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Exploring the causes of elevated kinesiophobia in post-coronary stenting patients: a qualitative analysis in a cardiac rehabilitation setting

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ABSTRACT

Objectives The primary aim of this study is to investigate the factors contributing to the development of kinesiophobia in patients following coronary artery stent implantation, integrating perspectives from both patients and healthcare professionals. The main hypothesis is that understanding and methods for effectively overcoming the fear of exercise and improving the effectiveness of cardiac rehabilitation require further exploration from both patient and professional viewpoints.

Design This qualitative study used a semi-structured interview approach to gather data from participants.

Setting The study was conducted at a hospital in Gansu province, China, focusing on the level of care provided to cardiac rehabilitation patients.

Participants A total of 11 cardiac rehabilitation patients identified as having kinesiophobia (Tampa Scale for kinesiophobia Heart, TSK-SV Heart >37) through screening and nine healthcare professionals participated in the study. The selection criteria included patients undergoing cardiac rehabilitation and professionals involved in their care.

Results The study identified a core theme, 'Navigating Fear and Uncertainty', encompassing five themes that elucidate how various factors contribute to the prevalent phenomenon of kinesiophobia among patients. These were further delineated into 11 subthemes: (1) physiological factors (fatigue, negative illness experiences), (2) psychological factors (hypervigilance, psychogenic anxiety and depression), (3) capacity factors (reduced physical abilities, lack of rehabilitation knowledge and skills), (4) motivational factors (low exercise self-efficacy, rehabilitation cognitive errors) and (5) support systems (primary caregivers, healthcare professionals and medical support). The results provide a qualitative understanding rather than quantitative measures, hence no CIs or statistical significance levels are provided.

Conclusions The kinesiophobia observed in patients following coronary artery stent implantation stems from the combined influence of multiple factors, warranting early assessment and intervention by healthcare professionals. The study suggests that healthcare institutions should address the practical concerns faced by cardiac rehabilitation patients and enhance familial, medical and societal support systems to increase patient engagement and compliance with exercise rehabilitation.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The study utilized a qualitative research approach to gain in-depth insights into the experiences and perceptions of patients post-coronary stenting.
⇒ A purposive sampling strategy was employed to ensure a diverse range of participants, which enhances the transferability of the findings.
⇒ The study was limited by its single-center setting, which may affect the generalizability of the results to other healthcare contexts.
⇒ The study relied on self-reported data, which could be subject to recall bias.
⇒ All study participants were from China, so it is possible that some nuances were missed in translation.

Further research is needed to develop and validate interventions based on these findings.

INTRODUCTION

Cardiovascular disease has persistently posed a significant health challenge globally, markedly affecting patients' quality of life. Coronary artery disease (CAD), as a subset of heart diseases, can lead to cardiac functional impairment or even death.[1] Percutaneous coronary intervention (PCI) therapy holds crucial significance in alleviating symptoms and improving prognosis for CAD patients.[2] However, PCI patients who lack appropriate rehabilitation management still face the risk of recurrent cardiovascular events.[3]

The recovery process post-PCI encompasses critical measures such as pharmacotherapy, lifestyle modification and exercise rehabilitation.[4] Exercise rehabilitation plays a vital role in enhancing cardiac function and quality of life in patients and has become a focal point of research.[5] Studies indicate that exercise can significantly improve cardiac function in patients after PCI, reduce the

incidence of recurrent events and elevate their quality of life.[6 7]

The availability of CR (Cardiac rehabilitation) has been reported to be significantly low, at 60% in high-income countries, 28% in middle-income countries and 8% in low-income countries, respectively. Further, low referral and participation rates and higher dropout rates have been reported globally.[8] Lack of resources, poor access, educational attainment and high cost of care were some of the barriers to CR, particularly in low- and middle-income countries.[9] In addition to this, it has been suggested that fear of exercise affects adherence to home-based cardiac rehabilitation exercises.[10] Kinesiophobia is an excessive, irrational fear of exercise due to the fear of pain or re-injury, and this psychological disorder directly affects the patient's willingness and actions to participate in exercise rehabilitation.[11] The study showed that 75.7% of CAD patients suffered from varying degrees of exercise fear, and their level of recovery was negatively correlated with their kinesiophobia.[12 13] Another study showed that fear of exercise was an independent negative predictor of adherence to home cardiac rehabilitation exercise in patients with chronic heart failure, accounting for 23.6% of the total variance. The higher the level of fear of exercise in patients with chronic heart failure, the poorer their adherence to home cardiac rehabilitation exercises.[14]

Currently, there is a scarcity of research on the specific causes and psychological impacts of kinesiophobia among patients who have undergone coronary stent surgery in China; moreover, existing studies generally lack a thorough exploration of effective identification and response strategies to this issue within clinical practice.[12 15] Presently, exercise rehabilitation programmes tend to emphasise uniform guidance, failing to adequately consider individual patient differences and psychosocial backgrounds, which constrains the effectiveness of rehabilitation outcomes.[16 17]

