Arch Bronconeumol. 2011;47(1):3-9

ARCHIVOS DE BRONCONEUMOLOGIA

www.archbronconeumol.org

Original Article

Effectiveness of a Cognitive Orientation Program With and Without Nicotine Replacement Therapy in Stopping Smoking in Hospitalised Patients

Francisco Ortega,* Arturo Vellisco, Eduardo Márquez, José Luis López-Campos, Ana Rodríguez, María de los Ángeles Sánchez, Emilia Barrot, Pilar Cejudo

Sección de EPOC y Rehabilitación Respiratoria, Unidad Médico-Quirúrgica de Enfermedades Respiratorias, Hospital Universitario Virgen del Rocío, Sevilla, Spain

ARTICLE INFO

Article history:
Received May 8, 2010
Accepted July 29, 2010

Keywords:
Smoking cessation
Cognitive-behavioral treatment
Nicotine replacement therapy
Hospitalization

ABSTRACT

Introduction: We have analyzed the effectiveness of high-intensity cognitive-behavioral intervention initiated during hospitalization, compared with minimal intervention. We have also analyzed whether the combination of intervention with nicotine replacement therapy (NRT) can increase smoking abstinence rates after 12 months of follow-up.
Methods: We studied 2,560 active smokers during their hospital stays. Of these, 717 smokers declined to participate in the study, and after minimal intervention they were asked for permission to telephone them one year later to ask if they continued to smoke. The remaining 1,843 smokers received high-intensity cognitive therapy and were randomized to receive NRT or not. The follow-up after hospital discharge was completed either in the outpatient consultation or by telephone sessions.
Results: One year later, 7% of the patients who declined to participate in the study maintained smoking abstinence, compared with 27% of those who did participate in the study (p<0.001). There were significant differences between the group that only received behavioral treatment (21% abstinence) compared with the group that also received NRT (33% abstinence; p=0.002). In this last group, there were significant differences (p=0.03) between those who attended outpatient consultation (39% abstinence) and those who had telephone sessions (30%). In the multivariate analysis, the predictors for abstinence 12 months later were: having used NRT (OR 12.2; 95% CI, 5.2-32; p=0.002) and a higher score on the Richmond test (OR 10.1; 95% CI, 3.9-24.2; p=0.01).
Conclusions: Cognitive orientation interventions initiated in hospitalized smokers increase 12-month abstinence rates compared with minimal intervention, and said rates increase significantly when NRT is added.

Efectividad de un programa de orientación cognitiva con y sin tratamiento sustitutivo con nicotina en la cesación tabáquica en pacientes hospitalizados

Palabras clave:
Deshabituación tabáquica
Tratamiento conductual
Tratamiento sustitutivo con nicotina
Estancia hospitalaria

RESUMEN

Introducción: Analizamos la eficacia de una intervención conductual-cognitiva de alta intensidad frente a una intervención mínima iniciada durante un ingreso hospitalario, y si la combinación con tratamiento sustitutivo con nicotina (TSN) puede aumentar las tasas de abstinencia a los 12 meses de seguimiento.
Método: Se estudiaron 2.560 fumadores activos durante un ingreso hospitalario. De ellos, 717 fumadores rehusaron entrar en el estudio y tras una intervención mínima se les solicitaba poder telefonearlos al año para preguntar si continuaban fumando. El resto, 1.843 fumadores recibieron tratamiento cognitivo de alta intensidad y fueron aleatorizados para recibir o no TSN. El seguimiento tras el alta se realizaba en consultas externas o con sesiones telefónicas.

*Corresponding author.
E-mail address: med000521@saludalia.com (F. Ortega).

0300-2896/$ - see front matter

Resultados: Al año de seguimiento, el 7% de los que rehusaron entrar en el estudio se mantenían sin fumar frente al 27% de los que entraron en el estudio (p < 0,001). Existían diferencias significativas entre el grupo que realizó solo tratamiento conductual (21% de abstinencia) frente al grupo que además realizó TSN (33% de abstinencia; p = 0,002). En este último grupo existían diferencias significativas (p = 0,03) entre los que realizaron el seguimiento en consultas (39% de abstinencia) frente a los que hicieron el control telefónico (30%). En el análisis multivariante, los predictores de abstinencia a los 12 meses fueron: haber utilizado TSN (OR 12,2; 95% de CI, 5,2-32; p = 0,002) y mayor puntuación en el test de Richmond (OR 10,1; 95% de CI, 3,9-24,2; p = 0,01).

Conclusiones: Una intervención de orientación cognitiva iniciada en fumadores ingresados aumenta las tasas de abstinencia a los 12 meses frente a una intervención mínima, y aún aumenta de forma más significativa dichas tasas si se le añade TSN.

