

Determining the Effects of the Monitoring and Counseling in Addition to Standard Monitoring on the Abstinence after Quit Smoking: A Randomized Controlled Study

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BACKGROUND/AIMS

The aim of this study was to determine the effects of supplemental monitoring and counseling in addition to the standard monitoring during the treatment period on the abstinence behavior of smoking cessation center applicants.

MATERIAL and METHODS

The randomized controlled study was conducted in the smoking cessation clinic as an intervention study. The study involved 67 participants. Data collection was implemented using the Descriptive Questions Form, Fagerström Test for Nicotine Dependence, Carbon Monoxide Monitoring Chart, and Self-Efficacy Questionnaire. After routine standard training and tests at the smoking cessation center, a total of six supplemental interviews were conducted in the intervention group by one of the researchers; these interviews were conducted one week before smoking cessation and one week and one, two, three, and six months after quitting. Two interviews were conducted in the control group for evaluation: one week before and six months after quitting.

RESULTS

After six months, 88.2% of the intervention group and 60.6% of the control group had stopped smoking. A statistically meaningful difference was found between the intervention and the control groups in terms of attending the standard monitoring. In the last interview, the self-efficacy score of the intervention group was significantly higher than that in the control group. Compared to the control group, the intervention group was 1.5 times more successful in smoking cessation at the end of the sixth month.

CONCLUSION

Those successful in smoking cessation must be monitored in frequent follow-ups simultaneously supported by physicians, nurses, and other health-care providers.

Keywords: Abstinence, counseling, monitoring, nursing, quit smoking

INTRODUCTION

Nicotine addiction is a very common addiction, and tobacco use has serious negative effects on human health and is one of the most significant preventable public health problems in the world (1). Interventions for smoking cessation include pharmacological and behavioral methods and other alternative approaches (2). Each year approximately two out of every three smokers make an attempt to quit (3). However, quitting is very difficult to achieve without any systemic support or program. Only 3%–5% of self-quitters achieved abstinence after a self-quit effort (4).

The greatest problem in smoking cessation is relapse. The relapse rate for smokers who attempt to quit on their own has been reported as 80% within the first month, with only 3%–5% individuals remaining abstinent at 6 months (5). Relapse generally occurs within the first three months. Although relapse is related to withdrawal symptoms in the early cessation period, psychological factors may play a more crucial role in the long term (6); therefore, a model focusing on cognitive-behavioral relapse prevention has been suggested (7). Interviews intended to prevent relapse and

approaches to reward positive attitude were very effective in the attempting-to-quit phase. Frequent contact with health-care providers is important to support the abstinence efforts. The clinical guidelines reported a strong relationship between the number of health care providers visits and the length of abstinence (3, 8). Pharmacotherapy, counseling, and behavioral support also increase quitting and abstinence rates (3, 8, 9). In addition, self-efficacy influences behavioral changes in smoking cessation efforts. Self-efficacy represents the self-confidence levels that cause individuals to resist smoking in many high-risk situations (10). The success of the intervention was markedly increased, if it was implemented in specialized smoking cessation clinics with close monitoring and appropriate motivational and psychological support (11).

Nurses are mainly involved in the smoking cessation campaigns and provide preventive and curative services in collaboration with other health-care professionals. There have been successful cessation interventions implemented by nurses in clinics and in other social contexts (12-16). Besides smoking cessation interventions, nurses have been involved in relapse prevention by monitoring smokers, during both the cessation attempt and the continuation phase (17, 18).

The aim of this study was to determine the effects of monitoring and counseling during the cessation period in addition to the routine monitoring performed during the treatment period on the abstinence behavior of smoking cessation center applicants.

MATERIALS AND METHODS

Design and Participants

This study was conducted in the smoking cessation clinic of the Cancer Early Diagnosis, Screening and Education Center (CEDSEC) between December 2012 and November 2013 as an intervention type and randomized controlled study. In Turkey, smoking cessation clinics are incorporated into the CEDSEC. Ethical approval was received from the Institutional Ethics Committee (I491-I323-I2/I648-4002). Research application approval was received from the Public Health Institution (Ministry of Health).

