Original Research / Orijinal Araştırma

The Prevalence of Tobacco Use Among University Students and Associated Risk Factors: Trabzon, Turkey

Üniversite Öğrencilerinde Tütün Kullanım Prevalansı ve İlişkili Risk Faktörleri: Trabzon, Türkiye

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Abstract

Background: MPOWER strategies are employed to combat tobacco use in Turkey. However, no decrease in the prevalence of use among university students has been achieved. In research conducted among university students, only smoking was generally questioned. The purpose of the present research is to evaluate the prevalence of tobacco product use and associated risk factors among university students in Trabzon, northeast of Turkey, following the restrictions imposed due to the COVID-19 pandemic.

Methods: This cross-sectional study was conducted with 6445 students between December 2021 and June 2022. Data analysis was performed with chi-square test and logistic regression test backward method.

Results: The prevalence of tobacco use is 26.9% in university students in Trabzon. The most frequently consumed tobacco product was cigarettes (25.0%), followed by hand-rolled cigarettes (6.5%), waterpipes (5.0%), and e-cigarettes (1.0%). Students' tobacco use was statistically significantly associated with male gender, attending a vocational school, maternal tobacco use, paternal tobacco use, and romantic partner/close friend tobacco use.

Conclusion: The prevalence found is higher than in many previous studies. Priority should be given to women as well as men in intervention programs to fight against tobacco. Programs should begin in vocational school and include students' close friends, romantic partners, or parents

Keywords: tobacco use, university students, prevalence, waterpipe, e-cigarette

Özet

Giriş: Türkiye'de tütün kullanımıyla mücadele için MPOWER stratejileri kullanılmaktadır. Ancak üniversite öğrencileri arasındaki kullanım prevalansında herhangi bir azalma sağlanamadı. Üniversite öğrencileri arasında yapılan araştırmalarda genel olarak sadece sigara kullanımı sorgulanmıştır. Bu araştırmanın amacı, Türkiye'nin kuzeydoğusundaki Trabzon'da, COVID-19 salgını nedeniyle getirilen kısıtlamaların ardından üniversite öğrencileri arasında tütün ürünü kullanım yaygınlığını ve buna bağlı risk faktörlerini değerlendirmektir.

Yöntem: Kesitsel tipteki bu çalışma Aralık 2021-Haziran 2022 tarihleri arasında 6445 öğrenci ile gerçekleştirildi. Veri analizi ki-kare testi ve geriye doğru lojistik regresyon testi yöntemiyle yapıldı.

Bulgular: Trabzon'da üniversite öğrencilerinde tütün kullanım yaygınlığı %26,9'dur. En sık tüketilen tütün ürünü sigara (%25,0) olurken, bunu elle sarma sigara (%6,5), nargile (%5,0) ve e-sigara (%1,0) takip etti. Öğrencilerin tütün kullanımı, erkek cinsiyet, meslek okuluna gitme, annenin tütün kullanması, babanın tütün kullanması ve romantik partner/yakın arkadaşının tütün kullanması ile istatistiksel olarak anlamlı düzeyde ilişkiliydi.

Sonuç: Bulunan prevalans daha önce yapılan birçok çalışmaya göre daha yüksektir. Tütünle mücadeleye yönelik müdahale programlarında erkekler kadar kadınlara da öncelik verilmelidir. Programlar meslek okulunda başlamalı ve öğrencilerin yakın arkadaşlarını, romantik partnerlerini veya ebeveynlerini içermelidir.

Anahtar kelimeler: tütün kullanımı, üniversite öğrencisi, prevalans, nargile, e-sigara

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Introduction

Although tobacco is one of the leading preventable causes of disease and mortality, it is still used by 1.3 billion individuals worldwide and by 19.2 million in Turkey.[1] Almost all these users experiment with tobacco at a young age and come to use it daily.[2] Figures show that 31.9% of individuals aged 15-24 in Turkey use tobacco, higher than the general prevalence involving all age groups over 15.[1] High frequencies of use are also observed among university students, who are members of that age group. There is no national research covering university students in general in Turkey, although current research reports prevalences of use between 20.6% and 43.6%.[3–10] MPOWER strategies are employed to combat tobacco use in Turkey. Within that context, the sale and advertising of tobacco products have been banned in universities, and numerous educational and other activities stressing their deleterious effects on health have been and continue to be organized.[11] However, although tobacco use among university students first decreased, it then increased again.[12]

