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EVALUATION OF LEARNING IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE DURING A PULMONARY REHABILITATION PROGRAM

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ABSTRACT

Background: Patients who undergo pulmonary rehabilitation programs also participate in an educational program with classes covering matters related to their disease and treatment. Such programs aim to provide patients with the knowledge needed for them to be able to deal with their disease and its repercussions. Objective: To evaluate whether the educational program applied to patients undergoing pulmonary rehabilitation has effective results regarding their learning. Method: This was a prospective study involving 22 patients who underwent a pulmonary rehabilitation program. Their mean age was 63 years (SD ± 11.8). Initially, a questionnaire developed and validated by the Pulmonary Rehabilitation Center of UNIFESP/LESF was applied to evaluate the patients' knowledge about the disease before and after the educational intervention. The patients were divided into two groups: one with the educational program and the other serving as a control group (no educational program). The educational program group answered the questionnaire twice (before and after the intervention), and the control group answered only once. Results: The patients who underwent the educational program presented an increase in the percentage of correct answers, from before to after the intervention (69% versus 84%, respectively), and a decrease in the percentage of mistakes, from before to after the intervention (20% versus 14%, respectively). Conclusion: The educational program applied to patients in the pulmonary rehabilitation program was effective to increase the patients' knowledge about their disease, its consequences and its treatment.

Key words: COPD; education; rehabilitation; physical therapy.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is characterized by a limitation of the air flux, which is not totally reversible. This limitation is, in general, progressive and associated with an abnormal inflammatory lung response to harmful particles or gases[1]. The real prevalence of COPD is not known in our field. The data on it in Brazil were obtained were based upon symptomatic questionnaires, which allow the estimation of COPD in adults older than 40 years in 12% of the population, that is, 5.500.500 individuals[2].

According to the *American Thoracic Society*[1], morbidity data include medical consultations, visits to emergency rooms and hospitalizations. Morbidity due to COPD increases with age, and is more common in men than in women. Admission costs are high for patients of low socioeconomic levels. Morbidity will tend to increase in the future, not only due to the changes of habits, but also due to aging of the population.

Pulmonary rehabilitation is one of the auxiliary forms on the treatment of COPD patients, removing them from a state of inactivity, and inserting them in a physical activity program. Pulmonary rehabilitation is defined as a program directed towards chronic pulmonary disease patients and their relatives, developed by a specialized multi-disciplinary team, promoting individualized treatment prescribed and designated to optimize physical performance, promoting functional and social autonomy of the patient with respiratory limitations[3].

Due to the compromising of the lung histo-architecture generated by pneumo-disease, pulmonary rehabilitation does not help the patient in his state of air flux obstruction, but aids him in decreasing the systemic deficiencies and dysfunctions as the result of secondary processes of pulmonary disease such as, for example, peripheral muscle and respiratory dysfunctions, nutritional abnormalities, cardiovascular deficiencies, and skeletal, sensorial and psycho-social perturbations[4].

Patients who complete the pulmonary rehabilitation programs show positive psychological changes, increase functional skills, increase motivation of the exercises and consequently improve their quality of life[5]. If treatment of the patient is considered a consumer service, education cannot be ignored as a fundamental component of this service[6]. Most of the pulmonary rehabilitation programs defend the necessity of the inclusion of an educational program in its treatment context, however, its still not clear the benefits that this program may offer[5].

In Brazil, clarification about the features of certain diseases for the patient is made in a discrete way, without the existence of an effective educational program that instructs the individuals. Besides, over-crowding of health centers does not allow professionals to dispose of their time to explain the patient what his disease means, and how to control it in a better way. The patient, in turn, neglects such information, once the doctor is already taking care of him. This cycle does not allow most part of the population to have access to information on their disease, placing the load of its handling completely on the health professionals[7].

Education is one of the pulmonary rehabilitation program components, and that is why its isolated effects cannot be readily determined. Among the benefits of education are: active participation of the patients in their healthcare; aiding the patient and family to deal with the disease and its consequences; the comprehension that they have of their physical and psychological alterations, stimulating, thus, adhesion to treatments[3].

Since COPD is a progressive, chronic disease that hospitalizes thousands of individuals, educational programs are a fundamental component of pulmonary rehabilitation, providing basic orientations to patients and their relatives. Therefore, it becomes necessary to assess how much of these orientations are assimilated by the patients.

