

# The determinants of high school students smoking habits with special focus on teachers smoking in Iran: a population based study

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## ABSTRACT

**Introduction:** Approval of smoking by friends and teachers is likely to increase the probability of smoking by the students. This study aims to determine whether adolescent smoking is associated with teachers or other students smoking, after controlling for confounders. **Materials&Methods:** In a cross sectional study, a representative sample of 4599 students in the third grade were selected from high schools in Tehran. A 21 item questionnaire was administered consisting of demographic and tobacco smoking habit questions. Pattern of adolescent tobacco smoking was compared between two sexes. Association between smoking behavior and perceived exposure to teachers smoking were assessed using bivariate and multivariate analyses, adjusting for parental, best friends and sibling smoking and sex. A multivariate logistic regression model was constructed and adjusted Odds Ratios were estimated. **Results:** In total, 4591 students, aged 17 to 19 years, consisting of 2092 (45.6%) boys and 2499 (54.4%) girls, with the overall mean age of 17.53±0.59 years, were recruited. Of the students studied, 250 (12.1%) of boys and 131 (5.3%) of girls reported being current smokers ( $p=0.001$ ). The proportion of smoker and non-smoker students reporting to have been exposed to teachers smoking inside the school building was 209 (55.7%) and 1191 (29.3%), respectively ( $p=0.001$ ). Of those reporting being exposed to teachers smoking outdoors on school premises, 220 (58.7%) were smokers and 1205 (29.2%) were non-smokers ( $p=0.001$ ). After adjusting for sex, smoking habit of father, mother, brothers, sisters and best friends, adolescent perceived exposure to teachers smoking on school premises, but not inside school, was significantly associated with current smoking (OR=2.1, 95% CI:1.7-2.7). Adolescent exposure to best friend smoking was strongly associated with current smoking after adjusting for above variables (OR=6.7, 95% CI:5-9). **Conclusion:** Teachers smoking during school hours and best friend smoking are the two important determinants to be considered in any project aiming to establish tobacco-free schools.

**Keywords:** adolescent, teacher, smoking, school

## REZUMAT

**Factorii determinanți ai fumatului la elevii de liceu în Iran, cu accent pe fumatul în rândul profesorilor: studiu populațional**

**Introducere:** Aprobarea fumatului de către prieteni și profesori crește probabilitatea de a fuma în rândul elevilor. Studiul de față urmărește să determine dacă fumatul la adolescenți este asociat cu fumatul la profesori sau la colegi, după eliminarea altor factori de influență posibili. **Materiale și metode:** Studiul cross-sectiional a fost realizat pe un eșantion reprezentativ de 4599 de elevi de anul 3 din licee din Teheran. Aceștia li s-a administrat un chestionar cu 21 de întrebări referitoare la date demografice și la consumul de tutun. Rezultatele au fost analizate comparativ pentru cele două sexe. Asocierea dintre obiceiul de a fuma și expunerea la fumatul în rândul profesorilor a fost investigată utilizând analiza univariată și multivariată, cu corecție în funcție de fumatul parental, în rândul prietenilor, al fraților și în funcție de sex. A fost construit un model de regresie logistică multivariată cu estimarea Odds Ratios ajustată. **Rezultate:** În total, au fost recrutați 4591 de elevi cu vârste de la 17 la 19 ani, dintre care 2092 (45.6%) băieți și 2499 (54.4%) fete, cu vârsta medie de 17,53±0,59 ani. 250 (12,1%) dintre băieți și 131 (5,3%) dintre fete au raportat că sunt fumători activi ( $p=0.001$ ). Proporția de elevi fumători și nefumători care au declarat că au fost expuși la fumatul profesorilor în incinta școlii a fost de 209 (55,7%), respectiv 1191 (29,3%) ( $p=0.001$ ). Dintre cei expuși la fumatul profesorilor în exterior, 220 (58,7%) erau fumători și 1205 (29,2%) erau nefumători ( $p=0.001$ ). După ajustarea în funcție de sex, obiceiul de a fuma la tată, mamă, frați, surori și cei mai buni prieteni, expunerea la fumatul profesorilor în perimetrul școlii, dar nu în școală, a fost semnificativ asociată cu statusul de fumător curent al elevilor (OR=2,1, 95% CI:1.7-2.7). Obiceiul de a fuma al celui mai bun prieten a fost puternic asociat cu fumatul activ la adolescenții analizați, după ajustarea în funcție de variabilele de mai sus (OR=6,7, 95% CI:5-9). **Concluzii:** Fumatul profesorilor în timpul orelor de școală și fumatul în rândul celor mai buni prieteni sunt doi determinanți importanți care trebuie avuți în vedere în orice proiect de realizare a unor școli „fără fumat”.