Young people choose to use tobacco products as a coping method under the influence of numerous compelling factors, including decreased family supervision, freedom to make their own decisions, separation from the home and family, adaptation to a new environment, and educational life-related stress. Research among university students shows that tobacco use is affected by age, sex, and socioeconomic factors. The attitudes and behaviors toward tobacco of parents and friends also have a highly significant impact on use among students.[12-15] In addition to traditional cigarettes, other products such as waterpipes (hookahs) and e-cigarettes (vapes), which are believed to be less harmful, also contribute to students becoming users.[13,16,17]

All these factors can have varying effects on university students in different regions. For example, there are differences in the effect of gender or the type of product used in studies conducted in the USA, India, or Saudi Arabia.[16,18,19] The prevalences and affecting factors in research performed in universities in Turkey also vary.[6,7] Regional research in the fight against tobacco therefore contributes to the understanding of local factors affecting its use. In addition, research has become a priority need at this time when students' tobacco use preferences may be affected by lifestyle changes, and after the many restrictions and limitations on social life resulting from the COVID-19 pandemic. Therefore, the purpose of the present research is to evaluate the prevalence of tobacco use among university students and associated risk factors.

Material and Method

The population in this cross-sectional research consisted of undergraduate and associate degree students from three universities in the province of Trabzon. This province lies in northeast Turkey and has a population of 816,684, with a young population rate of 14.4%. Karadeniz Technical University (KTU), one of the universities in the province, consists of engineering, social sciences, health sciences faculties, and vocational schools and had 19,820 students in 2022. Trabzon University (TRU) principally consists of social sciences faculties and vocational schools and had 8983 students in 2022. Avrasya University (AVU) is a foundation university, and most students are fee-paying. It consists of health sciences, social sciences, engineering faculties, and vocational colleges. It had 4398 students in 2022.

The sample size was calculated using Open Epi software. For KTU, at an expected prevalence of 25%, deviation of 1.5%, and a 95% confidence interval, the required minimum sample size was 2757 individuals. With the addition of a wastage margin for potential errors, we aimed to reach 3500 individuals. Sample sizes for the other universities were calculated based on the sample/population ratio (17.5%) determined for KTU. Accordingly, the targets were 1800 individuals for TRU and 700 for AVU. The sample was weighted and distributed to the faculties and programs on the basis of student numbers. Due to pandemic conditions, many courses are taught online or both face-to-face and online. For this reason, students' participation in face-to-face classes is low. Only courses that were taught face-to-face and where student participation was high were identified. A questionnaire was applied to the students, before or after class hours, in a class setting, and under observation. A researcher explained the aim of the research before questionnaire administration, the procedure being based on the principle of voluntary participation. Deficient or uncompleted questionnaires were removed, and 3988 from KTU, 1746 from TRU, and 711 from AVU were finally included in the analysis.

The dependent variable of the research is tobacco use status. Among the tobacco products, cigarettes, hand-rolled cigarettes, waterpipes, cigars, pipes, chewing or snuff tobacco, heated tobacco and e-cigarettes were questioned. A person who used any of these products at least once in the last month was considered a tobacco user. People who used tobacco were questioned about their reasons for using them. For those who did not use it, their reasons for not using it were questioned. Additionally, students' exposure to passive exposure to tobacco smoke on the university campus was questioned. The independent variables of the study were gender, faculty, academic year, place of residence, monthly personal income, and tobacco use of the mother, father, romantic partner/close friends. Monthly income data was converted into US dollars (USD).

Approval for the study was received from the KTU Medical Faculty Scientific Research Ethical Committee and from the university rector's offices. The research data were collected between December 20, 2021 and June 30, 2022. The research was supported by the Karadeniz Technical University Scientific Research Projects Coordination Unit (project no. TDI-2022-10004).
The research data were analyzed on IBM SPSS Statistics version 26 software. Descriptive statistics were presented as numbers and percentages for categorical variables and as mean plus standard deviation for numerical variables. The chi-square test was applied in the analysis of categorical variables. The binary logistic regression backward method was employed for multivariate analyses. The results were expressed with odd ratios (OR) and 95% confidence intervals. p values less than 0.05 were regarded as statistically significant.