The current study employs qualitative analysis methods, grounded in the dual perspectives of patients and healthcare professionals, to conduct an in-depth investigation into the phenomenon, causes and impacts of kinesiophobia in patients post-coronary stent implantation in China. This paper, while verifying and expanding on relevant concepts and research findings present in the existing literature, also takes into consideration the individual experiences of patients, aiming to construct a more comprehensive understanding of kinesiophobia. The research objective is to unveil the complex psychosocial factors affecting post-PCI patients' kinesiophobia and their rehabilitation experiences, to advance targeted intervention strategies, to assist patients in overcoming kinesiophobia, to enhance participation and outcomes in exercise rehabilitation, and ultimately, to improve the overall effectiveness of rehabilitation and quality of life.

Study design

To explore the causes of exercise-induced fear in patients after coronary stent implantation, we employed a phenomenological research approach to guide the overall design of this study, focusing on the patients' subjective experiences and their perceptions of exercise-induced fear. The phenomenological approach allows us to delve into how patients and healthcare workers understand and interpret this phenomenon, especially how they perceive its impact on exercise rehabilitation programmes.

However, considering the large volume of interview data and the need for efficient and systematic data analysis, we incorporated content analysis in the data analysis phase. Content analysis is a widely used, systematic data organisation method in qualitative research that involves categorising and coding interview data to extract meaningful themes and patterns from a large volume of text. We combined phenomenological and content analysis methods by first collecting and understanding the data through a phenomenological lens, and then using content analysis to structure the data, identifying key themes and subthemes. This combination allows for maintaining the subjective depth of the study while ensuring the systematic and actionable nature of the data analysis.

The Combination of Phenomenology and Content Analysis: The core goal of phenomenology is to understand the participants' 'lifeworld', while content analysis provides a specific technical framework to systematically organise and interpret the participants' experiences. In this study, we used a phenomenological perspective to gain an in-depth understanding of patients' perceptions of exercise-induced fear and applied content analysis to identify and categorise the underlying themes of these perceptions. Studies by Vaismoradi *et al*,[18–20] suggest that combining phenomenology with content analysis enhances the depth and breadth of qualitative research.

Using a phenomenological approach for qualitative research, data were gathered through semi-structured one-on-one interviews and observational methods, and content analysis was conducted using Colaizzi's seven-step analytical process.

METHODS

Interviews

Patients with kinesiophobia

Using a purposive sampling strategy, this study identified subjects from individuals who engaged in cardiac rehabilitation training at the outpatient clinic or wards of a tertiary A-grade hospital in Gansu province, having received coronary stent implantation surgery.[21] This qualitative analysis focuses on post-coronary stenting patients, emphasising the unique experiences and fears associated with this interventional procedure rather than open heart surgery. Data collection took place from May to June 2023. Patients were selected to ensure a representative sample, considering variables such as educational attainment, residential location, number of stents implanted and concurrent comorbidities. The sample size was determined by the principle of theoretical saturation, where data collection continues until no new themes emerge.

This is defined as the point at which no new themes emerge.[22]

Inclusion criteria: (1) be aged 18 years or older; (2) have received coronary artery stent implantation via the radial artery; (3) outpatients or inpatients with active cardiac rehabilitation; (4) achieve a score greater than 37 on the Tampa Scale for kinesiophobia Heart,TSK-SV Heart questionnaire,[23] which was validated for use in patients with CAD by Bäck *et al*. The TSK-SV Heart is a brief, comprehensive tool designed to detect fear of movement in this patient population. It has been rigorously tested for its psychometric properties, including face, content and construct validity, as well as reliability measures such as composite reliability, internal consistency and stability over time; (5) provide informed consent, acknowledged by themselves and their relatives, to partake in the investigation.

Exclusion criteria: (1) lack of functional communication skills, either oral or written; (2) the presence of a psychiatric illness and (3) the existence of other significant medical complications, such as cancer or impaired hepatic or renal function, which would preclude participation.

Healthcare professionals

Using purposive sampling methodology, the study focused on medical and nursing personnel employed within the Cardiology Department of a tertiary-level, A-grade hospital located in Gansu province.[21] The investigation took place from June to July 2023. Participants were carefully selected based on criteria such as age, gender, education level, professional titles, roles, employment duration and departmental affiliation to ensure the sample accurately reflected the broader medical workforce.

Inclusion criteria: (1) doctors specialising in clinical cardiology were required to have a decade or more of professional experience, hold a minimum title of associate senior level and possess an educational background extending to at least a master's degree. (2) Cardiology nurses were included if they had 10 or more years of experience in clinical nursing, a professional ranking of associate senior level or above and had completed a bachelor's degree or higher. (3) Participation was limited to individuals who assented to voluntarily join the study, consent to be interviewed, demonstrate the ability to express their sentiments effectively and agree to the use of audio recording devices.

