

Cigarette Smoking Experience and its related Socio-demographic and Environmental Risk Factors in High School Boy Students, Shiraz- Iran

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Abstract

Background: Several environmental and psychosocial risk factors are known for adolescent smoking as the single cause of preventable diseases and premature death. This cross-sectional study aimed to determine the prevalence of cigarette smoking, socio-demographic factors associated with cigarette smoking (age, education level, parents' job, and family's socioeconomic statuses), and the role of family and friends in cigarette smoking by high school students.

Materials and Methods: In this cross-sectional study which was conducted in Shiraz, Iran, 900 high school boy students (grades 9-11) were selected through multistage random cluster sampling. They responded a researcher designed anonymous questionnaire about smoking experiences of themselves and their friends and family members. Chi-square and Mann-Whitney U test and Binary logistic regression analysis were used to analysis of the data, using the SPSS version 17.0.

Results: The mean age of the participants was 16.11 (1.16) years and 19.7% of the students were ever smokers. Students' higher educational grade ($P=0.001$), fathers' lower education level ($P=0.03$), live with one parent or people other than parents ($P=0.024$), father's, siblings', and friends' smoking, and family members' cigarette smoking at home ($P<0.001$), were significantly related to the students' smoking experience. Indeed, having smoker siblings was the strongest predictor of smoking among the students.

Conclusion: Cigarette smoking is a public health concern in all families from different socio-economic status. Special attention to orphans and children of divorce, setting rules about cigarette smoking in families, monitoring and being aware of offspring's and their friends' behavior can be recommended.

Key Words: Adolescent, Environmental, Smoking, Socioeconomic, Student Risk Factor.

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1- INTRODUCTION

Smoking is known as the most important single cause of preventable diseases and premature death. In fact, it is a public health challenge worldwide due to its public accessibility (1-3). Several studies have established that most regular smoker adults started smoking in their adolescence (1-4). Therefore, approximately 90% of smokers have experienced smoking for the first time before reaching the age of 18 years (4, 5). Hence, tobacco addiction is called a "pediatric disease" (6).

Although the serious consequences of smoking, such as cancer and cardiovascular and pulmonary diseases, are well known (4, 6), 82-99 thousand young individuals start smoking across the world every day (6). It has been predicted that if widespread preventive measures are not undertaken at global level, the number of tobacco consumers will increase from 1.4 to 1.9 billion, more than 8 million smokers will lose their lives annually, and great economic damages will be resulted worldwide by 2030 (7-9). In such circumstances, almost 81% of deaths resulting from tobacco-related diseases will occur in developing countries, mainly in Asia (9). On the other hand, the epidemic of cigarette smoking is slowing down in developed countries (6). Consequently, its attributable deaths will also reduce by 9% by 2030(8).

In the recent years (2003 to 2012), various studies have been conducted mostly on high school students and the results have reported the prevalence rate of smoking experience to be 7-25% among Iranian boy adolescents (10-14). This measure was reported to be 44.6% in Kerman, Iran (15). In these studies, 1.9-2.5% of adolescents were daily smokers and their mean age at the beginning of smoking was 12-14 years. Generally, adolescents' smoking behavior occurs in various complex environments, such as home, school, and community

(16). Besides, low socio-economic status, parents' low education level, living with one parent, peer influences, and tobacco use by parents, siblings, and peers have been mentioned as some psychosocial risk factors for adolescents' smoking (1, 4, 6). Up to now, public health, behavioral sciences, and sociology researchers have conducted extensive researches about the complex and multifaceted factors related to adolescents' smoking, particularly the influence of parents' behaviors on adolescents (1, 17). Some studies have emphasized the impact of family members' and friends' smoking on adolescents' smoking (4, 6, 18-23).

