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The Scope Review of Kinesiophobia in Patients with Chronic Obstructive Pulmonary Disease

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Abstract: *Objective:* To review the current status of research on kinesiophobia, assessment tools, influencing factors, and intervention strategies in patients with chronic obstructive pulmonary disease, aiming to provide a reference for promoting pulmonary rehabilitation in these patients. *Methods:* A scoping review framework was employed to search databases including CNKI, Wanfang, VIP, China Biology Medicine (CBM), PubMed, Web of Science, and Wiley Online Library. The search time frame spanned from the database inception to May 20, 2024. Two researchers independently screened the literature, summarized, and analyzed the data. *Results:* A total of 18 articles were included. Commonly used assessment tools included the Tampa Scale for kinesiophobia and the dyspnea beliefs questionnaire. Influencing factors encompassed demographic, disease-related, psychosocial, and BMI-related factors. Intervention methods included inspiratory muscle training, narrative nursing, and cognitive interventions combined with active cycle of breathing techniques. *Conclusion:* The incidence of kinesiophobia in COPD patients is relatively high and varies among individuals, influenced by multiple factors. There is a need to develop localized assessment tools to identify kinesiophobia in a timely and accurate manner and to further refine intervention strategies.

Keywords: Chronic Obstructive Pulmonary Disease; Kinesiophobia; Scoping review

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1. Introduction

Chronic Obstructive Pulmonary Disease (COPD) is an irreversible respiratory disease characterized by airflow limitation. In recent years, the prevalence of COPD has been gradually increasing. According to statistics, the prevalence rate among individuals aged 40 and above in China is as high as 13.7%, with a total affected population approaching 100 million [1]. Guidelines identify exercise as a core component of pulmonary rehabilitation for COPD patients [2]. Studies have demonstrated that regular exercise can improve lung function and daily activity capacity in COPD patients while reducing the frequency of acute exacerbations, rehospitalization rates, and mortality [3–5]. However, kinesiophobia has become a significant barrier to COPD

patients' participation in pulmonary rehabilitation, leading to a decline in functional capacity, reduced physical activity, and a diminished quality of life [6–11].

Kinesiophobia was first proposed by Kori in 1990, defined as "an excessive, irrational fear of physical activity or movement due to the anticipation of pain or injury, resulting in heightened pain sensitivity" [12]. In 2012, Chinese scholar Hu translated it [13]. Currently, research on kinesiophobia in COPD patients is limited, primarily focusing on cross-sectional surveys of risk factors, with assessment tools lacking specificity, and few interventions aimed at preventing or alleviating kinesiophobia in these patients. This study aims to review domestic and international research on kinesiophobia in COPD patients, providing a reference for healthcare professionals to more accurately identify kinesiophobia and develop effective interventions, thereby improving patients' quality of life.

2. Materials and methods

2.1. Defining research questions

(1) What is the current status of kinesiophobia in COPD patients?

(2) What assessment tools are used?

(3) What are the influencing factors?

(4) What are the current intervention measures?

2.2. Literature inclusion and exclusion criteria

The Inclusion criteria were as such: (1) Studies involving COPD patients as the research subjects; (2) Studies related to kinesiophobia; (3) Original research; and (4)Studies published in Chinese or English.

The exclusion criteria included: (1) Duplicate publications; and (2) Full text unavailable.

2.3. Search strategy

Databases searched included CNKI, Wanfang, VIP, China Biology Medicine (CBM), PubMed, Web of Science, and Wiley Online Library. The search time frame spanned from the database inception to May 20, 2024. Taking PubMed as an example, a combination of MeSH terms and free-text keywords was employed. The search strategy are shown in **Table 1**.

