ADDICTA: THE TURKISH JOURNAL ON ADDICTIONS

Received: 29.10.2019
Accepted: 22.12.2019

http://addicta.com.tr/en/
Winter 2019 • 6(4) • 157-167

Research Article

The Relationship between Smoking Cessation Fatigue and Nicotine Dependence Severity

Sigara Bırakma Yorgunluğu ile Nikotin Bağımlılığı Şiddeti Arasındaki İlişki

Melike Mercan Başpınar Okcan Basat

Abstract

This study assessed the relationship between cessation fatigue and nicotine dependence level (NDL) by predicting cessation success using a standardized scale. Cessation fatigue was measured by the Turkish version of the Cessation Fatigue Scale (CFS), which includes emotional exhaustion (EA), pessimism (P), and devaluation (D) as subscales. Nicotine dependence was assessed using the Fagerstrom Test for nicotine dependence (FTND). The prospective study was planned to take place at the Family Medicine outpatient clinics of a tertiary hospital in February and May 2019. Out of 313 individuals (median age= 40 years; SD= 22.63; 40.3% females), 32.3% had a high nicotine dependence level. No relationship between cessation fatigue and NDL was detected by CFS. Women had greater EA scores than men, whereas men had greater P and D scores. The EA score was higher among patients unable to quit, while P score was higher in among patients who quit successfully. A cut-off value was detected (≥10 points) for the pessimism subscale. Lastly, although the reliability of the CFS scale was high (Cronbach's alfa value=0.76), the CFS could not predict cessation success significantly. However, the CFS did demonstrate successful patients have lower initial fatigue scores.

Keywords

Addiction • Cigarette • Cessation fatigue • Nicotine dependence • Smoking

Öz

Bu çalışma, sigara bırakma yorgunluğu ve nikotin bağımlılığı düzeyi (NBD) arasındaki ilişkiyi standart bir ölçek ile bırakma başarısını tahmin ederek değerlendirmiştir. Bırakma yorgunluğu, duygusal tükenme (DT), karamsarlık (K) ve değersizleşme (D) alt ölçeklerini içeren Bırakma Yorgunluk Ölçeği'nin (BYÖ) Türkçe versiyonu ile ölçüldü. Nikotin bağımlılığı, Fagerstrom Nikotin Bağımlılık Testi (FNBT) kullanılarak değerlendiridi. Prospektif tip çalışmanın Şubat ve Mayıs 2019'da üçüncü basamak bir hastanenin Aile Hekimliği polikliniklerinde yapılması planlandı. 313 kişiden (ortanca yaş=40 yıl; SD=22,63; % 40,3 kadın)

Correspondence to: Melike Mercan Başpınar, Email: drmelikemercan@gmail.com

Department of Family Medicine, University of Health Sciences Gaziosmanpaşa Training and Research Hospital, İstanbul, Turkey

ORCID ID's of the authors: M.M.B. 0000-0003-3183-3438; O.B. 0000-0002-5222-9136.

To cite this article: Başpınar, M. M., & Basat, O. (2019). The relationship between smoking cessation fatigue and nicotine dependence severity. *Addicta: The Turkish Journal on Addictions, 6*(4), 157-167.
http://dx.doi.org/10.5152/addicta.2020.19120

% 32,3'ü yüksek düzey nikotin bağımlıydı. Bırakma yorgunluğu ile NBD arasında BYÖ sonuçlarına göre anlamlı bir ilişki saptanmadı. Kadınlar erkeklerden daha yüksek DT skorlarına sahipken, erkekler daha yüksek K ve D skorlarına sahipti. DT skoru bırakamayan hastalarda daha yüksek iken, K skoru başarıyla bırakan hastalarda daha yüksekti. Karamsarlık alt ölçeği için bir kesme değeri (≥10 puan) saptandı. Son olarak, BYÖ ölçeğinin güvenilirliği yüksek olmasına rağmen (Cronbach'ın alfa değeri = 0,76) BYÖ sigara bırakma başarısını tahmin edememiştir. Bununla birlikte, BYÖ başarılı hastaların başlangıçtaki yorgunluk skorlarının daha düşük olduğunu göstermiştir.

