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THE ROLE OF DIET DURING HEALTH EDUCATION PROGRAMS FOR THE IMPROVEMENT OF CLINICAL OUTCOMES IN COPD PATIENTS: LITERATURE REVIEW

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ABSTRACT

Introduction: Chronic obstructive pulmonary disease is a growing health problem. It is a chronic inflammatory lung disorder characterized by progressive, poorly reversible airflow limitation. The identification of modifiable risk factors for prevention and related patient health education have given positive results. We have passed from the observation of risk factors to a careful diet rich in substances capable of improving lung function. The purpose of this integrative review was to identify, describe and summarize previous studies that have investigated the importance of health education about nutrition in patients with COPD.

Materials and methods: For this scope, a review process was conducted following these five steps: 1) identification of the research problem, 2) literature research, 3) data evaluation, 4) data analysis and 5) presentation of the synthesis of the results. After the identification of the research problem, the second phase of the literature research was conducted using the CINAHL and PubMed databases. MeSH search terms included: COPD, health education, malnutrition, and Quality of Life. These terms have been combined each other using boolean operators. The electronic research was limited to the articles published in the English language within the past 10 years. Studies that responded to the hypotheses of bibliographic research were considered. Primary studies, systematic reviews and guidelines were included. Bibliographic research was conducted from 1 June 2024 to 24 October 2024.

Results: Some studies show that by eliminating risk factors, improving nutrition and educating the patient to self-manage the disease through tertiary prevention programs, there has been an improvement in the patients' quality of life.

Conclusion: Correct health education is important to have "instructions" on the pathology and its self-help management. Outcomes are enhanced by self-efficacy interventions that aim to achieve a healthy lifestyle through behavior modification, especially about diet.

Keywords: COPD, health education, malnutrition and Quality of Life.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) was ranked as the third leading cause of death worldwide in 2016 [1] and the fourth leading cause of death in the United States in 2017 [2]. The prevalence of COPD was reported to be approximately 300 million in 2017 [3]. Furthermore, the incidence of COPD expected to increase further in the coming years due to an aging population and continued exposure to COPD risk factors, including tobacco smoke, occupational dusts and chemicals, biomass fuel and air pollution [4]. So, COPD can be prevented by reducing exposure to these risk factors, including avoidance or early cessation of smoking [5]. This disease is characterised by persistent respiratory symptoms and airflow limitation [6], providing in this way a significant burden for patients and society. In effect, patients suffering from BPCO complain reduced daily physical activities, impacting on their work and social life. The consequence is often the onset of psychological conditions such as anxiety and depression [7,8]. Together, all these factors decrease health-related quality. COPD is caused by the alveolar wall destruction which results in air trapping and static hyperinflation [9,10], increasing the mortality of these patients compared to the general population [6]. Symptoms of COPD may include chronic and progressive dyspnoea, chronic cough (with or without sputum production), chest tightness or fatigue [11-17]; patients typically do not seek medical help until symptoms have a substantial impact on their daily life [18]. Sarcopenia, which is common in COPD, worsens dyspnoea due to reduced muscle mass leading to decreased exercise capacity and increased breathless ness [19]. In effect, patients with COPD, especially those with advanced emphysema, often have severe nutritional deficiencies. Weight loss in COPD patients has been associated with malnutrition [20] and such patients also have high mortality rates [21]; therefore, they require nutritional support. However, once these patients lose weight, it is difficult for them to regain it. Malnourished COPD patients experience a 1.5-fold increase in resting energy expenditure, compared to the healthy population. Therefore, among the risk factors to pay attention for public health, apart from smoking cessation [22], diet has

