

Gender differences in smoking behavior among adolescents in Saudi Arabia

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ABSTRACT

Objectives: To describe and assess gender differences in current cigarette smokers' according to certain variables including prevalence, access to tobacco, knowledge and attitude, environmental tobacco smoke, cessation of smoking, tobacco related advertisements, and education on tobacco in school among adolescents in grades 7-12 in Tabuk, Saudi Arabia.

Methods: A random sample of schools in Tabuk city was obtained using a 2-stage cluster, in April 2005. A total of 16 governmental schools were selected. Within the schools, 48 classes were selected, targeting grades was 7 to 12. An anonymous, self-administered questionnaire was used to select 1,505 participants, with 96% response rate.

Results: Out of 1,505 students, 22.3% (34% males, 11.1% females) were current cigarette smokers (students who had smoked on one or more days in the 30 days preceding the survey), and 5.8% (11.1% males, 0.7% females) were daily smokers. There were significant gender differences concerning source of cigarettes, usual place of smoke, intensity of smoking, knowledge on addiction of tobacco, exposure to education on tobacco, attitudes, and exposure to tobacco smoke in public places. While no significant gender differences were found with respect to age of initiation, knowledge of health hazards of tobacco, exposure to media, desire to quit, or exposure to tobacco smoke at home.

Conclusion: For the suppression of the use of tobacco by adolescents in Saudi Arabia differential intervention strategies and policies in males and females are needed, such as reducing youth access to cigarettes – in addition to intensive school and community anti-tobacco programs

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Epidemiological and research evidence from different parts of the world have stressed the importance of tobacco use - particularly cigarette smoking as a cause or important factor in the causation and deterioration of many diseases.^{1,2} Adolescents who smoke are more likely to have a variety of health problems, including upper respiratory tract infections, reduced lung growth, and retardation of maximum lung function. Adolescence is a critical period in the formation of smoking habits, with most smokers starting during their teenage years or early adult years. Ninety percent (90%) of persons who ever smoked cigarettes on a daily basis reported having smoked their first cigarette prior to age 15.³ Research suggests that between 33% and 50% of those who experiment with cigarette smoking escalate to regular use.³ Teenage smoking has been studied widely, and it has been found in Western countries that nearly 50% of school students have already established the habit of smoking with some degree of regularity by the age of 18.⁴

The World Health Organization estimates that 50% of men and 8% of women in developing countries are smokers. Data from previously published studies⁵ show the narrowing of the gap in prevalence of cigarette smoking between males and females in developing countries, due to an increasing rate of smoking in women and girls. In Saudi Arabia, according to published data the prevalence of adolescent smoking is relatively high (on average of 23%; range of 20-31.1%). The results vary, possibly due to different research design, methods, and age groups rather than smoking behavior. A limitation of previous studies is that samples consisted primarily of high secondary school

male students, neglecting young teenage students at the intermediate level.

The initiators and predictors of smoking by adolescents, although well documented in the West, have not been well studied in Saudi Arabia particularly the gender differences. The aim of this study is to describe and assess gender differences in current cigarette smokers' according to certain variables including prevalence of tobacco use, access to tobacco, knowledge and attitude, exposure to environmental tobacco smoke, attitude toward cessation of smoking, exposure to tobacco related advertisements in media, and education on tobacco and smoking in school among adolescents in Tabuk, Saudi Arabia. Assessing gender differences in smoking is vital for successful intervention strategies. The results of the study presented here are expected to provide valid and reliable information on cigarette smoking, and the related gender differences and similarities as a prerequisite for designing effective anti-smoking, gender-specific programs aimed at reducing and controlling the negative health, social, and economic effects among adolescents in Saudi Arabia.

Methods. Tabuk City is the Capital of the North West region of Saudi Arabia, and has a population of approximately 500,000. The Saudi Arabia Educational System has three pre-university levels: elementary level (grades 1-6), intermediate level (grades 7-9), and secondary level (grades 10-12). All schools are single-gender schools, with 94% of students at intermediate and secondary levels in public schools, and the remainder in private schools.