METHODS

The realization of the present study began after submitting the research project to the Research Ethics Committee of the Nove de Julho University Center, and receiving its approval (nº. 067/2005). This study was prospectively performed, with the administration of a knowledge assessment questionnaire, developed and validated by the Pulmonary Rehabilitation Center of the Federal University of São Paulo/School Home São Francisco (UNIFESP/LESF)[7], to the patients of a pulmonary rehabilitation program of the Nove de Julho University Center, in the city of São Paulo.

The questionnaire is specific for pulmonary rehabilitation and is divided into the following themes: disease, smoking, medicines, energy conservation exercise effects, nutrition and hydration, with three questions on each theme, for a total of 24 questions. Scoring on this questionnaire was by the percentage of correct, wrong, and 'don't know' answers; in this way, it was possible to know the level of information that the patient has about his disease.

Patients with COPD diagnosis were included in the study according to the criteria of the *Global Initiative for Chronic Obstructive Lung Disease* (GOLD), without cardiovascular disease, referred to the service in order to perform pulmonary rehabilitation, and who signed the free and clarified consent term. The exclusion criterion was absence from any class related to the themes of the questionnaire.

Protocol

Patients were divided into two groups (morning and afternoon), according to their preference and convenience, to perform pulmonary rehabilitation. The morning period group was submitted to the educational program and the afternoon period group was not submitted to the educational program during the period of this study, however, afterwards these patients had access to the same information.

The group of patients who participated of the pulmonary rehabilitation and educational program (EG) participated in six lectures elaborated and developed according to the themes specified in the questionnaire (disease, smoking, medications, energy conservation, exercise effects, nutrition and hydration). The questionnaire was applied before the first lesson and after the sixth lesson, when all themes were already presented.

Lessons occurred on six consecutive Mondays in a room at the physical therapy laboratory with the use of multimedia resources, such as data-show, television and video. Elaboration and presentation of the material were the tasks of the teachers and trainees of the physical therapy course, and some teachers from nursing, nutrition and pharmacy courses, involved in the ambulatory activities.

The group of patients, or control group (CG) who performed pulmonary rehabilitation during the afternoon period and, therefore, did not participate of the educational program completed the questionnaire once, at the start of the program, for they did not received any interventions during the study. Differences at the $p < 0.05$ level were considered statistically significant[8,9].

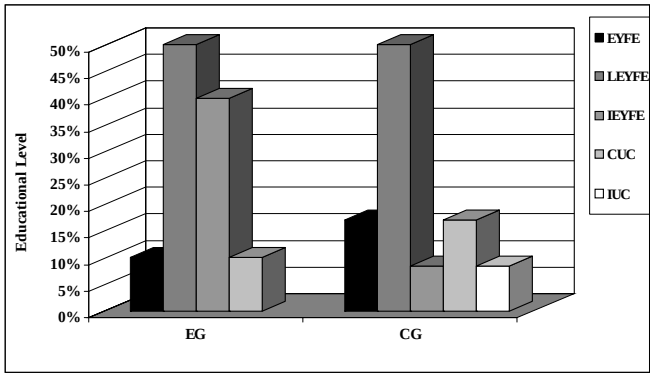
RESULTS

Initially, 25 patients were selected, however three were excluded, since they did not return to answer the questionnaire after the six consecutive lessons. Then, the sample used was of 22 patients, with six (27.3%) females and 16 (72.7%) males. The mean group age was 63 (SD ± 11.8) years. The characteristics of the 22 patients who completed the study are presented at Table 1.

Table 1. Information on patients' age, gender and educational level.

n	22
Age (year)	63 (11.8)
Male	16 (72.7%)
Female	06 (27.3%)
Less than eight years of formal education (LEYFE)	10
Eight years of formal education (EYFE)	03
Incomplete 11 years of formal education (IEYFE)	05
Incomplete under graduation course (IUC)	01
Complete under graduation course (CUC)	03

Regarding the degree of instruction of the patients, after having applied *Student's* t test, it was verified that there were statistically significant differences between both groups with a p= 0.351, although there are patients with different levels of school achievements in both groups, as can be found at Figure 1.



EYFE: Eight years of formal education; LEYFE: Less than eight years of formal education; IEYFE: Incomplete 11 years of formal education; CUC: Complete under graduate course; IUC: Incomplete under graduate course.

Figure 1. Percentage of patients the study divided by educational level.

According to the proposed questionnaire, patients could answer correctly, incorrectly, or simply answer 'don't know'. Comparing the answers of the questionnaires on the EG before and after the education program, the following results were obtained: 69% correct answers previously to the program, and 83% afterwards the program; 20% wrong answers before, and 14% wrong answers after the program; 11% of 'don't know' answers before, and 3% after the program. When the pre- and post-education program answers were compared, it was found that there were statistically significant differences (p= 0.02) in relation to the percentage of correct, wrong, and 'don't know' answers (Figure 2).

