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Research Article / Araştırma Makalesi

Assessment of psychological tobacco dependence among medical students: a cross-sectional study

Tıp fakültesi öğrencileri arasında psikolojik tütün bağımlılığının değerlendirilmesi: kesitsel bir çalışma

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ABSTRACT

Introduction: Smoking addiction is a multidimensional process resulting from the combination of many factors that mutually influence and reinforce each other. Physical addiction to cigarettes progresses through stages of craving, longing, and need, with increased addiction levels making cigarette cravings more difficult to resist. This progression in physical dependence is accompanied by a corresponding increase in heightened psychological dependence, which constitutes an additional dimension of tobacco addiction. The stressful environment of medical education necessitates examining the nicotine dependence of students. In our study, we aimed to assess nicotine dependence in medical students by examining both the physical and psychological dimensions of smoking behavior within this population.

Methods: This is a cross-sectional study conducted with 169 medical students enrolled at a medical school in Turkey. Data were collected using a questionnaire including sociodemographic information, the Fagerström Test for Nicotine Dependence (FTND), and the Test to Assess the Psychological Dependence on Smoking (TAPDS).

Categorical variables are reported as n (%), and continuous variables as mean ± SD or median (IQR). The Kolmogorov-Smirnov test was employed to assess the normality of the distribution. For group comparisons based on normal distribution, independent samples t-test, one-way ANOVA, Mann-Whitney U test, and Kruskal-Wallis test were used. Multiple linear regression analysis was performed to identify independent predictors of the TAPDS score.

Results: The median score on the FTND was 3.0 (IQR 1.0-6.0). The mean TAPDS score was 49.40 ± 9.98.The age at smoking initiation was significantly higher in females compared to males (p=0.039), while the number of cigarettes smoked per day was significantly lower (p=0.015).A moderate positive correlation was found between FTND and TAPDS scores (r=0.459, p<0.001). In the multiple linear regression model including number of cigarettes smoked per day, age at smoking initiation and FTND scores, only FTND score remained significantly associated with TAPDS score (B=1.668; p<0.001)

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Conclusions: An increase in one form of dependence affects the other as well. In our study, a significant association was found between TAPDS and FTND scores. This highlights the importance of holistic approaches targeting both physical and psychological components in interventions for smoking dependence.

Keywords: smoking, addiction, psychological dependence, medical students

ÖZ

Arka Plan: Sigara bağımlılığı, birbirini karşılıklı olarak etkileyen ve pekiştiren birçok faktörün birleşiminden oluşan çok boyutlu bir süreçtir. Sigaranın fiziksel bağımlılığı, arzu, özlem ve ihtiyaç evrelerinden geçerek ilerler; bağımlılık düzeyinin artması sigara isteğine karşı koymayı daha da zorlaştırır. Fiziksel bağımlılıktaki bu ilerlemeye, tütün bağımlılığının ek bir boyutunu oluşturan artan psikolojik bağımlılık eşlik eder. Tıp eğitiminin stresli ortamı, öğrencilerin nikotin bağımlılığının incelenmesini gerektirmektedir. Çalışmamızda, tıp öğrencilerinde sigara içmenin hem fiziksel hem de psikolojik boyutlarını inceleyerek, bu popülasyondaki nikotin bağımlılığı düzeylerini değerlendirmek amaçlanmıştır.

Yöntemler: Bu çalışma, Türkiye'de bir tıp fakültesine kayıtlı 169 tıp öğrencisi ile yürütülen kesitsel bir çalışmadır. Veriler, sosyodemografik bilgileri içeren bir anket, Fagerström Nikotin Bağımlılık Testi (FTND) ve Sigaranın Psikolojik Bağımlılığını Değerlendirme Testi (TAPDS) aracılığıyla toplanmıştır. Kategorik değişkenler sayı ve yüzde (%) olarak, sürekli değişkenler ise ortalama ± standart sapma (SS) veya medyan (interkuartil aralık, IQR) şeklinde raporlanmıştır. Dağılımın normalliğini değerlendirmek için Kolmogorov-Smirnov testi kullanılmıştır. Normale dayalı grup karşılaştırmalarında bağımsız örneklem t-testi, tek yönlü ANOVA, Mann-Whitney U testi ve Kruskal-Wallis testi kullanılmıştır. TAPDS skorunun bağımsız belirleyicilerini tanımlamak için çoklu doğrusal regresyon analizi yapılmıştır.

