

Factors affecting success and abstinence within a smoking cessation clinic: A one-year follow-up study in Turkey

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ABSTRACT

INTRODUCTION Successful smoking cessation requires personal, environmental and pharmacological support. In our clinic, pharmacological treatment lasts up to three months. In this study, we aimed to investigate smoking cessation rates, the effects of follow-up visits and pharmacological therapies on smoking cessation in our smoking cessation clinic for one year.

METHODS Our study included 505 patient files that were randomly selected from the 5271 patients who were admitted to our outpatient clinic for smoking cessation in 2015–2016 and at least one year has passed from treatment initiation. Patients, who agreed to participate in this study, provided information on their smoking cessation status, treatment duration and drug side effects. Data were recorded on electronic media for statistical analysis. Significance was evaluated at $p < 0.05$.

RESULTS Our study was conducted on 505 patients that were randomly selected, 309 (61.2%) males and 196 (38.8%) females. The mean age was 38.9 ± 10.3 years. There were 313 (61.9%) participants who stopped smoking after treatment and 229 (45.3%) were not smoking currently. The smoking cessation rate of males (57.9%) was significantly lower than that of females (68.4%) ($p = 0.019$). The rate of relapse of males (12.9%) was significantly lower than that of females (20.9%) ($p = 0.017$). Side effects occurred in 68 (13.5%) patients, 32 taking varenicline and 36 taking bupropion.

CONCLUSIONS In our study, 45.3% of the patients had stopped smoking after one year. Smoking cessation rates were higher in the early stages of treatment than at late periods. Approximately half of the participants had never attended follow-up visits. Due to the low number of follow-up visits, both pharmacological treatment and motivational support were insufficient for effective smoking cessation therapy.

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INTRODUCTION

Tobacco use is the leading single preventable cause of death worldwide, killing over 7 million people each year. Tobacco Control Framework Convention (FCTC), the first international agreement on the fight against tobacco, was adopted by the World Health Organization's 56th World Health Assembly on 21 May 2003. It is almost a decade since WHO introduced 6 MPOWER measures in 2007 to help countries implement the Framework Convention on Tobacco Control; only 42 countries were protected

by at least one measure at the best-practice level. Today, 121 countries have put at least one of these measures into place at the highest level to protect people from tobacco¹. The Framework Convention on Tobacco Control was signed by Turkey in 2004. As of 2012, Turkey became and since then has remained the only country to adopt all MPOWER measures at the most comprehensive level². Turkey is among eight countries that are implementing four or more MPOWER measures effectively according to the WHO report in 2017².

Within the National Tobacco Control Program, smoking cessation outpatient clinics were established. In these clinics, psychological and social support is provided with appropriate medical treatment for the smokers³. Successful cessation of smoking requires personal, environmental and pharmacological support, along with knowledge of the factors that cause the use of tobacco⁴. In January 2015, our smoking cessation clinic started to admit patients. After examination, pharmacological treatment is initiated in appropriate cases, and cognitive behavior therapy is provided by experienced specialists. The pharmacological treatment lasts up to three months. Patient follow-up visits are performed at least once in the first 15 days, once a month up to three months, and once every three months until the end of one year. The psychologists also provide counselling and behavioral therapy during the first interview and follow-up. Patients are considered to have quit smoking if they do not smoke at the end of a year. Smoking cessation rates are determined monthly, quarterly and annually by smoking cessation polyclinics.

In our study, we aimed to investigate smoking cessation rates, the effects of follow-up and pharmacological treatments on smoking cessation in our smoking cessation clinic for at least one year.

METHODS

In the period 2015–2016, 5271 patients were admitted to our outpatient clinic for smoking cessation and at least one year has passed from treatment initiations. Our previously noted smoking cessation success rate was 45% at follow-up at one year in our smoking cessation clinic. According to our sample calculation, it was sufficient to include a minimum of 380 people from the patients who applied to our outpatient clinic with a 5% margin of error at 95% confidence interval. A clinical study without a control group was conducted. Our study included 505 patient files that were randomly selected. Selection criteria of participants were: be available by phone, able to give reliable verbal information, and agree to participate in the study. Exclusion criteria were: people with less than a year after the beginning of treatment, aged <18 years, being unavailable by phone, cognitive impairment, psychotic illness, and inability to answer

questions at interview. Ethics committee approval was obtained from the Ethics Committee of Okmeydani Training and Research Hospital (approval number 812).