The current study was a cross-sectional, school-based study conducted in April 2005, in Tabuk Governmental schools, with grades 7 through 12, intermediate and secondary schools, corresponding to ages 12 to 19 years. The school-based study was preferred to the household survey as it was logistically easier, cheaper, and gave the students, particularly females, an opportunity to express their habits and views in the absence of family pressure.

A 2-stage stratified cluster sampling method was used. All public schools consisting of grades 7 to 12 in Tabuk City were placed in 2 categories according to school level (intermediate or secondary school). Each category was stratified further into 2 categories according to gender. In the first stage, 16 schools were randomly selected according to proportional enrollment size (4 schools from each of the 4 categories: 4 intermediate boys, 4 intermediate girls, 4 secondary boys, and 4 secondary girls). In the second stage, 3 classes were randomly chosen from each of the 16 schools, one from each grade. This yielded 48 classes with 1,566 students, all of them were included in the study. The mean class

size for the group was 32-33 students, and there were no obvious differences between males and females in this respect.

The study tool used was an anonymous, pilot-tested, self-administered questionnaire consisting of 56 questions, with core items selected from international standardized Global Youth Tobacco survey items (Arabic version). The questions were grouped into categories relating to tobacco use, including prevalence of tobacco use, minors' access to tobacco, knowledge and attitude toward smoking, exposure to environmental tobacco smoke, attitude toward cessation of smoking, exposure to tobacco related advertisements in media, and education on tobacco and smoking in school.

Questionnaires were distributed during mid-morning classes to avoid lunchtime and eliminating tardy students. The collection of data was conducted under the supervision of health care workers, in the absence of any schoolteacher or other school personnel. Parents were informed and could refuse their child's participation. Confidentiality was assured (written and verbal), and students were informed that the data would be used only for the stated research purposes and their participation was voluntary. The study was approved by a research and ethics committee at North West Armed Forces Hospital in Tabuk, and permission was obtained from related authorities.

Health workers were responsible for the delivery and collection of all survey documentation forms, and for reporting the number of students that did not attend class on the date of the study, or refused to participate in the study.

Completed questionnaires were collected and checked manually for completeness, and entered into a personal computer to be analyzed using the Statistical Package for Social Sciences version 11.5. Descriptive statistics was performed to compare between the 2 sexes. Statistical associations between current smoking status and study variables were tested with chi-squared statistics; Z-test was also used. The level of significance was set at $p < 0.05$.

The following definitions were used to characterize smoking status: Never smoker: students who never tried or experimented with cigarettes. Ever smoker: student who had ever smoked cigarettes even one or 2 puffs. Current cigarette smoking: student who has smoked on one or more days in the 30 days preceding the survey; those are further sub-classified as: regular smoker (daily smoker) and current intermittent smoker (smoking irregularly, not on daily basis). Current use of other tobacco products: student who has used any form of tobacco other than cigarettes on one or more days in the 30 days preceding the survey. Other tobacco products include chewing tobacco, snuff, dip, cigars, cigarillos, and pipe.

Results. All selected schools participated in the study, with a student participation rate of 96%. Forty five (45) students were absent from school and 16 students refused to participate or were excluded due to non-completion of items. Therefore, the number of students was reduced to 1,505. The non-participants do not appear to differ significantly from participants with respect to age, grade, gender, or school. The sample was composed of 738 males (49%) and 767 females (51%), from grade 7th-12th with almost equal distribution among grades. The mean age of the total sample is 15.62 with standard deviation of 1.70. For males, the mean age was 15.74 with standard deviation of 1.71, and for females, the mean age was 15.51 with standard deviation of 1.68. There were no significant differences in age within grades between males and females.

Table 1 shows smoking status by gender and age from the whole population sample (1505). The participants were categorized into 3 groups according to age: 12-15, 16-17, and 18-19 years. The overall ever smoking rate was 43.7% (65% males, 23.1% females).

