Chapter 9

Psychological Approaches to Increase Tobacco Abstinence in Patients with Chronic Obstructive Pulmonary Disease: A Review

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1. Introduction

In the last century, the definition of COPD was considered as a disease constituted by chronic bronchitis and pulmonary emphysema; however, nowadays these terms are in disuse. In the last decades emerged the Global Initiative for Chronic Obstructive Lung Disease (GOLD), a group formed by researches with the objective of count with a diagnostic guide to study this disease. According to the GOLD, the COPD is a common preventable and treatable disease, characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases, exacerbations and co-morbidities contribute to the overall severity in individual patients [1]. However, some of the parameters and the definition have been questioned [2-4].

The prevalence of COPD in developed countries ranges from 3 to 6% in subjects over 50 years of age. According to the National Center for Health Statistics (NCHS) in the United States, prevalence of COPD was stable from 1998 through 2009 and was significantly higher among women than in men, and the prevalence was higher in old groups. The prevalence was high among non-Hispanic white (5.7%) and Puerto Rican (6.9%) adults, Mexican-American adults had the lowest COPD prevalence (2.6%) [5]. The prevalence of COPD appears to be increasing not only in many developed countries, but also in Latin America. COPD occupies the fourth place in terms of mortality around the world, in Mexico is currently located between the sixth and the fourth. In 2005 there was more than 11 000 deaths in men, against just over 9 000 in women, recent studies show that the prevalence is equal between men and

women [6]. According the European Federation of Allergies and Airways Diseases (EFA), in Europe the prevalence of COPD varies among the different countries, having in the extremes more than 10% Germany and 2% in Netherlands: with an annual mortality of 0.28 per 1000 in Germany and 0.30 per 1000 in Austria [7]. An important problem is that COPD prevalence varies across the world, mainly to the different definitions of the disease, leading to an over-diagnosis or under-diagnosis.

Smoking contributes too many health problems including cancer, cardiovascular disease, and lung diseases, among others. In respiratory illnesses smoking increase the probability of bronchitis, emphysema, chronic obstructive lung disease and pneumonia [8]. Diagnoses of these illnesses are more common in smokers than in non-smokers; in fact is the most important risk factor of COPD and their health complications [1,9]. Therefore, in a person with the diagnosis COPD, if it is smoking, the intervention plan should include the elimination of the tobacco, since it is the most effective measurement in the prevention of this illness, provoking a delay in the loss of the pulmonary function and improving the survival [10].

2. Pathophysiology

The exposure to noxious particles produces lung inflammation, this chronic inflammation produces several airways disease as obstructive bronchiolitis and parenchymal destruction (known as emphysema) and impair defense mechanisms, all these changes result in a progressive airflow limitation [1].

The main risk factors for COPD are tobacco smoking, occupational dusts and chemicals, indoor and outdoor air pollution. In countries as Mexico, Nepal, New Guinea and Colombia, exposure to wood smoke also cause COPD. Inhalation in the work environment of dusts, gases, fumes and chemicals are other risk factors. For example in United States 19% of patients with COPD had an occupational exposure.

The symptoms more frequently observed include dyspnea, chronic cough and excessive sputum production or expectoration. However, COPD is not just simply a "smoker's cough", but an under-diagnosed, life threatening lung disease that may progressively lead to death. Physical examination includes cyanosis of lips and fingers, breathing with pursed lips (more common in patients with emphysema), use of accessory muscles of respiration: scalene and sternocleidomastoid (in cases of severe COPD), engorgement jugular, decrease in respiratory or abolished (in severe stages of COPD) noise, vibrations reduced vowels (advanced stage), there may be wheezing.

The spirometry is a simple diagnostic test that confirms the presence of COPD, it measures the amount and speed of air inhaled and exhaled. Spirometry measures the forced expiratory volume in one second (FEV1), which is the greatest volume of air that can be breathed out in the first second of a large breath; also measures the forced vital capacity (FVC), which is the greatest volume of air that can be breathed out in a completely large breath (OMS). Normally, at least 70% of the FVC comes out in the first second (i.e. the FEV1/FVC ratio is

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>70%). A ratio less than normal defines the patient as having COPD. The diagnosis of COPD is made when the FEV1/FVC ratio is <70%. The GOLD criteria also require that values be after bronchodilator medication has been given to make the diagnosis, and the NICE criteria require FEV1%. According to the ERS criteria, it is FEV1% predicted that defines when a patient has COPD, that is, when FEV1% predicted is < 88% for men, or < 89% for women [1].

At the beginning, the airflow obstruction first causes breathlessness that reduces the forced expiratory volume in one second (FEV1) to about 1 liter, which is less than half the normal value. Then, the condition progresses persistently over five or more years, with further loss of FEV, causing more and more distressing disability and, finally, death from respiratory failure [11]. The (FEV1) declines normally with aging by approximately 30 mL/yr, but in vulnerable smokers, the decline is greater (about 60 mL/yr), resulting in the development of COPD. Smoking cessation usually restores the normal or near-normal rate of FEV1 decline. Therefore, smoking cessation is a critical component for the prevention of COPD progression. FEV1 is an index in the definition of COPD and classification of its severity. FEV1 is a good predictor of exercise tolerance and correlates with survival and quality of life. More rapid FEV1 decline is also predictive of morbidity, mortality, and hospitalization rates [12].

