












Original Article



Medical Students' Tobacco Consumption Status and Experiences with Smoke-free Law Violations in Enclosed Spaces in Türkiye and Northern Cyprus

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Cite this article as: Aslan D, Ay P, Raymond K, et al. Medical students' tobacco consumption status and experiences with smoke-free law violations in enclosed spaces in Türkiye and Northern Cyprus. *Thorac Res Pract.* 2025;26(2):48-54

Abstract

OBJECTIVE: This study aimed to determine the frequency of tobacco smoking among medical students and assess their exposure to violations of smoke-free laws in enclosed spaces 30 days before the study. It also identifies key locations where such infractions occur and explores associated factors.

MATERIAL AND METHODS: A descriptive study was conducted using a questionnaire-based survey among students from two public and two private medical faculties in Türkiye and Northern Cyprus in 2023. Of the invited students, 628 responded. Data were analyzed using IBM Statistical Package for the Social Sciences statistics for Windows, version 23.0. Descriptive statistics included frequencies, percentages, means±standard deviations, and medians (interquartile ranges). Relationships between categorical variables were assessed using chi-squared and Fisher's exact tests, with significance set at $P < 0.05$. Binary logistic regression analysis of predictors of exposure to smoke-free violations was conducted. Ethical approval was obtained from each university.

RESULTS: Most participants were female (56.4%), with a mean age of 21.5 ± 2.37 years. Nearly one in five students was a current tobacco user (19.9%). Smokers had higher exposure to passive smoking than non-smokers (92.0% vs. 82.5%, $P = 0.009$). Encountering tobacco industry-branded vehicles was associated with higher exposure (92.3% vs. 83.7%, $P = 0.03$). Exposure to violations of the antismoking ban in enclosed spaces was significantly higher among students who smoked with higher frequency (odds ratio: 2.418, 95% confidence interval: 1.172 to 4.990, $P = 0.017$).

CONCLUSION: This study underscores the need for strict tobacco control among medical students, with an emphasis on advocacy and interdisciplinary collaboration to combat the tobacco industry's influence.

KEYWORDS: Tobacco consumption, medical student, smoke-free law, violation

Received: 01.03.2024

Accepted: 19.10.2024

Epub: 29.01.2025

Publication Date: 04.02.2025

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INTRODUCTION

Tobacco consumption and exposure to passive tobacco smoke are major tobacco-related public health challenges faced globally.^{1,2} According to estimates by the World Health Organization (WHO), tobacco consumption, including exposure to tobacco smoke, results in approximately 8 million deaths annually.^{1,3} Strong and persistent tobacco control strategies are needed to overcome these challenges with the help of health professionals, including medical doctors.^{4,5} In this regard, medical schools are crucial in tobacco control strategies. Medical schools should educate students about the tobacco control roles they will play throughout their careers. Physicians' expected tasks in tobacco control are to protect their patients from the dangers of active and passive smoking, to help them quit tobacco, and to advocate for comprehensive smoke-free legislation.⁵

Implementing comprehensive smoke-free legislation to create 100% smoke-free indoor public spaces is an effective strategy to mitigate environmental tobacco exposure. Research has demonstrated the success of such legislation; reductions in second-hand smoke exposure were associated with decreased incidences of heart attacks, strokes, and respiratory diseases, increased cessation rates among smokers, and protection of vulnerable populations such as children and pregnant women from the harmful effects of tobacco smoke.⁶⁻⁹

Article 8 of the WHO's Framework Convention on Tobacco Control mandates that countries implement effective legislation to prevent individuals from exposure to tobacco smoke in enclosed indoor spaces.¹⁰ In compliance with this directive, the Turkish Parliament enacted an amendment that prohibited smoking in all enclosed public spaces across Türkiye, starting in July 2009.¹¹ A similar legislation also applied to Northern Cyprus. Although the legislation initially saw successful implementation, the effectiveness of enforcement diminished over time.¹² A study employing a direct observation method to evaluate violations in hospitality venues in Türkiye revealed

that non-compliance with indoor smoke-free law was 49.0% in 2013 and 29.7% in 2014. Moreover, establishments previously fined were more likely to violate the law, indicating significant weaknesses in enforcement activities. Additionally, the Global Adult Tobacco Survey (GATS) conducted in 2016 determined that 12.7% of adults aged 15 years and older were exposed to tobacco smoke in restaurants, whereas 28.0% were exposed in cafes, coffee shops, or tea houses.¹³