been recognized as a modifiable risk factor for the development and progression of the disease [23]. A better understanding of the impact of diet on COPD prevention and/or outcomes can raise awareness of the importance of nutritional approaches, providing insights to promote lung health and to prevent disease onset and progression. As we have seen, if the patient follows a good nutritional plan, he can have an improvement in the disease. The nurse plays an important role thanks to good health education that promotes self-care in people with COPD. Currently, patients are provided with disease management training both in hospital and at home to implement patient self-efficacy. Self-efficacy intervention is essential because it aims to achieve a healthy lifestyle through behavior regulation [24], to improve quality of life and avoid the exacerbations [25]. The identification of these modifiable risk factors for prevention is important: Sarcopenia is associated with a poorer quality of life, increased risk of repeated hospital admissions and higher mortality [26]. Good health education can give positive results. The role of the nurse is to support patients in developing self-management skills, providing adequate information and feedback on behaviors in case of exacerbations, also improving their nutritional plans [27]. This type of prevention is called tertiary prevention because it does not indicate the prevention of the disease, but is used to avoid complications, the probability of recurrence and death. The purpose of this integrative review was to identify, describe and summarize previous studies that have investigated the importance of health education about nutrition and its factors in patients with COPD.

MATERIALS AND METHODS

In the study of this topic, we formulated the following questions:

1. How can the modification of diet improve the quality of life of COPD patients?
2. Is there the impact of health education by health professionals on the adherence to new lifestyles from COPD patients?

We conducted the research using the P.I.O. framework, which stands for population, intervention

and outcomes (Table 1).

POPULATION	COPDS PATIENTS
INTERVENTION	HEALTH EDUCATION ABOUT NUTRITIONAL PLAN
OUTCOME	REDUCE MORTALITY, HOSPITALISATION, EXACERBATIONS AND WORSENINGS OF SYMPTOMS

Table 1. *The PIO methodology assessment*

Study Design

The study design is an integrative review performed following the PRISMA (Preferred Reporting Items for Systematic-review and Meta-Analysis) (PRISMA) guidelines [28]. So, a review process was conducted by C.R. and P.S. following these five steps: 1) identification of the research problem, 2) literature research, 3) data evaluation, 4) data analysis and 5) presentation of the synthesis of the results [29]. Bibliographic research was conducted from 1 June 2024 to 24 October 2024. After the identification of the research problem, the second phase of the literature research was conducted using the CINAHL and PubMed databases. MeSH search terms included: COPD, health education, malnutrition and Quality of Life. These terms have been combined each other using Boolean operators “AND” and “OR”. The search strategies for each database are provided in the search string table (Table 2).

DATABASE	KEYWORDS COMBINATION
PUBMED	modification[All Fields] AND ("diet"[MeSH Terms] OR "diet"[All Fields]) AND improve[All Fields] AND ("quality of life"[MeSH Terms] OR ("quality"[All Fields] AND "life"[All Fields]) OR "quality of life"[All Fields]) AND ("pulmonary disease, chronic obstructive"[MeSH Terms] OR ("pulmonary"[All Fields] AND "disease"[All Fields] AND "chronic"[All Fields] AND "obstructive"[All Fields]) OR "chronic obstructive pulmonary disease"[All Fields] OR "copd"[All Fields]) AND ("patients"[MeSH Terms] OR "patients"[All Fields])
PUBMED	"impact"[All Fields] AND ("health education"[MeSH Terms] OR ("health"[All Fields] AND "education"[All Fields]) OR "health education"[All Fields]) AND ("health personnel"[MeSH Terms] OR ("health"[All Fields] AND "personnel"[All Fields]) OR "health personnel"[All Fields] OR ("health"[All Fields] AND "professionals"[All Fields]) OR "health professionals"[All Fields]) AND adherence[All Fields] AND new[All Fields] AND ("life style"[MeSH Terms] OR

	("life"[All Fields] AND "style"[All Fields]) OR "life style"[All Fields] OR "lifestyles"[All Fields]) AND ("pulmonary disease, chronic obstructive"[MeSH Terms] OR ("pulmonary"[All Fields] AND "disease"[All Fields] AND "chronic"[All Fields] AND "obstructive"[All Fields]) OR "chronic obstructive pulmonary disease"[All Fields] OR "copd"[All Fields]) AND ("patients"[MeSH Terms] OR "patients"[All Fields])
CINAHL	Modification AND ("diet"[MeSH Terms] OR "diet") AND improve AND ("quality of life"[MeSH Terms] OR ("quality" AND "life") OR "quality of life") AND ("pulmonary disease, chronic obstructive"[MeSH Terms] OR ("pulmonary" AND "disease" AND "chronic" AND "obstructive") OR "chronic obstructive pulmonary disease" OR "copd") AND ("patients"[MeSH Terms] OR "patients").
CINAHL	"impact" AND ("health education"[MeSH Terms]) OR ("health" AND "education") OR ("health education") AND ("health personnel"[MeSH Terms] OR ("health" AND "personnel") OR "health personnel" OR ("health" AND "professionals") OR "health professionals") AND adherence AND new AND ("life style"[MeSH Terms] OR ("life" AND "style") OR "life style" OR "lifestyles") AND ("pulmonary disease, chronic obstructive"[MeSH Terms] OR ("pulmonary"AND "disease" AND "chronic" AND "obstructive") OR "chronic obstructive pulmonary disease" OR "copd") AND ("patients"[MeSH Terms] OR "patients")