Introduction

Currently, smoking is considered an addictive chronic disease capable of causing premature death in more than half of smokers. The most recent data in our country reveal that tobacco use kills 56,000 people each year.[1] Smoking is the most important isolated cause of avoidable premature morbidity and mortality, causing 87% of lung cancer and more than 93% of chronic obstructive pulmonary diseases.[2]

Smoking cessation treatment is based on medical advice, psychological support and pharmacological treatment. It should be noted that, with such intervention, good results can be obtained for the state of health of this population, although its success depends in large part on the type of intervention carried out.[3]

Smokers are hospitalized more frequently than non-smokers and, therefore, the diseases related with tobacco use are responsible for a large part of hospital stays and the consumption of many health-care resources.[4] In addition, 70% of Spanish smokers express a desire to quit smoking.[5] Starting a smoking cessation program during a hospital stay can help more people make an attempt at stopping smoking, and maintain abstinence. Smokers may be more receptive to help at a moment when they feel vulnerable and they may find it easier to quit smoking in a setting where tobacco use is restricted or prohibited.[6]

Hospitalized patients who smoke must abstain from tobacco use, at least temporarily. Many hospitalized smokers have a moderate-high dependence on nicotine, and not smoking triggers cravings and other symptoms of abstinence syndrome, creating discomfort.[7] This causes some smokers to violate health-care center regulations and smoke during their hospital stay, which may also interfere with their medical treatment and with the clinical evolution of their disease. Some studies have reported that more than 25% of patients who smoke admit having done so during their hospital stay, while 55% of smokers experience cravings in the first 48 h after admittance.[8] The presence of symptoms of abstinence syndrome is significantly associated with smoking during hospitalization, and this increased the possibilities of continuing to smoke after hospital release.

The therapeutic interventions aimed at hospitalized patients who smoke encompass two objectives: to improve comfort during the hospital stay, and to help patients in the process of smoking cessation to achieve long-term abstinence. In a systematic review of the Cochrane Library on interventions in hospitalized patients for quitting smoking,[9] the authors came to the conclusion that the results depended on the type and the intensity of the program applied. An intensive intervention (contact during hospitalization as well as a follow-up for at least one month) was associated with a significantly higher quit rate compared with the control group. The incorporation of pharmacological treatment to help stop smoking did not seem to produce a statistically significant increase in cessation when compared with intensive orientation alone. In a randomized assay,[10] however, the authors concluded that the interventions in hospitalized patients that include nicotine replacement therapy (NRT) could increase one-year abstinence rates.

Our objective was to analyze the efficacy of a high-intensity cognitive-behavioral intervention on smoking cessation initiated during hospital stay, compared to minimal intervention, and whether its combination with NRT could increase long-term abstinence rates. We also intended to analyze whether there are predictive factors (social, demographic, base pathology, tobacco dependence, etc.) that could be associated with a greater level of abstinence. Our hypothesis was that a program initiated in hospitalized smokers that applied behavioral intervention would achieve higher 12-month abstinence rates when compared with minimal intervention and, moreover, NRT would increase said rates.

Patients and Methods

Subjects

This prospective study included smoker patients admitted to hospital from January to December of 2008 at the Virgen del Rocío Hospital in Seville, Spain. These were internal medicine and surgery patients, including different specialties, such as pulmonology, cardiology and cardiovascular surgery, gastroenterology, otolaryngology, ophthalmology, etc. Patients were considered to be smokers if they identified themselves as current smokers or if they answered affirmatively to the question "Do you smoke cigarettes now?" and had smoked at least 100 in their life.[6] Patient under the age of 18 were not included in the study, nor were those patients with pathologies related to traumatology, gynecology or obstetrics, psychiatry or neurology. The study was approved by the Ethics Committee of our center and written informed consent was obtained from all the patients before their inclusion in the study.

Procedure

During the first 24-48 h of hospitalization, a written questionnaire was used to obtain information about the baseline characteristics of the patient and their smoking habit. After minimal intervention, the patients were asked to enter in the smoking cessation protocol. Those that declined to form part of the study were asked for permission to telephone them within a year to ask if they continued smoking.

All the hospitalized smokers that accepted entering in the study protocol underwent cognitive-behavioral intervention and were randomized, assigning each to one of the branches of the study, using a computerized algorithm according to whether they received NRT or not.

The cognitive intervention was performed by a specially-trained nurse in 30-45 min sessions every 3 days until the patients' release. The method was standardized and educational material was supplied. During the sessions, the patients received advice to quit smoking and

the potential risks of tobacco use were commented, as were as the benefits of cessation. Knowledge, beliefs and potential barriers for smoking cessation were evaluated, and arguments were given to try to overcome these. Factors related to the ongoing tobacco habit were discussed, and strategies were provided for behavior modification. Risk factors for relapse were identified, and self-management methods and relaxation techniques to control them were discussed.