Main Points:

- In our study, we studied the effects of supplemental monitoring and counseling in addition to the standard monitoring during the treatment period on the abstinence behavior of smoking cessation center applicants.
- At the end of the six months, the self-efficacy score of the intervention group was significantly higher than that in the control group.
- The intervention group was 1.5 times more successful than the control group in smoking cessation.
- Individuals who have been successful in smoking cessation should be frequently monitored, and in follow-ups simultaneously supported by physicians, nurses, and other health-care providers.
- There is a need for longer-term, randomized controlled studies with larger sample groups.

The participants were individuals admitted to the smoking cessation program who were > 18 years of age. Informed consent was obtained from all individual participants included in the study. Participants were assigned to the intervention or control groups by way of random closed-enveloped lottery. Participants were blinded to their assigned group, each of which consisted of 34 individuals. One individual from the control group was excluded after the first interview because they moved away from the area.

Data were collected by using the following forms:

- Descriptive Questions Form,
- Fagerström Test for Nicotine Dependence (FTND),
- Carbon monoxide (CO) Monitoring Chart, and
- Self-Efficacy Questionnaire (SEQ).

Descriptive Questions Form

This form was developed by the researchers in keeping with the related literature (1, 4, 6, 8, 10, 12-15, 17, 18, 21, 22, 25-27, 31, 34); it elicits individual characteristics and smoking behaviors.

FTND

FTND, developed in 1978 and revised in 1991, indicates the individual's nicotine dependence level (19). Uysal et al. (20) translated the scale into Turkish in 2004. They determined the Cronbach's alpha was 0.59 in a sample of Turkish smokers.

The FTND is composed of six questions, two scored "0-3", and four scored "0-1". Total scores vary from 0 to 10; 0 indicates no dependence, and 10 indicates the highest level of dependence. The FTND was routinely applied by physicians before education on "Effects of Tobacco on Health" to those who applied to the CEDSEC for smoking cessation. These test results were used in our study.

CO Monitoring Chart

CO measurement is used to monitor those undergoing smoking cessation and to diagnose various pulmonary diseases (21). CO levels of CEDSEC applicants for smoking cessation were routinely measured by the physician every monitoring visit. These measurement results have been used in our study.

SEQ

The SEQ, developed by Nicki et al. (10) in 1984, was adapted by Karanci in a Turkish sample of 174 smokers in 1992. Cronbach's alpha value was determined as 0.92. The SEQ assesses the subjects' perceptions of their ability to abstain from smoking in various situations. It contains 25 items, each rated on a five-point scale ranging from "not sure at all: 1" to "very sure: 5". The scale total score varies between 25 and 125 points and a higher score indicates a greater ability to refrain from smoking (10). We obtained permission from Karanci by e-mail to use the SEQ. In our study, Cronbach's alpha value was 0.80.

Application

A total of six interviews were performed with the intervention group members who also received standard care in the clinic. The researchers encouraged their continued participation in the standard monitoring. The individuals in the control group received only standard monitoring in the clinic on a voluntary ba-

sis. For both groups, the measurements were conducted during the first and the last interviews. Participants were asked about their abstinence in the first, third, and sixth month. Figure I shows the application process in detail.

Standard Monitoring:

This monitoring was routinely implemented in the CEDSEC. Participants completed the FTND before education on “Effects of Tobacco on Health”. Then, participants had a blood test, breath function test, and lung X-ray performed at the Chest Diseases Clinic. If nothing was amiss, the participants were provided with appropriate pharmacotherapy. Participants were given information about the medicine and cautioned about the early effects of quitting smoking and the importance of avoiding even minimal amounts of smoking. Their first CO measurement

was also taken at this time. They were provided with the first three month supply of medicines, and at every control visit, CO levels were measured. During this period, the participants were required to attend a control visit in the first week, and in the first, second, third, sixth, ninth, and twelfth months. For the standard monitoring, there were no attempts to make absent participants attend the control visits, and participants with CO levels >5 were excluded. After 12 months of monitoring, successful participants were no longer required to attend.

