

# IMPACTO DA INTERVENÇÃO DO ENFERMEIRO DE REABILITAÇÃO À PESSOA COM DOENÇA PULMONAR OBSTRUTIVA CRÓNICA - REVISÃO SISTEMÁTICA

IMPACTO DE LA INTERVENCIÓN DEL ENFERMERO DE REHABILITACIÓN A LA PERSONA CON ENFERMEDAD PULMONAR OBSTRUCTIVA CRÓNICA - REVISIÓN SISTEMÁTICA

IMPACT OF THE REHABILITATION NURSE'S INTERVENTION ON THE PERSON WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE - SYSTEMATIC REVIEW

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## RESUMO

**Introdução:** A Doença Pulmonar Obstrutiva Crónica é prevenível e tratável, com manifestações respiratórias persistentes, nas quais as intervenções do ER podem contribuir para melhorar a capacidade funcional e emocional, o conhecimento, promover o autocuidado, a adesão ao regime terapêutico e a comportamentos saudáveis.

**Objetivo:** Sintetizar evidência científica sobre impacto da intervenção do ER na Pessoa com DPOC.

**Métodos:** Estabeleceu-se como pergunta de investigação “Qual o impacto da intervenção do Enfermeiro de Reabilitação na Pessoa com Doença Pulmonar Obstrutiva Crónica?”, adotando-se a metodologia do The Joanna Briggs Institute para revisão sistemática. Definiram-se critérios de inclusão e a pesquisa booleana, na EBSCOhost.

**Resultados:** Incluíram-se 6 artigos, que retratam a componente educacional e suporte do ER. O ER tem impacto positivo na vida da pessoa com DPOC, verificando-se melhores resultados no controlo sintomático/dispneia, na redução das admissões e tempo de internamento, no aumento da perceção da doença e da qualidade de vida. Tem impacto na melhoria das atividades de vida diária e na redução dos custos.

**Conclusões:** Os estudos evidenciaram variedade nas formas de atuação do ER, mas impacto positivo associado. Salienta-se pouca investigação sobre resultados das intervenções.

**Descritores:** Doença Pulmonar Obstrutiva Crónica. Enfermagem de Reabilitação. Reabilitação Respiratória

## RESUMEN

**Introducción:** la enfermedad pulmonar obstructiva crónica es prevenible y tratable, con manifestaciones respiratorias y limitación del flujo de aire, en la cual las intervenciones de ER pueden contribuir a mejorar la capacidad funcional y emocional, el conocimiento, promover el autocuidado, el cumplimiento del régimen terapéutico y los comportamientos saludables.

**Objetivo General:** Sintetizar la evidencia científica sobre el impacto del ER en la Persona con EPOC.

**Métodos:** Se estableció como pregunta de investigación “¿Cuál es el impacto de la intervención del Enfermero de Reabilitación en la persona con Enfermedad Pulmonar Obstrutiva Crónica?”, Se adoptó la metodología del Instituto Joanna Briggs para la revisión sistemática. Se definieron criterios de inclusión y la como investigación booleana, en la base EBSCOhost.

**Resultados:** Incluimos 6 artículos, que retratan e el componente educativo y de apoyo de la ER. El ER tiene un impacto positivo en la vida de la persona con EPOC, con mejores resultados en términos de control sintomático/disnea, en la reducción de las admisiones y tiempo de internamiento, en el aumento de la percepción del control de la enfermedad y de la calidad de vida. Tiene impacto en la mejora de las actividades de vida diaria y en la reducción de los costos.

**Conclusiones:** Los estudios evidenciaron variedad en las formas de actuación del ER, pero impacto positivo. Se destaca la escasa investigación sobre los resultados de las intervenciones.

**Palabras clave:** Enfermedad Pulmonar Obstrutiva Crónica. Enfermería en Reabilitación. Reabilitación Respiratoria

## ABSTRACT

**Introduction:** The Chronic Obstructive Pulmonary Disease (COPD) is preventable and treatable with respiratory manifestations and airflow limitation, in which intervention can contribute to improve functional and emotional capacity, knowledge, to promote self-care, adherence to the therapeutic regimen and healthy behaviors.