Results

Women constituted 3745 (58.1%) of the students taking part in the study, 2969 (46.1%) students were aged 20-21, and 2285 (35.5%) were attending social sciences faculties and 1842 (28.6%) science faculties; 3161 students (49.2%) were living in dormitory and 2083 (32.4%) in the family home. Analysis showed that 1022 (16.1%) mothers of students and 2457 (39.1%) fathers and 2534 (39.3%) romantic partner/close friends used tobacco (Table1).

Table 1. *Students' sociodemographic and personal characteristics and their distributions across the universities*

	Total (n:6445)		**KTU (n:3988)**		**TRU (n:1746)**		**AVU (n:711)**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Gender (n:6443)								
Female	3745	58.1	2061	51.7	1193	68.3	491	69.3
Male	2698	41.9	1927	48.3	553	31.7	218	30.7
Age (n:6437)								
19 or under	1423	22.1	1091	27.4	253	14.5	79	11.2
20-21	2969	46.1	1839	46.1	820	47.1	310	43.8
22 or over	2045	31.8	1058	26.5	668	38.4	319	45.1
Academic year (n:6445)								
1	2106	32.7	1303	32.7	534	30.6	269	37.8
2	2131	33.1	1312	32.9	569	32.6	250	35.2
3	1015	15.7	580	14.5	336	19.2	99	13.9
4 or higher	1193	18.5	793	19.9	307	17.6	93	13.1
Faculty attended (n:6445)								
Social Sciences	2285	35.5	1070	26.8	1185	67.9	30	4.2
Sciences	1842	28.6	1670	41.9	-	-	172	24.2
Health Sciences	863	13.4	718	18.0	-	-	145	20.4
Vocational colleges	1455	22.6	530	13.3	561	32.1	364	51.2
Place of residence (n:6425)								
Family home	2083	32.4	1097	27.5	623	35.8	361	51.3
Dormitory	3161	49.2	2023	50.8	942	54.2	196	27.8
Shared student house or apartment	1181	18.4	863	21.7	173	10.0	147	20.9
Monthly personal income (n:5059)								
Q1 (≤50$)	1227	24.3	885	27.8	210	15.1	132	27.2
Q2 (≤65$, >50$)	1415	28.0	595	18.7	731	52.5	89	18.4
Q3 (≤110$, >65$)	1125	22.2	830	26.1	223	16.0	72	14.8
Q4 (>110 $)	1292	25.5	871	27.4	229	16.4	192	39.6
Maternal tobacco use (n:6331)								
User	1022	16.1	623	15.8	251	14.9	148	21.4
Non-user	5309	83.9	3332	84.2	1433	85.1	544	78.6
Paternal tobacco use (n:6286)								
User	2457	39.1	1516	38.8	674	40.0	267	38.8
Non-user	3829	60.9	2396	61.2	1012	60.0	421	61.2
Spouse/romantic partner/close friend tobacco use (n:6445)								
User	2534	39.3	1542	38.7	666	38.1	326	45.9
Non-user	3911	60.7	2446	61.3	1080	61.9	385	54.1

A total of 1732 (26.9%) students used at least one tobacco product, 1046 (26.2%) students at the KTU, 448 (25.7%) at the TRU, and 238 (33.5%) at the AVU. The most frequently consumed tobacco product was cigarettes (25.0%), followed by hand-rolled cigarettes (6.5%), waterpipes (5.0%), cigars (2.5%), and e-cigarettes (1.0%). The most frequent reasons for use among the students were stress (46.7%) and for pleasure (46.5%). The most frequent reasons cited for non-use were adverse impacts on health (63.4%) and reluctance to spend money on tobacco products (38.3%). In addition, 3734 (57.9%) participants were exposed to passive tobacco smoke on the university campus (Table 2).