Table 2. *Search string in databases.*

Inclusion and Exclusion criteria

Studies that responded to the hypotheses of bibliographic research were considered. Primary studies, systematic reviews and guidelines were included. The inclusion criteria used for the selection of articles were human population including both males and females, studies in English language, available abstract, publications of the last 10 years and scientific articles. Articles of national and international scientific literature whose title and content contained at least one of the keywords or a link to them are included. All those quotes for which it was not possible to find the written "full text" version were excluded. The selected studies were found in full text format, read critically and the relevant ones were included in the review.

RESULTS

The selection process resulted in the inclusion of 6 articles, as shown in Figure 1, according to the 2020 Preferred Reporting Items for Systematic-review and Meta-Analysis (PRISMA) guidelines [28].

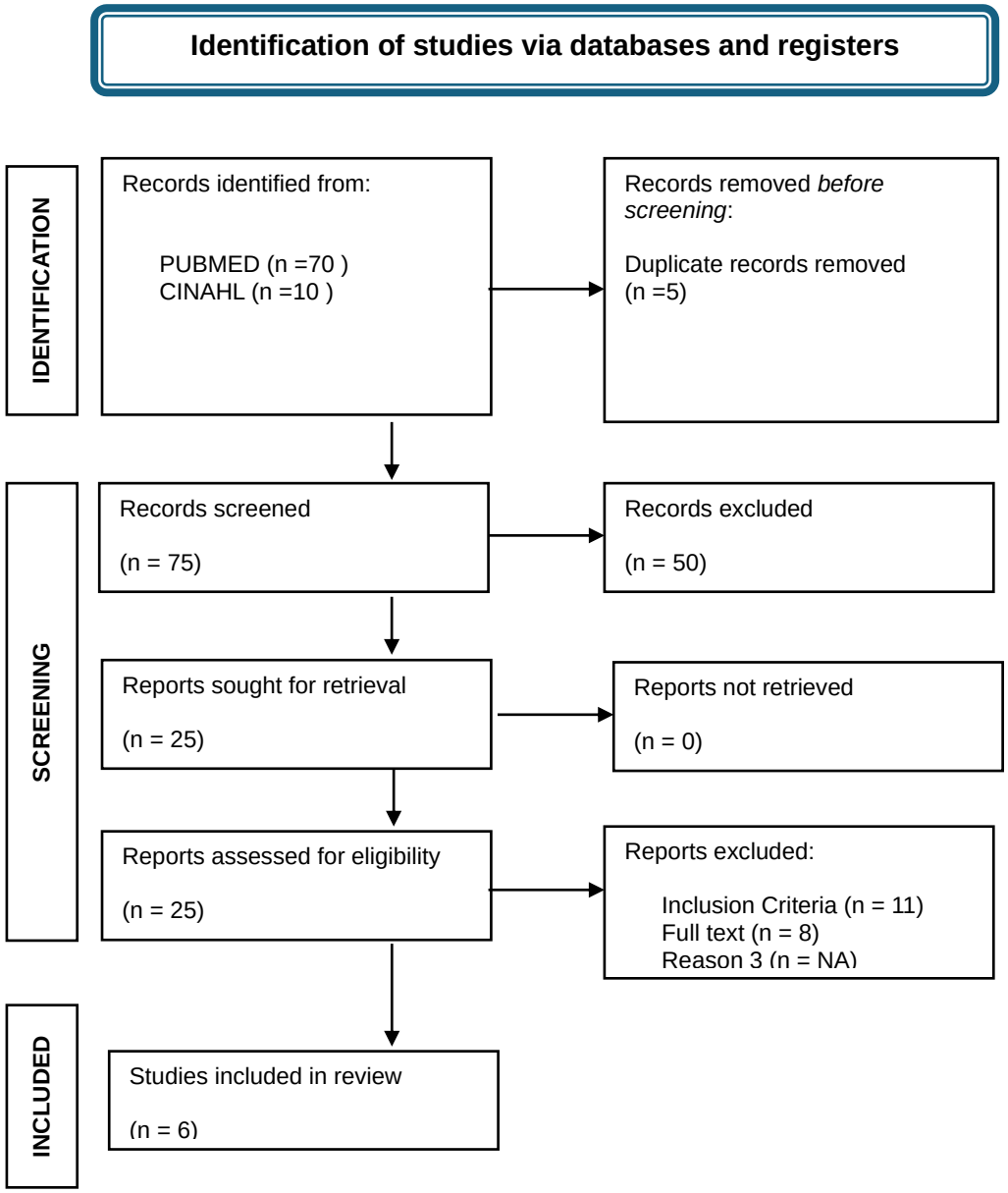

Figure 1. *PRISMA flow diagram for this review*

The following table reports the included studies, describing their features: year of publication, name of authors, title, scope, methodology, study sample and their results (Table 3); 6 articles were identified, published between 2018 and 2024, with different methodology as follows: three randomized controlled trials, two cross-sectional studies and one experimental study. Four studies were conducted in the European countries (Norway [30], Iceland [31], Turkey [32] and Hungary [34]) while only two in Asian continent: exactly, in Japan [33] and China [35].

YEAR	AUTHORS	TITLE	SCOPE	RESEARCH METHOD	SAMPLE	RESULTS
2018 [30]	Heidi B Bringsvor, Eva Langeland, [...], and Signe Berit Bentsen	Effects of a COPD self-management support intervention: a randomized controlled trial	Promote self-management, self-efficacy after COPD patient education programs	Randomized controlled trial	182 patients	In people with COPD, an educational plan gave way to acquire skills and constructive attitudes in self-monitoring of symptoms and disease course.