Intervention Group

Interviews were conducted as follows: 45 minute sessions of nurse counseling were provided in a quiet and appropriate room in the clinic by a qualified nurse in accordance with the principals of individual counseling.

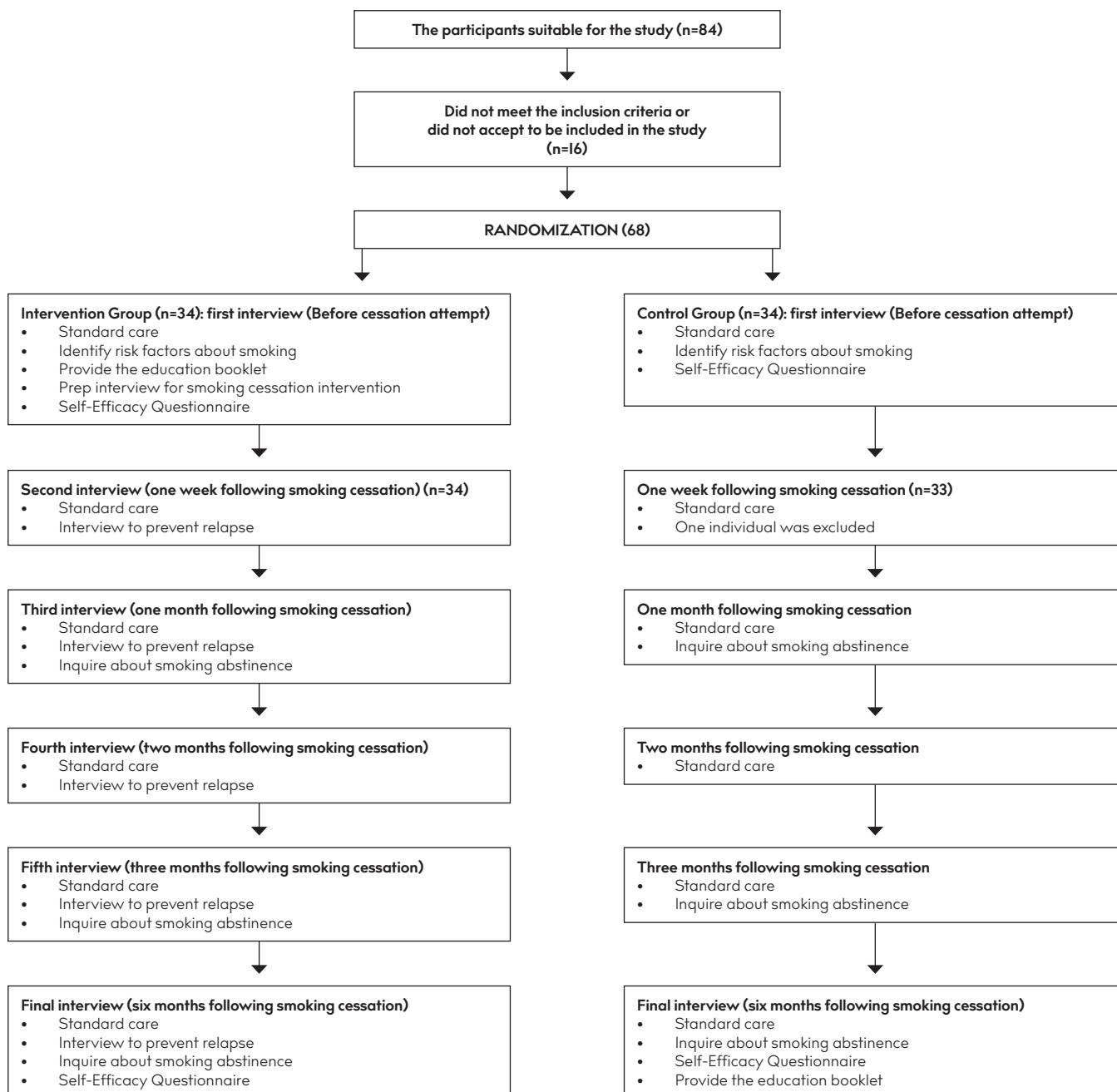


FIGURE I. Flow chart of the Study

Education Booklet

An educational booklet, which provided information on the challenges of cessation, was prepared for those undertaking smoking cessation to support this endeavor. The booklet was provided in the first interview, and participants were asked to complete the "Smoking Cessation Diary" section.

First Interview (Prep Interview)

This was an interview to prepare the individual to quit smoking; it was conducted approximately one week before the smoking cessation date and determined the personal information and risk factors of the individual. Information about the education booklet was provided, and participants completed their "My Smoking Cessation Diary". No statistical analysis was applied to the diary as its aim was only to motivate and support the cessation efforts.

Second Interview (High-Risk Period Monitoring)

The first two weeks of the cessation period carry the greatest risk of relapse (3). Therefore, the second interview took place within a week, in order to prevent relapse.

Third, Fourth, and Fifth Interviews (Relapse Prevention Monitoring):

Interviews to prevent relapse were repeated. In these interviews, participants who missed their control appointments were reminded of the appointments and invited by phone to attend. When participants missed appointments because of forgetfulness, shame, or failure, they were reminded that:

- Smoking one or two cigarettes did not mean that they had resumed smoking,

- This was a learning process, and
- They should not smoke even the smallest amount.

Last Interview (Evaluation Interview)

Participants' smoking cessation statuses were evaluated. In this period, those who managed to quit were in the cessation phase. They were reminded of the continuing danger of relapse. Those in relapse risk were supported with cessation help and counseling.

Control Group

In the first interview, personal information and risk factors were determined for the control group. In the second and final interview, the smoking cessation status of the participants was evaluated. For ethical reasons, an educational booklet was also provided for this group at the end of the study.

