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Original Article

Prevalence of Cigarette Smoking and Associated Risk Factors among Adolescents in Hamadan City, West of Iran In 2010

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ABSTRACT

Background: Most people start smoking during teenage years. There is an increasing trend in the prevalence of cigarette smoking among children and adolescents in recent years. The aim of the present study was to investigate the prevalence of cigarette smoking and associated risk factors among high-school students.

Methods: This cross-sectional study was conducted in January 2010 in Hamadan City, west of Iran. A random sample of 1161 high-school students was enrolled voluntarily. The data collection tool was a self-administered questionnaire including demographic characteristics as well as questions about knowledge and attitude toward cigarette smoking. Stata version 11 (StataCorp, College Station, TX, USA) was employed for data analysis.

Results: The prevalence of cigarette smoking was 10.2% (95% CI: 8.4%, 11.9%; SD=0.30) with an increasing trend toward older ages. Of the 118 smokers, 70% were boys, 93% were 15-20 years old, 80% had experienced smoking before age of 15 yr, 80.3% used less than five cigarettes per day, and 39% started smoking out of curiosity. Students' mean scores of knowledge and attitude toward smoking were 53% and 74%, respectively. Odds ratio estimate of becoming a smoker was 4.44 for those who lived with people other than their parents, 5.68 for those who had siblings who smoke, 10.74 for those who had friends who smoke, 12.56 for those who were frequently offered cigarettes by their friends.

Conclusion: The current study revealed the effect of several social variables on adolescents' smoking status. The results of our study thus provide information on possible areas of intervention, which should be the focus of special attention by policymakers when planning tobacco control preventive programs among adolescents and young adults.

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Introduction

igarette smoking is one of the common leading causes of preventable deaths. It is estimated that more than 5 million deaths per year occur due to cigarette smoking worldwide. Most of these deaths occur in low- and middle-income countries¹. Data shows that most people start smoking before the age of 18 yr. In Iran, 66.7% of the current smokers have experimented their first cigarette smoking at age of 14^2 . Recent studies indicated an increasing trend in the prevalence of cigarette smoking among children and adolescents². Cigarette smoking is not limited to a specific social class or a particular age group; however, adolescents and young adults are the most vulnerable groups to start smoking^{3,4}. Approximately 50% of those who currently smoke have started smoking before age of 18 and 78% have started smoking before age of 20⁵. An adolescent who starts smoking at age of 16, may continue smoking for at least 16 years in boys and 20 years in girls⁶. Those who start smoking at younger age are also less likely to stop smoking⁷. Based on the results of previous studies, one may have a tendency toward cigarette smoking because of various reasons including lack of knowledge of its consequences, following one's parents' or friend's behaviors, extensive mass media advertising for smoking, self-indulgence, feeling of maturity, the need for attention, and in order to reduce negative emotions such as depression, anxiety and distress⁸.

However, there may be other unknown social and familial reasons that may increase the tendency of the adolescents toward cigarette smoking. This study was conducted to determine the prevalence of cigarette smoking among high-school students and to identify the demographic and social risk factors that may affect on tendency of adolescents toward cigarette smoking.

Methods

Local Human Subject Review Board of Hamadan University of Medical Sciences approved this study. All participants were enrolled voluntarily and anonymously into the study.

This cross-sectional study was conducted among high-school students in Hamadan City, west of Iran, in 2009. Previous studies reported the prevalence of cigarette smoking among adolescents $14.3\%^9$. Assuming *P* to be 0.143, we arrived at a sample of 576 with 0.05 significance level and error level of 0.2. Because of cluster random sampling, we doubled the sample size and raised it to 1161.

We used stratified cluster random sampling method (Figure 1).



