















REVIEW

## Respiratory Rehabilitation Programs in Portugal: Rapid Review

### Programas de Rehabilitación Respiratoria en Portugal: Revisión rápida

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#### ABSTRACT

**Introduction:** respiratory rehabilitation is an essential intervention in the management of respiratory diseases, focusing on physical symptoms and psychological aspects that pharmacological therapy alone cannot resolve. The aim of this review was to map the existing evidence on respiratory rehabilitation programs implemented in Portugal.

**Method:** a rapid literature review was carried out, following the recommendations of Cochrane Rapid Reviews, PICoS strategy and PRISMA guidelines. Evidence was sought regarding the implementation of programs, services offered and user needs. The search included EBSCOHost and B-on databases, with study selection by two independent reviewers.

**Results:** twelve articles were included, presenting a high level of evidence and medium to high methodological quality. Inductive thematic analysis revealed central topics: program organization, accessibility, transition pathways, benefits, structures, management, and user perspectives.

**Conclusions:** several variables influence the success of programs, such as high costs, geographic inequalities, insufficient supply and limited capacity of the hospital network. Alternatives such as home-based programs, telerehabilitation and community initiatives show promise for expanding access to and effectiveness of respiratory rehabilitation. These findings suggest that the integration of innovative approaches can contribute to overcoming current limitations, promoting improvements in patients' quality of life. Future studies should confirm evidence.

**Keywords:** Respiratory Diseases; Respiratory Rehabilitation; Respiratory Rehabilitation Services.

#### RESUMEN

**Introducción:** la rehabilitación respiratoria es una intervención esencial en el manejo de las enfermedades respiratorias, centrándose en los síntomas físicos y aspectos psicológicos que la terapia farmacológica por sí sola no puede resolver. El objetivo de esta revisión fue mapear la evidencia existente sobre los programas de rehabilitación respiratoria implementados en Portugal.

**Método:** se realizó una revisión rápida de la literatura, siguiendo las recomendaciones de Cochrane Rapid Reviews, la estrategia PICoS y las guías PRISMA. Se buscó evidencia sobre la implementación de los programas,

los servicios ofrecidos y las necesidades de los usuarios. La búsqueda incluyó las bases de datos EBSCOHost y B-on, y la selección de estudios fue realizada por dos revisores independientes.

**Resultados:** se incluyeron doce artículos, presentando un alto nivel de evidencia y calidad metodológica media a alta. El análisis temático inductivo reveló temas centrales: organización del programa, accesibilidad, vías de transición, beneficios, estructuras, gestión y perspectivas de los usuarios.

**Conclusiones:** diversas variables influyen en el éxito de los programas, como los altos costos, las desigualdades geográficas, la oferta insuficiente y la capacidad limitada de la red hospitalaria. Alternativas como los programas domiciliarios, la telerehabilitación y las iniciativas comunitarias parecen prometedoras para ampliar el acceso y la eficacia de la rehabilitación respiratoria. Estos hallazgos sugieren que la integración de enfoques innovadores puede contribuir a superar las limitaciones actuales, promoviendo mejoras en la calidad de vida de los pacientes. Estudios futuros deberían confirmar la evidencia.

**Palabras clave:** Enfermedades Respiratorias; Rehabilitación Respiratoria; Servicios de Rehabilitación Respiratoria.

## INTRODUCTION

One of the conventional practices for treating respiratory diseases is respiratory rehabilitation (RR), which consists of an organized and personalized plan to meet the specific needs of each person. Its main aim is to relieve breathlessness, improve quality of life and increase the ability to perform physical activities.<sup>(1)</sup>

Respiratory rehabilitation is a comprehensive intervention that improves the physical and psychological conditions of people with chronic respiratory diseases through physical training, education and behavior modification. This intervention has been shown to improve dyspnea, quality of life and exercise capacity in patients with chronic respiratory diseases, and is the only way to improve respiratory function.<sup>(2)</sup>

Respiratory rehabilitation programs (RRP) have interventions that are indispensable, reliable, proven effective and inexpensive.<sup>(2)</sup> However, according to the latest information, only a small proportion, or 2 %, of people who need to integrate respiratory rehabilitation programs are able to access them.<sup>(3)</sup>

The poor response may be caused by the lack of convenient access to specialized centers and geographical discrepancies, however, in the current context of Portuguese primary health care, community care units have been providing multidisciplinary care to COPD patients. These units have a multidisciplinary team, including specialist rehabilitation nurses, whose skills enable them to prescribe and carry out RRP.<sup>(4)</sup> The choice of this topic is justified by the importance of RR in the management of respiratory diseases, the need to evaluate the implementation of RRP and the urgency of addressing accessibility issues to ensure that all people have equitable access to these essential services.

Although there is some information about RRP, there is no summary of the current state of knowledge about these programs, leading to questions such as: How are respiratory rehabilitation programs implemented in Portugal? What services are offered to people with respiratory diseases in the context of health and respiratory rehabilitation services in Portugal? and what are the unmet needs of people with respiratory diseases?" The general aim of this rapid review is to map the existing evidence on RRP implemented in Portugal and the specific objectives are to describe the organization of health services, rehabilitation pathways, identify how RRP are structured and find out the perspective of people with respiratory disease regarding the implementation of RRP in Portugal.

## METHOD

A rapid review was carried out to obtain answers to the research questions, using a rigorous and explicit review method,<sup>(6)</sup> following Cochrane recommendations<sup>(7)</sup> and PRISMA guidelines when writing the manuscript.

The survey was carried out by AF and repeated and verified by CV in March 2023. The search strategy was carried out using the EBSCOHost platform and adapted to the databases - CINAHL Complete; MEDLINE Complete; Cochrane Database of Systematic Reviews; MedicLatina, based on the descriptors OR and AND which allowed the Boolean Equation to be formulated.