**General Objective:** To synthesize scientific evidence of the impact of the Rehabilitation Nurses (RN) intervention on the person with COPD.

**Methods:** It was established as a research question "What is the impact of the Rehabilitation Nurse intervention on a person with Chronic Obstructive Pulmonary Disease?" adopting The Joanna Briggs Institute methodology for systematic review. The inclusion criteria were defined, and it was defined a Boolean research in the EBSCOhost database.

**Results:** We included 6 articles, which mainly portrayed the educational and support component of the RN. The RN has a positive impact on the life of the person with COPD, with better results in terms of symptomatic control/dyspnea, on the reduction of admissions and length of hospitalization, increased awareness of disease control and quality of life. It has an impact on improving daily life activities and reducing costs.

**Conclusions:** The studies evidenced many ways of performance of the RN with positive impact. There is little research on the results of interventions.

**Keywords:** Pulmonary Disease, Chronic Obstructive. Rehabilitation Nursing. Respiratory Rehabilitation.

## INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a preventable and treatable disease, which is characterized by persistent respiratory manifestations and airflow limitation, due to significant exposure to harmful particles/gases<sup>(1)</sup>. COPD is responsible for high expenses for society, having a considerable economic impact, which is determined from the direct costs (diagnosis and treatment) and the indirect costs (consequences of the disabilities caused by COPD such as losses due to disability, absenteeism, premature mortality and benefits payment)<sup>(2)</sup>. It is a fact that Portugal is part of the group of countries with the lowest mortality from COPD, with a rate of 8.0% (630 people)<sup>(3)</sup>. However, in 2016, COPD was responsible for 7,864 admissions, being present in 1,963 people undergoing non-invasive ventilation. In 2016, it accounted for 7.0% of admissions for respiratory causes, being surpassed by admissions for pneumonia and respiratory failure. This translates into a considerable social and economic burden for the country, as mentioned above. In other words, it translates into considerable direct and indirect costs with (re)hospitalizations and complications, which could be avoided by resorting to the rehabilitation of people with COPD. For this reason, in Portugal, by 2020, it is intended to reduce by 10% (compared to 2014) the admissions due to respiratory causes (including COPD), which can be prevented or treated in health centers<sup>(4)</sup>.

One of the strategies is the implementation of respiratory rehabilitation programs, that is, the adoption of an intervention based on the person's assessment, followed by personalized therapies that include training and exercise, education, behavioral changes and adherence/management of good-promoting behaviors<sup>(1)</sup>. This makes sense when realizes that it brings benefits to people with COPD, having been shown to be the most effective therapeutic strategy in stable people, being responsible for several gains such as: reduction of hospitalizations (among people who have had recent exacerbations), improvement of dyspnea, improved exercise tolerance, symptomatic control or improved quality of life<sup>(1)</sup>. In the same perspective, at the national level, the need and importance of Respiratory Rehabilitation in people with COPD was clarified, emphasizing the

gains that can be obtained, such as the improvement of dyspnea and quality, as well as the reduction of hospitalization days<sup>(5)</sup>. Respiratory rehabilitation should be seen as a global and multidisciplinary intervention, and should be individualized and encompassing effort training, psychosocial intervention, with a view to symptoms reducing, optimizing functionality, increasing social participation and reducing costs. Thus, the rehabilitation team must be composed of a pulmonologist, physiatrist, physiotherapist, psychologist, nutritionist, social worker and, inevitably, the Rehabilitation Nurse<sup>(5)</sup>.

In view of the above, the intervention of the Rehabilitation Nurse in the rehabilitation process of the person with COPD is essential. In fact, it is described that the Rehabilitation Nurse must act at the level of therapeutic optimization (checking and correcting the inhalation technique and the most appropriate inhalation device), education of the person/family and functional respiratory re-education, training and exercise<sup>(6)</sup>. Regarding the educational component, the Rehabilitation Nurse must focus on the needs of the person/family, seeking to demystify COPD and focusing on the need for exercise, smoking cessation, adoption of techniques of energy conservation or aspects related to feeding. In turn, functional respiratory reeducation should be a component of the Rehabilitation Nurse's respiratory rehabilitation program, including breathing exercises, awareness of breathing times, (re)learning of diaphragmatic breathing and expiration with semi-closed lips. Likewise, the training of respiratory muscles, upper and lower limbs should be a concern of the Rehabilitation Nurse<sup>(6)</sup>.