Anahtar Kelimeler

Bağımlılık • Sigara • Bırakma yorgunluğu • Nikotin bağımlılığı • Sigara kullanımı

Introduction

The latest research suggests smoking-related mortality has risen to 7.2 million lives annually, killing more people than AIDS, malaria, and tuberculosis combined. Globally, the World Health Organization (WHO) European Region has the highest prevalence of tobacco smoking among adults (28%). In addition to causing illness and death, tobacco is a driver of health inequities (WHO, 2019). In 2013, two-thirds of all adult smokers surveyed reported making a quit attempt. Between 2001and 2010, a significant increase in the proportion of adult cigarette smokers that attempted to quit was observed in 29 states and the U.S. Virgin Islands (Outbreak—Orange, 2015). Analyses on treatment-seeking smokers found quit rates decreased over time, and some studies found that DSM-defined dependence appeared to increase over time (Hughes, 2011).

The first step in smoking cessation treatment is to advise, motivate, inform, and support the individual on their path to quitting. Afterward, appropriate pharmacological treatments (bupropion and varenicline) or nicotine replacement therapies can be used in treatment (Dougherty and Conway, 2008; Öztürk et al., 2018) (Zwar, 2014). Unfortunately, among smokers who quit without prescribed treatment, approximately 95% to 98% will return to smoking within 6 to 12 months following a quit attempt. Thus, findings indicate the continued need to not only support attaining smoking cessation, but also to prevent smoking relapse (Collins et al., 2010; Hughes et al., 2004). The rate of smoking-cessation success is reported differently for those who have attended clinics, which provide smoking-cessation services in Turkey. A one-year success rate of 40% was determined in a report including five-years of results from a smoking-cessation outpatient clinic (Karadağlı & Nahcivan, 2012; Öztürk et al., 2018).

The first time to stop, trial frequency, coping methods in abstinence, etc. describe the process of nicotine cessation (Burns et al., 2000). One possible relapse risk factor that has been suggested, but rarely studied, is cessation fatigue (defined as being tired of trying to quit smoking). Indeed, understanding cessation fatigue may be essential

to understanding the relapse process. There is also some evidence which shows those who present now for treatment have higher levels of nicotine dependence than those presenting 10 or more years ago (Hughes, 2011).

We hypothesized a higher cessation fatigue score would be associated with a high nicotine dependence level and unsuccessful treatment. At the beginning of cessation treatment, predicting those likely to quit smoking can help inform treatment time or method. To our knowledge, this is the first study demonstrating the Turkish version of Cessation Fatigue Scale (CFS) and how it relates to nicotine dependence severity for predicting successful quitting.

Method

Participants and Selection Criteria

This study was performed by prospectively evaluating 313 nicotine addicts admitted to the Family Medicine outpatient clinics of a tertiary hospital for smoking cessation treatment between February and May 2019. All volunteers were selected from among current smokers, >18 years old, who relapsed from a quit attempt or failed in treatments before. All relapses were included, regardless of how much time had elapsed after smoking cessation.

Ethical Approval and Consent to Participate

Voluntary patients were informed about the face to face questionnaire and the written survey included a patient consent form on its first page. Ethical permission to conduct this study was obtained from the Taksim Training and Research Hospital Clinical Researches Ethics Committee (No:13, dated 16/01/2019). All authors read and carried out the principles within the Helsinki Declaration.

Measures

Fagerstrom Test for Nicotine Dependence

Nicotine dependence was assessed with the Fagerstrom Test for nicotine dependence (FTND). Reliability in the Turkish version of the FTND and factor analysis was done in 2004 by Uysal et al. (Uysal et al., 2004). Nicotine dependence was classified as mild (0-4 points), medium (5-7 points), and heavy (8-10 points) dependence.

Validation and Reliability of the Turkish Version of Cessation Fatigue Scale

The “smoking cessation fatigue” scale was developed by Mathew et al. (2017) and adapted to a Turkish version, with validity and reliability investigated by Öztürk et al. (2018). The smoking CFS is a 5-point Likert scale, and items are evaluated between 1 and 5 (1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree). The Turkish version of CFS consists of 13 items grouped into three factors;

emotional exhaustion (EA, 6 items), pessimism (P, 3 items), and devaluation (D, 4 items) (Öztürk et al., 2018; Mathew et al., 2017). High scores on the P and D subscales are interpreted to mean low pessimism and a devaluated situation.

Sample Size

Sample size was calculated by a simple random sampling method from the study population. The minimum number of people required to be collected was calculated to be 269 with a 95% confidence interval.