**Cuvinte-cheie:** adolescent, profesor, fumat, școală

## Introduction

Tobacco smoking, the main cause of preventable morbidity and death worldwide, is a behavior that starts in adolescence for 90% of the adults who self-report smoking. Serious consequences of smoking, such as cancer and cardiovascular disease,

are known to occur later in life<sup>1</sup>. Smoking and its related diseases are responsible for an estimated 20 percent of deaths in the United States each year and cost about \$97.2 billion annually<sup>2</sup>.

Since most smokers start smoking before reaching the age of 18, preventing adolescents from becoming smokers is one

of the most important strategies for reducing the prevalence of smoking<sup>3</sup>. Recognition of the prevalence of smoking and understanding of the initiating factors and patterns of smoking in adolescents can be effective in meeting this goal.

Various factors influencing the initiation of smoking in adolescents have been studied, including socio-demographic factors (e.g. age, gender and family social status), role modeling factors (e.g. smoking among friends and family members), sense of social belonging (e.g. school influences, sense of belonging to family and friends) and personal factors (e.g. self-confidence, ability to reject peer pressure and attitudes towards cigarette smoking)<sup>4</sup>.

Another factor contributing to the initiation of smoking in adolescents is their perceived exposure towards smoking of teachers or other school staff<sup>3</sup>. Schools have long been of great social importance in the growth and development of children and adolescents, as well as of their health behaviors. Many smoking prevention programs have targeted schools, but unfortunately there is little information on how these programs can influence the smoking habits of adolescents<sup>3</sup>. It has been shown in a number of studies<sup>5,6</sup> that prohibition of cigarette smoking in schools has decreased the rate of smoking in adolescents. Although problems exist in designing, developing, implementing and monitoring the prohibition of smoking in schools<sup>7</sup>, these problems can be overcome even with limited financial and human resources<sup>5</sup>.

In this survey, we aimed to study the current status of adolescent cigarette smoking in high schools in Tehran and their exposure to the smoking of teachers. In addition, we aimed to examine the association between adolescent smoking behavior and their perceived exposure to teachers smoking at school, as well as other factors that are in association with smoking in adolescents. By this approach, we hope to provide and develop a fundamental basis for a realistic and feasible program aimed at establishing tobacco-free schools, which has been proposed as an interventional study by the Ministry of Education of Iran, with the ambition to control smoking and prevent smoking initiation in adolescents.

## Materials & Methods

### Subjects

The study was designed to select a representative sample of 4591 third year high school students in Tehran. Stratified cluster random sampling was used to obtain the study sample. Each high school was assumed as a cluster. The process generated a final sample of 68 students from each school.

### Sampling

According to data published by the Ministry of Education, at the time of study (2004) there were 147,275 students studying at 2166 high schools in Tehran. Tehran is divided into 19 Administrative Educational Regions (AER) by the Ministry of Education. In order to select a representative sample, we divided Tehran into five arbitrary Geographical Areas (GA): North, South, East, West and Central Tehran, including 3, 5, 4, 3, and 4 AERs, respectively. One AER was randomly selected in each GA, except for southern Tehran, where two AERs were selected. In total, 2092 boys and 2499 girls were selected for the study. All details about sample size detection and sampling technique has been fully described elsewhere<sup>8</sup>.

### Data Collection

After getting approval from the ethics committee of National Research Institute of Tuberculosis and Lung Disease (NRITLD), and providing the permission of the Ministry of

Education, a written informed consent was obtained from all students. A 21 item questionnaire was administered to collect information on demographic characteristics such as age and gender, cigarette smoking habits including frequency and patterns of use for different tobacco products, and exposure of students to smoking among parents, siblings, teachers and close friends. Questionnaires were distributed among students of the 3<sup>rd</sup> grade classes, in the absence of their teachers or any other school personnel. Participation was voluntary and anonymous.