Parents play a vital role in facilitating or preventing the initiation of smoking among adolescents through their behaviors, attitudes, and expectations (24, 25). In fact, parents' smoking leads to indirect confirmation of smoking cigarettes and adolescents' higher exposure and easier access to cigarettes. Also, these parents serve as role models for their children and, as a result, affect their chance of smoking (6, 19, 26). Moreover, some studies have found a stronger relationship between adolescents' smoking and their friends' smoking (6, 17, 18, 21, 23). Nonetheless, some researchers may believe that these relations are because of the impact of cigarette smoking on selection of friends rather than the influence of friends. Thus, they have concluded that in comparison to friends, parents' behaviors had a much deeper effect on adolescents' smoking (17).

Due to the limited published information on the factors related to cigarette smoking by adolescents and considering the fact that there may be several other factors increasing adolescents' tendency to smoke cigarettes, a study was conducted in Shiraz, South West of Iran to investigate the environmental and psychological factors associated with adolescents' smoking behavior. The present article, as a

part of that study, aimed to determine the prevalence of cigarette smoking, the socio-demographic factors associated with cigarette smoking (age, education level, parents' job, and family's socioeconomic status), and the role of family and friends in cigarette smoking among high school students in Shiraz, Iran.

2- MATERIALS AND METHODS

2-1. Participants and sampling method

In this cross-sectional study, the target population included high school boy students (grades 9-11) in Shiraz, which is one of the five large cities in south of Iran with a population of 1,460,000 people according to the last census report in 2011. In this study performed in winter of 2014, 950 boy high school students were selected through the multistage random cluster sampling. First, two out of the four educational districts in Shiraz were selected randomly. Then, two boys' high schools with at least 250 students were chosen from each district. Finally, based on the number of students in each grade (9, 10, and 11), at least 200 students were selected in each high school through random stratified sampling. All students of the selected classes were enrolled into the study.

2-2. Instrument and procedures

The study data were collected using an anonymous questionnaire whose validity was established by a panel of experts. Before administering the questionnaires, the students were informed that their participation was voluntary, their responses would be completely confidential, and they could stop completing the questionnaires at any time. The questionnaire consisted of multiple sections, the first of which including information about demographic characteristics (age, student's grade, family's economic status, and parents' education levels and jobs). In the second

section, the students were required to respond to a question about their smoking experiences using 9 items ranging from "I smoke every day" to "I have never smoked in my life". Based on their responses, the students were classified into two categories: ever smokers (students who had smoked at least once) and never smokers (students who had never smoked). The participants also had to answer some yes/no questions about their parents' and siblings' smoking status and also whether their family members smoked at home. The students were also asked about their friends' smoking status through the following question: "How many friends do you know who smoke".

Based on their answers, the students were divided in two groups; having or not having smoker friends. Also, the students were asked "If your parents do not smoke now, did they smoke in the past". Another question was asked about the individuals living with the students, which could be answered through four options as follows: with my parents, with my father, with my mother, and none of them. Also, the students were asked about their families' economic statuses with the following question: "How do you assess the economic situation of your family". This question could be responded through five options, including "very bad, bad, medium, good, and very good".

2-3. Ethical consideration

Ethical approval of this study was gained from the Research Ethics Committee of Shahid Sadoughi University of Medical Sciences, Yazd city, Iran and Department of Education of Fars province, Iran.

2-4. Data analysis

All data analyses were performed using the SPSS statistical software, version 17.0. Mann-Whitney U test was used to compare the frequency distributions of ever smoker and never smoker groups based on demographic characteristics.

In addition, Chi-square test was used to compare the categorical variables. Binary logistic regression analysis was also utilized to evaluate the relationship between smoking risk factors and the participants' experiences of smoking. Odds Ratios (OR) and 95% Confidence Intervals (CI 95%) were calculated, as well. $P < 0.05$ was considered to be statistically significant.

3- RESULTS

Totally, 900 students completed the distributed questionnaires (response rate: 94.7%). The mean age of the participants was 16.11 (1.16) years (range: 13 to 19 years). Among the 842 participants who responded to the question about smoking status, 166 ones (19.7%) reported an experience of smoking for at least once. The participants' demographic information has been presented in **Table.1**.