In light of the above, the College of Rehabilitation Nursing Specialty identified as one of the priority areas of investigation in the short term, the study about the impact of interventions by the Rehabilitation Nurse<sup>(7)</sup>.

It is important to understand the effect of the intervention of the Rehabilitation Nurse on the person with COPD and the gains that result from that. Thus, it is necessary to prepare a systematic review of literature that aims to achieve the following objective: to synthesize the evidence on the impact

that the intervention of the Rehabilitation Nurse has on the person with COPD. To this purpose, the following research question was defined as a starting point: What is the impact of the intervention of the Rehabilitation Nurse on the person with COPD?

**METHOD**

This manuscript is a systematic literature review. For its purpose, the steps and recommendations of the Joanna Briggs Institute were adopted as a methodological framework<sup>(8)</sup>. For the construction of the research question and for the identification of the key concepts, the PICO method (Population, Intervention, Comparison and Results)<sup>(8)</sup> was used, as shown in Table 1.

<b>P</b>	Population	Person with Chronic Obstructive Pulmonary Disease	<b>Key-concepts:</b> - <i>Chronic obstructive pulmonar disease</i> <i>and</i> - <i>Impact</i> <i>and</i> - <i>Nurse</i>
<b>I</b>	Intervention	Intervention of the Rehabilitation nurse	
<b>C</b>	Comparison	If there is one.	
<b>O</b>	Results	Arising from the interventions of the RN in any context	

Table 1 - Identification of key concepts through PICO mnemonic.

Source: it was adapted by the authors based on The Joanna Briggs Institute (2011)

With the PICO method, inclusion and exclusion criteria were defined, and listed in table 2.

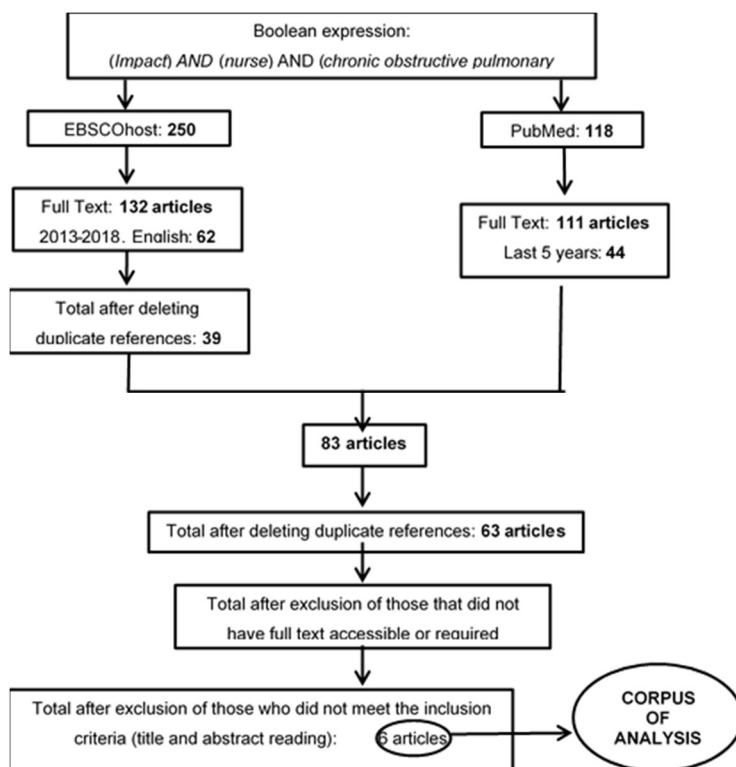
It should be noted that the choice of the publication period (last 5 years) was linked to the fact that the temporal updating of the references is one of the crucial points of its scientific rigor, intending to synthesize the most current evidence on the impact of the rehabilitation. At the same time, this limit is justified by the fact that concern about the impact of the rehabilitation nurse has emerged in recent years.