Evidence from research shows that tobacco consumption is high among medical students.^{14,15} Additionally, tobacco smoke exposure exposes medical students to the same risks as other community members. Such unwanted consequences may be caused by the lack of awareness among medical students and the weak enforcement of indoor smoking prohibition in Northern Cyprus and Türkiye.

The objective of this study was to ascertain the tobacco smoking frequency among medical students and quantify the proportion of students affected by infractions of smoke-free legislation in enclosed spaces within the preceding 30 days (prior to the study). Furthermore, this research aims to identify the predominant locations where smoke-free policy violations occur and to elucidate the factors associated with exposure to these violations among medical student populations.

MATERIAL AND METHODS

Study Design and Population

In this descriptive study, a questionnaire-based survey was carried out among students in four medical schools in Türkiye and Northern Cyprus in 2023. Two of the medical schools, Marmara University and Hacettepe University, were public academic institutions located in Türkiye, and the other two, Near East University and Girne University, were private academic institutions in Northern Cyprus.

All students registered in the four medical schools were invited to participate in the study, and 628 students voluntarily replied to the questionnaire.

Data were collected through an online self-administered questionnaire using Google Forms. The questionnaire was developed after an extensive review of relevant data sources, including the GATS and other comparable studies on smoking behavior. The questions were adapted and tailored to explore sociodemographic variables, smoking status, and exposure to smoke-free violations in enclosed spaces, ensuring they aligned with the objectives of the study.

The tobacco consumption status of the students was one of the main variables used in this study to assess the general student profile. The outcome variable of the study was exposure to smoke-free violations in enclosed spaces within the last 30 days. Having been exposed to tobacco smoke in a cafe, taxi, or public transport, the room where the student stayed, or common spaces at school or in a dormitory were identified as being exposed to a violation. The independent variables were sociodemographic characteristics and smoking status.

Main Points

- **Prevalence of tobacco use:** Approximately 20% of medical students are current tobacco users, indicating a significant level of tobacco consumption within this population.
- **Exposure to smoke-free violations:** Most students experienced passive smoke exposure, primarily in cafes, highlighting a common breach of smoke-free legislation.
- **Impact of smoking on violations:** Smokers face higher rates of exposure to smoke-free law violations than non-smokers, suggesting that smoking status influences exposure levels.
- **Perception of anti-tobacco laws:** Students who view anti-tobacco laws as ineffective are more likely to experience smoke-free law violations, underscoring the need for improved legislation and enforcement.
- **Need for targeted interventions:** The findings emphasize the necessity for enhanced enforcement of smoke-free policies and targeted public health interventions to reduce tobacco use and associated violations.

Statistical Analysis

Data obtained from each school were collected and converted to International Business Machines Corporations, Statistical Package for the Social Sciences (IBM SPSS) file. IBM SPSS statistics version 23.0 was used for data analysis. Descriptive data were summarized as frequencies, percentages, means±standard deviations, and medians (interquartile ranges). Chi-squared and Fisher's exact tests were used to explore the relationship between the categorical variables. Statistical significance was set as $P < 0.05$.

Binary logistic regression was performed to analyze the relationship between exposure to smoke-free violations and predictor variables. Hosmer-Lemeshow test was used to measure the model's predictive accuracy in the binary logistic regression model.

Ethical Issues

Participation in the study was entirely voluntary, and informed consent was obtained from all participants prior to their involvement. The purpose of the study, procedures, and benefits were explained to the students through an introductory section of the online questionnaire. The participants were informed that they could withdraw from the study at any time without any consequences. No personally identifiable information was collected to ensure the confidentiality and anonymity of the responses. Data was securely stored and used only for research.

