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Kinesiophobia in Primary Caregivers of Patients with Chronic Heart Failure: A Scoping Review

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Abstract: *Objective*: To conduct a scoping review of kinesiophobia among primary caregivers of patients with chronic heart failure (CHF). *Methods:* Following a scoping review methodological framework, PubMed, Web of Science, Embase, Cochrane Library, CINAHL, CNKI, SinoMed, Wanfang, and VIP were searched from inception to 30 June 2025. Relevant studies on kinesiophobia in primary caregivers of CHF patients were identified, summarized, and analyzed. *Results:* A total of 24 studies were included. Caregivers generally showed insufficient exercise-related knowledge, particularly regarding appropriate exercise intensity and risk recognition. At the cognitive–affective level, caregivers exhibited a pronounced "substitutive" kinesiophobia, characterized by excessive worry about potential adverse events induced by patients' physical activity. At the behavioral level, this was reflected in restricting patients' activities and avoiding assisting with exercise, which in turn reduced patients' adherence to cardiac rehabilitation. *Conclusion:* Kinesiophobia among primary caregivers of CHF patients arises mainly from cognitive deficits and protective psychological mechanisms. Individualized education and professional guidance are needed to enhance caregivers' exercise management competence and thereby optimize patients' rehabilitation outcomes.

Keywords: Chronic heart failure; Caregivers; Kinesiophobia; Homebased rehabilitation; Scoping review

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1. Introduction

Chronic heart failure (CHF) represents the terminal stage of various cardiac diseases [1]. Characterized by a high occurrence rate, high mortality rate, and high readmission rate, it constitutes a major public health concern [2]. Currently, the global population of heart failure patients exceeds 64.3 million [3]. In China, the number of heart failure patients has reached 12.05 million, with approximately 2.97 million new cases annually, posing significant challenges for disease management [4].

Exercise-based cardiac rehabilitation can improve outcomes, reduce rehospitalization rates and mortality in patients with cardiovascular diseases, and has become one of the main approaches in the management of cardiovascular diseases [5]. However, adherence to exercise rehabilitation among patients with chronic heart failure (CHF) remains suboptimal. Studies indicate that kinesiophobia is a key contributing factor [6]. Kinesiophobia refers to an irrational avoidance behavior resulting from excessive worry about potential adverse consequences of physical activity, which severely impacts patients' participation in exercise and the effectiveness of rehabilitation [7]. Previous research has largely focused on kinesiophobia in patients themselves, with insufficient attention paid to caregivers. Nevertheless, primary caregivers of CHF patients play a crucial role in daily decision-making, exercise planning, and safety monitoring. Studies have shown that the attitudes and behaviors of primary caregivers significantly influence patients' willingness and adherence to exercise rehabilitation [8]. If caregivers lack knowledge about heart failure and exercise, risk assessment skills, or exhibit excessive concern for patient safety, they may subjectively amplify the perceived risks of exercise. This can lead to restrictions on patient activity, undermine the effectiveness of cardiac rehabilitation, and adversely affect the physical and mental health of both patients and caregivers [9].

Currently, reviews on kinesiophobia both domestically and internationally predominantly focus on assessment tools and patient-related factors, while systematic exploration of kinesiophobia among caregivers is relatively scarce. Given the crucial role of caregivers in the patient rehabilitation process, a deeper understanding of the connotation, sources, and impacts of their kinesiophobia holds significant practical importance for developing targeted interventions and enhancing patient adherence to exercise rehabilitation. Therefore, following the methodological framework for scoping reviews, this study synthesizes and analyzes research on kinesiophobia among primary caregivers of patients with heart failure, aiming to provide a theoretical reference for developing targeted intervention strategies and improving nursing practice [10].

2. Materials and methods

2.1. Defining research questions

(1) What are the primary causes of kinesiophobia among primary caregivers of patients with chronic heart failure?
(2) What are the caregivers' attitudes toward patient exercise?
(3) What are the impacts and consequences of caregiver kinesiophobia on the exercise behaviors of patients?

2.2. Literature search

Based on the defined research questions, a search was conducted across the following databases: China National Knowledge Infrastructure (CNKI), Wanfang Data, VIP Database, China Biomedical Literature Service System (SinoMed), PubMed, Embase, Web of Science, Cochrane Library, and CINAHL. The search strategy employed a combination of subject headings and free-text terms.

