ADDICTA: THE TURKISH JOURNAL ON ADDICTIONS

Received: 06.09.2019
Accepted: 31.10.2019

http://addicta.com.tr/en/
Winter 2019 • 6(4) • 99-115

Research Article

Investigation and Detection of Risk Factors Related to the Period without Tobacco Consumption

Tütün Kullanılmayan Süreyle İlişkili Riskli Faktörlerin Araştırılması ve Belirlenmesi

Ömer Alkan Ayşenur Demir

Abstract

The consequences of tobacco consumption include disease and death. Many people want to give up tobacco use because of its dangers, but its addictive quality makes it difficult. The aim of this study was to detect the risk factors in Turkey that affect the number of days without tobacco consumption among individuals attempting to quit smoking in the last 12 months. Data collected from 1,251 individuals selected in the Global Adult Tobacco Survey were utilized in this study. The multivariate cox regression analysis was used to determine the factors that affected the number of days without tobacco among individuals aged 15 and above in Turkey. At the end of the analysis, variables, such as gender, education, age, household rules about tobacco consumption, supporting higher taxes for tobacco products, and household welfare indicators, were effective in the tobacco-free period. To prevent smoking relapses, tobacco cessation programs should be promoted among the citizens. Awareness of the risks associated with tobacco consumption should be raised and social support from family and friends to quit smoking should be further accentuated.

Keywords

Tobacco cessation • Cox regression • Turkey • Global adult tobacco survey • Tobacco use

Öz

Tütün kullanımının sonuçları hastalıklar ve ölümlerdir. İnsanlar tütünün zararlarından dolayı bu kullanımlarından vazgeçmek istemektedir ancak tütünün bağımlılık yapıcı özelliği buna engel olmaktadır. Tütün kullanmayı bırakanlarda ise yeniden başlama durumu yaygın olarak görülmektedir. Bu çalışmanın amacı, Türkiye'de tütün kullanımını bırakmayı deneyen bireylerin tütün kullanmadıkları gün sayısını etkileyen risk faktörlerini belirlemektir. Bu çalışmada Küresel Yetişkin Tütün Araştırması'nda seçilen 1.251 kişiden toplanan veriler kullanılmıştır. Türkiye'de 15 yaş ve üzeri bireylerde tütün kullanmadığı gün sayısını etkileyen faktörleri belirlemek için çok değişkenli cox regresyon analizi kullanılmıştır. Analiz sonunda,

Correspondence to: Ömer Alkan, Email: oalkan@atauni.edu.tr
Department of Econometrics, Atatürk University School of Economics and Administrative Sciences, Erzurum Turkey
ORCID ID's of the authors: Ö.A. 0000-0002-3814-3539; A.D. 0000-0002-2463-4329..

To cite this article: Alkan, Ö., & Demir, A. (2019). Investigation and detection of risk factors related to the period without tobacco consumption. *Addicta: The Turkish Journal on Addictions, 6*(4), 99-115.
http://dx.doi.org/10.5152/addicta.2020.19085

cinsiyet, eğitim, yaş, tütün tüketimine ilişkin hane halkı kuralları, tütün ürünleri için daha yüksek vergileri destekleme ve hane halkı refah göstergeleri gibi değişkenler tütün kullanılmayan dönemde etkili olmuştur. Sigara içilmesinin önlenmesi için vatandaşlar arasında tütün bırakma programları teşvik edilmelidir. Tütün tüketimi ile ilgili risklerin farkında olunmalı ve sigarayı bırakmak için aileden ve arkadaşlardan gelen sosyal destek daha da vurgulanmalıdır.

Aanahtar Kelimeler

Tütün bırakma • Cox regresyon • Türkiye • Küresel yetişkin tütün araştırması • Tütün kullanımı

Introduction

Nowadays, public health is considered one of the most important indicators of quality of life. In recent years, it has become one of the main issues in all countries (Pascual Sáez, González Prieto, & Cantarero Prieto, 2015). Tobacco use, identified as an addiction by WHO, is a global problem and an important public health hazard that can damage almost every organ in the human body, negatively affect quality of life, and lead to death (Bassiony, Aqil, Khalili, Radosevich, & Elsabaa, 2015). Tobacco use, the primary reason for preventable deaths and diseases, is considered a very serious problem and one that urgently needs to be solved (Kaplan et al., 2013). It is expected that of the 1.2 billion people aged 15 and above, tobacco use kills about six million people worldwide. Tobacco use also causes hundreds of billions of dollars in damages yearly, and it is estimated that it will kill more than eight million people every year by 2030 (WHO, 2011). In Turkey, the number of people who die yearly owing to tobacco-related diseases is estimated to increase to 240,000 by 2030 (Bilir, Çakır, Dağlı, Ergüder, & Önder, 2009).

Tobacco use has remarkable costs regarding health and the economy. It can lead to decreasing productivity and increasing health and social costs, causing damage to individuals, families, society, and the economy of a country (Grover, 2010). Most users knowing about the harm of tobacco try to quit, and some of these trials are successful. Nevertheless, the most important problem for those who quit tobacco use is the restart of its use; therefore, the real struggle lies in ensuring non-relapse.

People who try to quit tobacco use on their own without medical help find it difficult in maintaining the cessation because of their dependence on nicotine. The success rate is higher for those who quit tobacco use with help (Buzgan et al., 2007). There is a link between relapse and factors that are effective in giving up tobacco use (Yazıcı & Özbay, 2004).

