

# Prognostic factors affecting smoking cessation

## A real-life study in a population of Greek smokers visited a smoking cessation clinic

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- Smoking cessation
- Prognostic factors
- Real-life study

### Abbreviations

aOR: adjusted Odds Ratio  
 Backward LR: Backward Likelihood Ratio  
 BMI: Body Mass Index  
 EU: European Union  
 FEV1: Forced Expiratory Volume in 1 second  
 FNDT: Fagerström Nicotine Dependence Test  
 MNWS: Minnesota Nicotine Withdrawal Scale  
 NRT: Nicotine Replacement Therapy  
 OR: Odds Ratio  
 RS: Rosenberg self-esteem scale  
 SD: standard deviation  
 WHO: World Health Organization

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### SUMMARY

**BACKGROUND:** Smoking is a chronic disease not only responsible for numerous premature deaths every year, but also for substantial financial burden on health systems. Greece is still one of the leading countries in European Union (EU) in prevalence and incidence of smoking, a fact leading to even higher rates of morbidity and mortality and increases the cost of healthcare. The aim of this study is to identify predictors which play a role in a successful smoking cessation effort in three and six months, in Greek patients, who visited a smoking cessation clinic. **METHODS:** The research designed as a "case – control" study. Participants were patients who visited the smoking cessation clinic and agreed to take part in the research, answered all the questions needed and could be re-evaluated after three and six months. Out of 231 patients who visited the clinic during a year, 100 fulfilled the above criteria and were divided into two groups; those who succeeded in smoking cessation and those who failed; Fagerström (FNDT), Minnesota (MNWS) and Rosenberg questionnaires, along with questions about epidemiologic and other features were used to evaluate the patients. Multivariate regression analysis was performed to identify predictors which played a role in successful smoking cessation. **RESULTS:** Among various characteristics examined, multivariate regression analysis indicated that "difficulty in concentration" of the MNWS as well as the whole score of MNWS and FNDT and the reduced number of cigarettes after work independently predicted smoking cessation. **CONCLUSIONS:** This research confirms that the answers of smokers in both MNWS and FNDT should be taken under consideration for personalized medicine in smoking cessation treatment. Moreover, smoking cessation programs at workplaces should be implemented, because it seems that the increased number of cigarettes at work associates with higher smoking cessation success rates.

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## INTRODUCTION

Smoking is one of the major causes of premature death worldwide, creating apart from health problems significant increase of the financial burden on health systems<sup>1</sup>. In 2011, World Health Organization (WHO) reported that diseases associated with smoking are responsible for a very large proportion of deaths worldwide<sup>2</sup>. Nicotine addiction is defined as highly controlled or compulsive use of tobacco products, with tolerance to nicotine<sup>3</sup>. Various pharmacological therapies have been developed for smoking cessation. More specifically a) Nicotine replacement therapy (NRT), which act on nicotinic receptors<sup>4</sup>, b) Bupropion hydrochloride, a substance that acts as a selective inhibitor of the reuptake of catecholamines (noradrenaline and dopamine)<sup>5</sup>, and c) Varenicline, a partial agonist of the nicotine, which selectively binds to  $\alpha 4\beta 2$  nicotine receptors and competes nicotine for binding them<sup>6</sup>.

Epidemiologic factors affect smoking cessation. Aged patients, especially those older than 60 years old are more likely to quit smoking<sup>7</sup>. Gender seems to associate with varying degrees of success, depending on the quitting method selected<sup>8</sup>. Patients of lower socioeconomic strata are at increased risk of relapse and the same applies for patients with basic education compared to those of university degree<sup>9</sup>. Smoking cessation is more likely for working men compared to those who are unemployed, while for women the opposite applies<sup>10</sup>. Married smokers are twice as likely to quit compared to singles, something that also applies for senior executives related to other workers<sup>11</sup>. Incentives, disincentives, and/or support activities in workplaces related to smoking cessation are very helpful, particularly among middle and heavy smokers<sup>12</sup>. On the other hand, increased use of alcohol reduces the probability of a successful smoking cessation<sup>13</sup>. Patients with coronary heart disease, who have undergone intervention in their coronary artery, have higher success rates of smoking cessation<sup>14</sup>. Patients with reduced Forced Expiratory Volume in 1 second (FEV1) have better chance smoking cessation compared to those with normal FEV1<sup>15</sup>. The coexistence of depression reduces the likelihood of a successful smoking cessation effort in patients with chronic respiratory problems<sup>16</sup>.