3. Smoking cessation

With regard to lung diseases, COPD is which is more associated with cigarette smoking. Smoking cessation reduces the risk of COPD, improves the prognosis [11,13], prevents progression of the disease [14], and reduces exacerbations of COPD [15-17]. However, COPD patients find it difficult to quit smoking; in fact, the majority of new patients to the hospital for exacerbation of COPD continue smoking. COPD patients have a long smoking history, higher tobacco consumption, higher level of CO in the exhaled air, severe dependence to nicotine, and most have experienced numerous unsuccessful previous quit attempts [18,19]. This makes smoking cessation even more difficult for this group. Smoke quitting not only reduces the risk of COPD but also improve some symptoms like cough, coughing, shortness of breath and immune response, which leads to fewer respiratory infections to occur [20].

There are different drug treatments to quit smoking, however, when pharmacological treatments are combined with psychological techniques, the effectiveness increased significantly in patients with COPD [20-22]. Coronini-Cronberg et al. [21] pointed out that the main problems associated with the relapse of smoking in patients with COPD are the lack of motivation to quit smoking, poor communication with healthcare professionals, and the misleading information of the effects of smoking on health.

In patients with COPD, the comorbidity with anxiety and depression becomes more relevant. For that reason, it is important to review the available literature related to psychological techniques to quit smoking, specifically focused on psychological techniques to increase motivation, development of skills to deal with situations to prevent relapse, and the management of anxiety, depression, and stress. Therefore, the objective of this study was to con-

duct a review of the effectiveness of the treatments to quit smoking in patients with COPD, identifying the main difficulties to maintain abstinence and propose strategies to eliminate such obstacles.

4. Method

To perform this bibliographic review it was searched in the Cochrane Tobacco Addiction Group, as well as the databases MEDLINE, EMBASE, PsycINFO, PubMed, and SCOPUS from 2000 to 2012. We used the following keywords: smoking cessation, tobacco cessation, hospital, patient, medical setting, and chronic obstructive pulmonary disease. The inclusion criteria used in this review were: a) studies involving interventions for smoking cessation in smokers who have COPD, b) that smokers had 18 or more years; and c) that smokers submit voluntarily to interventions for smoking cessation.

5. Results

Ten reports were identified and grouped in three categories:

a. Studies with an experimental group with a psychological intervention (2)

b. Studies with an experimental group in which the treatment consisted of the combination of any pharmacological treatment with psychological intervention to quit smoking (6), and

c. Studies in which the intervention was done in hospitalized patients (2).

6. Psychological interventions for smoking cessation in patients with COPD

In a review on the effectiveness of interventions for smoking cessation, Lancaster and Stead [23] point out that psychological interventions that use behavioral and cognitive behavioral techniques are effective (e.g. control of stimuli, self-management, coping skills). In the same way, van der Meer et al. [24] reviewed the effectiveness of interventions for smoking cessation in people with COPD. The five studies included show the effectiveness of psychosocial interventions combined with pharmacological intervention: psychosocial interventions combined with NRT and a bronchodilator respect to any treatment with a 5-year follow-up (RD = 0.16, RR = 4, 0); psychosocial interventions combined with NRT and placebo with respect to any treatment with a 5-year follow-up (RD = 0.17, RR = 4.19). In addition the results demonstrated the effectiveness of various combinations of psychosocial and pharmacological interventions in the follow up at 6 months (RD = 0.07, RR = 1.74). The limitation of this review is that none of the included studies compared psychosocial interventions without pharma-

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cotherapy. It is concluded that a combination of psychosocial and pharmacological interventions are superior to none apply any treatment. However, few studies have evaluated in the context of clinical trials the effectiveness of psychological interventions in patients with COPD (see table 1).

Hilberink, Jacobs, Bottema of Vries, and Grol [25] conducted in the Netherlands a randomized controlled trial in patients with COPD (392 smokers) to evaluate the type of intervention on smoking cessation rates, the interventions were a minimal intensity intervention for smoking cessation or the usual care. The intervention was educational and included patient support by health professionals. In the first visit, it was spoken of symptoms, health status and treatment, smoking behavior and motivational state for smoking cessation; also a brochure and a video designed for people with COPD were given. Based on the stages of change [26], the patients were assigned in three categories: 1) preparers (wanted to quit in the next month), 2) contemplators (wanted to quit in the next 6 months), and 3) precontemplators (not want to quit). According to these categories, smokers with no motivation to quit, just received information about the benefits of quitting (control group). Smokers motivated to quit received information to increase their self-efficacy from discussing how they could deal with barriers to quitting, and additionally, information on nicotine replacement therapies according to the level of nicotine dependence was given. After six months, the experimental group showed more attempts to quit smoking (44.9% vs. 36.5%), and quit smoking compared with control group (16.0% vs. 8.8%).