Many studies found that demographic and socioeconomic variables, such as gender (Alkan, 2017; Alkan & Abar, 2020; Srivastava, Malhotra, Harries, Lal, & Arora, 2013), age (Fidan, Pala, Ünlü, Sezer, & Kara, 2005; Osler & Prescott, 1998), education (Fernández et al., 2006), vocation (Kaleta, Usidame, Dziankowska-Zaborszczyk,

& Makowiec-Dąbrowska, 2014; Milcarz, Makowiec-Dąbrowska, Bak-Romaniszyn, & Kaleta, 2017), place of residence (Harmer & Memon, 2013), race (Stevens et al., 2016; Zimmerman, Warheit, Ulbrich, & Auth, 1990), marital status (Hawkins, Hollingworth, & Campbell, 2010; Kim, 2014), income (Levy, Romano, & Mumford, 2005; Yang, Fisher, Li, & Danaher, 2006), health problem (Stevens et al., 2016), health awareness and concern about the harmful effects of tobacco (Halpern & Warner, 1993; Vahidi et al., 2014), tobacco control policies (Kaplan et al., 2013), and taxes on tobacco (Kaleta et al., 2012), are related to tobacco use.

Data collected from the Global Adult Tobacco Survey (GATS) were utilized in this study. Tobacco consumption is both an addictive habit and a huge health problem owing to its detrimental effects on human physiology. Therefore, the aim of this study was to determine the socio-demographic and economic factors and personal and life-quality indicators that affect the number of days without tobacco consumption among those aged 15 and above who attempted to quit tobacco in the last 12 months. Unlike other relevant studies in the literature, this study aims to shed light on several factors that affect tobacco-free periods, and it is considered that the results could make a remarkable contribution in the existing literature in tobacco consumption.

This study is organized as follows: the material, variables, and analysis methods used in the study are described in the Methods section; the obtained results are explained in detail in the Results section; and the results obtained in the study are discussed and compared with those in the literature in the Discussion and Conclusion sections.

Method

Data Source and Study Population

The GATS was conducted in May 2012 as a household survey using a national sample of individuals, aged 15 and above, to represent the entire country. Coordinated by the Ministry of Health, the study was organized by the Turkish Statistical Institute. All areas in Turkey were included for sample selection within the scope of the research. Because it was believed that small villages with populations below 200 would fail to provide the required cluster width, they were excluded. As for those included in the research, all household members aged 15 and above and residing in Turkey were included. Residents of schools, dormitories, hotels, kindergartens, rest homes, jails, and military facilities were not included.

This study has accomplished by using data of Global Adult Tobacco Survey conducted by Turkey Statistical Institute. Therefore, ethical approval was not required for this study.

Sampling Frame and Sample Design

The 2012 GATS utilizes the 3-stage systematic cluster sampling method. In the first stage, a total of 412 clusters (Primary Stage, selection unit, PSU) were selected, with 206 each from urban and rural settlements. Together with urban settlements and rural settlements with a municipal body, clustering was conducted to include approximately 300 addresses. In those settlements without a municipal body and in settlements with 200 or more houses, the analysis was structured as a single cluster, whereas villages with fewer addresses were united as pairs within the same cluster. The selection of primary sampling units was conducted proportionate to size based on the number of addresses in the clusters.

In the second stage, employing the systematic selection method, a total of 28 houses were picked from all the clusters. In the final stage, all family members aged 15 and above were selected from each house chosen randomly from the model based on the list formed in the field using the applicable software. In sum, 11,536 households were selected as the sample, and from each household, one person was randomly chosen for analysis. Data were gathered from a total of 9,851 people (TC Ministry of Health, 2014).

In the 2012 GATS, we limited our sample to those who answered the survey items on tobacco use. The participants were asked in the section about quitting tobacco if they ceased tobacco consumption during the previous 12 months (from May 2011 to May 2012). In addition, the number of tobacco-free days was obtained of those who have attempted to stop tobacco consumption in the last 12 months. The GATS section on ceasing tobacco consumption is fit for the Cox regression model because all participants were asked about the total number of days on which they had not consumed tobacco in the last 12 months. On the basis of our parameters, a total of 1,251 was selected in our sample. The participant selection is explained in Figure 1.

Measures

In the study, the tobacco-free period was measured in days. The period without tobacco consumption or surviving was identified as the dependent variable. An event in this study was restarting tobacco consumption. Censored data refer to the exact moment of performing the survey and individuals ceasing tobacco consumption. In the case of ceasing tobacco consumption, those who failed to quit tobacco were scored as 1, whereas those who succeeded scored 0.

The relationship between independent variables and the time of relapse after quitting was investigated. Demographic variables included gender (female, male), educational status (did not finish school, primary school, primary education, high school, university), labor status (paid/salaried public sector, paid/salaried private sector, self-employed/employer, retired, other), place of residence (rural, urban), and age (15–24, 25–44, 45–64, 65, and above). The independent variables in this study in-