Figure 1: Method of stratified cluster random sampling

For this purpose, each region of the city was considered as a stratum (1st stratification level). The schools are separated for boys and girls in Iran. Accordingly, high schools were divided into two subgroups based on the students' gender (2nd stratification level) within each region. Then, five high schools were randomly selected from each subgroup using random numbers table (1st clustering level). Each high school had three educational grades (3rd stratification level). Accordingly, one class was randomly selected from each grade of one to three. A sample of 20 students was randomly selected from each class. This included a total sample of 1200 of which 1161 students participated voluntarily in this study. Accordingly, the response rate was about 97%.

The data collection tool was a selfadministered questionnaire, which was filled out by the participants anonymously. The questionnaire consisted of three parts. The first part included 21 questions related to basic and demographic characteristics such as age, sex, educational field, and parents' job. The second part included 13 two-choice questions (Yes/No) related to students' knowledge of the consequences of cigarette smoking such as "Cigarette smoking may reduce life expectancy". The third part included 10 five-choice questions (Completely disagree/ Disagree/ No idea/ Agree/ Completely agree) related to students' attitude toward smoking consequences such as "Cigarette smoking helps me to have more concentration". A panel of experts in the field of health education and epidemiology evaluated, discussed and validated the questionnaire. The reliability of the questionnaire was evaluated by a pilot study including 50 individuals. The value of Cronbach's alpha was 0.72 for questions of knowledge and 0.86 for questions of attitude toward smoking.

The number of correct answers to questions related to students' knowledge of the consequences of cigarette smoking was obtained for each subject that made a total score ranged from a minimum of zero to a maximum of 13 for each volunteer. Then, the average score of the correct answers was calculated for all subjects. For estimating of the students' attitude toward smoking complications, each five-choice question was scored from one to five that made a total score ranged from a minimum of 10 to a maximum of 50 for each volunteer. Then, the average score of the students' attitude toward smoking complications was calculated for all subjects.

Stata version 11 (StataCorp, College Station, TX, USA) was employed for data analysis. We used chi-squared test for measuring association between nominal variables and logistic regression at 0.05 significant level to assess the effect of various risk factors on cigarette smoking. We chose a backward stepwise regression method in order to both fit the data well and exclude unnecessary variables from the model. For this purpose, we started with full model and then excluding variables one at a time, while checking via the likelihood ratio test to determine whether the reduced model or the full model fitted the data significantly well¹⁰.

Results

Of 1161 students who participated in this study, 588 were boys (50.6%) and 573 were girls (49.4%). The mean age was 15.77 (95% CI: 15.71, 15.83) years ranged from 14 to 20 years. The prevalence of cigarette smoking was 10.2% (95% CI: 8.4%, 11.9%; SD=0.30) on average, 13.4% (79/588) among boys and 6.8% (39/573) among girls (P<0.001).



Figure 2: Distribution of smokers by age versus prevalence of smoking among adolecents by age

	Smokers	Nonsmokers	Crude Odds Ratio				
Variables	N=118 ^a	N=1043 ^a	(95% CI)	P value			
Gender							
Female	39	534	1.00				
Male	79	509	2.13 (1.42, 3.18)	< 0.001			
Grade							
1st	29	370	1.00				
2nd	44	372	1.51 (0.92, 2.46)	0.100			
3rd	45	301	1.91 (1.17, 3.12)	0.010			
Age							
1 year (continuous)	118	1043	1.54 (1.29, 1.84)	< 0.001			
Living with							
Parents	109	969	1.00				
Father (only)	1	6	1.48 (0.18, 12.4)	0.717			
Mother (only)	3	52	0.51 (0.16, 1.67)	0.268			
Other people	4	8	4.44 (1.32, 15.0)	0.016			
Father							
Nonsmoker	68	661	1.00				
Smoker	50	374	1.30 (0.88, 1.91)	0.184			
Mother							
Nonsmoker	113	1032	1.00				
Smoker	5	9	5.07 (1.67, 15.4)	0.004			
Sibling							
Nonsmoker	99	1007	1.00				
Smoker	19	34	5.68 (3.13, 10.3)	< 0.001			
Friend							
Nonsmoker	42	890	1.00				
Smoker	76	150	10.74 (7.09, 16.2)	< 0.001			
Fail to pass the exams							
No	91	933	1.00				
Yes	26	99	2.69 (1.66, 4.36)	< 0.001			
Offering cigarette by a	friend						
No	48	930	1.00				
Yes	70	108	12.56 (8.27, 19.1)	< 0.001			
Insistence on smoking by a friend							
No	53	564	1.00				
Yes	42	46	9.72 (5.87, 16.1)	< 0.001			
Knowledge							
1 percent	118	1043	0.26 (0.10, 0.68)	0.006			
Attitude							
1 percent	118	1043	0.02 (0.01, 0.07)	< 0.001			