In a second study Wilson, Fitzsimons, Bradbury and Stuart [27] conducted a randomized controlled trial to evaluate the effectiveness of interventions to quit smoking based on the brief advise or brief advise accompanied by nurse support, either individually or in group; smoking status was biochemically validated at 2, 3, 6, 9 and 12 months. The sample consisted of 91 smokers with COPD from an Ireland hospital. All patients received a brief smoking cessation intervention from the physician (5-10 minutes); afterwards, smokers were randomly assigned to one of three groups: usual care, individual, or group support. The usual care group (n = 35) or control group, received only the brief advise; the intervention groups, individual support (n = 27) or group support (n = 29), underwent five weeks of support after the intervention; the nurses with approximately 6 hours of training carried out the interventions. Individual interventions consisted in providing self-help material and information about the personal benefits of quit smoking, discussion about the benefits of nicotine replacement therapy, to encourage setting a date to stop smoking and inform friends and family about the intent. In group interventions, patients were classified according to the phase of change [26] in order that nurses could adapt the intervention to the phase of each patient. In addition, the positive and negative aspects of smoking, particularly on health were discussed, as well as the previous efforts to quit smoking with the intention of to identify those factors that contributed to relapse. In addition, role play in risk situations was performed to increase their confidence to quitting smoking. Both interventions consisted of five sessions of 60 minutes, in which nicotine replacement therapy was given upon request. Twelve months after the intervention, no significant differences between the groups were observed. Abstinence in patients was of 6%

in control group and of 10% in intervention group, a significant reduction of their addiction to nicotine was observed in all groups. These data lead to the authors to conclude that patients with COPD were unable to quit smoking, regardless of the type of support they receive. Therefore, the reduction of tobacco consumption may be an alternative goal for these smokers.

7. Combination of pharmacological and psychological interventions for smoking cessation in patients with COPD

Pharmacologic therapies have as main function the relief of withdrawal symptoms produced by suppressing the consumption of tobacco and consequently help people quit smoking. Pharmacological therapies are classified in two categories, the nicotinic therapies such as nicotine gum, nicotine transdermal patch and inhaler, and non-nicotinic therapies such as bupropion, nortriptyline and varenicline [28]. A review of clinical trials to assess the effectiveness of nicotinic therapies to smokers without chronic disease, describes that all these types of treatments increase the probability of abstinence and is higher than placebo [29]. While with non-nicotinic drug therapy in smokers without the diagnosis of a chronic disease, varenicline and bupropion are most effective because the rate abstinence is higher than placebo or with any other treatment to stop smoking.

Several clinical trials had evaluated whether the efficacy of drug therapy increases when is combined with psychological intervention in patients with chronic diseases. For example, Molyneux et al. [30] compared NRT with placebo NRT or with no NRT. All subjects received a counseling intervention for smoking cessation. They found that counseling without NRT was equally effective. Another trial compared the effect of incorporating intensive cognitive-behavioral intervention or minimal counseling intervention combined with NRT [31]. The results showed that smoking cessation did not improve long-term quit rates with NRT interventions. The results are conflicting, some studies show that there is no increase in efficiency and others mention that it is indispensable the inclusion of a psychological intervention [24]. In the present review, we identified six studies (table 1) combining a psychological intervention with pharmacological therapy (bupropion, nortriptyline, varenicline or nicotine sublingual tablet).

In the first report [32] examined the effect of nicotine replacement therapy (NRT) in patients with COPD. In a double-blind, multicenter, placebo-controlled trial involving 370 patients the efficacy of sublingual tablets or placebo combined with two levels of behavioral support for smoking cessation in COPD patients who smoked on average 19.6 cigarettes per day was evaluated, 6 and 12 months after treatment.

Participants were assigned to one of four experimental conditions: 1) nicotine sublingual tablet with low behavioral support, 2) nicotine sublingual tablet with high behavioral support, 3) placebo sublingual tablet with low behavioral support or 4) placebo sublingual tablet with high behavioral support. The instructions given by nurses were to use nicotine tablets according to the number of cigarettes smoked per day. One or 2 tablets per hour

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(minimum 10 tablets and maximum 40 tablets per day) for over 16 cigarettes; 1 tablet per hour (6 to 30 tablets per day) for 10 to 15 cigarettes and 1 tablet per hour (3 to 10 tablets per day) those who smoked 6 to 9 cigarettes. Abstinence rates were statistically significantly superior with nicotine sublingual tablets (low support 14% vs. high support 14%) compared to placebo (low support 5% vs. high support 6%).

No statistical differences were found between the different intensity of behavioral support. The main findings were sustained abstinence rates with nicotine sublingual tablet compared with placebo in a group of patients with mild, moderate and severe COPD. The authors point out the efficacy of NRT in combination with a smoking cessation program and suggest that NRT should be used for smoking cessation in smokers with COPD, regardless of the severity of the disease and the number of cigarettes smoked.