Patients receiving NRT were given NRT patches or chewing gum. The dosage was adjusted to the degree of physical dependence of the smoker and we followed the SEPAR recommendations for the pharmacological treatment of smoking[11] up to a maximum of 12 weeks. During the hospital stay, NRT was provided free of charge, whereas after release the patients incurred this fee.

After the hospital stay, the patient follow-up was carried out in two different ways, depending on the decision and possibilities of the patient. On one hand, the patient could attend the smoking cessation outpatient consultation where he/she would continue with the controls and behavioral therapy, reinforcing the maintenance strategies and dealing with risk factors for relapse. These visits would be at one week, 15 days, one month and then at 2, 3, 6 and 12 months. A second option was to receive telephone sessions, which would have the same frequency as the office visits. The phone calls would continue with the same training initiated at the sessions during the hospital stay. The patients were trained to try to maintain abstinence. Patients who did not take part in the study protocol simply received a phone call 12 months later to confirm whether or not they continued smoking.

Measurements

The baseline sociodemographic information included age, sex, employment, education, marriage status and reason for hospital admittance. The variables related to tobacco habit included age of onset, years as smoker, number of cigarettes/day, number of previous cessation attempts, stage of abandonment phase (pre-contemplation, contemplation, preparation or action), nicotine dependence and motivation for quitting. The degree of nicotine dependence was quantified with the simplified Fageström tolerance questionnaire (FTQ), comprised of 6 multiple-choice questions answered by the smoker.[12] The score obtains ranges from 0 to 10 points and classifies dependence as: low (score between 0 and 3 points), moderate (between 4 and 6 points) and high (from 7 to 10 points). Smoker motivation was evaluated with the Richmond test,[13] comprised of four questions evaluating the degree of motivation to quit smoking on a scale of 1 to 10 points, classifying motivation level as: low (if the score is 0 to 5), moderate (from 6 to 8) and high if it is over 8. In addition, we asked the patient to evaluate from 1 to 5 their opinion of the degree of influence that smoking had had in their hospitalization: 1 (smoking had no influence), 2 (smoking had some influence), 3 (half due to smoking, half due to other causes), 4 (smoking had more influence than other circumstances), 5 (smoking is the only cause: if I didn't smoke, I would not been in this situation). In all the sessions with personal contact with the patients (including hospital admittance) a CO-Oximetry measurement was taken to verify whether the subject smoked. We used a Micro-Smokerlyzer CO-Oximeter (Bedfont Technical INRTruments Ltd., London, England) and concentrations of carbon monoxide (CO) in expired air lower than 7 ppm was considered non-smoker.[7]

Statistical analysis

To describe the qualitative variables, we used absolute and relative frequencies, and the quantitative variables were described by means and standard deviation. Bivariate and multivariate regression analyses were used to identify baseline characteristics that were associated with smoking cessation one year after release from hospital. In the bivariate analysis, the Student's t test was used to compare continuous variables, while the chi-square test and Fischer's exact test were applied for categorical variables. The level of statistical significance was set at <0.05. Significant factors associated with abstinence in the bivariate analysis were included sequentially, starting with the most significant variable, in a multivariate logistic regression model. The dependent variable was tobacco abstinence twelve months after hospital release. Odds ratios (OR) were calculated with a 95% confidence interval in order to evaluate the independent effect of the predictive variables. The statistical analysis was done with the Statistical Package for Social Sciences (SPSS) version 15.0 software (SPSS Inc, Chicago, IL, USA).

Results

The original cohort was selected from the 6,738 patients admitted to hospital from January to December, 2008. Of these, 2,560 (38%) considered themselves to be active smokers. Of these smokers, 717 patients (28%) refused to enter in the study, while 1,843 (72%) were randomized. Figure 1 shows how the study population was distributed after randomization during their hospitalization and how the follow-up was completed after their release.

Table 1 shows baseline, demographic and social characteristics of our study cohort. There were no significant differences for any of the parameters evaluated among either the patients that declined to take part in the study, those that received cognitive-behavioral