Generally, we considered the smoking habits of the participants as "current smokers" and "non-smokers". According to the MONICA project of the WHO, current smoker was defined as a person who, at the time of the survey, smoked cigarettes either daily or occasionally. A daily smoker was defined as a person who smoked cigarettes at least once a day and/or more than 100 cigarettes totally. However, an occasional smoker was a person who smoked, but not every day. In addition, a non-smoker was defined as a person who, at the time of the survey, did not smoke at all<sup>9</sup>.

### Statistical Analysis

Data was analyzed using SPSS version 12. The proportion of current smokers was compared between the two sexes and the three age groups using Chi Square test. The proportion of smokers among parents, siblings and close friends was compared between smokers and non-smokers by Chi Square test. In addition, student's perceived exposure to their teachers smoking was compared between smokers and non-smokers. In a multivariate logistic regression model, independent effects of teachers smoking was tested by adjusting for confounders including gender and smoking behavior of parents, siblings and close friends and adjusted ORs were estimated. Differences were significant at  $\alpha=0.05$  and 95% confidence interval was calculated for all statistics.

## Results

In total, 4591 students, aged 17 to 19 years, were recruited. The sample consisted of 2092 (45.6%) boys and 2499 (54.4%) girls. The overall mean age of the students was  $17.53 \pm 0.59$  years. The mean age of boys was  $17.54 \pm 0.62$  years and for the girls it was  $17.51 \pm 0.57$  years. Detailed descriptions of the studied group regarding age, gender and administrative educational region are presented in Table I.

Out of 4548 students who responded to the question on cigarette smoking (99% response rate), 8.4% (95% CI: 7.6-9.2) were current smokers. The percentage of current smoking was 12.1% in boys (95% CI: 10.7-13.9) and 5.3% in girls (95% CI: 4.4-6.2) ( $p=0.001$ ). Overall, the highest prevalence of smoking was observed in 19 years olds at 12.8% (95% CI: 8.6-17.0), while the lowest prevalence of smoking was observed in 17 years olds at 8.1% (95% CI: 7.0-9.2) ( $p=0.04$ ). In both genders, smoking prevalence increased with age; however the difference was not significant. Detailed descriptions of the status of cigarette smoking are presented in Table II.

Overall, smokers had more exposure to teacher smoking both inside and outside of school than non-smokers. In both cases, smokers had observed teacher smoking almost twice as much as non-smokers (55.7% and 58.7% compared to 29.3% and 29.2%). Further, smokers reported daily smoking by their fathers, mothers and close friends at 33.5%, 4.6% and 28.2%, respectively. These percentages were lower in non-smokers, with 21.9%, 1.7% and 5.3% reporting regular smoking in their

**Table I. Demographic Characteristics of Students regarding Age, Gender and Administrative Educational Region (AER)**

AER	Gender	Age			Total
		17 N (%)	18 N (%)	19 N (%)	
2	Boy	377 (57.1)	246 (37.3)	37 (5.6)	660
	Girl	248 (56.6)	182 (41.6)	8 (1.8)	438
	Total	625 (56.9)	428 (39)	45 (4.1)	1098
3	Boy	161 (67.9)	75 (31.6)	1 (0.4)	237
	Girl	168 (57.1)	121 (41.2)	5 (1.7)	294
	Total	329 (62)	196 (36.9)	6 (1.1)	531
12	Boy	69 (42.9)	69 (42.9)	23 (14.3)	161
	Girl	89 (64.5)	46 (33.3)	3 (2.2)	138
	Total	158 (52.8)	115 (38.5)	26 (8.7)	299
14	Boy	103 (51.5)	89 (44.5)	8 (4)	200
	Girl	305 (52.8)	253 (43.8)	20 (3.5)	578
	Total	408 (52.4)	342 (44)	28 (3.6)	778
15	Boy	104 (59.1)	70 (39.8)	2 (1.1)	176
	Girl	136 (54.4)	110 (44)	4 (1.6)	250
	Total	240 (56.3)	180 (42.3)	6 (1.4)	426
18	Boy	280 (42.6)	298 (45.3)	80 (12.2)	658
	Girl	334 (43.8)	375 (49.1)	54 (7.1)	763
	Total	614 (43.2)	673 (47.4)	134 (9.4)	1421
Total	Boy	1094 (52.3)	847 (40.5)	151 (7.2)	2092 (100)
	Girl	1304 (52.2)	1101 (44.1)	94 (3.8)	2499 (100)

fathers, mothers and close friends, respectively. In smokers, the percentage of those whose fathers had quit smoking (4.6%) was lower than in non-smokers (6.3%), while in mothers the reverse was observed (1.6% in smokers and 0.9% in non-smokers). Smokers reported regular smoking in 30.2% and 10% of their brothers and sisters, respectively. These percentages were 9.4% and 1.1% in the non-smoker group, respectively. All comparisons between smokers and non-smokers regarding exposure to teacher smoking and smoking behaviors of parents, siblings and close friends were significant ( $p=0.001$ ) (Table III).

