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Tobacco Dependency Evaluation with Fagerstrom Test among the Entrants of Smoking Cessation Clinic

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ABSTRACT

Background: *Smoking is considered the first preventable cause of mortality worldwide. There are many predictive factors on smoking cessation including social, family and individual issues. High nicotine dependency is one of the factors that make the cessation harder for the smoker. There are several methods for estimating the nicotine dependency rate in practice among which Fagerstrom test is one of the most suitable and non-invasive ones.*

Materials and Methods: *This was a cross-sectional study. Data were collected from all smokers who had participated in the group therapy smoking cessation courses in Tehran smoking cessation clinic. The questionnaires were designed based on these data and nicotine dependency rate was evaluated via Fagerstrom test (FT). The smokers declared that they had quit smoking since the third session of the cessation course; this claim was confirmed by testing the expiratory carbon-monoxide rate. Finally, data were analyzed by using t-test and Chi-square test via SPSS software version 12.*

Results: *There were 986 cases in this study including 786 (79.7%) males. Evaluation of the nicotine dependency rate showed that more than half of the smokers (n= 544, 55.2%) had high dependency, 330 (33.5%) had moderate dependency and 112 (11.3%) had low dependency.*

At the end of the course, 642 subjects quit smoking successfully. The maximum rate of success in cessation was among the smokers with low nicotine dependency (79 cases, 70.5%) and the minimum rate of success was among the smokers with high nicotine dependency (323 cases, 59.4%) (P=0.00).

Conclusion: *According to the results of this study smokers with high nicotine dependency had a low chance to quit successfully. Therefore, it is recommended to follow them up for a longer period of time and use combination therapy for them.* ***(Tanaffos 2007; 6(4): 47-52)***

Key words: *Smoking, Cessation, Nicotine dependency, Fagerstrom test*

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INTRODUCTION

Smoking is considered the first preventable cause of mortality in the world (1). There are many predictive factors on smoking cessation such as social, family and individual issues (2). Many studies have shown that 70% of smokers are interested in quitting smoking, 46.4% of them have made an effort to quit during the last year, but only 4-6% of those who quit smoking can hold on to it for one year (3).

High nicotine dependency is one of the effective factors that make the cessation hard for the smoker (4). There are many invasive and non-invasive methods to measure nicotine dependency rate in practice. Fagerstrom test is a non-invasive applicable way to measure nicotine dependency rate. In this test some questions are designed based on the smoking patterns such as the time of smoking the first cigarette in the morning after waking up, the number of cigarettes smoked, alteration in consumption, the best cigarette of the day, tendency to smoke during illness and the problems the smoker faces in non-smoking areas (5). According to the answers given by the smokers and their scores, they are divided into three groups of low dependency, moderate dependency and high dependency.

Hymowitz et al. (6) showed that nicotine dependency rate had an important impact on the cessation outcome, and it can be used as an anticipating factor for successful cessation just like the number of cigarettes smoked per day and the time of smoking the first cigarette of the day.

Also Rojas et al. (7) in a stepwise linear regression analysis on the factors effective on smoking cessation showed that nicotine dependency rate accounted for approximately 35% of the variance in total number of withdrawal symptoms. Also, nicotine dependency rate plays a significant role in selecting the therapeutic method and programming smoking cessation. To our knowledge, there is no study in Iran that evaluates the role of nicotine dependency rate in successful smoking cessation. Therefore, we studied the correlation between nicotine dependency rate and outcome of smoking cessation among the entrants of smoking cessation clinic during 2002-2004.

MATERIALS AND METHODS

This was a cross-sectional study in which all the smokers who accomplished the smoking cessation course from March 2002 to February 2004 were studied.

Smoking cessation clinic was established by National Research Institute of Tuberculosis and Lung Disease (Shaheed Beheshti University) in association with the municipality of district number 14 in 1998 and is located in Pirouzi Street. In this clinic, monthly cessation courses are held for women and men separately. These courses comprise of 7 sessions each lasting for 2 hours. In these courses the physicians use educational methods, consultation, cognitive-behavioral therapy (CBT) and pharmacotherapy to help smokers quit smoking. Usually, 15-20 smokers participate in each course.

In these courses, nicotine-replacement therapy (NRT) in the form of nicotine chewing gum is given to smokers for free.

At the end of the course, smokers who were absent for more than half the sessions were considered as the missing group and the ones who had authorized absence (maximum of 3 sessions) comprised the accomplished group.

