



Sociodemographic Factors Associated With Tobacco Smoking Among Intermediate and Secondary School Students in Jazan Region of Saudi Arabia

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ABSTRACT. *Background:* The objectives of this study were to (i) determine the prevalence of and characteristics associated with tobacco smoking; (ii) identify the factors associated with tobacco smoking; and (iii) evaluate the association between tobacco smoking and khat chewing among intermediate and secondary school students in Jazan Region, Saudi Arabia. *Methods:* A cross-sectional study was conducted with a representative sample ($N = 4100$) of intermediate and secondary school students in Jazan Region. The data were collected using a pretested modified version of the global youth tobacco survey questionnaire. *Results:* A total of 3923 students from 72 intermediate and secondary schools for males and females in Jazan Region, Saudi Arabia, were included in this study. The ever having smoked prevalence was 17.3%, and the current smoking prevalence was 10.7%. The most important independent predictors of smoking were academic performance (odds ratio [OR]: 5.32), having friends who used khat (OR: 3.23), and having friends who used tobacco (OR: 2.88). *Conclusions:* Understanding the factors and predictors associated with tobacco use are crucial to identifying high-risk groups to design tobacco prevention and control programs. For the first time, a strong and statistically significant association was identified between tobacco smoking and khat chewing among intermediate and secondary school students in Jazan Region. Because the use of khat is increasingly spreading outside of its traditional areas to Europe and America, this finding may have an important impact on tobacco control efforts internationally.

Keywords: Co-substance use, priority/special populations, tobacco

INTRODUCTION

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Although the World Health Organization Framework Convention on Tobacco Control (WHO FCTC) has been one of the most rapidly embraced treaties in the history of the United Nations, tobacco use continues to be the leading global cause of preventable death (1, 2). It kills nearly 6 million people and causes hundreds of billions of dollars of economic damage worldwide each year (1), and the death toll from tobacco is expected to reach 8 million people per year in 2030 (2).

In the WHO Eastern Mediterranean Region, the adult daily smoking prevalence (age- and sex-standardized) ranges

from 4% in Oman to 37% in Lebanon (1). In the Gulf Cooperation Countries (GCCs), the adult daily smoking prevalence is 21% in Yemen, 19% in Bahrain, 17% in Kuwait, 9% in Saudi Arabia, 7% in the United Arab Emirates, and 4% in Oman (1). The prevalence of the current use of any tobacco product among youth (13–15 years old) in the GCC reaches alarming levels (3–9). According to the most recent Global Youth Tobacco Survey (GYTS) data, the current use of any tobacco product among boys ranges from 15.5% in Yemen (5) to 28% in Bahrain and Kuwait (7, 9), whereas use among girls ranges from 10.5% in Yemen (5) to 14.3% in Kuwait (7).

Sixteen years ago, Jarallah et al. reported that 3.2% of intermediate schoolboys (12–13 years old) in Riyadh, Saudi Arabia, were current smokers (10). In 2001, Abdullah found that this prevalence had increased to 13.2% in Riyadh (11). The GYTS 2007 data show that the prevalence of current smokers was 20.2% among intermediate schoolboys and 10.7% among girls (4).

Variations in the prevalence of current smokers among boys in secondary school have been observed between different regions in Saudi Arabia (12–15). The prevalences of 21.7%, 29.8%, and 31.2% were reported in the Al-Hassa, Al-Qassim, and Riyadh regions, respectively (13–15). Some factors have been identified as predictors of tobacco use in studies conducted at the international and national levels (10, 13–17), such as age (10, 15, 16), gender (13, 15, 16), perception and knowledge of the health hazards of smoking (10, 17), having friends or parents who smoke (13, 15–17), peer influence (10, 14–17), academic performance, type of school, and religion (17). Although some studies have examined the prevalence of tobacco smoking and associated sociodemographic factors among school students in many specific regions, no studies are available for Jazan Region, Saudi Arabia. This study was the first to examine these associations in Jazan Region. The general education system in Saudi Arabia consists of three levels: primary (6 years), intermediate (3 years), and secondary (3 years). Then, the students start their higher education studies either in universities and colleges or in technical training institutes.