Logistic regression analysis was conducted to study the influence of factors such as gender, perceived exposure to teacher smoking, both on and off school premises, smoking among parents and smoking among close friends on the probability of smoking in students. The proportion of crude and adjusted odds in the obtained results showed that smokers were exposed to teacher smoking outdoors on school premises 3.4 times more than non-smokers (95% CI: 2.8-4.3). Further, smokers were exposed to teacher smoking in school 3 times more than non-smokers (95% CI: 2.5-3.8). The probability of boys becoming smokers was 2.4 times more than the probability of girls becoming smokers (95% CI: 1.94-3.04). Smokers reported daily smoking among their close friends 12.8 times more than non-smokers (95% CI: 9.54-17.20).

After adjusting for various exposures to smoking and gender, only three important and effective factors remained in the logistic regression model, including exposure to teacher smoking outdoors on school premises (OR=2.1, 95% CI: 1.7-2.7), daily smoking among close friends (OR=9.9, 95% CI: 7.2-13.6) and daily smoking among fathers (OR=1.6, 95% CI: 1.20-2.04) (Table IV).

## Discussion

### Pattern of Use

In the present study, 12.1% of boys and 5.3% of girls were current smokers, either daily or occasional smokers, accounting for 8.4% of the total sample. However, in similar studies in Iran, various results have been reported. A study on the smoking pattern of over 15 years old inhabitants of the urban area of Tehran, as part of the Tehran Lipid & Glucose Study, found that 8.8% of 15-24 years old males and 0.4% of females of the same age group were current smokers<sup>10</sup>. Another study on a sample of high school students in Tehran found that 36.9% of boys and 26.7% of girls smoked daily or occasionally<sup>11</sup>. In a similar study, occasional smoking was reported among 35% of boys and 26.9% of girls in a group of high school seniors in Tehran<sup>12</sup>.

The rate of current smoking was higher in boys than in girls and rose with increasing age. The higher incidence of

**Table II. Students Smoking Status regarding Age and Gender**

	No of students				Smokers in each group % (0.95 CI)				P value
	17	18	19	Total	17	18	19	Total	
Boy	1086	834	149	2069	11.5 (9.6-13.4)	12.5 (10.3-14.7)	14.1 (8.5-19.7)	12.1 (10.7-13.5)	0.6
Girl	1298	1087	94	2479	5.2 (4.6-4)	4.9 (3.6-6.2)	10.6 (4.4-16.8)	5.3 (4.4-6.2)	0.056
Total	2384	1921	243	4548	8.1 (7-9.2)	8.2 (7-9.4)	12.8 (8.6-17)	8.4 (7.6-9.2)	0.04

**Table III. Comparison of Current Smokers and Non-smokers report of Smoking Habits among Family members, close friends and exposure to Teachers Smoking**

Smoking Pattern			Current Smoker		P-value
			No N (%)	Yes N (%)	
Exposure to Teachers Smoking	Inside School	No	2873 (70.7)	166 (44.3)	0.001
		Yes	1191 (29.3)	209 (55.7)	
	School Premises	No	2916 (70.8)	155 (41.3)	0.001
		Yes	1205 (29.2)	220 (58.7)	
Father Smoking Status	Everyday	890 (21.9)	124 (33.5)	0.001	
	Sometimes	461 (11.3)	41 (11.1)		
	Ex-Smoker	254 (6.3)	17 (4.6)		
	Never	2458 (60.5)	188 (50.8)		
Mother Smoking Status	Everyday	71 (1.7)	17 (4.6)	0.001	
	Sometimes	116 (2.8)	17 (4.6)		
	Ex-Smoker	38 (0.9)	6 (1.6)		
	Never	3871 (94.4)	329 (89.2)		
Close Friend Smoking Status	Everyday	218 (5.3)	107 (28.2)	0.001	
	Sometimes	384 (9.3)	115 (30.3)		
	Never	3239 (78.4)	124 (32.8)		
Sister Smoking Status	Everyday	35 (1.1)	27 (10)	0.001	
	Sometimes	903 (28.5)	82 (30.3)		
	Never	2226 (70.4)	162 (59.7)		
Brother Smoking Status	Everyday	282 (9.4)	79 (30.2)	0.001	
	Sometimes	858 (28.7)	85 (32.4)		
	Never	1845 (61.9)	98 (37.4)		