Withdrawal symptoms assessed with questionnaires as the Minnesota Nicotine Withdrawal Scale (MNWS) are associated with a successful smoking cessation<sup>17</sup>. Nicotine addiction, usually measured by the Fagerström Nicotine Dependence Test (FNNT) has been related with the degree

of the successful smoking cessation<sup>18</sup>. Additionally, the degree of self-esteem measured with Rosenberg self-esteem scale (RS) at the beginning of a smoking cessation attempt seems to play a role in successful quitting<sup>19</sup>.

The aim of the study was to identify predictors which play a role in successful smoking cessation in three and six months, in patients who visited a smoking cessation clinic in Greece during one year.

## METHODS

### Subject evaluation

Patients filled out a questionnaire (age, gender, Body Mass Index (BMI), parental smoking status, educational status, work status, working and workplace related factors, marital status, living with other smokers, smoking after workout, usage, type and amount of alcohol consumption, pregnancy smoking status for women, age of start and duration of smoking, number of daily cigarettes, number of packyears, nicotine content of cigarettes, previous cessation efforts, psychiatric, respiratory, cardiovascular or other co-morbidities) and the MNWS, FNNT and RS (Table 1). Subsequently, the doctor suggested a smoking cessation therapy. Finally, patients were given brochures with useful information, and contact numbers for further information or psychological support. A psychologist was part of the team and participants had a free session during their visit. Moreover, the psychologist's telephone number was given to patients, to communicate if they needed further assistance. Patients were monitored by telephone at 10 days, 1, 3 and 6 months after their first visit to the smoking cessation clinic. After excluding the patients who did not want to take part in the research, those who did not answered all the questions and those who could not be re-evaluated, 100 patients were included in the research (Figure 1). The protocol was approved by the local ethics committee and all the patients gave their informed consent to participate in the study.

### Questionnaires used

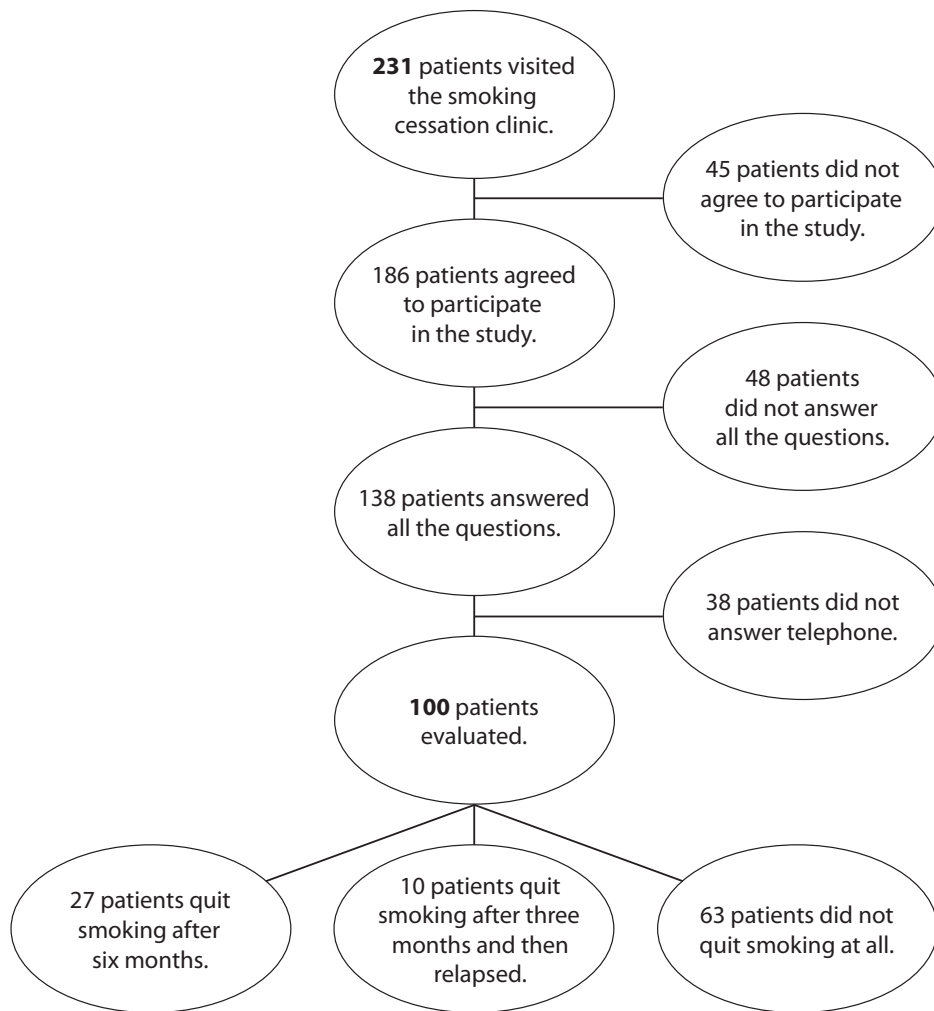
Fagerström Nicotine Dependence Test (FNNT)<sup>20</sup> consists of the following six questions: 1) the time between waking up in morning and first cigarette of the day, 2) the difficulty of non-smoking in places where smoking is forbidden, 3) if the most difficult cigarette to avoid is the first of the day or any other, 4) the number of daily cigarette, 5) the frequency of smoking at morning compared with that of afternoon, 6) if an illness prevents from smoking or not.