The final Boolean equation on the EBSCOhost platform was ((Rehabilitation Services) OR (Rehabilitation Centers) OR (Physiotherapy) OR (Rehabilitation Nursing) OR (Physical Medicine and Rehabilitation) OR (Respiratory Function Tests)) AND ((Respiratory Tract Diseases) OR (Chronic Obstructive Pulmonary Disease) OR (Asthma) OR (Long Covid)) AND ((Respiratory Physiotherapy) OR (Exercise Therapy) OR (Exercise) OR (Physical Activity)).

The search criteria were Portuguese studies published between 2019 and 2023, in English or Portuguese, with full text available.

We limited the search to studies suitable for the objectives of this rapid review and, for this reason, the studies underwent a screening process by title and abstract. A pilot exercise was carried out by the screening

team (AF and CV), which assessed 30 titles and abstracts to calibrate and test the review form. The two reviewers double-screened 20 % of the abstracts, resolving conflicts. AF screened the remaining abstracts; CV reviewed all the excluded abstracts and resolved conflicts.

Full-text articles describing potentially relevant studies were selected by AF and CV in a pilot exercise using the same 5 full-text articles to calibrate and test the review form and apply the inclusion and exclusion criteria. The reviewer (AF) then screened all included full-text articles and a second reviewer (CV) filtered all excluded full-text articles. Whenever differences were found, they were resolved by consensus and with the help of a third reviewer (LS).

AF extracted the data based on previously defined criteria, according to the objectives of the study and the inclusion and exclusion criteria. CV checked the reliability of the data extracted by the extractor (AF). Errors of more than 1 % of the records were verified, so the remaining records were checked by a third reviewer (LS). Conflicts were resolved by the reviewers (AF and LS); Extraction was carried out manually on an Excel sheet.

After data extraction, the quality of the included studies was assessed. In order to critically evaluate each article, reliable tools for assessing the risk of bias were implemented, namely the JBI evaluation grids,<sup>(8)</sup> in order to validate their level of strength and evidence, and the percentage of quality and risk of bias.<sup>(9)</sup>

The classification and judgment of the risk of bias was carried out by the reviewer (AF) and then the reviewer (LS) to check whether or not they were in agreement with the judgments previously made. The risk of bias classification was limited to the most relevant results, emphasizing those that were relevant to decision-making.

The protocol for this rapid review followed Cochrane guidelines and was registered on the Open Science Framework (OSF) platform and has the number OSF.IO/TF3JP.

## RESULTS

The evidence found was synthesized in narrative form using a table drawn up for this purpose, and one of the articles was assessed by both reviewers (AF and CV) as to whether it guaranteed the evidence. The remaining articles were divided equally and then the judgments made by each of the reviewers were validated.

Based on the search strategy applied, 130 potentially relevant articles were identified; 2 were excluded due to repetition; 78 were excluded by the inclusion and exclusion criteria; 30 were excluded after analysis of the abstract and 8 were excluded after analysis of the full text. Finally, 12 articles were included in the rapid review (figure 1).

A PRISMA flowchart was used to summarize the study selection process.<sup>(10)</sup>

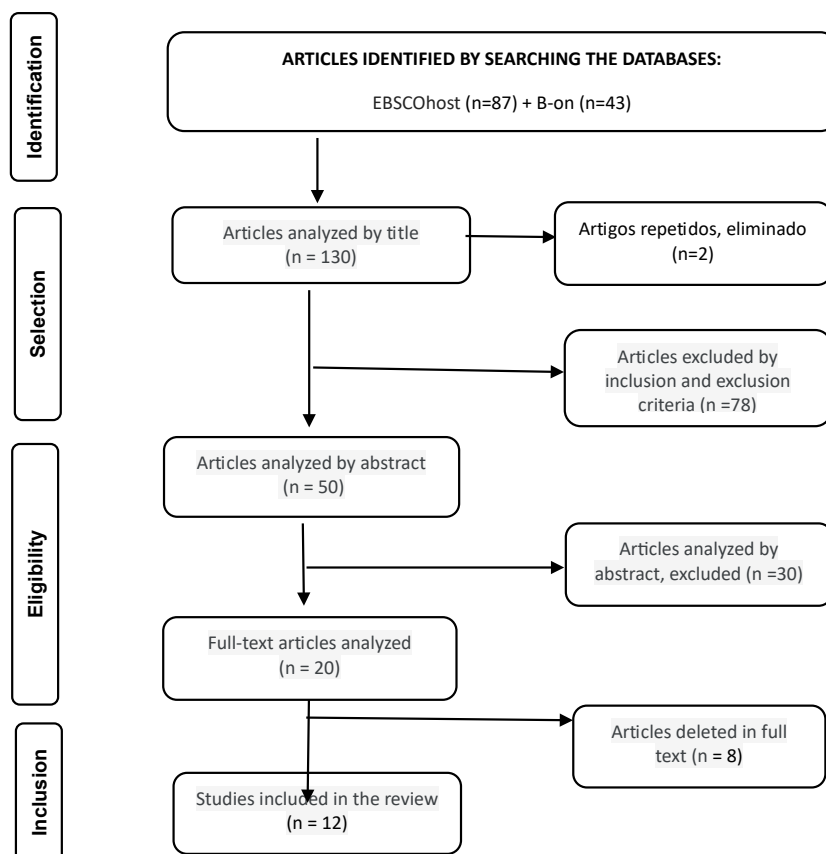


Figure 1. Methodological approach to article selection (PRISMA)