Statistical Analysis

Statistical Package of Social Sciences 16.0 (SPSS, Inc., Chicago, IL, USA) was used for the data analysis. The results were assessed at the 95% confidence interval, with significance at $p < 0.05$. For the descriptive statistics, variables determined by counting were stated as numbers and percent, and measured variables were stated as median (\pm) standard deviation, and "minimal"–"maximal". Normal distribution suitability of the continuous variables was evaluated with the one-sample Kolmogorov-Smirnov test. In analyzing the differences between the groups, for the normal distribution variables, Student *t* test was used, and for the others, Mann-Whitney U test was used. In analyzing the differences within a group for the normal distribution variables, Paired samples *t* test was applied, and for others, Wilcoxon test. Pearson chi-square test was used for the analysis of intermittent variables.

RESULTS

No statistically meaningful differences in demographics and smoking behavior were observed between the intervention and the control groups at the first interview ($p > 0.05$) (Table 1).

The percent of participants who began smoking before age 18 years was 52.9% in the intervention group and 45.5% in the control group; 55.9% of the intervention group and 63.6% of the control group reported smoking for >30 years, and 38.2% of the intervention group and 42.4% of the control group reported smoking more than a pack per day. No previous attempts at smoking cessation were reported by 32.4% of the intervention group and 18.2% of the control group; 61.8% of the intervention group and 60.6% of the control group reported previously trying to quit by themselves. According to the FTND, 29.4% of the intervention group and 24.2% of the control group were in the very high dependence group (Table 2).

The intervention group attended an average of 5.47 ± 1.16 standard monitoring sessions, whereas the control group attended an average of 4.12 ± 1.56 ($p < 0.01$).

An increase in the self-efficacy scores of all subjects in the study was found. At the last interview, the self-efficacy score of the intervention group was significantly higher than that in the control group ($p < 0.05$) (Table 3).