2019 [31]	Arora Ros Ingadottir, Anne Marie Beck, Ingibjorg Gunnarsdottir	Oral nutrition supplements and between-meal snacks for nutrition therapy in patients with COPD identified as at nutritional risk: a randomized feasibility trial	To evaluate the impact of nutrients on lung function and COPD progression. Several dietary options may be considered in terms of COPD prevention and/or progression.	Randomized study.	34 participants at nutritional risk, of which 19 took oral food supplements and 15 snacks, providing 600 kcal and 22 gr of protein per day in addition to the regular daily diet.	In COPD patients who are at nutritional risk, snack foods are more feasible and effective than oral dietary supplements.
2020 [32]	Ayşe Çevirme, PhD and Gönül Gökçay, PhD student	The impact of an Education-Based Intervention Program (EBIP) on dyspnea and chronic self-care management among chronic obstructive pulmonary disease patients	Evaluate the impact of dyspnea and outcomes on an education-based intervention program (EBIP) versus routine care.	Single-blind randomized controlled study	51 patients diagnosed with stage 2 chronic obstructive pulmonary disease (COPD) divided into experimental and control groups. Participants are similar in terms of gender, marital status, smoking status, disease duration and age.	In patients with stage II COPD, structured education programs (often including the presence of nurses in the form of home visits and telephone calls) contribute to the management pf COPD symptoms, primarily dyspnea.
2020 [33]	Takako mouri, Chieko hatamochi, and Koichi takayama	Education Program for Male Patients with Chronic Obstructive Pulmonary	To evaluate the effects of an educational program to change the eating	Experimental study	22 male participants, of which 11 in the intervention group with an average	In order to prevent malnutrition in patients with COPD, it was sufficient to provide them with relevant knowledge in increased energy