Jazan Region is located in the southwest of Saudi Arabia. The capital of the region is only 70 km from the border with Yemen. This location, in addition to the region's population characteristics, has resulted in a unique mixture of social norms and values. Khat chewing is a social norm in this region, as in Yemen, with a high prevalence among school and college students, reaching 21.5% and 15.2%, respectively (18). Khat is a well-known natural stimulant from the *Catha edulis* plant, which is a large flowering evergreen shrub in the Celastraceae family. Khat chewing has a stimulating effect on the central nervous system, and for this reason, khat is chewed widely in the Red Sea region, including parts of Ethiopia, Kenya, Somalia, Zimbabwe, Tanzania, Uganda, Malawi, and South Africa, as well as Yemen. Takhzeen al-Khat (khat chewing) is a common habit among all segments of the Jazan population. This habit involves picking tender

leaves of the khat plant, inserting them into one side of the mouth, chewing them for a while, and then storing them in the same side of the mouth. People chew khat because of its psychostimulation effect, which takes the form of euphoria and excitement and is due to the cathinone content (18). Khat chewing is a social habit that is traditionally associated with tobacco use. This study explored the relationship between khat chewing and tobacco smoking. Information about tobacco use and its predictors will contribute to the design of prevention and control programs for the general population and for high-risk groups.

Objectives

- To determine the prevalence of and characteristics associated with tobacco smoking among intermediate and secondary school students in Jazan Region, Saudi Arabia.
- To identify the factors associated with tobacco smoking among intermediate and secondary school students in Jazan Region.
- To evaluate the association between tobacco smoking and khat chewing among intermediate and secondary school students in Jazan Region.

METHODS

Study Area

Jazan is one of 13 regions in Saudi Arabia. It lies in the southwest corner of the country and is directly north of the border with Yemen. This region is situated on the coast of the Red Sea and serves as a large agricultural heartland, with a population of 1.5 million according to the 2010 census.

Study Design and Population

This observational cross-sectional study targeted students between the ages of 12 and 21 years in both intermediate and secondary schools in Jazan Region. This study was conducted in late 2011.

Sample Size and Design

A representative random sample of 4100 students was identified using 3-stage cluster random sampling based on educational sectors, schools, and grades. Two intermediate schools and 2 secondary schools for each gender were selected from the 9 educational sectors of Jazan Region.

In the general education system, all schools use the curriculum endorsed by the Ministry of Education, but some schools add Quran recitation as a major subject. These schools are referred to herein "Quranic," whereas we refer to the other schools as "formal" schools. A total of 72 intermediate and secondary schools in Jazan Region were selected using systematic random sampling. Probability-proportional-to-size (PPS) sampling was used to determine the number

of students included from each selected school. Systematic random sampling was used to select the target students from different grades within each selected school. The inclusion criteria for our analysis were (a) student status, (b) age between 12 and 21 years, (c) consent to participate in the survey, and (d) no missing data for the tobacco-related variables. A total of 3923 students (approximately 95.68%) satisfied these criteria; the remaining 4.32% were nonresponders and subjects with missing data for tobacco-related variables.

Data Collection

A modified version of the GYTS questionnaire was used for data collection. The questionnaire was tested in a pilot study of 160 students. Minor modifications in questions phrasing were made to the original questionnaire after the pretest. The self-administered questionnaire covered demographic data (age, sex, class, family background, including father's and mother's education levels, employment, and income levels), tobacco use patterns (type of smoking, frequency, age of initiation, duration), and possible risk factors that may encourage students to start smoking. A smoker was defined as someone who was currently using ≥ 1 tobacco product (cigarettes, waterpipes, etc.). Current smoking included daily, nondaily, and occasional smoking in the past 30 days.

Data Management and Analysis

To ensure the quality of the data collection, the field work supervisor reviewed the submitted questionnaire daily, and any errors or inconsistencies were reviewed and corrected immediately. The data entry was performed at the Substance Abuse Research Centre of Jazan University under the supervision of a data analysis specialist. The data were managed and analyzed using Epi-Info version 3.5.3 (Center for Disease Control and Prevention [CDC], USA) and SPSS ver-

sion 17.0 (SPSS, Chicago, IL, USA). Descriptive statistics (mean, standard deviation [SD], and proportion) were used to describe the study variables. The chi-square test was used to test for associations, and Student's *t* test for independent samples was used for bivariate analyses. Crude odds ratios (ORs) with 95% confidence intervals (CIs) were calculated to measure the strength of the association of each of the categorical variables with the nominal outcome variable (smoking status). Stepwise multiple logistic regression was then used to determine the adjusted ORs to identify the most important predictors for smoking among students in our sample. A *P* value $< .05$ was considered statistically significant.

