ADDICTION TO NICOTINE IN MODERATE SMOKERS - CLINICAL PROFILE AND SMOKING CESSATION OUTCOMES

Irinel Oana Pascal[1], Letitia Trofor[1*], Roxana Chirita[1], Ramona Miron[2], Antigona Trofor[2]

[1]"Grigore T. Popa" University of Medicine and Pharmacy - Iași, Romania, Clinic of Psychiatric Diseases Iasi, Romania

[2]"Grigore T. Popa" University of Medicine and Pharmacy - Iași, Romania, Clinic of Pulmonary Diseases Iasi, Romania

*Corresponding author: Letitia Trofor, PhD, DDS
"Grigore T. Popa" University of Medicine and Pharmacy - Iași, Romania
e-mail: letitia.trofor@yahoo.com

ABSTRACT

Aim of the study was to determine smoking cessation outcomes in a group of moderate smokers, based on clinical and smoking profile and on level of nicotine dependence. **Material and methods** Moderate smokers included in a tobacco dependence 3 months treatment program were evaluated for age, gender, smoking profile, nicotine dependence score and co-morbidities, to determine smoking cessation rates at both 3 and 6 months follow up. **Results** We found 124 moderate smokers, age average 31. 2 yrs., in majority women (60%) and 12% had also psychiatric co-morbidities. Nicotine dependence was predominantly moderate and severe: only 31.2% subjects had a Fagerstrom score < 3. Abstinence rate at 3 and 6 months follow-up was 30 %, respectively 12.5%. **Conclusions** Moderate smoking has become more frequent nowadays, due to tobacco control successful legislation, worldwide. Smoking abstinence rate in moderate smokers was satisfactory, considering the complex clinical profile and the high level of nicotine dependence we have found.

Keywords: moderate smokers, nicotine dependence

INTRODUCTION

According to the criteria adopted by the World Health Organization in the International Classification of Diseases, tobacco use and dependence is included in: Mental and behavioural disorders due to tobacco use and has the disease code of F17. Dependence is induced by nicotine, a substance present in any tobacco product. Current manuals and guidelines define it as a chronic relapsing disease and recommend to all health professionals to mandatory identify and treat any smoker to quit tobacco [1]. Smoking cessation interventions consist of pharmacological treatment of nicotine dependence and cognitive-behavioural counselling. In Romania, a national program offering such therapies for free is running since 2007. Clinical diagnosis of tobacco dependence is based on evaluation of the smoking status, type of tobacco product, tobacco consumption defined as number of cigarette packs-years (PY), nicotine dependence score, passive tobacco exposure, previous quit attempts.

Although nowadays most people understand and have the knowledge that smoking is very harmful over the long run

and determines numerous smoking related diseases, some still believe they are protected from harm if they smoke "just a few" cigarettes each day. But smoking less does not diminish tobacco induced health hazards! *Moderate smokers* are defined as those individuals smoking less than 10 cigarettes daily/10 PY and sometimes also having low-moderate nicotine dependence [2,3]. The U.S. Surgeon General has stated that there is no safe level of tobacco smoke or nicotine for the body, so, despite lower consumption and addiction levels, moderate smokers should be aware of the fact that they are still at risk for developing smoking-related disorders [2].

On the other hand, even if one could expect easier quitting smoking when smoking fewer cigarettes, it has been observed that smoking cessation outcomes can be modest even though moderately smoking or if being an occasional smoker. One possible explanation is an unexpected severe nicotine dependence found in this category of „light" smokers. For such patients, quitting smoking can be a real challenge and so, careful assessment of the clinical and smoking profile of the patient should be carried on. This refers especially to any factor that might contribute to a more severe addiction, such as long duration of smoking, any psychiatric co-morbidity, alcohol or other co-addictions, or even long time use of menthol cigarette brands [2].

OBJECTIVE

Aim of the study was to determine smoking cessation outcomes in a group of moderate smokers, based on clinical and smoking profile and on level of nicotine dependence.

MATERIAL AND METHODS

The study sample was chosen from all categories of smokers treated in the tobacco cessation centre of the Clinic of Pulmonary Diseases Iasi, Romania, from October 2007 to December 2009. Among all these patients, with various degrees of tobacco consumption and dependence severity, we selected a study group of moderate smokers, defined as subjects smoking less than 10 cigarettes/day or less than 10 packs-years (PY). Number of PY = number of cigarettes smoked daily/ 20 x number of years of smoking.