		Disease to Change Dietary Behavior	behaviors of male COPD patients.		age of 67 years and 11 in the control group with an average age of 72 years (the patients are only male in order to control the effects of sex on eating behavior).	intake.
2021 [34]	Fekete, M.; Fazekas-Pongor, V.; Balazs, P.; Tarantini, S.; Szollosi, G.; Pako, J.; Nemeth, A.N.; Varga, J.T.	Effect of malnutrition and body composition on the quality of life of COPD patients.	to determine the correlation between nutritional status and quality of life of COPD patients.	cross-sectional study	Fifty patients (mean age was 66 years). Mean body mass index (BMI) was 26.2.	Considering that malnourished COPD patients may have reduced lung function and lower quality of life compared to normal weight patients, nutritional therapy must be included in the treatment of COPD patients combined with nutritional risk screening during the follow-up.
2024 [35]	Qi Jiang, Zheru Ma, Jing Sun and Yang Li	Association of dietary inflammatory indices with sarcopenia and all-cause mortality in COPD patients	Explore the relationship between sarcopenia in patient with COPD and mortality	cross-sectional study,	1429 patients	A significant association between concurrent sarcopenia and an increased risk of all-cause mortality in COPD patients within the United States was observed.

Table 3. *Analysis of selected studies*

DISCUSSION

The purpose of this integrative review was to identify, describe and summarize previous studies that have investigated the importance of health education about nutrition in patients with COPD, addressing COPD from a non-pharmacological perspective, analysing how a health education about nutritional plan can improve the health of COPD patients. Health education, in terms of self-management interventions, should be part of chronic care for patients with COPD, at all stages of

their disease. A good health education also improves self-management of the disease and its awareness [27]. In fact, the patient is able to perceive his own skills and competences in managing the pathology. The identification of modifiable risk factors for the prevention and treatment of COPD is the first step. About this, increased awareness of diet and dietary factors that influence respiratory health may be of interest to public health, due to their effects on the disease course. For this reason, informing and educating the patient should be the main goal with patients suffering from COPD. A randomized controlled trial by Bringsvor et al. [30], involving 182 patients, evaluated the effects of a COPD self-management support intervention. The results showed significant positive changes in patients' attitudes and approaches, with an acquisition of skills thanks to educational activities on disease awareness. This confirms the effectiveness of educational interventions, which should also include nutrition as an integral part of treatment. In line with this evidence, a study conducted by Ingadottir et al. [31], involving COPD patients divided into two groups (one with snacks and the other with food supplements), showed that a weight gain of more than 2 kg was a significant predictor of survival in underweight patients. Both groups gained weight during the 12-month follow-up, but the group receiving snacks showed a greater weight gain than the group receiving food supplements. The results suggest that in COPD patients at nutritional risk, snacks may be more effective and practical than oral supplements. The study by Cevirme et al. [32] also showed that an education-based educational program (EBIP) had positive effects on improving self-management skills, reducing functional disability and improving quality of life. Nurse interventions play an important role in supporting and motivating patients, and COPD patient self-management education reduces the frequency of hospitalizations associated with acute exacerbations and improves patients’ quality of life [36]. In experimental study by Mouri et al [33], the effects of an educational program to change the eating behaviors of COPS patients were also evaluated, including 22 male participants subdivided in two groups (intervention group and control group). The conclusion of this study, as well as in previous studies, was that the prevention of

malnutrition and deterioration in patients with COPS could be obtained providing these patients with relevant knowledge and skills in order to increase the energy intake. In fact, in the study "Effect of malnutrition and body composition on the quality of life of COPD patients" [34] an association between low body weight and the severity of COPD was noted, indicating that patients' nutritional status was linked to their quality of life. This study indicates that malnourished COPD patients may have reduced lung function and lower quality of life compared to normal weight patients. Thus, their findings suggest that nutritional therapy must be included in the treatment of COPD patients during the follow-up [37]. At the end, in the last article "Association of dietary inflammatory indices with sarcopenia and all-cause mortality in COPD patients" [35], the results revealed sarcopenia prevalence in COPD patients, showing a significant association between concurrent sarcopenia and an increased risk of all-cause mortality in COPD patients. Dietary adjustments may be mandatory in order to mitigate muscle wasting and enhance the prognosis of COPD. Targeted nutritional interventions, like high-protein diets, may improve respiratory muscle strength, physical performance, overall health status and quality of life in elderly COPD patients [38]. In the light of the results of different reported studies, in order to obtain a better quality of life and to control the symptoms, the health education programs (also including the intervention of nurse both at the hospital and by home visits) may focus on improving the energy intake and consequently the "status" of muscle mass. An essential concept emerges from all these studies: nutritional status is an important determinant of outcome of COPD and the only way for assessing the nutritional risk of these patients is through longitudinal measurement of body weight and body composition. Probably, two limitations are common to all the studies enrolled in our review; at first, the lack of the evaluation of vitamin D in patients with COPD is to be considered. In effect, as highlighted by Bojesen et al. [39], the prevalence of vitamin D nutrient deficiency is high in COPD and could be incorporated into nutritional risk screening. At second, none of the authors assessed the different metabolic phenotypes of COPD patients, from which a specific nutritional risk is