According to the systematic review purpose, it was defined as a Boolean expression (impact) AND (nurse) AND (chronic obstructive pulmonary disease). In April 2018, an electronic search was carried out in the EBSCOhost database (at CINAHL Plus, at MEDLINE, Academic Search Complete, Business Source Complete, MedicaLatina, Chrocrane Central Register of Controlled Trials), obtaining 250 articles. The 'Full Text' option (132 articles) was selected, within the 2013-2018 time limit, in English (there were no articles available in Portuguese), leaving 62 articles. Of these, duplicate articles were eliminated (by the database itself), resulting in 39 articles. At the same time, a new search was carried out in PubMed, with the same Boolean search (118 articles). 'Full text' (111 articles) and the time limit of the last 5 years were selected, leaving 44 articles. Also at PubMed there was no production of articles in Portuguese.

Selection criteria	Inclusion criteria	Exclusion criteria
Type of participants	Person with Chronic Obstructive Pulmonary Disease	Person with another pathology
Type of intervention	Intervention of the Rehabilitation nurse	What does not refer only to the intervention of the Rehabilitation Nurse
Type of results	Arising from intervention in any context	-----
Type of studies	Quantitative or qualitative research studies	Mixed, non-scientific and no-database abstract studies
Date of publishing	Between 2013-2018	Before 2013
Language	English or Portuguese	Another language, which is not English or Portuguese.

Table 2. Definition of Inclusion and Exclusion criteria

Out of the 83 articles in the 2 databases, duplicate references<sup>(20)</sup> were eliminated, leaving 63 articles. Articles who did not have a full text or required subscription were eliminated<sup>(17)</sup>, leaving 46 articles. This was followed by reading title and abstract, in order to verify compliance with the inclusion criteria. 40 articles were excluded as they did not meet the criteria, and 6 articles constituted the body of analysis, as shown in Flowchart 1.



Flowchart 1 - Identification of the Analysis Corpus

### Methodological Quality Assessment

After obtaining 6 studies, which were part of the analysis body, there was an assessment of the methodological quality. For the evaluation of 4 articles, we used the Meta-Analysis of Statistics Assessment and Review Instrument critical appraisal tools Randomized Control/Pseudo-Randomized Trial, with 10 criteria<sup>(8)</sup>. For the evaluation of the other 2 articles, we used the Meta Analysis of Statistics

Assessment and Review Instrument critical appraisal tools Descriptive/Case Series Studies with 9 criteria<sup>(6)</sup>. Table 3 shows that all studies with scores equal to or greater than 70% of the criteria (score equal to or greater than 7) were included, maintaining an analysis body of 6 articles. Table 3 also demonstrates the assessment of the levels of evidence for each article, according to Joanna Briggs Institute Levels of Evidence<sup>(8)</sup>.

Studies	Instrument used	Ponctuation	Evidence Level
Champion, R., Hall, T., & Tori, K. (2015). Home oxygen therapy assessment for COPD patients discharged from hospital: Respiratory NP Model of Care.	<i>Meta Analysis of Statistics Assessment and Review Instrument critical appraisal tools Randomized Control/Pseudo-Randomized Trial</i>	8 / 10	E2
Kim, J., Park, E.-C., & Han, K.-T. (2016). Nurse Staffing and 30-day Readmission of Chronic Obstructive Pulmonary Disease Patients: A 10-year Retrospective Study of Patient Hospitalization.		7 / 10	E2
Bilington, J., Coster, S., Murrells, T., & Norman, I. (2015). Evaluation of a Nurse-Led Educational Telephone Intervention to Support Self-Management of Patients With Chronic Obstructive Pulmonary Disease: A Randomized Feasibility Study.		10 / 10	F1
Weldam, S. W., Schuurmans, M. J., Zanen, P., Heijmans, M. J., Sachs, A. P., & Lammers, J.-W. J. (2017). The effectiveness of a nurse-led illness perception intervention in COPD patients: a cluster randomised trial in primary care.		9 / 10	E1
Duangubpha, S., Hanucharunkul, S., Pookboonmee, R., Orathai, P., & Kiatboonri, C. (April-June de 2013). Chronic Care Model Implementation and Outcomes among Patients with COPD in Care Teams with and without Advanced Practice Nurses.	<i>Meta Analysis of Statistics Assessment and Review Instrument critical appraisal tools Descriptive/Case Series Studies</i>	7 / 9	E1
Cox, K., Macleod, S. C., Sim, C. J., Jones, A. W., & Trueman, J. (2017). Avoiding hospital admission in COPD impact of a specialist nursing team.		7 / 9	E2

Table 3. Assessment of Methodological Quality and Study Evidence Level

### RESULTADOS

After the methodological evaluation, the data extraction and synthesis were performed.