Table 2. *Students' tobacco use characteristics and their distribution across the universities*

	Total		**KTU (n:3988)**		**TRU (n:1746)**		**AVU (n:711)**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Use status								
User	1732	26.9	1046	26.2	448	25.7	238	33.5
Quit	152	2.4	105	2.6	32	1.8	15	2.1
Non-user	4561	70.7	2837	71.2	1266	72.5	458	64.4
Frequency of use of various tobacco products								
Cigarettes	1610	25.0	976	24.5	413	23.7	221	31.1
Roll-ups	416	6.5	267	6.7	103	5.9	46	6.5
Water pipe	320	5.0	193	4.8	92	5.3	35	4.9
Cigars	159	2.5	103	2.6	39	2.2	17	2.4
E-cigarettes	65	1.0	36	0.9	18	1.0	11	1.5
Pipe	31	0.5	24	0.6	2	0.1	5	0.7
Chewing tobacco	14	0.2	8	0.2	5	0.3	1	0.1
Snuff	9	0.1	6	0.2	1	0.1	2	0.3
Heated tobacco	9	0.1	6	0.2	-	-	3	0.4
Reasons for use* (n:1732)								
Stress	809	46.7	495	47.3	212	47.3	102	42.9
Pleasure	806	46.5	487	46.6	210	46.9	109	45.8
No special reason	596	34.4	344	32.9	165	36.8	87	36.6
Invitations from others	194	11.2	127	12.1	43	9.6	24	10.1
Curiosity	190	11.0	117	11.2	50	11.2	23	9.7
Maternal/paternal use	70	4.0	34	3.3	25	5.6	11	4.6
Emulation of tobacco users	52	3.0	33	3.2	16	3.6	3	1.3
Reasons for non-use* (n:4713)								
Deleterious health effects	2990	63.4	1908	64.9	827	63.7	255	53.9
Reluctance to spend money on tobacco products	1803	38.3	1159	39.4	528	40.7	116	24.5
Unpleasant aroma	1725	36.6	1113	37.8	477	36.7	135	28.5
In order not to become dependent	1435	30.4	911	31.0	409	31.5	115	24.3
No special reason	1295	27.5	771	26.2	368	28.4	156	33.0
Religious views	824	17.5	512	17.4	265	20.4	47	9.9
Maternal/paternal opposition	551	11.7	339	11.5	178	13.7	34	7.2
Spousal/romantic partner opposition	108	2.3	65	2.2	35	2.7	8	1.7
Passive exposure to tobacco smoke on the university campus								
Exposed	3734	57.9	2297	57.6	1027	58.8	410	57.7
Not exposed	2711	42.1	1691	42.4	719	41.2	301	42.3

**More than one option could be selected.*

Seven hundred thirty-eight (19.7%) women and 994 (36.8%) men used tobacco products ($p<0.001$). In terms of accommodation, 456 (21.9%) students living in the family home, 804 (25.4%) of those in dormitories, and 467 (39.5%) in student houses were users ($p<0,001$). Three hundred ninety-eight (38.9%) of students whose mothers used tobacco and 1302 (24.5%) of those whose mothers did not also use it ($p<0.001$). In addition, 1211 (47.8%) of those with a user romantic partner or close friend user and 521 (13.3%) of those without also used tobacco ($p<0.001$). Multivariate analysis was adjusted for gender, university, academic year, faculty, high school, place of residence, spouse/romantic partner/close friend tobacco use. Age and monthly personal income were excluded from multivariate analysis because age and academic year were highly correlated and monthly personal income

contained a large number of missing data. In multivariate analysis, students' tobacco use was statistically significantly associated with male gender (OR 2.3; 95%CI 2.0-2.6), study at AVU (OR 1.5;95%Cl 1.2-1.9), attending a vocational school (OR 1.6; 95%CI 1.2-2.0), living in a student house (OR 1.9; 95%CI 1.6-2.3), living in a dormitory (OR 1.3; 95%CI 1.1-1.5), maternal tobacco use (OR 1.6; 95%CI 1.3-1.8), paternal tobacco use (OR 1.3; 95%CI 1.2-1.5), and romantic partner/close friend tobacco use (OR 5.2; 95%CI 4.6-5.9) (Table 3).