The study was approved by the ethical review boards of each of the four participating institutions as follows: Marmara University in İstanbul (approval no: 09.2023.524, date: 7th of April 2023), Hacettepe University in Ankara (approval no: 2023/09-53, date: 23rd of May 2023), Near East University in Northern Cyprus (approval no: 2023/113-1722, date: 27th of April 2023), and Girne University in Northern Cyprus (approval no: 02, date: 22nd of August 2023).

RESULTS

As shown in Table 1, the students' characteristics according to their medical training were collected. Most students were enrolled in the English program of the faculty ($n = 379, 60.3\%$), and 56 students were from various international backgrounds (8.9%). The data indicate that first-year students exhibited the highest participation frequency among all participants ($n = 169, 26.9\%$), as illustrated in Table 1.

As highlighted in Table 2, the sociodemographic features and health status of the students were assessed. The majority of students were female ($n = 355, 56.4\%$). The mean age of the students was 21.5 ± 2.37 years. Only three students were married (0.5%). Most students stated that their economic situation was sustainable ($n = 494, 78.5\%$). The most frequently stated place of residence was "in the dormitory, with friends ($n = 215, 34.2\%$)" and "at home, with friends ($n = 94, 15.0\%$). Most students perceived their health as "healthy" ($80.8\%, n = 508$). Twenty-seven percent of the students had a diagnosed disease ($n = 170$), and 19.7% of them were taking prescribed medication ($n = 124$).

Tobacco consumption by students and their relatives or friends, as well as exposure to smoke-free law violations, were analyzed, as shown in Table 3, where about one out of five students is a current tobacco user ($n = 125, 19.9\%$). The quit frequency was 12.7% ($n = 80$). The frequency of tobacco consumption was highest among the best friends of the students ($n = 223, 35.8\%$) compared with the other categories. Ninety-nine students (48.3%) stated that they started smoking because of curiosity. The mean age at which students started smoking was 18.05 ± 2.58 years. The students' fathers' smoking status was higher than the mothers' smoking status (30.5% vs. 19.1%).

As shown in Figure 1, the frequency of passive smoke exposure among students in the last 30 days prior to their study in the selected venues is highlighted. The most common place where the students were exposed to a smoke-free violation in the last 30 days was "cafes" ($n = 509, 80.9\%$). Other venues where passive smoking exposure was significant included taxis, public transport, places of residence, and common areas used by students.

As supported by Table 4, the univariate analysis of exposure to violations of the smoke-free law within the last 30 days according to selected characteristics was performed. Students who smoked were more exposed to passive smoking than nonsmokers (92.0% vs. $82.5\%, P = 0.009$). Students who perceived themselves as healthy were less exposed to passive smoking than those who were hesitant about their health and perceived themselves as unhealthy (82.9% vs. $90.9, P = 0.02$).

As shown in Table 5, the results of a univariate analysis examining the exposure of students to violations of smoke-

Table 1. Students' characteristics according to their medical education

	Number	Percentage
University		
Marmara University	281	44.7
Hacettepe University	185	29.4
Near East University	110	17.5
Girne University	53	8.4
Program language		
English	379	60.3
Turkish	250	39.7
International students		
No	573	91.1
Yes	56	8.9
Academic year		
1	169	26.9
2	118	18.8
3	107	17.0
4	73	11.6
5	81	12.9
6	81	12.9
Total	629	100.0

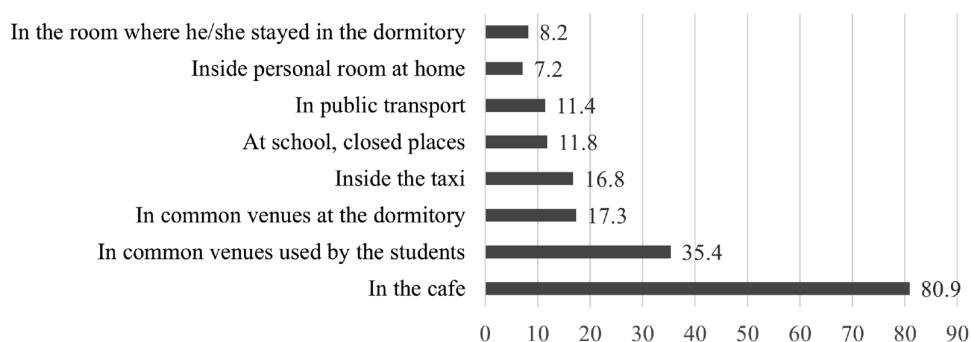


Figure 1. Frequency of passive smoke exposure of the students in the last 30 days prior to the study in selected venues (n = 629)