Some authors developed a study that aimed to assess the effectiveness of the nurse's intervention (Respiratory Nurse), in the context of primary health care<sup>(9)</sup>. They implemented a type of intervention, the Chronic Obstructive Pulmonary Disease-Guidance, Research on Illness Perception (COPD-GRIP). The authors performed a randomized controlled trial conducted in 30 general community practice settings and 5 home care centers in the Netherlands during 6 weeks of intervention and 9 months of follow-up. The study recruited 204 people with COPD, differentiating them into 2 groups: a control group (consisting of 101 people) and an intervention group (consisting of 103 people)<sup>(9)</sup>.

In the intervention group, the COPD-GRIP was applied to each participant. This consisted of 3 extra consultations, lasting 30 minutes, 3 weeks apart. In the first consultation, the nurse addressed the perceptions of the person with COPD about the disease, using the Brief Illness Perception Questionnaire. Later, on the 2nd consultation, the relationship between the person's perceptions and the

behavior was discussed, being invited to prepare the person's own care plan. In the last consultation, the actions, perceptions and behaviors that the person with COPD changed were evaluated. After the implementation of the intervention, the results were analyzed using a mixed linear model<sup>(9)</sup>.

The first study concluded that there was a change in the COPD Clinical Questionnaire after 9 months of intervention. At the same time, the intervention contributed to changes in the level of perceptions about COPD, in terms of quality of life related to health, in terms of activities of daily living and in terms of health education. In the intervention group, there was a significant increase in health-related behavior at 6 weeks ( $p = 0.024$ ) and in personal control ( $p = 0.005$ ) at 9 months. Still, there was no significant change between the control and intervention groups at 9 months.

Thus, the authors concluded that the COPD-GRIP intervention did not improve the health status of people with COPD at the primary care level. However, the intervention brought benefits by improving the ability to control disease and health-related behaviors in the short term<sup>(9)</sup>.

The second study was carried out in Lincolnshire and aimed to assess the safety and effectiveness of a specialized acute respiratory assessment service for people with COPD, led by nurses (Respiratory Nurse Specialist)<sup>(10)</sup>. The authors analyzed the case notes, referring to people who had been referred to the unit, during a period of 12 months. Simultaneously, the application and analysis of questionnaires (on a Likert scale) was carried out in order to assess satisfaction with the service<sup>(10)</sup>.

In this study, there were 128 patients with COPD, with acute exacerbation and who needed support to prevent hospitalization. These patients were forwarded to community nurses specialized in respiratory nursing. The specialized service included an initial respiratory assessment, developed by a nurse specialized in respiratory nursing (medical history, medication, inhalation technique, physical examination, objective assessments of temperature, heart rate, respiratory rate, blood pressure and arterial blood gas). It was followed by a discussion with each person with COPD, where a personalized plan was developed. Participants were monitored at home and by telephone (up to 14 days, depending on severity and need for support)<sup>(10)</sup>.

The authors concluded that the respiratory nursing specialist can serve as an articulation and reference element for people with COPD to other services (e.g., occupational therapy, physiotherapy, social care, day hospital, smoking cessation programs, pulmonary rehabilitation programs)<sup>(10)</sup>. Consequently, they found that the skills of these specialists were a significant contributor to the success of the service, particularly their abilities to interpret blood gas values and to initiate emergent oxygen delivery as needed.