Necessary data including personal and demographic data, smoking habit and therapeutic factors were collected by using a questionnaire. The demographic data consist of age, sex, marital status, level of education and occupation. Smoking dependency was evaluated from zero to ten (low=1-3, moderate=4-7, high=8-10) by using nicotine dependency rate test based on the Fagerstrom test (FT). This test contained 6 questions as follows: how long after waking up the first cigarette is smoked,

number of cigarettes smoked per day, the best cigarette of the day, period of time in the day when most cigarettes are smoked, tendency to smoke during illness and difficulties of smoking in the banned or non-smoking areas. Also some other questions were designed and asked such as the reasons of smoking, the number of cigarette packs smoked per day during the smoking years (pack/year), and the number of absences from sessions and the outcome of the course.

Finally, the nicotine dependency rate, cessation outcome, the mean number of cigarettes smoked per day and per year, the age and sex of smokers in both groups were analyzed by Chi-square test.

RESULTS

There were 986 cases in this study out of which 786 (79.7%) were males. The age range was between 16 and 89 years (mean 38.3±14 years). Most smokers were between 21 and 40 years of age. The majority of the cases were under-graduates (39.8%). Also most smokers were businessmen (45.7%) and the employees were at the second place (21.9%). The minimum rate belonged to students (2.4%) (Table 1).

Table 1. Relative frequency distribution of the smokers of smoking cessation clinic by sex, age, education and occupation.

Volunteers		Number	Percentage
Sex	Male	786	79.6
	Female	201	20.4
Age	Under 20	22	2.2
	21-40	566	57.6
	41-60	359	36.5
	61 and more	36	3.7
Education	Illiterate	49	5
	Under graduate	390	39.8
	Graduate	314	32
	Over graduate	227	23.2
occupation	Unemployed	71	7.2
	Employee	215	21.9
	Businessman	449	45.7
	Housewife	146	14.8
	Retired	39	4
	Student	24	2.4
	Other	39	4

Considering the nicotine dependency rate, it is shown that more than half of the smokers had high nicotine dependency. Five-hundred forty-four individuals (55.2%) had high nicotine dependency (score 8, 9, 10), 330 (33.5%) had moderate nicotine dependency (score 4,5,6,7) and 112 (11.3%) had low nicotine dependency (score1,2,3).

At the end of the course, 642 subjects (65.1%) successfully quit smoking (not smoking even one puff after the third session), 73 were unable to quit smoking (7.4%) and 271 were excluded from the study (27.5%). The overall success rate was 89.8% (Table 2).

Table 2. Relative frequency distribution of entrants of smoking cessation clinic according to the outcome of cessation

Result	Number	Percentage	Valid percentage
Cessation	642	65.1	89.8%
Failure	73	7.4	10.2%
Miss	271	27.5	___
total	986	100.0	100%

Study of the correlation between cessation outcome and nicotine dependency rate (Fagerstrom) in three groups showed that the maximum rate of success belonged to smokers with low dependency rate (n=79, 70.5%) while the minimum rate of success belonged to those with high dependency rate (n=323, 59.4%) (P=0.00) (Table 3).

Table 3. Relative frequency distribution of the cessation outcome based on the nicotine dependency rate of smokers.

Result / Dependency	Cessation	Failure	Miss	Total
Low	79 (70.5%)	5 (4.5%)	28 (25%)	112 (100%)
Moderate	241 (72.7%)	19 (5.8%)	71 (21.5%)	330 (100%)
High	323 (59.4%)	49 (9%)	172 (31.6%)	544 (100%)
total	642 (65.1%)	73 (7.4%)	271 (27.5%)	986 (100%)

The relationship between cessation outcome and nicotine dependency after excluding those who failed to complete the course also confirmed that the maximum rate of success was among the smokers with low dependency rate (n= 79, 94%) while the minimum rate of success was among those with high dependency rate (n=323, 86.8%) (P=0.02) (Table 4).

Table 4. Relative frequency distribution of the cessation outcome based on the nicotine dependency of the smokers (after excluding the missing group).

Result / Dependency	Successful cessation	Failure	total
Low	79 (94%)	5 (6%)	84 (100%)
Moderate	240 (92.7%)	19 (7.3%)	259 (100%)
High	323 (86.8%)	49 (13.2%)	372 (100%)
Total	642 (89.8%)	73 (10.2%)	715 (100%)

Also in this study there was a correlation between pack/year consumption and nicotine dependency rate in a way that nicotine dependency rate increased by higher pack/year consumption. (p=0.00)(Table 5)

Table 5. Relative frequency distribution of pack/year based on the nicotine dependency according to Fagerstorm test among the smokers of cessation clinic.