Table 1
Comparison of baseline characteristics of smoking patients

Factors	Declined	CBT	CBT+NRT
	(n=717)	(n=919)	(n=924)
Age, in years (SD)	65.8 (12)	63.7 (17)	61.1 (19)
Males, %	83	87	88
Marital status, %			
Married	60	65	64
Divorced/separated	19	14	17
Widowed	4	8	7
Single	17	13	12
Level of education, %			
No schooling/Primary education	15	18	16
Secondary education	67	58	63
University	18	24	21
Employment, %			
Actively employed	32	31	35
Retired	20	19	17
Disabled	31	35	29
Unemployed	17	15	19
Reason for hospitalization, %			
Respiratory	12	14	13
Cardiovascular	23	22	25
Other	65	64	62
Number of hospitalizations, %			
First	33	35	36
Multiple	67	65	64
Tobacco habit, packs/year (SD)	56 (31)	55 (33)	57 (35)
Age first started smoking, in years (SD)	16 (4)	17 (5)	16 (4)
Fageström Tolerance Questionnaire, FTQ (SD)	7 (2)	6 (3)	6 (2)
Richmond Test (SD)	5 (4)	5 (4)	6 (3)
Smoking cessation phase, %			
Preparation	12	10	13
Contemplation	63	66	65
Pre-contemplation	25	24	22
Influence of tobacco use on hospitalization (SD)	3 (2)	3 (1)	3 (2)

CBT: cognitive-behavioral therapy; NRT: nicotine replacement therapy; SD: standard deviation.

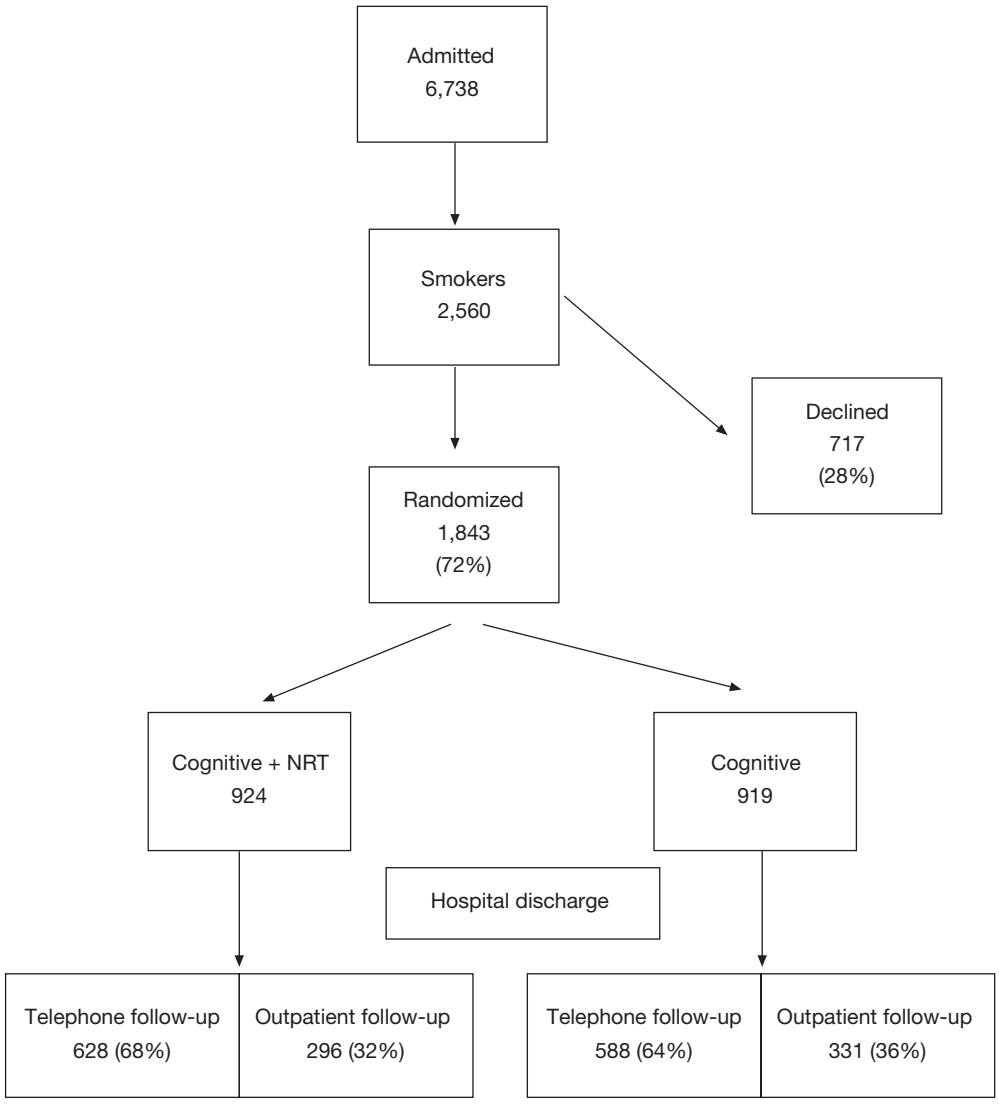


Figure 1. Study population and follow-up. NRT: nicotine replacement therapy.

therapy (CBT) or those who received cognitive-behavioral therapy plus NRT (CBT+NRT).