The search period spanned from the inception of each database to June 30, 2025, and the reference lists of some relevant articles were manually reviewed. Taking PubMed as an example, the search strategy is shown in **Table 1**.

Table 1. PubMed search strategy

ID	Search terms
#1	((“Heart Failure”[Mesh]) OR (Cardiac Failure[Title/Abstract] OR Heart Decompensation[Title/Abstract] OR Decompensation, Heart[Title/Abstract] OR Congestive Heart Failure[Title/Abstract] OR Heart Failure, Congestive[Title/Abstract] OR Heart Failure, Right-Sided[Title/Abstract] OR Heart Failure, Right Sided[Title/Abstract] OR Right-Sided Heart Failure[Title/Abstract] OR Right Sided Heart Failure[Title/Abstract] OR Heart Failure, Left-Sided[Title/Abstract] OR Heart Failure, Left Sided[Title/Abstract] OR Left-Sided Heart Failure[Title/Abstract] OR Left Sided Heart Failure[Title/Abstract] OR Myocardial Failure[Title/Abstract]))
#2	((“Caregivers”[Mesh]) OR (Caregiver[Title/Abstract] OR Care Givers[Title/Abstract] OR Care Giver[Title/Abstract] OR Carers[Title/Abstract] OR Carer[Title/Abstract] OR Family Caregivers[Title/Abstract] OR Caregiver, Family[Title/Abstract] OR Caregivers, Family[Title/Abstract] OR Family Caregiver[Title/Abstract] OR Spouse Caregivers[Title/Abstract] OR Caregiver, Spouse[Title/Abstract] OR Caregivers, Spouse[Title/Abstract] OR Spouse Caregiver[Title/Abstract] OR Informal Caregivers[Title/Abstract] OR Caregiver, Informal[Title/Abstract] OR Caregivers, Informal[Title/Abstract] OR Informal Caregiver[Title/Abstract]))
#3	((“Kinesiophobia”[Mesh]) OR (Pain-Related Activity Avoidance[Title/Abstract] OR Activity Avoidance, Pain-Related[Title/Abstract] OR Avoidance, Pain-Related Activity[Title/Abstract] OR Pain Related Activity Avoidance[Title/Abstract] OR Movement Phobia[Title/Abstract] OR Fear of Movement[Title/Abstract] OR Movement Fear[Title/Abstract] OR Kinesophobia[Title/Abstract] OR Kinetophobia[Title/Abstract] OR Phobia, Movement[Title/Abstract] OR (Care knowledge[Title/Abstract] OR care needs[Title/Abstract] OR exercise knowledge[Title/Abstract] OR physical activity[Title/Abstract] OR physical exercise[Title/Abstract] OR care skills[Title/Abstract] OR care experience[Title/Abstract] OR care burden[Title/Abstract] OR care load[Title/Abstract] OR home care[Title/Abstract] OR health literacy[Title/Abstract] OR physical activity[Title/Abstract]))
#4	#1 AND #2 AND #3

2.3. Inclusion and exclusion criteria

The inclusion criteria were determined in accordance with the PCC principles [10].

2.3.1. Inclusion criteria

(1) Population (P)

Primary caregivers of patients with CHF, including family members, spouses, or other informal caregivers who bear the primary responsibility for caregiving.

(2) Concept (C)

Caregivers’ concerns, fears, overestimation of risk, or resulting restrictive/avoidant behaviors related to the patient’s physical activity/exercise, i.e., “caregiver kinesiophobia”. Given that the literature in this field does not always use the term “kinesiophobia”, this review also includes studies that indirectly characterize this fear through descriptions such as “insufficient knowledge of exercise safety”, “negative beliefs about activity”, or “activity restriction”.

(3) Context (C)

Caregiving situations during the inpatient treatment phase, the post-discharge home/community rehabilitation phase, or participation in rehabilitation at a cardiac rehabilitation center.

(4) Study types

To comprehensively map the evidence, quantitative, qualitative, and mixed-methods studies were included (e.g., intervention studies, cross-sectional surveys, cohort studies, qualitative interviews).

(5) Language

Chinese or English.

2.3.2. Exclusion criteria

(1) Review articles, conference abstracts, or commentary articles.

