

Predictors of Smoking Behavior of First Year University Students: Questionnaire Survey

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Aim. To assess the prevalence of smoking and sociodemographic factors related to smoking behavior of first year university students in Adana, Turkey.

Methods. The sample was selected from two faculties (Faculty of Engineering and Architecture and Faculty of Agriculture) using the method of simple cluster sampling, representing the university student population. The students filled out an anonymous questionnaire comprising 17 questions related to their sociodemographic characteristics and smoking behavior. The response rate was 73.5% (471 out of 640 students).

Results. The prevalence of daily smoking among the first year students was 21.4%, with the predominance of men (25.0%) over women (12.9%). Most students (89.1%) had positive expectations about quitting smoking in the next 5 years ("I will quit smoking", "I will decrease the number of cigarettes I smoke", and "I will continue to be a non-smoker"). The smoking behavior was significantly related to student's sex ($p=0.026$, Pearson's chi-square test), mother's education ($p=0.029$, Pearson's chi-square test), number of failed grades ($p=0.011$, ANOVA), student's monthly income ($p<0.001$, Pearson's chi-square test), and having friends who smoke ($p<0.0001$, Pearson's chi-square test).

Conclusion. The main determinants of regular smoking behavior for university students in Turkey were male sex, low academic performance, having smoking friends, high level of income, and a mother with high education level. These findings call for making anti smoking policies more specific in regard to the targeted population.

Key words: *population characteristics; prevalence; questionnaire; smoking cessation; students*

It is estimated that 30-40% of the world adult population smoke; the situation is particularly alarming in adolescents (1). Each day, nearly 4,800 adolescents smoke their first cigarette; of these, nearly 2,000 will become regular smokers (2). It is estimated that at least 4.5 million adolescents in the United States of America (USA) are cigarette smokers. If current tobacco use patterns persist, an estimated 6.4 million children will die prematurely from a smoking-related disease. According to the 2001 national survey of the USA high school students, the overall prevalence of cigarette use was 28% (3). Over 20% of the 12th graders, 14% of 10th graders, and 7.4% of 8th graders smoke cigarettes daily (3).

Several studies defined different factors which affected the smoking behavior: genetic predisposition, demographic and psychosocial factors, tobacco policy, accessibility of cigarettes, society values regarding tobacco smoking, role models, and academic performance (4-8). Tobacco smoking is an important public health problem in Turkey (9). In 1988, a study comprising the whole Turkish population found that the prevalence of smoking was 44.5% in inhabitants over 15 years of age, with a much higher percentage

of men among smokers (62.8% men vs 24.0% women) (10).

The aim of this study was to define the predictors of smoking behavior among university students in Turkey. We expected to find more smokers among young men than women, students with friends and family members who smoke, and those whose parents have a low education level and/or high income.

Subjects and Methods

Sample

Our population was the whole first year student population of the Cukurova University, Adana, Turkey. The sample size was calculated from the total population of first year students ($n=2,882$). With the maximum acceptable difference set at 5%, design effect at 2, 10 clusters, estimated true rate of 25%, and a 95% confidence interval, the required sample size was 481 students (11).

There are ten faculties at the Cukurova University. Some of them comprise several orientation departments for students to choose among (such as the Faculty of Agriculture with 10 orientation departments or Faculty of Art and Science with 8) whereas others, such as the Faculty of Medicine, have no orientations departments but have a large student body. Because of this, we decided to employ the one stage cluster sampling method. The Faculty of Engineering and Architecture and Faculty of Agriculture were randomly selected from all faculties. Then we randomly excluded two departments from the Faculty of Agriculture from the

study in order to include an approximately equal number of students from both faculties (12). In 1998, there were 302 first year students at the Faculty of Engineering and Architecture and 338 first year students at the Faculty of Agriculture. Out of the targeted 640 students, 471 accepted to participate in the study (73.5%). Of these 471 students, 256 (70.1%) were men and 185 (29.9%) women.

Questionnaire

The questionnaire comprised 17 questions, some open ended and some multiple choice, aimed at collecting the data on the examinees' sociodemographic characteristics and their smoking behavior. The following data was collected pertaining to each student: sex, name of the faculty, place of family residence, number of failed years in elementary and high school, parents' occupation, parents' education level, smoking behavior of the student, his or her family members, and closest three friends, student's expectations on changes of his or her own smoking behavior in the next 5 years, and mean monthly income. Each student's smoking status was classified according to the World Health Organization criteria (13): daily smoker, defined as anyone who at the time of the survey smokes some kind of a tobacco product at least once a day; occasional smoker – anyone who smokes, but less than once a day; former smoker – anyone who smoked daily for at least 6 months, but did not smoke at the time of survey; never-smoker – anyone who has never smoked. The questionnaires were administered by the study coordinator, who asked the students to respond freely and truthfully to each question. The assurance of anonymity was provided, and the consent was obtained from the Ethic Committee of Cukurova University Faculty of Medicine before the survey was conducted.