Table 1. Retrieval strategies based on Pub Med

ID	Search Terms	Results
#1	"pulmonary disease, chronic obstructive"[MeSH Terms]	71163
#2	"pulmonary disease, chronic obstructive"[MeSH Terms] OR "chronic obstructive pulmonary diseases"[Title/Abstract] OR "COPD"[Title/Abstract] OR "chronic obstructive lung disease"[Title/Abstract] OR "chronic obstructive pulmonary disease"[Title/Abstract] OR "COAD"[Title/Abstract] OR "chronic obstructive airway disease"[Title/Abstract] OR "airflow obstruction chronic"[Title/Abstract] OR "airflow obstructions chronic"[Title/Abstract] OR "chronic airflow obstructions"[Title/Abstract] OR "chronic airflow obstruction"[Title/Abstract]	114284
#3	"Kinesiophobia"[MeSH Terms]	159
#4	"Kinesiophobia"[MeSH Terms] OR "pain related activity avoidance"[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]	1017
#5	#2 AND #4	11

2.4. Literature screening and data extraction

The retrieved literature was imported into EndNote 20 for deduplication. Two trained nursing graduate students independently screened the titles and abstracts based on inclusion and exclusion criteria. Full texts of the selected articles were then reviewed for a second screening. In cases of disagreement, a third researcher was consulted to make the final decision on inclusion. The researchers extracted data including the author, year, country, study type, sample size, intervention duration, outcome measures, and research themes.

3. Results

3.1. Literature screening results

A total of 143 articles were retrieved, and 18 were ultimately included, consisting of 8 Chinese articles and 10 English articles. The literature screening process is illustrated in **Figure 1**.

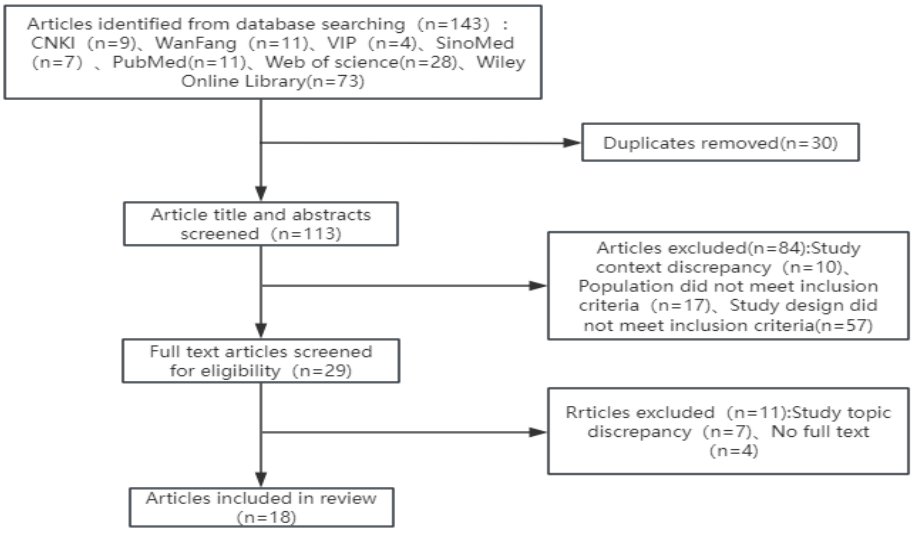

Figure1. Literature screening process

3.2. Basic characteristics of included studies

The 18 included studies were conducted in five countries: Turkey, China, India, Japan, and Belgium [8,10,11,14–28]. The basic characteristics of these studies are summarized in **Table 2**.