smoking in males has been reported in all studies conducted in Iran, whether on high school adolescents<sup>11-14</sup> or among other population groups including youth<sup>15</sup>, medical students<sup>16,17</sup>, medical specialists<sup>18,19</sup> and other target groups<sup>20,21</sup>. In addition, the same trend has been observed in most of the studies conducted in other countries<sup>22-24</sup>; however, a number of studies in developed countries have shown the reverse trend, with a higher incidence of smoking among girls than boys<sup>25-27</sup>.

The relationship between the higher prevalence of smoking and increasing age has also been reported both in studies conducted in Iran<sup>13,28</sup> and worldwide<sup>23,29,31</sup>. However, a study by Meysami et al. on a sample of 16-81 years old inhabitants of a rural area in northern Iran found that increasing age had a significant relationship with lower prevalence of cigarette smoking<sup>21</sup>.

Possible reasons for the observed differences in the above-mentioned studies include different studied age groups, different definitions for patterns of tobacco use in each study and studies with either a small sample size, or non-representative samples, whereas we tried to provide an exact representative sample of the whole target group and therefore the results can be generalized to all third year high school students of Tehran.

#### *Cigarette Smoking in Family Members*

In the present study, the percentage of cigarette smoking by the family members was significantly higher in students who smoked than in those who did not smoke. Nearly two-thirds of smokers reported having a cigarette smoker brother, while more than one-third of them had a father or sister who smoked cigarettes. On the other hand, the lowest level of smoking among immediate family members was reported in mothers. Studies conducted in Iran and worldwide on the impact of the smoking behavior of immediate family members on ado-

lescent and youth smoking have shown a strong relationship between smoking habits of adolescents and smoking among parents and siblings.

In a number of studies conducted in Iran, it has been shown that smoking in at least one family member, especially in parents, is a risk factor for smoking in adolescents and youth<sup>11,13,28,32,33</sup>. In addition, having smoking brothers or sisters as role models places adolescents at higher risk for smoking initiation<sup>15,34</sup>. A study by Kelishadi et al. at the Heart Health Promotion from Childhood (HHPC) program in Isfahan found that the number of smokers in the family had a significant impact on adolescent smoking<sup>13</sup>.

Studies conducted in other countries have also observed the effect of parental smoking on adolescent smoking<sup>35-37</sup>. This effect was shown specifically for smoking in fathers<sup>38</sup> and in mothers<sup>31</sup>, both of which have been recognized as the strongest factors in cigarette smoking among adolescents. On the other hand, smoking among siblings has also been shown to have a relationship with adolescent smoking<sup>39</sup>.

The higher prevalence of cigarette smoking among adolescents in households with at least one smoking family member compared to households with no smokers can be attributed to the following: easier physical access to cigarettes, acclimatization to the stimulating effects and smell of cigarette smoke from childhood and the subsequent possibility of dependency after a few years and, in addition, low cultural standards of parents who give cigarettes to their children, even at a very young age<sup>34</sup>. On the other hand, since parents often serve as role models for their children, parental smoking can misguide adolescents into believing that smoking has beneficial effects<sup>40</sup>. Additionally, adolescents often try to imitate the smoking

**Table IV. Crude and Adjusted Odds Ratio (OR), and 95%CI of the Perceived Exposure to Teachers Smoking, and Smoking Status of Parents and Close Friends as determinants of Smoking by the Students**