In the second report [33] the objective was to identify the factors detected in the initial assessment to predict abstinence in COPD patients when two different interventions were applied. The patients (N=225) with moderate to severe COPD were assigned to one of two interventions: 1) Minimal Intervention Strategy for Lung Patients (LMIS) of 180 min which consisted of individual counseling and telephone contacts and the use of pharmacological treatment was recommended if patients required or 2) Intensive Intervention [Smoke Stop Therapy (SST)] with 595 min of duration which consisted of group and individual counseling, telephone calls and support for the use of bupropion (available for the patients). In a one-year follow-up, the continuous abstinence rates (validated with cotinine in saliva) were 9% for LMIS and 19% for SST [RR = 2.22, 95% CI: 1.06-4.65]. Regarding variables identification to predict abstinence, the SST was no predictor for success; while for LMIS the attitude toward smoking cessation (OR: 11.8, 95% CI: 1.7-8.15, p =.013) and cotinine level (OR: 2.1, 95% CI: 1.08-3.93, p =.028) were significant predictors, 31% the variance in continuous abstinence was explained by these variables (p =.003). It is concluded that LMIS is suitable for COPD patients with a positive attitude to smoking cessation. SST may be an alternative for patients without such features.

Tashkin et al. [19] conducted a study to investigate the effect of bupropion in promoting abstinence from smoking in patients with COPD. Smokers (N=404) with mild or moderate COPD, who smoked 15 or more cigarettes per day, were assigned randomly to two groups receiving one of two treatments for 12 weeks: intervention group with bupropion (150 mg, twice daily) or placebo control. All patients received smoking cessation counseling by a nurse or doctor; each patient received telephone counseling to quit smoking for 3 days after discharge of the hospital and followed personally in each visit to the hospital. Medication was taking one week before patients attempted to quit. The objective was to obtain complete and continuous abstinence from week 4 until the end of week 7; there was a follow-up at 6 months. The abstinence rates were significantly higher in participants with bupropion compared with placebo (28% vs. 16%, p = 0.003). The abstinence rate between weeks 4 to 12 (18% vs. 10%) and between weeks 4 to 26 (16% vs. 9%) also were higher in participants receiving bupropion ($p < 0.05$). The authors concluded that bupropion along with the counselling was an effective aid to smoke cessation in patients with COPD.

Wagena, Knipschild, Huibers, Wouters and van Schayck [34] explored the efficacy of bupropion and nortriptyline in smokers at risk of COPD versus smokers with COPD. In a randomized placebo-controlled, double blind trial, 255 adults at risk for COPD or with COPD were assigned to one of three groups that received different smoking cessation intervention: a) bupropion (15 mg twice daily), b) nortriptyline (75 mg once daily) for 12 weeks and c) placebo bupropion. All patients received advice to quit smoking. The main indicator of outcome was prolonged abstinence from smoking from 4 to 26 weeks after beginning the date of withdrawal. The results showed that bupropion (27.9%) and nortriptyline (25%) had high rates of prolonged abstinence at 26 weeks follow-up compared with placebo (14.6%), significant differences between bupropion and placebo were detected ($p = 0.03$), 13.1% [95% CI: -1.2% to 25.1%], and no differences for nortriptyline 10.2% [95% CI: 1.7% to 22.2%). In patients with COPD, bupropion (27.3%) and nortriptyline (21.2%) were equally effective in prolonged abstinence rates (differences with placebo 18.9% [95% CI: 3.6% -34.2%], for bupropion and 12.9% [95% CI: -0.8% to 26.4%] for nortriptyline). In subjects with COPD risk, no statistically significant differences were detected compared with placebo in prolonged abstinence rates (bupropion= 28.6% vs. nortriptyline= 32.1% vs. placebo = 22%). The authors conclude that bupropion combined with smoking cessation counselling is an effective treatment for smoking cessation in patients with COPD and nortriptyline is a useful alternative.

van Schayck, et al. [35] conducted a randomized, double-blind placebo-controlled trial to evaluate the efficacy of bupropion and nortriptyline in combination with behavioral cognitive intervention in smokers with COPD risk in Netherlands. Smokers (n=255) with COPD risk between 30-70 years, were counseled to quit smoking (three sessions of 20 minutes and 6 calls of 5 minutes). They were randomly allocated to one of three groups: bupropion, nortriptyline or placebo for 12 weeks. The results showed prolonged abstinence rate (defined by report of participants have not smoked in week 2 to 52 after the beginning of abstinence) for bupropion (20.9%), nortriptyline (20%) and placebo (13.5%). Significant differences were obtained between bupropion and placebo [relative risk (RR) = 1.6, 95%, confidence interval (CI) 0.8-3.0], in contrast, the differences between nortriptyline and placebo were not significant. The severity of the airway obstruction did not influence the significance of abstinence. The social costs were € 1368 with bupropion, € 1906 with nortriptyline and € 1212 with placebo. The authors concluded that bupropion and nortriptyline are equally effective, but bupropion was more cost effective compared with placebo and nortriptyline. One possible reason for the high cost of nortriptyline may be that participants who used nortriptyline experienced more side effects from treatment.