The selected participants were reached using the phone number noted in the patient file. The participants were informed about this study, and their consent was obtained. If a participant could not be reached by phone or did not agree to participate in the study, the next patient file was considered.

Survey questions were asked to patients who agreed to participate in this study, such as their smoking cessation status if they started smoking again, how long they continued treatment and whether the drug has side effects. Alternative methods were not used to verify the former smoker status, for example, by asking a family member or a person who lived with the former smoker. Smokers who did not quit smoking and relapsed were classified as current smokers in our study.

Data were recorded on electronic media for statistical analysis, including age, gender, education level, Fagerström nicotine addiction test score, the number of cigarettes smoked per day, smoking years, and age of smoking initiation.

Fagerström nicotine dependence test (FNDT)

The Fagerström Nicotine Dependence Test (FNDT) developed from the Fagerström Tolerance Test (FTT) consists of six questions, and the answers are scored⁵. Fagerström nicotine addiction test scores are rated in three groups: low (0–3), medium (4–6), and high (≥ 7)⁶. Turkish validity study of the Fagerström Nicotine Dependence Test was carried out by Uysal et al.⁷ and it was concluded that it could be used as a method of measurement in the evaluation of nicotine dependence in smoking cessation. The Fagerström nicotine addiction test is widely used in smoking cessation clinics. It is applied to every patient in our polyclinic and noted in patient files.

Statistical analysis

Conformity of parameters to the normal distribution was evaluated using the Shapiro Wilks test. In the evaluation of this study, data descriptive statistical methods (mean, standard deviation, frequency) and chi-squared test were used to compare qualitative data. Student's t-test was used to compare quantitative

data. Significance was evaluated at $p < 0.05$. For statistical analysis, IBM SPSS Statistics 22 program was used.

RESULTS

Our study was conducted among the 505 randomly selected patients, aged 18–65 years, 309 (61.2%) males and 196 (38.8%) females. The mean age was 38.9 ± 10.3 years; and 348 of the participants were married while 157 were single. The average number of cigarettes smoked per day was 27.0 ± 10.2 , the mean age of starting smoking was 17.6 ± 5.0 years, the average number of smoking years was 20.9 ± 10.3 years, and average FNDT score was 6.5 ± 2.2 . The findings showed that 305 patients were treated with bupropion, 196 with varenicline, and 4 with nicotine patches. Side effects occurred in 68 (13.5%) patients, 32 taking varenicline and 36 taking bupropion. The treatment was changed in 30 patients due to side

effects, the ineffectiveness of the drug, or the inability to find drugs. Of the patients, 253 (50.1%) had never been to control, while 146 (28.9%) came to control once, 59 (11.68%) twice, 37 (7.3%) three times, seven (1.3%) four times, and three (0.59%) came five times (Table 1).

In Table 2 it is shown that 313 (61.9%) participants stopped smoking after treatment, and 84 (26.8%) relapsed. After one year, 229 (45.3%) participants were abstinent. Smoking cessation rate of males was significantly lower (57.9%) than that of females (68.4%) ($p = 0.019$). The rate of quitting smoking (70.4%) with a Fagerström score < 6 was significantly higher than that (58.0%) with a Fagerström score ≥ 6 ($p = 0.008$).

The smoking cessation rate (67.9%) of the users who used varenicline was significantly higher than those who used bupropion (58.4%) ($p = 0.033$).