The ever smoking rate increased from 38% at age 12-15 to 54.9% at age 18 and older. Overall, 22.3% of all respondents were current smokers (34% males, 11.1% females), and this rate increased from 20.3% (30.5% males, 10.8% females) at age 12-15 to 29.5% (41.9% males, 10.4% females) at age 18 and older. A greater number of males were daily smokers (11.1%) compared to females (0.7%). With 5.8% overall daily smokers, this rate increased from 2.6% at age 12-15 to 14.3% at age 18 and older. For ever smokers, current smokers, and daily smokers, a significant difference was observed between males and females ($p < 0.05$), with higher proportions among males. The proportion of ever smokers and current smokers increased with age among male students, and the highest proportion for females was at age 16-17.

Table 2 shows characteristics of current smokers according to gender. A majority of current smokers started at age 12-15 years in both males (57%) and females (47.1%), and more than 25% of both males and females started the habit at an earlier age. There was

Table 1 - Smoking status by gender and age from the whole population sample.

Smoking status	No. of participants (%)						p-value
	Total		Boys		Girls		
<i>Ever smoked</i>							
12-15	281	(38)	211	(58.4)	70	(18.5)	<0.0001
16-17	242	(46.4)	159	(69.4)	83	(28.3)	<0.0001
18-19	134	(54.9)	110	(74.3)	24	(25)	<0.0001
Total	657	(43.7)	480	(65)	177	(23.1)	<0.0001
<i>Never smoked</i>							
12-15	458	(62)	150	(41.6)	308	(81.5)	<0.0001
16-17	280	(53.6)	70	(30.6)	210	(71.7)	<0.0001
18-19	110	(45.1)	38	(25.7)	72	(75)	<0.0001
Total	848	(56.3)	258	(35)	590	(76.9)	<0.0001
<i>Current cigarette smoking</i>							
12-15	150	(20.3)	110	(30.5)	41	(10.8)	<0.0001
16-17	114	(21.8)	79	(34.5)	35	(11.9)	<0.0001
18-19	72	(29.5)	62	(41.9)	10	(10.4)	<0.0001
Total	336	(22.3)	251	(34)	85	(11.1)	<0.0001
<i>Daily cigarette smoking</i>							
12-15	19	(2.6)	18	(5)	1	(0.3)	<0.0001
16-17	33	(6.3)	29	(12.7)	4	(1.4)	<0.0001
18-19	35	(14.3)	35	(23.6)	0	(0.0)	<0.0001
Total	87	(5.8)	82	(11.1)	5	(0.7)	<0.0001
<i>Currently use other tobacco products</i>							
12-15	78	(10.8)	61	(16.9)	17	(4.5)	<0.0001
16-17	72	(13.8)	53	(23.1)	19	(6.5)	<0.0001
18-19	59	(24.2)	55	(37.2)	4	(4.2)	<0.0001
Total	209	(13.9)	169	(22.9)	40	(5.2)	<0.0001

no significant difference in the age of smoking initiation according to gender ($p=0.233$).

Significant gender differences were found concerning source of cigarettes, usual place of smoking, and intensity of smoking. In the 30 days prior to the study, approximately 57% of males obtained cigarettes from a store, while approximately 59% of females stole cigarettes from home. A majority of males (68.5%) usually smoked in public places and gatherings, while 80% of the females usually smoked at home. Less than 6% of females were daily current smokers, compared to approximately 33% of males. The intensity of smoking, as measured by the number of cigarettes smoked, is significantly higher in males than females, where more than 55% of males smoked 2 or more cigarettes per day compared to 21.2% of females.

Table 3 depicts knowledge and attitude, attitude toward cessation of smoking, exposure to environmental tobacco smoke, exposure to tobacco related advertisements in media, and education on tobacco and

smoking in school among current smokers according to gender. Knowledge regarding the harmful effects of direct and indirect smoking was high among both genders, with similar percentages (85%). Compared to males, females were significantly more positive towards smoking, citing that smokers look 'successful' and 'intelligent', versus 'lacks confidence', 'loser', and 'stupid'. Other items, such as 'smoking cigarettes makes people more comfortable at social gatherings' show no significant gender differences.