Table 3. *A comparison of students' tobacco use for risk factors (univariate and multivariate analysis)*

Risk Factors		**Tobacco Use Status**			
		n	**%**	**p**	**AOR (95%CI)***
Gender (n:6443)	Female	738	19.7	<0.001	1
	Male	994	36.8		**2.3** (2.0-2.6)
Age (n:6437)	19 or under	278	19.5		
	20-21	793	26.7	<0.001	-
	22 or over	660	32.3		
University (n:6445)	KTU	1046	26.2		1
	TRU	448	25.7	<0.001	1.1 (0.9-1.3)
	AVU	238	33.5		**1.5** (1.2-1.9)
Academic year (n:6445)	Year 1	519	24.6		1
	2	574	26.9	0.014	1.1 (0.9-1.2)
	3	286	28.2		1.1 (0.9-1.4)
	4 or above	353	29.6		**1.4** (1.1-1.6)
Faculty (n:6445)	Social Sciences	557	24.4		1.2 (0.9-1.5)
	Science	520	28.2	<0.001	1.1 (0.9-1.4)
	Health Sciences	174	20.2		1
	Vocational Schools	481	33.1		**1.6** (1.2-2.0)
High School (n:6369)	Public	1464	25.8	<0.001	1
	Private	249	36.4		**1.4** (1.1-1.7)
Place of residence (n:6425)	Family home	456	21.9		1
	Dormitory	804	25.4	<0.001	**1.3** (1.1-1.5)
	Student house/apartment	467	39.5		**1.9** (1.6-2.3)
Monthly personal	Q1 (≤50$)	227	18.5		
income (n:5059)	Q2 (≤65$ >50$)	321	22.7	<0.001	-
	Q3 (≤110$ >65$)	333	29.6		
	Q4 (>110$)	513	39.7		
Mother (n:6331)	User	398	38.9	<0.001	**1.6** (1.3-1.8)
	Non-user	1302	24.5		1
Father (n:6286)	User	792	32.2	<0.001	**1.3** (1.2-1.5)
	Non-user	895	23.4		1
Spouse/romantic	At least one user	1211	47.8	<0.001	**5.2** (4.6-5.9)
partner/close friend tobacco use (n:6445)	Non-user	521	13.3		1

**(AOR:Adjusted odds ratio) Multivariate logistic regression model was adjusted for gender, university, academic year, faculty, high school, place of residence, spouse/romantic partner/close friend tobacco use. (n:6145, Hosmer Lemeshow test:0,022 Nagelkerke R^2:0,261)*

Discussion

The prevalence of the use of any tobacco product in the present study was 26.9%, while the prevalence of cigarette smoking was 25.0%. The great majority of such studies in Turkey have investigated the frequency of cigarette smoking, reporting prevalences between 20.6% and 43.6%.[3–10] Prevalences between 4.8% and 43.6% have been reported in universities in other countries (Figure 1).[16,18–21] The prevalence of smoking among university students in Turkey has decreased over the years. However, in this research we conducted after the COVID-19 pandemic, we found an increase in prevalence compared to previous studies. Therefore, it can be thought that many limitations on social life resulting from the COVID-19 pandemic increased tobacco use among students. The figures suggest that

the universities where the current research was performed have one of the highest prevalences of tobacco use in the world.

The prevalences in the KTU and TRU were similar to the general prevalence in Trabzon. The 33.5% prevalence in the AVU, a foundation university, is one of the highest figures seen in research in recent years. Tobacco use among students at AVU was 1.5 times (95%Cl 1.2-1.9) higher than that of students at KTU. The characteristics such as the tobacco products consumed, reasons for use and non-use, and passive exposure to tobacco smoke were similar among the three universities. There may be several reasons why students use tobacco more at AVU. Studying in a vocational college, which we identified as a risk factor, was more common in AVU and 51.2% of the students were studying in a vocational school. In addition, maternal tobacco use and spouse/romantic partner/close friend 's tobacco use, which we also identified as risk factors, were more common among students at AVU.

