
RESEARCH ARTICLE

The Mechanism of Pulmonary Rehabilitation Training on Social Participation in Elderly and Debilitating People

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ABSTRACT

Along with the population aging, more attention is focused on how to improve the quality of life of the frail elderly and improve their ability to participate in social activities. This study discussed the effects of pulmonary rehabilitation training on the social participation ability of the elderly through the literature review approach. We searched a series of relevant research literature from the keywords "pulmonary rehabilitation training", "frail elderly," and "social participation ability" and analyzed the selected academic databases. The results showed that pulmonary rehabilitation can significantly improve lung function and exercise tolerance, reduce asthma symptoms, improve quality of life, and consequently enhance social participation ability. These findings provide powerful evidence for the potential of pulmonary rehabilitation training in improving the social participation ability of the frail elderly, meanwhile providing a theoretical foundation for future research and practice.

KEYWORDS

Pulmonary rehabilitation training, frail elderly people, social participation ability

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1. Introduction

According to the report of the seventh population census of 2020 (National Bureau of Statistics, 2021), the proportion of the population of age 60 and above in China has reached 18.70%, among which the population of age 80 and above is 35.8 million, accounting for 2.54% of the total population. This figure increased by 14.85 million from 2010, an increase of 0.98 percentage points. With the increasing trend of population aging, life quality and social participation ability of the elderly have become increasingly prominent (CHARLS Data Forum, 2023). With the growth of age, the elasticity and compliance of the elderly's thoracic cage decline, as well as respiratory muscle atrophy and other problems increase their ineffective ventilation when they breathe, which is manifested in symptoms such as dyspnea (Dai & Huang, 2019). Studies have shown that the respiratory function of people over 80 years old declines by 50 percent as well, and fatigue increases, which affects their life quality and social participation ability. Geriatric experts generally believe that improving the life quality of the elderly and enhancing their social participation ability is an important research topic (Zhu et al., 2024), and pulmonary rehabilitation training as a possible solution deserves further study. If pulmonary rehabilitation training can effectively improve the respiratory function of the elderly, their life quality, and social participation ability, it will have a positive impact on solving problems caused by the aging population in China and even the world. By analyzing relevant studies, researchers can get a more comprehensive and in-depth understanding of the mechanisms and practical effects of pulmonary rehabilitation training in improving the life quality and social participation ability of the elderly. The goal of this paper is to clarify the impact of pulmonary rehabilitation training on the social participation ability of the frail elderly by reviewing and analyzing relevant studies, so as to provide theoretical basis and practical reference for subsequent studies.

2. Research Background

2.1 The Current Situation and Importance of the Social Participation Ability of the Frail Elderly

With the aging of the global population, improving the ability to participate in social activities for the elderly has become an urgent social problem. According to the data of the 2020 China Social Tracking Survey for the Elderly (CLASS), the participation rate of the elderly in China is low on the whole, and the types of activities involved are relatively single, usually family activities and the community and friendly relations are relatively weak (CHARLS Data Forum, 2023; Levasseur et al., 2010; Michalovic et al., 2020; Yang et al., 2020). Social participation has an important impact on the physical and psychological health of the elderly, which can improve the life satisfaction and happiness of the elderly, relieve mental pressure, and maintain good cognitive function (Li et al., 2018; Tian et al., 2024; P. Wang et al., 2024; Wei et al., 2023). Therefore, how to improve the social participation ability of the elderly and improve their physical and mental health in an effective way has become an important topic of academic and social concern.

Table 1 The participation in social activities of different groups of older people

group	participation rate (%)		group	participation rate (%)
Total sample	52.0		male	53.3
60~65 Years old	64.0	Gender grouping	female	50.8
66~70 Years old	57.3		Mean difference	-0.025**
71~75 Years old	48.4	Urban and rural groups	city	60.3
Age specific	46.5		rural area	40.9
76~80year	39.2		Mean difference	-0.194
81~85 Years old	32.4	Academic group	Primary school and below	46.0
Over 85 years old	32.4		junior middle school	63.3
Pearson Chi ²	303.777		High school and above	66.9
			Pe arson Chi2	287.720***

Table 1 shows that among the total sample, 52.0% of older adults participated in social activities. The social participation rate varied among different groups of elderly people, including younger elderly, older men, urban elderly, and those with high education levels.

3. Overview of The Pulmonary Rehabilitation Training

3.1 Elements of Pulmonary Rehabilitation Training

Pulmonary rehabilitation training is a non-pharmaceutical therapy that consists of five elements, including respiratory training, physical training, nutrition guidance, psychological guidance, and educational guidance (Peng et al., 2024). Specifically, respiratory training improves respiratory function by practicing different breathing techniques, and physical fitness training enhances lung and systemic endurance through aerobic exercise and muscle strength training (Wei et al., 2024). Nutrition guidance and psychological counseling help patients improve their nutritional status, adjust their mentality, and cope with diseases through professional nutrition and psychological counseling. Education guidance through training and education to help patients understand their own diseases and learn self-management.