More than 75% of both genders cited a desire to quit smoking, but significantly more males than females tried seriously to quit (64.9% and 49.4%, respectively), received advice to quit smoking (78.1% compared to 67.1%), and discussed hazards of smoking at home (71.3% compared to 60%).

Approximately 75% of smokers were exposed to environmental tobacco smoke within 7 days preceding the survey, 69% at home, 80.7% at public places. Significant gender differences were found among those

Table 2 - Responses to questions regarding age of initiation, place, source and intensity of cigarette smoking among Current smokers (N=336).

Questions	Female N=85 (%)	Male N=251 (%)	P-value
<i>When did you first try a cigarette?</i>			
1 = 11 yrs old or younger	(30.6)	(27.1)	0.233
2 = 12 to 15 yrs old	(47.1)	(57)	
3 = 16 yrs or older	(22.4)	(15.9)	
<i>Where do you usually smoke?</i>			
1 = At home	(80)	(17.9)	<0.0001
2 = At school	(1.2)	(5.2)	
3 = At friends' houses	(9.4)	(2.8)	
4 = At social events	(5.9)	(4.8)	
5 = In public spaces (such as, parks, shopping centers, street corners)	(3.5)	(68.5)	
6 = Other	(0)	(0.8)	
<i>In the last 30 days, how did you usually get your own cigarettes?</i>			
1 = I bought them in a store or shop	(8.2)	(56.6)	<0.0001
2 = I bought them from a vendor	(1.2)	(2.4)	
3 = I gave someone else money to buy them for me	(1.2)	(1.6)	
4 = I borrowed them from someone else	(12.9)	(18.3)	
5 = I stole them from our home	(58.8)	(9.6)	
6 = An older person gave them to me	(9.4)	(3.6)	
7 = I got them other way	(8.2)	(8)	
<i>How many days did you smoke cigarettes in the past 30 days?</i>			
1 = 1 or 2 days	(51.8)	(27.9)	<0.0001
2 = 3 to 5 days	(23.5)	(11.6)	
3 = 6 to 9 days	(14.1)	(10.4)	
4 = 10 to 19 days	(4.7)	(12.7)	
5 = 20 to 29 days	(0)	(4.8)	
6 = All 30 days	(5.9)	(32.7)	
<i>On the days you smoked, how many cigarettes did you usually smoke?</i>			
1 = 1 cigarette/day or less	(78.8)	(44.6)	<0.0001
2 = 2 to 10 cigarette/day	(17.6)	(41.4)	
3 = 11 to 20 cigarettes/day	(1.2)	(9.2)	
4 = More than 20 cigarettes/ day	(2.4)	(4.8)	

exposed in public places (84.9% males, 68.2% females) ($p < 0.05$). A significantly higher proportion of females than males reported to have at least one parent who was a smoker (61.2% and 35.5%, respectively).

Almost half of current smokers reported watching an anti-tobacco program during the 30 days preceding the survey, and more than 75% reported watching tobacco promotion programs, no significant gender differences.

More males than females reported being taught or having discussed hazards of smoking in school, males 24.3–25.5% and females 16.5–18.8%, respectively, with statistics significant difference ($p < 0.05$).

Discussion. The study presented here describes the results of a school survey in 48 classes of 16 schools in Tabuk City, Saudi Arabia, among adolescents 12–19 years old. The Arabic version of the Global Youth Tobacco Survey (GYTS) was used to collect data. To understand gender differences in cigarette smoking in

Saudi Arabia, it is vital to know the structures of Saudi Arabian society, and consider the role of tradition, culture, and religion in the social structure of the country.

Consistent with previous studies, males were significantly associated with higher smoking prevalence than females. In Tabuk city, almost 65% of all boys students were ever smokers and 34% were current smokers, compared to 23.1% of female students who were ever smokers and 11.1% current smokers. This is not surprising, as Arab males are culturally encouraged to spend free time with peers and are not as strictly supervised as are females. Arab adolescents could believe smoking to help increase the masculine image and perception of maturity among peers. And, Arab females could perceive smoking to affect the feminine Islamic image and reputation, thus affecting prospects for marriage.⁶ These factors may explain the clear gender differences in cigarette smoking in the current study.