The rate of relapse in males (12.9%) was significantly

Table 1. Participant characteristics and smoking factors

Characteristics and smoking factors	Categories	n	%
Age (years) range, mean \pm SD		18–65	38.85 \pm 10.31
Gender	Male	309	61.2
	Female	196	38.8
Marital status	Married	348	68.9
	Single	157	31.1
Education level	Primary school	184	36.4
	Secondary school	101	20.0
	High school	127	25.1
	University	93	18.4
Presence of a smoker at home	Yes	223	44.2
	No	282	55.8
Chronic disease	Yes	142	28.1
	No	363	71.9
Number of cigarettes smoked per day, range, mean \pm SD		7–100	26.98 \pm 10.2
Initiation age of smoking, range, mean \pm SD		7–48	17.57 \pm 4.99
Smoking years, range, mean \pm SD		1–57	20.86 \pm 10.29
Fagerström score, range, mean \pm SD		2–10	6.49 \pm 2.16
Fagerström score	< 6	162	32.1
	≥ 6	343	67.9
Treatments	Varenicline	196	38.8
	Bupropion	305	60.4
	Nicotine replacement	4	0.8
Side effects	Yes	68	13.5
	No	437	86.5

Continued

Table 1. Continued

Characteristics and smoking factors	Categories	n	%
Changing the treatment	Yes	30	5.9
	No	475	94.1
Duration of treatment (days), range, mean±SD		0–90	44.29±23.82
Number of controls, range, mean±SD		0–5	0.83±1.05
Reason for not coming to polyclinic control (n=444)	Lack of time	250	56.3
	Couldn't find drug	22	5.0
	Drug side effects	33	7.4
	Drug was not effective	33	7.4
	Could not use the drug regularly	94	21.2
	Other	12	2.7
Quit smoking	Yes	313	62.0
	No	192	38.0
Current smoking	No	229	45.3
	Yes	276	54.7
Reason for re-starting smoking (n=84)	Stressful incident	8	9.5
	General stress	12	14.3
	Environmental impact	10	11.9
	Inability of continuing the treatment	35	41.7
	Lack of motivation	19	22.6
Relapses (n=313)	Yes	84	26.8
	No	229	73.2

Table 2. Assessment of smoking cessation according to gender, presence of chronic disease, presence of a smoker at home, Fagerström score and treatments

Variable	Categories	Quit smoking		p
		Yes	No	
		n (%)	n (%)	
Gender	Male	179 (57.9)	130 (42.1)	*0.019
	Female	134 (68.4)	62 (31.6)	
Chronic disease	Yes	95 (66.9)	47 (33.1)	0.154
	No	218 (60.1)	145 (39.9)	
Presence of a smoker at home	Yes	144 (64.6)	79 (35.4)	0.286
	No	169 (59.9)	113 (40.1)	
Fagerström score	<6	114 (70.4)	48 (29.6)	*0.008
	≥6	199 (58.0)	144 (42.0)	
Treatments	Varenicline	133 (67.9)	63 (32.1)	*0.033
	Bupropion	178 (58.4)	127 (41.6)	

Chi-squared test, *p<0.05.

lower than in females (20.9%) (p=0.017). There was no statistically significant difference in quitting smoking between the mean age groups. There was no statistically significant difference in relapsing between the mean age groups (p>0.05) (Table 3). After one year, 43.4% of males and 48.5% of females were current smokers, and there was no statistically significant difference between the two groups (p>0.05) (Table 4).

Of the patients, 47.9% with chronic disease and 44.4% of those without chronic diseases were current smokers, and there was no statistically significant difference between the two groups (p>0.05) (Table 4). In all, 45.7% of patients who smoke at home and 45% of non-smokers at home were currently smoking, and there was no statistically significant difference between them (p>0.05) (Table 4).

Current smokers (54.3%) with Fagerström scores <6 were found to be statistically significantly more (41.1%) than current smokers with Fagerström

scores ≥ 6 ($p=0.005$) (Table 4). Current smokers were 47.4% of the users of varenicline and 44.3% of those using bupropion, and there was no statistically significant difference between the two groups ($p>0.05$) (Table 4).