(2) Studies for which the full text is unavailable or key data are missing.

(3) Studies unrelated to the research topic.

2.4. Literature screening and data extraction

After importing the literature into EndNote software and removing duplicates, the first step involved two professionally trained researchers independently screening the titles and abstracts of the literature based on the inclusion and exclusion criteria and the study objectives. The second step involved a full-text review for further screening. Any discrepancies arising during these two steps were resolved through consultation with a third researcher. The extracted data from the literature included the author, publication year, country, study type, and knowledge, beliefs, and behaviors related to kinesiophobia.

3. Results

3.1. Literature screening results

A total of 3,475 articles were initially retrieved, with an additional 4 articles obtained from other resources. After deduplication, 2,824 articles remained. Preliminary screening based on titles and abstracts excluded 2,560 articles. The full texts of the remaining 264 articles were reviewed for secondary screening, resulting in the exclusion of 240 articles. Ultimately, 24 articles from 8 countries were included [9,11–33]. The literature selection process is illustrated in **Figure 1.**

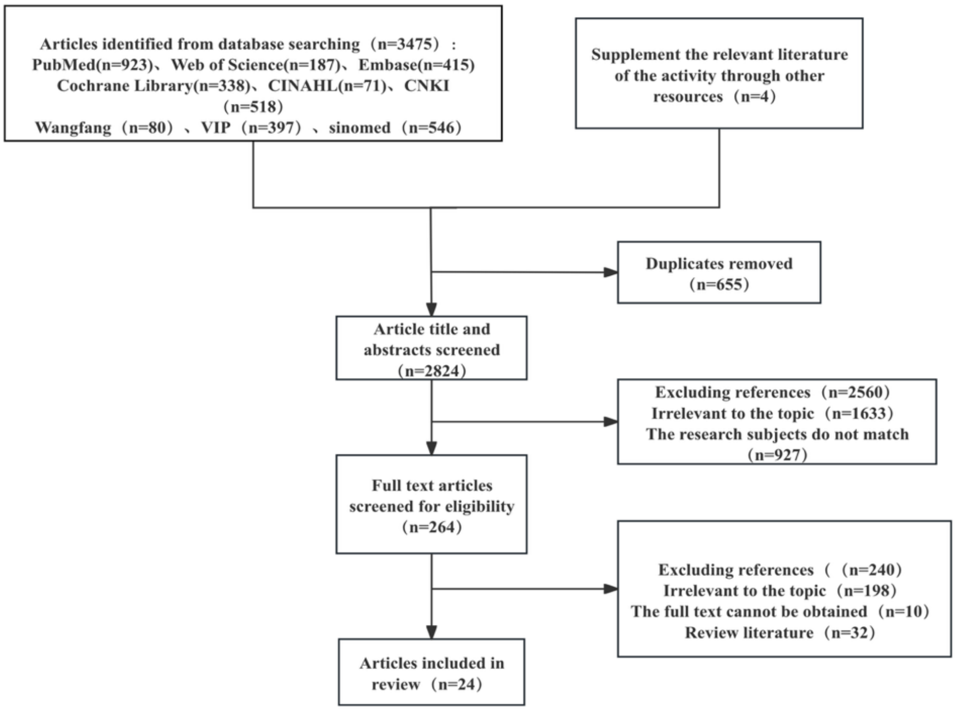

Figure 1. Flowchart of literature screening

3.2. Basic characteristics of included studies

The basic information of the included articles is shown in **Table 2**.