Table 2. Characteristics of the included studies

Author	Year	Country	Study design	Study sample(Intervention groups/Comparison groups)	Duration of intervention
Liu *et al.* [17]	2020	China	Cross-sectional	31/31	—
Liang *et al.* [18]	2023	China	Cross-sectional	216	—
Liang *et al.*[19]	2023	China	Longitudinal study	220	—
Bayraktar *et al.* [11]	2023	Turkey	Cross-sectional	70	—
Vardar-Yagl *et al.* [14]	2019	Turkey	Cross-sectional	31/31	—
Wang *et al.* [20]	2023	China	Cross-sectional	233	—

Table 2 (Continued)

Author	Year	Country	Study design	Study sample(Intervention groups/Comparison groups)	Duration of intervention
Mankar *et al.* [10]	2023	India	Cross-sectional	60	—
Tanaka *et al.* [28]	2022	Japan	Prospective cohort	68/65	—
Li *et al.* [21]	2023	China	Cross-sectional	103	—
Liang *et al.* [22]	2023	China	Longitudinal study	240	—
Wang *et al.* [23]	2022	China	Cross-sectional	207	—
Ru *et al.* [24]	2023	China	Cross-sectional	195	—
Peuter *et al.* [15]	2012	Turkey	Cross-sectional	187	—
Janssens *et al.* [8]	2011	Belgium	Longitudinal study	73	—
Saka *et al.* [16]	2021	Turkey	RCT	20/20	8 weeks, 2 times/day, 5 days/week
Su *et al.* [25]	2023	China	RCT	30/27	8 weeks, 2 times/day, 5 days/week
Zhang *et al.* [26]	2023	China	RCT	38/38	2–3 days, 6–7 days, 9–10 days after admission and 4 weekends after discharge
Cai *et al.* [27]	2024	China	RCT	53/53	8 weeks

Author	Evaluation index	Aims
Liu *et al.* [17]	(1)(2)(3)(4)	To evaluate the degree of motion phobia in patients with COPD, and to investigate the related factors of motion phobia in patients with COPD
Liang *et al.* [18]	(1)(2)(4)(5)	To explore the development trajectories of exercise fear and its influencing factors in COPD patients
Liang *et al.* [19]	(1)(2)(3)(4)(5)	To determine differences in kinesiophobia levels among COPD patients at different time points 6 months after discharge; To identify potential subgroups of COPD patients who perceived different levels of kinesiophobia over time; and to evaluate differences in identified subgroups based on demographic and disease-related characteristics
Bayraktar *et al.* [11]	(1)(2)(4)(5)(6)(8)	To determine the related factors with breathlessness beliefs
Vardar-Yagli *et al.* [14]	(1)(2)(3)(4)	To assess levels of kinesiophobia among stable COPD patients and evaluate the relationship between kinesiophobia and pain and fatigue severity, dyspnea level, and comorbidities in this patient group
Wang *et al.* [20]	(1)(8)	To assess the status of dyspnea-related kinesiophobia in people with COPD, and investigate its impact on PA levels, further examine the mediated moderation effects of exercise perception and social support on this relationship
Mankar *et al.* [10]	(1)(2)	To assess kinesiophobia related to dyspnea in patients with chronic respiratory diseases and investigate its correlation with environmental constraints
Tanaka *et al.* [28]	(1)(3)(6)	To describe the multifaceted impact of chronic pain on cognition, emotional and physical health in people with COPD and to explore the clinical impact of pain
Li *et al.* [21]	(1)(7)	To explore the level of pulmonary rehabilitation behavior perception and its influencing factors in stable COPD patients
Liang *et al.* [22]	(1)(2)(4)	To explore the potential categories and influencing factors of fatigue trajectory in patients with COPD

Note: RCT, Randomized Controlled Trial; (1)kinesiophobia related indicators; (2)dyspnea; (3)pain level; (4)fatigue severity; (5)lung function and course; (6)psychological status; (7)sports self-efficacy; (8)social support; (9)disease-related health outcomes.