Table 3 - Knowledge, attitudes and practices of current smokers by gender.

Variables	Total N=336 (%)	Gender		P-value
		Male N=251 (%)	Female N=85 (%)	
<i>Knowledge on health hazards and addiction of tobacco</i>				
Thought smoking is dangerous for one's health	(87.8)	(88.4)	(85.9)	0.533
Thought smoke from other people's cigarettes is harmful to you	(83.6)	(84.9)	(80)	0.295
Thought it would be difficult to quit once someone has started to smoke	(37.2)	(32.2)	(51.7)	0.001
<i>Attitudes related to cigarette smoking</i>				
Thought that a man/female smoking looks 'successful', 'intelligent', vs. 'lacks confidence', 'loser', or 'stupid'	(32.2)	(29.2)	(41.3)	0.039
Thought that smoking cigarettes makes people more comfortable at social gatherings	(28.3)	(28.7)	(27.1)	0.22
<i>Cessation</i>				
Desired to stop	(79.2)	(79.7)	(77.6)	0.690
Tried to stop smoking during the past 12 months	(61)	(64.9)	(49.4)	0.011
Thought they would be able to stop if they wanted to	(72.9)	(70.5)	(80)	0.089
Received advice to quit smoking	(75.3)	(78.1)	(67.1)	0.042
<i>Environmental tobacco smoke</i>				
One or both parents smoke	(42)	(35.5)	(61.2)	<0.001
Someone smoked in your presence in your home over past 7 days	(69)	(68.4)	(70.6)	0.706
Someone smoked in your presence in places other than home over past 7 days	(80.7)	(84.9)	(68.2)	0.001
Is in favor of total or partial ban of smoking in enclosed places	(60.1)	(61.4)	(56.5)	0.427
<i>Media and advertising for and against smoking</i>				
Saw or heard a few or a lot of advertisements against tobacco (TV, billboards, and others)	(48.4)	(45.8)	(56.5)	0.089
Saw an actor smoking when watching a movie, video or TV	(92.6)	(91.6)	(95.3)	0.419
Saw cigarette brand names when watching sport or other programs on TV	(74.4)	(74.5)	(74.1)	0.944
<i>Exposure to education on tobacco</i>				
Teacher or other person talked in class about danger of smoking during past 12 months	(23.8)	(25.5)	(18.8)	0.021
Discussion in class on why young people start smoking during past 12 months	(22.3)	(24.3)	(16.5)	0.004
Anyone in your family discussed the harmful effects of smoking with you	(68.5)	(71.3)	(60)	0.052

Previous studies conducted in other Arab countries with similar culture showed the same pattern.⁷⁻¹² The current study also supports the World Health Organization (WHO) report that males are significantly more likely than females to smoke in almost all countries in the Eastern Mediterranean region.¹³ However, in some Western countries, smoking prevalence is higher among girls than boys.¹⁴

The high prevalence of current cigarette smoking in the current study compared to previous studies among males in Saudi Arabia 5 years ago (4.7%),¹³ shows the rapid increase in cigarette smoking among students. This underlines the need to develop school-based tobacco control programs.

The current study shows that most current smokers started smoking at 15 years or younger, and nearly one-third first tried a cigarette at 11 years or younger. Early initiation of smoking in Tabuk is a warning since there is evidence that early initiation of smoking is associated with lower cessation rates, longer duration of smoking, and higher nicotine dependence in adulthood.¹⁵

Most female current smokers obtained cigarettes from home or an older person, while most males obtained cigarettes from a store or friends. The findings presented here agree with a previous study that reported the main sources for cigarettes were significantly different for males and females. For males, the sources were friends outside of school and school friends, while for females sources were immediate relatives, such as father, mother, or siblings.¹⁶ Easy access to cigarettes from parents or siblings at home appears to encourage the youths to start and continue smoking. Surprisingly, a large percentage of girls (58.8%) stole cigarettes from home. Previous studies show a large percentage of females who smoke also steal cigarettes, and young females whose family members smoked were more likely to have stolen cigarettes than those with non-smoking families. Among males, however, family smoking was unrelated to reports of stealing cigarettes. The results of the current study show that the majority of males obtained cigarettes directly from stores (56.6%), indicating that shopkeepers sold cigarettes to almost all students who attempted to buy from them (92.0%), regardless of the age of the buyer. This finding underlines the need to enforce strict rules regarding the sale of cigarettes to minors under the age of 18.