The results showed a significant difference among the 9th, 10th, and 11th grade students regarding the experience of smoking. Accordingly, the possibility of smoking experience increased in higher grades ($P = 0.001$). Moreover, increase in father's education level was associated with a significant decrease in the students' smoking experience ($P = 0.03$). However, no significant relationship was observed between the students' smoking experiences and mother's education levels, parents' jobs, and family's economic status (**Table.2**).

The results revealed the lowest and highest possibility of smoking experience among the students who lived with their parents (18.46%) and those who did not live with any of their parents (50%, $OR = 4.41$), respectively. In addition, the possibility of smoking experience was higher among the ever smoker students who lived with their mothers (31.25%, $OR = 2.007$) compared to those who lived with their fathers (20%, $OR = 1.10$) ($P = 0.024$).

The results indicated a significant relationship between the students' smoking and their fathers', siblings', and friends' smoking as well as their family members' cigarette smoking at home ($P < 0.001$).

Considering the students whose fathers were not current smokers at the time of the study but had experienced smoking in the past, no significant relationship was found between the students' smoking experience and their fathers' smoking history. Because only a small number of mothers smoked in this study (1.1%), this variable was not entered into analysis. The contingency tables and the results of chi-square test have been separately presented in **Table.3**.

Four independent variables (father's smoking, siblings' smoking, friends' smoking, and family members' smoking at home), were entered into the binary logistic regression model ($P < 0.001$). This model explained 11-17.3% of the variance in the students' smoking experience. In addition, it correctly predicted 20.3% of the students who had smoking experience and 95.3% of those who had never smoked. Overall, 80% of the predictions were correct. The summary of the raw values of binary logistic regression coefficients, Wald statistics, corresponding degrees of freedom, ORs, and CIs (95%) for each predicted variables have been presented in **Table.4**.

Accordingly, having smoker siblings was the strongest predictor of the students' smoking experience. Other predictors that made significant contribution to the model were having smoker friends, family members' smoking at home, and father's smoking. However, smoking history of the fathers who were not current smokers did not increase the chance of the students' smoking experience significantly.

Table-1: The frequency distribution of the students with and without smoking experience according to demographic variables

Variables		Ever smokers		Never smokers		Total		Ever smoker/total (%)
		N	Percent	N	Percent	N	Percent	
Grade	9	53	31.9	307	45.4	360	42.8	14.70
	10	52	31.3	190	28.1	242	28.7	21.48
	11	61	36.7	179	26.5	240	28.5	25.41
Father's job status	On-leave or unemployed	5	3.0	27	4.0	32	4.0	15.62
	Working full time	140	84.3	551	81.5	691	85.4	20.26
	Retired	10	6.0	76	11.2	86	10.6	11.63
Mother's job status	Homemaker	140	84.3	578	85.5	718	86.9	19.49
	Employee	16	9.6	83	12.3	99	12.0	16.16
	Retired	7	4.2	2	0.3	9	1.1	77.77
Father's education level	Under diploma	83	50.0	287	42.5	370	45.2	22.43
	Diploma	46	27.7	207	30.6	253	30.9	18.18
	Academic	30	18.1	166	24.6	196	23.9	15.31
Mother's education level	Under diploma	87	52.4	315	46.6	402	49.3	21.64
	Diploma	45	27.1	226	33.4	271	33.2	16.61
	Academic	28	16.9	115	17.0	143	17.5	19.58
Family's income status	Very low	6	3.6	44	6.5	50	6.1	12.00
	Low	31	18.7	101	14.9	132	16.1	23.48
	Middle	87	52.4	316	46.7	403	49.1	21.58
	High	32	19.3	183	27.1	215	26.2	14.88
	Very high	5	3.0	16	2.4	21	2.5	23.81
Who do you live with?	Father	6	3.7	24	3.6	30	3.6	20.00
	Mother	15	9.3	33	5.0	48	5.8	31.25
	None of them	4	2.5	4	0.6	8	1.0	50.00
	Both of them	137	84.5	605	90.8	742	89.6	18.46

N: number.