3.3. The status of kinesiophobia in patients with COPD

Five studies found that kinesiophobia is relatively common among COPD patients [14,17,18,20,28]. A study involving 233 COPD patients revealed that all participants experienced dyspnea-related kinesiophobia [20]. Another study reported that the average kinesiophobia score in COPD patients was significantly higher than that in the healthy group, with a statistically significant difference ($P < 0.001$) [14]. Notably, around 90.3% of COPD patients exhibited high levels of kinesiophobia, particularly those with moderate to severe disease. Tanaka *et al.* followed up with 68 COPD patients and found that 67% of participants had high levels of kinesiophobia [28]. Additionally, a study categorized the trajectories of kinesiophobia in COPD patients into low (25.5%), moderate (46.8%), and high (27.7%) latent classes and compared kinesiophobia levels at different time points [18]. The results showed that most patients experienced a significant decline in kinesiophobia levels during the first six months after discharge [18,19]. Nurses can develop targeted interventions based on patients' kinesiophobia trajectories and influencing factors to reduce their fear of movement. Janssens *et al.* found that higher baseline levels of dyspnea-related fear were significantly associated with activity limitation [8]. In summary, while the incidence of kinesiophobia in COPD patients varies, it is generally high. Over time, the level and incidence of kinesiophobia may change, but this phenomenon persists, indicating that the current status of kinesiophobia in COPD patients remains concerning and warrants heightened attention from healthcare providers and researchers.

3.4. Assessment tools for kinesiophobia in COPD patients

3.4.1. Tampa Scale of Kinesiophobia (TSK)

Studies used the TSK to assess kinesiophobia in COPD patients [14,17-19,22,24,28]. The TSK was developed by Kori in 1990 and is the most widely used tool for assessing kinesiophobia across various diseases [12]. It has been adopted by researchers in multiple countries and results consistently demonstrate its good psychometric properties. The TSK includes four dimensions: fear avoidance, work activity fear, kinesiophobia, and fear of re-injury. Higher scores indicate greater levels of kinesiophobia. In 2012, Hu translated the TSK into Chinese and validated it in patients with degenerative lumbar and leg pain, reporting a Cronbach's α coefficient of 0.778 and good reliability and validity [13].

3.4.2. Breathlessness Beliefs Questionnaire (BBQ)

Studies used the BBQ to assess kinesiophobia in COPD patients [8,10,11,15,16,20,21,23,25,27]. The BBQ consists of two dimensions: fear of breathlessness (BBQ-SF, 5 items) and fear of activity (BBQ-AA, 6 items). A score ≥ 33 indicates stronger fear of breathlessness and activity. Wu *et al.* translated the BBQ into Chinese in 2015, reporting a Cronbach's α coefficient of 0.81 and good reliability and validity [29]. This scale helps in understanding patients' fears and assists healthcare providers in addressing psychological factors in treatment.

3.5. Influencing factors

Nine studies reported factors influencing kinesiophobia in COPD patients [11,14,17–21,23,24].

3.5.1. Demographic factors

Elderly patients are more prone to kinesiophobia, likely due to poorer physical and lung function, leading to excessive concern about movement [18,19]. Female patients exhibit higher levels of kinesiophobia, possibly because women are more susceptible to negative emotions and external influences that lead to psychological

and behavioral changes [19]. Patients with lower education levels generally have poorer health literacy and compliance, resulting in higher kinesiophobia levels [18,19]. Healthcare providers should therefore focus on patients with lower education levels, providing health education and appropriate exercise plans. Unmarried patients, lacking spousal support and emotional expression, exhibit significantly higher fear levels than married patients [20]. Healthcare providers should strengthen the assessment of kinesiophobia in patients with these factors and offer personalized guidance to help patients better cope with fear during exercise.