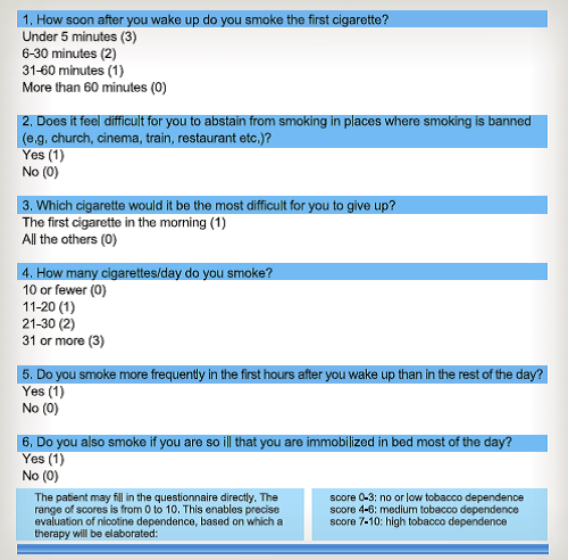
The moderate smokers group have received counselling and Varenicline to stop smoking, during a 3 months smoking cessation program, while heavier smokers or relapses were treated with either Varenicline, or Bupropion, or nicotine patch and counselling, also for three months. During the 3 months of treatment, patients had to attend 4-6 clinic visits, for monitoring smoking status by both clinical and biological (exhaled air carbon monoxide - as biomarker of sure tobacco exposure) evaluation.

All subjects in the study group were evaluated for the following variables: age, gender, smoking profile (number of cigarettes/day, number of years of smoking, nicotine dependence score, age of starting smoking, type of cigarettes smoked, previous quit attempts with history of nicotine withdrawal syndrome) and co-morbidities clinical profile.

Study assessments were done by a standard Romanian smoking cessation questionnaire, according to the Romanian Smoking Cessation Guideline [4, 5] and to the Fagerstrom nicotine dependence test (Fig.1).

Smoking cessation outcomes were determined by measuring smoking abstinence rates at the end of the three months treatment program and at six months follow up, based on a clinic visit, respectively on a 6 months telephone evaluation. Abstinence from smoking (*synonyms*: tobacco abstinence, nicotine abstinence or smoking cessation) was defined for those subjects that have

stopped smoking for at least 6 weeks since target quit smoking date and it was certified by patient's self-declaration, as validated by a carbon monoxide (CO) concentration of < 4 ppm in exhaled air [1,6].


1. How soon after you wake up do you smoke the first cigarette?
Under 5 minutes (3)
6-30 minutes (2)
31-60 minutes (1)
More than 60 minutes (0)

2. Does it feel difficult for you to abstain from smoking in places where smoking is banned (e.g, church, cinema, train, restaurant etc.)?
Yes (1)
No (0)

3. Which cigarette would it be the most difficult for you to give up?
The first cigarette in the morning (1)
All the others (0)

4. How many cigarettes/day do you smoke?
10 or fewer (0)
11-20 (1)
21-30 (2)
31 or more (3)

5. Do you smoke more frequently in the first hours after you wake up than in the rest of the day?
Yes (1)
No (0)

6. Do you also smoke if you are so ill that you are immobilized in bed most of the day?
Yes (1)
No (0)

The patient may fill in the questionnaire directly. The range of scores is from 0 to 10. This enables precise evaluation of nicotine dependence, based on which a therapy will be elaborated:

score 0-3: no or low tobacco dependence
score 4-6: medium tobacco dependence
score 7-10: high tobacco dependence

Figure 1. Fagerström Test for nicotine dependence (FTND)

RESULTS

We found 124 moderate smokers, as defined by the moderate smoking inclusion criteria, referred to the tobacco cessation centre in the Clinic of Pulmonary Diseases Iasi, Romania. All subjects, registered as either in or outpatients, were treatment completers, treated with varenicline and counselling for three months. Overall, the age average of the study group was 31.2 years and female gender was prevalent, in 60%. Duration of smoking in the analysed group - expressed as years of smoking - is shown in (Fig. 2).

All subjects in the study group answered the Fagerstrom nicotine dependence test, thereafter the Fagerstrom score was calculated, accordingly. Distribution of the levels of nicotine dependence is represented in (Fig.3).