Table 2. Characteristics of the included studies

First author (year)	Country	Study population	Study design	Key findings related to caregivers' kinesiophobia
Molloy, 2006 [11]	United Kingdom	Caregivers (n = 60)	Randomized controlled trial (RCT)	After an unsupervised exercise intervention, caregiver burden increased, reflecting concerns about the safety of home-based exercise.
Piamjariyakul, 2012 [12]	United States	Caregivers (n = 17)	Qualitative study	Widespread lack of knowledge about safe exercise; caregivers need specific, repeatable home-exercise guidance.
Bahrami, 2014 [13]	Iran	Caregivers (n = 19)	Qualitative study	Difficulty obtaining care/exercise information and knowledge deficits → cognitive uncertainty and anxiety.
Etemadifar, 2014 [14]	Iran	Caregivers (n = 100)	Randomized controlled trial (RCT)	Supportive education (including exercise guidance) can reduce caregiver burden.
Etemadifar, 2015 [15]	Iran	Caregivers (n = 21)	Qualitative study	Caregiver uncertainty and hypervigilance (e.g., frequent monitoring) were prominent.
Wingham, 2015 [16]	United Kingdom	Caregivers (n = 26)	Qualitative study	Core need: safety-threshold information such as exercise type/intensity and "when it's too much".
Cameron, 2016 [17]	Australia	Caregivers (n = 12)	Qualitative study	Caregivers viewed fatigue and inactivity as barriers to self-care, shaping attitudes toward activity.
He Jie, 2016 [18]	China	Caregivers (n = 14)	Qualitative study	Lack of care knowledge is a core source of caregiver burden, providing background for uncertainty in exercise management.
Wingham, 2017 [19]	United Kingdom	Caregivers (n = 22)	Qualitative study	"Distress / fear of the future" drove hypervigilance and role conflict.
Sedlar, 2020 [20]	Slovenia	Caregivers (n = 21)	Qualitative study	Low confidence in physical activity; unwilling to encourage activity; arguments with patients about activity.
Zhang Yu, 2021 [21]	China	61 caregiver–patient dyads	Quantitative survey	Higher heart-failure knowledge was associated with stronger caregiving contribution/capacity ($\beta = 0.522$).
Schutz, 2022 [22]	United Kingdom	Caregivers (n = 17)	Qualitative study	Knowledge deficits → fear in emergency situations; physical activity was generalized as a potential risk.
Fox, 2022 [9]	Canada	Caregivers (n = 16)	Qualitative study	Vague guidance fostered the belief that "rest is better than activity", which can conflict with patients' desire to be active.
Birtwistle, 2022 [23]	United Kingdom	6 dyads	Longitudinal qualitative study	Fear of relapse → restricting activity; inadvertently promoting sedentary behavior and triggering family conflict.
Najjar, 2022 [24]	Canada	Family members (n = 23)	Questionnaire survey	26.1% believed early activity is risky; most were willing to participate but lacked training.
Purcell, 2023 [25]	United Kingdom	Caregivers (n = 56)	Mixed-methods	REACH-HF (including caregiver resources) improved patient HRQOL and self-care, suggesting empowerment may reduce barriers.
Clements, 2023 [26]	United States	37 dyads	Randomized controlled trial (RCT)	Caregiver education improved perceived control/knowledge; improved patient self-care and reduced 30-day readmissions.
Li Fei, 2024 [27]	China	Caregivers (n = 10)	Qualitative study	Lack of knowledge about when/how to do home-based exercise rehabilitation → activity avoidance and restriction.
Marzban, 2024 [28]	Iran	Caregivers (n = 91)	Quasi-experimental study	Emotional Freedom Techniques (EFT) reduced anxiety and caregiver burden.
Wu, 2024 [29]	China	16 dyads	Qualitative study	Skill deficits and reliance on intuitive caregiving → helplessness/fear; supporting exercise became a barrier to caregivers' self-care.
Alaei, 2024 [30]	Iran	Caregivers (n = 90)	Randomized controlled trial (RCT)	COPE supportive education reduced caregiver burden and improved quality of life.
Noonan, 2024 [31]	United Kingdom	Caregiver involvement (n = 117)	Pooled analysis of randomized trials	In home-based rehabilitation, caregiver involvement was associated with greater improvements in patients' HRQOL.
Can, 2025 [32]	China	118 dyads	Retrospective cohort study	Integrated medical–nursing–family training for family members to support exercise rehabilitation led to better patient outcomes than usual care.
Tsami, 2025 [33]	Greece	340 dyads	Cross-sectional study	Caregiver anxiety (79.1%) and depression (60.9%) were associated with poorer patient quality of life.

Note: HRQOL = health-related quality of life; EFT = emotional freedom techniques; Supportive education frameworks such as COPE = Creating Opportunities for Parent Empowerment Model.