Statistical Analysis

Descriptive statistics were used to measure the frequency, mean, and standard deviation of all variables. Covariates were analyzed using the Mann-Whitney U test (or Kruskal Wallis test) and the independent samples t-test. Dunn test was used for multiple comparisons. ROC analyses assessed the CFSscale and subscales. Comparison of variables by CFS total fatigue, EA, P, and D scores were calculated with parametric tests for normally distributed data and non-parametric tests for non-normally distributed data. Data were analyzed using the NCSS 10 program (2015; Kaysville, Utah, USA). A p-value of <0.05 was considered significant.

Cronbach's alpha value was used to show reliability. Alpha value was described as excellent (0.93–0.94), strong (0.91–0.93), reliable (0.84–0.90), robust (0.81), fairly high (0.76–0.95), high (0.73–0.95), good (0.71–0.91), relatively high (0.70–0.77), slightly low (0.68), reasonable (0.67–0.87), adequate (0.64–0.85), moderate (0.61–0.65), satisfactory (0.58–0.97), acceptable (0.45–0.98), sufficient (0.45–0.96), not satisfactory (0.4–0.55) and low (0.11).

Results

The Cronbach's alpha value for the Turkish version of CFS in our sample was calculated to be 0.76 (minimum alfa value=0.73 maximum alfa value=0.77), indicating the scale had high reliability.

The evaluation of demographic data is presented in Table 1. The sample included 313 smokers (M_{age}=40 years, SD=22.63) and consisted of 40.3% females and 59.7% males. In total, 46.3% of the sample had a basic education degree, 33.2% completed high school, and 16.9% had a university degree. The proportion of patients with any diseases related to the cardiovascular (CVS) and /or respiratory system (RS) was 24.3%. Moderate nicotine dependence level (NDL) was most common (45.4%), followed by heavy NDL (32.3%), and mild NDL (22.4%). The mean FTND score was 6.1±2.3, while average duration of smoking was 22.1±11.9 years. The median number of cigarettes consumed was 20 cigarettes/per day. At the end of the treatment, the success rate for quitting was 43.8% (n=137). In cessation treatments the pharmacotherapy, varenicline, was used in 35.8% of patients and nicotine replacement therapies (NRT),

Table 1.
Evaluation of Demographic Data

		Quit smoke	Continue smoke	
Continuous variables		**M±SD**	**M±SD**	**p**
Age		40.5±13.26	39.5±10.60	[a]0.84
Duration of smoking (year)		22.63±12.75	21.58±11.18	[b]0.68
FTND score		5.88±2.31	6,33±2.25	[a]0.08
Cigarette (per/day)		23.25±10.85	25.80±13.87	[b]0.21
Cigarette (packet/year)		26.27±20.40	28.71±24.23	[b]0.44
		Quit smoke	**Continue smoke**	
Categorical variables		**N %**	**N %**	**p**
Gender	Female	48 (35%)	78 (44%)	[c]0.09
	Male	89 (65%)	98 (56%)	
Education	Illiterate	4 (3%)	7 (4%)	[c]0.66
	Basic education	63 (46%)	82 (47%)	
	High school	43 (31%)	61 (35%)	
	University	27 (20%)	26 (15%)	
NDL	Mild	34 (25%)	36 (20%)	[c]0.50
	Moderate	63 (46%)	79 (45%)	
	Heavy	40 (29%)	61 (35%)	
Treatment type	NRT	74 (54%)	127 (72%)	[c]0.001*
	Varenicline	63 (46%)	49 (28%)	
Presence of disease (CVS/Respiratory)	Positive	32 (23%)	44 (25%)	[c]0.74
	Negative	105 (77%)	132 (75%)	

*p<0.05 statistically significant; [a]Student t-test; [b]Mann-Whitney U test; [c]Chi-square test.
SD: standart deviation; FTND: Fagerstrom Test for nicotine dependence; NDL: nicotine dependence level; NRT: nicotine replacement therapy; CVS: cardiovascular system; M: mean.

such as the nicotine patch, were used in 64.2%. Despite the fact varenicline had more success (n=63) than failure (n=49), NRT (success n=74 failure=127) was used twice as much. Thus, NRT appears more successful statistically. When comparing the successful and unsuccessful groups, there is no difference in the demographic data, NDL groups, FTND scores, nor other variables related to smoking cigarettes.

