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Prevalence, Patterns, and Socio-Demographic Correlates of Nicotine Use in a Sample of Iranian University Students

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ABSTRACT

Background: Diagnosis of nicotine dependence is a common psychiatric disorder. Use of tobacco products, particularly cigarette smoking, is the most widespread form of nicotine use.

Objectives: To determine the prevalence of cigarette, water-pipe, and oral tobacco use among students at Ferdowsi University in Iran and to evaluate the associations between socio-demographic characteristics and nicotine use.

Patients and Methods: A cross-sectional survey of 1565 students was conducted in December 2009 at Ferdowsi University of Mashhad in Iran. The survey included questions from the substance use section of the Youth Risk Behavior Survey questionnaire. Three manners of prevalent nicotine use were evaluated: cigarette, water-pipe and oral tobacco use. Data were analyzed using χ^2 tests and logistic regression analysis.

Results: For cigarette use, 17.6% of respondents reported using cigarettes at least once, 3.7% reported using cigarettes occasionally, and 3.9% reported using cigarettes on a regular basis. For water-pipe use, the corresponding percentages were 30.5%, 6.4%, and 4.3%, respectively. Men were more likely than women to report using nicotine at least once (odds ratio 5.46; 95% confidence interval, 3.9-7.60) or regularly (odds ratio 11.267; 95% confidence interval, 6.64 - 19.11). The odds of having used nicotine at least once were higher in students with poor academic performance, very good family income, and a history of cigarette smoking by family members.

Conclusions: The prevalence of nicotine use among Ferdowsi University students is lower than the prevalence in the general population of Iran and the prevalence in other countries.

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► Implication for health policy/practice/research/medical education:

The major population who would be benefited from this research are people who work in research centers and researchers, medical educators and it also would help to improve the health policy.

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1. Background.

The diagnosis of nicotine dependence is the most prevalent psychiatric disorder. Tobacco is the most common form of nicotine and smoking is the most common

form of tobacco use (1). In the world, one billion men and 250 million women, aged 15 and older, smoke tobacco and approximately 3 million people per year die from the health effects of smoking (2). Today, 51% of people in the United States (U.S.) currently smoke, 25% are former smokers, and 24% have never smoked. On average, people in the U.S. begin smoking at age 16, with fewer people beginning after the age of 20. According to the Center for Disease Control (CDC), approximately 20% of adults, 23% of high school students, and 8% of middle school stu-

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dents in the U.S. currently smoke (3). Studies in the U.S. have shown that approximately 30% of college students report smoking in the past 30 days, and 40% had smoked in the past year (4). Level of education correlates with tobacco use. Thirty-seven percent of those who did not finish high school smoke compared to only 17% of university graduates. Although cigarette use is decreasing in the U.S., cigarette use is on the rise in developing countries (1). Some studies have shown that the increase in water-pipe use has the potential to become a major public health problem in many parts of the world, particularly in the Eastern Mediterranean Region (EMR), a region which includes Iran (5, 6). Preliminary evidence on the health effects of water-pipe use and smoking links them closely to respiratory disease, cardiovascular disease, and cancer (7, 8). Researchers in Iran have studied the prevalence of substance use and substance-related disorders among students and have reported that nicotine is the most prevalent substance used. Fifteen to thirty percent of students reported that they have used nicotine once or more during their lifetime, while 10% to 15% reported using it occasionally, and 3% to 10% reported nicotine dependence (9-13). In a public sample in Iran, 14.6% of 15-69 years old smoke cigarettes regularly (14). Studies also report that nicotine use is higher in men than women. However, these studies have not considered the patterns of nicotine use and demographic variables as correlates of nicotine use or dependence. This paper reviews the epidemiology of water-pipe, cigarette, and oral tobacco use among Iranian university students and evaluates sociodemographic variables that correlate with nicotine use in this population.

2. Objectives

To determine the prevalence of cigarette, water-pipe, and oral tobacco use among Ferdowsi University students in Iran and to evaluate the association between sociodemographic characteristics and nicotine use.

3. Patients and Methods

Ferdowsi University of Mashhad is the main university in the east of Iran. Students were selected using stratified sampling. One thousand and eight hundred students were selected by gender, academic level, and faculty, and a total of 1565 students responded to the questionnaire (a response rate of 87%). As shown in *Table 1*, the sample includes more female respondents (54.2%) than male respondents (45.8%). The academic level of the respondents included undergraduate (71%), Master's degree (19.7%), and PhD students (9.1%). Students of human sciences comprised 42.7% of the sample followed by engineering (24%), science (18.8%), and agriculture (14%). The sociodemographic variables of the sample are also shown in *Table 1*.