Table-2: The results of Mann-Whitney U test comparing the students who smoked according to demographic variables

Variables	Number Ever-smokers	Mean rank	Sum of ranks	Z	U	P-value
Grade	166	473.96	78677.00	-3.316	47400.0	.001
Father's job	155	391.40	60667.50	-1.315	48577.5	0.189
Mother's job	163	419.46	68372.00	-.609	53063.0	.542
Father's education level	159	376.75	59903.50	-2.123	59903.5	.034
Mother's education level	160	391.25	62600.50	-1.127	49720.5	.260
Economic status	161	393.81	63403.50	-1.107	50362.5	.268

Table-3: The relationship between the students' cigarette smoking and their family members' and friends' smoking behaviors

Risk factors		Students' smoking		Total Number	Chi ²	df	P-value	COR*	95% CI. for OR	
		Yes	No						Lower	Upper
Father's smoking status	Yes	62	160	829	14.02	1	<0.001	1.71	1.29	2.26
	No	99	508							
Former smoker father	Yes	14	58	842	0.004	1	0.95	0.985	0.60	1.16
	No	152	618							
Siblings' smoking status	Yes	28	30	828	32/24	1	<0.001	2.75	2.03	3.74
	No	135	635							
Smoking at home	Yes	39	61	688	24/59	1	<0.001	2.25	1.66	3.04
	No	102	486							
Friends' smoking status	Yes	70	134	842	36.025	1	<0.001	2.28	1.75	2.97
	No	96	542							

*Crude Odds Ratio for Ever smoking

Table-4: The results of logistic regression analysis predicting the likelihood of high school students' experience of cigarette smoking

Variables	B	Wald	df	Sig.	AOR*	95% CI. for AOR	
						Lower	Upper
Father's smoking status	.552	4.771	1	.029	1.736	1.058	2.848
Former smoker father	.502	1.933	1	.164	1.651	.814	3.350
Siblings' smoking status	1.290	15.246	1	.000	3.634	1.902	6.946
Smoking at home	.675	5.102	1	.024	1.964	1.093	3.526
Friends' smoking status	1.189	30.983	1	.000	3.285	2.161	4.994
Constant	-2.208	176.098					

AOR: Adjusted Odds Ratio for Ever Smoking.

4- DISCUSSION

Since almost 90% of adult smokers have started this behavior in adolescence (4), health policymakers need to understand the prevalence of cigarette smoking and its risk factors among adolescents to guide the design of preventive interventions. Up to now, several studies have addressed the prevalence of cigarette smoking in adolescents (21, 27, 28).

However, to the best of our knowledge, this is one of the few studies conducted on this issue in Iran. This study aimed to determine the relationship between high school boy students' smoking behaviors and some family and environmental factors, including parents', siblings', and

friends' smoking and exposure to cigarette smoke at home, along with demographic variables, such as students' grades, family's economic conditions, and parents' employment statuses and education levels. In the current study, 19.7% of the students had the experience of cigarette smoking for at least once. Review of the literature indicated various prevalence rates of cigarette smoking among adolescents. For instance, averagely 54% of 15-16-year-old European students stated in 2011 that they had smoked for at least once during their lifetime and 28% reported that they had experienced smoking in the last month (27). In another study, the prevalence of cigarette smoking was reported to be 17.38%, 22.03%, and 32.71% among

American students in grades 9, 10, and 11, respectively (28). In one other study in Saudi Arabia, one of the Middle-Eastern countries, the prevalence of cigarette smoking varied from 9.4% in 14-year-old students to 18.3% in those aging 16 years and above in both sexes. Additionally, 21.3% of the boys aging above 16 years reported the experience of cigarette smoking (21). In the recent years, most studies have reported the prevalence of smoking to be 7-25% among Iranian high school boys (10-14, 29-31). Nonetheless, this measure was estimated as 33.5% and 44.6% in some studies in Tehran and Kerman, respectively (15, 30).