Table 2 displays the characteristics of the CFS scale and its subscales

Females had a greater EA score than men (p= 0.005). However, males had greater P (p= 0.01) and D scores (p=0.05) than women. Interestingly, EA score was higher among the quitting (-) group (p= 0.001), and P score was higher among the quitting (+) group (p= 0.006). Age, FTND score, nicotine dependence severity, treatment method, daily smoking, lifetime smoking, and the duration of smoking were not statistically different when compared across the CFS (total fatigue) nor its subscales (EA, P, D) as seen in Table 2.

Table 2.
Comparison of Variables by CFS Total Score and Subscale Score

Variables		CFS-Total M±SD	CFS-EA M±SD	CFS-P M±SD	CFS-D M±SD
Categorical variables					
Gender	Female	44.48±9.22	18.67±5.72	8.67±3.07	17.13±4.56
	Male	44.05±8.36	16.68±6.40	9.53±2.95	17.83±4.16
	p	[a]0.67	[a]0.005*	[b]0.01*§	[b]0.05*§§
NDL	Mild	43.30±9.18	17.07±6.24	9.27±3.04	16.96±5.09
	Moderate	44.87±7.56	17.68±5.84	9.35±2.88	17.84±3.85
	Heavy	43.95±9.82	17.50±6.72	8.90±3.21	17.56±4.39
	p	[c]0.63	[d]0.80	[d]0.49	[c]0.72
Treatment method	NRT	44.35±8.45	17.58±5.98	9.15±3.01	17.63±4.39
	Pharmacotherapy	43.98±9.17	17.31±6.63	9.25±3.07	17.42±4.24
	p	[a]0.72	[a]0.72	[a]0.78	[b]0.39
Quitting smoke	Yes	43.79±8.26	16.20±6.31	9.71±3.02	17.88±3.94
	No	44.56±9.05	18.48±5.95	8.77±2.97	17.30±4.60
	p	[a]0.44	[a]0.001*	[a]0.006*	[b]0.44
CVS/RS disease	Yes	45.28±8.23	18.22±6.22	9.16±2.98	17.90±3.86
	No	43.88±8.84	17.25±6.20	9.20±3.04	17.44±4.47
	p	[a]0.23	[a]0.23	[a]0.93	[b]0.67
Continuous variables					
Age	p	[f]0.87	[f]0.59	[f]0.72	[f]0.48
FTND score	p	[g]0.96	[g]0.92	[g]0.37	[g]0.73
Cigarette (per/day)	p	[g]0.42	[g]0.16	[g]0.70	[g]0.19
Cigarette (packet/year)	p	[g]0.70	[g]0.74	[g]0.82	[g]0.42
Duration of smoking (year)	p	[g]0.39	[g]0.53	[g]0.32	[g]0.55

*p<0.05 significant; [§] percentiles 25-75: male (8-12) female (6-11); [§§]percentiles 25-75: male (17-20) female (16-20); [a]Student t-test; [b]Mann-Whitney U test; [c]One way ANOVA test; [d]Kruskal-Wallis test; [f]Pearson correlation test; [g]Spearman rho correlation test.
CFS: cessation fatigue scale; EA: emotional exhaustion; SD: standart deviation; NDL: nicotine dependence level; NRT: nicotine replacement therapy; CVS: cardiovascular system; RS: respiratory system; FTND: Fagerstrom Test for nicotine dependence; M: mean.

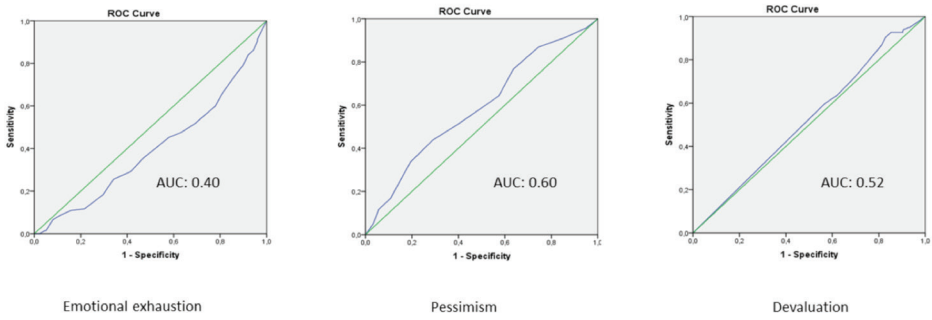

Figure 1. ROC curve analyses in predicting the presence of treatment success with CFS Subscales (EA, P, D).
AUC: area under the curve.