The authors also found that since the introduction of this type of service, the hospital admission rate has reduced significantly. Even so, they admit that it is difficult to attribute the reduction in admission only to this type of service<sup>(10)</sup>. Finally, another improvement in this service was the education provided on self-management, since people who took advantage of this type of service became more aware of the services existing in the community. This makes it possible to design adequate self-management plans in helping people with COPD when they look for a treatment at the first sign of disease exacerbation.

The research also attested that specialist nurses play a key role in avoiding hospital admissions, being able to care for people safely and effectively and being able to prescribe treatments that, if they're managed by generalist nurses, would require hospital admission<sup>(10)</sup>.

This is followed by a third study, developed in Korea, which aimed to assess the association between the level of nursing teams and the readmission rate of people with COPD<sup>(11)</sup>. For this, they analyzed national health data from 2002 to 2012 and used a model equation to associate readmission to nurses (in Korea there are Registered Nurses or Certified Nursing Assistants). 1,070 hospitals participated and 339,379 cases of hospitalization of people with COPD were studied. The authors divided the number of nurses by

100 beds and distinguished it into three groups according to the proportion of nurses: Group 1 (low), Group 2 (moderate), Group 3 (high). Subsequently, they identified the dates of the 1<sup>st</sup> hospitalization and discharge, followed by verification of the existence of readmission within a period of 30 days, each one being considered as a new hospitalization (after the 1<sup>st</sup> discharge).

The authors considered the variables of the person with COPD (main diagnosis, age, gender, respiratory distress, comorbidities, duration of oxygen therapy, length of stay in an intensive care unit,) and the characteristics of the hospital (structural, human resources, type of institution, number of beds)<sup>(11)</sup>.

In this study, the results showed remarkable positive effects of nurses on the person with COPD. However, the magnitude of this impact differed depending on the size of hospitals. In fact, there was an increase in readmissions in hospitals with reduced numbers of nurses (more readmissions in group 1 than in group 3). Thus, a higher number of nurses per 100 beds was significantly associated with lower readmission rates (when compared to a lower number of nurses)<sup>(11)</sup>.

Despite what was described, the authors recognized that the study had some limitations, such as not evaluating other characteristics of the person with COPD that could affect readmission (education, socioeconomic status, disease severity, current medical treatment, use of other health services, home visits...), the inability to assess the effects of specialist physicians on readmission, as well as changes in human resources (such as the turnover rate of nurses)<sup>(11)</sup>.

Another study, resultant from the review carried out, aimed to assess whether a supportive intervention, via telephone, would increase the person's well-being and reduce the severity of symptoms, in the primary health context in London. This study aimed to: determine the feasibility of the study, the intervention, to determine the secondary effects of the intervention and its costs<sup>(12)</sup>.

For this, the authors designed a randomized study with 2 groups (control and intervention) and applied the Chronic Obstructive Assessment Tool (CAT) questionnaires. A total of 71 people with COPD, living in the community, and followed up in a primary care setting participated (34 people in the intervention group and 35 in the control group). The Intervention group received the same treatment as the control group, having participated in an intervention for an additional 6 weeks. During this period, people in the intervention group were contacted twice (in the 3<sup>rd</sup> and 5<sup>th</sup> week) by an advanced nurse practitioner. Each call lasted about 25 minutes and addressed the following issues: living with the condition, use of the action plan for symptoms, use of medication, encouragement, and provision of support.

In addition, the nurse analyzed the information needed for self-management and answered questions about the self-management plan, symptom management and starting emergency medication. The nurse also assessed the person's self-perception of

their health, and suggested clinical visits when necessary. At the same time, the nurse evaluated all medical reports at the time of the telephone intervention, and used open questions in order to promote discussion<sup>(12)</sup>.

To measure the results, the authors assessed the impact on symptoms through the CAT (at the beginning and at the end of 12 weeks), the number of self-reported exacerbations and the satisfaction with the service. In the intervention group, the CAT score decreased significantly, showing improvement between time 1 and time 2. In the control group, there were no changes. In the CAT score, there was a significant difference between the two groups, in the 2nd moment. However, there were no significant changes with regard to exacerbations in the second moment, as well as with regard to satisfaction (which did not differ significantly between the two groups). The authors concluded that the nursing intervention via telephone is valid, in the context of primary health care, and can help to improve people's health and well-being<sup>(12)</sup>.