Table 3. Evaluation of smoking relapse according to gender, presence of chronic disease, presence of smokers in the house, Fagerström score and treatments

Variable	Categories	Smoking relapse		p
		Yes	No	
		n (%)	n (%)	
Gender	Male	40 (12.9)	269 (87.1)	*0.017
	Female	41 (20.9)	155 (79.1)	
Chronic disease	Yes	26 (18.3)	116 (81.7)	0.385
	No	55 (15.2)	308 (84.8)	
Presence of a smoker at home	Yes	42 (18.8)	181 (81.2)	0.128
	No	39 (13.8)	243 (86.2)	
Fagerström score	<6	29 (17.9)	133 (82.1)	0.433
	≥ 6	52 (15.2)	291 (84.8)	
Treatments	Varenicline	39 (19.9)	157 (80.1)	0.054
	Bupropion	41 (13.4)	264 (86.6)	

Chi-squared test, * $p<0.05$.

Table 4. Evaluation of smoking status according to gender, presence of chronic disease, presence of smoker at home, Fagerström score and treatments

Variable	Categories	Current smokers (who did not quit smoking and relapsed)		p
		Yes	No	
		n (%)	n (%)	
Gender	Male	134 (43.4)	175 (56.6)	0.262
	Female	95 (48.5)	101 (51.5)	
Chronic disease	Yes	68 (47.9)	74 (52.1)	0.473
	No	161 (44.4)	202 (55.6)	
Presence of a smoker at home	Yes	102 (45.7)	121 (54.3)	0.875
	No	127 (45.0)	155 (55.0)	
Fagerström score	<6	88 (54.3)	74 (45.7)	0.005*
	≥ 6	141 (41.1)	202 (58.9)	
Treatments	Varenicline	93 (47.4)	103 (52.6)	0.485
	Bupropion	135 (44.3)	170 (55.7)	

Chi-squared test, * $p<0.05$.

DISCUSSION

In our study, 45.3% of the patients who applied to our outpatient clinic stopped smoking after one year. The rate of the patients who quit smoking during the first year of treatment was 61.9% while 26.8% started smoking again. According to previous research, the success of smoking cessation at the end of the first year varies between 19–48%^{3,4,8-15}. The variable ratios in these studies may depend on many factors. The success of smoking cessation differs in the early and late periods of treatment and quitting. Early success rates are observed higher than in late periods^{3,11,14}.

The smoking cessation rate in men was lower than in women at the beginning of treatment; however, women were less likely to maintain smoking cessation behavior, and no differences in quitting smoking rates were observed between males and females at the end of the first year. Also, no difference in the success of smoking cessation was found between the age groups.

Although some studies show that males have a higher rate of success, other studies emphasize that age and gender have no effect on smoking cessation rates^{3,16}. Monso et al.¹⁷ reported that gender and age were related to smoking cessation rates, with higher smoking cessation rates in males and older patients¹⁷. In some studies, it has been reported that smoking cessation rates increase with age regardless of gender^{8,13,18,19}. Studies that examined the effects of education level on smoking cessation found that it is higher in groups with high levels of education^{11,19-21}; but in some studies there was no difference between education level groups^{4,8,14,17}. Monso et al.¹⁷ found that socioeconomic factors, such as education level and employment status, did not influence smoking cessation. There are other studies that report that the level of education, occupation type and employment status are not related to smoking cessation success³. In our study, no difference was found between the education level groups in terms of smoking cessation success.

The presence of underlying smoking-related disease may have increased the smoking cessation rate. In one study, smoking cessation rates were significantly higher in the group that reported pathological findings on chest radiography¹⁶. Monso et al.¹⁷ reported that people with chronic respiratory and cardiac disease had lower rates of smoking

cessation success; however, there was no evidence that other chronic diseases or a history of depression have a negative effect on smoking cessation. In a study investigating the success of smoking cessation in patients with chronic obstructive pulmonary disease (COPD), smoking cessation rate was 29% in the COPD group and 49% in the control group¹⁰. The presence of comorbid conditions, such as cardiovascular, pulmonary and psychiatric disorders, has not been shown to have a positive or negative effect on smoking cessation^{8,14,20}. In our study, no difference in smoking cessation was observed between patients with and without comorbid chronic disease.

While in some studies, it was found that the number of cigarettes smoked daily was associated with smoking cessation success, some studies reported that the number of cigarettes smoked daily was not related to smoking cessation success^{3,18,20}. Several studies have shown that patients with low nicotine dependence scores have higher smoking cessation success^{3,11,19,21}, but in some studies there was no difference in nicotine dependence score among the groups who quit smoking and those that did not quit smoking^{14,20,22}.