Most smokers reported knowing that cigarette smoking is harmful to health, yet only one-third of adolescents current smokers aware to tobacco addiction in Tabuk, which agrees with a previous study that stated many adolescents do not understand the nature of tobacco addiction, and are unaware of or underestimate the health consequences of tobacco use.¹⁷

Most international studies show a higher proportion of current smokers who desire to stop smoking and

actually try to stop smoking. The current findings confirm this trend, with 79.2% of smokers reporting a desire to quit smoking while only 61.0% (65.0% males, 49.0% females) tried to stop smoking in the past year, with significant gender differences (Table 3). These findings show that female adolescents just like male adolescents, in Tabuk City underestimated the powerful addictive nature of nicotine, which underlines the importance of providing more information on nicotine and addiction to adolescents.

Approximately 75% of current smokers received advice to quit smoking, with significant gender differences. Parental advice and discussions regarding the harmful effects of smoking occurred more with males, perhaps as females are not suspected to be smokers.

This study shows that adolescents in Tabuk were exposed to intense environmental tobacco smoke both at home and public places. Although males were exposed at higher rates than females in public places, a high proportion of females were exposed. This finding requires further investigation to determine where and when adolescents are exposed to environmental tobacco smoke. Approximately two-thirds of current smokers were in favor of a total or partial ban on smoking in enclosed places, with no gender differences. This finding is in correlation with previous studies.¹⁸

Exposure to pro-tobacco advertising in this study was particularly worrying, since more than three-quarters of students reported watching tobacco-promotion programs during the 30 days preceding the survey, with equal rates for both genders. Heavy exposure to tobacco-promotion programs - which use misleading messages such as stress relief, beauty, being slim, and sexual attraction to appeal to women and youths - may encourage adolescents to initiate smoking, as reported by Lam et al¹⁹ in a study that showed tobacco advertisements were among the strongest risk factors for smoking among students.

Although numerous independent studies recommend school-based tobacco prevention education programs to reduce the onset of smoking among students,²⁰⁻²¹ there are still no established programs in Tabuk public schools. Therefore, only one-quarter of students reported having had a lesson in school on the dangers of smoking. Females were less exposed to education on tobacco and to discussions on the harmful effects of smoking with a family member. This could be attributed to a lack of awareness that female adolescents are smokers, too.

The findings in this report are subject to several limitations. These data apply only to adolescents who attend public schools in Tabuk, and might not be representative of all persons in this age group. However, in Saudi Arabia, the majority of young people in this age group are students, and 94% of them attend public schools in Tabuk. These data also

apply only to adolescents in schools the day the survey was administered, and who actually participated in the survey. However, the response rate was 96%. All conclusions from this study are based on associations that are not clearly causal in nature because of the cross-sectional nature of the study. In addition, these data are based on self-reports of students, and must take into account any under- or over-reporting of cigarette use.

Cigarette smoking and use of other tobacco products was highly prevalent among students in Saudi Arabia, even among females. Gender differences in current smokers were found to be significant in many aspects and not only in prevalence of cigarette smoking, such as source of cigarettes, usual place of smoke, intensity of smoking, knowledge on addiction of tobacco, attitudes related to cigarette smoking, received advice to quit smoking, exposure to environmental tobacco smoke in public places, and exposure to education on tobacco. For the suppression of tobacco use by young persons under the age of 18 years in Saudi Arabia, certain measures are needed such as stricter policies prohibiting the use of tobacco in public places and the sale of tobacco to minors to reduce youth access to cigarettes - in addition to intensive school and community anti-tobacco use programs.

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