Table 1: The odds ratio (OR) estimates of cigarette smoking among adolescents using logistic regression model

^aThere are a few missing data among subgroups.

As shown in Figure 2, the distribution of smokers was the highest among 16-year-old students (bar chart). Nonetheless, there was a positive correlation between age and cigarette smoking (linear curve). In addition, about 83.1% (98/118) of the smokers started smoking for the first time before age of 16.

About 34.8% (41/118) of the smokers preferred to smoke with their friends, 38.1% (45/118) smoked alone, and 27.1% (32/118) smoked in both situations. Fail rate in school exams among smokers (22.2%) was higher than among nonsmokers (9.6%). About 80.3% of smokers used 1 to 5 cigarettes, 4.3% used 6 to 10 cigarettes and 15.4% used >10 cigarettes on average per day. About 39.0% (56/118) of the smokers mentioned curiosity as the main reason of cigarette smoking. Having a smoker friend (22.1%), daily stress (20.3%), feeling uphoria (7.6%), the need to smoke (5.9%) and inability to reject suggestions of cigarrets by other subjects (5.1%) were other reasons mentioned for starting cigarette smoking.

The prevalence of cigarette smoking was 33% among adolescents lived with people other than parents were smoker. It was 14% among subjects lived with their fathers, 5% among those who lived with their mothers, and 10% among those who lived with both parents. The prevalence of cigarette smoking was 17% among those students whose fathers were smokers, 50% among those students whose students whose mothers were smokers, 29% among those students whose siblings were smokers, and 54% among those students whose friends were smokers.

About 79% of those students who were frequently offered cigarette ultimately became smokers and 33% of those students who were occasionally offered cigarette became smokers, while only 5% of those students who were not offered cigarette became smokers themselves.

The effects of different risk factors on cigarette smoking in adolescents were investigated (Table 1).

Based on these results, crude odds ratio (OR) estimates of becoming a smoker was 4.44 for students who lived with people other than their parents compared to those who lived with their parents. Furthermore, crude OR estimate of becoming a smoker was 5.68 for students whose siblings were smoker and 10.74 for students whose friends were smoker compared with those who do not have a smoking sibling or smoking friend respectively. In addition, the crude OR estimate was 12.56 for students to whom cigarette was frequently offered. The crude OR estimate of becoming a smoker was 9.72 for students whom were insisted to smoke. The adjusted OR estimates of becoming smoker are shown in Table 2.

Table 2: The odds ratio (OR) estimates of cigarette smoking among adolescents using logistic regression model. A backward stepwise regression method was chosen in order to both fit the data well and exclude unnecessary variables from the model

	Smokers	Nonsmokers	Adjusted Odds Ratio	
Variables	$N=118^{a}$	N=1043 ^a	(95% CI) ^b	P value
Sibling				
Nonsmoker	99	1007	1.00	
Smoker	19	34	2.57 (1.10, 6.00)	0.029
Friend				
Nonsmoker	42	890	1.00	
Smoker	76	150	3.52 (1.93, 6.41)	< 0.001
Offering cigarette by a friend				
No	48	930	1.00	
Yes	70	108	3.47 (1.80, 6.70)	< 0.001
Insistence on smoking by a friend				
No	53	564	1.00	
Yes	42	46	3.18 (1.68, 6.03)	< 0.001
Attitude				
1 percent (continuous)	118	1043	0.94 (0.90, 0.97)	0.001