Bulgular: FTND'nin medyan skoru 3.0 (IQR 1.0-6.0) olarak bulunmuştur. TAPDS skorunun ortalaması 49.40 ± 9.98'dir. Sigara başlama yaşı kadınlarda erkeklere göre anlamlı şekilde daha yüksek bulunurken (p=0.039), günlük içilen sigara sayısı anlamlı şekilde daha düşüktür (p=0.015). FTND ve TAPDS skorları arasında orta düzeyde pozitif bir korelasyon saptanmıştır (r=0.459, p<0.001). Günde içilen sigara sayısı, sigaraya başlama yaşı ve FTND skorlarının dahil edildiği çoklu doğrusal regresyon modelinde, yalnızca FTND skoru TAPDS skoru ile anlamlı ilişki göstermiştir (B=1.668; p<0.001).

Sonuçlar: Bağımlılığın bir türündeki artış, diğerini de etkiler. Çalışmamızda TAPDS ve FTND puanları arasında anlamlı bir ilişki bulunmuştur. Bu durum, sigara bağımlılığına yönelik müdahalelerde hem fiziksel hem de psikolojik bileşenleri hedef alan bütüncül yaklaşımların önemini vurgulamaktadır.

Anahtar kelimeler: sigara, bağımlılık, psikolojik bağımlılık, tıp öğrencileri

Introduction

Tobacco use is an important risk factor for numerous health issues, such as lung cancer and cardiovascular diseases and respiratory disorders, and causes more than 8 million deaths annually.[1,2] In 2022, the global prevalence of tobacco use among individuals aged 15-24 years was 13.3%, with projections indicating a decline to 12.7% by 2025.[3] In Turkey, the prevalence of daily and occasional tobacco use within the same demographic was 22.4%.[4]

The progression of smoking behavior typically occurs through several stages: preparation, initiation, experimentation, regular smoking, and addiction.[5] Adverse experiences during adolescence are correlated with increased rates of smoking initiation, recent smoking, and daily smoking, suggesting that smoking serves as a coping mechanism.[6]

Addiction constitutes a multifaceted phenomenon characterized by the dynamic interplay among physical processes, sensations, behavioral

patterns, and the socio-environmental contexts that give rise to and sustain them.[7] Smoking, which leads to addiction, is a condition that requires intervention.[8]

Nicotine stimulates dopamine release in brain regions associated with the reward system and positive affect, inducing sensations of arousal and pleasure while alleviating stress and anxiety.[9,10] Nicotine addiction is a learned behavior initiated by psychosocial variables and maintained by the physiological dependence that develops on nicotine. This condition is typically manifested through smoking or the use of smokeless tobacco products.[11]

Smoking addiction is a multidimensional process resulting from the combination of many factors that mutually influence and reinforce each other. Physical addiction to cigarettes progresses through stages of craving, longing, and need, with increased addiction levels making cigarette cravings more difficult to resist. This progression in physical dependence is accompanied by a corresponding increase in heightened psychological dependence, which constitutes an additional dimension of tobacco addiction. This process involves the sustained use of cigarettes for internal reasons, such as emotional regulation, shaping self-perception, or seeking social acceptance.[12-15]

The prevalence of smoking is also high among medical students.[16] Literature shows that medical students who smoke exhibit higher levels of anxiety symptoms compared to non-smokers, and that anxiety is positively correlated with nicotine dependence.[17] These findings may be associated with the inherently stressful environment of medical education.[18] The stressful environment of medical education necessitates examining the nicotine dependence of students.

In our study, we aimed to assess the levels of nicotine addiction within this population and to identify the individual, environmental, and psychosocial factors associated with these behaviors by examining both the physical and psychological dimensions of smoking among medical students. The findings are expected to contribute to the development of effective interventions and prevention strategies for this group. Furthermore, implementing necessary changes in this group, who will become future physicians, may contribute to the quality of the healthcare services they will provide in the future.