The state of the smoker 12 months after being discharged from the hospital was confirmed in 588 patients (82%) of those who had declined to participate in the study and in 1,640 (89%) of the randomized subjects. The lack of information or the loss to follow-up of the patients was considered a relapse in tobacco habit in the analysis of the results.

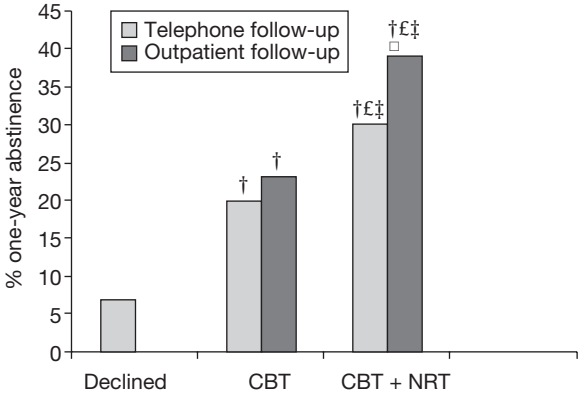
Mean baseline expiratory CO was 21.45 ± 9.02 ppm for the group that entered into the study; 22.63 ± 10.24 in the CBT group and 20.34 ± 9.75 in the CBT+NRT group. One year after abstinence, mean expiratory CO was 4.05 ± 2.23 ppm in the outpatient consultation group, 3.92 ± 2.87 in the CBT group and 4.25 ± 2.56 in the CBT+NRT group. The 9 patients presenting some type of discrepancy regarding their self-declaration of smoking abstinence and a high level of CO were considered relapses.

One year later, only 7% (55 patients) of the patients who declined to participate in the study were not smoking, compared with 27% (498 patients) of those who participated in the study (p<0.001). There were also significant differences between the group that only received cognitive-behavioral therapy (CBT) in which 193 patients (21%) continued not to smoke compared with 305 patients (33%) in the group that also received NRT (p=0.002).

There were no significant differences between the group with outpatient consultation follow-up and the group with telephone follow-up for anthropometric characteristics (age: 64.2 ± 14 vs. 62.7 ± 18) nor for the rest of the baseline characteristics (tobacco habit: 55 ± 32 vs. 57 ± 310 packs/year; Fageström test: 6 ± 3 vs. 7 ± 2). When we analyzed CBT + NRT, we found significant differences between those who had done the follow-up in the outpatient consultation, with 117 patients who continued not to smoke (39%), compared with those who chose the telephone follow-up, with 188 patients (30%) who continued not to smoke (p=0.03).

However, there were no significant differences in the CBT group between those that had telephone sessions, 117 patients (20%), and those that had outpatient consultation follow-up where 76 patients maintained their abstinence (23%). There were significant differences between the CBT group with consultation follow-up and CBT + NRT with telephone follow-up (p=0.02) and consultation follow-up (p=0.01) (fig. 2).

When we analyzed the predictors for abstinence in the simple logistic regression analysis, the factors that were significantly related



CBT: group treated with cognitive-behavioral therapy.
CBT + NRT: group treated with cognitive-behavioral therapy and nicotine replacement therapy.
† Significant differences with the group that declined to take part in the study.
£ Significant differences with CBT and telephone follow-up.
‡ Significant differences with CBT and outpatient follow-up.
□ Significant differences with CBT + NRT and telephone follow-up.

Figure 2. Smoking abstinence according to treatment and control type.

with maintained smoking cessation twelve months later were: having used NRT (odds ratio [OR] 9.8; 95% confidence interval [CI], 2.8 –25; p=0.004); higher score on the Richmond test (OR 7.5; 95% CI, 2.5-18.3; p=0.008); greater belief of the influence of tobacco use as a cause for hospitalization (OR 4.2; 95% CI, 1.3-11.9; p=0.002); having attended outpatient consultation follow-up (OR 2.3; 95% CI, 1.2-5.6; p=0.01); hospitalization due to cardiovascular disease (OR 2.2; 95% CI, 1.2-5; p=0.02) and a cessation stage of other than pre-contemplation (OR 1.8; 95% de CI 1.1-2.2; p=0.02).

Each of the factors found as positive in the bivariate analysis for abstinence was included in the multivariate model. The factors that remained significant when included together in the multivariate model 12 months later were: having used NRT (OR 12.2; 95% CI, 5.2-32; p=0.002); higher score on the Richmond test (OR 10.1; 95% CI, 3.9-24.2; p=0.01).

Discussion

According to our results, a high-intensity cognitive orientation intervention program initiated in hospitalized smokers increases 12-month abstinence rates when compared to minimal intervention, and this rate increases significantly if NRT is added. The use of this pharmacological therapy and a greater score on the Richmond test seem to be especially useful factors as predictors for maintained smoking cessation.