In turn, other researchers developed a study in Victoria, Australia, which aimed to: assess the impact of the introduction of a model of care (with advanced nurse practitioner in chronic respiratory disease - Chronic Respiratory Disease Nurse Practitioner, at the level of appreciation) of short-term oxygen therapy, in the provision of care and in the results for the person with COPD<sup>(11)</sup>. They carried out an uncontrolled retrospective study, through clinical audits, which were conducted in 2 moments (pre and post introduction of the model of care, in 2009 and 2011 respectively)<sup>(13)</sup>.

301 people with COPD and acute respiratory infection/exacerbation participated in the study, and the data were collected from medical reports. The data collected were: oxygen saturation (48h before discharge), collection of arterial blood gas (48h before discharge) in cases of saturations less or equal to 90%, existence or not of functional gait test and oxygen saturations lower or equal to 88% (48 hours before discharge), eligibility of the person to receive short-term oxygen therapy, existence of recommendation for short-term oxygen therapy (at discharge) and existence of readmission, within 28 days, with a diagnosis associated with COPD<sup>(13)</sup>.

The results revealed the existence of a significant increase in people evaluated with arterial blood gas to assess the need for short-term oxygen therapy, from 7.7% (2009) to 45% (2011). The study revealed that the need for short-term oxygen therapy increased from 26.7% to 44.4%<sup>(13)</sup>.

At the same time, hospital readmissions in the 28-day post-discharge period in people with short-term oxygen therapy decreased from 25% to 12.5%. Thus, the authors concluded that, with the introduction of the care model, there was an increase in the number of people assessed for eligibility and receiving short-term oxygen therapy, a reduction in hospital readmissions, an improvement in performance

protocols, as well as a improvement in health gains and financial savings for the hospital studied<sup>(13)</sup>.

Lastly, a study carried out in hospitals in Thailand. This study aimed to explore the level of implementation of a care model in a COPD program and compare the difference in the results of teams without and with advanced nurse practitioner. The authors carried out a comparative descriptive study, through the application of questionnaires, the assessment of respiratory function and the performance of a pilot test (to assess the validity of the instruments)<sup>(14)</sup>.

210 people with COPD participated who, 1 year before, had 80% adherence to COPD consultations and who were able to communicate. Participants were divided into a control group, which was cared for by teams without advanced nurse practitioner (105 people), and an intervention group, which was cared for by teams with advanced nurse practitioner (105 people)<sup>(14)</sup>.

In the form of an interview, the authors applied the questionnaires in the following order: Personal Information Questionnaire, Self-Care Behaviors Questionnaire, Health-Related Quality of Life Questionnaire and Satisfaction with Care Questionnaire. They continued with the performance of the 6-minute walk test and respiratory function tests. Subsequently, they reviewed the number of visits to the emergency room, hospital admissions, length of stay and health care costs (recorded in medical reports) for the last year. Also during the process, the team's professionals were invited to jointly respond to the Assessment of Chronic Illness Care<sup>(14)</sup>.

The study revealed that the intervention group had higher self-care behaviors and lung function, as well as lower hospital stay and health care costs. At the same time, the authors found that advanced nurses practitioner can lead and support multidisciplinary teams, by educating and developing skills that enable people to perform appropriate self-care (e.g., accurate use of inhalers, promotion of physical exercise and breathing adequate, smoking cessation, early recognition and prevention of exacerbations...)<sup>(14)</sup>.

In addition, advanced nurse practitioner have integrated other components of the model, using clinical guidelines and providing effective care (through care planning, consultations, home visits and case management). The articulation of advanced nurses practitioner with community resources and with the other team members also enabled the creation of productive interactions, with the objective of functional improvement and the improvement of the person's quality of life. A positive example was the action of an advanced nurse practitioner, who developed a blow bottle to help people perform breathing exercises, facilitating their self-care, their knowledge about the disease and lung function. Finally, the study revealed that the intervention of these nurses in COPD programs resulted in gains, namely in the improvement of lung function/self-care

behaviors and in the reduction of costs with services and the length of stay<sup>(14)</sup>.