Finally, one study evaluated varenicline combined with psychological intervention. In 27 centers a randomized, controlled, double blind, trial in patients (N=504) with mild to moderate COPD the efficacy of varenicline was evaluated [36]. The intervention consisted in 12 weeks of varenicline with 40 weeks follow-up. All participants received an educational booklet on smoking cessation information and brief counseling sessions (10 minutes) at each telephone call or visit at the clinic. The primary endpoint to confirm the continuous abstinence rate with the carbon monoxide level was week 9 to 12. The secondary endpoint was week 9 to 52. The re-

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sults showed that the rate of continuous abstinence from week 9-12 was significantly higher for patients in the varenicline group (42.3%) than for placebo patients (8.8%) (OR: 8.40, 95% CI: 4.99 -14.14, p <.0001). The continuous abstinence rate in patients treated with varenicline remained significantly higher than for those treated with placebo through week 9 to 52 (18.6% vs. 5.6%) (OR: 4.04, 95% CI: 2.13-7.67; p <.0001). Side effects commonly reported by patients in the varenicline group were nausea, nightmares, respiratory infection, and insomnia. The authors conclude that varenicline was more effective than placebo for smoking cessation in patients with mild and moderate COPD, and showed consistent with that observed in previous trials.

8. Interventions for smoking cessation in hospitalized patients with COPD

An additional component in treatments for smoking cessation in patients with COPD is hospitalization, which provides an excellent opportunity to help to stop smoking. Given that in this condition the perceived vulnerability of patients increase, as well the receptivity to the messages for the abandonment of smoking. In addition, access to health care allows patients to have direct contact with health professionals who can provide messages or interventions for smoking cessation, and smokers may find it easier to quit smoking in an environment smoke-free [37]. Despite this, in practice few hospitals provide this kind of help to their patients. Table 1 shows intervention for smoking cessation in patients hospitalized for COPD.

Regarding the above, a study [38] measured in successive discharged patients of the department of neumology of a university hospital, the percentage of smoking history and smoking cessation medical advice contained in 100 medical reports. They detected that most of the main diagnoses were smoking related diseases. From all reports, only 48% of patients had history related to tobacco, 14 were smokers and 11 had in the report a written advice to quit smoking. Only 36.7% of smokers received smoking advice. Of the patients who had no history, 16 were smokers and had not received advice. In addition, the first hospital admissions were 5.9% more likely to count with clinical history than readmissions (77.8% in first admission compared to 35.6% in readmissions). An interesting finding was that physicians who smoked where less likely record the smoking history than non-smoking physicians. The authors conclude that the interview related to tobacco and smoking advice should be improved.

Sundblad, Larsson and Nathell [39] designed a smoking cessation program in which patients were hospitalized for 11 days to develop their motivation to quit smoking through information, exercise the option to make a nicotine replace therapy, learning coping strategies and personal support. The results on smoking were evaluated after 1 and 3 years. The abstinence was compared in the patients with COPD who participated in the smoking cessation program (N = 247) and the ones receiving usual care (N = 231). Abstinence rates obtained in smoking cessation group at one year were 52% and 38% at follow-up to three years.

