Original Research Paper

Volume - 13 | Issue - 07 | July - 2023 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Respiratory Medicine

HOME-BASED PULMONARY REHABILITATION: A NARRATIVE REVIEW

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ABSTRACT Pulmonary rehabilitation is a multidisciplinary, evidence based therapy wherein individually tailored therapies made to improve the physiological and psychological status of chronic respiratory disease patients. We searched 3 databases and term used "home-based pulmonary rehabilitation". We identified 68 literatures and 8 of them met our inclusion criteria. Our review suggests that home-based pulmonary rehabilitation is effective in chronic respiratory disease patients, further research needed to standardise its quality and benefits.

KEYWORDS :

HBPR- home-based pulmonary rehabilitation, PR – pulmonary rehabilitation

INTRODUCTION

Pulmonary rehabilitation (PR) is a comprehensive therapy followed by a complete patient assessment that includes patient-tailored interventions that are not limited to exercise training, education, behaviour change which are structured to improve the physiological and psychological status of patients and to promote long-term adherence of health enhancement.[1] PR is recognised as an essential component of the integrated care of people suffering from chronic respiratory disease.[2] It is a critical component of treatment for people suffering from chronic respiratory diseases.[3] There is level 1 evidence recommended to support the pulmonary rehabilitation from the American thoracic society (ATS) and European respiratory society (ERS) for the benefits of Chronic obstructive Pulmonary Disease (COPD) including improved health related quality of life (HRQOL), improved exercise tolerance, improved dyspnea and reduced hospitalization.[4-5] There is also mounting evidence that pulmonary rehabilitation can improve outcomes in other chronic respiratory conditions such as interstitial lung disease, post pulmonary tuberculosis,[6] pulmonary hypertension and bronchiectasis.[7] Pulmonary rehabilitation is also can be prescribed for 3 levels: pre-surgery, post surgery and in the advanced stages of the diseases however it is always recommended to give early stage of the pulmonary diseases to perceive the optimal benefits.[8]

The traditional centre based (out-patient/in-patient) PR is medically monitored and its safety and effectiveness is well implemented. Also traditional PR reduces frequent hospitalization, secondary infections and increases life expectancy.[9-10]

The term "home-based pulmonary rehabilitation" refers to a communication-based intervention, and the review included pulmonary rehabilitation delivered to individuals or groups either in physical or virtual mode in the patient's home.[11] Pulmonary rehabilitation is underutilized despite the evidence of guidelines and efficacy.[12] The barriers for underutilization of PR is geographical distance from centre of PR and reasons for poor adherence to PR and completion rates are multifaceted, however inconvenient scheduling of PR, low socioeconomic status and poor transportation facilities plays a major role in middle and low-income countries.[13] Hence this review summarises the importance of home-based pulmonary rehabilitation and its barriers.

Table 1 represents the possible advantage and disadvantage of home-based pulmonary rehabilitation that includes the possibility to overcome the challenges of traditional centre based pulmonary rehabilitation (transportation, scheduling time, and cost).

Table 1: Advantages And Disadvantages Of HBPR Compared With Traditional Centre Based PR.

Advantage	Disadvantage
Easy access and convenient	Lack of peer support
Less delaying in enrolment	Lack of HBPR standards
Minimal/No transportation	Safety concerns for patients
Individual tailored therapies	Lack of motivation
Associated with regular home routine	Low intensive exercise training

METHODS

Search Strategy

An online literature search was conducted between January 2023 to February 2023 in databases such as Scopus, Web of Sciences and proQuest. The search strategy was restricted between 2015 and 2021, and English language. The search was initiated by selecting the keywords such as "home based pulmonary rehabilitation" OR "home based lung rehabilitation". Studies in the English language, between the year of 2015 and 2022 and Randomized trials were included.

Goals Of Home-based Pulmonary Rehabilitation

Chronic respiratory patients who are not able to access the traditional centre-based pulmonary rehabilitation are good candidate for HBPR. Chronic respiratory disease patients lack physical activities due to the 'fear of dyspnea' which results in skeletal muscle dysfunction; these disabilities are the disadvantage of chronic respiratory conditions resulting in lower desired level of functioning capacity. Thus goals of home-based PR are to 1. Reduce symptoms, 2. Restoring functional capacities and enhancing overall quality of life (QoL).[14]

Structure Of Home-based Pulmonary Rehabilitation

As per ATS/ERS guidelines standard duration to perceive the benefits of pulmonary rehabilitation is atleast 8 to 12 weeks and 3 sessions per week.[10] However literatures available on HBPR follow the same duration as per the guidelines (table 2). A pulmonary rehabilitation is a multidisciplinary team comprised of a physician or medical director who usually leads the PR program and allied health professionals including but are not limited to, respiratory therapist, physical therapist, occupational therapist, psychologist, exercise physiologist, nutritionist, nurse and social worker.[15]

Table 2: Multidisciplinary team in PR program
Physician/Medical director
Allied health professionals
Respiratory therapist

Physical therapist
Occupational therapist
Exercise physiologist
Psychologist
Nutritionist
Nurse
Social worker

The role of physician in pulmonary rehabilitation is to co-ordinate the team and to ensure the proper medical treatment of the patient and to act for medical emergencies. Allied health professionals play a vital role in PR team. Respiratory therapist monitors and teaches breathing exercises, aerosolized therapy, oxygen therapy, chest physiotherapy, tobacco cessation and they act for the medical emergencies like sudden cardiac arrest etc… Physical therapist prescribes appropriate exercises, occupational therapist manage conservative measures to patients and assess the needs of prosthetics. Exercise physiologist prescribes and manages the appropriate exercise and they tailor it to the patient needs. A Nutritionist goal is to educate about the proper diet and psychologist counsels the patients to improve the psychological status of the patients. Nurses supervise the educational components and drug therapy and social worker may work on the needs of home services. However in HBPR any one healthcare professional provide HBPR therapy to patient as it is face to face or one on one program. Communication to the team/medical director is compulsory to improve the patients overall health related quality of life.[15]