Materials and Methods

Study design, setting and participants

This descriptive cross-sectional study was conducted among the students of the İnönü University Faculty of Medicine between February 10 and May 8 in 2025. The study population comprised students who currently smoke. The Faculty of Medicine has a total of 1,741 students. In the reference study, the prevalence of smoking was reported to be 17.2%.[19] Using these prevalence estimates, the target population was calculated to comprise 299 individuals. Assuming a 50% prevalence of psychological dependence among smoking medical students, a minimum sample size of 169 participants was required to achieve a 95% confidence level with a 5% margin of error. Given the voluntary nature of the study, only students who self-reported as currently smokers were invited to the survey.

Variables

During the data-collection phase, we employed a standardized questionnaire and psychometric scales that were adapted into Turkish and underwent validity and reliability testing. Sociodemographic data were collected via questions on gender, age, academic year, type of residence, family structure, and socioeconomic status.

Smoking-related variables included age at smoking initiation, smoking frequency, daily cigarette consumption, smoking status of family members and friends, and previous quit attempts. Nicotine dependence was assessed using the Fagerström Test for Nicotine Dependence (FTND)[20], with scores ranging from 0 to 10.

Psychological dependence levels were measured using the Test to Assess the Psychological Dependence on Smoking (TAPDS)[21] a 3-point Likert-type scale (1=Never, 2=Sometimes, 3=Quite Often), yielding total scores from 25 to 75 (25-41=mild dependence; 42-58=moderate dependence; 59-75=severe dependence).

Reliability analysis was conducted via Cronbach's alpha coefficient. The Cronbach's alpha value of the FTND was 0.56.[20] In our study, the Cronbach's alpha value of the FTND was 0.747. The Cronbach's alpha value of the TAPDS has a high level of reliability with 0.93.[21] In our study, the total Cronbach's alpha value of the TAPDS was found to be 0.906.

Data collection

Participants received a comprehensive explanation of the study's objectives, scope, and voluntary nature, and provided written informed consent. The surveys were conducted face-to-face by the research team in environments where participant privacy was protected. No personally identifying information was recorded; all responses were anonymized via coding and stored electronically.

Statistical analysis

Statistical analyses were performed using IBM Statistical Package for the Social Sciences (SPSS) version 22.0. Categorical variables are reported as n (%), and continuous variables as mean ± SD or median (IQR). The Kolmogorov-Smirnov test was employed to assess the normality of the distribution. Between group comparisons used independent samples t-tests or one-way ANOVA for normally distributed variables, and Mann-Whitney U or Kruskal-Wallis tests for non-normal variables. Among smokers, the association between FTND and TAPDS scores was assessed with Spearman's rho. Variables with significant bivariate correlations were entered (Enter method) into a multiple linear regression model to examine factors independently associated with TAPDS score.

Ethical approval

This study was approved by the Faculty of Medicine Non-Interventional Clinical Research Ethics Committee (Decision No: 2025/7073) and the Dean's Office of the Faculty of Medicine. The study was conducted in accordance with the principles of the Declaration of Helsinki. Participants were informed about their voluntary participation in the study and their rights were fully protected.

Results

In the study sample, 13.0% of students were female, while 87.0% were male, with a median age of 21.0 years (IQR 20.0-23.0). Second-year students constituted the largest subgroup, representing 26.0% of the sample.

The median age at smoking initiation was 18.0 years (IQR 16.0-19.0), and the median daily cigarette consumption was 15.0 (IQR 8.0-20.0). Smoking frequency was reported as daily by 87.0% of students, several times per week by 7.1%, several times per month by 3.0%, and only on special occasions by 3.0%. The prevalence of smoking among family members or friends was 63.3% and 98.2%, respectively. Overall, 63.9% of smokers had attempted to quit at least once: 25.0% made one attempt, 42.6% made two to three attempts, and 32.4% made four or more attempts; notably, 75.0% of these individuals did not seek professional assistance.

The median score on the Fagerström Test for Nicotine Dependence (FTND) was 3.0 (IQR 1.0-6.0). Psychological dependence, assessed by the Test to Assess the Psychological Dependence on Smoking (TAPDS), yielded a mean score of 49.4 ± 9.98 (mean ± SD), with 21.9% of students classified as mildly dependent, 59.2% as moderately dependent, and 18.9% as severely dependent (Table 1).

In our cohort of currently smoking medical students, female students initiated smoking at a median age of 18.0 years (IQR 17.0-20.0) compared with 17.0 years (IQR 16.0-19.0) among male students (p=0.039). Furthermore, female current-smoking medical students reported a median daily consumption of 10.0 cigarettes (IQR 5.0-15.0), whereas male current-smoking medical students consumed 15.0 cigarettes per day (IQR 8.0-20.0; p=0.015). These results indicate that, within this cohort, female medical students both begin smoking later and smoke fewer cigarettes each day than their male counterparts (Table 2).