Table 2. Sociodemographic features and health status of the students

Feature	Number	Percentage
Sex (n = 629)		
Female	355	56.4
Male	274	43.6
Age (n = 628)		
Mean±SD	21.52±2.37	
Median	21	
Min-max	16-35	
Marital status (n = 629)		
Not married	626	99.5
Married	3	0.5
Economic sustainability (n = 629)		
Yes	494	78.5
I could not decide	92	14.6
No	43	6.8
Place of residence (n = 628)		
In a dormitory with friends	215	34.2
At home, with family	182	29.0
At home with friends	94	15.0
At home, alone	93	14.8
In the dormitory alone	38	6.1
At home, with siblings or cousins	6	1.0
Perceived health status (n = 629)		
Healthy	508	80.8
I could not decide	83	13.2
Unhealthy	38	6.0
Disease diagnosed by doctor (n = 629)		
No	459	73.0
Yes (top 3 diseases)*	170	27.0
Respiratory system diseases	27	15.0
Mental health diseases	21	12.4
Endocrinology/metabolic diseases	17	10.0
Take medication prescribed by a doctor (n = 629)		
No	505	80.3
Yes	124	19.7

*Percentages were calculated for more than 170 students. SD: standard deviation, Min-max: minimum-maximum

free laws within the past 30 days, stratified by the extent of tobacco industry interference, were analyzed. Students who encountered tobacco industry-branded vehicles were exposed to passive smoking at a higher rate than the others (92.3% vs. 83.7, $P = 0.03$). Students who found national anti-tobacco control legislation successful were less exposed to passive smoking than the others (72.9% vs. 87.0%, $P = 0.004$). Students who found the country successful in preventing passive smoking were less exposed to passive smoking than the others (74.2% vs. 88.9%, $P < 0.001$).

Table 6 shows the infractions of anti-tobacco legislation pertaining to passive smoking within indoor environments, stratified by selected characteristics. Exposure to violations of the anti-smoking ban in enclosed spaces was statistically significantly higher among students who smoked with higher frequency (OR=2.418, 95% CI: 1.172 to 4.990, $P = 0.02$), compared with their respective reference categories.

DISCUSSION

Medical students are expected to be role models as they are defined as “the five-star doctor” by the WHO.¹⁶ Their role as “care giver,” “decision maker,” “communicator,” “community leader,” and “manager” gives them significant responsibility in leading both individuals and the community in tobacco control.¹⁶ They are expected to be role models for the community. Nevertheless, our data show that 19.9% of students are current tobacco users, and 12.7% have quit smoking. In addition to traditional cigarettes, they use other tobacco products, including water pipes and e-cigarettes, etc. (Table 3). Different frequencies have been reported in other studies. For example, tobacco use among medical students in the Western Balkan region was reported to have a higher frequency.¹⁵ Smoking prevalence in Malaysian medical students was reported to be lower than that of Balkan students.¹⁷

Medical students reported having diagnosed diseases (27.0%), with respiratory system diseases, mental health disorders, and endocrinology/metabolic diseases ranking among the top three (Table 2). Tobacco consumption is closely related to a variety of diseases. The WHO calls for the use of these reasons to convince smokers to quit.¹⁸ Awareness among medical students should be improved in this regard.