3.1. Assessment

Three manners of nicotine use were evaluated (ciga-

rette, water-pipe and oral tobacco use) using questions from the substance use section of the Youth Risk Behavior Survey questionnaire (15). The following questions were used: A) Ever used (cigarette, water-pipe and oral tobacco) with answer choices of "yes" or "no"; B) Used (cigarette, water-pipe and oral tobacco) during the past 12 months with answer choices of yes or no, and; C) Used (cigarette, water-pipe and oral tobacco) during the previous month with answer choices of no, 1-5 days, 6-19 days and 20 or more days. For each of these manners of nicotine use, the age at first use was queried. Demographic data were determined with questions about gender, marital status, age, race, occupational status, domestic status, faculty, academic level, academic performance, residence status, paternal education level, maternal education level, family income, and history of nicotine and substance use by family members.

3.2. Statistical Analysis

Prevalence rates for nicotine use (cigarette, water-pipe and oral tobacco use) were computed using SPSS software 18.00) First, univariate analysis was performed to investigate the association between demographic and background variables with nicotine use. The relationship between nicotine use and gender, marital status, age, race, vocational status, domestic status, faculty, academic level, academic performance, residence status, paternal education level, maternal education level, family income, history of nicotine and substance use by family members as computed using χ^2 tests. Next, the associations that were significant in the univariate analysis were analyzed using logistic regression models. The dependent variables in the logistic regression were lifetime nicotine use (ever used) and recent nicotine use (used within the past month).

4. Results

4.1. Prevalence of Nicotine Use

Overall, approximately one-third (32.33%) of all subjects reported using nicotine at least once during their lifetime (*Table 1*). The prevalence of nicotine use among men was more than 3 times the prevalence among women (52.8% vs. 15.2%, $P < 0.001$). Differences in the prevalence of nicotine use by age group, family income, occupational status, educational level, residency, faculty, academic level, academic performance, paternal and maternal education level, history of nicotine and substance use by family members were statistically significant (*Table 1*). Specifically, nicotine use was higher among students aged 23-26 or 26 years and older, students with very good family income, students who were employed part-time or full-time, students who lived at home alone or with friends, students who were in agriculture or engineering faculty, Master's degree or PhD students, students with average or poor academic performance, students with illiterate fathers or mothers, and students with a history of substance use by family members. The prevalence and

Table 1. Prevalence (%) of Nicotine Use for Lifetime Use (One or More Times) by Sociodemographic Variables

	Sample, No. (%)	Used, No. (%)	95%CI	k value
Gender				251.3 ^a
Male	716 (45.8)	378 (52.8)	49.3-56.3	
Female	847 (54.2)	128 (15.2)	12.8-17.6	
Not stated	2 (0.1)	-	-	
Marital status				N.S ^c
Single	1287 (82.3)	422 (32.8)	30.3-36.3	
Married	272 (17.4)	81 (29.7)	24.3-35.1	
Divorced, separated or widowed	4 (0.3)	3 (75)	-	
Not stated	2 (0.1)	-	-	
Age groups				68.4 ^a
< 20	569 (36.4)	119 (20.933)	17.6-23.3	
20-23	586 (37.4)	200 (4.1)	30.3-37.9	
23-26	261 (16.7)	123 (47.1)	41-53.2	
> 26	139 (8.9)	60 (43.1)	34.9-51.3	
Not stated	10 (0.6)	-	-	
Residential area				N.S ^b
Domestic	916(58.4)	283 (30.9)	27.9-33.9	
Not domestic	622(39.7)	213 (34.2)	30.5-37.9	
Not stated	27(1.7)	-	-	
Race				N.S ^b
Persian	1340(85.6)	436 (32.533)	30-35	
Turkish	84(5.4)	31 (6.9)	26.9-46.9	
Kurdish	48(3.1)	17 (35.4)	21.8-48.9	
Other	64(4.1)	19 (29.6.)	18.5-40.7	
Not stated	29(1.9)	-	-	
Family income				19.1 ^a
Poor	438 (28)	122 (27.8)	23.6-32	
Average	422 (27)	133 (31.5)	27.1-35.9	
Good	331 (21.2)	96 (29)	24.1-33.9	
Very good	339 (21.7)	141 (41.5)	36.3-46.7	
Not stated	35 (2.2)	-	-	
Occupational status				70.7 ^a
Unemployed	1185 (75.7)	318 (26.8)	24.3-29.3	
Part-time	301 (19.2)	147 (48.8)	43.2-54.4	
Employed	55 (3.5)	32 (58.1)	45.1-71.1	
Not stated	24(1.5)	-	-	
Residency				46.7 ^a
At home with family	889 (56.8)	276 (31)	28-34	
At home with friends	57 (3.6)	28 (49.1)	36.1-62.1	
At home alone	30 (1.9)	23 (76.6)	61.5-91.7	
In student dormitory	454 (29)	122 (26.8)	22.7-30.9	
Other	123 (7.9)	52 (42.2)	33.5-50.9	
Not stated	12 (0.8)	-	-	
Faculty				65.3 ^a
Human sciences	662(42.7)	167 (25.2)	21.9-28.5	
Sciences	294(18.8)	72 (24.5)	19.6-29.4	
Agriculture	219(14)	93 (42.5)	36-49	
Engineering	375(24)	171 (45.6)	40.6-50.6	
Not stated	8(0.5)	-	-	
Academic level				49.9 ^a
Undergraduates	1111 (71)	303 (27.2)	24.6-29.8	
Master's	309(19.7)	130 (42.1)	36.8-47.4	
PhD students	142(9.1)	73 (51.4)	43.2-59.6	
Not stated	3(0.2)	-	-	
Academic performance				65.4 ^a
Very good	433(27.7)	115 (26.5)	22.4-30.6	
Good	674 (43.1)	184 (27.3)	23.9-30.7	
Average	321 (20.5)	141 (43.9)	38.5-49.3	
Poor	73 (4.7)	46 (63)	52-74	
Not stated	64 (4.1)	-	-	