Exclusion criteria: (1) non-frontline clinical healthcare practitioners were omitted and (2) individuals engaged in advanced professional training were not considered.

Procedure

In the cardiovascular ward, study information was provided by nurses to eligible patients. All patients consenting to engage with the study were subjected to a standardised process. Nurses were required to meet eligible individuals in person, explain the study's objectives and promise to keep any disclosed information confidential. Informed consent was obtained from each participant.

The interviews were conducted by two researchers (the first and second authors) with Master of Medicine degrees who had received specialised training. A dedicated researcher was responsible for on-site data collection through semi-structured face-to-face interviews. A pilot test with two participants was conducted to assess the interview guide's clarity and identify any needed changes. Interviews were audio-recorded and then transcribed verbatim. The interviews were conducted by two researchers with a Master of Medicine degree, who had undergone extensive training in qualitative research methods, specifically in the conduct of semi-structured interviews. This training included participation in workshops focused on interview techniques, the importance of establishing rapport and the ethical considerations in qualitative research. Additionally, both researchers had prior experience in conducting interviews within a healthcare setting, which equipped them with the necessary judgement, experience and tact to proceed flexibly during the interview process. They were also trained to recognise and manage potential biases and to ensure that the interviews were conducted in a manner that was respectful and considerate of the participants' experiences and perspectives.

Each interview lasted an average of 20 min. To ensure validity and avoid errors that could compromise research integrity, transcripts were sent to participants for review. Participant anonymity was maintained in the transcripts, with identification based on gender, age and adherence to the cardiac rehabilitation protocol.

Interview guide

The structured interview with patients involved the following inquiries:

- Participants were invited to relay their sensations and experiences after undergoing cardiac stent insertion.
- Patients were asked to elucidate the source of their postoperative trepidation concerning physical activity.
- The study sought to uncover patients' attitudes toward post-stent-implantation exercise regimens.
- An exploration into patients' awareness of appropriate post-stent exercise practices was conducted.
  1. Affirmative responses triggered further questioning about their knowledge of specific exercise routines, adherence to these routines and any complications encountered during execution.
  2. Negative responses prompted an investigation into the underlying reasons for their lack of knowledge.
- Finally, patients were queried about the type of assistance they anticipated receiving from healthcare providers.

The interviews with healthcare professionals included the following:

- Participants were asked for their professional evaluation of the current physical rehabilitation for patients who have received coronary stent placement.

- The interview sought to identify the obstacles encountered by healthcare providers in orchestrating exercise protocols for these patients.
- Explorations were made into the healthcare providers' perceptions of the psychological barriers, such as why some patients might experience an aversion to exercise post-procedure.
- Finally, medical staff were asked to suggest methodologies to enhance physical recovery after coronary stent insertion.

Data analysis

On the completion of each interview, two investigators are required to transcribe the audio recordings into text accurately and completely within 24 hours. The converted textual data should then undergo analysis employing Colaizzi's seven-step procedural framework.[24] The methodology includes the following steps: diligently recording and reviewing all interview transcripts; isolating narratives relevant to the study's objectives; coding recurring themes and insights; collating coded elements; drafting a comprehensive and detailed account; identifying similar perspectives and extracting significant themes. To ensure the accuracy of our interpretations of patient views, it is essential to re-engage with the respondents for confirmation.

The interviews, originally conducted in Chinese, were translated into English by professional medical translators, who are native speakers of both languages and have extensive experience in translating medical and scientific documents. The translation process involved a double-check by a second medical expert translator to ensure accuracy and the preservation of the participants' intended meanings.

Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

RESULTS

Participants' characteristics

There were no patient dropouts in this study. In this study, 11 patients (P1–P11) were enrolled, consisting of 7 males and 4 females, with ages ranging from 49 to 73 years. Tampa Scale for Kinesiophobia-Heart scale scores ranged from 39 to 57. Four patients had comorbid conditions. The study also included nine healthcare professionals (N1–N7 for nurses, D1–D2 for physicians), with professional experience ranging from 22 to 40 years. The sociodemographic and clinical characteristics of these individuals are detailed in table 1.

Table 1 Participant demographic characteristics in the qualitative study

Kinesiophobia patients	N=11	Healthcare professionals	N=9
Age (range 49–73 years)		Degree	
≤60	5	Bachelor	4
>60	6	Master's and higher	5
TSK-Heart (score)		Professional title	
39–50	7	Senior title	1
>50	4	Deputy senior title	8
Comorbid (type)		Work experience (range 22–40 years)	
No	7	≤30	4
1	3	>30	5
2	1		
Smoke			
Yes	8		
No	3		
Drink			
Yes	9		
No	2		
Number of coronary stents (pieces)			
1	6		
2	4		
3	1		

TSK-Heart, Tampa Scale for Kinesiophobia-Heart.