Ethical Considerations

Ethical clearance and permission was obtained from the local authorities of Jazan Region prior to the beginning of the data collection. The study proposal and instrument were approved by Jazan University's review board. Authorization was granted by the headmasters and the Directorate of Education Sectors in Jazan and Sabiya. During the distribution of the questionnaire, the students were informed that the information collected would be kept anonymous and that participation was completely voluntary.

RESULTS

Table 1 shows the background characteristics of the study population. A total of 3923 students from 72 intermediate and secondary schools in Jazan Region were included in the study. Approximately 39% (1521) were from rural areas, 42.8% (1678) were from intermediate schools, and 43.8% (1717) were female. The majority of the students (75.1%) were 15–19 years old, and 15% (589) were from Quranic schools.

TABLE 1
Background Characteristics of the Study Population

Characteristics	Intermediate No. (%)		Secondary No. (%)		Total
	Male	Female	Male	Female	
Type of school					
Quranic	174 (18.7)	224 (29.9)	174 (13.5)	17 (1.8)	589 (15)
Formal	756 (81.3)	524 (70.1)	1111 (86.5)	952 (98.2)	3343 (85)
Age group					
10–15	415 (44.6)	450 (56.1)	10 (0.8)	27 (2.8)	872 (22.2)
15–19	515 (55.4)	328 (43.9)	1199 (93.3)	909 (93.8)	2951 (75.1)
20+	—	—	76 (5.9)	33 (4.4)	109 (2.8)
Grade					
First	209 (22.5)	225 (30.1)	355 (27.6)	264 (27.2)	1053 (26.8)
Second	329 (35.4)	221 (29.5)	406 (31.6)	314 (32.4)	1270 (32.3)
Third	392 (42.2)	302 (40.4)	524 (40.8)	391 (40.4)	1609 (40.9)
Mode of living					
Rural	298 (32.0)	320 (42.8)	543 (42.3)	360 (37.2)	1521 (38.7)
Urban	632 (68.0)	428 (57.2)	742 (57.7)	609 (62.8)	2411 (61.3)
Total	930 (100)	748 (100)	1285 (100)	969 (100)	3923 (100)

TABLE 2
Smoking Prevalence Among the Study Population

Category	Ever having smoked		Current smoking	
	Yes%	95% CI	Yes%	95% CI
Gender				
Male	522 (25.5)*	23.71–27.50	323 (16.2)*	14.64–17.87
Female	105 (6.5)	5.50–7.95	59 (3.8)	2.93–4.83
School level				
Intermediate school	195 (12.7)*	11.11–14.44	120 (7.9)*	6.64–9.35
Secondary school	432 (20.7)	18.97–22.44	262 (12.8)	11.46–14.36
School type				
Quranic school	87 (17.0)	14.01–20.53	52 (10.5)	8.10–13.5
Formal school	540 (17.3)	16.03–18.69	330 (10.8)	9.71–11.91
Mode of living				
Urban	376 (16.8)	15.30–18.40	242 (11.0)	9.80–12.42
Rural	251 (18.1)	16.12–20.16	140 (10.2)	8.72–11.93
Total	627 (17.3)	16.08–18.54	382 (10.7)	9.75–11.78

*Statistically significant.

Table 2 shows the smoking prevalence among the study population according to gender, school level, school type, and mode of living. The ever having smoked prevalence was 17.3% (95% CI: 16.12–20.16), and the current smoking prevalence was 10.7% (95% CI: 9.75–11.78). Statistically significant differences were observed in the smoking prevalence by gender and school level, whereas the differences by school type and mode of living were not significant. The prevalence of current smoking was higher among males (16.2%; 95% CI: 14.64–17.87) than females (3.8%; 95% CI:

2.93–4.83). Furthermore, the prevalence of current smoking was higher among secondary school students (12.8%; 95% CI: 11.46–14.36) than among intermediate school students (7.9%; 95% CI: 6.64–9.35).