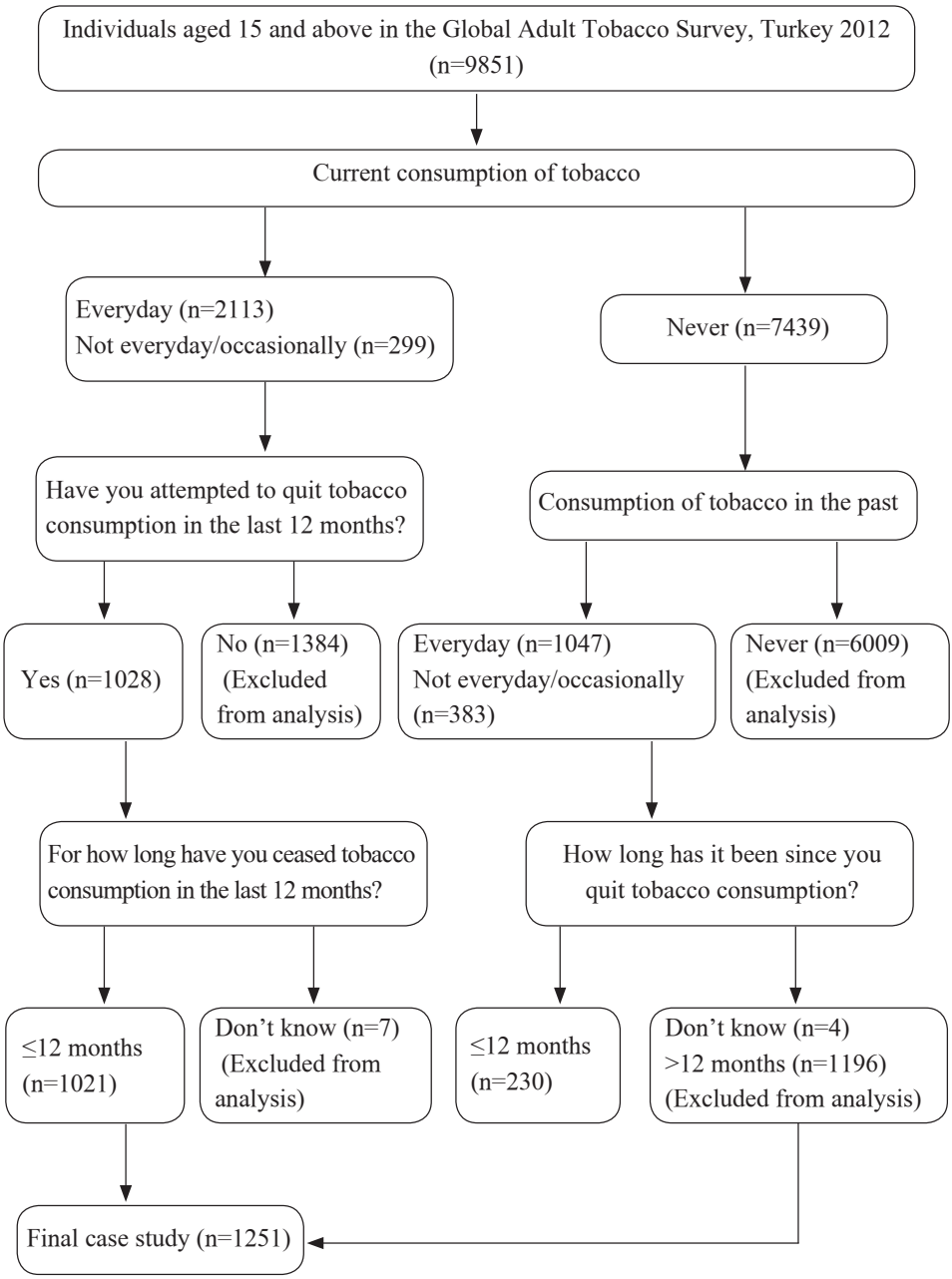

Figure 1. Selection process among individuals who have attempted to quit smoking during the ensuing 12 months from the GATS survey.

cluded the thought that tobacco use causes serious diseases (yes, no), house rules (tobacco can be used inside the house, cannot be used inside the house but there are exceptions, tobacco can never be used, no rule), the indoor and public place restriction

on tobacco use (disagree, agree), increase in the tax of tobacco products (disagree, agree), restriction on tobacco product advertising (disagree, agree). In addition, the indicators of the level of welfare, such as electricity, plumbing toilet, sewer connection toilet, fixed telephone, mobile phone, television, radio, refrigerator, washing machine, automobile, and motorcycle, are evaluated and coded as yes/no items.

Statistical Analysis

In this study, descriptive and comparative quantitative research methods were utilized. Multivariate Cox regression analysis was used to determine the factors relevant to socio-demographic, economic, personal, and life-quality indicators that affected the number of days without tobacco consumption among individuals aged 15 and above in Turkey.

We use the Cox regression model because it is employed in analyzing survival data (Kleinbaum & Klein, 2005). It also utilizes higher quantities of data because it obtains the survival period and information on cessation.

To employ the Cox regression method that constituted the scope of this study, data obtained should involve units that lose and continue life within a specific length of time. Thus, in Cox regression analysis, the presence of censored data may emerge. In this study, the analysis focused on the tobacco-free days between May 2011 and May 2012. During this period, those who failed to quit tobacco were regarded as units that lost their lives and those who succeeded were units that continued as survivors. On the basis of the insights obtained from the relevant literature, survival data were viewed as tobacco-free periods, in this study (Borsari et al., 2018; El Mhamdi et al., 2013; Holm et al., 2017). SPSS (SPSS; IBM, New York, USA) and STATA (STATA; StataCorp, Texas, USA) package programs were used to compute the statistical analysis. The assumption of proportionality, which is the basic assumption of the Cox regression model, was tested with the STATA program. In the Cox regression model, variables that had or did not have an impact on the risk for relapse to tobacco use were determined. A $p>0.05$ was considered significant.