Paternal (father) education				12.1 ^c
Illiterate	171 (10.9)	69 (40.3)	34-47.6	
Primary school	187 (11.9)	44 (23.5)	17.4-29.6	
Guidance school	166 (10.6)	50 (30.1)	23.1-37.1	
High school	386 (24.7)	127 (32.9)	28.3-37.5	
University	625 (39.9)	204 (32.6)	28.9-36.3	
Not stated	30 (1.9)	-	-	
Maternal (mother) education				12.7 ^c
Illiterate	213 (13.6)	83 (38.9)	32.4-45.4	
Primary school	305 (19.5)	76 (24.9)	20.1-29.7	
Guidance school	227 (14.5)	70 (30.8)	24.8-36.8	
High school	431 (27.5)	144 (33.4)	28.9-37.8	
University	372 (23.8)	125 (33.6)	28.8-38.4	
Not stated	17 (1.1)	-	-	
Smoking in family				43 ^a
No one	1255 (80.2)	370 (29.4)	26.9-31.9	
Father and/or mother	238 (15.2)	89 (37.3)	31.2-43.4	
Brother and/or sister or with parents	68 (4.2)	45 (66.1)	54.9-77.3	
Not stated	4 (0.3)	-	-	
No one				
Substance use in family				35.1 ^a
No one	1481 (94.6)	455 (30.7)	28.4-33	
Father and/or mother	45 (2.9)	25 (55.5)	41-70	
Brother and/or sister or with parents	23 (1.5)	18 (78.2)	61.3-95.1	
No one	14 (0.9)	-	-	
Not stated				
Total	1565 (100)	506 (32.33)	30.01-34.65	

^a $P < 0.001$ ^b Abbreviation: N. S, Non-Significant^c $P < 0.05$, (n = 1565)

manner of nicotine use in the past month and past year and are shown in Table 2. Water-pipe and cigarette smoking were the most common forms of nicotine use. The prevalence of lifetime water-pipe use was approximately 2 times greater than that for cigarette use. A small group of students (6.4% of the total sample) reported using water-pipes occasionally (1-5 days in the past month) while only 3.7% of the total sample reported using cigarettes occasionally (1-5 days in the past month). Regular water-pipe or cigarette users (defined as 5-19 and ≥ 20 days in the past month) comprised 4.3% and 3.9% of the sample, respectively. The mean ages of first use for cigarette, water-pipe, and oral tobacco use were 18.3 ± 3.4 , 18 ± 3.01 and 20.5 ± 3 years, respectively.