Analysis of dependence scores revealed the following. There was no significant gender difference in TAPDS scores (p=0.538), whereas male students exhibited significantly higher FTND scores than female students (p=0.006). Socioeconomic status was associated with TAPDS scores (p=0.023); post hoc comparisons showed that students with poor socioeconomic status had higher psychological dependence than those with moderate (p=0.024) and good (p=0.024) socioeconomic status. No significant difference was observed between socioeconomic status and FTND scores (p=0.318).

Dependence scores differed by smoking frequency (daily, several times per week, several times per month, only on special occasions). Students who smoked daily exhibited significantly higher psychological dependence (TAPDS) scores than those who smoked several times per week (p=0.030). Smoking frequency was also significantly associated with nicotine dependence (FTND) scores (p<0.001). Pairwise comparisons showed that daily smokers had higher FTND scores than those smoking several times per week (p<0.001) and those smoking only on special occasions (p=0.034).

Students who tried to quit smoking two or three times had significantly higher scores on the TAPDS (p=0.026) and FTND (p=0.010) than those who tried four or more times. The FTND score was found to be significantly higher in the students who considered getting help compared to those who did not (p=0.044).

Students reporting intense smoking cravings during cessation attempts had significantly higher psychological dependence scores (TAPDS; p=0.027) and physical dependence scores (FTND; p=0.018) than those without such urges. In addition, it was found that medical students who experienced “irritability/anger” (p=0.002) and “sleep disturbances” (p<0.001) among the psychological symptoms experienced during the smoking cessation attempt had significantly higher TAPDS scores compared to students who did not report these symptoms.

Likewise, there was a significant difference in FTND score between individuals who reported “sleep disturbances” and those who did not (p=0.019). There was no significant difference between the students who had “irritability/anger” problems and those who did not (p=0.084) (Table 3).

A statistically significant negative correlation was found between age at smoking initiation and number of cigarettes smoked per day (r=-0.285, p<0.001). A significant negative correlation was found between age at smoking initiation and FTND scores (r=-0.357, p<0.001) and TAPDS scores (r=-0.235, p=0.020). A significant positive correlation was found between the number of cigarettes smoked per day and TAPDS scores (r=0.325, p<0.001). A moderate positive correlation was found between FTND and TAPDS scores (r=0.459, p<0.001) (Table 4).

Table 1. Sociodemographic and smoking-related characteristics of currently smoker medical students (n=169)

		n (%)
Gender	Female	22 (13.0%)
	Male	147 (87.0%)
Age, years		Median 21.0 (IQR 20.0–23.0)
Academic year	1	38 (22.5%)
	2	44 (26.0%)
	3	24 (14.2%)
	4	23 (13.6%)
	5	19 (11.3%)
	6	21 (12.4%)
Place of residence	Dormitory	81 (47.9%)
	At home with family/relatives	60 (35.5%)
	Living independently (away from family)	28 (16.6%)
Family status	Both parents alive and living together	156 (92.3%)
	Parents divorced	8 (4.7%)
	Single parent (one deceased)	5 (3.0%)
Socioeconomic status	Low	12 (7.1%)
	Middle	85 (50.3%)
	High	72 (42.6%)
Age at smoking initiation, years		Median 18.0 (IQR 16.0-19.0)
Smoking Frequency	Daily	147 (87.0%)
	Several times per week	12 (7.0%)
	Several times per month	5 (3.0%)
	Only on special occasions	5 (3.0%)
Number of cigarettes smoked per day		Median 15.0 (IQR 8.0-20.0)
Family members who smoke		107 (63.3%)
Peer smoking status		166 (98.2%)
Ever attempted to quit smoking	Yes	108 (63.9%)
	No	61 (36.1%)
Number of quit attempts	1 time	27 (25.0%)
	2-3 times	46 (42.6%)
	4 or more times	35 (32.4%)
Reasons for quitting*	Health concerns	37 (34.3%)
	Financial reasons	29 (26.9%)
	Family or peer pressure	13 (12.0%)
	Personal determination	75 (69.4%)
	Other	2 (1.9%)
Cessation methods*	Self-detachment	106 (98.2%)
	Nicotine replacement (patches/gum)	6 (5.6%)
	Pharmacotherapy	5 (4.6%)

*:Multiple responses allowed
TAPDS, Test to Assess the Psychological Dependence on Smoking; FTND, Fagerström Test for Nicotine Dependence.