Results

Description of Study Respondents

According to the survey data, the mean number of days without tobacco consumption was 80.98 and the median value was 30 days. Because the last 12 months was considered, the minimum tobacco-free period was one day and the maximum was 365 days. The frequency and percentage distributions of the individuals who participated in this research are shown in Table 1. In addition, the descriptive individual characteristics are grouped as individuals who started using tobacco again and those who did not start using tobacco again. The sample consisted of 1251 participants, of

Table 1.
Distribution of Individual Characteristics According to Risk Factors

Variable	Variable Levels	n	Percentage (%)	Re-users (Event) (1)	Those who did not re-use (Censored) (0)
Gender	Female	356	28.5	277	79
	Male	895	71.5	744	151
	Total	1251	100.0	1021	230
Education	Did not finish school	76	6.1	61	15
	Primary school	522	41.7	441	81
	Primary education	214	17.1	173	41
	High school	285	22.8	231	54
	University	154	12.3	115	39
	Total	1251	100.0	1021	230
Labor Force Status	Paid/salaried public sector	114	9.1	85	29
	Paid/salaried private sector	440	35.2	380	60
	Self-employed/ employer	195	15.6	162	33
	Retired	153	12.2	117	36
	Other	347	27.8	275	72
	Total	1249	100.0	1019	230
Place of Residence	Rural	509	40.7	410	99
	Urban	742	59.3	611	131
	Total	1251	100.0	1021	230
Age	15–24	116	9.3	90	26
	25–44	718	57.4	601	117
	45–64	343	27.4	278	65
	65+	74	5.9	52	22
	Total	1251	100.0	1021	230
Acknowledgement of Adverse Health Effects	No	31	2.5	28	3
	Yes	1215	97.5	990	225
	Total	1246	100.0	1018	228
House Rules	Tobacco can be used inside the house	402	32.1	373	29
	Cannot be used inside the house but there are exceptions	257	20.5	204	53
	Can never be used	547	43.7	407	140

Table 1.
Distribution of Individual Characteristics According to Risk Factors (continued)

Variable	Variable Levels	n	Percentage (%)	Re-users (Event) (1)	Those who did not re-use (Censored) (0)
	There is no rule about this	45	3.6	37	8
	Total	1251	100.0	1021	230
Prohibition of Indoor and Public Space in Tobacco Use	Disagree	69	5.5	60	9
	Agree	1181	94.5	960	221
	Total	1250	100.0	1020	230
Increasing Tax on Tobacco Products	Disagree	582	47.2	537	45
	Agree	651	52.8	470	181
	Total	1233	100.0	1007	226
Prohibition of Tobacco Products Advertising	Disagree	94	7.6	77	17
	Agree	1145	92.4	936	209
	Total	1239	100.0	1013	226
Ownership of Electricity	No	2	0.2	1	1
	Yes	1249	99.8	1020	229
	Total	1251	100.0	1021	230
Ownership of a Toilet with Plumbing	No	46	3.7	41	5
	Yes	1205	96.3	980	225
	Total	1251	100.0	1021	230
Ownership of a Toilet with a Sewer Connection	No	129	10.3	109	20
	Yes	1122	89.7	912	210
	Total	1251	100.0	1021	230
Fixed Telephone Ownership	No	671	53.6	547	124
	Yes	580	46.4	474	106
	Total	1251	100.0	1021	230
Mobile Phone Ownership	No	35	2.8	26	9
	Yes	1216	97.2	995	221
	Total	1251	100.0	1021	230
Television Ownership	No	13	1.0	9	4
	Yes	1238	99.0	1012	226
	Total	1251	100.0	1021	230
Radio Ownership	No	744	59.5	607	137
	Yes	507	40.5	414	93
	Total	1251	100.0	1021	230
Refrigerator Ownership	No	24	1.9	22	2

Table 1.
Distribution of Individual Characteristics According to Risk Factors (continued)

Variable	Variable Levels	n	Percentage (%)	Re-users (Event) (1)	Those who did not re-use (Censored) (0)
	Yes	1227	98.1	999	228
	Total	1251	100.0	1021	230
Washing Machine Ownership	No	45	3.6	38	7
	Yes	1206	96.4	983	223
	Total	1251	100.0	1021	230
Car Ownership	No	755	60.4	625	130
	Yes	496	39.6	396	100
	Total	1251	100.0	1021	230
Motorcycle Ownership	No	1131	90.4	913	218
	Yes	120	9.6	108	12
	Total	1251	100.0	1021	230

whom 1021 (81.6%) had started to use tobacco again after stopping tobacco use and 230 (18.4%) had not started using tobacco again after discontinuing tobacco use.

Overall, many participants were men (71.5%). Regarding education level, the highest was elementary school graduates (41.7%) and the lowest was without any formal education (6.1%). Regarding employment status, the highest percentage was in the private sector (35.2%). In addition, more than half of the participants (59.3%) live in cities and are in the 25–44 age group (57.4%). Those who believe that tobacco consumption triggers serious diseases form a remarkably high percentage at 97.5%. Those who declared that they never consume tobacco inside their home were also relatively high (43.7%). Many (94.5%) supported the ban on tobacco consumption in enclosed areas, like restaurants, pubs, and public buildings. More than half were also in favor of raising the tax on tobacco products (52.8%), and most believe that tobacco-related advertisements should be banned (92.4%). In this study, the direct incomes of the household members were not specified, but some of the variables on welfare indicators reveal that most of the individuals had access to electricity (99.8%), had a mobile phone (97.2%), a TV (99%), a refrigerator (98.1%), and a washing machine (96.4%).

Risk Factors Related to the Period without Tobacco Consumption

The relationship between variables that are thought to affect time of tobacco non-use and duration of the relapse to tobacco after the individual had quit tobacco use in the year is found in Table 2. The Cox regression analysis revealed that gender, educational status, house rules, increase of taxation of tobacco products, age group, ownership of a toilet with plumbing, and ownership of a refrigerator in relation to

indicators of quality of life and welfare are associated with the relapse to tobacco use after cessation.