**TABLE 1.** Characteristics of the population

|   |                                       |
|---|---------------------------------------|
| <b>Age (years)</b> (mean $\pm$ SD)                            | <b>49.87 (<math>\pm</math> 10.64)</b> |
| <b>Gender</b>   | N = 100                               |
| Male  | 54                                    |
| Female  | 46                                    |
| <b>BMI</b> (mean $\pm$ SD)                                    | <b>27.90 (<math>\pm</math> 4.78)</b>  |
| <b>Education</b>  | N = 100                               |
| Primary education graduates                                   | 10                                    |
| High school graduates   | 17                                    |
| Senior high school graduates                                  | 26                                    |
| Technological Institute graduates                             | 28                                    |
| University graduates  | 19                                    |
| <b>Work status</b>  | N = 100                               |
| Employed  | 62                                    |
| Unemployed  | 21                                    |
| Pensioner   | 17                                    |
| <b>Age of start smoking</b> (mean $\pm$ SD)                   | <b>18.84 (<math>\pm</math> 6.19)</b>  |
| <b>Years of smoking</b> (mean $\pm$ SD)                       | <b>31.05 (<math>\pm</math> 10.92)</b> |
| <b>Daily number of cigarettes</b> (mean $\pm$ SD)             | <b>27.43 (<math>\pm</math> 14.59)</b> |
| <b>Packyears</b> (mean $\pm$ SD)                              | <b>44.36 (<math>\pm</math> 29.61)</b> |
| <b>Daily number of cigarettes in work</b> (mean $\pm$ SD)     | <b>15.98 (<math>\pm</math> 11.90)</b> |
| <b>Daily number of cigarettes out of work</b> (mean $\pm$ SD) | <b>13.14 (<math>\pm</math> 9.24)</b>  |
| <b>Presence of comorbidities</b>                              | N = 100                               |
| Yes   | 65                                    |
| No  | 35                                    |
| <b>Psychiatric comorbidity</b>                                | N = 100                               |
| Yes   | 18                                    |
| No  | 82                                    |
| <b>Psychiatric condition</b>                                  | N = 18                                |
| Anxiety   | 3                                     |
| Depression  | 10                                    |
| Bipolar Disorder  | 2                                     |
| Schizophrenia   | 3                                     |
| <b>Minnesota total score</b> (mean $\pm$ SD)                  | <b>16.1 (<math>\pm</math> 9.2)</b>    |
| <b>Fagerström total score</b> (mean $\pm$ SD)                 | <b>6.35 (<math>\pm</math> 2.3)</b>    |
| <b>Rosenberg total score</b> (mean $\pm$ SD)                  | <b>19.8 (<math>\pm</math> 5.6)</b>    |
| <b>Treatment</b>  | N = 100                               |
| Counseling  | 5                                     |
| Nicotine replacement therapy                                  | 39                                    |
| Bupropion   | 2                                     |
| Varenicline   | 54                                    |

\*SD: standard deviation

\*BMI: Body Mass Index



**FIGURE 1.** Study flowchart.

Scores under 3 indicate low nicotine dependence; scores 4-5 indicate moderate nicotine dependence and scores 6-10 high level of dependence.