Table 1. Identification of the selected studies

| Authors and Year                                                                                                                  | Journal                                                                           | Title                                                                                                                                                                     | Methodology and Level of Evidence JBI (2013) <sup>(11)</sup> | Quality |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|---------|
| E1-Reis, N., Dias, M. J. C., Sousa, L., Agostinho, I., Ricco, M. T., Henriques, M. A., & Baixinho, C. L. (2022). <sup>(13)</sup>  | International Journal of Environmental Research and Public Health, 19(24), 17096  | Telerehabilitation in the Transitional Care of Patients with Sequelae Associated with COVID-19: Perception of Portuguese Nurses.                                          | Qualitative5b                                                | 100 %   |
| E2- Almeida, R., Lima, M. E., Rodrigues, L., Silva, S., & Tavares, M. (2023). <sup>(14)</sup>                                     | Millenium-Journal of Education, Technologies, and Health, (20), e27496 e27496.    | Reabilita3o Respirat3ria pedi3trica no domic3lio: alternativa 3 aus3ncia de cuidado.                                                                                      | Descriptive 4a                                               | 75 %    |
| E3- Gaspar, L., Ferreira, D., Vieira, F., Machado, P., & Padilha, M. (2019). <sup>(15)</sup>                                      | Revista Portuguesa de Enfermagem de Reabilita3o, 2(1), 59-65.                     | O treino de exerc3cio em pessoas com doen3a respirat3ria cr3nica estabilizada: uma Scoping Review.                                                                        | SLR 1b                                                       | 85 %    |
| E4- Moreira, J., Fonseca, P., & Miguel, S. (2022). <sup>(16)</sup>                                                                | International Journal of Environmental Research and Public Health, 19(21), 14365. | A pilot study on a nurse rehabilitation program: Could it be applied to COVID-19 patients?.                                                                               | Descriptive 3c                                               | 75 %    |
| E5-Ribeiro, C., Vieira, A. L., Pamplona, P., Drummond, M., Seabra, B., Ferreira, D., ... & Nunes, R. (2021). <sup>(17)</sup>      | International Journal of Chronic Obstructive Pulmonary Disease, 2217 2226.        | Current practices in home mechanical ventilation for chronic obstructive pulmonary disease: a real-life cross-sectional multicentric study.                               | Descriptive 4b                                               | 100 %   |
| E6-Santos, C. D., das Neves, R. C., Ribeiro, R. M., Caneiras, C., Rodrigues, F., Spruit, M. A., & B3rbara (2020). <sup>(18)</sup> | Journal of clinical medicine, 9(8), 2450.                                         | Novel input for designing Patient-Tailored pulmonary rehabilitation: Telemonitoring physical activity as a vital Sign-SMARTREAB study.                                    | Descriptive 4b                                               | 100 %   |
| E7-Souto Miranda, S., Dias, C., J3come, C., Melo, E., & Marques, A. (2022). <sup>(19)</sup>                                       | In Healthcare (Vol. 10, No. 1, p. 119). MDPI                                      | Long-Term Maintenance Strategies after Pulmonary Rehabilitation: Perspectives of People with Chronic Respiratory Diseases, Informal Carers, and Healthcare Professionals. | Qualitative 5b                                               | 90 %    |
| E8-Vilarinho, R., Serra, L., Coxo, R., Carvalho, J., Esteves, C., Montes, A. M., & Caneiras, C. (2021). <sup>(20)</sup>           | In Healthcare (Vol. 9, No. 5, p. 538). MDPI.                                      | Effects of a Home-Based Pulmonary Rehabilitation Program in Patients with Chronic Obstructive Pulmonary Disease in GOLD B Group: A Pilot Study.                           | Quasi-experimental 2d                                        | 85 %    |
| E9-Marques, A., Souto Miranda, S., Dias, C., Melo, E., & J3come, C. (2022). <sup>(21)</sup>                                       | ERJ Open Researc                                                                  | Access, access, access: the Three A's of pulmonary rehabilitation-perspectives of patients, loved ones and healthcare professionals.                                      | Qualitative 5b                                               | 90 %    |
| E10-Souto Miranda, S., & Marques, A. (2019). <sup>(22)</sup>                                                                      | Reabilita3o cl3nica,33(4),8 05-814                                                | Triangulated perspectives on outcomes of pulmonary rehabilitation in patients with COPD: a qualitative study to inform a core outcome set.                                | Qualitative 5b                                               | 90 %    |
| E11-Marques, A., Pinho, C., De Francesco, S., Martins, P., Neves, J., & Oliveira, A. (2020). <sup>(23)</sup>                      | Respiratory Medicine, 162, 105861.                                                | A randomized controlled trial of respiratory physiotherapy in lower respiratory tract infections.                                                                         | Randomized clinical trial 2c                                 | 95 %    |
| E12-Pedrosa, R., Ferreira, 3., & Baixinho, C. L. (2022). <sup>(24)</sup>                                                          | Jornal de Medicina Personalizada, 12(4), 582                                      | Rehabilitation Nurse's Perspective on Transitional Care: An Online Focus Group.                                                                                           | Qualitative 5b                                               | 80 %    |

The critical appraisal of the selected studies is presented below, which includes the score according to the JBI<sup>(11)</sup> and the percentage of quality according to Camp et al.<sup>(12)</sup> in table 1; therefore, it can be concluded that 2 of the selected articles are of average quality, 7 articles are of high quality and the remaining 3 are of excellent quality.

Table 1 shows the articles selected, their methodology, level of evidence and JBI score.