Figure 3 shows that the EG group had 83% correct, 14% wrong, and 3% 'don't know' answers after the educational program. CG group demonstrated 76% correct, 16% wrong and 8% 'don't know' answers. Comparisons between both groups revealed that there were statistically significant differences (p= 0.01) in relation to the correct, wrong and 'don't now' answers.

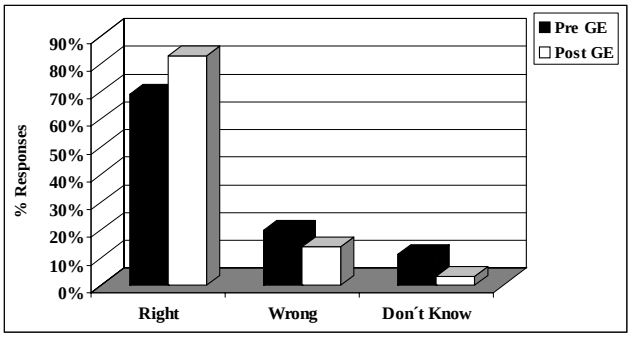


Figure 2. Percentage of responses right, wrong and don't know, pre and post-educational program.

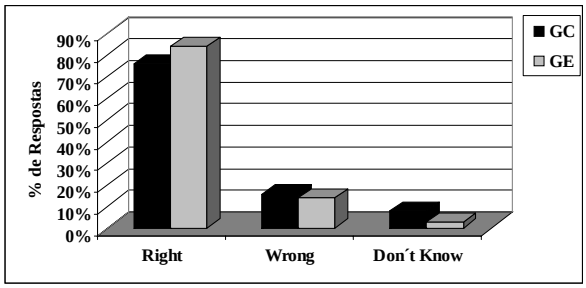


Figure 3. Percentage of responses right, wrong and don't know, compared between control group (CG) and educational group (EG).

DISCUSSION

In COPD patients, cognitive functional declines have an intense relationship with age and the course of disease duration is not related to instruction levels[10]. Results from the neuro-psychological tests showed that the memory of these patients is damaged, which impedes the evocation of verbal and non-verbal information, making it difficult to remember the lessons, and recognition of the studied material[11]. Cognitive development has particular relevance in populations suffering from COPD, because research shows that the cognitive deficits of patients with hypoxemia contribute to a lower quality of life due to mental confusion and memory problems[12].

In this study, it was observed that most of the patients in both groups had not concluded junior high school, a fact that made the administration of the questionnaire difficult, since the patients had reading and understanding deficits. Thus, the supervisors in the rehabilitation program, avoided false interpretations by impartially reading the questionnaire.

Lisansky et al. [12] studied cognition, anxiety, depression, somatic symptoms, hostility and inaptitude disturbances in patients suffering from COPD by means of an educational and self-care program, with initial and final interventions.

They concluded that the interventions had positive results in all of the studied variables, suggesting that, despite cognitive and behavioral changes, the educational programs were effective and should be applied to these patients. The multidisciplinary health professional teams studied and added new techniques, with which science and education might provide resources for the efficient and differentiated treatment to patients with chronic diseases[13, 14].

Patient-directed health education has been shown to be fundamental in order to create an understanding of the physical and psychological changes caused by disease. Teaching patients how to properly deal with their diseases makes them more apt to develop self-care attitudes[13,14]. Unfortunately, most patients with chronic lung diseases are poorly prepared to take part in decision-taking regarding their health, because of the limited availability of health professionals who can discuss subjects related to their disease[15]. The educational program developed for patients with CODP had the main objective of helping patients to better control their disease in the various situations of daily life, by means of attitudinal and behavioral shifts towards the difficulties imposed by his disease[16].

Educational programs may be applied in small groups or for a single individual, depending on the patient's needs, location, resources and the pulmonary rehabilitation project. It is common for the COPD patients to believe that the rehabilitation program will change their pulmonary function, not aware of his peripheral muscle limitation and physical incapacities. Patients must comprehend that lung limitations are treated with medicine and that, most times, they are already using them in high doses when they are referred to a pulmonary rehabilitation program. They must also acknowledge the importance of physical exercise in oxygen uptake and the utilization of energy, as well as exercising as an instrument to maintain their functionality[17].