Minnesota Nicotine Withdrawal Scale (MNWS) consists of nine questions<sup>21</sup>. Each question measures the intensity of withdrawal symptoms from nicotine in smokers who abstained or significantly decreased smoking for 24 hours. Those symptoms are 1) desire to smoke, 2) irritability, frustration, anger, 3) Anxiety, 4) Difficulty to concentrate, 5) worry, 6) increased appetite or weight gain, 7) discomfort or depressed mood, 8) insomnia or sleep disorders, 9) awakening at night to smoke. The patients answer to every question at a scale from 0 to 4, with 0 meaning "none", 1 meaning "very lightly", 2 meaning "lightly", 3 meaning "mediocre" and 4 meaning "intensely". From the sum of the answers results a total score, with the higher

score showing greater intensity of withdrawal symptoms.

Rosenberg self-esteem scale (RS) consists of 10 questions<sup>22</sup>. Five of them express positive feelings and the other five negative ones. Patients answer with: "I absolutely disagree", "I disagree", "I agree", "I absolutely agree". For every positive feeling question those answers corresponding to a score from 0 to 3 and for every negative feeling question to a score from 3 to 0 respectively. From the sum of the answers results a total score, with the higher score showing higher degree of self-esteem.

### Statistical analysis

Statistical analysis was performed using the SPSS software, version 20 of the IBM Company. Continuous variables are presented as mean value  $\pm$  1 standard deviation (mean $\pm$ SD) and categorical variables as % percentage

values. For the detection of statistical significance for variables as prognostic factors of smoking cessation at three and six months, univariate logistic regression and then the multivariate logistic regression to the ratio of the inverse probability (Backward LR) were used. In the univariate logistic regression all the population's characteristics as age, gender, BMI, parental smoking status, educational status, work status, working and workplace related factors, marital status, living with other smokers, smoking after workout, usage, type and amount of alcohol consumption, pregnancy smoking status for women, age of start and duration of smoking, number of daily cigarettes, number of packyears, nicotine content of cigarettes, previous cessation efforts, psychiatric, respiratory, cardiovascular or other co-morbidities and their answers of MNWS, FNDDT and RS were included. In the multivariate logistic regression we included those factors that were statistically significant in the univariate logistic regression. For the detection of statistically significant factors for the relapse after the first three months chi square was used. To compare the group of smokers who relapsed after three months, with the other two groups (never quitters and quitters for six months or more), two dummy variables were created with reference to the group of interest and then were compared using univariate and multivariate logistic regression (Binary Logistic). Additionally, we performed the above analyses after adjusting for gender, number of daily cigarettes categorized at 0–10, 11–20, 21–30 and more than 30 cigarettes per day and treatment received (type and compliance).  $P < 0.05$  was considered statistically significant.

## RESULTS

The basic characteristics of the smokers included in the analysis are presented in Table 1. Counseling was provided to all patients and only 5 of them did not receive any pharmacological treatment. Combination treatment with NRT and Varenicline or Bupropion was not used. Varenicline and Bupropion doses were applied according to guidelines. Patients received NRTs according to their nicotine dependence (cigarettes/day) i.e. patch with different dosages and additionally inhalers and chewing gums when needed. Therefore, the patients could not be stratified according to the pharmaceutical dosage they received.

In the univariate model, the number of cigarettes per day was a significant predictor of smoking cessation both for three and six months (OR = 1.034,  $P = 0.044$  and OR =

1.625,  $P = 0.044$ ) respectively. However, this did not apply in the multivariate analysis; adjusted for the factors that were statistically significant in the univariate models for three and six months respectively. For smoking cessation at three months those factors were: The questions about 1) desire to smoke, 2) difficulty to concentrate, 3) discomforted or depressed mood, 4) irritability, frustration, anger, 5) insomnia or sleep disorders, 6) awakening at night to smoke and 7) the total score of the MNWS, the questions about 8) the time between waking up in morning and first cigarette of the day, 9) the difficulty of non-smoking in places where smoking is forbidden, 10) the number of daily cigarettes and 11) the total score of FNDDT as an absolute number and 12) by categories, 13) the daily number of cigarettes as an absolute number and 14) the number of cigarettes out of workplaces. For smoking cessation at six months those factors were: 1) The use of alcohol, 2) the number of cigarettes out of workplaces, 3) the question about difficulty to concentrate and 4) the total score of the MNWS and the questions about 5) the time between waking up in morning and first cigarette of the day, 6) the difficulty of non-smoking in places where smoking is forbidden, 7) the number of daily cigarettes and 8) the total score of FNDDT as an absolute number and 9) by categories. The daily number of cigarettes tends to show a statistical significance in predicting the risk of relapse to smoking at six months after a successful smoking cessation effort at three months ( $P = 0.069$ ). There were no significant outcomes when this factor adjusted for gender.

