior, and social isolation. Gaining the confidence and ability to overcome challenges brought about by these manmade structures should be part of goal setting when developing a treatment plan with patients.

#### *Conclusion*

Our study identified six psychosocial factors (anticipation and avoidance of pain and suffering, vicious cycle of negative emotional experiences, loss of face because of knee OA, social and family support, workplace environment and employment uncertainty, and built environment) that impact the experience, rehabilitation, and recovery of patients with knee OA. Understanding how culture and psychosocial factors impact the clinical outcomes of patients with knee OA would improve shared decision-making and recommendation of treatment aligned with the patient's values and needs. In particular, based on what we found, we recommend special focus on pain perception and misconceptions about pain, shame associated with chronic illness and with the use of walking aids, the level of social support, presence of workplace stressors, and built environment as drivers of kinesiophobia. Where practically possible, screening tools that measure psychosocial factors such as pain catastrophizing, fear avoidance, and emotional distress can also be used as an added layer of screening when there are competing demands during the clinical interview process. Treatment recommendations can then be tailored and aligned to the patient's values and goals, potentially in partnership with the patient's family or a social worker, where these psychosocial factors can be addressed and patient-centered care provided to the patient. Further research is needed to investigate the ability of these factors to impact short-term and long-term clinical outcomes through prospective longitudinal studies and develop and validate prognostic psychosocial tools for use in regular clinical practice.

**Acknowledgment** We thank Ms Lo Tak Hei BSc for her assistance in coding the transcripts and preparing the manuscript.

#### **References**

1. Alshahrani MS, Reddy RS, Tedla JS, Asiri F, Alshahrani A. Association between kinesiophobia and knee pain intensity, joint position sense, and functional performance in individuals with bilateral knee osteoarthritis. *Healthcare (Basel)*. 2022;10:120.
2. Bair MJ, Wu J, Damush TM, Sutherland JM, Kroenke K. Association of depression and anxiety alone and in combination with chronic musculoskeletal pain in primary care patients. *Psychosom Med*. 2008;70:890-897.
3. Bowden JL, Hunter DJ, Feng Y. How can neighborhood environments facilitate management of osteoarthritis: a scoping review. *Semin Arthritis Rheum*. 2021;51:253-265.
4. Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology*. 2006;3(2):77-101.
5. Briani RV, Ferreira AS, Pazzinatto MF, Pappas E, De Oliveira Silva D, Azevedo FMd. What interventions can improve quality of life or psychosocial factors of individuals with knee osteoarthritis? A systematic review with meta-analysis of primary outcomes from randomised controlled trials. *Br J Sports Med*. 2018;52:1031-1038.
6. Bunzli S, O'Brien P, Ayton D, et al. Misconceptions and the acceptance of evidence-based nonsurgical interventions for knee