The questionnaire used in this study contains questions related to pulmonary functioning; the benefits of lung rehab; the use and effects of medicines; and to energy-saving techniques. It was observed that before the educational program, patients had questions regarding all of these topics, which were reduced after the educational program. According to Oliveira et al.[18], the direct costs of an educational program directed towards patients with COPD suffer reduced hospitalization expenses, visits to emergency rooms, and for total expenses, which makes this program economically attractive. Denise et al.[19] studied how to identify elements that influence COPD patients' quality of life, and how educational practices contribute to improve it. They observed that group education produces effective results in health promotion, and improving quality of life.

In order to assess the learning of patients in this study, they completed the questionnaire before and after the educational program, which resulted in more correct answers (69% increased to 83%), than wrong answers (20% decreased to 3%) when pre- and post-program answers were compared. There was, also, a decrease on the number of 'don't know' answers (11% decreased to 3%), which showed that the program decreased the most frequent doubts in relation to aspects of the disease and treatment.

Ries at al.[15] performed a randomized study with 119 patients, with no significant clinical differences, divided into two group: 67 participated of the rehabilitation program, and the other 62 only in the educational program. Afterwards, they compared the evolution of both groups on the pre-rehabilitation periods, 2, 6, 12, 18, 24, 48, and 72 months after the beginning of the experiment. They verified that the group that performed the rehabilitation program resulted in higher exercise tolerance, greater endurance, and better gait efficiency, as well as decreases in dyspnea and muscle fatigue. There were no statistical differences in life span increases, hospitalization time, life quality, and for the depression indices between both groups. However, differences between the groups tended to decrease after a year of follow-up. The authors concluded that physical exercise and associated educational programs promoted an ideal interaction for pulmonary rehabilitation.

Howland et al. [20] analyzed the impact of education on patients with different levels of bronchial obstruction. They concluded that patients with moderate to severe levels of obstruction did not show significant differences in relation to the perception of their health, general state regarding symptoms, physical functioning, mental health, or social functioning. They show that the devastating action of the disease frustrated the patient in regards to expected improvements. In this case, when patients are submitted to educational interventions, they learn how to appreciate the medical measures, thus optimizing treatment and the symptoms decrease during pulmonary rehabilitation.

Gallefos et al.[21] studied 140 patients with COPD and asthma in order to assess the educational program and self-care of patients regarding medicines use. Volunteers were randomized into two groups: 70 who participated in the educational program, and 70 in the control group. Statistical differences were found between the groups regarding dose reduction of the most often used daily medicine, which allowed them to conclude that the educational program may change the patients' habits, thus reducing the necessity of high medicine doses.

Recently, Souza[22] assessed the learning of COPD patients submitted to a standard educational program and, in order to do so, used the same knowledge-assessing questionnaire used in the present study. Results revealed that, after the educational program, there was an increase in the number of correct answers of the questionnaire regarding knowledge about the disease, varying from 59.58% to 91.25% ($p< 0.001$), better energy-saving techniques, and higher scores of correct answers on the utilization of inhaling medications, varying from 6.5% to 10.25% ($p= 0.002$).

In the present study, statistical differences were found between pre- and post- educational programs on the EG (p= 0.02). This data shows that patients who followed the educational program acquired greater knowledge about the disease and its treatment, answered the questionnaire more assuredly, made fewer mistakes, and showed fewer doubts while answering the questionnaire, thus corroborating the findings of Souza[22]. Together with the results from the studies by Gallefos et al.[21]; Howland et al.[20]; Ries et al.[15]; and Souza[22], data from this study point towards the importance of instituting a well-structured educational program in a pulmonary rehabilitation program.

Devine and Pearcy[23] reported that the main objectives of educational programs are the individual assistance regarding behavior and health care, and the stimulation of health prevention and promotion. Other objective is related to the learning acquired through contacts between patients with the same problem, sharing of new experiences, the patients' motivation, improvement, and the availability of patients and their families for treatment.

Although differences were found between the EG post-educational program questionnaire and the CG (p= 0.01), it cannot be stated these differences are real, because the CG answered the questionnaire before starting the rehabilitation program, and did not answer it after six weeks as occurred with the EG, the second objective proposed by Devine and Pearcy[23] was not considered.

In any case, the relevance of this study resides in the fact of drawing the attention of health professionals to the importance of keeping patients well informed about their disease and the proposed treatment, especially of COPD, which is a limiting, progressive, and irreversible disease. By means of this study, it is concluded that the educational program applied to COPD patients has shown itself to be efficient, because it increased the patient' knowledge about their disease and its treatment.