TABLE I. Sociodemographic characteristics

Characteristics	Intervention (n=34)		Control (n=33)		X ²	p
	n	%	n	%		
Age						
≤45 years	14	41.2	12	36.4	0.163	0.686
>45 years	20	58.8	21	63.6		
Gender						
Female	18	52.9	17	51.5	0.014	0.907
Male	16	47.1	16	48.5		
Marital Status						
Married	27	79.4	29	87.9	0.875	0.350
Single/Widow	7	20.6	4	12.1		
Education level						
≤Primary education	9	26.5	15	45.5	2.625	0.269
Secondary education	7	20.6	5	15.2		
≥Higher education	18	52.9	13	39.4		
Working status						
Working	10	29.4	10	30.3	1.185	0.553
Not working	13	38.	16	48.5		
Retired	11	32.4	7	21.2		
X ² =Pearson Chi-Square						

The intervention group stated that their desire to smoke was strongest "postprandial" and "when stressed" before cessation

and "when stressed" and during "arguments" after cessation. The control group also stated that before cessation, their desire was strongest "postprandial" and "when stressed". Except for "Coffee" and "popular smoking places", no statistically significant differences were determined between the groups after cessation attempt (p>0.05).

At the end of the study, it was observed that 88.2% of the intervention group and 60.6% of the control group had ceased smoking, and a statistically significant difference was determined (p<0.05). The intervention group was 1.5 times more successful compared to the control group at the end of the sixth month. Among participants who had not tried any previous cessation attempts, the intervention group was 5.5 times more successful than the control group. Among participants who had tried previous cessation attempts, the intervention

TABLE 2. Smoking behavior characteristics

Characteristics	Intervention (n=34)		Control (n=33)		X ²	p
	n	%	n	%		
Beginning age for smoking						
≤17 years	18	52.9	15	45.5	0.376	0.540
≥18 years	16	47.1	18	54.5		
Cigarettes per day						
≤1 pack (20 pieces)	21	61.8	19	57.6	0.122	0.727
>1 pack (20 pieces)	13	38.2	14	42.4		
Smoking years						
<15	6	17.6	3	9.1	1.085	0.581
15-29	9	26.5	9	27.3		
≥30	19	55.9	21	63.6		
Pack - years						
≤20	19	55.9	13	39.4	1.825	0.224
>20	15	44.1	20	60.6		
Previous cessation attempts						
Yes	23	67.6	27	81.8	1.776	0.183
No	11	32.4	6	18.2		
Method used in the previous attempt						
No Intervention	11	32.4	6	18.2	5.681	0.128
Self-willed	21	61.8	20	60.6		
With drug support	2	5.9	3	9.1		
Other (Acupuncture etc.)	0	0	4	12.1		
Encouragement of close friends in the cessation attempt						
They encourage	16	47.1	20	60.6		
Do not encourage	11	32.4	7	21.2	1.396	0.498
Partially encourage	7	20.6	6	18.2		
Fagerström Nicotine Dependence Test (FNDT)						
Very low (0-2 p.)	1	2.9	3	9.1	6.730	0.151
Low (3-4 p.)	9	26.5	2	6.1		
Medium (5 p.)	4	11.8	6	18.2		
High (6-7 p.)	10	29.4	14	42.4		
Very high (8-10 p.)	10	29.4	8	24.2		

X²=Pearson Chi-Square

TABLE 3. Self-efficacy Questionnaire (SEQ) scores at first and last interviews

SEQ scores (X±SD)	Intervention (n=34)	Control (n=33)	t	p
First Interview (SEQ1)	59.94±17.17	62.93±14.94	-0.762	0.449
Last Interview (SEQ2)	113.82±19.37	101.06±14.94	2.356	0.021
Score Differences (SEQ2-SEQ1)	53.88±27.50	38.12±24.03	2.495	0.015

t=Independent samples t test

TABLE 4. Smoking Abstinence Statuses of the Intervention and Control groups at the 1st, 3rd, and 6th month periods