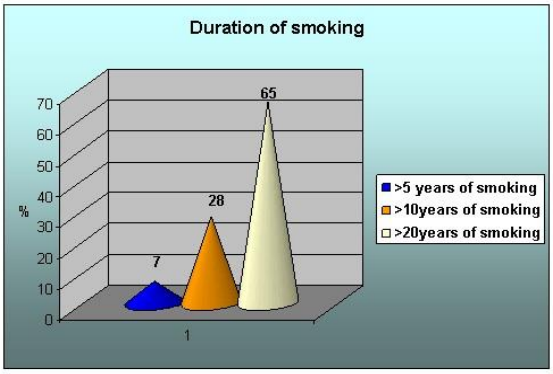


Figure 2. Duration of smoking for the study group

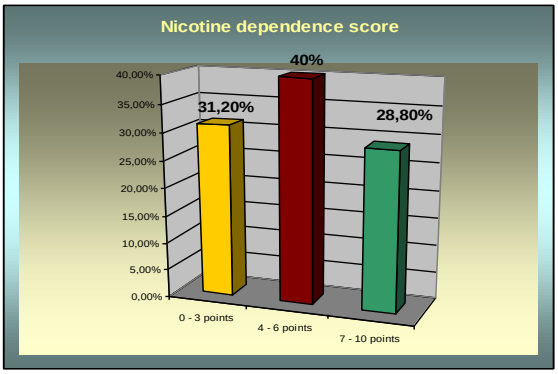


Figure 3. Degrees of nicotine dependence severity for the study group

Careful examining of medical records in our database was done to investigate whether or not present any co-morbidity or abnormal condition, among moderate smokers. For this purpose, our main pursuit was to signal respiratory and cardiovascular tobacco-related disorders, as well as any psychiatric co-morbidity or any other disease independent or caused by tobacco smoking.

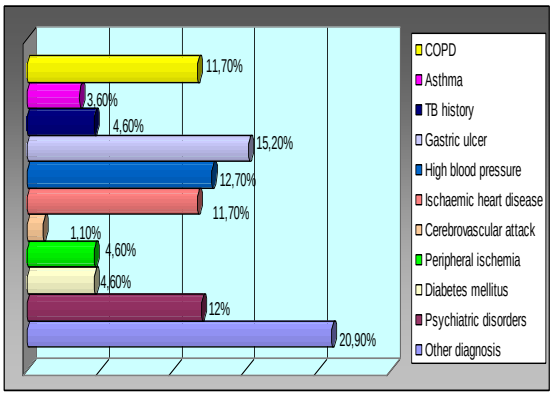


Figure 4. Spectrum of co-morbidities found in moderate smokers

As described here above, in (Fig.4), psychiatric co-morbidities were met in 12 %, among various other associated digestive, metabolic, respiratory and cardiovascular disorders. As well, most frequently identified conditions were gastric ulcer (15. 2%), blood hypertension (11.7%) and COPD (11.7%).

Other smoking pattern characteristics, relevant for the proposed analysis in this study, were as follows: 38. 8% of all subjects started smoking under the age of 14, 13.2 % declared they preferred to smoke menthol cigarettes and 40 % described nicotine withdrawal history. Thus, in (Fig.5), one can find useful information about past quitting smoking history of the group: while a high fraction (38.8%) were attending for the first time a tobacco cessation program, yet a majority of 61.2% has experienced trying and failing to stop smoking, with or without nicotine withdrawal symptoms.

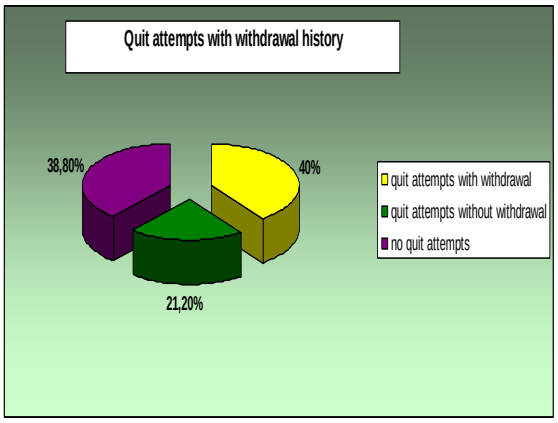


Figure 5. Past nicotine withdrawal history in the study group

Smoking cessation outcomes in the moderate smokers group are shown in (Fig.6). As here below, abstinence rate at the end of the 3 months treatment program was 30%. A second evaluation, in follow-up, done by a telephone visit at 6 months post quit date, revealed an abstinence rate of 12.5%.