The risk for relapse to tobacco use after cessation was 1.31 times higher in men than women (HR=1.31; CI=1.08–1.60). Regarding educational status, the risk for relapse to tobacco use for primary school graduates was 1.51 times higher and for primary education graduates 1.35 times higher than those who were university graduates (HR=1.51; CI=1.12–2.03 and HR=1.35; CI=0.98–1.87, respectively). Regarding age group, the risk for relapse to tobacco use for individuals aged 25–44 is 1.41 times higher than those in the age group 15–24 and 1.45 times more than those aged 65 and over (HR=1.41; CI=1.01–1.96 and HR=1.46; CI=1.00–2.13, respectively).

A remarkable relationship was also detected with the house rules variable. The risk for relapse to tobacco use of individuals who stated that tobacco could be used inside the house is 1.67 (1/HR) times more than those who stated that tobacco could not be used inside the house but that there were exceptions (HR=1.67; CI=1.37–2.04). Similarly, the risks for relapse to tobacco use for individuals who stated that tobacco could be used inside the house was 1.70 times higher than those who stated that tobacco could never be used (HR=1.70; CI=1.45–2.00).

Regarding increasing the tax for tobacco products, the risk for relapse to tobacco use for individuals who are against a high tax on tobacco products was 1.64 times higher than for those who supported the increase of tax on tobacco products (HR=1.64; CI=1.41–1.89). Regarding indicators of quality of life and the level of welfare, the risk for the relapse to tobacco use for individuals after cessation who had no sanitary toilets was 1.45 times more than those who had sanitary toilets (HR=1.45; CI=1.00–2.17). Similarly, the risk for relapse to tobacco use for individuals who did not have refrigerators was 2.78 times more than those who had refrigerators (HR=2.78; CI=1.69–4.55).

Discussion

In this study, the factors that affect duration of the period from quitting tobacco use until relapse to tobacco use in the adult population in Turkey were evaluated. Variables, like gender, education, age group, house rules, increasing the tax of tobacco products, indicators of quality of life, and the level of welfare, such as possession of a toilet or a refrigerator, were detected to be risk factors that affect the relapse to tobacco use after quitting.

The findings found that demographic and socioeconomic variables are important for the duration of time until relapse to tobacco after cessation. On the basis of these

Table 2 .
Risk Factors Related to the Period without Tobacco Consumption with Cox Regression

Variables		HR	Confidence Interval
Gender (Ref. Female)	Male	1.314[a]	1.084–1.594
Education Status (Ref. University)	Did not finish school	1.189	0.784–1.802
	Primary School	1.509[a]	1.122–2.030
	Primary Education	1.353[c]	0.983–1.862
	High School	1.265	0.941–1.701
Labor Force Status (Ref. Other)	Paid/salaried public sector	1.032	0.742–1.438
	Paid/salaried private sector	1.136	0.922–1.401
	Self-employed/employer	1.123	0.886–1.425
	Retired	0.911	0.670–1.238
Place of Residence (Ref. Rural)	Urban	1.043	0.889–1.223
Age (Ref. 25-44)	15–24	0.710[b]	0.512–0.985
	45–64	0.875	0.734–1.045
	65+	0.685[c]	0.465–1.009
The Thought about Disease (Ref. No)	Yes	1.222	0.799–1.869
House Rules (Ref. Tobacco can be used inside the house)	Cannot be used inside the house but there are exceptions	0.598[a]	0.491–0.728
	Can never be used	0.588[a]	0.499–0.693
	There is no rule about this	0.797	0.521–1.222
Prohibition of Indoor and Public Space in Tobacco Use (Ref. Disagree)	Agree	1.088	0.827–1.432
Increasing Tax on Tobacco Products (Ref. Disagree)	Agree	0.61[a]	0.527–0.707
Prohibition of Tobacco Products Advertising (Ref. Disagree)	Agree	1.229	0.926–1.630
Ownership of Electricity (Ref. No)	Yes	1.18	0.659–2.113
Ownership of the Toilet with plumbing (Ref. No)	Yes	0.688[c]	0.457–1.036
Ownership of A Toilet with A Sewer Connection (Ref. No)	Yes	1.146	0.857–1.533
Fixed Telephone Ownership (Ref. No)	Yes	1.006	0.868–1.167
Mobile Phone Ownership (Ref. No)	Yes	1.33	0.794–2.227
Television Ownership (Ref. No)	Yes	1.711	0.873–3.354
Radio Ownership (Ref. No)	Yes	0.966	0.832–1.121
Refrigerator Ownership (Ref. No)	Yes	0.36[a]	0.219–0.591
Washing Machine Ownership (Ref. No)	Yes	1.348	0.897–2.026
Car Ownership (Ref. No)	Yes	1.001	0.863–1.160
Motorcycle Ownership (Ref. No)	Yes	1.128	0.901–1.412

[a]p<0.01; [b]p<0.05; [c]p<0.10.

results, it was concluded that the duration of time until relapse to tobacco use after quitting was shorter for men than women. This result consistent with those of other studies in the literature. In a study of adults in India who attempted to quit tobacco

and succeeded in quitting, men were less likely to succeed in smoking cessation attempts (Srivastava et al., 2013). It is possible that this situation may be caused by the perception of male behavior regarding smoking from the past to the present (Bilir, 2003). Nevertheless, in some studies, the possibilities of long-term tobacco cessation (Stevens et al., 2016) and successful tobacco cessation in women (Halpern & Warner, 1993) were found to be lower.