Characteristics	Ceased Smoking %			
	Intervention	Control	RE	%95 CI
All the Participants				
At the end of 1 st month	97.1	90.9	1.068	0.944-1.207
At the end of 3 rd month	97.1	84.8	1.144	0.979-1.336
At the end of 6 th month	88.2	60.6	1.456	1.077-1.968
Previous Cessation Attempt Exists				
At the end of 1 st month	95.7	92.6	1.033	0.900-1.186
At the end of 3 rd month	95.7	88.9	1.076	0.918-1.262
At the end of 6 th month	87.0	70.4	1.236	0.923-1.654
Previous Cessation Attempt Does Not Exist				
At the end of 1 st month	100	83.3	1.200	0.839-1.716
At the end of 3 rd month	100	66.7	1.500	0.852-2.641
At the end of 6 th month	90.9	16.7	5.455	0.903-32.963
Cigarettes per day ≤1 pack (20 pieces)				
At the end of 1 st month	95.2	84.2	1.131	0.910-1.405
At the end of 3 rd month	95.2	73.7	1.293	0.972-1.719
At the end of 6 th month	85.7	52.6	1.629	1.027-2.582
Cigarettes per day >1 pack (20 pieces)				
At the end of 1 st month	100	100	-	-
At the end of 3 rd month	100	100	-	-
At the end of 6 th month	92.3	71.4	1.292	0.896-1.865
FNDT ≤5				
At the end of 1 st month	92.9	72.7	1.277	0.864-1.886
At the end of 3 rd month	92.9	72.7	1.277	0.864-1.886
At the end of 6 th month	92.9	45.5	2.043	1.052-3.966
FNDT ≥6				
At the end of 1 st month	100	100	-	-
At the end of 3 rd month	100	90.9	1.100	0.964-1.255
At the end of 6 th month	85.0	63.6	1.336	0.927-1.925

RE: Relative effectiveness; CI: Confidence Interval; FNDT: Fagerström Nicotine Dependence Test

group was 1.2 times more successful than the control group. Among the individuals who smoked less than a pack per day, the intervention group was 1.6 times more successful than the control group. All participants in both groups who smoked more than a pack per day managed to avoid smoking at the end of the first and third months. But at the end of the sixth month, the intervention group was 1.3 times more successful than the control group. Among the individuals with a dependence score of 5 or less, it was observed that the intervention group was 2 times more successful than the control group at the end of the sixth month. Among the individuals with a dependence score of 6 or more, the intervention group was 1.3 times more successful than the control group at the end of the sixth month (Table 4).

DISCUSSION

Nicotine is a challenging addiction, and relapse is one of the biggest problems in smoking cessation. Relapse prevention interventions and smoking cessation interventions are different, but they cannot be separated from one another. Smoking cessation interventions focus on cessation, whereas relapse prevention interventions focus on prevention, especially of smoking resumption (22). Although data about relapse prevention indicate a wide variation, in a systematic review, it was stated that pharmacotherapy and written materials were effective in the short term, and behavioral interventions were effective in the long term (23). In the literature, a combination of behavioral counseling and pharmacotherapy have been found to produce the best results (3, 8). The likelihood of success increased by between 10% and 25% when the level of behavioral support increased (9). In our study, participants who decided to quit received supplemental monitoring and counseling along with pharmacotherapy and routine monitoring in the smoking cessation clinic. At the end of the sixth month, it was determined that 88.2% of the intervention group and 60.2% of the control group ceased smoking ($p < 0.05$). In studies in Turkey that evaluated data from smoking cessation therapies, cessation rates were reported as 36%–65% after three months and 22%–45% after the first year (24–26). In our study, the intervention group's cessation rates were higher than those rates. In a study conducted in 2010 at a smoking cessation clinic, Önen et al. (27) observed that behavioral therapy applied with pharmacologic treatments was more effective than other therapies, and they recommended routine monitoring and support with behavioral treatments.