3.3. Evidence mapping and thematic synthesis

By comprehensively incorporating the research, the evidence related to exercise fear among the main caregivers of CHF can be summarized as antecedents. Performance; Consequence; The logical chain of intervention/support requirements. The themes and representative evidence are shown in **Table 3.**

Table 3. Comprehensive themes

Theme	Connotation and key manifestations	Source of evidence	Revelation
Theme 1: Knowledge gaps in exercise prescription / safety thresholds	Lack of guidance on exercise intensity and symptom recognition; missing specific advice on "whether to exercise / how much / when to seek care"; often receive vague recommendations.	[9,12,13,15,16,18,20,22,24,27,29]	Prioritize providing actionable exercise prescriptions and contingency plans; standardize discharge education with consistent messaging.
Theme 2: Emotional burden and uncertainty	Unpredictable disease course, feeling powerless to handle acute episodes, and persistent anxiety/depression/distress coupled with responsibility pressure.	[11,13,15,16,18–20,22,23,27–29,33]	Routinely screen caregivers for emotional distress; integrate psychological support into the rehabilitation support package.
Theme 3: Substitute fear-of-movement beliefs (risk overestimation)	Link patient activity to consequences such as rehospitalization or sudden death; develop beliefs like "rest is better than activity" and "the patient is very fragile".	[9,19,22–24]	Interventions should focus on risk communication and boosting self-efficacy, correcting catastrophic interpretations and misconceptions.
Theme 4: Behavioral externalization—overprotection or avoidance of supporting exercise	Restrict activity, over-monitor, and take over tasks; or avoid prompting/assisting activity due to low confidence.	[9,15,16,19,20,23,24]	Use behavioral goals and family negotiation to promote "moderate support", avoiding fear-driven restrictions.
Theme 5: Consequences—dyadic conflict and poorer patient outcomes	Disputes over "whether/how to exercise"; reduced activity, more sedentary behavior, and declines in adherence and quality of life.	[9,20,23,33]	Adopt dyadic interventions to establish shared goals and role division.
Theme 6: Evidence for intervention/support strategies	Structured education (including exercise modules), home-based rehabilitation empowerment (caregiver manuals/ resources), and psychological support (e.g., EFT).	[14,25,26,28,30–32]	Future interventions should directly measure caregivers' fear of movement and include long-term follow-up.

3.3.1. Cognitive antecedents: Information gaps and uncertainty

Multiple studies consistently indicate that the most prominent difficulty for caregivers is not "whether they are willing to support exercise", but rather a lack of the ability to translate abstract recommendations into actionable plans: they do not know "whether the patient can exercise, how much exercise is safe, and which symptoms necessitate stopping or seeking medical attention" [12,16,22]. When healthcare professionals provide overly general exercise advice (e.g., "be more active but don't overdo it"), caregivers are more inclined to adopt "rest is safer" as a default strategy [9]. This information uncertainty provides the cognitive groundwork for subsequent risk overestimation and fear beliefs.

3.3.2. Affective antecedents: Emotional burden and responsibility pressure

The fluctuating disease course and readmission risk in patients with CHF keep caregivers in a state of prolonged vigilance. Some studies report a high prevalence of anxiety and depression among caregivers, along with persistent worries such as "inability to cope with acute episodes" and "fear of making wrong decisions" [22,33]. This emotional burden interacts with cognitive uncertainty, readily triggering catastrophic interpretations: viewing physical activity as a high-risk event that may "precipitate acute episodes", thereby fostering vicarious kinesiophobia.

3.3.3. Conceptual features: Vicarious and responsibility-laden fear of movement

Unlike the fear experienced by patients based on somatic sensations, caregiver kinesiophobia primarily stems from risk imagination concerning the "other" (the patient) and the responsibility for decision-making consequences. Its core is not "I will feel pain/shortness of breath if I move", but rather "Will something happen to him/her if he/she moves, and will I be held responsible if it does?" Consequently, caregivers often associate physical activity scenarios with their ability to handle medical emergencies: in the absence of contingency plans and professional support, fear is more likely to generalize to routine physical activities [19,22]. This characteristic suggests that caregiver kinesiophobia needs to be recognized and addressed as an independent concept.