Regarding the results on educational status, some studies found that the risk for relapse to tobacco use was higher among primary school graduates (Fernández et al., 2006) and lower among high school graduates (Hawkins, Hollingworth, & Campbell, 2010). Similar evaluations could be conducted for successful tobacco cessation. Studies have found that a higher education level increases the probability of successful tobacco cessation (Halpern & Warner, 1993; Kaleta et al., 2012; Kim, 2014; Srivastava et al., 2013). Similarly, in this study, the relapse to tobacco use was found to be higher among primary school graduates and primary education graduates. This indicates that with the increase in education level, the resumption of tobacco use decreased.

In the study, individuals between 15–24 and 65+ were found to have a smaller risk for relapse to tobacco use, which indicates that for individuals in the 25–44 age group, the time until relapse to tobacco use was longer. As age increased, the possibility of relapse to tobacco use after cessation decreased. A reason for this might be that, after a certain age, health problems of individuals increase. In previous studies, the risk for tobacco use relapse was found to be decreased with the increase in age (Hawkins, Hollingworth, & Campbell, 2010); most of the people who failed to cease smoking were in the 18–44 age groups and those who were successful in quitting were in the group aged 65 and above (Kim, 2014). These findings are consistent with those in this study. Existence of a remarkable correlation between the findings regarding age of the individual and the tendency to quit smoking successfully was also consistent with those in previous studies (Halpern & Warner, 1993; Osler & Prescott, 1998; Srivastava et al., 2013).

Concerns about passive smoking can be said to be effective in quitting tobacco use. As to the point of whether tobacco can be used inside the house, options like "cannot be used inside the house but there are exceptions" and "can never be used" were detected to be more effective in reducing the risk for relapse to tobacco use. Lack of concern regarding environmental tobacco smoke exposure has an adverse effect on smoking cessation, which is thought to be consistent with those of previous studies (Madewell, 2018; Okoli & Seng, 2018). The passive influence of domestic or environmental tobacco smoke was important. The absence of other smokers in the home in which the smoker lived (Kaleta et al., 2014), the effect of the non-smoker

spouse in smoking cessation (Osler & Prescott, 1998), and the positive relationship between low environmental tobacco smoke exposure and the intention to quit smoking (Milcarz et al., 2017) supported continuing cessation. The presence of tobacco users at home, in the workplaces, and in the environments can be said to have a negative effect on individuals for tobacco cessation.

From the results of the analysis, the support of individuals for increasing the tax on tobacco products was found to have downward effect on the risk for relapse to tobacco use. In some similar studies, factors like higher cigarette prices motivated individuals to quit tobacco use (Levy et al., 2005); findings, such as concerns about the high price of cigarettes (Kaleta et al., 2012) and the economic burden of cigarette smoking were effective for quitting tobacco use (Kaplan et al., 2013), were also detected in this study.

Studies have found that the possibility of quitting tobacco use and success in doing so increased as the level of wealth increased (Srivastava et al., 2013). Similarly, in this study, indicators of a higher quality of life and a higher level of welfare, such as presence of a sanitary toilet and ownership of refrigerator, had a reducing effect on the risk for relapse to tobacco use. It can be thought that the increase in quality of life and level of welfare may be effective in the successful cessation of tobacco use.

Tobacco use is a serious health problem, both worldwide and in Turkey. Participation in tobacco cessation programs should be increased to prevent individuals from starting again after quitting tobacco use. Necessary studies should be undertaken to apply the Tobacco Control Law, which encourages the abolition of tobacco and controls the price policy for tobacco products more efficiently. It is necessary to increase awareness of the risks of tobacco use, to investigate the reasons for relapse to tobacco use, and to investigate by taking these factors into consideration and to emphasize the importance of social support from the family or the environment in tobacco cessation.

There are certain limitations in this study. First is that the tobacco relapse period was only identified on the basis of the answers of the survey participants. There was no other external measurement or monitoring process; thus, it is possible that the results were biased. Second is that independent variables included in the Cox regression model consisted of questions listed in the GATS. Factors, such as stress, depression, alcohol consumption, tobacco consumption of parents, age at which smoking began, and duration and intensity of smoking, that might affect on restarting tobacco consumption were excluded from the model because they were absent from that survey.

Ethics Committee Approval: This study has accomplished by using data of Global Adult Tobacco Survey conducted by Turkey Statistical Institute. Therefore, ethical approval was not required for this study.

Informed Consent: N/A.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – Ö.A.; Design – Ö.A.; Supervision – Ö.A.; Resources – Ö.A., A.D.; Materials – Ö.A., A.D.; Data Collection and/or Processing – Ö.A.; Analysis and/or Interpretation – Ö.A., A.D.; Literature Search – A.D.; Writing Manuscript – Ö.A., A.D.; Critical Review – Ö.A., A.D.; Other – Ö.A., A.D.

Acknowledgements: The authors would like to thank the Turkish Statistical Institute for the data. The views and opinions expressed in this manuscript are those of the authors only and do not necessarily represent the views, official policy, or position of the Turkish Statistical Institute.

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, Türkiye İstatistik Enstitüsü tarafından yürütülen Global Adult Tobacco Survey (GATS)'ın verileri kullanılarak tamamlanmıştır. Bu sebeple çalışma için etik onam gerekmemektedir.

Hasta Onamı: Uygulanabilir değil.

Hakem Değerlendirmesi: Dış bağımsız.

Yazar Katkıları: Fikir - Ö.A.; Tasarım - Ö.A.; Denetleme - Ö.A.; Kaynaklar - Ö.A., A.D.; Malzemeler - Ö.A., A.D.; Veri Toplanması ve/veya İşlemesi - Ö.A.; Analiz ve/veya Yorum - Ö.A., A.D.; Literatür Taraması – A.D.; Yazıyı Yazan - Ö.A., A.D.; Eleştirel İnceleme - Ö.A., A.D.; Diğer - Ö.A., A.D.