Statistics

The data were analyzed using SPSS for Windows version 9.05 (SPSS Inc, Chicago, IL, USA). Pearson's chi-square, ANOVA, and regression analyses were used, with significance set at $p < 0.05$. When ANOVA was significant, post hoc Bonferroni multiple comparisons were used.

Results

The mean age of the first year students in our sample was 20.0 ± 1.7 (19.8 ± 1.5), which does not significantly differ from the mean age of the whole studied population (campus records). The mean age was lower at the Faculty of Engineering and Architecture than at the Faculty of Agriculture (19.4 ± 1.3 vs 20.1 ± 1.5 , respectively; $p < 0.01$, ANOVA).

Univariate Analysis

The 4 students who did not report the data on their sex and smoking behavior in the questionnaire

Table 1. Smoking behavior of the first year students in regard to sex, Cukurova University, Adana, Turkey

Sex*	Smoking status (No, % [†] of students)				Total (No, % [‡])
	daily smoker	occasional smoker	former smoker	non smoker	
Men	82 (25.0)	52 (15.9)	20 (6.1)	174 (53.0)	328 (70.2)
Women	18 (12.9)	30 (21.6)	8 (5.8)	83 (59.7)	139 (29.8)
Total	100 (21.4)	82 (17.6)	28 (6.0)	257 (55.0)	467 (100.0)

*Pearson's chi-square = 9.25, df = 3, $p = 0.026$.

[†]Row percentage.

[‡]Column percentage.

form were exempt from the analysis. Of the 467 respondents who remained for the analysis, 100 (21.4%) smoked daily, 82 (17.6%) were occasional smokers, 28 (6%) were former smokers, and 257 (55%) were non-smokers (Table 1). A quarter of male students ($n = 82$, 25.0%) were regular smokers. Among female students, 18 (12.9%) smoked regularly, and this was significantly less than among the male students (chi-square = 9.25, $df = 3$, $p = 0.026$; Table 1).

Most students (89.1%) had positive expectations about their smoking behavior in the following five years. Those who were smokers believed that they would quit smoking or decrease the number of cigarettes, and the non-smokers believed that they would continue to be non-smokers (chi-square = 54.169, $df = 3$, $p < 0.0001$; Table 2).

The number of failed years during the elementary and high school education was collected as an indicator of each student's academic performance and was analyzed against his or her smoking behavior. Students who were daily smokers had significantly more years lost in elementary and high school education than their non-smoking colleagues (Table 3).

Our students lived either at home with their families (50%), in dormitories (33.3%), or shared an apartment with their friends (16.7%). There was no significant difference among these 3 groups of students in regard to regular tobacco smoking regularly (20.4%, 22.7%, and 22.4%, respectively; $p > 0.05$, Pearson's chi-square test).

Table 3. The number of failed years during elementary and high school and smoking behavior of students

Smoking behavior	No. of failed years (mean \pm SD)
Daily smoker ($n = 97$)	1.15 \pm 1.40*
Occasional smoker ($n = 78$)	0.76 \pm 1.12
Former smoker ($n = 27$)	0.78 \pm 1.27
Non smoker ($n = 235$)	0.69 \pm 1.08
Total ($n = 437$)	0.81 \pm 1.18

*Statistically significant difference vs non-smokers; $p = 0.011$, ANOVA and $p = 0.006$, Bonferroni post-hoc multiple comparison test.

Only 5.1% of the students whose best friends were non-smokers were themselves regular smokers, whereas 49.3% of those whose all three best friends smoked were also regular smokers. At the same time, 85.7% of students whose best friends were non-smokers were non-smokers as well. The correlation between the smoking behavior of friends and smoking behavior of the student was statistically significant (chi-square = 84.870, $df = 9$, $p < 0.001$; Table 4). There was no statistically significant correlation between the smoking behavior of family members and smoking behavior of the student ($p > 0.05$, Pearson's chi-square).

Table 2. Expectations about smoking behavior in the next 5 years and smoking behavior of students

Expectations about smoking in the next 5 years*	Smoking status (No, % [†] of students)				Total (No, % [‡])
	daily smokers	occasional smokers	former smokers	non smokers	
Positive	89 (87.3)	53 (67.1)	24 (88.9)	249 (60.0)	415 (89.1)
Negative	13 (12.7)	26 (32.9)	3 (11.1)	9 (40.0)	51 (10.9)
Total	102 (21.9)	79 (17.0)	27 (5.8)	258 (55.4)	466 (100.0)

*Pearson's chi-square = 54.169, $df = 3$, $p < 0.0001$.

[†]Row percentage.

[‡]Column percentage.

Table 4. Smoking behavior of students and their 3 closest friends

Smoking behavior of the 3 closest friends*	Smoking status (No, % [†] of students)				Total (No, % [‡])
	daily smoker	occasional smoker	former smoker	non smoker	
None of the friends smoke	5 (5.1)	8 (8.2)	1 (1.0)	84 (85.7)	98 (21.0)
One friend smokes	15 (12.1)	31 (25.0)	11 (8.9)	67 (54.0)	124 (26.6)
Two friends smoke	48 (27.1)	32 (18.1)	12 (6.8)	85 (48.0)	177 (38.0)
All three friends smoke	33 (49.3)	10 (14.9)	4 (6.0)	20 (29.9)	67 (14.4)
Total	101 (21.7)	81 (17.4)	28 (6.0)	256 (54.9)	466 (100.0)

*Pearson's chi-square=84.870, df=9, p<0.001.