Key themes

On meticulous examination of the dataset, a core theme emerged, delineating the contributory factors to the genesis of kinesiophobia among patients post-coronary stent placement. This includes 5 main themes and 11 subthemes, specifically: physiological factors (fatigue and negative illness experiences), psychological factors (hypervigilance, psychogenic anxiety and depression), capability factors (reduced physical abilities, lack of rehabilitation knowledge and skills), motivational factors (low exercise self-efficacy, rehabilitation cognitive errors) and support systems (primary caregivers, healthcare professionals and medical support). These themes and subthemes are illustrated in figure 1.

Theme 1: physiological factors

Subtheme 1: fatigue

Fatigue is characterised by a subjective sensation of exhaustion, either mentally or physically, and is recognised as non-specific. It has been found that the exertion from surgical and therapeutic procedures can greatly reduce a patient's energy and vitality, leading to postoperative lassitude and physical weakness. This inadequate recovery from physical exhaustion may cause patients to doubt their stamina and strength, leading to fears that physical activity could increase their fatigue and discomfort, potentially triggering kinesiophobia. Thus, fatigue is considered a key factor in the development of movement-related fear after coronary stent implantation.

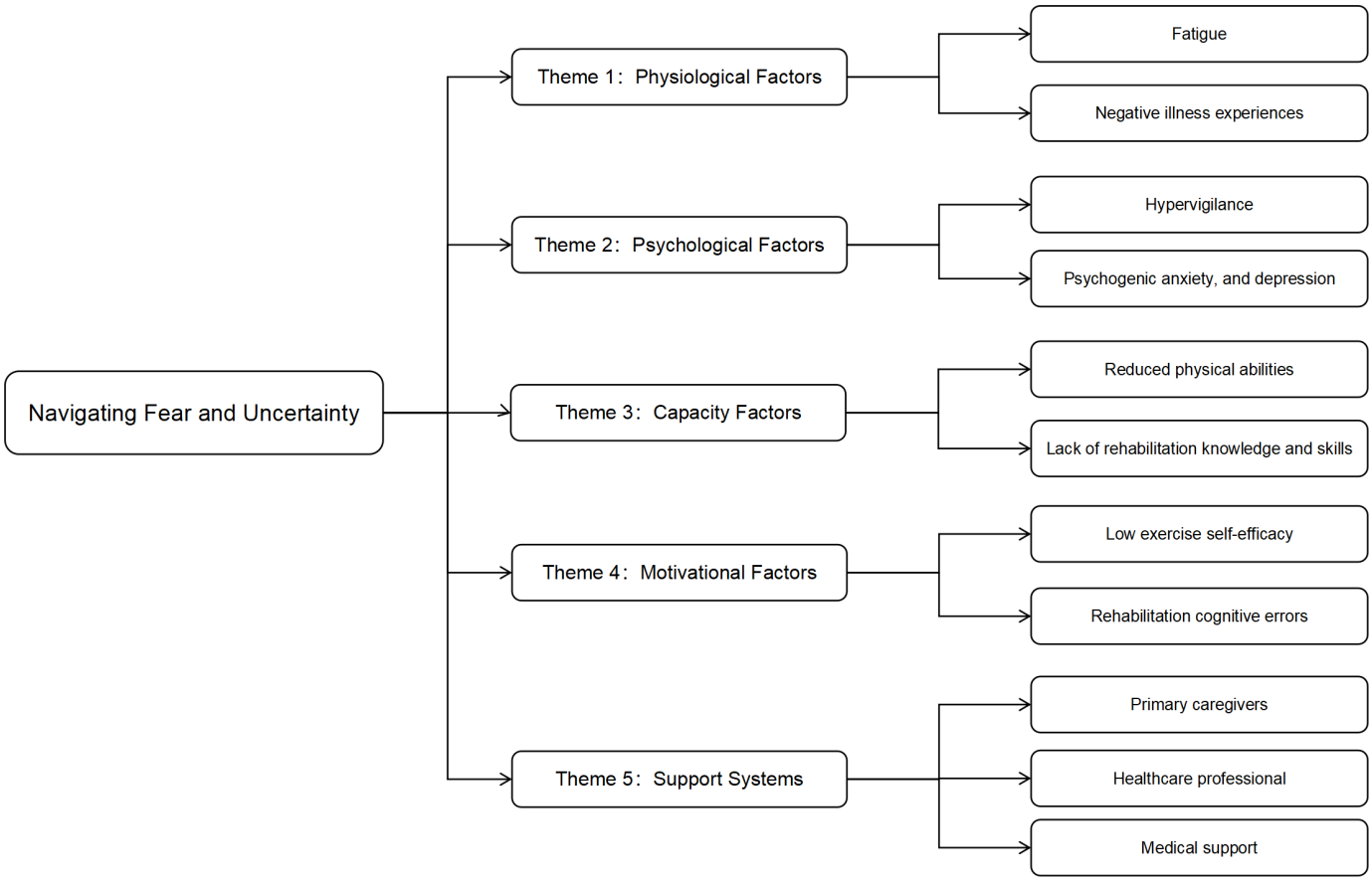

Figure 1 Themes and subthemes.