Figure 1 shows the prevalence of current smokers in Jazan among male intermediate and secondary schools students compared with other regions in the Kingdom of Saudi Arabia. The prevalence of current tobacco smoking was higher among secondary school males (19.1%) than among male intermediate school students (12.1%), female secondary school students (4.7%), and female intermediate school students (2.5%). A similar trend was observed for the prevalence of ever having smoked, with a prevalence reaching 30.2% among secondary school males.

The mean age at first smoking (age of initiating smoking) was 12.96 years for males and 12.49 years for females. The mean number of cigarettes smoked per day was 5.42 for males and 3.79 for females, and the mean number of waterpipes smoked per day was 3.32 for males and 1.92 for females ($P < .05$).

Table 3 shows the smoking status, family characteristics, students' living situation, father's education and occupation, mother's education and occupation, and family income. Statistically significant associations ($P < .05$) were observed between the student's smoking status and the people with whom the student lived, the father's education and occupation, and the mother's education. No significant associations were observed with the mother's education, the father's occupation, or family income. The smoking prevalence was lower among those who lived with both parents (16.8%) and was higher among those who lived with one parent (father

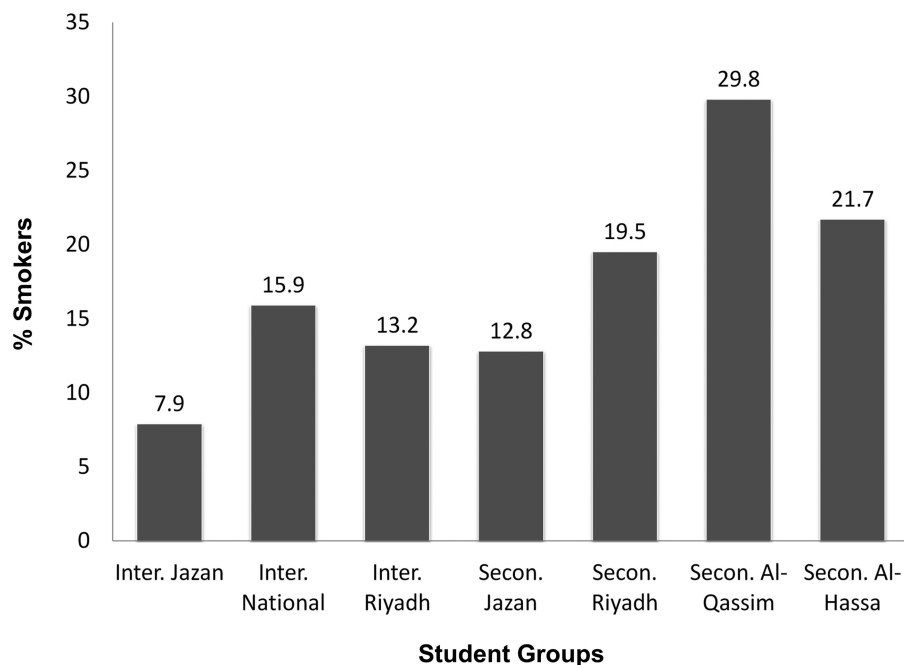


FIGURE 1 Prevalence of current smokers in Jazan among male intermediate and secondary schools students compared with other regions in the Kingdom of Saudi Arabia.