Teşekkür: Yazarlar, veriler için Türkiye İstatistik Kurumu'na teşekkür eder. Bu makalede ifade edilen görüşler yalnızca yazarların görüşleri olup, Türkiye İstatistik Kurumu'nun görüşlerini, resmi politikalarını veya pozisyonlarını temsil etmezler.

Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

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

References

Alkan, Ö. (2017). Türkiye'de gençlerin tütün kullanımında cinsiyet farklılıklarının araştırılması. *Bağımlılık Dergisi, 18*(2), 35-45. https://dergipark.org.tr/tr/download/article-file/427098 [Crossref]

Alkan, Ö., & Abar, H. (2020). Determination of factors influencing tobacco consumption in Turkey using categorical data analyses. *Archives of Environmental & Occupational Health, 75*(1), 27-35. https://doi.org/10.1080/19338244.2018.1556200 [Crossref]

Bassiony, M. A., Aqil, M., Khalili, M., Radosevich, J. A., & Elsabaa, H. M. (2015). Tobacco consumption and oral, pharyngeal and lung cancers. *The Open Cancer Journal, 8,* 1-11. https://doi.org/10.2174/1874079001508010001 [Crossref]

Bilir, N. (2003). *Sigara kullanımının kadın sağlığına etkileri ve kontrolü*. A. Akın (Ed.), Toplumsal Cinsiyet, Sağlık ve Kadın (s. 209-219). Ankara: Hacettepe Üniversitesi Yayınları.

Bilir, N., Çakır, B., Dağlı, E., Ergüder, T., & Önder, Z. (2009). *Tobacco control in Turkey.* Who Europe, 43-45. Retrieved from http://www.euro.who.int/__data/assets/pdf_file/0004/98446/E93038.pdf

Borsari, L., Storani, S., Malagoli, C., Filippini, T., Tamelli, M., Malavolti, M., & Vinceti, M. (2018). Impact of referral sources and waiting times on the failure to quit smoking: One-year follow-up of an italian cohort admitted to a smoking cessation service. *International Journal of Environmental Research and Public Health, 15*(6), 1234. https://doi.org/10.3390/ijerph15061234 [Crossref]

Buzgan, T., Çom, S., Irmak, H., Baykan, H., Aydın, E., & Taner, S. (2007). *Mpower tütün salgınını kontrol etmeye yönelik politika paketi.* Ankara: Sağlık Bakanlığı-Dünya Sağlık Örgütü.

El Mhamdi, S., Sriha, A., Bouanene, I., Salah, A. B., Salem, K. B., & Soussi Soltani, M. (2013). Predictors of smoking relapse in a cohort of adolescents and young adults in Monastir (Tunisia). *Tobacco Induced Diseases, 11*(1), 12. https://doi.org/10.1186/1617-9625-11-12 [Crossref]

Fernández, E., Schiaffino, A., Borrell, C., Benach, J., Ariza, C., Ramon, J. M., Twose, J., Nebot, M., & Kunst, A. (2006). Social class, education, and smoking cessation: long-term follow-up of patients treated at a smoking cessation unit. *Nicotine & Tobacco Research, 8*(1), 29-36. https://doi.org/10.1080/14622200500264432 [Crossref]

Fidan, F., Pala, E., Ünlü, M., Sezer, M., & Kara, Z. (2005). Sigara bırakmayı etkileyen faktörler ve uygulanan tedavilerin başarı oranları. *Kocatepe Tıp Dergisi, 6*(3), 27-34. https://dergipark.org.tr/tr/download/article-file/161487 [Crossref]

Grover, A. (2010). Role of race in influencing smokers'attitudes and behavior: An explorative study for African-American and white adolescents. *Academy of Health Care Management Journal, 6*(2), 41-55. https://www.abacademies.org/articles/volume-6-issue-2.pdf#page=49

Halpern, M. T., & Warner, K. E. (1993). Motivations for smoking cessation: A comparison of successful quitters and failures. Journal of Substance Abuse, 5(3), 247-256. https://doi.org/10.1016/0899-3289(93)90066-K [Crossref]

Harmer, C., & Memon, A. (2013). Factors associated with smoking relapse in the postpartum period: an analysis of the child health surveillance system data in Southeast England. *Nicotine & Tobacco Research, 15*(5), 904-909. https://doi.org/10.1093/ntr/nts221 [Crossref]

Hawkins, J., Hollingworth, W., & Campbell, R. (2010). Long-term smoking relapse: a study using the british household panel survey. *Nicotine & Tobacco Research, 12*(12), 1228-1235. https://doi.org/10.1093/ntr/ntq175 [Crossref]

Holm, M., Schiöler, L., Andersson, E., Forsberg, B., Gislason, T., Janson, C., & Torén, K. (2017). Predictors of smoking cessation: A longitudinal study in a large cohort of smokers. *Respiratory Medicine, 132,* 164-169. https://doi.org/10.1016/j.rmed.2017.10.013 [Crossref]

Kaleta, D., Korytkowski, P., Makowiec-Dąbrowska, T., Usidame, B., Bąk-Romaniszyn, L., & Fronczak, A. (2012). Predictors of long-term smoking cessation: Results from the global adult tobacco survey in Poland (2009–2010). *BMC Public Health, 12*(1), 1020. https://doi.org/10.1186/1471-2458-12-1020 [Crossref]