Mental fatigue

In the hospital, I just didn't have any energy or desire to do anything. But, once I started working at the construction site, I was surprisingly full of life. (P4)

Lately, nothing really grabs my attention. I'm just so tired all the time and don't feel like working out or seeing anyone. (P7)

Somatic fatigue

Earlier, just moving around would leave me gasping and my heart racing. Post-surgery, I still feel that way, plus I get these occasional twinges of pain in my chest. (P11)

You know, surgery really does a number on you. Ever since mine, I just don't have the energy I used to. (P7)

Subtheme 2: negative illness experiences

It has been observed that patients who perceive pain as a threatening stimulus and overestimate its effects may reduce or avoid physical activity, leading to exercise-induced phobia. Specifically, patients with acute myocardial infarction (AMI) often experience intense, persistent compressive pain behind the sternum or in the precordial area, along with a sense of impending death. Consequently, these negative experiences can make patients hesitant to engage in physical activity for fear of reinducing such distressing symptoms.

Before, it was so bad with the blocked artery that I had to be hospitalized. Now that I've got a stent, and things are flowing again, I still feel some pain, but it's way more manageable. (P6)

Having a heart attack was terrifying. The pain, the fear, sweating like crazy—I truly thought I was dying. That's why I'm pretty much scared to even leave my bed now. (P11)

There are guys who just freeze up at the first sign of pain and don't move past it. They're stuck in this fear that any bit of exercise could make the pain worse. It's really holding them back. (P2)

Stents are usually for heart attack survivors, right? And since a heart attack means you've had some serious chest pain, the thought of exercising afterward and possibly triggering that pain again freaks people out. (P5)

Theme 2: psychological factors

Subtheme 3: hypervigilance

Hypervigilance is characterised by exaggerated sensitivity or intense preoccupation with bodily sensations, emotional responses or environmental triggers. A variety of elements have been identified as contributing to the escalation of psychological sensitivity in patients post-coronary stent implantation, encompassing such aspects

as the hospital environment, the mental state during hospital stay, level of cognition and an excessive concern with personal health status. After a coronary stent procedure, patients often show heightened vigilance about their bodily sensations and physical activities, fearing stent displacement or disease recurrence, potentially leading to exercise-related phobia.

> The thought of my arteries clogging up again and going through that pain freaks me out. I can still feel how bad it was … And there's this crazy worry that exercising could somehow knock the stent loose! (P8)
>
> These days, I'm extra cautious with everything, worried about the stent slipping out and ending up with a blocked artery again. Plus, with work, finding time to exercise just is not possible. (P6)

Patients believe that metallic coronary stents may cause mechanical irritation and adverse reactions within the body.

> The idea that any sort of activity might mess up the stent has me worried. I mean, getting a stent makes you a patient for life, doesn't it? So, that probably means taking it easy.
>
> Knowing there's a stent inside me is weird; I can actually feel it's there. And yeah, there's this lingering discomfort even after it's been placed. (P3)

It is documented that some individuals confuse normal physiological responses like accelerated heart rate and rapid breathing during exercise with symptomatic expressions of illness.

> Every time I work out, my heart just pounds like crazy, and it's super uncomfortable—feels like I'm about to have an episode or something. Is that supposed to happen? (P11)
>
> Patients with a higher level of education can sometimes focus too much on themselves, ramping up their psychological sensitivity. It's like they hit one of two extremes—either going all out with exercise or being too scared to move a muscle. (D1)
>
> There are patients who are just too sensitive, mistaking normal stuff that happens when you exercise, like your heart racing or breathing harder, for signs of a serious problem. (D2)

Subtheme 4: psychogenic anxiety and depression

Increased psychopathological manifestations during the acute phase of myocardial infarction (MI) are well-documented, with anxiety and depression being the most common psychological responses. AMI pathogenesis is characterised by rapid progression and severe intensity. Due to factors like physical illness and financial stress, patients often experience negative psychological states, mainly depression. This psychological disposition is suggested to induce enhanced sympathetic nervous system activity, subsequently invoking a spectrum of physiological transformations.

Cardiogenic anxiety refers to a specific focus on cardiac-related worries, often seen in people with cardiovascular diseases. Patients with cardiogenic anxiety may vigilantly monitor their cardiovascular symptoms and avoid activities thought to trigger symptoms. They are frequently noted to be engaged in compulsive checking of their cardiac activity, eschew potential symptom-inducing activities and undertake efforts to mitigate anxiety. Moreover, a pattern of continuous solicitations for reassurances from healthcare professionals has been recognised.