The distribution of daily cigarettes during work time, appeared to play a role in smoking cessation efforts. As the number of cigarettes smoked outside the workplace reduced, the likelihood of successful smoking cessation increased both in three (OR = 1.094,  $P = 0.027$ ) and six months (OR = 1.118,  $P = 0.019$ ) in the univariate model. This relationship remained in the multivariate model for three months (aOR = 1.105,  $P = 0.044$ ) (Table 2), but not for six. Working status such as employment, unemployment or pension did not seem to constitute a predictor for smoking cessation or relapse. There was also no association between working status (i.e. employment, unemployment) and withdrawal symptoms after abstinence or decreased smoking for at least 24 hours.

Nicotine dependence assessed by the FNDDT was a statistically significant factor for successful smoking cessation in six months (aOR = 1.417,  $P = 0.007$ ) (Table 2) and also for the prediction of relapse in six months after a successful smoking cessation for three months (aOR =

**TABLE 2.** Results of the statistical analysis of prognostic factors adjusted for the factors that were statistical significant in the univariate models

| <b>Multivariate logistic regression for smoking cessation in three months.</b>   |          |            |                                 |        |
|--|----------|------------|---------------------------------|--------|
| <i>Variable</i>  | <i>P</i> | <i>aOR</i> | <i>95% Confidence Intervals</i> |        |
| Minnesota "difficulty in concentration"  | 0.020    | 2.207      | 1.135                           | 4.289  |
| Minnesota Total score  | 0.025    | 0.833      | 0.711                           | 0.977  |
| Minnesota "depressed mood"   | 0.081    | 1.748      | 0.934                           | 3.270  |
| Daily number of cigarettes out of work   | 0.044    | 1.105      | 1.003                           | 1.218  |
| Minnesota "waking up to smoke"   | 0.074    | 3.864      | 0.876                           | 17.041 |
| <b>Multivariate logistic regression for smoking cessation in six months</b>  |          |            |                                 |        |
| <i>Variable</i>  | <i>P</i> | <i>aOR</i> | <i>95% Confidence Intervals</i> |        |
| Fagerström Total score   | 0.007    | 1.417      | 1.097                           | 1.829  |
| <b>Multivariate logistic regression for the increased probability of relapse after a successful smoking cessation effort of three months</b>                 |          |            |                                 |        |
| <i>Variable</i>  | <i>P</i> | <i>aOR</i> | <i>95% Confidence Intervals</i> |        |
| Minnesota "difficulty in concentration"  | 0.050    | 0.711      | 0.505                           | 1.000  |
| Fagerström Total score   | 0.009    | 0.753      | 0.609                           | 0.933  |
| <b>Multivariate logistic regression for the increased probability to protect against relapse after a successful three months of smoking cessation effort</b> |          |            |                                 |        |
| <i>Variable</i>  | <i>P</i> | <i>aOR</i> | <i>95% Confidence Intervals</i> |        |
| Minnesota "difficulty in concentration"  | 0.012    | 1.481      | 1.090                           | 2.012  |
| Fagerström Total score   | 0.042    | 1.224      | 1.007                           | 1.488  |

\*aOR: adjusted Odds Ratio

0.753,  $P = 0.009$ ) (table 2). In the univariate logistic regression the first, the second and the fourth question of the FNDDT, were statistically significant factors for smoking cessation at three and six months ( $OR = 1.679$ ,  $P = 0.034$  and  $OR = 2.149$ ,  $P = 0.004$  for three and six months for question 1 respectively,  $OR = 2.616$ ,  $P = 0.032$  and  $OR = 4.281$ ,  $P = 0.008$  for three and six months for question 2 respectively and  $OR = 1.661$ ,  $P = 0.023$  and  $OR = 1.625$ ,  $P = 0.044$  for three and six months for question 4 respectively). However, no significant associations were found in the multivariate analysis. Additionally, no significant relationships were found when factors from FNDDT were adjusted for gender and treatment received.