Table 1. Continued

		n (%)
Difficulty in quitting*	Intense cigarette cravings	37 (34.3%)
	Coping with stress	39 (36.1%)
	Influence of social smoking environments	25 (23.2%)
	Habitual smoking behavior	49 (45.4%)
	Decreased concentration or motivation	19 (17.6%)
	Other	2 (1.9%)
Psychological symptoms upon quitting*	Irritability/anger	56 (51.9%)
	Depression/unhappiness	36 (33.3%)
	Anxiety/worry	21 (19.4%)
	Sleep disturbances	23 (21.3%)
	Indecision/urge to resume smoking	61 (56.5%)
Reason for relapse*	Stressful events	42 (38.9%)
	Presence of smokers in social settings	48 (44.4%)
	Nicotine withdrawal symptoms	17 (15.7%)
	Weak determination to quit	30 (27.8%)
	Other	7 (6.5%)
Consideration of getting professional help		27 (25.0%)
FTND Score		Median 3.0 (IQR 1.0-6.0)
TAPDS Group	Mild dependence (25-41)	37 (21.9%)
	Moderate dependence (42-58)	100 (59.2%)
	Severe dependence (59-75)	32 (18.9%)
TAPDS Total Score		Mean±SD 49.4 ± 9.98

*:Multiple responses allowed
TAPDS, Test to Assess the Psychological Dependence on Smoking; FTND, Fagerström Test for Nicotine Dependence.

Table 2. Comparisons of age at smoking initiation and daily cigarette consumption by gender

Variable	Female (n=22) Median (IQR)	Male (n=147) Median (IQR)	p
Age at smoking initiation*	18.0 (17.0-20.0)	17.0 (16.0-19.0)	0.039
Number of cigarettes smoked per day*	10.0 (5.0-15.0)	15.0 (8.0-20.0)	0.015

*Mann-Whitney U Test

In the multiple linear regression model including number of cigarettes smoked per day, age at smoking initiation and FTND scores, only FTND score remained significantly associated with TAPDS score (B=1.668; p<0.001). Neither number of cigarettes per day nor age at smoking initiation were significantly associated with TAPDS score (Table 5).

Table 3. Associations between sociodemographic and smoking-related variables and dependence scores (TAPDS and FTND) among current-smoking medical students

		TAPDS Mean ± SD	p	FTND Median (IQR)	p
Gender	Female	48.18 ± 8.22	0.538*	2.0 (0.0-3.0)	**0.006****
	Male	49.59 ± 10.23		3.0 (1.0-6.0)	
Socioeconomic status	Low	57.0 ± 10.89[a]	**0.023****	5.0 (2.0-7.0)	0.318*****
	Middle	48.88 ± 9.97[b]		3.0 (1.0-6.0)	
	High	48.76 ± 9.46[b]		3.0 (1.0-6.0)	
Smoking Frequency	Daily	50.29 ± 9.76[a]	**0.030****	4.0 (1.0-6.0)[a]	**<0.001*****
	Several times per week	42.83 ± 7.71[b]		0.0 (0.0-1.0)[b]	
	Several times per month	44.60 ± 9.76[ab]		1.0 (0.0-2.0)[ab]	
	Only on special occasions	44.20 ± 15.24[ab]		0.0 (0.0-0.0)[b]	
Ever attempted to quit smoking	Yes	49.48 ± 9.13	0.900*	3.0 (1.0-6.0)	0.749****
	No	49.27 ± 11.40		3.0 (1.0-6.0)	
Number of quit attempts	1 time	48.07±7.80[ab]	**0.026****	2.0 (1.0-5.0)[ab]	**0.010*****
	2-3 times	52.1[7] ± 9.93[a]		4.0 (3.0-6.0)[a]	
	4 times or more	47.03 ± 8.25[b]		2.0 (1.0-4.0)[b]	
Consideration of getting professional help	Yes	50.96 ± 10.81	0.393*	4.0 (2.0-7.0)	**0.044****
	No	48.99 ± 8.52		3.0 (1.0-5.0)	
Intense cigarette cravings	Yes	52.16 ± 8.27	**<0.001***	4.0 (2.0-6.0)	**0.018****
	No	48.08 ± 9.31		3.0 (1.0-5.0)	
Sleep disturbances	Yes	55.30 ± 10.00	**0.027***	5.0 (3.0-7.0)	**0.019****
	No	47.91 ± 8.27		2.0 (1.0-5.0)	
Irritability/anger	Yes	52.09 ± 8.89	**0.002***	4.0 (2.0-6.0)	0.084****
	No	46.67 ± 8.62		2.0 (1.0-5.0)	