Kelishadi, et al. (2003) conducted a national study and found that the prevalence of self-reported cigarette smoking was 18.5% in Iranian 11-18-year-old boys, which was higher in high school students compared to middle school ones (12). Gharlipour et al. (2010) (10), and Ayatollahi et al. (2005)(14), also carried out two separate studies in Shiraz and demonstrated that the prevalence of smoking for at least once was 6.9% among the 8th grade boy students and 16.9% among the 10th grade ones (10, 14). Based on the results of the current study, it seems that there is a slight difference between the prevalence of cigarette smoking in adolescents in Shiraz and those reported in other studies in Iran. However, those studies were conducted on different samples. For example, Ghalipour and Ayatollahi just assessed students in one educational grade.

Consistent with the findings of many studies in Iran and other countries (13, 20, 29, 31-34), the present study results revealed a significant difference among the students in the 9th, 10th, and 11th grades, regarding smoking experience. Accordingly, the possibility of smoking experience increased by increase in the students' grades (14.7%, 21.5%, and 25.48% for the students in grades 9, 10,

and 11, respectively; $p=0.001$). However, Ayatollahi et al. (2005) did not find any significant relationships between students' age and their smoking status in Shiraz (14). Many studies have revealed that socio-demographic factors, such as parents' low education level, low socio-economic status, and living with one parent, were risk factors for cigarette smoking among adolescents (35-37). Based on our findings, father's higher education level was associated with a dramatic reduction in the students' smoking experience ($p=0.03$). Several studies have also confirmed this finding (6, 15, 23, 38). However, this relationship was not shown in the study performed by Habibi et al.(30). On the other hand, many studies have found that mother's higher education level was associated with a decrease in children's smoking (6, 23, 39, 40). However, consistent with the results obtained by Barreto et al. (41), our study indicated no significant relationship between mother's education level and students' cigarette smoking.

There was no agreement about the effects of other socioeconomic variables, including parents' jobs and family's economic status, on adolescents' smoking in the previous studies. Our study findings showed no significant difference between the ever smoker and never smoker groups, regarding parents' jobs and family's income status. US Surgeon General stated lower socio-economic status as a risk factor for the initiation of tobacco use in the youth (36). In contrast, the findings of the study conducted by Rezaei et al. (2011) showed that in the group with high socio-economic status, not only the adolescents smoked more, but they also had easier access to cigarettes (42).

Moreover, Kelishadi et al. (2007), reported that father's job status was one of the strongest predictors of boys' cigarette smoking (38). On the other hand, some other studies in Iran have found no

significant relationships between students' cigarette smoking and father's employment status and family's income and economic status (29, 30). Based on our findings, the chance of experiencing cigarette smoking was higher among the students who lived with none of their parents (OR=4.41), their mother alone (OR=2.007), and their father alone (OR=1.10) compared to those who lived with both of their parents. Similar results were also obtained by Sanchez et al. (2010) (4) and Gittens et al. (2009)(23). The results of the study conducted by Habibi et al. (2011) in Iran showed that 18.8% of smoker students lived with both of their parents, 38.9% lived with one of their parents, and 42.3% lived with their stepfathers or stepmothers(30). Moeini et al. (2012), also carried out a research in Hamedan, Iran, and found that the chance of cigarette smoking was 4.44 folds higher among adolescents who lived with people other than their parents (13).

Several studies have addressed the environmental factors associated with cigarette smoking by adolescents, including tobacco use by parents, siblings, and peers and preventive laws at home. However, contradictory results have been obtained regarding the relative impact and predictive power of each of these variables (6, 17, 22, 43).

Consistent with the results of the research by Leonardi et al. (2011)(43), our results disclosed that having smoker siblings was the strongest predictor of the students' smoking experience (OR=3.63). Moreover, Bauman et al. (1990), believed that if parents' lifetime smoking was considered, the effect of parental smoking on adolescents' cigarette smoking was as important as that of friends' smoking (17). Also, Gilman et al. (2009), reviewed 87 studies and concluded that smoker siblings and peers had a strong impact on adolescents' smoking (22). However, Vuolo et al. (2014), stated that older

smoker siblings were mediators of parents' smoking and younger family members' behaviors (44). According to our findings, friends' smoking was the second important predictor of the adolescents' smoking (OR=3.28). Yet, most studies have revealed that having smoker friends was a stronger predictor in comparison to parents' and family members' smoking. For example, Gittens et al. (2013), suggested that among seven risk factors for smoking, having relations with smoker friends was the most important factor in all age and sex groups (23). Additionally, Mahammadpour et al. (2012), reported that the chance of smoking was 2.52 times higher among the students with smoker friends compared to 1.78 times among those who had a smoker family member (33). Similarly, Moeini et al. (2010), indicated that the chance of smoking was higher in the adolescents who had smoker friends (OR=10.74) than in those who had smoker siblings (OR=5.68)(13).