PSYCHOLOGICAL INTERVENTIONS					
Author	**Objetive**	**Patients**	**Interventions**	**Results**	**Validation**
Hilberink et al. (2005)	To compare smoke cessation rates depending on the type of intervention.	392 smokers with COPD	IG: brief intervention (counsel+ self-help material) CG: usual care (counsel)	Attempts to stop the smoking at 6 months: IG: 44.9% vs. CG: 36.5%. Abstinence at 6 months: IG: 16.0% vs. CG: 8.8%.	Self-reports
Wilson et al. (2006)	Evaluate the effectiveness of interventions for smoking cessation based on brief counsel alone or with support from nurses (individual or group).	91 smokers with COPD IG 1=27 IG 2= 29 IG 3= 35	IG 1: individual support (briefings, self-help materials and telephone support 5 weeks). IG 2: group support by stage of change (group information sessions + 5 follow-up sessions after discharge). IG 3: usual care (brief counsel).	Abstinence at 12 months: IG 2: 10% vs CG: 6%. There were no significant differences between groups (p = 0.7).	Self-reports Carbon monoxide in expired air Cotinine in saliva
PHARMACOLOGICAL TREATMENT COMBINED WITH A PSYCHOLOGICAL INTERVENTION FOR SMOKING CESSATION					
Author	**Objetive**	**Patients**	**Interventions**	**Results**	**Validation**
Tonnesen, Mikkelsen & Bremann (2006)	To identify predictors of abstinence	370 patients with COPD who smoke on average 19.6 cigarettes per day	IG1: sublingual tablet + low behavioral support IG2: sublingual tablet + high behavioral support CG1: sublingual tablet + placebo with low behavioral support CG2: placebo sublingual tablet + high behavioral support	Prolonged abstinence IG1: 14% vs.IG2: 14% CG1: 5% vs.CG2: 6% 12 months point prevalence IG1: 17% vs.IG2: 18% CG1: 6% vs.CG2: 13%	Self-reports Carbon monoxide in expired air
Christenhusz, Pieterse, Seydel & van der Palen (2007)	To evaluate the efficacy of sublingual tablets or placebo combined with two levels of behavioral support for smoking cessation in COPD patients after 6 and 12 months.	225 patients with moderate to severe COPD	CG: moderately intensive intervention: individual counseling + telephone contacts Total time: 180 minutes. IG: intensive intervention , group and individual counseling and support +phone calls + bupropion. Total time: 595 minutes.	Abstinence rates CG:9% IG:19%	Cotinine in saliva Self-reports
Tashkin et al. (2001)	To investigate the effect of bupropion promoting abstinence from smoking in patients with COPD	404 smokers with mild or moderate COPD who smoked 15 or more cigarettes / day.	IG: bupropion (150 mg twice daily) + counseling for smoking cessation CG: placebo for 12 weeks + counsel	Abstinence at 6 months: IG:28% vs. CG:16%. Abstinence between weeks 4 and 12: IG:18% vs. CG:10%. Abstinence between weeks 4 and 26: IG:16% vs. CG:9%.	Self-reports Carbon monoxide in expired air
Wagena et al.(2005)	Explore the efficacy of bupropion and nortriptyline in smokers with COPD risk compared with smokers with COPD.	255 adults at risk for COPD or with COPD	IG1:bupropion (15 mg twice daily) IG2: nortriptyline (75 mg once/day X 12 weeks) CG: bupropion placebo	Prolonged Abstinence 26 weeks: IG1:27.9% vs. IG2:25% vs. CG:14.6 %(p=0.03)	Self-reports Carbon monoxide in expired air

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van Schayck et al.(2009) Netherlands	To evaluate the efficacy of bupropion and nortriptyline compared with placebo in smokers with COPD risk	255 COPD risk	IG 1: Bupropion-12 weeks IG 2: nortriptyline -12 weeks CG: Placebo 12 weeks	Prolonged Abstinence: IG1:20.9%, IG2: 20%, G.C:13.5% Significant differences between bupropion and placebo [RR=1.6, 95% IC=0.8-3.0]	Cotinine in urine Self-reports
Tashkin et al. (2011)	To evaluate the efficacy of varenicline in patients with COPD	504 patients with mild and moderate COPD	IG: Varenicline + educational booklet on smoking cessation information and brief sessions (10 minutes) telephone counseling CG: placebo + educational booklet on smoking cessation information and brief sessions (10 minutes) telephone counseling	Continuous abstinence IG:42.3% CG:8.8% p<.0001	Self-reports Carbon monoxide in expired air

INTERVENTIONS FOR SMOKING CESSATION IN PATIENTS HOSPITALIZED FOR COPD

Author	Objetive	Patients	Interventions	Results	Validation
Sundblad, Larsson y Nathell (2008)	To evaluate a smoking cessation program	478 COPD patients	IG: hospitalization for 11 days were used to develop the motivation to quit smoking through information, exercise the option to take a nicotine replacement therapy, learning coping strategies and given personal support CG: usual care	Abstinence rates at 12 months IG: 52% vs. CG: 7% Abstinence rates at 3 years IG: 38% vs. CG: 10%	Self-reports Carbon monoxide in expired air
Borglykke, Pisinger, Jørgensen & Ibsen (2008)	To evaluate the effect of a smoking cessation group in hospitalized patients with COPD	223 hospitalized patients with COPD	IG: Participants attended group intervention sessions (two hours weekly for five weeks) NRT was used when necessary CG: usual care	Abstinence rates at 12 months IG:30% CG:13%	Self-reports Carbon monoxide in expired air

IG: Intervention Group; CG: Control Group; NRT: Nicotine Replace Therapy

Table 1. Interventions for smoking cessation in patients with chronic obstructive pulmonary disease (COPD).

Also, Borglykke, Pisinger, Jorgensen and Ibsen [40] evaluated the effect of a smoking cessation group in hospitalized patients with COPD. Patients were assigned to a control group (n = 102) or an intervention group (n = 121). In the first two sessions of the intervention, the group received information on smoking cessation and had to set a date to start the withdrawal that was supported NRT when necessary. At 1 year follow-up 36 (30%) patients in the intervention group remained abstinent compared with 13 (13%) patients in the control group [odds ratio (95% confidence interval): 2.83 (1.40 -5.74). A significant difference was observed between the intervention group and control group with respect to the self reporting of the phlegm production however no significant improvement was observed in terms of survival benefit at 3 years follow up period (intervention group 86% vs. control group 85%).Therefore, the authors conclude that this study showed that a group intervention for chronic patients made it possible to get high withdrawal rates. Furthermore, this intervention showed positive impact in hospitalization in survival and reducing phlegm.