Figure 1 displays the ROC curve analyses of each subscale calculated for sensitivity and specificity.

AUC $_{\text{total fatigue}}$: 0.46 (95%CI: 0.40-0.52 p: 0.18)

AUC $_{\text{emotional exhaustion}}$: 0.40 (95%CI: 0.33-0.46 p:0.002)

AUC $_{\text{pessimism}}$: 0.60 (95%CI:0.53-0.65 p:0.006)

AUC $_{\text{devaluation}}$: 0.52 (95%CI:0.46-0.59 p:0.49)

A diagnostic cut-off score was created for the CFS-P subscale to predict smoking cessation. The details of the cut-off value are shown below:

Cut-off value: 10 points

Sensitivity: 0.40

Specificity: 0.49

Positive likelihood ratio (PLR): 0.79

Negative likelihood ratio (NLR): 1.22

Unfortunately, there were no strong cut-off values within the Turkish version of CFS and its subscales, except for the P subscale. Although pessimism scores of 10 points or higher were significant in predicting cessation success, both the sensitivity and specificity of this test were under 50%.

Discussion

In this study, increased fatigue was not associated with high dependence levels. Moreover, the Turkish CFS could not predict cessation success nor could cut-off values be determined for the CFS and FTND scores that could accurately determine between the quitting (+) and (-) groups.

A current study suggests cessation fatigue is an obstacle to quitting smoking and precipitates smoking relapse. Among recent quitters, emotional exhaustion progressively increased over the first 6 weeks after the initial quit. Elevated exhaustion was associated with greater lapse and relapse risk. Interventions targeting this novel risk factor may help improve smoking-cessation and reduce relapse rates (Heckman et al., 2018). Consistent with the initial CFS study, EA demonstrated good internal consistency and strong construct validity. Pessimism and devaluation subscales in the CFS were comprised entirely of reverse-scored items. Further work is needed to extend the assessment of these domains and validate their role as meaningful constructs for fatigue and cessation outcomes (Mathew et al., 2017). Our study obtained significant

EA and P scores between quitting smoke positive (+) and negative (-) groups. However, a strong cut-off value could not be obtained. Therefore, it is possible for high EA and P subscale scores to be used as a tracking tool, despite not being significant predictors of quitting success by ROC analyses.

According to one study, higher CFS scores were associated with greater nicotine withdrawal severity and difficulty quitting, but lower self-efficacy, abstinence related motivational engagement, and quit intentions (Mathew et al., 2017). In our study, there was no CFS score difference demonstrated across the NDL groups. Moreover, a high FTND score was not correlated with a high fatigue score.

Another research sample showed greater EA was associated with both younger age and greater pre quit date cigarettes per day (CPD). Emotional exhaustion scores were also higher among those who were male. Lastly, exhaustion was predicted by age, nicotine dependence, and CPD, while gender and education were significant predictors of devaluation (Heckman et al., 2018). In our study, results between males and females were significantly different for all three subscales. Women had a higher score for EA, and men had higher scores for P and D. Furthermore, although it was not significant, total cessation fatigue was higher for women than men. Our results also indicated successful addicts had a higher score on the P subscale and a lower score for EA than addicts who failed to quit at treatment end.

Varenicline is the first smoking cessation treatment to demonstrate significant long-term relapse prevention by helping recent ex-smokers to maintain abstinence. (Tonstad et al., 2006). The US Food and Drug Administration (FDA) has drawn attention to varenicline regarding its role in neuropsychiatric or cardiovascular events. In October 2014, the FDA obtained a black box neuropsychiatric warning for varenicline. Although the most recent evidence suggests that varenicline can be used safely, patients should be screened and monitored. (Baker et al., 2016) (Ahmed et al., 2013). In a study about comparing treatment methods, varenicline and varenicline plus NRT did not produce different effects on 26- or 52-week abstinence. In our clinic, we did not use combined varenicline plus NRT therapy on any individuals, due to its unproven superiority. The treatment methods used were nicotine patches (NRT) or varenicline. Initial fatigue was higher in the NRT group than the varenicline group, but it was not statistically significant. In our sample population, varenicline's success was superior to varenicline's failure. The findings also made us believe varenicline treatment may have been more effective than NRT in patients with high fatigue, but it was not statistically significant due to the disproportionate allocation of patients.