> Ever since I got sick, I just feel like I've turned into a burden, [sighs deeply and pauses] I can't do a thing without feeling like I'm just a drain on my family's finances. (P7)
>
> I used to get short of breath and feel all panicky when I exercised, but post-surgery, it doesn't seem much better. I still get this nagging pain in my chest … Can you check with the doctor? [appears worried] Is this normal, or what? (P11)
>
> The way a patient feels mentally can play a huge role in their recovery. If they're battling anxiety or depression, they're not going to feel pumped about doing much—exercise included. (D2)
>
> In guiding patients through heart rehab, it's clear that those grappling with anxiety or depression find it harder to stick with the program. (N6)

Theme 3: capacity factors

Cardiovascular diseases are particularly common among middle-aged and elderly individuals, often leading to a decline in physical functional capacity. At the same time, some individuals face co-occurring conditions like diabetes, hypertension and hyperlipidaemia, which can reduce their ability to exercise. This diminution in the ability to engage in physical activity has been associated with the emergence of anxiety about subsequent cardiac events, disquietude over one's own physical competence, trepidation concerning the ramifications of physical exertion and self-questioning in the wake of coronary stent placement. Taken together, these personal perceptions distinctly contribute to a fear-fuelled aversion to exercise among this patient group. Moreover, an array of patients demonstrates a deficiency in informed awareness and practical skills required for post-stenting cardiac rehabilitation, representing a significant influence on their apprehension towards exercise.

Subtheme 5: reduced physical abilities

> I've gotten up there in years and been dealing with diabetes for 17 years now. Honestly, my body just doesn't seem up for exercise anymore … (P5)
>
> People who are a bit on the heavier side usually don't get enough exercise, but if they've also got heart problems, it's like their willingness to work out takes an even bigger hit. (N6)

> When working with patients who've got a mix of health issues, like high blood pressure and diabetes, they often say, 'You know my blood pressure's through the roof, and you still want me to work out?' (N7)

Subtheme 6: lack of rehabilitation knowledge and skills

A lack of knowledge and skills in rehabilitation is shown to reduce patients' willingness to engage in cardiac recovery. This void is notably conspicuous among those encountering their inaugural incidence of illness, initial surgical intervention or emergent hospital admission. This lack of understanding and ability in rehabilitation can lead to a learnt fear of physical activity in those recovering from coronary stent surgery. Predominantly, this emanates from a limited comprehension of the correct rehabilitative protocol and exercise instruction, ambiguity over the resumption of exercise endeavours in a safe and effective mode, thereby cultivating an augmentation in trepidations concerning exercise-associated hazards. The paucity of necessary knowledge and skills in rehabilitation might also lead to incorrect manoeuvres or inappropriate postures during physical endeavours, exacerbating concerns about potential recurrent cardiac events and concomitantly magnifying the psychological encumbrance tethered to the phobia of exercising.

"Getting a stent was a first for me. Honestly, getting this disease caught us by surprise. Sure, I've felt off before, but I thought it was just due to tiredness". When asked about knowing how to exercise post-stent, the patient replied, "I'm in the dark here; not sure if I'm even allowed to exercise. I pretty much do what the doctor tells me because I'm clueless about these things". (P2)

> I've never really looked into this stuff—never read any books or went to any talks about it. I've been pretty healthy up until now, so I didn't think it was something I needed to worry about. (P3)

> There are health talks at the community hospital all the time, but I've never attended one. (P5)

> The only exercises I know are pretty basic, like taking slow walks, push-ups, playing a bit of badminton, or table tennis. But when it comes to rehab and all that, I'm lost. (P6)

> Getting patients to understand what they need to do can be a big hurdle. Especially for those with less education, it can be tough to get the hang of the rehab plan and what healthcare professionals advise, which can lead to a lot of confusion or getting things wrong. (D2)

Theme 4: motivational factors

A key factor contributing to exercise-related fear after coronary stent insertion is related to motivational factors. This factor can be divided into two parts: reduced exercise self-efficacy and misconceptions about rehabilitation. Reduced exercise self-efficacy is seen when patients lack confidence in facing the challenges of rehabilitative physical activities, leading to hesitation or refusal to participate. Misconceptions about rehabilitation stem from a poor understanding of its importance and a dismissive attitude towards its potential positive impact on disease progression.

Subtheme 7: low exercise self-efficacy

> I'm older and, honestly, I don't think I have the energy to engage in sports or exercise like I used to. (P7)

> The whole exercise thing feels overwhelming—too many activities and the moves are way too complex. I can't keep them straight, much less actually do them. (P8)

Subtheme 8: rehabilitation cognitive errors

"Honestly, I don't see much benefit in exercising for me. If I got seriously ill, it's not like working out could fix that, right?" When asked about their exercise habits, the patient responded, "I don't think rehab exercises are for me. Those who genuinely need it should go ahead. I'm not ill, so why would I do those exercises?" (P5)

> The main issue, I think, is how patients see their role and understand their health. They come to the hospital expecting treatments like drips and shots, not to work out. … They believe that buying and taking medication is the answer. The idea of paying just to exercise seems pointless to them. (N2)

Theme 5: support systems

Social support refers to the network of social resources that individuals perceive or receive when facing illness challenges. This encompasses emotional solidarity, substantial assistance, informative guidance and evaluative encouragement. Notably, in the realm of post-MI physical rehabilitation, the pivotal role of family support cannot be overstated. It is instrumental in facilitating a continuous and structured rehabilitation process, simultaneously acting as a cornerstone of emotional comfort.