Variable		Number	Crude OR†	%95CI	Adjusted OR	%95CI
Exposure to Teachers Smoking on School Premises	Yes	1337	3.4	2.8-4.3	2.1	1.7-2.7
	No	2927	1*		1*	
Exposure to Teachers Smoking Inside School	Yes	1319	3.04	2.5-3.8	1.2	0.83-1.63
	No	2945	1*		1*	
Gender	Boy	1933	2.4	1.94-3.04	1.14	0.83-1.57
	Girl	2331	1*		1*	
Father Smoking Status	Everyday	970	1.8	1.4-2.3	1.6	1.2-2.04
	Sometimes	475	1.2	0.8-1.7	1.2	0.8-1.7
	Ex-smoker	261	0.9	0.5-1.5	0.6	0.4-1.1
	Never	2558	1*		1*	
Mother Smoking Status	Everyday	80	2.8	1.6-4.8	1.64	0.88-3.05
	Sometimes	127	1.7	1.024-2.9	1.03	0.56-1.9
	Ex-smoker	41	1.9	0.8-4.4	1.24	0.46-3.30
	Never	4016	1*		1*	
Close Friend Smoking Status	Everyday	300	12.8	9.54-17.2	9.9	7.2-13.6
	Sometimes	471	7.8	5.94-10.3	6.7	5-9
	Ex-smoker	3193	3.0	2.0-4.4	2.6	1.7-3.9
	Never	300	1*		1*	

† Dependent variable: Current smoker vs. Non-smoker; \* Reference category

behaviors of their older siblings, which are shown to have an even greater effect than parental smoking<sup>34</sup>.

#### *Cigarette Smoking in Teachers and Close Friends*

The present study showed that exposure to teachers and other students smoking inside school is quite common. More than half of studied students reported observing their teachers smoking outdoors on school premises or inside the school building. In addition, more than half of the students observed their peers smoking both in and out of school. These results suggest that the prohibition of cigarette smoking in schools is not implemented correctly and cigarette smoking among teachers and students is not sufficiently controlled. In other words, smoking restriction policies are not applied appropriately. Therefore, it seems that the flaws and inefficiencies of such restrictions and prohibitions can affect the beliefs and attitudes of students towards cigarette smoking. On the other hand, since elders, especially teachers, serve as role models for adolescents, perceived exposure to teachers smoking can cause students to consider smoking as a positive and acceptable behavior and thus influence the initiation of smoking in adolescents.

Another important result of this study was the positive association between teachers smoking during school hours and smoking among students. Adolescents' exposure to teachers smoking both in and out of school had a significant relationship with their smoking behavior. After adjusting for gender and smoking patterns of fathers, mothers, brothers, sisters and close friends, only perceived exposure to teachers smoking outdoors on school premises, but not inside school, was significantly associated with current smoking in adolescents. This result suggests that teachers smoking on school premises in front of students might be of greater importance than smoking inside the school building, especially in the staffroom, which is more likely to be shorter and less frequent.

This study also found a relationship between the smoking behavior of students and their close friends, such that adolescent smokers had more smoker friends. The relationship between the smoking pattern of adolescents and the smoking behavior of their friends has been shown in various studies in Iran<sup>28, 32, 33, 41</sup>.

We did not find any prior research on the relationship between teachers smoking and smoking among students in Iran. Only a study by Mohtasham Amiri et al. on the smoking status of high school male teachers in Rasht (center of Guilan province in the North of Iran) found a significant relationship between smoking in current teachers and perceived exposure to the smoking of their own high school teachers. However, the simultaneous use of cigarettes among their students was not studied. The study also found that 20.4% of high school teachers in Rasht were current smokers, which was not found to differ substantially from the general public, contrary to the predictions of the study's researchers. This result identified teachers as part of a high risk group, giving rise to an important health problem in schools. On the other hand, it was further found in this study that a greater proportion of smoking teachers, as compared to non-smokers, opposed anti-smoking programs in schools and participated less in such programs<sup>42</sup>.

Regarding the effect of smoking of close friends on adolescents smoking habits, two important points are mentionable. While studies have shown the role of smoking friends on the initiation of smoking in students, the smoking of close friends does not change the smoking status of adolescents from non-smoking to experimental or regular smoking. However, the effect of parental smoking on this transition is increasing<sup>43</sup>.

#### **Conclusion**

The results of the present study not only emphasize the necessity to take preventive measures against initiation of smoking in adolescents, but also to consider other groups

influencing smoking in students, including teachers and family members. Therefore, it is suggested that in addition to adolescents, teachers especially at the high school level and family members, particularly parents, should be considered as target groups in any program aiming to fight against tobacco in high schools. By this approach, a successful program for prevention and control of smoking among adolescents and youth can be achieved.

### Limitations

Since this was a cross-sectional survey, it was not possible for us to establish causal relationships. The adolescent respondents may have underreported their tobacco use<sup>44</sup> and smoking behaviors may have been underestimated, because the study asked questions only about cigarettes.

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