Withdrawal symptoms assessed by the MNWS associated with reduced likelihood of successful smoking cessation in three months were: "difficulty in concentration" ( $OR = 1.559$ ,  $P = 0.003$  and in multivariate analysis  $aOR = 2.207$ ,  $P = 0.020$ ), "depressed mood" ( $OR = 1.422$ ,  $P = 0.014$  and in multivariate analysis  $aOR = 1.748$ ,  $P = 0.08$ ), "waking up to smoke" ( $OR = 1.910$ ,  $P = 0.027$  and in multivariate analysis  $aOR = 3.864$ ,  $P = 0.07$ ), and the total

score of the questionnaire ( $OR = 1.073$ ,  $P = 0.006$  and in the multivariate analysis  $aOR = 0.833$ ,  $P = 0.025$ ) (table 2). The withdrawal symptom that increased the risk of relapse in six months after successful smoking cessation in three months was the "difficulty in concentration" that significantly increased the risk of recurrence and the protection factor of recurrence in the multivariate analysis ( $aOR = 0.711$ ,  $P = 0.05$  and  $aOR = 1.481$ ,  $P = 0.012$  respectively) (table 2). There was no significant association between the withdrawal symptoms assessed or the total score of the MNWS with the type of treatment used. There was a trend of higher MNWS score for patients non-compliant to treatment ( $P = 0.14$ ), but this trend was not observed for any specific treatment ( $P = 0.285$  for Varenicline and  $P = 0.387$  for NRT). Similarly, there was no association between any specific withdrawal symptom and non-compliance in all or a specific smoking cessation treatment.

Self-esteem at the beginning of the smoking cessation effort was assessed by RS. Although a tendency of higher successful rates was found in patients with higher self-esteem, this was not statistically significant ( $P = 0.12$ ).

Many other factors concerning the population's baseline characteristics as age, gender, BMI, parental smoking status, educational status, working and workplace related factors other than number of cigarettes at work, marital status, living with other smokers, smoking after workout, usage, type and amount of alcohol consumption, pregnancy smoking status for women, age of start and duration of smoking, number of packyears, nicotine content of cigarettes, previous cessation efforts, psychiatric, respiratory, cardiovascular or other co-morbidities, were analyzed, but there was no significant relationship between them and the success in smoking cessation effort.

The treatment received by the patients did not affect significantly the success of the smoking cessation neither at three months ( $P = 0.823$ ), nor at six months ( $P = 0.575$ ). Moreover, there was no significant relationship between the treatment and the prediction of relapse in six months after a successful smoking cessation of three months ( $P = 0.915$ ).

Out of five patients who received only counseling, two quit smoking in 3 months but one of them relapsed at 6 months. The two patients that received bupropion did not quit smoking neither at 3 nor at 6 months. From 39 patients that received NRT 14 (35.9%) quit smoking after 3 months, but 4 (10.3%) relapsed at 6 months. From the patients receiving varenicline, 21 out of 54 (38.9%) quit smoking at 3 months, but 5 (9.3%) relapsed at 6 months.

Finally, a subgroup analysis according to gender and treatment for smoking cessation was performed. None of all the factors analyzed predicted smoking cessation at three or six months or relapse at six months after a successful smoking cessation effort of three months, when adjusted for gender or treatment received.

## DISCUSSION

The main outcome of this study was that in Greek population of a smoking cessation clinic, smoking out of the workplace and difficulty in concentration affected smoking cessation and abstinence. Additionally, as found in previous studies, the total score in both MNWS and especially in FNDS were prognostic factors of smoking cessation and relapse<sup>17-18,23-26</sup>.

In this study we scrutinized the role of a wide variety of epidemiological characteristics in smoking cessation. Gender and age associate with varying degrees of success<sup>8,27-30</sup>. Additionally, smokers with higher degree of education are more likely to quit smoking and less likely

to relapse compared to those of lower degree of education<sup>9,31-32</sup>. Married smokers are more likely to quit smoking compared to those who are single<sup>11,33-34</sup>. Increased use of alcohol reduces a successful smoking cessation attempt<sup>13,35-36</sup>. Cardiovascular and respiratory co-morbidities are associated with higher success rates<sup>14-15,37-40</sup>, while psychiatric co-morbidities have the opposite effect<sup>16,41-42</sup>. In our study, we did not discover any significant relationship between all the above mentioned factors and the success rate of smoking cessation. Perhaps this is due to the relatively small number of the participants. Moreover, in the gender subgroup analysis no significant relationship was found.