Table 2. Summary of article data

| Authors                                                                                                                          | Study objectives and participants                                                                                                                                                                                                                                   | Method/ interventions highlighted                                                                                                                                                                                                                                                                                                                                                             | Results obtained                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E1-Reis, N., Dias, M. J. C., Sousa, L., Agostinho, I., Ricco, M. T., Henriques, M. A., & Baixinho, C. L. (2022). <sup>(13)</sup> | Main objective to identify the aspects/components to be considered when planning and implementing telerehabilitation interventions that guarantee transitional care for people with long COVID-19 after hospitalization                                             | Qualitative study - focus group, carried out online with eight nurses specializing in rehabilitation nursing in hospital and community settings.                                                                                                                                                                                                                                              | The COVID-19 pandemic has accelerated the process of digitizing healthcare, bringing with it a new wave of changes, with an impact on the organization of healthcare. Telehealth in rehabilitation nursing care is a clear opportunity in the reorganization of care, resource management and infection control.                                                                                                                                                 |
| E2-Almeida, R., Lima, M. E., Rodrigues, L., Silva, S., & Tavares, M. (2023).                                                     | The aim is to evaluate the effectiveness of a respiratory rehabilitation project in reducing the prevalence rate of nursing diagnoses in a sample of pediatric individuals with respiratory pathology, thus contributing to their well-being in a pandemic context. | A descriptive and exploratory study was carried out with 24 pediatric individuals of both sexes, aged between 14 months and 17 years, with respiratory pathology and in need of Respiratory Rehabilitation, living on the islands of São Miguel and São Jorge in the Azores. An innovative project was designed and implemented, combining home visitation and respiratory telekinesitherapy. | The Pediatric Respiratory Rehabilitation in the context of the pandemic - Respiratory Telekinesitherapy & Home Visitation project has improved access to RR projects for pediatric patients who were deprived of this care due to the closure of the Divino Espírito Santo Hospital's Service. Its implementation contributes to reducing exacerbations of respiratory pathology, with rates of resolution of nursing diagnoses in the order of 77,7 % to 100 %. |
| E3- Gaspar, L., Ferreira, D., Vieira, F., Machado, P., & Padilha, M. (2019). <sup>(15)</sup>                                     | To know the impact of RR programs, led by nurses, on people with chronic respiratory disease.                                                                                                                                                                       | Scoping review with JBI methodologis included 10 studies that revealed that RR programs conducted by RNS increase exercise tolerance, quality of life, functional independence and reduce dyspnea and anxiety.                                                                                                                                                                                | The results obtained (reduction in dyspnea; reduction in anxiety; increase in tolerance to exertion and activities of daily living, as well as improvement in quality of life) are in line with the best available scientific evidence. This study demonstrates the positive impact of the actions of rehabilitation nurses on the health status of people with chronic respiratory disease who take part in exercise training programs.                         |
| E4- Moreira, J., Fonseca, P., & Miguel, S. (2022). <sup>(16)</sup>                                                               | The overall aim of this study was to train respiratory patients to be able to promote airway hygiene and patency at home, improve their ventilatory capacity and prevent complications.                                                                             | An observational, analytical and prospective pilot study was proposed, identifying the needs inherent in the population studied in terms of self-care and training participants in the face of acute and chronic conditions, as well as preventing their recurrence. Participants: aged between 39 and 76, diagnosed with pneumonia or chronic obstructive pulmonary disease                  | This program had a positive impact on patient independence, reducing dyspnea and increasing the functionality of the patients included in this study. The set of exercises and techniques can be replicated at home and can be fundamental in the management of the respective recovery, as well as in the treatment of dyspnea. como na pandemia de COVID-19.                                                                                                   |
| E5-Ribeiro, C., Vieira, A. L., Pamplona, P., Drummond, M., Seabra, B., Ferreira, D., ... & Nunes, R. (2021). <sup>(17)</sup>     | To provide an accurate description of current practices in relation to the prescription of HMV and clinical characteristics of patients with COPD in Portugal.                                                                                                      | A cross-sectional, multicenter, real-life study of COPD patients established on HMV for at least 30 days. Data related to clinical characteristics, adaptation and ventilatory settings were collected                                                                                                                                                                                        | It seems that smoking, obesity and sleep apnea affect the clinical and ventilatory characteristics of COPD patients. According to the latest studies and recommendations, there seems to                                                                                                                                                                                                                                                                         |



|                                                                                                                                             |                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>E6-Santos, C. D., das Neves, R. C., Ribeiro, R. M., Caneiras, C., Rodrigues, F., Spruit, M. A., &amp; Bárbara (2020).<sup>(18)</sup></p> | <p>The aims of this study were: (1) to compare subjective and objective measures of AFVD in patients with chronic respiratory diseases; and (2) to demonstrate how SMARTREAB provides important information for designing pulmonary rehabilitation tailored to the patient.</p> | <p>This cross-sectional study describes activity in daily life in 100 chronic respiratory patients before pulmonary rehabilitation, comparing subjective and objective measures.</p>                                                                                                                                                                                                                 | <p>be a movement towards higher ventilatory pressures, increased use of oronasal masks and the intention to achieve normocapnia. Chronic hypercapnic patients are more often obese and subsequently present more often with OSA</p> <p>Telemonitoring of physical activity revealed that chronic respiratory patients perform daily activities raising basal metabolism up to 3 times, regardless of the IPAQ score and the category as a subjective outcome reported by the patient SMARTREAB proved to be an innovative methodology for measuring AFVD as a vital sign combining oximetry, accelerometry and qualitative patient data, providing important information for the design of personalized pulmonary rehabilitation for the patient.</p> |
| <p>E7-Souto Miranda, S., Dias, C., Jácome, C., Melo, E., &amp; Marques, A. (2022).<sup>(19)</sup></p>                                       | <p>Aim to explore what maintenance strategies should be available to people with CRD in the community and how they should be provided, from the perspective of people with CRD, informal caregivers and health professionals.</p>                                               | <p>An exploratory qualitative study was carried out with focus groups: people with CRD, informal caregivers and health professionals.</p>                                                                                                                                                                                                                                                            | <p>This study suggests that motivation and professional and peer support are key elements in maintaining the benefits of PR in people with CRD, and that different physical activity options (independent or group activities), taking into account people's preferences, should be available through partnerships with the community, namely town halls.</p>                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>E8-Vilarinho, R., Serra, L., Coxo, R., Carvalho, J., Esteves, C., Montes, A. M., &amp; Caneiras, C. (2021).<sup>(20)</sup></p>           | <p>To explore the feasibility of a home-based pulmonary rehabilitation program (HAS) and evaluate its impact on COPD patients in the GOLD B group.</p>                                                                                                                          | <p>A real-world pre-post intervention study was carried out on COPD patients. It consists of a multidisciplinary, evidence-based, individualized approach for the patient that includes exercise training, education and behavior change with the aim of controlling symptoms and the disease, promoting a healthy lifestyle, autonomy, social skills and long-term adherence to improve health.</p> | <p>The 12-week MRPA program, through face-to-face home visits, for physical training and self-management sessions, and telephone calls, including monitoring the clinical picture and the progression of physical training. Future research should focus on studying the follow-up of people after this HBPR program. In addition, it is important to include other GOLD groups (groups C and D) and add more functional test results to determine their responsiveness in PR.</p>                                                                                                                                                                                                                                                                    |
| <p>E9-Marques, A., Souto Miranda, S., Dias, C., Melo, E., &amp; Jácome, C. (2022).<sup>(21)</sup></p>                                       | <p>Improving access to pulmonary rehabilitation (PR) is a global priority</p>                                                                                                                                                                                                   | <p>They held seven focus groups with people with CRD (n=29), LO (n=5) and health professionals (n=16) recruited using purposive sampling strategies. snowball sampling strategies from two hospitals, two primary health care centers and one institutional practice.</p>                                                                                                                            | <p>Improving access to pulmonary rehabilitation (PR) is a global priority, but universal access is an intangible goal. Efforts need to be made to increase access to PR as early as possible, prioritizing those who are most symptomatic and functionally limited, as necessary, and improving communication within and between health services.</p>                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p>E10-Souto Miranda, S., &amp; Marques, A. (2019).<sup>(22)</sup></p>                                                                      | <p>This study aimed to explore the views of different stakeholders on the outcomes of rehabilitation in COPD</p>                                                                                                                                                                | <p>Semi-structured interviews were conducted with 12 COPD patients, 11 informal caregivers and 10 health professionals. The data was analyzed using content analysis, followed by</p>                                                                                                                                                                                                                | <p>PR has given patients the tools not only to control their symptoms, but also to be less afraid of the course of the disease; there has been a symbiotic relationship between a healthier mind and a healthier body.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