3.3.4. Behavioral manifestations and dyadic consequences

Caregiver fear often manifests behaviorally: restricting patients from going out and exercising, taking over daily activities, excessively monitoring vital signs, or avoiding encouraging patient activity due to a lack of confidence [15,16,19,23,24]. When patients are willing to be active but caregivers insist on rest, disputes easily arise around "whether to be active and how to be active" and patient resistance to care may even occur [9,20]. At the patient level, prolonged restriction can promote a sedentary lifestyle and reduce rehabilitation adherence, which is subsequently associated with a decline in quality of life [23,33].

3.3.5. Intervention and support strategies

Current intervention studies suggest three relatively consistent strategies:

(1) Structured education and supportive programs (e.g., COPE) reduce caregiver burden and improve quality of life by enhancing knowledge and perceived control [14,26,30];

(2) Integrating caregivers into home-based cardiac rehabilitation and providing instrumental resources (e.g., the REACH-HF caregiver manual) can help transform caregivers from restrictors into facilitators and improve patients' HRQOL [25,31,32];

(3) Psychological interventions targeting anxiety (e.g., Emotional Freedom Techniques) can alleviate negative emotions and burden in the short term [28]. However, overall, the number of intervention studies is limited, and most have not considered "caregiver kinesiophobia" as a primary outcome. Higher-quality, dyadic intervention trials specifically targeting fear are still needed in the future.

4. Discussion

4.1. Addressing caregiver kinesiophobia and enhancing discharge education and care preparedness

A lack of nursing knowledge constitutes the cognitive foundation for caregiver kinesiophobia. On one hand, caregivers for heart failure patients are often elderly spouses or retired family members, who generally have lower educational levels and health literacy [34,35]. Their ability to acquire and comprehend information is relatively limited, making them more reliant on face-to-face explanations from healthcare professionals and peer experience sharing. When healthcare providers offer only brief instructions without providing structured, visual educational content, caregivers struggle to translate abstract guidance into concrete, feasible exercise plans.

Consequently, they are more prone to confusion and uncertainty regarding physical activity [22]. On the other hand, the current healthcare system remains patient-centered, often marginalizing caregivers. The information they receive is fragmented and lacks specific operational guidance tailored to their caregiving role. This results in caregivers facing a dual challenge of insufficient knowledge and ambiguous information in managing patient exercise, thereby providing a cognitive basis for the development of kinesiophobia [36,37]. Previous studies suggest that implementing nurse-led health education for both heart failure patients and their caregivers, utilizing methods such as chart-based materials, tiered explanations, plain language combined with the "teach-back" method, supplemented by post-discharge home visits and telephone follow-ups, can significantly improve disease knowledge, promote self-management behaviors, and reduce readmission rates and caregiver burden [38,39]. Therefore, it is recommended that primary caregivers be integrated into standardized educational processes within discharge planning and follow-up systems. Simplified, visual, and user-friendly exercise education materials should be designed for populations with low health literacy, with reinforcement and individualized guidance provided through various follow-up methods. Concurrently, it is advisable to provide homogeneous training for healthcare professionals to ensure consistent and detailed information delivery across different personnel and time points [40].

4.2. Identifying and intervening in caregivers' negative beliefs regarding patient exercise

The core beliefs of primary caregivers concerning patient exercise are fear and worry. Studies indicate that caregivers commonly perceive patients as fragile individuals and are highly sensitive to physiological responses following patient activity [35,41]. They worry that exercise may trigger acute exacerbations, readmissions, or even sudden death [42]. Consequently, they tend to adopt care strategies emphasizing rest, and their attitudes towards patient exercise gradually shift from support to excessive caution or even avoidance [43]. Research by Birtwistle also found that approximately one-quarter of family members considered it dangerous for patients to resume activity too early, with this concern being a significant factor in caregivers restricting patient participation [23,44]. On one hand, caregivers' lack of systematic exercise knowledge leads them to overestimate the risks and underestimate the benefits of exercise, resulting in erroneous judgments about its safety [45]. On the other hand, caregivers of heart failure patients exhibit a high prevalence of anxiety and depression and low levels of self-efficacy [46]. The interaction between negative emotions and low self-efficacy makes it more difficult for them to believe in their own ability to identify and manage exercise-related risks, thus viewing restriction of patient activity as the most controllable strategy [47]. Based on this, clinical practice could provide caregivers with clearer, more actionable support for exercise management. Developing exercise management tools for caregivers, such as decision flowcharts or mobile applications, while clarifying key decision points like whether exercise is permissible, how much is appropriate, and when to seek medical attention, could enhance their judgment capabilities in the home environment [48]. Research indicates that the period of 1 to 3 months post-discharge is a critical window for changes in caregiver self-efficacy and emotional state. Providing targeted psychological support and exercise guidance during this period may be more effective in breaking the vicious cycle between anxiety, low self-efficacy, and overprotection [47].