Kaleta, D., Usidame, B., Dziankowska-Zaborszczyk, E., & Makowiec-Dąbrowska, T. (2014). Correlates of cessation success among Romanian adults. *BioMed Research International,* 2014. https://doi.org/10.1155/2014/675496 [Crossref]

Kaplan, B., Özcebe, H., Attila, S., Ertan, E., Kılıçaslan, B., Kanmaz, S., & Kalkan, F. Ş. (2013). Hacettepe Erişkin Hastanesine başvuran hastaların sigara bırakma hizmetleri hakkındaki yaklaşımlarının değerlendirilmesi. *Tüberküloz ve Toraks, 61*(4), 312-319. http://www.tuberktoraks.org/managete/fu_folder/2013-04/2013-61-04-312-319.pdf [Crossref]

Kim, Y.-J. (2014). Predictors for successful smoking cessation in Korean adults. *Asian Nursing Research, 8*(1), 1-7. https://doi.org/10.1016/j.anr.2013.09.004 [Crossref]

Kleinbaum, D. G., & Klein, M. (2005). *Survival analysis: a self-learning text* (2nd ed.). New York, NY: Springer.

Levy, D. T., Romano, E., & Mumford, E. (2005). The relationship of smoking cessation to sociodemographic characteristics, smoking intensity, and tobacco control policies. *Nicotine & Tobacco Research, 7*(3), 387-396. https://doi.org/10.1080/14622200500125443 [Crossref]

Madewell, Z. J. (2018). The belief that secondhand smoke causes serious illness among Chinese smokers: Smoking cessation and intention to quit. *Tobacco Prevention & Cessation, 4*. https://doi.org/10.18332/tpc/82813 [Crossref]

Milcarz, K., Makowiec-Dąbrowska, T., Bak-Romaniszyn, L., & Kaleta, D. (2017). Smoking patterns and smoking cessation willingness-A study among beneficiaries of government welfare assistance in Poland. *International Journal of Environmental Research and Public Health, 14*(2), 131. https://doi.org/10.3390/ijerph14020131 [Crossref]

Okoli, C. T., & Seng, S. (2018). Associations between secondhand tobacco smoke exposure and nicotine dependence and smoking cessation attempts among adult tobacco users with a psychiatric disorder. *Biological Research for Nursing, 20*(5), 558-565. https://doi.org/10.1177/1099800418781914 [Crossref]

Osler, M., & Prescott, E. (1998). Psychosocial, behavioural, and health determinants of successful smoking cessation: A longitudinal study of Danish adults. *Tobacco Control, 7*(3), 262-267. http://dx.doi.org/10.1136/tc.7.3.262 [Crossref]

Pascual Sáez, M., González Prieto, N., & Cantarero Prieto, D. (2015). The determinants of tobacco consumption: Evidence from Spain. *Journal of Knowledge Management, Economics and Information Technology, V*(1), 1-15. http://hdl.handle.net/10902/10064 [Crossref]

Srivastava, S., Malhotra, S., Harries, A. D., Lal, P., & Arora, M. (2013). Correlates of tobacco quit attempts and cessation in the adult population of India: Secondary analysis of the Global Adult Tobacco Survey, 2009-10. *BMC Public Health, 13*(1), 263. https://doi.org/10.1186/1471-2458-13-263 [Crossref]

Stevens, V. J., Solberg, L. I., Bailey, S. R., Kurtz, S. E., McBurnie, M. A., Priest, E. L., & Hazlehurst, B. L. (2016). Assessing trends in tobacco cessation in diverse patient populations. *Nicotine & Tobacco Research, 18*(3), 275-280. https://doi.org/10.1093/ntr/ntv092 [Crossref]

TC Ministry of Health, (2014). *Küresel yetişkin tütün araştırması Türkiye 2012.* Ankara: Sağlık Bakanlığı Yayın No: 948. https://havanikoru.saglik.gov.tr/dosya/dokumanlar/yayinlar/KYTA-2012-TR-25-07-2014.pdf adresinden edinilmiştir.

Vahidi, R. G., Lezadi, S., Mojahed, F., Shokri, A., Gholipour, K., & Imanparva, R. (2014). Factors affecting successful smoking cessation: Patient views regarding determinants of successful smoking cessation-a study from East Azerbaijan, Tabriz-Iran. *Journal of Pioneering Medical Sciences, 4*(2), 89-93. https://www.jpmsonline.com/wp-content/uploads/2019/07/JPMS-VOL4-ISSUE2-PAGES89-93-OA.pdf [Crossref]

World Health Organization. (2011). WHO report on the global tobacco epidemic, 2011: warning about the dangers of tobacco. Retrieved from https://www.who.int/tobacco/global_report/2011/en/

Yang, T., Fisher, K. J., Li, F., & Danaher, B. G. (2006). Attitudes to smoking cessation and triggers to relapse among Chinese male smokers. *BMC Public Health, 6*(65). https://doi.org/10.1186/1471-2458-6-65 [Crossref]

Yazıcı, H., & Özbay, Y. (2004). Üniversite öğrencilerinin sigara içme davranışlarıyla öz-yeterlik inançları arasındaki ilişkilerin incelenmesi. *Sakarya Üniversitesi Eğitim Fakültesi Dergisi, 7,* 91-106. https://dergipark.org.tr/en/download/article-file/115524 [Crossref]

Zimmerman, R. S., Warheit, G. J., Ulbrich, P. M., & Auth, J. B. (1990). The relationship between alcohol use and attempts and success at smoking cessation. *Addictive Behaviors, 15*(3), 197-207. https://doi.org/10.1016/0306-4603(90)90063-4 [Crossref]