The status of tobacco smoking is very closely linked to tobacco industry interference. The recent Global Tobacco Industry Interference Index was published in 2023, and Türkiye's rank was 72 out of a total of 90 countries.¹⁹ As lower scores represent better rankings, it seems that Türkiye should improve its capacity to combat the tobacco industry. Full implementation of the current anti-tobacco legislation in

Türkiye is believed to be a good step toward improving the situation of the country.¹¹ Nevertheless, this study revealed the interference of the industry, as 23.1% of the students stated their exposure to tobacco industry sponsorship, and 19.3% of them emphasized that they had encountered tobacco industry-branded vehicles in the last 30 days prior to the study (Table 5). Tobacco control is a health promotion intervention, and legislation plays an important role. In this regard, primordial prevention strategies are necessary. The WHO already recommends tobacco control measures, such as laws, regulations, administrative decisions, enforcement measures, and population-based interventions.²⁰

While a significant number of students were exposed to passive smoking in various ways in the last 30 days prior to the study, being a smoker was associated with higher exposure (Table 6). The tactics of the tobacco industry may have influenced these results and should therefore be thwarted. The tobacco industry has employed approximately seven tactics consistently for many years.^{21,22}

Table 3. Tobacco consumption-related characteristics of the students

Feature	Number	Percentage
Tobacco consumption status of students (n=629)		
Current users		
Cigarette*	125	19.9
Cigarette*	112	89.6
Waterpipe*	21	16.8
E-cigarettes*	17	13.6
Use of more than one tobacco product*	23	18.4
Quit		
Cigarette**	80	12.7
Cigarette**	68	85.0
Waterpipe**	31	38.8
E-cigarettes**	21	26.2
Heated, not burned tobacco	7	8.8
Never used	424	67.4
Reason for starting smoking (n=205)***		
Curiosity	99	48.3
Wannabe smoker, peer influence	71	34.6
More than one reason (curiosity, peer influence, etc.)	21	10.2
Stress, unhappiness	9	4.4
No specific reason	1	0.4
Shifting from one tobacco product to another	1	0.4
Age at which smoking started (n=205)***		
Mean±SD	18.05±2.58	
Median	18	
Min-max	10-30	
Consumption of tobacco by relatives/friends of students**** (n=629)		
Mother	120	19.1
Father	192	30.5
Siblings	123	19.6
Best friend	223	35.8
Partner	89	19.1
The friend whom he/she lives with	159	25.3

*Percentages are calculated for 125 current smokers. More than one option was mentioned by the students.

**Percentages are calculated for over 80 quitters; more than one option is mentioned by the students.

***Percentages are calculated over 205 students; more than one option is mentioned by the students.

****Percentages were calculated for 629 students; more than one option is mentioned by the students.

SD: standard deviation, Min-max: minimum-maximum

Table 4. Exposure violate smoke-free law within the last 30 days according to selected characteristics of the students (%)

Characteristics	Exposure to violations of smoke-free law within the last 30 days*			P
	Yes	No	Total	
Sex (n = 629)				
Male	85.8	14.2	43.6	0.41
Female	83.4	16.6	56.4	
Age group in years (n = 627)				
16-24	84.1	15.9	91.5	0.38
25 years	88.7	11.3	8.5	
Faculty (n = 629)				
Marmara University	82.9	17.1	44.7	0.26
Hacettepe University	85.9	14.1	29.4	
Near East University	81.8	18.2	17.5	
Girne University	92.5	7.5	8.4	
Academic level (n = 629)				
Pre-clinic	86.0	14.0	62.6	0.15
Clinic	81.7	18.3	37.4	
Sustainability based on economic status (n = 537)**				
Yes	83.4	16.6	92.0	0.10
No	93.0	7.0	8.0	
Disease diagnosed by a doctor (n = 629)				
Yes	87.6	12.4	27.0	0.17
No	83.7	16.8	73.0	
Perception of health (n = 629)				
Healthy	82.9	17.1	80.8	0.03
Hesitant and not healthy	90.9	9.1	19.2	
Tobacco consumption status (current) (n = 629)				
Yes	92.0	8.0	19.9	0.009
No	82.5	17.5	80.1	

*Passive smoking exposure in the café; OR inside the taxi; OR on public transport; OR in the room where the student stayed in the dormitory; OR in common places at school; OR in common venues at the dormitory

**Students who did not select this category were excluded.

Table 5. Incidence of exposure to violations of smoke-free legislation within the past 30 days stratified by tobacco industry interference and students' perceptions of legislative efficacy (%)