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REFERENCES

1. Global Initiative for Chonic Obstructive Lung Disease. Guia de bolso para o diagnostico, a conduta e prevenção da DPOC. São Paulo: Anexo Gráfica e editora; 2005.
2. Jardim J, Oliveira J, Nascimento O. II Consenso brasileiro sobre DPOC. J Pneumol. 2004;30:S1-42.
3. American Thoracic Society. Pulmonary rehabilitation. Am J Crit Care Med. 1999;159:1666-82.
4. Rodrigues LS, Veigas A, Lima T. Efeitos da reabilitação pulmonar como tratamento coadjuvante da doença obstrutiva crônica. J Pneumol. 2002;28:65-70.
5. Manzetti JD, Hoffman LA, Sereika SM, Sciurba FC, Griffith BP. Exercise, education, and quality of life in lung transplant candidates. J Heart Lung Transplant. 1994; 13:297-305
6. Dunlevy CL. Educação do paciente e promoção da saúde. In: Scanlan R, Wilkins JK. Fundamentos da terapia respiratória de Egan. São Paulo: Manole; 2000. p. 1087-97.
7. Araújo PD. Plano educacional para pacientes com doença pulmonar obstrutiva crônica: Validação de um questionário [dissertação]. São Paulo (SP): UNIFESP; 2001.
8. Guedes MLS, Guedes JS. Bioestatística: para profissionais da saúde. Rio de Janeiro: Ao livro técnico; 1988; p. 200.
9. Vieira S. Introdução à bioestatística. Rio de Janeiro: Campus; 1980.
10. Krop HD, Block AJ. Neuropsychologic effct of continuous oxygen therapy in chonic obstructive pulmonary disease. Chest. 1993;64:317-22.
11. Incalzi RA, Gema A, Marra C, Caparella O, Fuso L, Carbonin PU. Verbal memory imairment in COPD: its mechanisms and clincal relevance. Chest. 1997;112(6):1506-13.
12. Lisansky DP, Clouch DH. Cognitive-behavioral self-help educational program for patient with COPD. A pilot study. Psychoter Pychosom. 1996;65(2):97-101.
13. Smeets F. Place of education in the management of chronic lung disease: role of the educational coordinator. Monaldi Arch Chest Dis. 1993; 48(6):669-71.
14. Hevvner JE, Fahy B, Hilling L, Barbieri C. Outcomes of advance directive education of pulmonary patient. Am J Resp Crit Care Med. 1997;155:1055-9.
15. Ries A, Kaplan RM, Limberg TM, Prewitt LM. Effects of pulmonary rehabilitation on physiologic and psychosocial outcomes in patient with chonic obstructive pulmonary disease. Ann Intern Med. 1995;122(11):823-32.
16. Charles F, Emery VJ, Honn DJ, Frid KL, Philip TD. Acute effects of exercise on cognition in patients with Chronic Obstructive Pulmonary Disease. Am J Respir Crit Care Med. 2001;164(9): 1624-7.
17. Jardim RJ, Mayer AF, Cardoso F, Cavalheiro L, Velloso M. Reabilitação pulmonar. In: Tarantino AB. Doenças Pulmonares. 5ª ed. Rio de Janeiro: Guanabara Koogan; 2002. p. 524-35.
18. Oliveira AM, Munizm MT, Santos LA, Fernades AG. Custo-efetividade de programa de educação para adultos asmáticos atendidos em hospital-escola de instituição pública. J Pneumologia. 2002;28(2):71-6.
19. Denise M, Silva GV, Souza SS, Francioni FF, Meirelles BH. Qualidade de vida na perspectiva de pessoas com problemas respiratórios crônicos: a contribuição de um grupo de convivência. Rev Latinoam Enfermagem. 2005;13(1):50-5.
20. Howland AD, Nelson EC, Barlow PB, Mchugo G, Meeier FA, Brent P, et al. Chonic obstructive pulmonary disease: Impact of health education. Chest. 1986;90(2):233-8.
21. Gallefoss F, Bakke PS. How does patient education and self-management among asthmatics and patients with chronic obstructive pulmonary disease affect medication? Am J Respir Crit Care Med. 1999;160(6):2000-5.
22. Souza GMC. Avaliação da aprendizagem de pacientes portadores de doença pulmonar obstrutiva crônica submetidos a um programa educativo [dissertação]. São Paulo (SP): UNIFESP; 2006.
23. Devine EC, Pearcy J. Meta-analysis of the effects of psychoeducational care in adults with chronic obstructive pulmonary disease. Patient Educ Couns. 1996;29(2):167-78.