According to randomized trials, there is a strong dose-response relationship between the duration of counseling and abstinence rates (3, 28). Intensive counseling is more effective if there are at least four sessions longer than 10 minutes (3). Joseph et al. (29) stated that intensive counseling providing long-term social support was effective in smoking cessation and relapse prevention. In our study, the intervention group attended an average of 5.5 follow-ups and the control group an average of 4; the results were significantly different. Argüder et al. (25) stated that the low success rate in their clinic may have been because of the failure of participants to attend follow-ups after the first interview.

It is important to identify factors that may increase the risk of smoking or relapse. These factors include stressful conditions, spending time with other smokers, alcohol consumption, and

smoking triggers (e.g., drinking coffee and after a meal) (3). In our study, risk factors were identified during the first interview, and coping strategies were determined based on individual needs. Individuals in the intervention group stated that they most desired to smoke "postprandial" and "when stressed" before the cessation attempt and "when stressed" and "when in arguments" after cessation. In the previous interviews, participants were asked to note smoking triggers and coping strategies in a "smoking diary" in order to identify and manage their own triggers. Similarly, Sağlam (26) determined the "eating" factor was a key trigger. Joseph et al. (29) investigated high-risk situations for relapse and planned interventions that were designed to cope with them.

It is important to practice coping skills to deal with the dangerous situations once these have been defined. Appropriate encouragement and support should be given to maintain healthy practices (3). In our study, participants in the intervention group who relapsed were advised to regard the relapse cigarette as their last, to consider this as a learning experience, and to continue their visits. At the end of the sixth month, the greater effectiveness in the intervention group compared to the control group was noticeable. The greater rate of relapse in the control group was attributed to the lack of this support. Similarly, Joseph et al. (29) stated that intensive follow up resulted in greater success compared to standard follow up in the long term. Deiches et al. (30) determined that in the first eight weeks of smoking cessation, the relapse rate was as high as 63%, and that 78% of those who relapsed in the early period restarted smoking within about six months.

According to Bandura, self-efficacy was one of the most important criteria for quitting smoking (10). Studies also showed that there was a positive correlation between self-efficacy scores and the time after quitting (10, 31–33). In our study, increases in the self-efficacy scores were greater in the intervention group than those in the control group.

In the literature, it has been reported that long-term smokers who started smoking early are more prone to failure in smoking cessation (4). According to the Global Adult Tobacco Survey, approximately half of all smokers attempted to quit, but only 15.8% succeeded (34). Önen et al. (27) stated that unsuccessful cessation attempts do not adversely affect the success rates of future cessation attempts, but in our study, the intervention was 1.2 times more effective in participants with a history of cessation attempts but 5.5 times more effective in those without a history when compared to results for the control group. When the intervention group rates compared to rates for similar groups of participants in the control group, the cessation success rates of intervention group were 1.6 times greater for individuals smoking a pack or less a day; 1.3 times greater for individuals smoking more than a pack a day; 2 times greater for those with a dependence score of 5 or less, and 1.3 times greater for those with a dependence score of 6 or more.

Conclusion and Practice Implications

In our study, we studied the effects of supplemental monitoring and counseling in addition to the standard monitoring during the treatment period on the abstinence behavior of smoking cessation center applicants. At the end of the six months, the

self-efficacy score of the intervention group was significantly higher than that in the control group. The intervention group was 1.5 times more successful than the control group in smoking cessation. Individuals who have been successful in smoking cessation should be frequently monitored, and in follow-ups simultaneously supported by physicians, nurses, and other health-care providers. There is a need for longer-term, randomized controlled studies with larger sample groups.

Study Limitations

Individuals who were successful in smoking cessation were monitored for only six months. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Ethics Committee Approval: Ethics committee approval was received for this study from Ethics committee approval received for this study from Gulhane Military Medical Academy (Approval Date: May, 2012, Approval Number: 1491-1323-12/1648-4002)

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

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