Hospitalization and surgery can be a good opportunity for intervening in tobacco habit as smokers find themselves in a situation of forced abstinence and feel more vulnerable. Some smokers who had not contemplated the possibility of quitting smoking beforehand may have greater motivation and change smoking cessation phase, especially if their pathology is related to tobacco use.[6]

According to our own results, intensive intervention (contact during hospitalization and later follow-up) is associated with a significantly higher quit rate compared with the control. Brief intervention in hospitalized patients, with no follow-up after hospital discharge, does not seem more effective than the usual attention.[14] Nor are more intense interventions with either no follow-up or with just one month of follow-up after discharge, as they do not seem to obtain a statistically significant benefit.[15,16] Rigotti et al.,[9] in their systematic review of interventions for smoking cessation in hospitalized patients, concluded that intensive intervention together with follow-ups of at least one month were associated with a significantly higher quit rate than the control. We carried out six follow-up consultations in the six months following hospitalization, although we cannot rule out similar results with perhaps fewer follow-ups. On the other hand, the assignation to the intervention group was done only if the patient so desired, which implies a certain bias in selection. The patients that accepted to participate in the study could be more motivated, although there were no significant baseline differences in either the sociodemographic or the descriptive characteristics between the two groups.

There is also no consensus on how the follow-ups should be done. In a recent randomized assay, advice to stop smoking given over the phone was no more useful in smoking cessation than minimal intervention with educational materials.[17] In other studies, however, telephone follow-ups did seem to be an effective and acceptable method for preventing relapses in different types of smoking cessation programs.[18] In our study, follow-up with outpatient supervision seems to be more effective than telephone sessions. In the group using NRT, there were significant differences favoring patients with follow-up at the consultation compared with over the phone. In the group that only received cognitive therapy, however, although there was a tendency favoring the outpatient consultation group, it was not statistically significant when compared with the phoned controls. In addition, in the simple logistic regression analysis, having attended the outpatient consultation was a factor significantly related with maintained smoking cessation 12 months later, although this factor disappeared in the multivariate model.

In our patients, verbal affirmation of abstinence was validated in the group with outpatient consultation follow-up by determining expired air carbon monoxide concentrations. However, the one-year abstinence in the telephone follow-up group was self-declared and not validated, which may entail bias when evaluating whether these patients truly had stopped smoking. Nevertheless, different authors have shown that smokers included in a treatment program prefer quitting over lying about their tobacco consumption.[19] In a study of 904 smokers receiving smoking cessation therapy and in whom the authors analyzed the reliability of the responses given by the patients about their abstinence from smoking, it was found that the group that stayed in the program gave highly reliable responses and that CO-Oximeter validation was unnecessary.[20] CO determination may be more recommendable as a patient motivational factor than a method to confirm abstinence.

Despite the recommendation of the guidelines to use pharmacological treatment in all smokers, their use in hospitalized patients is low. Different studies show that NRT is not often prescribed despite the presence of abstinence syndrome during hospitalization, and when it is prescribed the rates of actual usage are low. Rigotti NA et al.[21] find that NRT is prescribed in a small percentage (5.2% of smokers). The factors associated with the use of NRT were the presence of abstinence syndrome, the consumption of a high number of cigarettes/day and prolonged hospital stays. Other studies have confirmed the modest use of NRT in hospitalized patients despite their difficulties in refraining from smoking and the presence of abstinence syndrome.[22]

In our study, the use of NRT is associated with a higher level of 12-month smoking abstinence compared to patients who did not use NRT, regardless of the type of control carried out. In the aforementioned systematic review,[9] the incorporation of NRT in the treatment of hospitalized smokers did not seem to produce a statistically significant increase in cessation over that which was achieved with intensive orientation alone, although these studies were limited, with small, non-randomized samples. In a randomized study, cognitive intervention plus NRT was compared with minimal advice plus NRT.[10] Follow-up included five telephone calls over the