|                                                                                                                |                                                                                                                                                  |                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                |                                                                                                                                                  | thematic analysis to gain a deeper understanding of the different perspectives.                                                                                                                                    | Patients and informal caregivers recognized general improvements in health, with a decrease in the use of short-acting inhalers and in oxygen debt, relating this to a better outlook on health.                                                                                                                                                                                                                                                                                                                                               |
| E11 - Marques, A., Pinho, C., De Francesco, S., Martins, P., Neves, J., & Oliveira, A. (2020). <sup>(23)</sup> | To evaluate the effects of respiratory physiotherapy compared to standard pharmacological care on symptoms and function in outpatients with RTIs | Blind, randomized, controlled clinical trial<br>Outpatients with LRTI were recruited and randomly assigned to the control (pharmacological) or experimental (pharmacological and respiratory physiotherapy) group. | Adding respiratory physiotherapy to the pharmacological treatment of outpatients with LRTI results in greater recovery of symptoms and functional parameters.<br>The addition of respiratory physiotherapy to the experimental group led to improvements in the number of crackles, SpO2 levels, functional exercise capacity and limitation of activities due to dyspnea, which exceeded the control group. These improvements are associated with the recovery of symptoms and function, which are fundamental to the patients' daily lives. |
| E12-Pedrosa, R., Ferreira, Ó., & Baixinho, C. L. (2022). <sup>(24)</sup>                                       | The aim is to analyze nurses' perspectives on transitional care for dependents with rehabilitation care needs after hospital discharge.          | A focus group was held with the participation of rehabilitation nurses from hospital and community settings. This is a qualitative, descriptive and exploratory study.                                             | The increase in the incidence of chronic illnesses and dependency leads to the need for hospitalization and adaptation in the process of returning home, as well as the transition between levels of care to ensure continuity of care.<br>Ensuring transitional care is imperative for the development of a sustainable health system, increasing the quality of care and the satisfaction of professionals.                                                                                                                                  |

The evidence found was synthesized in narrative form, using a table prepared for this purpose, and one of the articles was assessed by both reviewers (AF and CV) as to whether the evidence was reliable.

The remaining articles were divided equally and then a table was drawn up with the main findings of the selected studies, which were identified through a second complete reading of each selected study, validating the judgments made by each of the reviewers.

Understanding the results is a challenging and intricate phase, subject to variations depending on the data obtained. The qualitative data in this review was analyzed using Inductive Thematic Analysis, which is often employed to recognize, examine, understand and communicate patterns present in the data, i.e. the underlying themes.<sup>(25)</sup>

After transcribing the data, AF generated initial codes, these codes were then mixed and interpreted as themes when there were common patterns in the data. During the analysis, memos were used to record decisions and other significant notes. The themes were discussed between (AF, LS and HJ) until a consensus was reached.

The following themes were generated about Respiratory Rehabilitation Programs in Portugal: "accessibility", "Pathways of the transition process", "Care management", "Benefit of the programs", "Program structure" and "People's perspective".

The implementation of RRP over the last 5 years has been disrupted by the pandemic (COVID 19), with the social isolation measures imposed, inpatient services have undergone structural changes, visits have been suspended, but in the meantime, other opportunities to access RRP have emerged, such as their implementation at home or the use of teleRR, which has facilitated the person's transition from hospital to home, in which the Rehabilitation Nurse Specialist (RNS) has played a facilitating role in this process.

The RRP have been successfully adapted to the person's new condition. Even so, the majority of people with respiratory diseases had a satisfactory outlook, they adhered very well to the programs at home or by video call, but they still reported that access was intangible.