3.5.2. Disease-related factors

Studies showed that higher levels of dyspnea correlate with higher levels of kinesiophobia [11,17–20]. Dyspnea causes airflow limitation, hypoxia, subjective fatigue, and pain, reducing patients' exercise capacity and leading to kinesiophobia. Fatigue severity is positively correlated with kinesiophobia levels, as fatigue decreases patients' willingness and ability to exercise, further increasing fear [14,17–20,22]. Fatigue severity also increases with dyspnea-related kinesiophobia [11]. This suggests that healthcare providers can assess patients' dyspnea and fatigue levels to provide targeted exercise guidance and timely interventions to reduce kinesiophobia. Pain is prevalent among COPD patients, with severity higher than in healthy individuals, significantly impacting kinesiophobia levels [17]. Pain can lead to resistance to exercise, affecting participation and effectiveness in pulmonary rehabilitation programs[17–19]. Healthcare providers should promptly assess patients' pain levels and cognitions and implement measures to alleviate pain, thereby reducing kinesiophobia.

Additionally, lung function grading and disease duration influence kinesiophobia [18,19]. Patients with higher lung function grades experience severe airflow obstruction, further limiting exercise and worsening disease prognosis, leading to kinesiophobia [14]. Patients with longer disease durations exhibit higher kinesiophobia levels, as prolonged illness increases physiological burden and negative perceptions of the disease, leading to exercise avoidance and heightened kinesiophobia [18,30]. Therefore, healthcare providers should provide psychological counseling, help patients develop positive rehabilitation perceptions, overcome fear, and enhance confidence in exercise rehabilitation.

3.5.3. Psychosocial factors

Lower exercise self-efficacy is associated with higher kinesiophobia levels [21,23,24]. Patients with higher dyspnea-related kinesiophobia may experience more depression and anxiety, and vice versa [11,15]. Increased social support can mitigate the negative effects of dyspnea-related kinesiophobia [20]. Thus, healthcare providers should focus on patients' negative emotions and social support, helping them improve exercise self-efficacy and motivation to enhance pulmonary rehabilitation outcomes.

3.5.4. Decreased physical activity

Physical activity levels negatively predict kinesiophobia. In Janssens *et al.* study, higher dyspnea-related kinesiophobia was positively correlated with activity limitation, as COPD patients experiencing exercise-related dyspnea develop kinesiophobia [18]. Moreover, patients with higher kinesiophobia levels tend to engage in less physical activity, creating a vicious cycle [10]. Therefore, clinical nurses should pay special attention to COPD patients with low activity levels or lack of exercise habits, educate them on the positive effects of activity, and provide appropriate exercise recommendations to gradually reduce kinesiophobia and promote recovery.

3.5.5. BMI

Patients with abnormal BMI may experience physiological, psychological, and cognitive dysfunction due to obesity or malnutrition, making them more prone to kinesiophobia than those with normal BMI [18,27]. Healthcare providers should encourage exercise and develop reasonable dietary plans to alleviate kinesiophobia and restore physical and mental health.

3.6. Intervention strategies for kinesiophobia in patients with COPD

3.6.1. Inspiratory muscle training (IMT)

Two studies applied Inspiratory muscle training (IMT) [16,28]. The results showed that IMT can reduce the perception of dyspnea and dyspnea-related kinesiophobia in COPD patients, alleviate anxiety and depressive symptoms, and improve exercise capacity and quality of life. Therefore, IMT will become a key point in enhancing the efficiency of pulmonary rehabilitation programs.

3.6.2. Narrative nursing

One study applied narrative nursing and he results showed a statistically significant difference in BBQ-AA scores before and after the intervention [26]. Narrative nursing helped patients recognize the benefits of scientific exercise, alleviated kinesiophobia, enhanced patients' confidence, improved their adherence to exercise, and had a lasting effect.

3.6.3. Cognitive intervention combined with Active Cycle of Breathing Techniques (ACBT)

One study reported the intervention effects of cognitive intervention combined with ACBT based on the fear-avoidance model [27]. Cognitive intervention can help patients avoid excessive focus on dyspnea, better coordinate inspiratory muscle movements, reduce dyspnea, and increase activity levels. ACBT includes breathing control, thoracic expansion exercises, and forced expiration techniques. Cognitive intervention combined with ACBT based on the fear-avoidance model significantly improved dyspnea-related kinesiophobia in moderate to severe COPD patients, with effects remaining significant over time. Additionally, this approach benefited dyspnea levels and quality of life, making it widely applicable in clinical practice.