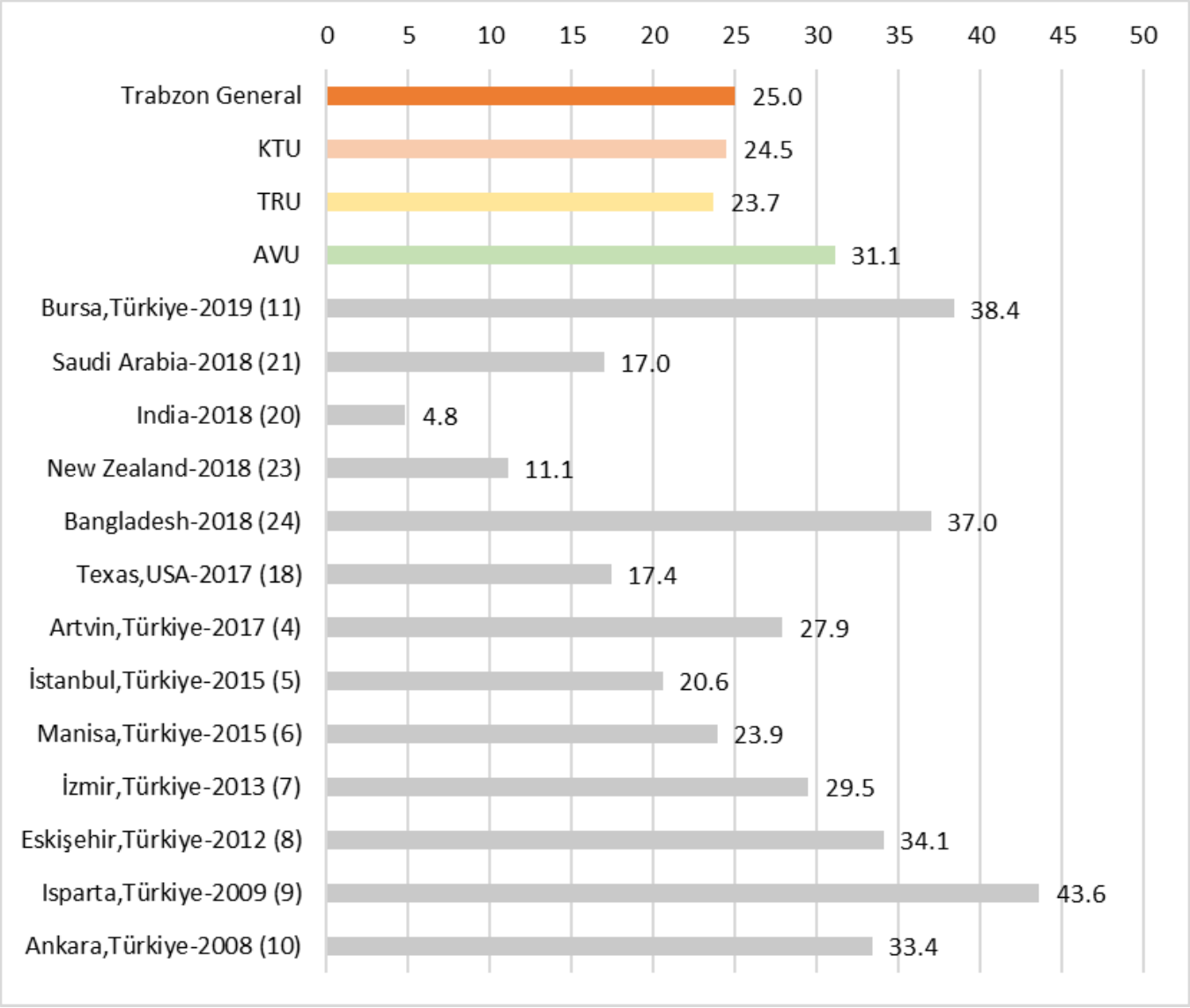

Figure 1. *Prevalences of cigarette smoking among university students in the present and previous research (%)*

The use of tobacco products such as e-cigarettes and waterpipes, which are believed to be less harmful than cigarettes, is increasing among university students.[15,16,21,22] Nonetheless, in agreement with other studies, cigarettes remain the most frequently used tobacco product.[17] Although the waterpipe was a frequently used product among students using tobacco products, at a level of 5.0%, e-cigarettes were relatively less frequently used compared to students from other countries. The low rate of e-cigarette use may be due to their high cost and the difficulty of finding and reaching them since they are prohibited in Turkey.