three months after discharge. Statistically significant differences were obtained between both groups, with a 12-month abstinence rate of 29% for the intensive intervention group and 20% for the group with minimal intervention. These authors concluded that the interventions in hospitalized patients that include NRT would increase abstinence rates one year after follow-up (although both groups had received NRT). In our patients receiving intensive cognitive intervention and NRT, the one-year abstinence rate was 33%, and it was more effective when the follow-up was held in the outpatient consultation (39% one-year abstinence) than when the follow-up took place over the phone (30% abstinence). The therapy in this group was even more effective than in the intensive cognitive treatment group without NRT, even if the follow-up had taken place in the consultation (23% abstinence). In addition, having used NRT was a factor significantly related with maintained 12-month smoking abstinence in the simple analysis and remained significant in the multivariate analysis. We used NRT instead of other drugs used in smoking cessation treatment basically because it is fast-acting. Hospitalized patients who smoke interrupt their tobacco habit abruptly and begin to feel the symptoms of abstinence at the start of their hospital stay which, in addition, may be quite long. The presence of cravings and symptoms of abstinence syndrome are significantly associated with smoking during hospitalization and this increases the possibilities to continue smoking after being discharged from the hospital.[8] With NRT, we can achieve two objectives: on one hand, to control the discomfort produced by the symptoms of abstinence during hospitalization and, on the other, to make patients aware of the therapeutic options to help them overcome their tobacco habit in the long-term, in a situation of forced abstinence. There is not much data in the literature about the use of bupropion and varenicline in hospitalized patients.[23-25] Studies are necessary to determine the efficacy and safety of these drugs in hospitalized smokers and to identify whether there is a patient subgroup that would benefit from these treatments.

Smoking intervention programs are cost-effective, even more so than other types of preventive interventions.[26,27] Nevertheless, it is recommendable to identify those factors that can predict better responses to the different types of interventions. Therefore, with the aim of optimizing resources, it is necessary to identify the subgroups of smokers that would most benefit from each of the proposed therapies, resulting in greater possibilities for success.[28]

After the initiation of an intervention program for hospitalized patients who smoked, Fung et al.[29] analyzed which social and psychological factors could predict long-term abstinence. They found that greater self-confidence in their own capability to quit smoking, cardiovascular disease, having grown up without smoker siblings and a greater consumption of packs/year were factors independently associated with 12-month abstinence. In another study,[6] the multivariate analysis identified only two variables associated with abstinence: the confidence of the patient to achieve abstinence, measured by a scale, and the number of previous attempts.

In our patients, when we analyze the predictive factors for maintained abstinence, these were: having used NRT, higher score on the Richmond test, greater belief of the influence of smoking on the cause for hospitalization, having attended the outpatient consultation follow-up, cardiovascular disease as the cause for hospitalization and smoking cessation phase stage other than "pre-contemplation". In the multivariate analysis, only NRT use and greater Richmond test score remained significant. It is evident that the confidence of the patient in succeeding, as well as the greater motivation for doing so, are easily-obtained measurements that can allow us to identify these smokers and improve the effectiveness of these programs in hospitalized smokers. As has been suggested in other studies,[29] our results affirm that hospital intervention in smokers with cardiovascular pathologies seems to be significantly associated with higher rates of abstinence, results that are not obtained with intervention in smokers hospitalized with respiratory pathologies.[9]

In conclusion, our smoking intervention program was effective when applied in hospitalized patients who smoked. These programs should include cognitive orientation and nicotine replacement therapy. Specifically, the use of NRT and the greater motivation of the smoker to stop smoking seem determining factors for achieving higher 12-month abstinence rates. All hospitals should promote these programs and facilitate their application in all smokers who are hospitalized.