9. Training of professionals who carry out interventions for smoking cessation

Ballbé et al. [41] assessed if the lack of promotion on the cessation of smoking in hospitals is due to deficits in professional training. In this study, knowledge, attitudes and action regarding the smoking behavior of 66 health professionals before and after training on brief intervention was evaluated. The performance of these professionals with 170 patients was compared before and another 170 training (patient's report). It was found was that the intervention training for smoking cessation increases knowledge of psychological skills by 23.3% and 27.1% of pharmacological resources. However no changes were observed with respect to the question of whether to smoke (30.8% before vs. 38.2% after training), to records the smoking status of patient medical history (73.4% vs. 65.9%), whether the patient want to quit (25% vs. 12.5%) or with respect to anti-smoking advice (21.9 % vs. 20.8%). This study shows that health care activity in hospitals tends to focus on treating specific diseases for which patients attend, and leave behind preventive interventions, even when the professionals have the training.

In a same line, Efraimsson, Fossum, Ehrenberg, Larson and Klang [42] tried to assess whether with a four-day training in motivational interviewing, a group of nurses will assume the communication style of motivational interventions (MI) for smoking cessation in primary care conducted with smokers with COPD. The nurses in their practice did not take the contents of the training they have received, which indicates that a course in motivational interviewing a few days was insufficient. It is concluded that training in communication methods should be integrated into the nursing curriculum, since the management of MI is a complex skill that requires a great workout.

In addition, sometimes personnel not sufficiently trained carry out the interventions. For example, Wilson et al. [27] obtained no differences between the interventions applied. The authors attribute the lack of success to patients and we must not forget that nurses who had received only 6 hours of training applied such interventions. It would be interesting to evaluate the results when intervention is performed by a psychologists with sufficient training in smoking cessation.

10. Discussion

The aim of this study was to conduct a review of the effectiveness of the treatments to quit smoking in patients with COPD, identifying the main difficulties to maintain abstinence and to propose strategies to eliminate such obstacles. As a result of the revision, we can say that although it is known how smoking affects COPD, the research attempting to demonstrate the benefits of quitting smoking on health in smokers diagnosed with COPD is insufficient. In addition, smoking history and the advice or counsel is not always a priority in hospitals. A large percentage of health professionals do not ask to patients if they smoke, therefore do not advise to quit, even though many of them have received formal

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training [41, 43-44]. Moreover, according to a survey, the majorities of patients are not offered help to quit smoking or are advised to make a follow-up with the physician or contact with a trained professional [43].

In addition, in the available reports, the interventions are very diverse both in relation to their content and in relation to their intensity. There are also differences in the professionals that conduct the interventions: physicians, nurses, psychologists, counselors or any other health personnel; this makes very difficult to compare results of different interventions. An important aspect to consider when analyzing the data obtained in present review is the difference in health staff that carried out the smoking cessation interventions, since their level of training was not considered; therefore, this could influence the results and the effectiveness of interventions. In some studies, nurses with little training to perform this task carried out the interventions [27]. It would be interesting to compare the results obtained in intervention carried by different professionals with no specialized training with those obtained by professionals who specializes in treating addictive behaviors.

In the studies reviewed, depending on the research involved, in some cases to calculate rates of abstinence only self-reports were used [e.g. 25], while in others to corroborate self-reported abstinence different biochemical test were used. This is another important aspect to consider when analyze and interpreting present findings.

Another problem that limits replication is that many studies do not describe the procedure followed in the psychological interventions, which could be central in the analysis of the results. That is, in most reports only the use of behavioral cognitive interventions is reported, but the techniques are not explained; therefore it is indispensable to specify and describe all the techniques used for patients who want to quit smoking and COPD.

A different area identified is the lack of assessment of psychological factors associated with relapse in the evaluation of different treatments, only side effects are evaluated with respect to the use of drug treatments and only evaluates both the level of depression with the "Beck Depression Inventory" and the level of motivation. Some reports suggest that depression and anxiety are present in patients with COPD, but do not mention if it is consequence of the disease or for quitting. It is known that lack of social support, depression, anxiety, anxiety sensitivity, negative affect, and deficiency of coping skills are factors associated with the ineffectiveness of interventions in smokers without the diagnosis of a disease, but little is known about the factors associated with relapse in the context of smoking cessation interventions in patients with COPD.

On the other hand, in terms of difficulties for smoking cessation in patients with COPD the review allowed to identify some factors:

- Many patients with COPD continue to smoke after diagnosis and those who manage to quit smoking have a high rate of relapse, for that reason many patients do not try quit again because their expectative is low.