4.2. Sociodemographic Variables Analysis

The results of the logistic regression analysis are shown in Table 3. Compared to women (the reference gender), the odds of lifetime nicotine use were nearly 5.5 times higher in men [odds ratio (OR) 5.46; 95% confidence interval (CI), 3.92-7.60]. Compared to students with very good family income, students with poor (OR 0.54; 95% CI, 0.36-0.81), average (OR 0.55; 95% CI, 0.37-0.82), or good family incomes (OR 0.56; 95% CI, 0.35-0.89) had lower odds of nicotine use. The odds of lifetime nicotine use were nearly 1.8 times higher in engineering faculty students than human science students (OR 1.83; 95% CI, 1.21-2.78). Further, Master's degree and undergraduate stu-

dents had lower odds of lifetime nicotine use than PhD students, as did those students with poor academic performance. The odds of lifetime nicotine use in students who had at least 1 parent with a history of cigarette use were lower than for students with at least 1 sibling with a history of cigarette use. Other factors affecting odds of lifetime nicotine use included residency. The results of the logistic regression analysis for regular nicotine use in the previous month are shown in Table 3. Men were about 11 times more likely than women to be regular nicotine users (OR 11.267; 95% CI, 6.640-19.11). Students with poor family income, poor academic performance, and history of smoking among parents had lower odds of regular nicotine use.

5. Discussion

According to the findings in this study, 32.33% of Ferdowsi University students have used nicotine at some point during their lifetime (52.8% of men and 15.2% of women). Approximately 3.9% reported using cigarettes on a regular basis and 4.3% reported using a water-pipe on a regular basis. These results show that nicotine use among Iranian students is lower than in the U.S. and Turkey, Iran's European neighbor (4, 16-20). Although smoking among Iranian male students is similar to that of the U.S and Turkey, the prevalence of smoking amongst Iranian female students is lower than in those countries. This difference may be the result of cultural and reli-

Table 2. The Prevalence of Water Pipe, Cigarette and Oral Tobacco Use in the Previous Year and Last Month

	No, No.	Yes, No. (%)	95%CI
Ever Used (Lifetime Use)			
Water-pipe			
Male	358	359 (50.06)	46.4-53.7
Female	815	133 (14.03)	11.7-16.3
Total	1078	487 (30.54)	28.2-32.8
Cigarette			
Male	490	227 (31.6)	28.2-35
Female	799	49 (5.8)	4.2-7.4
Total	1289	276 (17.6)	15.7-19.5
Oral tobacco			
Male	697	20 (2.8)	1.6-4
Female	846	2 (0.23)	0.07-0.39
Total	1543	22 (1.4)	0.8-2
Used in the Past Year			
Water-pipe			
Male	122	241(66.4)	63-75
Female	51	69 (57.5)	32.2-59.8
Total	173	310 (64.2)	59.2-70.4
Cigarette			
Male	70	156 (69)	14-56
Female	27	23 (46)	18.4-58.8
Total	97	179 (64.8)	63-75
Oral tobacco			
Male	13	7 (35)	32.2-59.8
Female	0	1 (1)	59.2-70.4
Total	13	8 (38.1)	14-56
Used Within the Last Month			
Water-pipe			
Male	215	84 (23.4)	34 (9.4)
Female	96	16 (13.3)	5 (.2)
Total	311	100 (20.5)	39 (8.1)
Cigarette			
Male	110	56 (24.7)	51 (23.1)
Female	45	4 (8)	0 (0)
Total	155	59 (21.4)	51 (18.5)
Oral tobacco			
Male	15	4 (20)	1 (5)
Female	1	0 (0)	0 (0)
Total	16	4 (19)	1 (4.7)

gious differences. Smoking is not approved of for women in Iran and this factor could be the reason for the lower rate of nicotine use in female students. The majority of tobacco users are cigarette smokers (16-20); however, this study shows that water-pipes were used more frequently among Iranian students. Compared to a public sample in Iran (14), fewer students were regular cigarette smokers. According to Johnston *et al.*, smoking rates among young adults who do not attend college are higher than smoking rates among college students (18). Iranian students in the current sample tended to be occasional nicotine

users rather than regular users, which may be because college student smokers are more likely to be non-daily smokers, meaning that they smoke more in social situations when compared to their non-college peers (21, 22).