Smoking related diseases have been on the rise all around the world, creating a large economic burden for individuals and health care systems. An analysis in France suggested providing medical support to smokers in their attempts to quit is cost-ef-

fective and may even result in cost savings (Cadier et al., 2016). Advice on smoking cessation from doctors and other health professionals has been shown to improve quit rates and is highly cost-effective (Zwar, 2014). Unfortunately, sometimes, it is necessary to a patient's health to accomplish the difficult task of quitting. When a person who enjoys smoking experiences a myocardial infarction, or any disease related to smoking, they may no longer look at the cigarette with pleasure. Of the respondents who successfully quit smoking in another study, 76% did so because of awareness, 16% because of illness, and 8% because of the demands of their profession (Helman, 1994). In our study, 24.3% of patients had CVS/RS disease. Which means behavior change in one out of four people could reduce the burden of smoking-related illness.

Rational use of public funding must be planned for cessation treatments because smoking-related diseases have continued to increase steadily. Therefore, all studies capable of predicting and increasing the success rate of smoking cessation are necessary.

There were a few limitations that should be noted. First, the use of treatments may have been affected by the availability of treatment in each center. Smoking cessation treatments are free for patients, but agents (NRT or pharmacotherapies) might be delivered and stocked unequally. Therefore access and availability may have affected treatment type in the clinic. Second, success was not measured over time. All current smokers who tried to quit smoking and/or failed before were included, regardless of the time duration between quitting and relapse.

Conclusion

The evaluation of the Turkish version of CFS proved highly reliable. Smokers with 10 points or more in the P subscale were successfully predicted to achieve quitting success. Still, both sensitivity and specificity were under 50%, which means the score from the P subscale is not an appropriate tool for predicting the success of cessation treatment alone. Likewise, a cut-off value for the CFS could not be determined. On the other hand, results from the CFS suggest that successful patients exhibited lower fatigue than others. Thus, it remains possible for high fatigue to signal increased probability of relapse during treatments, and physicians should consider the necessity of complementary therapies to use after clinic release.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of Taksim Training and Research Hospital (No:13, date: 16/01/2019).

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

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – M.M.B., O.B.; Design – M.M.B. O.B.; Supervision – M.M.B., O.B.; Resources – M.M.B., O.B.; Materials – M.M.B., O.B.; Data Collection and/or Processing – M.M.B., O.B.; Analysis and/or Interpretation – M.M.B., O.B.; Literature Search – M.M.B., O.B.; Writing Manuscript – M.M.B.; Critical Review – O.B.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Etik Komite Onayı: Bu çalışma için etik komite onayı Taksim Eğitim ve Araştırma Hastanesi Etik Kurulu'ndan alınmıştır (No:13, tarih: 16/01/2019).

Hasta Onamı: Sözlü hasta onamı bu çalışmaya katılan hastalardan alınmıştır.

Hakem Değerlendirmesi: Dış bağımsız.

Yazar Katkıları: Fikir - M.M.B., O.B.; Tasarım - M.M.B., O.B.; Denetleme - M.M.B., O.B.; Kaynaklar - M.M.B., O.B.; Malzemeler - M.M.B., O.B.; Veri Toplanması ve/veya İşlemesi - M.M.B., O.B.; Analiz ve/veya Yorum - M.M.B., O.B.; Literatür Taraması - M.M.B., O.B.; Yazıyı Yazan – M.M.B.; Eleştirel İnceleme – O.B.

Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

Finansal Destek: Yazarlar bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

References

Ahmed, A. I., Ali, A. N., Kramers, C., Härmark, L. V., Burger, D. M., & Verhoeven, W. M. (2013). Neuropsychiatric adverse events of varenicline: a systematic review of published reports. *Journal of Clinical Psychopharmacology, 33*(1), 55-62. https://doi.org/10.1097/JCP.0b013e31827c0117 [Crossref]

Baker, T. B., Piper, M. E., Stein, J. H., Smith, S. S., Bolt, D. M., Fraser, D. L., & Fiore, M. C. (2016). Effects of nicotine patch vs varenicline vs combination nicotine replacement therapy on smoking cessation at 26 weeks: a randomized clinical trial. *The Journal of the American Medical Association, 315*(4), 371-379. https://doi.org/10.1001/jama.2015.19284 [Crossref]

Burns, D. M., Anderson, C. M., Johnson, M., Major, J. M., Biener, L., Vaughn, J., Shanks, T. G. (2000). Cessation and cessation measures among adult daily smokers: National and state-specific data. Population-Based Smoking Cessation: What Works. *Smoking and Tobacco Control Monograph, 12*, 25-97.