Characteristics	Exposure to violations of smoke-free law within the last 30 days*			P
	Yes	No	Total	
Encounter with tobacco industry sponsorship (n=542)**				
Yes	86.4	13.6	23.1	0.63
No	84.7	15.3	76.9	
Encounter with tobacco industry-branded vehicles (n=540)**				
Yes	92.3	7.7	19.3	0.03
No	83.7	16.3	80.7	
Finding national tobacco control legislation successful (in general) (n = 528)**				
Yes	72.9	27.1	11.2	0.004
No	87.0	13.0	88.8	
Finding country successful in preventing passive smoking (n = 534)**				
Yes	74.2	25.8	29.0	<0.001
No	88.9	11.1	71.0	

*Passive smoking exposure in the café; OR inside the taxi; OR on public transport; OR in the room where the student stayed in the dormitory; OR in common places at school; OR in common venues at the dormitory
 **Students who do not understand this category are excluded.

Table 6. Logistic regression model of exposure to violations of antismoking bans in enclosed spaces in association with selected characteristics

Characteristics	OR	95% CI	P
Perception of health			
Healthy (reference)	1.00		
Hesitant and not healthy	1.970	0.981-3.953	0.06
Tobacco consumption status (current)			
No (reference)	1.00		
Yes	2.418	1.172-4.990	0.02

*Model is adjusted for age, sex, perceived health status, and current tobacco use.
 OR: odds ratio, CI: confidence interval

This study has some strengths. First, research data were obtained from four medical faculties. Second, the findings of this study cover an updated and wide range of tobacco control behaviors.

However, this study has a number of limitations. First, the results cannot be generalized to the general population because of limited participation. Second, a deep dive into the novel tobacco product consumption profiles could not be achieved due to the descriptive cross-sectional study design and self-reporting data. Third, the research data were self-reported by the students and were not a result of observed behaviors.

CONCLUSION

This study provides critical insights into tobacco consumption and smoke-free law violations among medical students in Türkiye and Northern Cyprus. With a significant proportion of students being current tobacco users and experiencing frequent exposure to smoke-free law violations, especially in cafés, the findings highlight a pressing public health issue. The study revealed that higher exposure to violations was associated with frequent smoking and skepticism regarding the effectiveness of anti-tobacco legislation. These results underscore the need for enhanced enforcement of smoke-free policies and targeted interventions to reduce tobacco use and its impact on public health among medical students. Moreover, advocacy work is crucial for reminding medical students of their role in tobacco control. As tobacco control is an interdisciplinary approach, all stakeholders should play their role. The fight against the tobacco industry should be a common goal for all stakeholders.

Ethics

Ethics Committee Approval: The study was approved by the ethical review boards of each of the four participating institutions as follows: Marmara University in İstanbul (approval no: 09.2023.524, date: 7th of April 2023), Hacettepe University in Ankara (approval no: 2023/09-53, date: 23rd of May 2023), Near East University in Northern Cyprus (approval no: 2023/113-1722, date: 27th of April 2023), and Girne University in Northern Cyprus (approval no: 02, date: 22nd of August 2023). Additionally, official permissions from the faculty administrations were secured prior to distributing the survey to ensure compliance with institutional guidelines and regulations regarding research involving human subjects.

Informed Consent: Participation in the study was entirely voluntary, and informed consent was obtained from all participants prior to their involvement in the research. The purpose of the study, procedures, and benefits were explained to the students through an introductory section of the online questionnaire. The participants were informed that they could withdraw from the study at any time without any consequences. No personally identifiable information was collected to ensure confidentiality and anonymity of the responses. Data was securely stored and only used for research purposes.

Presented in: The findings of the study were presented at the 9th ENSP-ECTC Conference between 22 and 24 October, 2024 in Athens.

Footnotes

Authorship Contributions

Surgical and Medical Practices - Concept – Design - Data Collection or Processing - Analysis or Interpretation – Literature Search - Writing: All authors contributed equally to all contribution sections.

Conflict of Interest: No conflict of interest was declared by the authors.

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

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