## DISCUSSION

The studies used showed a multiplicity in the ways in which the Rehabilitation Nurse works, namely COPD-GRIP, telephone intervention, models of care with respiratory nursing or the assessment of the need for short-term oxygen therapy. Even so, whatever the form of action, there was a preference for conducting randomized controlled studies (with intervention and control groups). This is in line with the literature, which highlights the comparison of results between people undergoing respiratory rehabilitation programs and people not undergoing them<sup>(15-16)</sup>.

The results showed agreement on the impact in terms of the reduction of hospital (re)admissions<sup>(10-11,13)</sup>, the increase in the perception of disease control and the surrounding environment<sup>(9-11,14)</sup>. At the same time, studies have shown a direct relationship between the role of the RN and the reduction in hospitalization time and financial burden for health institutions<sup>(13-14)</sup>.

Thus, the results obtained seem to be in agreement with some authors. In fact, in a study, which sought to estimate the cost of exacerbations of people with COPD undergoing a Pulmonary Rehabilitation Program, the authors found that a longer stay in the program was directly related to a reduction in the number and severity of exacerbations, as well as in cost reduction<sup>(2)</sup>.

In addition to the above, the results corroborate a study, where the authors, when comparing 2 groups (with and without the intervention of the rehabilitation nurse) concluded that the group that received the intervention of the rehabilitation nurse obtained gains in the two main dimensions of the SF Health Questionnaire-36, in physical performance, general health and vitality<sup>(15)</sup>.

Comparing the results obtained with the state of the art, there was an agreement in the improvement of activity tolerance and quality of life. However, only one study was found to be in agreement with the improvement in dyspnea<sup>(17)</sup>.

It is important to emphasize that although few countries have specialist nurses in rehabilitation nursing (with the same specific skills as the one legislated in the Portuguese context), many have advanced nurses in the field of chronic respiratory disease. These experts (“respiratory nurses”) have training, knowledge and clinical experience, performing similar interventions in approaching people with COPD. In fact, the articles analyzed highlight the specialized “look” of rehabilitation nurses towards the person. This is in line with the literature that recognizes that rehabilitation nurses recognize the impact of context and environment, being essential to manage complex situations and intervene at any stage of life, establishing partnerships with people and communities and coordinating interdisciplinary care plans<sup>(18)</sup>.

Finally, it is noteworthy that the studies converge in certain aspects on the gains of the Rehabilitation Nurse, reflecting on the reality of some contexts. Still, it is noteworthy that little research exists on intervention outcomes.

## CONCLUSION

This systematic review proposed to answer the guiding question “What is the impact of the intervention of the Rehabilitation Nurse on the Person with COPD?”, seeking to highlight the results of the intervention of the Rehabilitation Nurse. The studies highlighted diversity in the ways of acting of the Rehabilitation Nurse. The results were consistent with regard to the impact on reducing hospital (re)admissions and increasing disease control.

There was a direct relationship between the performance of the Rehabilitation Nurse and the reduction of hospitalization time and costs for organizations, which may have implications for decision-making by health managers. In addition, the studies converge in some aspects on the gains of the Rehabilitation Nurse, answering the initial question and reflecting on the reality of some health contexts.

This review has, therefore, implications at the level of education, as it demonstrates to students the importance of highlighting effective nursing care. Finally, it is suggested that investigations be carried out on the impact of the Rehabilitation Nurse on adherence to the therapeutic regimen (e.g. inhalation therapy) in people with COPD.

## Limitations of systematic literature review

This systematic review has some limitations. The first is related to the limitation of articles to English or Portuguese, as this conditions the appearance of articles published in other languages. Another limitation is the fact that articles were excluded because they did not have a full text or because they require subscription to the journal in question, reducing the number of available articles. Finally, the third limitation is due to the fact that we chose to study the general impact of the Rehabilitation Nurse intervention, which may have excluded interesting evidence on the economic impact for the health institution, for the satisfaction of the person with COPD, or on specific interventions by the Rehabilitation Nurse. However, it is important to emphasize that the objective of this systematic review was never to study the results of specific interventions by the Rehabilitation Nurse, but rather to understand and deepen the impact that their approach and perspective can have on the person with COPD.

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