3.2 Pulmonary Rehabilitation Training Methods Suitable for The Frail Elderly

Pulmonary rehabilitation training needs to be adjusted individually according to the physical condition of the frail elderly (Guo et al., 2023). This includes the specific method of respiratory training, the moderate amount of aerobic exercise and muscle strength training, and the importance of nutritional guidance and psychological counseling.

3.2.1 Respiratory Training Method

Breath training includes deep breathing, abdominal breathing, lip-lip breathing, etc. For example, the ratio of inhalation to exhalation time of lip contraction breathing time is 1:2 or 1:3, and practice 3-4 groups per day, 10-15 times per group; practice times and time of abdominal breathing, etc. (Chen et al., 2019; Li, 2021; Shen et al., 2024; Xu, 2021).

3.2.2 Exercise Training Methods

Exercise training includes aerobic exercise and strength training, specifically how to perform, such as the type, time, frequency, and intensity of aerobic exercise; the movement, number of sets, number of times, and frequency of strength training; and the method, time and frequency of balance training (Wei et al., 2024).

3.3 Implementation Principles and Precautions of Pulmonary Rehabilitation Training

The implementation principles of pulmonary rehabilitation training mainly include the principles of individuality, comprehensiveness, and continuity. Some matters need to be paid attention to in the implementation process, such as avoiding excessive training intensity. Regularly evaluate the training effects and timely adjust the training program (Chen et al., 2023; Hanania & O'Donnell, 2019).

To sum up, as a non-pharmaceutical therapy, the core of pulmonary rehabilitation training is to improve the physiological function of the elderly, adjust their mentality, and improve their life quality and social participation ability by means of comprehensive training methods, including respiratory training, physical fitness training, nutrition guidance, psychological counseling, and educational guidance. For the elderly and weak, the implementation of pulmonary rehabilitation training should pay more attention to individual differences and develop personalized training programs. In the implementation process, the principles of individualization, comprehensiveness, and continuity should be followed, the training effects should be evaluated regularly, and the training program should be adjusted in time to ensure the effectiveness and safety of the training.

4. Mechanism of The Influence of Pulmonary Rehabilitation Training on The Social Participation Ability of Frail Elderly People

4.1 Physiological Function Improvement

Pulmonary rehabilitation training specifically improves the physiological function of the frail elderly in various ways. Aerobic exercise can enhance cardiopulmonary function and improve blood oxygen levels (R. Wang et al., 2024). Strength training can enhance the strength of respiratory muscles and reduce the symptoms of dyspnea. Respiratory physiotherapy can help the elderly improve breathing patterns and improve breathing efficiency (Troosters et al., 2018). These physiological function improvements can directly improve the social participation ability of the elderly.

4.2 Adjustment of Psychological State

Pulmonary rehabilitation training not only improves the physical health of the elderly but also helps them adjust their mentality through a professional psychological counseling team. Individualized psychological counseling techniques, such as cognitive behavioral therapy and stress management, can reduce the psychological pressure on the elderly and improve their mental health level (Wang et al., 2022). Therefore, a good psychological state can boost the enthusiasm for social participation of the elderly.

4.3 Preservation and Improvement of Cognitive Function

Pulmonary rehabilitation training focuses on the cognitive health of the elderly and psychological activities in training, such as memory training and logical thinking training, which can help the elderly maintain and improve their cognitive function and prevent cognitive decline (Xiang et al., 2023). Good cognitive function enables the elderly to better understand and adapt to the social environment so as to improve their social adaptability and further improve their social participation ability. According to data from the Chinese Social Tracing Survey of the Elderly (CLASS), social activity participation can significantly promote the cognitive ability of the elderly (CHARLS Data Forum, 2023). Therefore, social participation can also, in turn, stimulate the improvement of cognitive function, forming a virtuous cycle.

To sum up, pulmonary rehabilitation training has achieved an all-around improvement of the elderly's social participation ability by improving the physiological function of the frail elderly, adjusting their psychological state, and maintaining and improving their cognitive functions. The improvement in these three aspects complements each other and jointly promotes the improvement of the social participation ability of the elderly. This not only improves their quality of life but also enables them to integrate better into society and actively participate in social activities, thus achieving healthy aging. Therefore, pulmonary rehabilitation training has important theoretical and practical significance for the improvement of the social participation ability of the frail elderly.