Dependency / pack/year	low	Moderate	High	Total
Less than 10	51 (18.9%)	105 (38.9%)	114 (42.2%)	270 (100%)
11-20	20 (10.9%)	67 (36.4%)	97 (52.7%)	184 (100%)
More than 20	20 (4.9%)	115 (28.2%)	273 (66.9%)	408 (100%)
Total	91 (10.6%)	287 (33.3%)	484 (56.1%)	862 (100%)

There was no significant difference between age and sex and absence or exclusion from the course. But the comparison of dependency rate in these two groups showed a meaningful correlation (P=0.02). In those with high dependency rate exclusion from the course was higher compared to those with moderate or low frequency rates (172 individuals, 31.6% versus 71 individuals, 21.5% and 28 individuals, 25%).

DISCUSSION

Most smokers are interested in quitting and 46.4% of them quit smoking every year (1,3). But due to the smoking cessation problems 5.7% of them can quit smoking for one month and only 2.5% of them can do it for good (2). Smoking cessation is related to many factors and by recognizing and concentrating on them, the success rate of cessation will increase, extra expenses will be prevented and the health level of the society will increase. One of these factors is nicotine dependency rate which was evaluated in this study.

In this study, there was a significant correlation between the cessation rate and low nicotine dependency rate (based on Fagerstrom test). More than half of the smokers had high nicotine dependency. It was shown that smokers with high nicotine dependency rate had less success in cessation which is consistent with the results of a study by Sargent et al (8). They showed that by increasing the dependency, the successful cessation rate decreased. The successful cessation rate was 46.3% among the smokers who smoked occasionally, 12.3% among the smokers consuming 1-9 cigarettes a day and 6.8% among the smokers consuming 10 cigarettes or more a day. The significant correlation between successful cessation and low nicotine dependency rate has also been confirmed by Hymowitz et al (6). Therefore, smokers with high dependency (consuming more than 25 cigarettes a day) were unsuccessful in quitting smoking and two important factors including the number of daily cigarettes and time of the first cigarette in the morning were the effective factors in this regard.

Also Gad et al. (9) demonstrated that smokers with higher nicotine dependency rate were less successful in quitting smoking (P<0.001). Therefore,

nicotine dependency rate can be considered as an important factor in predicting the cessation outcome. Given this fact, programming the cessation method based on dependency rate (such as designing specific classes for high dependent smokers, following up these smokers for a longer period of time, adding other scientific means such as psychiatric consultations and using combination therapy for high dependent smokers) can help smokers attend these classes and increase their cessation chance.

Also, specific programming for cessation of high dependent smokers is necessary according to Rojas et al. (7) study.

Gad et al. (9) showed that both cognitive behavioral therapy and pharmacotherapy were also important to motivate dependent smokers to quit and increase their chance to do it successfully. Masjedi et al (10). in a study showed that attendance in the course and number of cigarettes smoked were the two predictive factors on cessation outcome. Also in Gorini et al. (11) study on 693 smokers with high nicotine dependency rate who attended in 8 or 9 sessions of the cessation course, two predictive factors were specified for the smoking cessation which were attending at least 7 sessions of smoking cessation course (OR=4.26) and smoking less than 30 cigarettes a day (OR=1.56). In this study, there was a significant correlation between the rate of attended sessions of the course and the cessation outcome. On the contrary, it seems that nicotine dependency rate increases if the number of cigarettes smoked is higher and the smoker is highly dependent. Our study showed that 91.8% of the smokers who consumed less than 10 cigarettes a day and 71.4% of those who consumed more than 30 cigarettes a day had a high score in nicotine dependency based on Fagerstrom test. This issue showed that the number of consumed cigarettes is not indicative of the dependency to nicotine. After matching age and sex in both the missing and accomplished groups, it was obvious that there was no significant correlation between age and sex and absence or exclusion from the cessation course. Also, nicotine dependency rate had no correlation with age and sex and this issue was confirmed in Lessov et al. (12) study. But in Rojas et al. (7) study, nicotine dependency rate in men was more than women and there was no significant difference between sex and cessation outcome.

According to this study, it is recommended to make the below mentioned changes to get better results in smoking cessation courses:

1. Designing special courses for highly dependent smokers to quit smoking in their own special courses.
2. Following up these smokers for a longer period of time.
3. Adding other scientific means such as psychiatric consultations to their cessation course.
4. Using combination therapy for highly dependent smokers to get better results.
5. Using nicotine replacement therapy

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