Subtheme 9: primary caregivers

> I'm on my own when it comes to exercise. My wife's no longer here, my daughter's busy working, and my son's in another city. It's pretty lonely, and that zaps my motivation to work out. (P9)

> My motivation for exercise is hit or miss … With my kids living elsewhere, it was mostly my wife who'd encourage me or join me for walks now and then. (P10)

> Having family support is key to sticking with rehab. That means we need to do more than just teach patients about rehab; we've got to ensure their families get it, too. (D2)

Subtheme 10: healthcare professionals

An enhancement of the uncertainty perceived by patients regarding their illness has been associated with the provision of medical information or guidance that is identified as inaccurate or lacking by healthcare professionals. This magnified uncertainty can subsequently precipitate

a psychological dread regarding engagement in physical activities or exercise routines.

> I really hope to get clearer information from doctors, like what's going on with my health, treatment paths, and how to look after myself once I'm home—you know, what to eat, how to exercise. … I'm kind of flying blind here, not sure about my condition or recovery chances. I'd like the doc to fill me in on my health and what to watch for after I leave. (P5)

> We're pretty stretched thin here, with not enough nurses and a ton to do, so rehab sometimes falls by the wayside. It feels like some nurses think their job stops at handing out pills and doing injections. … But the tide is turning on how we view rehab, with healthcare pros slowly ramping up their focus on it. Since patients often don't have a clue about health matters, it's on us nurses to get the word out. And when we talk about it, we've got to ditch the med speak for plain language. (N2)

> Patients usually have more faith in doctors than nurses. They hang on the doctor's every word and are more likely to follow those directions. When it comes to nurses, there's less enthusiasm, and some folks question our expertise. (N5)

Subtheme 11: medical support

The cardiac rehabilitation journey, characterised by its extended timeline and recurrent hospital stays, incurs significant medical costs. In this context, patients are routinely burdened with profound socioeconomic challenges. The interplay between the level of primary healthcare provision and patients' socioeconomic status is found to have a bearing on the cardiac rehabilitation process. This is reflected in a spectrum of issues, including hindered access to healthcare resources, impediments to securing health information, limited lifestyle behaviour options and effects on the exercise of medical decisions.

> Our county hospital doesn't really do heart rehab—it's not something I've come across here. And getting rehab at a bigger hospital far away? It's just too far, too costly, and a real headache. (P11)

> I'm not sure if I'm doing these exercises right or even doing the right ones. Could there be an easier way that's still good for me? … (P10)

> I can get money back for my stay in the hospital, but the rehab costs after I get out? That's all on me. It'd be great if health insurance could help cover those rehab expenses. (P9)

"Out-of-towners can get the first part of their heart rehab for free in the hospital, which works fine. But for the next part, you've got to pay, and that's a problem for those living far from big medical centers. Trying to do rehab on your own at home isn't safe, and without insurance coverage for it, it's tough for folks to stick with it". When inquired about the prevailing difficulties encountered in cardiac rehabilitation, the nurse articulated: "We're missing a solid link between the rehab services at county and provincial levels. If we had a system to guide patients from intensive rehab at the provincial level to continued support locally, patients could complete their rehab closer to home, with the right support". (N1)

DISCUSSION

Kinesiophobia, or the phobia pertaining to physical movement and a pattern of avoidance, is acknowledged as a psychological disorder influencing the rate of active patient participation and the degree of compliance within cardiac rehabilitation settings.[25] This study probes into the phenomenon from the dual standpoints of patients and healthcare professionals, aiming to dissect the contributory factors underlying the emergence of movement-related fear post-coronary artery stent placement, as well as to articulate the rehabilitation experiences of the affected patients.

The contribution of physiological factors to the genesis of kinesiophobia has been demonstrated in this research. Fatigue, caused by various factors, is a common issue among patients with cardiovascular conditions.[26] Typically, physical fatigue is linked to muscle dysfunction, potentially arising from insufficient cardiac output, imbalances in muscle function and microcirculation, disturbances in the neuroendocrine system or metabolic dysregulation. Mental exhaustion, by contrast, is often correlated with imbalances in emotion, most notably depressive symptoms. An aggravation in the disease severity has been shown to limit further the functional capacity of patients in terms of both physical activity and daily living. The empirical findings of Norte *et al* and Williams have corroborated this perspective, unveiling a direct relationship between escalating fatigue levels and an increase in exercise-associated fear.[27 28]