5. Challenges of Pulmonary Rehabilitation Training in Improving The Social Participation Ability of The Frail Elderly

5.1 Factors of The Elderly Themselves

Factors of the elderly themselves are important challenges that affect the effectiveness of pulmonary rehabilitation training. Factors include differences in physical condition, cognitive function, psychological state, etc. (Evangelista et al., 2021; Xiong et al., 2022). For example, older adults with a severe decline in physical function may not be able to withstand the intensity of pulmonary rehabilitation training. Those with declining cognitive function may not be able to understand and follow training requirements. Those with poor psychological status may lack motivation to participate in training.

5.2 Limitations of The Training Program

The current pulmonary rehabilitation training program may have some limitations (Zhao et al., 2024). The individual differences of older people may not be fully taken into account to meet the needs of all elderly people. The training program may over-focus on

physical training and ignore the importance of psychological training and social skills training. The training program may be too theoretical and impractical.

5.3 Lack of External Environment Support

Lack of external environmental support is also a challenge for pulmonary rehabilitation training (Tong et al., 2024). This includes the lack of professional training personnel, training facilities, social support, etc. For example, professional pulmonary rehabilitation training requires professional training guidance, but such personnel may be inadequate. Also, pulmonary rehabilitation training requires specialized training facilities, but such facilities may not be accessible. Pulmonary rehabilitation training requires social understanding and support, but such support may not be sufficient at present.

In conclusion, pulmonary rehabilitation training faces multiple challenges in improving the social participation capacity of the aged and debilitated elderly. The physical, cognitive, and psychological differences of the elderly themselves, the limitations of training programs, and the lack of an external supporting environment may affect the effectiveness of pulmonary rehabilitation training. Therefore, in order to fully realize the potential of pulmonary rehabilitation training, we need to conduct in-depth research on these challenges and find effective solutions. This includes developing more personalized and comprehensive training programs, strengthening the development of professional trainers, improving training facilities, and increasing community understanding and support for pulmonary rehabilitation training.

6. Strategies to Improve the Effectiveness of Pulmonary Rehabilitation Training to Promote Social Participation Ability

6.1 Develop A Personalized Training Program

Due to the differences in physical condition, cognitive level, and psychological state of the elderly, It is necessary to formulate training content, training intensity, and training frequency suitable for the elderly according to their specific conditions so as to ensure that training can achieve the purpose of improving physiological function, and will not cause excessive pressure on the elderly.

6.2 Implementation of Multi-disciplinary Collaboration and Comprehensive Intervention

Pulmonary rehabilitation training should not only be limited to physiological training but also include psychological training and social skills training to comprehensively improve the social participation ability of the elderly (Hou et al., 2023; Yu et al., 2022). This requires multi-disciplinary professionals, such as respiratory doctors, psychological counselors, social workers, etc., to participate in the design and implementation of training and comprehensive intervention for older people.

6.3 Strengthen Community and Family Support

Communities and families are the main places for the social participation of the elderly, and their support is crucial for the improvement of their social participation ability (Levasseur et al., 2010; Zhuo et al., 2024). The community should provide sufficient activity space and activity facilities to encourage the elderly to participate in community activities. Family members should give understanding and encouragement to the elderly and support them in participating in social activities. At the same time, the community and family can also provide necessary training support, such as providing training venues and cooperating with training personnel.

In conclusion, to improve the effect of pulmonary rehabilitation training on promoting the social participation of the elderly, it is necessary to consider various factors such as individuals, training programs, communities, and families. Through the development of individualized training programs, the implementation of multidisciplinary cooperation and comprehensive intervention, and the strengthening of community and family support, the effect of pulmonary rehabilitation training can be effectively improved, and then the ability of social participation of the elderly can be improved.

7. Conclusion

This paper comprehensively reviews the impact of pulmonary rehabilitation training on the social participation capacity of older and frail elderly and summarizes the main findings and challenges of the existing research. As a non-drug therapy, pulmonary rehabilitation training has achieved positive effects in improving the physiological function, psychological state, and cognitive ability of the elderly, which has direct effects on promoting the social participation ability of the elderly. However, pulmonary rehabilitation training also faces some challenges in the implementation process, including the factors of the elderly themselves, the limitations of the training programs, and the lack of external environment support.

In future work, we need to explore and optimize pulmonary rehabilitation training programs further, enhance multidisciplinary collaboration, and strengthen community and family support to improve the effect of pulmonary rehabilitation training on the social participation ability of the elderly with frailty. This can not only help the elderly to improve their physiological health status and improve their life quality but also promote their more active participation in social activities, which has great practical

significance for coping with the increasingly serious global aging problem. At the same time, it also provides us with a new perspective, that is, to improve the social participation of the elderly by improving their physical health, which undoubtedly provides us with new ideas and methods to deeply understand and cope with the challenges brought by the aging society.

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