TABLE 3
Smoking Status and Family Characteristics

Variable	Smoking status		P value
	Smokers	Nonsmokers	
With whom do you live			
Both parents	540 (16.8)	2681 (83.2)	$P < .05$
Father	15 (19.5)	62 (80.5)	
Mother	39 (18.3)	174 (81.7)	
Relatives	16 (27.6)	42 (72.4)	
Alone	9 (34.6)	17 (65.4)	
Father's education			
Illiterate	106 (18.9)	456 (81.1)	$P < .05$
Read and Write	98 (17.7)	457 (82.3)	
Primary	113 (20.7)	434 (79.3)	
Intermediate	75 (16.0)	394 (84.0)	
Secondary	82 (17.2)	396 (82.8)	
University and above	132 (14.5)	777 (85.5)	
Mother's education			
Illiterate	176 (15.9)	928 (84.1)	
Read and write	91 (19.3)	381 (80.7)	
Primary	130 (19.0)	554 (81.0)	
Intermediate	77 (20.1)	306 (79.9)	
Secondary	50 (16.1)	261 (83.9)	
University and above	92 (15.5)	501 (84.5)	
Father's occupation			
Government employee	329 (17.2)	1579 (82.8)	NS
Private sector employee	26 (18.1)	118 (81.9)	
Own business	93 (19.5)	383 (80.5)	
Farmer/laborer	31 (18.9)	133 (81.1)	
Other	128 (15.5)	699 (84.5)	
Mother's occupation			
Government employee	83 (14.2)	501 (85.8)	$P < .05$
Private sector employee	8 (25.0)	24 (75.0)	
Own business	15 (22.1)	53 (77.9)	
Housewife	461 (17.0)	2246 (83.0)	
Other	35 (26.9)	95 (73.1)	
Family income			
Less than \$1000	104 (16.1)	542 (83.9)	NS
\$1001-\$3000	193 (18.8)	835 (81.2)	
Greater than \$3000	119 (17.6)	556 (82.4)	

Note. NS = not significant.

or mother) or relatives, reaching 34.6% for students who lived alone. A significant association was observed between students' smoking status and the father's education level. Generally, the smoking prevalence decreased as the father's education level increased. Students whose mothers worked in governmental positions had the lowest smoking prevalence (14.2%), whereas those whose mothers worked in the private sector and other jobs had the highest prevalence (26.9%).

Table 4 shows a comparison of smokers and nonsmokers with regard to age group, academic performance, pocket money, friends' smoking and khat use status, and psychological and mental status. Statistically significant associations ($P < .001$) were observed between smoking status and all of these factors. Smoking prevalence tended to increase as the student's age and amount of pocket money increased ($P < .001$). Furthermore, the smoking prevalence was higher

TABLE 4
Comparison of Smokers and Nonsmokers With Respect to Certain Variables

Variable	Smoking status		P value
	Smokers	Nonsmokers	
Age group			
10-15	64 (7.9)	745 (92.1)	$P < .001$
15-19	530 (19.5)	2188 (80.5)	
20+	33 (32.7)	68 (67.3)	
Academic performance			
Excellent	200 (11.4)	1560 (88.6)	$P < .001$
Very good	243 (19.7)	992 (80.3)	
Good	163 (27.9)	421 (72.1)	
Pass	11 (33.3)	22 (66.7)	
Fair	10 (62.5)	6 (37.5)	
Pocket money			
Less than 100 SR	105 (13.8)	658 (86.2)	$P < .001$
101-150 SR	81 (12.0)	592 (88.0)	
151-500 SR	180 (16.6)	906 (83.4)	
More than 500 SR	108 (29.3)	261 (70.7)	
Friends who smoke			
Yes	450 (37.3)	756 (62.7)	$P < .001$
No	146 (6.6)	2079 (93.4)	
Friends who use khat			
Yes	494 (34.8)	927 (65.2)	$P < .001$
No	119 (5.7)	1970 (94.3)	
Have you received a proposition during the past year?			
Yes	217 (27.8)	563 (72.2)	$P < .001$
No	351 (13.6)	2224 (86.4)	
Feel depressed			
Yes	320 (19.0)	1367 (81.0)	$P < .05$
No	263 (15.9)	1392 (84.1)	
Feel stressed			
Yes	216 (24.4)	668 (75.6)	$P < .001$
No	380 (15.1)	2135 (84.9)	
Feel anxious			
Yes	247 (21.1)	925 (78.9)	$P < .001$
No	357 (15.9)	1895 (84.1)	

among students who had poor academic performance, had received an offer to smoke during the past year, or had a friend who smoked or use khat ($P < .001$). Tobacco use was higher among those who felt depressed (19.0% vs. 15.9%; $P < .05$), those who felt stressed (24.4% vs. 15.1%; $P < .001$), and those who felt anxious (21.1% vs. 15.9%; $P < .001$).

Table 5 shows the univariate and multivariate logistic regression analyses for smoking-related factors among the study participants. These factors included gender, school level, age group, academic performance, amount of pocket money, friends' smoking status, friends' khat use status, and feelings of stress. In the univariate analysis, all of these factors exhibited highly significant statistical associations ($P < .001$), with odd ratios ranging from 1.79 (95% CI: 1.491-2.154) for the secondary school level to 13.00 (95% CI: 4.675-36.152) for fair academic performance. In the multivariate logistic regression analysis, the school level and age group exhibited statistically nonsignificant associations.