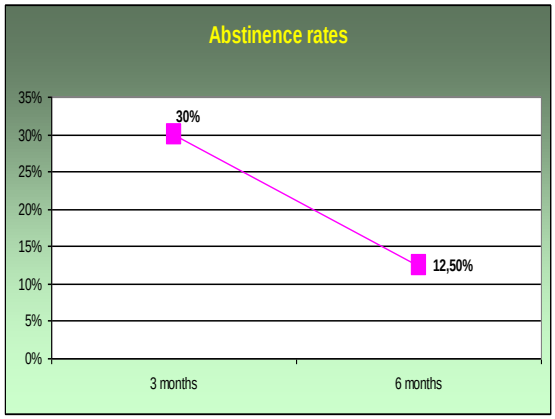


Figure 6. Abstinence rates found in moderate smokers at 3 and 6 months evaluation

DISCUSSIONS

There is not much evidence about moderate smoking consumption and cessation profile; data from early ’90-s have demonstrated diverging outcomes in managing „light” smoking [7]. Moreover, Romanian references in this domain are poor. Previous data in our tobacco cessation centre have found similar results in a group of 86 moderate smokers: an abstinence rate of 25 % at 3 months end of treatment and respectively of 11.6 % at 6 months evaluation [2].

Discussions should focus on discrepancies between expected higher proportion of abstinent among smokers of less than 10 cigarettes daily/ less than 10 PY and abstinence rates we have evidenced here above. The principal explanation for this situation is a more severe than expected nicotine dependence score, which is the case also in literature [7,8]. Hence, even if moderate tobacco consumption in our study group, we found only 31.2 % of subjects with expected low nicotine dependence (Fagerstrom scores < 3), while 40% had moderate dependence (scores 4-6) and an important (28.8%) subgroup were severely nicotine addicted (nicotine dependence scores of 7-10).

It seems it takes time to become drug

addicted, but in the case of nicotine, an inhaled drug delivered into the body via tobacco smoke, addiction installs quickly, sometimes in no more than 6 months, especially when starting to smoke in early childhood [9]. But for developing a severe degree of nicotine addiction, several factors may compete [10]. Number of years of smoking is the most important feature in this regard. That's why we have analysed duration of smoking separately for this group of less than 10 cigarettes/day consumers. Duration of smoking was expressed in number of years of smoking. Usually, in regular smokers, smoking intensity is indicated by the number of packs-years (no. of cigarettes/20 x no. of years of smoking), but in the case of moderate tobacco use, it is more relevant to refer to years of tobacco smoking, when quantifying consumption profile [11,12]. As revealed in (Fig.2), majority of the subjects (65%) have been smoking for more than 20 years, so this subgroup was at great risk to develop more severe tobacco dependence.

There is a great amount of research data available about a possible genetic pattern of nicotine addiction. Efforts have been done to discover genetic markers of nicotine dependence in its various forms or to predict its appearance [13,14,15]. Such investigation was not possible in our centre, but it is an important aspect to take in view for the future.

Another, usually disregarded, risk factor for acquiring severe dependence results from long-time use of menthol cigarettes brands. Due to menthol used as an additive to change cigarette flavour, smokers will inhale more deeply and will present an increasing salivary flow, thus a higher absorption of toxicants in tobacco, like aromatic hydrocarbures. It has been observed that such smokers become faster more addicted than non-menthol cigarettes users [16, 17]. Again, our data sustain this hypothesis as well, considering that we found 13.2% of subjects to prefer menthol brands.

Age to start smoking, if too young, contributes equally important to an increased nicotine dependence level [1], so another fraction of severe dependents in our study might arise from those 38.8% subjects starting earlier to smoke.

Finally, the presence of nicotine withdrawal syndrome documented in subjects' medical history is always considered a clue for severe addiction [18]. This aspect was demonstrated by our results, as 40% of the studied subjects declared past withdrawals. Nicotine withdrawal syndrome is usually described when suddenly stopping nicotine supply, like during the smoking cessation process, and includes symptoms like restlessness, acute/uncontrollable need to smoke (craving), irritability, anxiety feelings, tiredness, increased appetite (especially for sweets) and resultant weight gain, trouble to concentrate and focus memory, depression, headaches, insomnia, dizziness [1].

However, smoking cessation rates we found in moderate smokers appear rather fair, considering the great number of subjects being moderately and severely addicted to nicotine, due to a multitude of potentially addictive criteria. Also, if we refer to previously published outcomes from our tobacco cessation centre [19], our present results are overlapping data about 34.7% abstinence rates in a general population of smokers, regardless intensity of tobacco consumption.

CONCLUSIONS

1. We must not underestimate moderate smoking, especially nowadays, when number of such tobacco users may increase due to tobacco control successful legislation, worldwide.
2. Smoking cessation rates found at 3 and 6 months evaluations can be considered

satisfactory in moderate smokers, despite some specific smoking patterns and a high level of nicotine dependence.

3. Probably, the reimbursed treatment program in our centre had also a significant contribution to such successful abstinence rate.

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