- osteoarthritis. A qualitative study. *Clin Orthop Relat Res*. 2019; 477:1975-1983.
7. Cahill E, Lewis LM, Barg FK, Bogner HR. "You don't want to burden them": older adults' views on family involvement in care. *J Fam Nurs*. 2009;15:295-317.
  8. Cai H, Sedikides C, Jiang L. Familial self as a potent source of affirmation: evidence from China. *Soc Psychol Personal Sci*. 2013;4:529-537.
  9. Charmaz K. *Constructing Grounded Theory*. Sage; 2014.
  10. Chen JM, Kim HS, Mojaverian T, Morling B. Culture and social support provision: who gives what and why. *Pers Soc Psychol Bull*. 2012;38:3-13.
  11. Cleeland CS, Ryan KM. Pain assessment: global use of the Brief Pain Inventory. *Ann Acad Med Singap*. 1994;23:129-138.
  12. CONNACT OA Knee Cohort (CONNACT). ClinicalTrials.gov identifier: NCT04942236. Available at: <https://www.clinicaltrials.gov/ct2/show/NCT04942236>. Accessed May 19, 2022.
  13. Department of Statistics Singapore. Population Trends, 2021. Available at: <https://www.singstat.gov.sg/-/media/files/publications/population/population2021.ashx>. Accessed May 28, 2022.
  14. Engel GL. The need for a new medical model: a challenge for biomedicine. *Holistic Medicine*. 1989;4(1):37-53.
  15. Ferreira-Valente MA, Pais-Ribeiro JL, Jensen MP. Associations between psychosocial factors and pain intensity, physical functioning, and psychological functioning in patients with chronic pain: a cross-cultural comparison. *Clin J Pain*. 2014;30:713-723.
  16. Fillingim RB. Individual differences in pain responses. *Curr Rheumatol Rep*. 2005;7:342-347.
  17. Finan PH, Buenaver LF, Bounds SC, et al. Discordance between pain and radiographic severity in knee osteoarthritis: findings from quantitative sensory testing of central sensitization. *Arthritis Rheum*. 2013;65:363-372.
  18. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multidisciplinary health research. *BMC Med Res Methodol*. 2013;13:117.
  19. Glaser B, Strauss A. *The Discovery of Grounded Theory*. Aldine Publishing Company; 1967.
  20. Grant M, Rees S, Underwood M, Froud R. Obstacles to returning to work with chronic pain: in-depth interviews with people who are off work due to chronic pain and employers. *BMC Musculoskelet Disord*. 2019;20:486.
  21. Hale ED, Trehan GJ, Kitas GD. The common-sense model of self-regulation of health and illness: how can we use it to understand and respond to our patients' needs? *Rheumatology (Oxford)*. 2007;46:904-906.
  22. Helman C. *Culture, Health and Illness*, 5th ed. CRC Press; 2007.
  23. Hill CL, Baird WO, Walters SJ. Quality of life in children and adolescents with osteogenesis imperfecta: a qualitative interview based study. *Health Qual Life Outcomes*. 2014;12:54.
  24. Holla JFM, Sanchez-Ramirez DC, van der Leeden M, et al. The avoidance model in knee and hip osteoarthritis: a systematic review of the evidence. *J Behav Med*. 2014;37:1226-1241.
  25. Hunt MA, Birmingham TB, Skarakis-Doyle E, Vandervoort AA. Towards a biopsychosocial framework of osteoarthritis of the knee. *Disabil Rehabil*. 2008;30:54-61.
  26. IsHak WW, Wen RY, Naghdechi L, et al. Pain and depression: a systematic review. *Harv Rev Psychiatry*. 2018;26:352-363.
  27. Jackson D, Daly J, Davidson P, et al. Women recovering from first-time myocardial infarction (MI): a feminist qualitative study. *J Adv Nurs*. 2000;32:1403-1411.
  28. Jensen MP, Turner JA, Romano JM. Changes in beliefs, catastrophizing, and coping are associated with improvement in multidisciplinary pain treatment. *J Consult Clin Psychol*. 2001; 69:655-662.
  29. Jensen MP, Turner JA, Romano JM. Changes after multidisciplinary pain treatment in patient pain beliefs and coping are associated with concurrent changes in patient functioning. *Pain*. 2007;131:38-47.
  30. Kabel A, Dannecker EA, Shaffer VA, Mocca KC, Murray AM. Osteoarthritis and social embarrassment: risk, rain, and avoidance. *SAGE Open*. 2014;4:1-6.
  31. Karayannis NV, Baumann I, Sturgeon JA, Melloh M, Mackey SC. The impact of social isolation on pain interference: a longitudinal study. *Ann Behav Med*. 2019;53:65-74.
  32. Keefe FJ, Smith SJ, Buffington ALH, Gibson J, Studts JL, Caldwell DS. Recent advances and future directions in the biopsychosocial assessment and treatment of arthritis. *J Consult Clin Psychol*. 2002;70:640-655.
  33. Kim HS, Sherman DK, Ko D, Taylor SE. Pursuit of comfort and pursuit of harmony: culture, relationships, and social support seeking. *Pers Soc Psychol Bull*. 2006;32:1595-1607.
  34. Kramer EJ, Kwong K, Lee E, Chung H. Cultural factors influencing the mental health of Asian Americans. *West J Med*. 2002; 176:227-231.
  35. Krebs EE, Lorenz KA, Bair MJ, et al. Development and initial validation of the PEG, a three-item scale assessing pain intensity and interference. *J Gen Intern Med*. 2009;24:733-738.
  36. Lazaridou A, Martel MO, Cahalan CM, et al. The impact of anxiety and catastrophizing on interleukin-6 responses to acute painful stress. *J Pain Res*. 2018;11:637-647.
  37. Leeuw M, Goossens MEJB, Linton SJ, Crombez G, Boersma K, Vlaeyen JWS. The fear-avoidance model of musculoskeletal pain: current state of scientific evidence. *J Behav Med*. 2007;30: 77-94.
  38. Luborsky MR. Sociocultural factors shaping technology usage: fulfilling the promise. *Technol Disabil*. 1993;2:71-78.
  39. Lumley MA, Cohen JL, Borszcz GS, et al. Pain and emotion: a biopsychosocial review of recent research. *J Clin Psychol*. 2011; 67:942-968.
  40. Main CJ. The importance of psychosocial influences on chronic pain. *Pain Manag*. 2013;3:455-466.
  41. Main CJ, Sullivan MJ, Watson PJ. *Pain Management: Practical Applications of the Biopsychosocial Approach in Clinical and Occupational Settings*. Elsevier; 2008.
  42. McMurtry M, Viswanath O, Cernich M, et al. The impact of the quantity and quality of social support on patients with chronic pain. *Curr Pain Headache Rep*. 2020;24:72-77.
  43. Mojaverian T, Kim HS. Interpreting a helping hand: cultural variation in the effectiveness of solicited and unsolicited social support. *Pers Soc Psychol Bull*. 2013;39:88-99.
  44. Morrish N, Medina-Lara A. Does unemployment lead to greater levels of loneliness? A systematic review. *Social Sci Med*. 2021; 287:114339.
  45. Moustari V, Daly M, Delaney L. The scarring effect of unemployment on psychological well-being across Europe. *Soc Sci Res*. 2018;72:146-169.
  46. Nakano N, Shoman H, Olavarria F, Matsumoto T, Kuroda R, Khanduja V. Why are patients dissatisfied following a total knee replacement? A systematic review. *Int Orthop*. 2020;44: 1971-2007.
  47. Nicholas MK. The biopsychosocial model of pain 40 years on: time for a reappraisal? *Pain*. 2022;163(S1):S3-S14.
  48. Park S, Kang MY, Lee JH. Precarious employment as compared with unemployment reduces the risk of depression in the elderly in Korea. *J Occup Environ Med*. 2020;62: e559-e566.
  49. Quartana PJ, Campbell CM, Edwards RR. Pain catastrophizing: a critical review. *Rev Neurother*. 2009;9:745-758.