According to the fear-avoidance model, catastrophic appreciations and cognitions of pain can culminate in reduced or altogether avoided activity, engendering a phobia of movement.[29] Post-incident MI patients, having endured severe pain and near-death experiences, can be left with enduring psychological trauma, precipitating a dread of physical exertion. Kamonseki and colleagues have identified a reciprocal association between pain catastrophisation and kinesiophobia.[30] Such painful encounters spark an overblown fear response and adverse emotional reactions, further amplifying movement phobia and exacerbating pain and rehabilitation challenges. Concurrently, Zhou and fellow researchers' work has revealed that the magnification of pain indirectly affects the adherence to physical activity post-total knee arthroplasty through an effect on exercise self-efficacy.[31]

This research has revealed that psychological factors constitute another pivotal element influencing the onset of kinesiophobia. An interaction between hyperarousal, psychological anxiety and depression is commonly observed. It is noted that postoperative patients often

display an excessive fixation on the state of their heart, paired with apprehension—a vigilance that renders them overly sensitive to their physical sensations and prone to misconstruing normal physiological responses as indicators of disease relapse, which, in turn, culminates in the development of a fear of movement. The significance of heightened pain vigilance within the context of the pain fear-avoidance model has been underscored by Shigetoh's study, suggesting its possible preeminence over other psychological factors in relation to functional impairment among chronic pain sufferers.[32] Concurring with these findings, Yakut and associates have demonstrated a direct correlation between elevated movement phobia levels and heightened anxiety and depression symptomatology scores. Additionally, hyperarousal has been correlated with experiences of pain, anxiety and depression, and the monitoring of depressive and anxiogenic symptoms throughout cardiac rehabilitation has been advocated as a strategy to enhance compliance.[33 34]

This study has provided evidence for the decisive influence of capability factors in the development of kinesiophobia. Ageing-related declines in physical functions and motor abilities lead to a lack of exercise confidence among patients, often due to insufficient knowledge and rehabilitation skills. This lack thereby hinders the effective execution of rehabilitative training and intensifies the degree of kinesiophobia.[35] The work conducted by Kanavaki and colleagues has substantiated the beneficial impact of active engagement with exercise experiences and knowledge on promoting exercise rehabilitation adherence.[36] In contrast, barriers identified to rehabilitation progress include pain, physical incapacity, adverse exercise experiences, erroneous beliefs and information, a lack of motivation and an absence of professional backing. The critical role of healthcare professionals, particularly in the realm of cardiac rehabilitation, has also been affirmed. A qualitative analysis from China has emphasised the key role of nurses' expertise, attitudes and practices in reducing exercise-related fear.[37]

This research has revealed a significant influence of motivational factors on the development of kinesiophobia. Patients with low exercise self-efficacy and biased perceptions of rehabilitation may have reduced confidence and motivation in their recovery, possibly leading to a fear of exercise. It has been discovered in studies conducted by Zhang and colleagues that patients with coronary heart disease in China, who possess lower levels of kinesiophobia and heightened self-efficacy, engage more actively in self-management behaviours pertaining to physical exertion.[38] Moreover, the facilitative role of aims at bolstering mobility, along with positive exercise experiences, beliefs and attitudes, in the advancement of exercise rehabilitation has been substantiated by Kanavaki *et al*.[36] In congruence with these insights, research by Cremers and associates has indicated that cognitive distortions can indirectly modulate the nexus between the intensity of pain and tolerance for activity, likely posing as an impactful determinant of patients' trepidation concerning movement.[39]

This study also highlighted the importance of support systems in the development of kinesiophobia among patients. It has been demonstrated that primary caregivers, healthcare professionals and medical assistance play a pivotal role in delivering emotional support and instructing patients in exercise rehabilitation, which is supported by the findings of Qin *et al*.[40] The sustained cooperation between healthcare teams and family caregivers has been recognised as particularly essential for preserving the motivational drive in patients for their rehabilitation.[37] An absence of such support systems has been observed to leave patients feeling solitary and unsupported, potentially intensifying their fear associated with exercise. The relevancy of socio-psychological factors, like one's perceived social standing and employment status, to kinesiophobia has also been acknowledged, and the acquisition of professional healthcare and societal encouragement has been verified as a facilitator for exercise rehabilitation.[36 41]

Limitations

- Limitations related to sample selection: the sample's representativeness may be limited due to the specific medical institutions and geographic areas included in this study. This limitation may influence the generalisability of the study findings.
- Limitations related to data collection methods: some data were collected through patient self-reports and healthcare provider observations. These methods carry risks of subjective bias and incomplete information, which may affect the objectivity of the study results.

CONCLUSION

The development of kinesiophobia after coronary stent implantation is a complex process involving physiological, psychological, capability, motivational and support system dimensions. These factors interact and contribute to both the onset and progression of kinesiophobia. To improve rehabilitation outcomes and patients' quality of life, interventions should comprehensively consider these elements. Interventions should include psychological counselling, rehabilitation training and a robust support system.

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