4. Discussion

4.1. Strengthening attention, early identification, and prevention

Healthcare professionals should pay attention to the impact of psychological factors on patients' pulmonary rehabilitation and quality of life. It is recommended to include kinesiophobia in the routine assessment of COPD patients for early identification and intervention. Additionally, healthcare professionals should strengthen attention to high-risk patients, manage the prevention of kinesiophobia, and develop intervention methods targeting influencing factors.

4.2. Developing localized assessment tools and standardizing criteria

Currently, common assessment tools for kinesiophobia in COPD patients include TSK and BBQ, but there is a lack of localized tools. The classification of kinesiophobia levels and the dimensional variations of the same scale in different cultural contexts lead to differences in the measured levels of kinesiophobia, making

it difficult to draw reliable conclusions. Studies reported high rates of kinesiophobia ranging from 27.7% to 90.3%, which may be related to unrepresentative samples or inconsistent measurement tools and criteria [14,18,28]. Future research could focus on developing assessment tools tailored to different groups and conforming to Chinese culture to improve comparability and accuracy of results.

4.3. Need to enrich intervention strategies for kinesiophobia in COPD patients

The existing intervention methods have the following shortcomings: small sample sizes, insufficient intervention duration, lack of long-term follow-up, and focus limited to the hospital setting [16, 25–27]. COPD patients spend far more time in their homes and communities than in hospitals. Future research could focus on home and community-based interventions, utilizing social resources for diversified approaches. Peer support can enhance self-management, improve breathing, and enhance quality of life in COPD patients [31] . Establishing communication platforms can facilitate patient interactions, alleviate anxiety, improve the perception of exercise benefits, and increase exercise motivation. Family members should provide more support for exercise and encourage patients. Community health workers should actively conduct health education, guide patients and their families, and cultivate healthy lifestyles to improve functional capacity.

Additionally, virtual reality technology can improve lung function, exercise endurance, cognitive function, and alleviate negative emotions in COPD patients [32]. Meta-analysis suggests that virtual reality technology may reduce kinesiophobia levels, especially when combined with exercise, indicating its potential as an auxiliary tool in rehabilitation [33]. For example, setting exercise reminders, tracking and supervising patients' exercise, and developing related games to enhance patient motivation. Future studies could apply virtual reality technology to diverse COPD populations to clarify its relationship with the disease and develop appropriate intervention strategies to better meet patient needs. Relaxation therapy can help control kinesiophobia in chronic respiratory disease patients and improve quality of life, but its effectiveness in COPD patients requires further validation [34]. Attention should also be paid to the timing of interventions to maximize their effects.

5. Conclusion

In conclusion, kinesiophobia is prevalent among COPD patients, and its contributing factors and mechanisms are diverse. In addition to the above, the attitudes of healthcare professionals toward kinesiophobia should also be considered. Moreover, the available assessment tools in China are limited. Future research could focus on developing localized tools based on existing ones to more accurately assess kinesiophobia levels in this population, providing scientific support for in-depth research in this field. Finally, more evidence and research are needed to support the adverse effects of kinesiophobia on the physical and mental health and quality of life of patients. This reminds healthcare professionals to consciously identify risk factors for kinesiophobia in COPD patients, explore its influencing factors from multiple aspects and angles, and assess kinesiophobia levels before patients enter pulmonary rehabilitation programs for timely prevention. Multidisciplinary intervention strategies should also be considered, emphasizing the application of new technologies and evidence-based approaches to develop personalized rehabilitation plans for COPD patients. Family and community resources should be fully utilized to provide continuous care, with the aim of improving exercise rehabilitation literacy and participation rates in pulmonary rehabilitation among COPD patients with kinesiophobia.

Disclosure statement

The authors declare no conflict of interest.

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