* Independent-Samples T Test, **One-Way ANOVA test, ***Mann-Whitney U Test, ****Kruskal-Wallis test.
The following variables are distinct: a and b
TAPDS, Test to Assess the Psychological Dependence on Smoking; FTND, Fagerström Test for Nicotine Dependence.

Table 4. Correlations between FTND and TAPDS scores, age at smoking initiation and number of cigarettes smoked per day among medical students

	TAPDS	Age at smoking initiation
Age at smoking initiation	-0.235 (p=0.002)	
FTND	0.459 (p<0.001)	-0.357 (p<0.001)
Number of cigarettes smoked per day	0.325 (p<0.001)	-0.285 (p<0.001)

Spearman correlation coefficients are presented.
TAPDS, Test to Assess the Psychological Dependence on Smoking; FTND, Fagerström Test for Nicotine Dependence.

Table 5. Multiple linear regression analysis of factors associated with TAPDS score

Predictor	B	SE	β	t	p
Age at smoking initiation	-0.318	0.282	-0.084	-1.131	0.260
Number of cigarettes smoked per day	-0.051	0.119	-0.047	-0.431	0.667
FTND	1.668	0.389	0.471	4.287	<0.001

Model summary: R=0.474; R^2=0.225; adjusted R^2=0.211; p<0.001. Note. B, unstandardized regression coefficient; SE, standard error; β, standardized regression coefficient; t, t-statistic; Dependent variable: TAPDS total score. Method: Enter. N=169.
TAPDS, Test to Assess the Psychological Dependence on Smoking; FTND, Fagerstrom Test for Nicotine Dependence.

Discussion

Tobacco addiction constitutes a significant public health issue due to its widespread prevalence and the largely preventable nature of its associated morbidity and mortality. Furthermore, nicotine dependence involves both neurobiological and psychosocial aspects that necessitate thorough examination. In this study involving medical students, we investigated the interaction between physical dependence, as assessed by the FTND, and psychological dependence, as measured by the TAPDS.

In our cohort of current-smoking medical students, male students initiated smoking at a significantly younger age (median 17.0 vs. 18.0 years) and reported higher daily cigarette consumption than their female counterparts. These gender-based disparities align with findings from other Turkish undergraduate samples[22,23]; however, one study found no significant differences between men and women[24], suggesting that such patterns may depend on cohort characteristics, measurement methods, or sociocultural context.

Male current-smoking medical students exhibited greater physical nicotine dependence, as indicated by higher FTND scores, than female students.[12,25] A study of first-year Turkish undergraduates reported that males displayed higher physical nicotine dependence, whereas psychological dependence did not differ by gender[15], this finding consistent with our results.

In our study, physical dependence (FTND score) did not vary significantly by socioeconomic status. In previous studies conducted among university students in Turkey and in patients applying to smoking cessation outpatient clinics, it was similarly observed that socioeconomic status did not affect physical dependence.[25,26] In a study conducted in a dental clinic in India in 2017 and in a study conducted in Pennsylvania in 2012, it was observed that dependence increased as socioeconomic level decreased.[27,28]

On the other hand, those who perceived their socioeconomic status as poor were found to be more psychologically dependent on cigarettes than other groups. In a study conducted in patients applying to a smoking cessation outpatient clinic, it was observed that socioeconomic status had no effect on both physical and psychological dependence.[29] The socioeconomic status of the students in our study did not affect their physical dependence, but it did affect their psychological dependence.