- In general, smokers with COPD have characteristics that make difficult to quit, for example the level of dependency is severe, the number of cigarettes is high [45]; they are older and therefore have smoked for many years resulting in high dependency [46-47].
- A main barrier to quit smoking is the motivation. For example, in a study it was shown that patients with COPD stop smoking according the motivational state (precontemplation, contemplation, preparation, action), smokers in precontemplation associated significantly fewer advantages to quit smoking compared with smokers in contemplation or preparation stages. Smokers in preparation had significantly higher self-efficacy expectations about quitting than other smokers. Patients in preparation for quitting complained more about the symptoms associated with COPD. Smokers in contemplation and preparation to quit developed more plans to try to switch to action to stop smoking [48]. At this point, it is proposed to design an intervention for smokers with COPD motivated to quit and other unmotivated.
- The comorbidity with anxiety and depression is very high, particularly in women [49-50]. This difficulties to achieve the abstinence and justifies the use of psychological treatments to improve outcomes of smoking cessation treatments.
- Another factor that makes difficult to stop smoking is weight gain, particularly in women [45]. When patients stop smoking and gain weight, symptoms related with COPD are exacerbated and causes relapses.
- Social support between the moments the patients are diagnosed COPD and when decide to quit, is other factor. Some authors suggest that social support should be from a family member or someone close to the patient, instead of for example, another patient with COPD [46,51].

11. Conclusions

From present review about the interventions for smoking cessation and the identification of barriers to achieve and maintain abstinence, we suggest the inclusion of different techniques to overcome these barriers, since providing information about harm caused by smoking is not enough. It is imperative that patients with COPD to realize how smoking is decreasing their quality of life and deteriorating their health.

The motivational interviewing techniques [52-53] could be an effective method to support smoke cessation [42], but require significant training [54]. It is suggested the inclusion of motivational interviewing in the treatment for smoking cessation in smokers with COPD and personalized feedback with the use of measures of spirometry, Fletcher curve and to exploit the adverse events related to COPD to promote the decision of quitting [48]. En el patient with COPD the motivation for quitting increases if patients perceive that the respiratory symptoms are due to use of tobacco [55].

Problem-Solving Therapy helps patients to effectively deal with diverse problems from different learning strategies [56]. The objective of this therapy is to clearly define the problem,

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propose alternatives to solve the problem make decisions and implement solutions to assess the effectiveness of the alternative. For patients with COPD the strategies can be applied not only to the problems associated with quitting smoking, but also to emerging situations by the presence of the disease, such as social, physical and economic problems.

Functional analysis of problem behavior consists in the identification of the context of occurrence of the inadequate behavior and the consequences that maintain it. In treatments for smoking cessation implies the clear identification of the situation that triggers the consumption of cigarettes, and the positive and negative consequences of consumption, in order to plan and apply strategies that lead to abstinence from cigarettes [57].

Self-monitoring is a technique in which the patient is asked to record the duration, frequency and severity of the problem behavior. In the context of smoking cessation treatment, particularly in patients with COPD, it may ask the patient to record each cigarette consumed, the place of consumption, how it feels when smoke each cigarette, and to register the presence and severity of respiratory symptoms.

The proposal of a individualized plan for quitting would consist of two phases, one evaluation phase and the intervention phase that will include the techniques mentioned. In the evaluation phase, the goal would be to get specific information of psychological factors related with the consumption of cigarettes by the patient with COPD, to consider the individualized treatment.

Initially, it would be necessary to identify the stage of readiness to change [26], the pattern of consumption of cigarettes (daily average consumption per day, monthly consumption), identified the factors causing the consumption (moods, places, people or their combination) and the level of anxiety, depression, negative affection, social support, the level of dependency and the coping strategies of the patient.

From the results of the evaluation would be conducted a personalized feedback and decisional balance would be applied using the techniques of motivational interviewing (empathy, reflective listening, cognitive dissonance, without confrontation).

Based on the decisional balance the person must choose one of two strategies for reaching abstinence: 1) gradual reduction of the nicotine and tar consisting in the decline of 30 % of the initial consumption pattern every week until it reaches 0 %, or 2) abstinence.

To initiate strategies to abstinence from cigarettes consumption, start a record of a functional analysis of the behavior of smoking. This analysis include the negative effects of abstinence (nervousness, irritability, anxiety, depression, hunger, trouble sleeping) and the positive effects of abstinence, i.e. the registration of the reduction of the problems of the COPD from the change in the pattern of consumption (phlegm, breathing problems, cough).

Also, teach patients coping strategies for anxiety, depression, negative affect, and problem solving strategies to apply during periods in which the patient is still in situations or in the presence of factors (moods or people) that cause the consumption of cigarettes.

To summarize, the revisions point out that in COPD the smoking cessation programs should be intense, sustained over time and adapted to each patient individually. It also emphasizes

the need of combining pharmacological and psychological treatments, particularly behavioral focused to the relapse prevention and stress management [58,59]. What is clear is that smoking intervention should be considered as a substantial part of the treatment of COPD. The psychological techniques mentioned previously, could help to eliminate barriers and provide personalized feedback to increase abstinence rates in patients with COPD.

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