Zalabani et al. (2015), also showed that the adolescents with most or all their close friends smoking and those having some smoker friends had respectively a 12.5- and 5.7-fold higher risk of smoking compared to the students who had no smoker friends (21). Several other studies have also confirmed this findings (18, 22, 29). The results of many studies have shown the higher probability of smoking in the adolescents whose parents smoked at present or in the past compared to those with never smoker parents (6, 15, 17, 18, 26, 44).

For instance, Zalabani et al. (2015), reported that the chance of smoking was 1.3 times higher in the adolescents with one smoker parent and 2.95 times higher in those whose both parents smoked in comparison to those with never smoker parents (21). In the study by Karimi et al. (2013), having smoker parents was the most important predictor of adolescents' smoking (OR=4.75)(15). In the current

study, on the other hand, father's smoking increased the chance of smoking by children less compared to siblings' and friends' smoking (OR=1.73). Some researchers believed that this difference was influenced by age. They suggested that parents' smoking had a strong impact on children's smoking, but as they entered adolescence (13-19 years old), the initiation of cigarette smoking was more affected by their smoker peers (6, 22). Similar to the study by Gilman et al. (2009)(22), the current study findings demonstrated that the smoking history of the fathers who did not smoke currently did not increase the chance of students' smoking significantly. However, Bailey et al. (1993) showed that the chance of smoking was 6 times higher among the children with parents who had smoked in the past and 4 times higher among those with current smoker parents in comparison to those with never smoker parents (26).

Bauman et al. (1990), also believed that in comparison to current smoking, parents' lifetime smoking had the stronger relationship with adolescents' smoking. Based on their findings, in case parents' history of smoking was regarded as a criterion, parents' smoking was as important as friends' smoking (17). Consistent with some other studies (4, 11), our study results indicated that family members' smoking at home increased the possibility of the students' smoking (OR=1.96). This might be due to the indirect confirmation of cigarette smoking, lack of preventive rules about smoking cigarettes at home, and exposure to second-hand smoke (6).

4-1. Limitations of the study

Numerous aspects of this study may limit the application of its findings. First, limitation of the study participants to urban boy students (girls, students living in rural areas, and adolescents who did not go to school were not enrolled into the study) limit the generalizability of the results.

Thus, this issue is recommended to be addressed in other studies. Another important limitation of this study was making use of a self-administered questionnaire that despite being anonymous and ensuring the confidentiality of the information, increases the possibility of under-reporting of smoking by students. In addition, some students (5.3%) did not complete the questionnaires probably due to concerns about leaking of their answers. Therefore, the prevalence of the students' smoking experience might have been underestimated in this study.

5- CONCLUSION

The study findings revealed that cigarette smoking should be a public health and social-behavioral concern in all families from different socio-economic status. As students who did not live with any of their parents or lived only with their mother had high possibility of smoking experience, special attention should be paid to orphans and children of divorce. Moreover, based on the study results, setting rules about cigarette smoking inside and outside the home environment, and monitoring and being aware of offspring and their friends' behavior may reduce the risk of adolescent chance smoking. However, up to now, contradictory results have been obtained regarding the association between adolescents' smoking experience and demographic factors as well as family members' and friends' cigarette smoking. So; further studies in larger scales which include both sexes and rural and urban areas are needed to be done in this regard, especially in Iran

6- CONFLICT OF INTEREST

The authors declare that they have no conflict of interests.

7- ACKNOWLEDGMENTS

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