Cadier, B., Durand-Zaleski, I., Thomas, D., & Chevreul, K. (2016). Cost effectiveness of free access to smoking cessation treatment in France considering the economic burden of smoking-related diseases. *PLoS One, 11*(2), e0148750. https://doi.org/10.1371/journal.pone.0148750 [Crossref]

Collins, S. E., Witkiewitz, K., Kirouac, M., & Marlatt, G. A. (2010). Preventing relapse following smoking cessation. *Current Cardiovascular Risk Reports 4*(6), 421-428. https://doi.org/10.1007/s12170-010-0124-6 [Crossref]

Dougherty, D., & Conway, P. H. (2008). The "3T's" road map to transform US health care: the "how" of high-quality care. *The Journal of the American Medical Association, 299*(19), 2319-2321. https://doi.org/10.1001/jama.299.19.2319 [Crossref]

Heckman, B. W., Dahne, J., Germeroth, L. J., Mathew, A. R., Santa Ana, E. J., Saladin, M. E., & Carpenter, M. J. (2018). Does cessation fatigue predict smoking-cessation milestones? A longitudinal study of current and former smokers. *The Journal of Consulting and Clinical Psychology, 86*(11), 903-914. https://doi.org/10.1037/ccp0000338 [Crossref]

Helman, C. G. (1994). *Culture, health and illness*. Butterworth Heinemann, London, (pp. 354).

Hughes, J. R. (2011). The hardening hypothesis: is the ability to quit decreasing due to increasing nicotine dependence? A review and commentary. *Drug and Alcohol Dependence 117*(2-3), 111-117. https://doi.org/10.1016/j.drugalcdep.2011.02.009 [Crossref]

Hughes, J. R., Keely, J., & Naud, S. (2004). Shape of the relapse curve and long-term abstinence among untreated smokers. *Addiction, 99*(1), 29-38. https://doi.org/10.1111/j.1360-0443.2004.00540.x [Crossref]

Karadağlı, F., & Nahcivan, N. (2012). Sigara içen bireylerde sigara bırakmaya hazıroluşluk durumu ile ilişkili faktörler. *Dokuz Eylül Üniversitesi Hemşirelik Yüksekokulu Elektronik Dergisi, 5*(1), 8-15.

Mathew, A. R., Heckman, B. W., Meier, E., & Carpenter, M. J. (2017). Development and initial validation of a cessation fatigue scale. *Drug and Alcohol Dependence, 176,* 102-108. https://doi.org/10.1016/j.drugalcdep.2017.01.047 [Crossref]

Lavinghouze, S. R., Malarcher, A., Jama, A., Neff, L., Debrot, K., & Whalen, L. (2015). Trends in quit attempts among adult cigarette smokers-United States, 2001-2013. *Morbidity and Mortality Weekly Report, 64*(40), 1129-1135. https://doi.org/10.15585/mmwr.mm6440a1 [Crossref]

Öztürk, Y. E., Kıraç, R., Çiftçi Kıraç, F., & Mermerkaya, S. (2018). Sigara bırakma yorgunluğu ölçeğinin türkçe geçerlik ve güvenirlik çalışması [Turkish validity and reliability study of smoking cessation fatigue scale]. *Journal of Social and Humanities Sciences Research, 5*(25), 1996-2003. https://doi.org/10.26450/jshsr.578. [Crossref]

Tonstad, S., Tønnesen, P., Hajek, P., Williams, K. E., Billing, C. B., & Reeves, K. R. (2006). Effect of maintenance therapy with varenicline on smoking cessation: A randomized controlled trial. *The Journal of the American Medical Association, 296*(1), 64-71. https://doi.org/10.1001/jama.296.1.64 [Crossref]

Uysal, M. A., Kadakal, F., Karşıdağ, Ç., Bayram, N. G., Uysal, Ö., & Yılmaz, V. (2004). Fagerstrom test for nicotine dependence: reliability in a Turkish sample and factor analysis. *Tüberküloz ve Toraks Dergisi, 52*(2), 115-121.

WHO (2019) Tobacco. Available at from: http://www.euro.who.int/en/health-topics/disease-prevention/tobacco (accessed 30 August).

Zwar, N. A. (2014). Supporting smoking cessation. *British Medical Journal, 348,* f7535. https://doi.org/10.1136/bmj.f7535 [Crossref]