TABLE 5
Univariate and Multivariate Logistic Regression Analyses for Smoking-Related Factors Among the Study Participants

Category	Univariate			Multivariate*		
	OR	95% CI	P value	OR	95% CI	P value
Gender						
Female (Ref.)	1			1		
Male	4.84	3.88–6.05	<i>P</i> < .001	1.85	1.43–2.39	<i>P</i> < .001
School level						
Intermediate (Ref.)	1			1		
Secondary	1.79	1.49–2.15	<i>P</i> < .001	1.12	0.84–1.50	NS
Age groups						
10–14 (Ref.)	1			1		
15–19	2.00	1.31–3.07	<i>P</i> < .001	1.26	0.70–2.26	NS
20+	5.65	3.47–9.20	<i>P</i> < .001	1.71	0.84–3.49	NS
Academic performance						
Excellent (Ref.)	1			1		
Very Good	3.33	0.96–11.57	<i>P</i> < .001	3.01	0.41–21.77	NS
Good	4.31	1.54–12.04	<i>P</i> < .001	3.05	0.59–15.75	NS
Pass	6.80	2.45–18.90	<i>P</i> < .001	3.91	0.76–20.06	NS
Fair	13.00	4.68–36.15	<i>P</i> < .001	5.32	1.03–27.35	<i>P</i> < .05
Pocket money						
Less than 100 SR (Ref.)	1			1		
101–150 SR	2.08	1.58–2.74	<i>P</i> < .001	1.80	1.26–2.58	<i>P</i> < .05
151–500 SR	3.02	2.19–4.18	<i>P</i> < .001	1.81	1.23–2.67	<i>P</i> < .05
More than 500 SR	2.59	1.91–3.52	<i>P</i> < .001	1.72	1.24–2.38	<i>P</i> < .05
Friends who smoke						
No (Ref.)	1			1		
Yes	8.48	6.90–10.40	<i>P</i> < .001	2.90	2.10–4.00	<i>P</i> < .001
Friends who use khat						
No (Ref.)	1			1		
Yes	8.82	7.11–10.93	<i>P</i> < .001	3.23	2.20–4.75	<i>P</i> < .001
Feel stressed						
No (Ref.)	1			1		
Yes	1.82	1.51–2.19	<i>P</i> < .001	1.85	1.43–2.39	<i>P</i> < .001

Hosmer-Lemeshow goodness-of-fit test: $\chi^2 = 11.147$, *P* = .194.

*Adjusted for other variables in the table.

The risk factors identified by the multivariate logistic regression analyses were fair academic performance (OR: 5.32; 95% CI: 1.034–27.35), having friends who use khat (OR: 3.23; 95% CI: 2.200–4.75), having friends who use tobacco (OR: 2.90; 95% CI: 2.10–4.00), being male and feeling stressed (OR: 1.85; 95% CI: 1.43–2.39), and the amount of pocket money (151–500 SR) (OR: 1.81; 95% CI: 1.23–2.67).

DISCUSSION

The prevalences of ever having smoked and current smoking among the study population were 17.3% and 10.7%, respectively. The current tobacco smoking prevalence among intermediate school students in Jazan Region of 7.9% (boys = 12.1%, girls = 2.5%) is the lowest reported in all GCC states according to the latest GYTS (4), with significant variation between the two genders (Table 2 and Figure 1). The current tobacco smoking prevalence among intermediate school students is 14.1% in the bordering countries of Yemen (5), 15.2% in Oman (6), 15.9% in Saudi Arabia (4), 17.9% in

Qatar (3), 19.5% in the United Arab Emirates (8), 19.9% in Bahrain (9), and 20.9% in Kuwait (7).