[†]Row percentage.

[‡]Column percentage.

The rate of students who smoked regularly was the highest in the group with the highest family income (36.8%) and lowest in the group with the lowest income (14.2%). There was a correlation between the monthly income and smoking behavior of the student ($p < 0.001$, Pearson's chi-square test).

The smoking rate among the students whose mothers had less than five years of education was 15.3%, whereas the smoking rate among the students whose mothers had 12 and more years of education was 37.5%. More than half (59.4%) non-smoking students had mothers with only elementary education (5–8 years). There was a correlation between the mother's education level and smoking behavior of the student ($p = 0.029$, Pearson's chi-square test). At the same time, fathers' education level correlated with the prevalence of the regular smokers among the students. The percentage of regular smokers was the lowest (9.5%) among the students whose fathers had the lowest education level. However, there was no correlation between the father's education level and student's smoking behavior ($p > 0.05$, Pearson's chi-square).

Multivariate Analysis

Using the binary logistic regression analysis, we tested for possible predictors of students' smoking behavior among the following variables: sex, smoking of the mother, father, and siblings, mother's and father's education, student's place of living, and expectations of own smoking behavior in the next 5 years. We found a correlation between the smoking behavior of the students and smoking behavior of their siblings. If their siblings smoked, the chances of our students smoking increased ($p = 0.029$, odds ratio=1.773). There was also a significant correlation between the student's current smoking behavior and his or her expectations about their smoking behavior during the following 5 years. Students with negative expectations were more often regular smokers than students with positive expectations ($p < 0.001$, odds ratio=5.592). Thus, the smoking behavior of the siblings and student's expectations about their smoking during the following 5 years were the most important predictors of our students' smoking behavior.

Discussion

We found that the predictors of smoking regularly were male sex, lower academic performance, smoking of the closest friends, higher monthly income, and highly educated mothers. This contradicts the study recently conducted in Massachusetts, which showed that parents with lower income and educa-

tion level were more likely to have teenage children who smoked than the higher-paid, better-educated parents (14). Each step down the parents' education ladder meant a 28% increase in the risk of their adolescent child smoking (14). Therefore, it is difficult to explain our results. We suspect that they may be a consequence of a higher tolerance level of highly educated mothers, this perhaps being the consequence of the fact that these mothers work longer hours and possibly feel guilty of not spending enough time with their children. The latter fact itself might also be a part of the reason for the smoking behavior of their children. A more detailed and focused investigation into this phenomenon may be helpful.

The reported prevalence of daily smoking among the non-medical first year university students in Turkey was 21.0% (11.8% among the young women and 26.4% among men) (15), which is in concordance with our results, indicating that the prevalence remained unchanged after 4 years. A slight decrease in the prevalence of smoking among men and a slight increase among women are congruent with the internationally reported trends (16). Since the onset of public anti-smoking media campaign and banning of smoking in public places in 1994, the prevalence of smoking among the adults decreased, unlike the prevalence of smoking among the adolescents, which did not show a decreasing trend.

The literature data show that the proportion of adolescents who smoke increases with age (17,18). Also, adolescents who start to smoke early are more likely to continue smoking as adults (19). However, we could not find a significant correlation between the age and smoking behavior, probably because the age range our study sample comprised was too narrow to show a significant variation with respect to the pattern of smoking behavior.

The initiation to smoking is more likely to happen if an adolescent has friends who smoke, particularly if the best friend smokes (19). Our study confirmed this finding. Peer and sibling attitudes toward smoking are associated with smoking of the adolescent (6,19-22), and we found a direct correlation between the number of smoking friends and the "smoking status" of a student, as well as between the number of non-smoking friends and the "non-smoking status" of a student.

Although many studies showed a significant correlation between the adolescent's smoking behavior and the smoking behavior of his or her family members (23-25), we could not prove this in our study. Our study also confirmed the previously reported cor-

relation between the monthly income in the student's family and his or her smoking behavior (25). Also, it has been known that smokers often do not perform well at school (19), and our results confirmed the correlation between the academic performance and smoking behavior.

The main limitation of our study is the truthfulness of the data collected by the questionnaire method. Also, since our sample was representative of only university students, consisting of mostly male and urban adolescents, the results unfortunately could not be generalizable to all Turkish adolescents. Further studies need to be conducted for a reliable assessment of predictors of smoking behavior.

In conclusion, the main determinants of regular smoking among the university students were male sex, low academic performance, having friends who smoke, high level of family income, and high education level of the mother. This calls for the implementation of sex and age specific anti-smoking policies. By assessing the sociodemographic variations in smoking behavior, we can better target programs and policies aimed to reduce smoking rates among the adolescents. Further studies should be planned and conducted to further understand the smoking behavior of the young people in Turkey. There is also a need for training programs for health professionals and educational campaigns for opinion leaders, teachers, and the public.

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