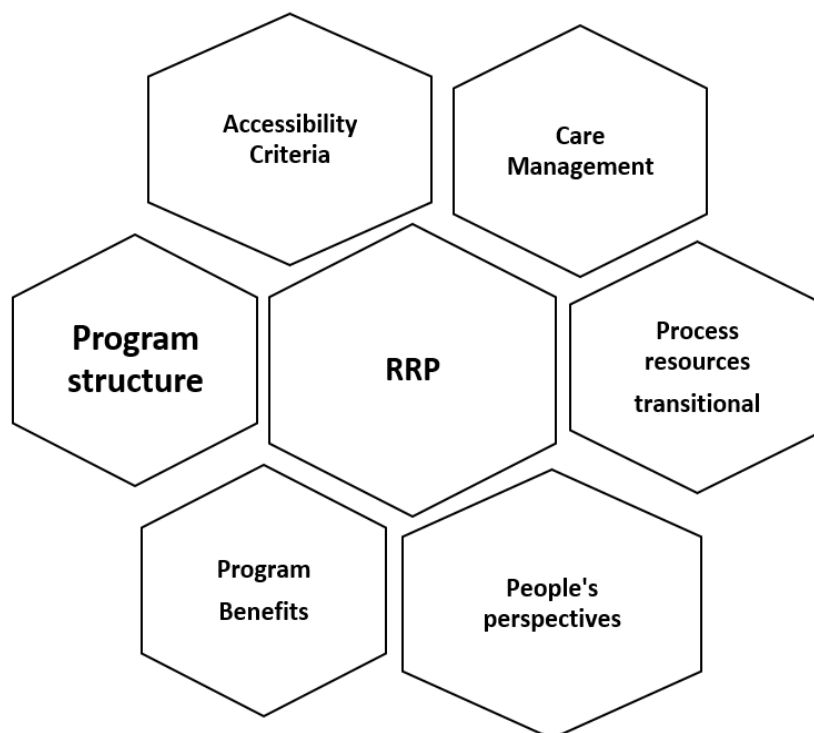


Figure 2. Thematic map showing the themes generated

### Theme: “Journeys in the transitional process”

During and after the pandemic, there were changes in the organization of health care, due to the imposed social isolation and individual protection measures: Difficulty in accessing RRP, hospital, transitional care at RR level was carried out by teleRR and home visits, bringing many benefits to people with respiratory diseases, since they continued their RRP without leaving home.

The susceptibilities and vulnerabilities of the person and family in a situation of transition are a life cycle phenomenon influenced by various factors and variables, which can guarantee adherence to the rehabilitation program.

It is noticed that in these specific years, of the articles included in this quick review, there are references to three ways for people with respiratory diseases to move from hospital to home and continue to perform RRP: In outpatient clinics, at home and by teleRR.:

#### *Outpatient/ Hospital*

“Most RR is carried out in hospital outpatient settings” (E9).<sup>(21)</sup>

“At hospital level, it is essential to involve the entire nursing team in the RRP to achieve continuity of care, since the average length of stay is reduced” (E4).<sup>(16)</sup>

#### *By Telerehabilitation*

- “Telerehabilitation allows home exercises and self-care training in people’s privacy; it allows them to take care of themselves. When digitally enabled and informed, they develop decision-making skills” (E1).<sup>(13)</sup>
- “tele-rehabilitation achieves similar results to face-to-face rehabilitation” (E1).<sup>(13)</sup>
- “telehealth allows hospital health teams to be closer to primary health care, and can be considered an instrument in the creation of transitional nursing care teams” (E1).<sup>(13)</sup>

#### *At Home*

- “the set of exercises and techniques can be replicated at home and can be fundamental in managing your recovery” (E4).<sup>(16)</sup>
- “It is in the home, despite the fact that resources are scarcer, that the RNS has the possibility of caring for the person/caregiver/family with a greater degree of adequacy to the reality.” (E2).<sup>(14)</sup>

### Theme: “Accessibility”

The family doctor, physiatrist or pulmonologist prescribes RR at hospital level, in specialized centers, by agreement or for the National Network for Integrated Continued Care, depending on the person’s degree of



dependence. But RRP can be compromised by difficulties in access, physical barriers, lack of information, lack of RR centers in certain geographical areas of the country, high travel costs to specialized centers, and in this sense studies indicate that it is necessary to:

- “Improving access to RR programs, with greater comfort and shorter distances, especially in the country’s interior areas, where health services are far from people’s homes” (E1).<sup>(13)</sup>
- “efforts to increase access to pulmonary rehabilitation as early as possible, prioritizing those who are most symptomatic and have functional limitations and improving communication within and between health services” (E9).<sup>(21)</sup>

### Theme: “People’s perspectives”

People with respiratory diseases adhere to the RRP, are satisfied with the results, but recognize barriers of access and articulation with services; more partnerships should be available in the community for regular physical activity.

#### *People satisfaction*

- “People listed and valued the advantages related to comfort, reduced travel, saving time with visits to health services and individualization of care(E1).<sup>(13)</sup>
- “In a region where geographic discontinuity is high, digital can be an alternative for health care, and can become an asset in cases of restricted access to health care” (E2).<sup>(14)</sup>

#### *Barriers*

- “Improving access to RR is a global priority, but universal access is nevertheless an intangible goal” (E9).<sup>(21)</sup>
- “improving access to RR programs, with greater comfort and shorter distances, especially in the interior of the country, where health services are far from people’s homes” (E9).<sup>(21)</sup>

#### *Improvement strategies*

- “Community RR programs should be available (E7).<sup>(19)</sup>
- “Efforts need to be made to increase access to rehabilitation programs as early as possible, prioritizing those who are most symptomatic and functionally limited, as necessary, and improving communication within and between health services.” (E9).<sup>(21)</sup>
- “in order to maintain the benefits of RR, different physical activity (PA) options should be available, through partnerships with the community, particularly town halls” (E7).<sup>(19)</sup>