We found that smoking cessation rate at the beginning of treatment was higher in those with FNBT score <6, while smoking rates were found to be lower for FNBT scores ≥ 6 in one year or longer. The cessation rates were higher in smokers with greater dependence, in contrast to those reported in the literature. The reason for this finding may be that smokers with high dependence were given drug therapies more than smokers with low dependence. Drug therapies may be more effective on smokers with higher dependence, especially in later follow-up periods.

There are studies showing that living with smokers in the same house reduces smoking cessation success and living with a partner who never smoked seems to be a factor that can prevent smoking relapse^{12,14}. In the present study, living with smokers in the same house did not influence smoking cessation success.

Smoking cessation rates are, in principle, higher in the early stages than in the late period^{3,12}. In the present study, the rate of those who started smoking again after giving up smoking for a certain period at

the end of treatment was 26.8%. Approximately half of the participants had never attended follow-up visits. Research in Turkey detected higher rates of quitting smoking in patients who attended in three months one or more follow-up sessions, and even higher for three or more follow-up sessions²³. A recent international study reported smokers who had more than one smoking cessation follow-up visit or were seen by a physician had a higher success rate²⁴. Research has noted that the use of pharmacotherapy for at least five weeks was associated with an increased smoking cessation rate¹⁵.

In a study, the smoking cessation rate was 63% in the first 15 days at the beginning of treatment, then decreased gradually in the 1st, 3rd, 6th and 12th month to 23% by the end of one year¹³. In another study, relapse rates of 37.1% were found after one year²⁵.

In a study, patients who quit smoking for at least six months after treatment, stress was the most important factor in starting smoking again^{18,20}. In another study, stress and excessive desire to smoke were the most common reasons for starting smoking again after quitting¹³. In a study, it was shown that polyclinic controls reduce the risk of relapse and that high relapses are associated with mental health problems and having a smoking partner^{12,26}. In our study, the most common reason for relapse was the inability to continue treatment, and then the lack of motivation and general stress.

We found that smoking cessation rates at the beginning of treatment were significantly higher in patients using varenicline compared to those using bupropion, but in the late period, about a year after the treatment, there was no difference in the success of smoking cessation between the two drugs. Also, in relapses, no significant difference was found between the two drugs. There are studies showing the superiority of varenicline to bupropion, nicotine replacement therapy and placebo in smoking cessation^{8,27-37}. There are also studies showing that there is no difference in the success of smoking cessation among medical treatments¹⁴. In two studies, the rate of quitting treatment due to side effects was found to be 12.6–15.9% for bupropion and 10.5–14.3% for varenicline use at different doses^{34,35}. In our study, the rate of total side effects was 13.5%, in accordance with the literature.

Limitations

There are limitations in our study. We did not verify that patients quit smoking by measuring carbon monoxide levels in exhaled air. We assumed that our patients' statements about quitting smoking were reliable.

CONCLUSIONS

In our study, 45.3% of the patients who applied to our outpatient clinic stopped smoking after one year. Smoking cessation rates were higher in the early stages of treatment than late periods related to the percentage of people who were successful in quitting smoking at the beginning of treatment, but smoking cessation behavior could not be sustained after the treatment in the first year or later. Approximately half of the participants had never come to follow-up visits. Due to the low number of outpatient controls, both pharmacological treatment and motivational support were insufficient for effective smoking cessation therapy. Smoking cessation success can be increased and the continuation of non-smoking behavior can be ensured by continuing pharmacological treatments for three months and encouraging patients to come to polyclinic control after the third and sixth months.

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CONFLICTS OF INTEREST

The authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none was reported.

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AUTHORS' CONTRIBUTIONS

All authors have contributed to the work and approved the final version of the manuscript for publication. ADE, YS, SA, GB and NG were responsible for the study concept and design. SA contributed to data analysis. SA, ADE and YS interpreted data, drafted the manuscript, and prepared the tools used in the data gathering. GB and NG had the responsibility of data gathering. SA and ADE revised the manuscript, and the whole process was under the supervision of SA, ADE and YS.

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