Home-based Physical Exercise

Exercise training is the cornerstone of pulmonary rehabilitation that alleviates symptoms and physical activities in chronic respiratory disease patients.[16] Taking into account of the health status of chronic respiratory disease patients it is recommended to practice with available resources at home with safe materials that through a light on aerobic training including walking on the floor, cycling, sit to stand exercise and strengthening training includes steps up and down, dumbbell can be replaced with water bottle, wall push ups and for mobilization transporting items with light to medium weights in the house.[17] According to a study, the main focus of the rehabilitation programme was aerobic lower limb exercises, which included physical reconditioning for strengthening essential muscles to improve oxygen utilisation for enhancing cardiopulmonary performance.[18]

Breathing Exercises

The HBPR programme includes deep breathing exercises, pursed lip breathing exercises, and diaphragmatic breathing exercises in a sitting position to alleviate breathing discomfort.[16] Pursed lip breathing entails actively exhaling while resisting with a pursed lip seal to produce an expiratory whistle (expiration). Expiration should last twice as long as inspiration. By improving ventilation of the lung, this type of breathing reduces airway collapse. Slow and deep inspiration is achieved by placing one hand on the chest and the other on the abdomen, projecting the abdominal wall to the outside.[19]

RESULTS

To identify the practice of home-based pulmonary rehabilitation in the literature, this section provides results of the literature review in organized manner (Table 3). Out of 68 articles identified in the selected database 8 articles met our inclusion criteria (Figure 1).

Table 3: Characteristics Of Included Literatures

Study/ Outcome	Year	Comparison/ Duration	Population	Interventions and controls comparison conditions
Chuatrakoon et al[20]	2022	Home-based PR VS PR balanced	COPD	Home PR: Breathing, strengthening, Stretching, endurance exercises and education. Control (PR): Balance exercise (narrow stance, narrow stance on foam, tandem stance, one leg stance, toe stand, heel stand, sit to stand and walking)
Keniş-Coşkun et al[21]	2022	Home breathing exercise VS bottle PEP	Stable moderate to severe COPD	Home breathing: Breath retraining (diaphragmatic and thoracic expansion) Bottle PEP: using bottle PEP device
N Priya et al[22]	2021	Home-based PR Vs Unwilling Home-based	COPD	Home PR: Breathing exercises (pursed lip and diaphragmatic), upper and lower limb training, slow walking. Control (unwilling HBPR): Regular Physical activities.
Wang et al[23]	2021	Home based Vs Control	Idiopathic Interstitial Pneumonia	Home PR: Exercise activities, including walking, brisk walking, jogging, climbing stairs, and cycling, for 3–5 times per week for 12 weeks Control: Conventional drug treatment (corticosteroids/immunomodulators)
Horton et al[24]	2018	Home based Vs Centre based	COPD	Home PR: Aerobic training, Resistance training – upper and lower body Centre based: Aerobic training, Resistance training – upper and lower body
de Souza et al[25]	2018	Home manual Vs No manual	COPD	Home manual: stretching, preparation, relaxation, breathing exercises, exercise for the upper limbs and lower limbs. No manual: Verbal recommendation
Holland et al[26]	2017	Centre based Vs Home based PR	COPD	Home based PR: Aerobic exercise training, resistance training and self-management education. Centre based PR: Aerobic exercise training, resistance training and self-management education.
Pradella et al[27]	2015	Home based Vs Control	COPD	Home based PR: warm-up, aerobic activity, stretching, relaxation, upper and lower limb exercises, breathing exercise. Control: Breathing exercise

CONCLUSION

This review suggests that home-based pulmonary rehabilitation is effective in patients with chronic respiratory diseases. Likewise to traditional centre based pulmonary rehabilitation HBPR has its own advantage and disadvantages; hence standardizing the structure and

quality of HBPR is important and advance randomized trials are needed to perceive the holistic benefits.

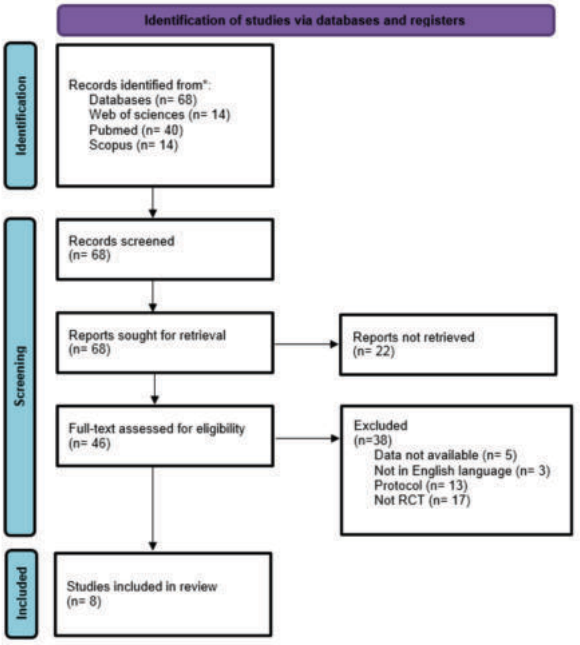

Figure 1: Flowchart Of Search Triad.

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