#### *Unmet needs*

- “Efforts need to be made to increase access to RP as early as possible, prioritizing those who are most symptomatic and functionally limited, as necessary, and improving communication within and between health services” (E9).<sup>(21)</sup>
- “Improving access to rehabilitation programs, with greater comfort and shorter distances, especially in the interior of the country, where health services are far from people’s homes.” (E1).<sup>(13)</sup>
- “town halls would have the necessary resources to place qualified professionals to accompany people with chronic respiratory disease (CRD), close to people’s homes, such as fire stations, parish council facilities or health centers, to carry out different physical activities at reduced costs” (E7).<sup>(19)</sup>

### Theme “Care management”

The growth of CRD and consequent dependence result in prolonged hospitalizations and the need to readapt to the process of returning home, and RNS are the most qualified professionals to act as transition care managers:

- “The COVID-19 pandemic in healthcare, bringing with it a new wave of changes, with an impact on the organization of healthcare” (E1).<sup>(13)</sup>
- “There was consensus among all the professionals that transitional care supported by Telehealth in rehabilitation nursing care is a clear opportunity in the reorganization of care, resource management and infection control” ... “RNS are the most qualified professionals to manage transitional care” (E1).<sup>(13)</sup>

### Theme “Benefits of RRP”

RR has proven benefits recognized by the medical community, such as a reduction in respiratory symptoms, an increase in exercise capacity, a reduction in the number of hospitalizations and exacerbations and an improvement in the psychosocial symptoms and quality of life of patients with respiratory diseases. People with respiratory disease who do PRR report greater functionality, quality of life, independence, health gains and changes in habits after doing physical activity:

### *Quality of life*

- “The results obtained (improvement in the perception of dyspnea; reduction in anxiety)” (E3).<sup>(15)</sup>
- “A person with health problems may have decreased perception of well-being and satisfaction, significantly affecting quality of life” (E2).<sup>(14)</sup>
- “The increase in effort tolerance, activities of daily living, as well as the improvement in quality of life, are superior to the best scientific evidence available” (E3).<sup>(15)</sup>

### *Health gains*

- “ This transition can be observed and is reflected in health gains for people who go to the emergency room, especially chronic patients who have had a number of emergency episodes “ (E12).<sup>(24)</sup>
- “RR also reduces hospitalizations and mortality” (E3).<sup>(15)</sup>
- “people and informal caregivers recognized general improvements in health, with a reduction in the use of short-acting inhalers and oxygen delivery, relating to a better health outlook” (E10).<sup>(22)</sup>

### *Functionality*

- “This RRP had a positive impact, reducing dyspnea and increasing the patients’ functionality” (E4).<sup>(16)</sup>
- “RRPs increase activity tolerance and reduce dyspnea, aspects that translate into functional gains and self-care capacity” (E3).<sup>(15)</sup>
- “PA intolerance limits functional independence with a consequent negative impact on self-care capacity and increased mortality.” (E3).<sup>(15)</sup>

### **Theme” Program structure”**

A RRP should be comprehensive, personalized, supervised by qualified professionals and include a variety of components to meet the individual needs of the person and promote a better respiratory quality of life; follow international recommendations, a comprehensive action based on an exhaustive assessment of the person followed by the prescription of adapted therapies (ex: FITT VP):

### *Evaluation tools*

- “To assess the impact, the sit and stand test (1MSTS), the modified Medical Research Council Questionnaire (mMRC), the COPD Assessment Test (CAT), the Hospital Anxiety and Depression Scale (HADS) and the London Chest Activity of Daily Living (LCADL) were used)” (E8).<sup>(20)</sup>
- “The instrument chosen to assess people’s functional capacity was the Barthel index” (E4).<sup>(16)</sup>
- “The modified Borg scale was used to measure and monitor training intensity” (E8).<sup>(20)</sup>
- “SMARTREAB has proven to be an innovative methodology for measuring Physical Activity in Daily Life (PADL) as a vital sign by combining oximetry, accelerometry and qualitative patient data, providing important information for the design of personalized pulmonary rehabilitation for the person.” (E6).<sup>(18)</sup>
- “During the implementation of the RRP, the scale chosen to assess dyspnea was the Medical Research Council (mMRC)” (E4).<sup>(16)</sup>

### *Interventions/exercise prescription*

- “these programs should focus on RR, with exercises that increase ventilatory capacity, chest expansion, diaphragm performance, control of associated symptoms (cough, dyspnea and expectoration) and tolerance to exertion.” (E1).<sup>(13)</sup>
- “The exercise training programs included 30-minute aerobic training and anaerobic training, the latter for the upper and lower limbs” (E3).<sup>(15)</sup>
- “the program included a warm-up, resistance, endurance/strength, flexibility, balance training and a relaxation period” (E8).<sup>(20)</sup>
- “The RRP followed international recommendations and was “a comprehensive intervention based on a thorough assessment of the patient followed by therapies adapted to the patient”, which included physical training (60-70 min, twice a week), education and psychosocial support and behavior change (once every 2 weeks) for 12 weeks. Aerobic training was carried out for 20 to 30 minutes at 80 % of the average speed achieved during the 6-minute walk test, and resistance training consisted of 8 exercises of the main muscle groups of the upper and lower limbs, at 60 to 70 % of 1- R.M. Doctors, nurses, physiotherapists, nutritionists, psychologists and social workers were involved in the program” (E7).<sup>(19)</sup>

## **DISCUSSION**

Considering the general objective to identify the existing evidence on the RRP implemented in Portugal and the specific objectives, to explore the structure of health services, rehabilitation pathways, identify how the RRP are structured and to know the perspective of people with respiratory disease regarding the implementation of the RRP, we will then proceed to discuss and interpret the results.