A novel finding of the study was that smokers who smoked more in their workplaces were more likely to quit. Numerous studies have found that actions in workplaces encouraging employees to abstain from smoking are very supportive in smoking cessation, especially among middle and heavy smokers<sup>12,43-48</sup>. This was also confirmed by three recent published Cochrane systematic reviews<sup>49-51</sup>. Our study is the first, connecting the effect of smoking at workplace with the success rate of smoking cessation in a population of Greek smokers. This finding supports the need of smoking abstinence in workplaces for successful smoking cessation. Greece is the country with the highest rate of non-compliance with the laws of restrain tobacco use in public places in EU and based on our results, smoking cessation programs in workplaces should be encouraged.

In our study there was no association between working status (i.e. employment, unemployment) and success rate of smoking cessation effort. The effect of working status in smoking cessation is debatable. There is evidence that smoking cessation was more likely for working men compared to those who are unemployed, while for women the opposite applied<sup>10</sup>. However, in another study, unemployment more strongly associated with persistent daily smoking among women than among men<sup>52</sup>. In a more recent study smoking relapse after percutaneous coronary intervention in Chinese patients was more likely in those who were employed<sup>53</sup>. Perhaps those controversial results are due to illegible confounding factors.

There is strong evidence supporting the validity and reliability of the MNWS for the evaluation of withdrawal symptoms<sup>54</sup>. In the current study, we found that concentration problems assessed by MNWS, constitutes a key factor that hardens smoking cessation even with different pharmacological treatments.

Pharmacological treatments present different success rates in smoking cessation<sup>4-6,55-61</sup>. In a systematic review all three pharmacological treatments were evaluated. It seems that higher doses or extended duration of therapy for NRT and Varenicline were associated with higher success rates of smoking cessation whereas for bupropion data are conflicting. Combination of Varenicline with either of the other two therapies had higher success rates compared with monotherapy something that not apply for the combination of NRT and Bupropion. Finally, a pre-cessation treatment with nicotine patches or with varenicline increased abstinence rates and retreatment with varenicline was efficacious in smokers who have previously taken it<sup>62</sup>. Most studies conclude that Varenicline may be more effective in smoking cessation than NRT or Bupropion<sup>55,58,60-62</sup>; however, two large studies including more than 35.000 smokers combined, found no statistical important differences between the three treatment options<sup>56-57</sup>.

Our study was a retrospective research of factors affecting smoking cessation in a smoking cessation clinic. There were no differences between Varenicline and NRT in smoking cessation success rate, something that has also been observed in previous studies with much bigger number of participants<sup>56,57</sup>. Bupropion was used in only two patients with psychiatric background after conciliation with their Psychiatrist, as it seems that it has the same efficacy in smokers with psychiatric disorders<sup>56</sup>. Counseling alone was used in only five patients with low nicotine addiction. Furthermore, in the subgroup analysis adjusted for treatment received, no association was found between any of the factors studied and smoking cessation at three or six months or relapse at six months after a successful smoking cessation effort of three months.

Finally, we investigated the role of self-esteem, at the beginning of a smoking cessation attempt in its success<sup>19,63-64</sup>. Although we found a tendency of higher successful rates of quit smoking in patients with higher self-esteem, this finding was not statistically significant.

Our study has some limitations. It was retrospective. However researcher biases were diminished by the fact that they were not aware of the outcome the time of the initial

evaluation. Participants were evaluated at the beginning of the smoking cessation attempt, thus the information they provided represented their current status at that time, something that minimized the recall bias, with the exception of nicotine withdrawal symptoms that were given retrospectively. Another weak point of the study was the inability to assess the compliance of the participants with the smoking cessation therapy. Additionally the follow-up was based on telephone interview and this could be regarded as another limitation of the study. This fact obliged us to evaluate participants' answers about the outcomes of the smoking cessation effort rather than biochemical examinations which are more objective than self-assessment (cotinine was not measured).

## CONCLUSIONS

This study verifies the outcomes of many previous studies that Minnesota Nicotine Withdrawal Scale and Fagerström Nicotine Dependence Test are valid predicting factors of smoking cessation and relapse. A new finding was that difficulty in concentration as a withdrawal symptom is an independent predictor of continuous abstinence failure. Moreover, this study evinced that smokers who smoke more at their workplaces and less out of them are more likely to quit smoking, therefore smoking cessation incentives at workplaces should be taken under more serious consideration.