Daily smokers in our cohort exhibited markedly greater dependence than their less frequent-smoking peers. Specifically, those who smoked daily had higher physical dependence (FTND) and psychological dependence (TAPDS) scores, which may indicate a dose-response relationship between smoking frequency and addiction severity.[15] This pattern underscores that even modest reductions in smoking occasions may attenuate both the neurobiological and psychosocial drivers of tobacco dependence.

In a study conducted in patients who applied to a smoking cessation outpatient clinic, it was observed that the FTND scores of the patients were very high. In our study, the fact that the FTND scores of the students who considered getting professional help were higher than those who did not, shows that individuals with high addiction are more willing to get help to quit.[30] Previous research has linked prior quit attempts to both higher physical and psychological dependence levels[15]; however, we observed no such differences among our participants.

In the literature, health concerns are the main reason for wanting to quit smoking and trying to quit smoking.[15,31,32] In our study, it was observed that health concerns were the most common reason for the current smoking medical students

who tried to quit smoking, apart from their own determination. This underscores that health concerns motivate current smokers to attempt cessation.

A substantial proportion of students who attempted to quit attributed their relapse to exposure to smokers in their social networks.[33,34] In our cohort, the prevalence of smoking among family members and friends was 63.3% and 98.2%, respectively. These high rates highlight that social smoking environments are significant factors in both smoking initiation and relapse. This may underscore the influence of peer and family smoking cues on tobacco use behaviors and suggests that effective cessation programs include strategies to manage environmental triggers.

Habitual smoking behavior and coping with stress are at the top of the list of barriers to smoking cessation. In our study, these were the two main reasons for the difficulties experienced by students who tried to quit smoking. It was observed that most of the students did not receive professional help in quitting smoking, no matter how hard they tried. In addition, the fact that most of the students had moderate psychological dependence shows that psychological support is also necessary for smoking cessation.[34]

Another major reason for smoking cessation is excessive craving for cigarettes.[31,32] In our study, it was observed that students who had intense cravings for cigarettes while trying to quit smoking had higher physical and psychological addiction scores than those who did not. This suggests that the level of addiction increases the desire to smoke.

Starting smoking at an early age is a risk factor for physical dependence.[25,35] In our study, the median age of starting smoking was found to be 18 (16-19) and a significant correlation was found between age and both physical and psychological dependence levels. In a previous study conducted in Mexico, it was observed that psychological dependence increased as the age of starting decreased, and in a study conducted in 2015 among university students in Turkey, it was observed that physical dependence increased as the age of starting decreased.[36,37]

As the number of cigarettes smoked per day increases, the level of psychological addiction also increases.[23,38] In our study, a low correlation was found between the number of cigarettes smoked per day and the TAPDS score.

An increase in one form of addiction affects the other.[36,38] In our study, a positive correlation was observed between TAPDS and FTND scores. The results of a previous study conducted in Mexico in patients who applied to a smoking cessation outpatient clinic were similar to our study.[12]

The cross-sectional design of the study limits the ability to establish a causal relationship between smoking behaviors and dependence dimensions, highlighting the need for longitudinal studies. As the data were based on participants' self-reports, responses may have been subject to recall and social desirability bias. The single-institution sample restricts the generalizability of the findings to other medical schools; therefore, more comprehensive studies across diverse academic settings are recommended. Factors such as peer-group smoking behaviors and academic stress levels may also influence dependence, but these were not assessed in the present study. Appropriately addressing these limitations in future research will enhance the validity and applicability of the findings.

In conclusion, our findings indicate that physical and psychological nicotine dependence are interconnected among medical students. Daily smoking, male gender, and lower perceived socioeconomic status increase the severity of addiction. Social environment and stress coping are also important factors influencing relapse after cessation. These findings reveal the

multidimensional nature of nicotine dependence in future physicians and highlight the necessity of addressing both aspects of dependence concurrently. Preventive measures in the future should adopt a comprehensive approach that encompasses both dimensions of nicotine dependence.

Ethical approval

This study has been approved by the Non-Interventional Clinical Research Ethics Committee of İnönü University Faculty of Medicine (approval date: 14.01.2025, number: 2025/7073). Written informed consent was obtained from the participants.

Author contribution

Study conception and design: AA, OK; data collection: AA; analysis and interpretation of results: AA, OK, BA; draft manuscript preparation: AA, OK, BA. The author(s) reviewed the results and approved the final version of the article.

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Conflict of interest

The authors declare that there is no conflict of interest.

Etik kurul onayı

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