In the case of respiratory diseases and due to the sequelae, impact on the prognosis and evolution of the respiratory condition, RR is recommended after discharge, as it has benefits recognized by the medical community, such as reducing respiratory symptoms, increasing exertional capacity, reducing the number of hospitalizations and exacerbations, improving psychosocial symptoms and the quality of life of people with respiratory diseases. RNSs are the most qualified professionals to manage transitional care.<sup>(13)</sup>

In Portugal, the Doctor, Physiatrist or Pulmonologist prescribes RR, at hospital level, primary health care (PHC), for specialized centers, by agreement or in cases of greater dependence of the person, for RNCCI. As far as PHC is concerned, the Directorate General of Health (DGS) states that the team should include at least the family doctor, the physiotherapist and the RNS, and should liaise with the Pulmonologist/Physiatrist responsible for RRP at the referral hospital. Other professionals can also be added to complement the Respiratory Rehabilitation team.<sup>(2)</sup>

One study reinforces that coordination must be multidisciplinary and that, given the transitional care programs that ensure the continuity of interventions initiated in hospitals, RNSs are the professionals who, within the scope of their competencies, are best prepared to manage the transition of care.<sup>(24)</sup>

However, according to the latest information, only a small proportion, or 2 %, of people who need to join respiratory rehabilitation programs are able to access them.<sup>(3)</sup> RRP can be compromised by difficulties in access, physical barriers, lack of information, lack of RR centers in certain geographical areas of the country, high travel costs to specialized centers.

With the emergence of the COVID-19 pandemic, there was a need to reorganize services, move human resources away from communities and outreach care. The risk of contagion for the most vulnerable populations, the elderly and the chronically ill, and the lack of personal protective equipment and human resources, strongly influenced the possibility of carrying out home visits and telerehabilitation for surveillance, monitoring, treatment and/or rehabilitation of people with respiratory diseases, which facilitated the transition of the person from the hospital to the home, in which the RNS played a facilitating role in this process.<sup>(13)</sup>

In the current post-pandemic context, it is necessary to reflect on the success of these adaptation strategies and the continuity of the PRR in the home context. It would be pertinent to define a plan for adapting the exercise to the home and monitoring it by the RNS through telephone contacts or ideally via tele-rehabilitation. In Portugal, there has been a National Telehealth Center since 2016, which produces guidelines for teleconsultation and remote monitoring of patients, however, guidelines for telerehabilitation are still lacking.<sup>(26,27)</sup>

The guidelines highlight the importance of maintaining the RRP, as the benefits achieved through this program are only maintained if there is continuous adherence, and can diminish after 6 to 12 months without maintenance strategies. It is crucial to explore alternative models to improve access and prolong positive results. Invest in community-based RRP, promoting accessibility and equity of care, establishing contact with the team at the respiratory rehabilitation referral hospital.<sup>(2,28)</sup>

It is recommended that the person be supervised and incorporate physical exercise into their daily routine, promoting changes in health behavior and ensuring long-term adherence to exercise.<sup>(29,30)</sup> In this way, the RNS defined strategies with the patient/family to, for example, replace strength training with dumbbells with strengthening with bottles filled with sand, or endurance training on the treadmill with walking at home, monitoring dyspnea.

With regard to the structure of RRP, the results of the survey showed how they are structured in terms of content, duration, frequency, intensity and intervention modalities, especially in relation to community-based RRP where these are well defined, as well as the inclusion of physical exercise, education, psychosocial support and other components.

The PRRs have been successfully adapted to the person's new condition. Even so, the majority of people with respiratory diseases had a satisfactory outlook, they adhered very well to the programs at home, or by video call, but they still reported that access was intangible.

The patient's perspective is increasingly legitimized as one of the three pillars of quality in healthcare, alongside clinical efficacy and safety. People with respiratory disease value access to RR as essential to their treatment, as it improves exercise tolerance and reduces or controls dyspnea.<sup>(31)</sup>

The unmet needs of people with Respiratory Disease can vary according to a number of factors, including the severity of the disease, individual characteristics and socio-economic context. However, the most commonly identified common needs are accessibility to adequate health services, information about their illness and self-management, insufficient psychological support, lack of social support, financial and geographical considerations.<sup>(21,22,32)</sup>

In this sense, health professionals and administrators need to know which are the best tools for measuring people's perceptions in order to understand how they can be used to improve the quality of healthcare.

As limitations of the study, some variables were identified that contributed to conditioning the results, namely the presence of risk bias in some of the selected articles.

As this was a rapid review, only a few databases were consulted which may have influenced the initial search,

as well as the restriction to only Portuguese studies. The results of the study may be specific to the Portuguese context and may not be generalizable to other countries or health systems with different characteristics.

Another limitation identified was the difficulty in accessing articles that were not available in full, which resulted in the loss of publications that may have impoverished the results.

There was also some difficulty in finding available data on PRR and its implementation in Portugal, which may affect the scope and depth of the analysis carried out in this study. The field of respiratory rehabilitation is constantly evolving, so the results of the review may become outdated over time.

## CONCLUSIONS

RR offers advantages that are widely accepted by the medical community, such as relieving respiratory symptoms, improving physical endurance, reducing hospitalizations and worsening episodes, as well as promoting improvements in psychosocial aspects and quality of life. RRP should adopt a multidisciplinary approach, involving health professionals such as physiotherapists, pulmonologists, RNS and psychologists, to provide comprehensive support to people with respiratory diseases.

Gaps were identified in the availability of RRP in Portugal, suggesting an urgent need to expand these programs to meet the growing demand from people with respiratory diseases. It became clear that accessibility to these programs is crucial to ensure that all those eligible can benefit from them. It is therefore recommended that policies and measures be put in place to ensure that programs are accessible in terms of location, cost and schedule.

The most frequently mentioned unmet needs of people with respiratory disease are accessibility to adequate health services, financial and geographical considerations and information about their disease and self-management.

In summary, this Rapid Review highlights the urgent need to expand and improve respiratory rehabilitation programs in Portugal, ensuring that they are accessible, comprehensive and effective in meeting the needs of patients with respiratory diseases. These recommendations can serve as a basis for developing and implementing policies and practices that will significantly improve respiratory care in the country.

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