The prevalence of current tobacco smoking among secondary school students in Jazan was 12.8% (boys = 19.1%, girls = 4.7%), which is lower than that reported in other regions of Saudi Arabia. In Riyadh Region, a smoking prevalence of 31.2% among secondary school boys and 8.9% among girls was reported (13). In Al-Qassim and Al-Hassa regions, smoking prevalences of 29.8% and 21.7%, respectively, were reported among secondary school boys (14–16). The tobacco regulations are national and not regional; therefore, all regions have the same policies that prohibit access to tobacco products by the underage population. People in Jazan usually live in small settlements with their relatives, their extended families, and those with whom they have tribal links, especially in rural areas. This mode of living may contribute to the lower level of low tobacco use, as teenager will be under the surveillance of their relatives most of the time when at home, on the streets, and in public places. More studies that examine demographic, social, and cultural factors are needed to explain these differences.

The prevalence was higher among males and among secondary school students than among females and intermediate school students (Table 2). This finding is consistent with the findings of other studies conducted in Saudi Arabia and the Gulf region and with international reports (1, 3–9, 11, 13, 19, 20). The high prevalence of underage smoking suggests that greater enforcement of regulations that minimize the access of minors to tobacco products is needed.

Some factors affect students' tobacco smoking status. These factors include family circumstances, the students' characteristics, and the students' relationships. Generally, the tobacco smoking prevalence was higher among those who live with a single parent (father or mother) or relatives and those who live alone. The tobacco smoking prevalence was also significantly associated with the father's education level and the mother's occupation. These associations are most likely due to a lack of supervision and guidance among this category of students and to their psychological status. Our results show that tobacco use is higher among those who feel depressed, stressed, or anxious. Although these feelings are self-perceived and self-reported, this finding provides indicators about the relationship between smoking and the psychological status in this region. More studies utilizing validated scales for depression, stress, and anxiety are recommended.

Univariate and multivariate logistic regression analyses were used to identify factors related to tobacco smoking among the study participants. The risk factors identified by the multivariate logistic regression analysis included fair academic performance (OR: 5.32; 95% CI: 1.03–27.35), having friends who use khat (OR: 3.23; 95% CI: 2.20–4.75), having friends who use tobacco (OR: 2.90; 95% CI: 2.10–4.00), being male and feeling stressed (OR: 1.95; 95% CI: 1.43–2.40), and the amount of pocket money (151–500 SR) (OR: 1.81; 95% CI: 1.23–2.667) (Tables 4 and 5). In Malaysia, an association was found between smoking prevalence and poor academic performance among Malaysian students, similar to our findings in Jazan (17). This study is the first to report a strong association between khat use and tobacco smoking. Having friends who smoke increased the risk of smoking, a result that is consistent with those of many national and international studies, including studies performed in Riyadh (10), Al-Qassim (14), Al-Hassa (15, 16, 21), and Malaysia (17). This association reflects the power of peer pressure and the influence of friends. Similar findings have been reported. One hypothesis of this study was that Quranic schools would have lower rates of smoking than formal schools. In Malaysia, one study found that tobacco use is lower in Quranic schools than in formal ones (17), but our findings show that the prevalence is almost equal in Saudi Arabia. The role of the family was found to be essential in tobacco control and prevention. The family members provide guidance, act as good role models, and provide psychological support to reduce stress, anxiety, and depression.

Conclusions and Recommendations

Understanding the factors and predictors associated with tobacco use will help identify high-risk groups, e.g., students with fair/low academic performance, students with friends who use khat, students with friends who use tobacco, and students who feel stressed in schools; thus, this understanding will aid in the design of tobacco/substance abuse prevention and control activities in Jazan and areas with similar populations. The prevalence of tobacco in Jazan, Saudi Arabia, and GCC reflects the need for greater enforcement of regulations that prohibit access to tobacco products by the underage population.

For the first time, a statistically significant association was identified between tobacco smoking and khat chewing among intermediate and secondary school students in Jazan Region. Because khat used is increasingly spreading outside its traditional areas to Europe and America, this finding may have an important impact on tobacco control efforts internationally.

Study Limitations

Tobacco use by minors is not socially accepted in Jazan Region. Our study was based on the use of a self-administered questionnaire; therefore, the denial of use is expected from some users. Therefore, the prevalences reported herein may be lower than the true prevalences. In addition, the use of a self-administered questionnaire for students at the intermediate level may have some drawbacks. Nonresponse is one anticipated issue. We controlled for nonresponse by calculating the sample size necessary to overcome the expected response rate. Furthermore, a cross-sectional study design is not the best design for assessing some of the variables associated with tobacco use.

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