The average age of first nicotine use agrees with studies in Iran and other countries (20, 23, 24). Prevalence of cigarette use in male students is approximately 3 times higher than in female students (9-13). According to these results, male students appear to be at higher risk of substance use than female students. Students with a very good family income have higher odds of lifetime and regular nicotine use. This finding is similar to Tot *et al.* (2004) (25) who reported that among Turkish adolescents, higher family socioeconomic status increased the likelihood of smoking and alcohol use, possibly because this group had the necessary funds to access these substances. Engineering students had high odds of lifetime nicotine use compared with human science students, a finding that disagrees with Metintash *et al.* (1998) (19). This may be attributed to the fact that the engineering faculty gender distribution is 3 to 1 (3 men for every 1 woman). Previous studies have shown that high education level is associated with lower odds of substance and cigarette smoking, except for alcohol use (1). In this study, PhD students had higher odds of lifetime nicotine use, but there was no correlation with regular nicotine use. This may be due to gender distribution (80% of PhD students are male), educational and entrance exam stressors at each level, and the competition to enter the university. Studies suggest that smokers smoke more during stressful situations or in situations involving negative mood (20), but this does not predict later regular nicotine use. Subjects who reported poor academic performance had higher lifetime and regular nicotine use rates, as has been reported previously in adolescents (25, 26). Thirty-four percent of all cigarette smokers in the U.S. have both a psychiatric disorder and are nicotine dependent, emphasizing the relevance of the comorbidity of nicotine dependence with other psychiatric disorders (27) and their possible detrimental effect on academic performance. Higher rates of smoking occur among students whose parents smoke compared to those whose parents do not smoke. Students who live with their families or in a dormitory were less likely to smoke compared to students who live with their friends or alone (19, 20, 25). Parental smoking behavior appears to be an important factor in the smoking behavior of university students. The prevalence of smoking was higher among students who had at least 2 family members who were smokers. The smoking behavior of fathers and siblings was found to be related to the prevalence of student smoking (19). The most important predictors of nicotine use were gender, very good family income, poor academic performance, and cigarette use by family members.

Table 3. Logistic Regression Analysis of Significant Variables Related to Lifetime and Regular Nicotine Use

	Lifetime Nicotine Use				Regular Nicotine Use in the Last Month			
	β	Standard Error	P value	Odds Ratio (95% CI)	β	Standard Error	P value	Odds Ratio (95% CI)
Gender								
Male	1.7	0.16	0.000	5.46 (3.9-7.60)	2.42	0.270	0.000	11.267 (6.64-19.11)
Female	1	-	-	-	1	-	-	-
Family income								
Poor	-0.61	0.21	0.003	0.54 (0.36-0.81)	-0.67	0.308	0.030	0.511 (0.28-0.93)
Average	-0.59	0.20	0.004	0.55 (0.37-0.82)	-0.54	0.272	0.047	0.583 (0.34-0.99)
Good	-0.58	0.24	0.016	0.56 (0.35-0.89)	-0.90	0.277	0.001	0.404 (0.23-0.93)
Very good	1	-	-	-	1	-	-	-
Faculty								
Agriculture	0.21	0.23	0.345	1.24 (0.79-1.94)				
Science	0.17	0.23	0.442	1.195 (0.75-1.88)				
Engineering	0.61	0.21	0.004	1.83 (1.21-2.78)				
Human science	1	-	-	-				
Academic level								
Undergraduates	-1.02	0.32	0.001	0.36 (0.19-0.67)				
Master's	-0.57	0.30	0.055	0.56 (0.31-1.01)				
PhD students	1	-	-	-				
Academic performance								
Poor	-1.61	0.34	0.000	0.199 (0.10-0.38)	-1.80	0.407	0.000	0.165 (0.07-0.38)
Average	-1.36	0.32	0.000	0.256 (0.13-0.48)	-1.37	0.362	0.000	0.254 (0.12-0.51)
Good	-0.56	0.32	0.081	0.572 (0.30-1.07)	-0.40	0.344	0.237	0.666 (0.34-1.30)
Very good	1	-	-	-	1	-	-	-
Cigarette Use in family								
No one	-1.29	0.34	0.000	0.274 (0.14-0.53)	-1.81	0.372	0.000	0.162 (0.078-0.33)
Father and/or mother	-1.23	0.37	0.001	0.292 (0.14-0.61)	-1.56	0.430	0.000	0.208 (0.090-0.48)
Brother and/or sister	1	-	-	-	1	-	-	-
Alone or with parents								
Residency								
At home with family	-1.09	0.32	0.001	0.335 (0.17-0.63)				
In student dormitory	-1.62	0.44	0.000	0.197 (0.08-0.47)				
At home alone	1.02	0.65	0.115	2.789 (0.78-9.97)				
At home with friends	-0.42	0.31	0.172	0.654 (0.35-1.20)				
Other	1	-	-	-				

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Authors' Contribution

Study design: BGH, MRA; data analysis: MVY, MRA; manuscript preparation and literature review: BGH, OS.

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