4.3. Focusing on the characteristics and impact of caregiver kinesiophobia and exploring multimodal intervention models

Compared to patients' own kinesiophobia, caregiver kinesiophobia shares commonalities but also exhibits distinct differences in its etiology. Research by Li Xinwen indicates that patient fear stems from concerns about disease recurrence and risks associated with comorbidities [40]. Liu Jianping further points out that kinesiophobia in heart failure patients often originates from their negative experiences of bodily sensations [49]. In contrast, caregiver kinesiophobia manifests more as a vicarious characteristic. Although caregivers do not directly experience the symptoms, they must make risk decisions for patients in situations of uncertainty. A strong sense of responsibility coupled with fear of making erroneous decisions constitutes a unique pressure for caregivers, a dimension less emphasized in studies focused on patients [50]. Therefore, attention should be paid to the specific characteristics of caregiver kinesiophobia. Intervention programs should incorporate psychological support components, utilizing supportive measures such as emotional expression and stress management to alleviate their vicarious responsibility pressure [28]. Existing research also indicates that comprehensive intervention models combining health education, psychological support, and peer support groups can reduce caregiver burden and psychological stress, suggesting that integrating emotional and cognitive approaches should be considered when developing interventions for caregiver kinesiophobia.

Based on the aforementioned differences, the impact of caregiver kinesiophobia exhibits multi-level characteristics. At the individual level, prolonged states of vigilance exacerbate the psychological burden on caregivers. For instance, Wingham’s study found that caregivers with higher levels of kinesiophobia often exhibited more monitoring behaviors and greater subjective fatigue [19]. For patients, this fear can easily externalize as restrictive behaviors, such as excessively taking over daily activities, limiting outings, and restricting participation in social activities, leading to insufficient physical activity and decreased adherence to cardiac rehabilitation [49]. When caregivers unconsciously assume the role of restrictor, even if patients themselves have the willingness to be active, they struggle to gain support, and their motivation to exercise subsequently diminishes [40]. At the dyadic relationship level, when patients desire to maintain function through exercise while caregivers insist on rest, family conflicts can easily arise, undermining the capacity for collaborative disease management [9,20]. Therefore, it is recommended that caregivers be included in exercise planning and follow-up to enhance family consensus on exercise goals and consistency in implementation.

4.4. Current research limitations and implications for future studies

Compared to international research, studies on kinesiophobia in China started relatively late, necessitating increased awareness of this issue among Chinese healthcare professionals. Current research is limited by small sample sizes, short follow-up periods, and a lack of multicenter randomized controlled trials (RCTs). Future studies should conduct large-sample, long-term follow-up RCTs to verify the stability and generalizability of intervention effects [51]. Secondly, there is insufficient application of digital tools. Although virtual reality and mobile health (mHealth) have been proven useful for safe simulation and individualized support their development specifically for the context of caregiver kinesiophobia remains inadequate [52]. The application of digital technology in cardiac rehabilitation is more mature and effective abroad. Future research could draw on international experience while addressing issues such as standardizing application market management and ensuring data accuracy and security, to improve patient exercise adherence [40]. Finally, there is a lack of specific assessment tools. Current reliance on scales for anxiety, depression, or caregiver burden makes it difficult to accurately measure the core features of kinesiophobia. Future efforts should focus on developing and validating a kinesiophobia scale specifically for caregivers of heart failure patients to improve screening accuracy and provide standardized outcome measures for intervention studies.

5. Conclusion

This study elucidates the manifestations and influencing mechanisms of kinesiophobia among primary caregivers of patients with chronic heart failure, providing a reference for developing targeted interventions. Currently, the crucial role of physical activity in promoting health and disease management is widely recognized. Future research should focus on the heterogeneity within the caregiver population, conduct longitudinal studies to verify the actual effects of different interventions, and further optimize rehabilitation support strategies for caregivers.

Disclosure statement

The authors declare no conflict of interest.

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