References

1. Encuesta Nacional de Salud 2003. Available from URL: http://www.ine.es/prensa.
2. Banegas JR, Díez L, González J, Villar F, Rodríguez F. La mortalidad atribuible al tabaquismo comienza a descender en España. Med Clin. 2005;124:769-71.
3. Foulds J, Gandhi KK, Steimberg MB. Factors associated with quitting smoking at a tobacco dependence treatment clinic. Am J Health Behav. 2006;30:400-12.
4. Haapanen-Niemi N, Miilunpalo S, Vuori I, Pasanen M, Oja P. The impact of smoking, alcohol consumption, and physical activity on use of hospital services. Am J Public Health. 1999;89:691-8.
5. Tabaquismo y nueva normativa antitabaco 2005. Centro de Investigaciones Sociológicas CIS. Available from URL: http://www.cis.es/cis/opencms/ES/1_encuestas/estudios.
6. MacKenzie TD, Pereira RI, Mehler PS. Smoking abstinence after hospitalization: predictors of success. Prev Med. 2004;39:1087-92.
7. Ong KC, Cheong GN, Prabhakaran L, Earnest A. Predictors of success in smoking cessation among hospitalized patients. Respirology. 2005;10:63-9.
8. Rigotti NA, Arnsten JH, McKool KM, Wood-Reid KM, Pasternak RC, Singer DE. Smoking by patients in a smoke-free hospital: prevalence, predictors, and implications. Prev Med. 2000;31:159-66.
9. Rigotti NA, Munafo MR, Stead LF. Intervenciones para el abandono del hábito de fumar en pacientes hospitalizados. In: Biblioteca Cochrane Plus, 2008 No. 4. Oxford: Update Software Ltd. Available from: http://www.update-software.com.
10. Simon JA, Carmody TP, Hudes ES, Snyder E, Murray J. Intensive smoking cessation counseling versus minimal counseling among hospitalized smokers treated with transdermal nicotine replacement: a randomized trial. Am J Med. 2003;114:555-62.
11. Jiménez-Ruiz CA, Riesco JA, Ramos A, Barrueco M, Solano S, De Granda JI, et al. Recomendaciones para el tratamiento farmacológico de tabaquismo. Propuesta de financiación. En: Recomendaciones SEPAR. Sociedad Española de Neumología y Cirugía Torácica, Elsevier Doyma, S.L. Barcelona 2007.
12. Payne TJ, Smith PO, McCracken LM, McSherry WC, Antony MM. Assessing nicotine dependence, a comparison of the Fagerström Tolerance Questionnaire (FTQ) with the Fagerström Test for Nicotine Dependence (FTND) in a clinical sample. Addict Behav. 1994;19:307-17.
13. Richmond RL, Kehoe L, Webster IW. Multivariate models for predicting abstention following intervention to stop smoking by general practitioners. Adiction. 1993;88:1127-35.
14. Hennrikus DJ, Lando HA, McCarty MC, Klevan D, Holtan N, Huebsch JA, et al. The TEAM Project: the effectiveness of smoking cessation interventions with hospital patients. Prev Med. 2005;40:249-58.
15. Molyneux A, Lewis S, Leivers U, Anderton A, Antoniak M, Brackenridge A, et al. Clinical trial comparing nicotine replacement therapy (NRT) plus brief counselling, brief counselling alone, and minimal intervention on smoking cessation in hospital inpatients. Thorax. 2003;58:484-8.
16. Bolman C, De Vries H, Van Breukelen G. A minimal-contact intervention for cardiac inpatients: long-term effects on smoking cessation. Prev Med. 2002;35:181-92.
17. Sood A, Andoh J, Verhulst S, Ganesh M, Edson B, Hopkins-Price P. "Real-World" effectiveness of reactive telephone counseling for smoking cessation. A randomized controlled trial. Chest. 2009;136:1229-36.
18. Lichtenstein E, Glasgow RE, Lando HA, Ossip-Klein DJ, Boles SM. Telephone counseling for smoking cessation. Health Educ Res. 1996;11:243-57.
19. Ockene J, Kristeller J, Goldberg R, Ockene I, Merrian P, Barret S, et al. Smoking cessation and severity of disease: the Coronary Artery Smoking Intervention Study. Health Psychol. 1992;11:119-26.
20. Barrueco M, Jiménez Ruiz C, Palomo L, Torrecilla M, Romero P, Riesco JA. Veracidad de la respuesta de los fumadores sobre su abstinencia en las consultas de deshabituación tabáquica. Arch Bronconeumol. 2005;41:135-40.
21. Rigotti NA, Arnsten JH, Mckool KM, Wood-Reid KM, Singer DE, Pasternak RC. The use of nicotine-replacement therapy by hospitalized smokers. Am J Prev Med. 1999;17:255-9.
22. Mahrer-Imhof R, Froelicher ES, Li WW, Parker KM, Benowitz N. Women's initiative for nonsmoking (WINS V): under-use of nicotine replacement therapy. Heart Lung. 2002;31:368-73.
23. Chouinard MC, Robichaud-Ekstrand S. The effectiveness of a nursing inpatient smoking cessation program in individuals with cardiovascular disease. Nurs Research. 2005;54:243-54.
24. Mohiuddin SM, Mooss AN, Hunter CB, Grollmes TL, Cloutier DA, Hilleman DE. Intensive smoking cessation intervention reduces mortality in high-risk smokers with cardiovascular disease. Chest. 2007;131:446-52.

25. Rigotti NA, Thorndike AN, Regan S, McKool K, Pasternak RC, Chang Y, et al. Bupropion for smokers hospitalized with acute cardiovascular disease. Am J Med. 2006;119:1080-7.
26. Parrot S, Godfrey C. Economics of smoking cessation. BMJ. 2004;328:947-9.
27. Jiménez Ruiz CA, Mayayo M, Cicero A, Amor N, Ruiz JJ, Cristóbal M, et al. Resultados asistenciales de una unidad especializada en tabaquismo. Arch Bronconeumol. 2009;45:540-4.
28. Nerín I, Novella P, Beamonte A, Gargallo P, Jiménez-Muro A, Marqueta A. Resultados del tratamiento del tabaquismo en una unidad especializada. Arch Bronconeumol. 2007;43:669-73.
29. Fung PR, Snape-Jenkinson SL, Godfrey MT, Love KW, Zimmerman PV, Yang IA, et al. Effectiveness of hospital-based smoking cessation. Chest. 2005;128:216-23.