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## DECLARATION OF INTEREST

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.



## ΠΕΡΙΛΗΨΗ

### Μελέτη προγνωστικών παραγόντων που επηρεάζουν τη διακοπή καπνίσματος σε έναν πληθυσμό Ελλήνων καπνιστών στην καθημερινή κλινική πράξη ενός ιατρείου διακοπής καπνίσματος

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**Υπόβαθρο:** Το κάπνισμα είναι μια χρόνια νόσος, υπεύθυνη όχι μόνο για αναρίθμητους πρόωρους θανάτους κάθε χρόνο, αλλά και για σημαντικό οικονομικό βάρος στα συστήματα υγείας. Η Ελλάδα είναι ακόμη μια από τις πρώτες χώρες στην Ευρωπαϊκή Ένωση (ΕΕ) στην επίπτωση και συχνότητα του καπνίσματος, παράγοντας που οδηγεί σε ακόμη μεγαλύτερο ρυθμό νοσηρότητας και θνητότητας και αυξάνει το κόστος της φροντίδας υγείας. Σκοπός της μελέτης αυτής είναι να εντοπιστούν οι προγνωστικοί παράγοντες που παίζουν ρόλο σε μία επιτυχημένη προσπάθεια διακοπής του καπνίσματος σε τρεις και έξι μήνες, σε Έλληνες ασθενείς που επισκέφτηκαν ένα ιατρείο διακοπής καπνίσματος. **Μέθοδοι:** Η έρευνα σχεδιάστηκε σαν μελέτη "ασθενών – μαρτύρων". Οι συμμετέχοντες ήταν ασθενείς που επισκέφτηκαν ένα ιατρείο διακοπής καπνίσματος και συμφώνησαν να πάρουν μέρος στην έρευνα, απάντησαν όλες τις ερωτήσεις που χρειάζονταν και μπορούσαν να επανεκτιμηθούν μετά από τρεις και έξι μήνες. Από τους 231 ασθενείς που επισκέφτηκαν το ιατρείο κατά τη διάρκεια ενός χρόνου, 100 πληρούσαν τα ανωτέρω κριτήρια και χωρίστηκαν σε δύο ομάδες; Αυτούς που κατάφεραν να διακόψουν το κάπνισμα και αυτούς που απέτυχαν; Τα ερωτηματολόγια Fagerström (FNDT), Minnesota (MNWS) και Rosenberg (RS), μαζί με ερωτήσεις που αφορούσαν επιδημιολογικά και άλλα χαρακτηριστικά, χρησιμοποιήθηκαν για την αξιολόγηση των ασθενών. Για να προσδιοριστούν οι προγνωστικοί παράγοντες που παίζουν ρόλο σε μια επιτυχημένη προσπάθεια διακοπής καπνίσματος, πραγματοποιήθηκε πολυπαραγοντική ανάλυση παλινδρόμησης. **Αποτελέσματα:** Μεταξύ των διαφόρων χαρακτηριστικών που εξετάστηκαν, η πολυπαραγοντική ανάλυση παλινδρόμησης υπέδειξε ότι η "δυσκολία στη συγκέντρωση" από το ερωτηματολόγιο Minnesota όπως επίσης και το συνολικό σκορ των ερωτηματολογίων Minnesota και Fagerström και ο μειωμένος αριθμός τσιγάρων μετά τη δουλειά αποτελούν ανεξάρτητους προγνωστικούς παράγοντες διακοπής καπνίσματος. **Συμπεράσματα:** Η έρευνα αυτή επιβεβαιώνει ότι οι απαντήσεις των καπνιστών στα ερωτηματολόγια Minnesota και Fagerström πρέπει να λαμβάνονται υπόψη για εξατομικευμένη ιατρική στη θεραπεία διακοπής καπνίσματος. Επιπλέον, υποδεικνύει ότι θα έπρεπε να εφαρμοστούν προγράμματα διακοπής καπνίσματος στους χώρους εργασίας, επειδή φαίνεται ότι ο αυξημένος αριθμός τσιγάρων στην εργασία σχετίζεται με υψηλότερα ποσοστά επιτυχούς διακοπής του καπνίσματος.

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**Λέξεις - Κλειδιά:** Ιδιοπαθής πνευμονική ίνωση, θεραπεία, αποζημίωση, επίπτωση στον προϋπολογισμό

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