The research showed that students most frequently used tobacco products due to stress and for pleasure. Other studies have consistent with the present research, cited stress as the most frequent reason for use.[4,5,9] It may be predicted that providing support for students in the face of the problems and stresses they experience without resorting to tobacco products may help prevent such use. The deleterious health effects of tobacco were cited as

the main reason for not using such products in this study. Awareness-raising activities concerning these harmful effects aimed at society in general have prevented also students from smoking. However, attention should also be paid to the fact that students who do not use tobacco for the other common reason, its unpleasant smell, may nevertheless be consuming new flavored or odorless products produced by the tobacco industry.

The greatest risk factor in terms of tobacco use among students was use by a close friend or romantic partner, which was found to increase the risk 5.2 (4.6-5.9) times. Other research has reported that use by a close friend increases the risk between 1.7 and 3.6 times.[3,23,24] The present and previous studies reveal the importance of peer influence. Intervention programs covering students in general, aimed at protecting them en masse or stopping them from using such products together, may therefore be more effective than individual support in terms of protecting students. Tobacco use by the mother and father increases the risk of their students using 1.6(95%Cl 1.3-1.8) times and 1.3(95%Cl 1.2-1.5) times, respectively. Similarly, the presence of tobacco users in the family has been identified as one of the main reasons for students to start using them.[3,7,24] These findings show that parents represent an important role in terms of tobacco use among students.

All studies involving university students in Turkey have observed a higher prevalence among men, and the male gender increased the risk 2.3-fold (95%Cl 2.0-2.6) in this study. The risk for males in previous studies ranged between 1.5 and 3.4.[3,7,25] Although male gender is a risk factor, the risk is affected by cultural differences. For example, 26% of male students and 5% of female students in Saudi Arabia, where women are isolated from social and economic life, use tobacco products.[20] But no significant difference has been observed in terms of tobacco use between male and female university students in the USA.[18] Tobacco use is being regarded as a male behavior represents the basic reason for this variation. Older research from Turkey reported wide differences in prevalence values between men and women, while the difference has diminished in more recent research. That difference is likely to decline further in subsequent years as tobacco use by women becomes more culturally acceptable.[3,4,9,10]

The highest use rates among faculties were found in vocational schools, where attendance increased the risk 1.6(95%Cl 1.2-2.0) times, a risk that has also been reported in a study.[3] The distinguishing features of these colleges are that education lasts for two years and that they require lower grades for admission. Another important characteristic is that each college lies in a different district of Trabzon, and is relatively segregated from other students. There is therefore a strong likelihood that students who spend time together in such places are more influenced by one another and use tobacco together.

The 2.4% cessation rate observed among the students shows that encouraging and supporting quitting is as important as prevention for this particular age group. Students are capable of quitting when they have newly started using and before they reach more advanced ages at which severe health impacts develop. Although clinical activities including pharmacological assistance, and also a telephone support line, are available for users in Turkey, the provision of centers that are continuously and easily available to students on university campuses may allow even higher cessation rates to be achieved.

This research was performed with a sufficient sample size and has high inclusivity. In contrast to research that generally selects from a single faculty and involves only cigarette use, all the faculties of universities were included in the present research, and new and traditional tobacco products used in Turkey were investigated. There are also several limitations to this research. The simultaneous collection of factor and outcome variables using a cross-sectional design may be confusing in terms of evaluating cause-and-effect relationships. The data was collected from students taking part in classes, and the results may differ from the actual values due to differences in characteristics among students not taking part in classes. Moreover, the students reported their own use status, and there is also the possibility of deficient reporting.

Conclusion

It was found that 26.9% of the students use tobacco, which is a high prevalence compared to many previous studies. Risk factors include male gender, living outside the family home, tobacco use by the mother, father, close friends or romantic partners, and attending a vocational college. Priority should be given to women as well as men in intervention programs to fight against tobacco. Programs should begin in vocational school and include students' close friends, romantic partners, or parents.

Conflicts of Interest

The authors declare that they have no competing interests.

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