^a There are a few missing data among subgroups

^b Odds ratio adjusted for all variables in the table

The correlation between cigarette smoking and all variables in the model was strongly significant, although the effect estimates were attenuated relative to crude estimate. The students' knowledge of complications and consequences of cigarette smoking was 53% on average. In addition, the students' negative attitude toward cigarette smoking was 74% on average. Furthermore, logistic regression analysis revealed that the chance of becoming a smoker decreased as knowledge and attitude increased (Table 1).

Discussion

The prevalence of cigarette smoking during adolescence is a useful indicator for the estimation of the following harmful outcomes caused by cigarette smoking. This issue may be important for health policymakers. The results of our study indicated that the most (83%) of adolescent smokers experienced smoking for the first time before 16 years. This finding is similar to the results of previous studies. Heydari et al.¹¹ revealed that 88.7% of students in Tehran experienced smoking before age of 17. This is a warning sign for both parents and the policy makers.

Based on our findings, the prevalence of smoking in male adolescents was almost twice as much as that of female adolescents (13.6% in boys compared with 6.9% in girls). This could be attributed to the fact that boys' behaviors outside the home are out of parents' control and this might predispose them to high-risk behaviors such as cigarette smoking. Moghimbeigi et al.¹² Garcia et al.¹³ and Zia Aldini et al.¹⁴ reported similar results.

Our study also showed that the fail to pass the school exams among smokers was more than 2.5 time higher as among nonsmokers. However, in this cross-sectional study, it was not possible to determine priority of failure in school exam over cigarette smoking and vice versa. In other words, we could not determine which one occurred first.

We revealed that 39% of smokers mentioned curiosity as the main cause of experiencing cigarette smoking. Indeed, curiosity of adolescents in this age group may predispose them to participate in high-risk behaviors such as cigarette smoking or even other substance abuse. Soria-Esojo et al.¹⁵ also reported similar results.

The risk of becoming a smoker was about 4.44 times higher among students lived with people other than parents compared with those who lived with their parents. Tucker et al.¹⁶ in-

dicated that parents' involvement in training children and monitoring their behaviors can reduce the prevalence of smoking during adolescence. Indeed, this issue indicates the important role of parents in controlling the adolescents' lifestyle and their social relations to reduce the predisposing factors of high-risk behaviors.

The odds ratio estimates of knowledge and attitude indicated that increasing the level of knowledge and attitude toward smoking complications lead to decreasing the chance of an adolescent to become a smoker. This issue indicates clearly the necessity of health education to improve students' knowledge and attitude toward complications and outcomes related to cigarette smoking. The results of similar studies confirmed our findings.

According to the findings, the prevalence of cigarette smoking among relatives had a great impact on the adolescents' behaviors and predisposed them to cigarette smoking. Soria-Esojo et al.¹⁵ reported that having a smoking sibling was the greatest risk factor for students to become smokers. Wang et al.¹⁷, indicated that having a smoking friend was an important motivating factor for adolescents to become a smoker.

There were a few limitations and potential biases in this cross-sectional study. First, many covariates were investigated simultaneously. For this reason, the determination of priority of the covariates was impossible. Second, 3% of the students did not participate in this study. This issue may raise the possibility of selection bias. Furthermore, potential bias might have occurred in the results by those who might not respond correctly.

Conclusion

Despite its limitations, the current study investigated the prevalence of cigarette smoking among adolescents and its associated demographic and social risk factors. Therefore, the results of the present study may help policymakers who plan preventive program to reduce incidence of cigarette smoking among adolescents and young adults.

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Conflict of interest statement

The authors have no conflicts of interest to declare for this study.

Sources of support

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