associated to and that it could be useful in patients counselling. Apart from these two limitations, it is clear that nutritional intervention is likely to be effective in undernourished patients and is probably most effective if combined with an exercise programme. Overall, the evidence from our review indicates that a well-balanced diet with sufficient intake of fresh fruits and vegetables is beneficial to COPD patients, not only for its potential benefits on the lung but also for its proven benefits on metabolic and cardiovascular risk. All this can only be achieved through close interaction between the patient and the health professionals in charge, in order to set up a health program that can be reproduced over time, even and especially when the patient provides for his self-management at home without being guided by health personnel. Furthermore, in the future, healthcare professionals should not only pay attention to the early screening of weight loss in COPD patients, but also provide relevant prevention information, in effect, according to the results from Zhou J et al. [40], age, body mass index, smoking and diabetes mellitus are the contributing factors for sarcopenia in patients with chronic obstructive pulmonary disease.

Limitations of the study

This review has some limitations: at first, only two databases were consulted; furthermore, among enrolled reports, one study limited their subjects to patients that were treated for stage II COPD [32] while another report included only Japanese men in the study [34], limiting its interpretation in terms of gender and ethnic groups. Finally, there are not many studies that have dealt with this topic in the last five years; for this reason, the review is limited to a small number of selected articles, which are long-standing dated.

Implications for clinical practice

The review suggests that different strategies should be adopted for patients with COPD. Except of the elimination of smoking as a risk factor in order to improve the lives of these patients, it is

needed to pay attention to educational programs, focusing particularly on eating behaviour and dietary factors. Through adequate nutritional support that can ensure the right energy intake and a balanced protein intake, associated with adequate exercise, it will be possible to guarantee a positive maintenance of the efficiency of cognitive and physical functions, essential prerequisites for ensuring the elderly maximum autonomy for an excellent life expectancy. The nurse, being in close and continuous contact with patients, assumes a fundamental role in identifying and preventing the causes of malnutrition with prevention programs. The study emphasises the importance of continued training in communications skills for healthcare professionals supporting people with COPD, particularly acknowledging the patient's concerns in the context of symptom changes/flare-up.

CONCLUSION

This integrative review aimed to identify, describe and summarize previous studies that have investigated how a health education about nutritional plan can improve the health of COPD patients. The results of this systematic review suggest that health education programs, including hospital and home nursing interventions, should focus on improving energy intake and muscle mass, to improve quality of life and control symptoms in COPD patients. The success of these interventions depends on a close collaboration between patients and healthcare professionals, to develop health programs that can be replicated over time, even when the patient is managing his or her condition independently at home. It is therefore essential that healthcare professionals not only monitor weight loss early in COPD patients, but also provide preventive information, considering factors such as age, body mass index, smoking and diabetes, which contribute to sarcopenia and worsen the risk of negative outcomes. Future studies should explore the effectiveness of combined interventions, integrating nutritional education and physical exercise, to improve muscle mass and quality of life and, further, focus on long-term, technology-supported self-management models to

monitor and optimize patients' nutritional self-management.

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Conflict of interest

The authors report no conflict of interest.

Authors' contribution

RC was the major contributor in writing the manuscript. AB, MP, MG, GG, DF, JM, AL and SP performed the data collection and interpreted the patient data regarding pulmonary disease. All authors read and approved the final manuscript.

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