50. Saunders B, Sim J, Kingstone T, et al. Saturation in qualitative research: exploring its conceptualization and operationalization. *Qual Quant*. 2018;52:1893-1907.
51. Sharma A, Kudesia P, Shi Q, Gandhi R. Anxiety and depression in patients with osteoarthritis: impact and management challenges. *Open Access Rheumatol*. 2016;8:103-113.
52. Shelby RA, Somers TJ, Keefe FJ, et al. Brief fear of movement scale for osteoarthritis. *Arthritis Care Res (Hoboken)*. 2012;64:862-871.
53. Smeets RJ, Vlaeyen JW, Kester AD, Knottnerus JA. Reduction of pain catastrophizing mediates the outcome of both physical and cognitive behavioral treatment in chronic low back pain. *J Pain*. 2006;7:261-271.
54. Somers TJ, Keefe FJ, Godiwala N, Hoyler GH. Psychosocial factors and the pain experience of osteoarthritis patients: new findings and new directions. *Curr Opin Rheumatol*. 2009;21:501-506.
55. Strauss A, Corbin J. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. Sage; 1998.
56. Sturgeon JA, Zautra AJ. Social pain and physical pain: shared paths to resilience. *Pain Manag*. 2016;6:63-74.
57. Sullivan MJL, Bishop SR, Pivik J. The Pain Catastrophizing Scale: development and validation. *Psychological Assessment*. 1995;7:524-532.
58. Tan BY, Pereira MJ, Yang S-Y, et al. Collaborative model of care between Orthopaedics and allied healthcare professionals in knee osteoarthritis (CONNECT): study protocol for an effectiveness-implementation hybrid randomized control trial. *BMC Musculoskelet Disord*. 2020;21:684.
59. Taylor SE, Sherman DK, Kim HS, Jarcho J, Takagi K, Dunagan MS. Culture and social support: who seeks it and why? *J Pers Soc Psychol*. 2004;87:354-362.
60. Thong ISK, Tan G, Lee TYC, Jensen MP. A comparison of pain beliefs and coping strategies and their association with chronic pain adjustment between Singapore and United States. *Pain Med*. 2017;18:1668-1678.
61. Thumboo J, Chew LH, Lewin-Koh SC. Socioeconomic and psychosocial factors influence pain or physical function in Asian patients with knee or hip osteoarthritis. *Ann Rheum Dis*. 2002;61:1017-1020.
62. Trindade IA, Ferreira C, Pinto-Gouveia J. Chronic illness-related shame: development of a new scale and novel approach for IBD patients' depressive symptomatology. *Clin Psychol Psychother*. 2017;24:255-263.
63. Uritani D, Kasza J, Campbell PK, Metcalf B, Egerton T. The association between psychological characteristics and physical activity levels in people with knee osteoarthritis: a cross-sectional analysis. *BMC Musculoskelet Disord*. 2020;21:269.
64. Vlaeyen JWS, Linton SJ. Fear-avoidance and its consequences in chronic musculoskeletal pain: a state of the art. *Pain*. 2000;85:317-332.
65. Vlaeyen JWS, Morley SJ, Linton SJ, Boersma DeJong J. *Pain-Related Fear: Exposure-based Treatment of Chronic Pain*. IASP Press; 2012.
66. Vlaeyen JWS, Crombez G, Linton SJ. The fear-avoidance model of pain. *Pain*. 2016;157:1588-1589.
67. Wallis JA, Taylor NF, Bunzli S, Shields N. Experience of living with knee osteoarthritis: a systematic review of qualitative studies. *BMJ Open*. 2019;9:e030060.
68. Ward-Griffin C, Bol N, Oudshoorn A. Perspectives of women with dementia receiving care from their adult daughters. *Can J Nurs Res*. 2006;38:120-146.
69. Zhou L, Zhang S-J. How face as a system of value-constructs operates through the interplay of mianzi and lian in Chinese: a corpus-based study. *Language Sciences*. 2017;64:152-166.