

# Smoking among secondary-school boys in Bahrain: prevalence and risk factors

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التدخين بين تلاميذ المدارس الثانوية في البحرين: معدل الانتشار وعوامل الاختطار

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الخلاصة: للتعرف على معدل انتشار التدخين بين تلاميذ المدارس الثانوية في البحرين، وعلى عوامل الاختطار التي تقضي للتدخين، قمنا بإجراء مسح لعينة عشوائية لتلاميذ المدارس الحكومية باستخدام الاستمارات. وقد تبين أن معدل انتشار التدخين يبلغ 26.6% بين تلاميذ السنة الأولى الثانوية، و25.5% بين تلاميذ السنة الثانية، و25.4% بين تلاميذ السنة الثالثة، وكان من الشائع استخدام السجاير (21.0%)، والغليون (13%)، والسيسمار (1.6%). ويتساوى المدخنون مع غير المدخنين في المرتسمات الاجتماعية والاقتصادية، ولكنهما مختلفان في درجة شجب التدخين من قِبَل الأصدقاء الحميمين وفي درجة كون هؤلاء الأصدقاء الحميمين مدخنين. إن معدلات انتشار التدخين بين تلاميذ المدارس الثانوية في البحرين لم تتناقص رغم الجهود المكثفة لمكافحة التدخين في العقد المنصرم، مما قد يشير إلى فعالية كبيرة للدعاية والترويج تقوم بهما شركات التبغ للإيقاع بالشباب.

**ABSTRACT** To determine the prevalence of smoking among male secondary school students in Bahrain and to identify their risk factors for smoking, we surveyed a random sample of students by questionnaire. The prevalence of smoking was 26.6%, 25.5% and 25.4% among first-year, second-year and third-year students respectively. Cigarettes (21.0%), water-pipes (13.0%) and cigars (1.6%) were popular. Smokers and non-smokers had similar socioeconomic profiles, but differed in degree of disapproval of smoking shown by close contacts and whether close contacts were smokers. The prevalence of smoking among male secondary-school students in Bahrain did not decline despite intense anti-smoking efforts in the last decade, perhaps indicating the effectiveness of tobacco advertising and promotions that target youth.

## Le tabagisme chez les étudiants du secondaire à Bahreïn : prévalence et facteurs de risque

**RESUME** Afin de déterminer la prévalence du tabagisme chez les étudiants du secondaire à Bahreïn et d'identifier les facteurs de risque pour le tabagisme, nous avons procédé à une enquête par questionnaire dans un échantillon aléatoire d'élèves d'une école gouvernementale. La prévalence du tabagisme s'élevait à 26,6 %, 25,5 % et de 25,4 % chez les élèves de première, de deuxième et de troisième année respectivement. Les cigarettes (21,0 %), le narguilé (13,0 %) et les cigares (1,6 %) étaient populaires. Les fumeurs et les non-fumeurs avaient des profils socioéconomiques similaires, mais il y avait une différence dans le degré de désapprobation du tabagisme exprimé par les proches et si ces derniers étaient eux-mêmes fumeurs ou non. La prévalence du tabagisme chez les étudiants du secondaire à Bahreïn n'a pas diminué malgré les efforts intenses de lutte antitabac déployés au cours des dix dernières années, indiquant peut-être l'efficacité de la publicité en faveur du tabac et la promotion des produits du tabac ciblant les jeunes.

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## Introduction

Regular tobacco use is a form of drug dependence and the pharmacological and behavioural effects of nicotine are similar to those that determine addiction to other drugs, such as heroin and cocaine [1,2]. Tobacco is a gateway drug and a risk marker for other forms of drug use [2]. Smoking usually starts in childhood or adolescence and in high-income countries eight of ten smokers begin smoking in their teens [3]. Young smokers are at risk of developing drug dependence to tobacco and to other drugs as the inhalation of cigarette smoke by young people leads to early pharmacological dependence on cigarettes [2,4].

In most industrialized countries, male adolescent tobacco use declined in the 1970s and the beginning of the 1980s but increased in the 1990s [5,6]. Smoking rates among boys in developing countries, including member countries of the Gulf Cooperation Council (GCC), are generally similar to those of industrialized countries, but the overall prevalence of smoking among all youth in GCC countries is much lower due to far fewer female smokers [7-10].

Risk factors for youth smoking have been extensively studied in industrialized nations [2,4,11] and in some countries of this Region [9,12-14]. These risk factors include:

- socioeconomic factors, such as parents' education and occupation;
- environmental factors, such as parents' acceptance of smoking, availability of cigarettes, perceptions about tobacco use as the norm, peer and sibling attitudes, parents' smoking, best friends' smoking and cigarette advertising [15,16];
- behavioural factors, such as low academic achievement, rebelliousness, alienation from school and lack of skills to resist offers of cigarettes;
- personal factors, such as low self-esteem, type of personality and belief that smoking confers future social advantages.

The most frequently reported reasons for starting to smoke by adolescents are curiosity, defiance of social norms, peer pressure and desire to imitate others [17,18]. Smoking by a friend is a major factor for current smoking in youth, although addiction or habit is the most frequently reported reason [12,17]. Smoking among other male family members is also significantly associated with current smoking among boys [11].

In Bahrain, the government education system is mostly separated into single-sex schools. Private schools, however, are usually coeducational. Following elementary education, the government schools provide 3 years of intermediate and 3 years of secondary education. At the secondary level, the majority of schools are traditional, i.e. few schools are vocational/technical. Traditional schools are separated into science and literature sections.

Smoking control in Bahrain is in collaboration with other GCC countries and is based on legislation and public education. To reinforce anti-smoking efforts Amiri Decree promulgating Law 10, the anti-smoking law, was issued in 1994 and included control measures to regulate tobacco use by the young. The anti-smoking law bans sales of cigarettes and other tobacco derivatives to minors (< 18 years of age), the import of vending machines and smoking in educational establishments. It also prohibits promotion of tobacco

through sponsorship of sports and cultural events [19].

The aim of the present study was to estimate the prevalence of smoking among secondary-school boys in Bahrain in the 1990s, to identify risk factors for their smoking and to compare smoking prevalence with that of the 1980s. Female secondary-school students were excluded from the study because of the low reported prevalence of smoking among females in Bahrain in general and among young females in particular [19-21]. However, the exclusion of female students from this study and from previous studies examining smoking among school students means that baseline and trend data on the prevalence of smoking among female school students in a community which is undergoing rapid lifestyle changes have yet to be collected [22,23].

## Methods

A cross-sectional study was conducted in all 7 government secondary traditional boys schools. According to Bahrain Ministry of Education statistics, 65.1% of government male secondary students attended traditional schools (6814 of a total of 10 464) and 34.9% attended vocational/technical and theological schools during the academic year 1996-1997. We excluded vocational/technical and theological schools from the study as only a select group of students enrol in them whereas the majority of students enrol in the traditional schools. From the 6814 eligible students, a minimum sample size of 300 was needed for our study based on an estimate of 20% smoking prevalence and 95% confidence level [24]. This estimate of prevalence was based on the results of two studies in the 1980s among male secondary students [22,23].

Although the minimum sample size required was 300 students, we used a sample of 600 students. From each of the 7 schools, 3 classes were randomly chosen, i.e. 1 class from each grade. All students from these selected classes were included in the study.

Consent for the study was obtained from the Ministry of Education and the school administration. An anonymous self-administered questionnaire was distributed to the students in each class by one of the authors in the presence of the teacher. We explained the aim of the study to the students and informed them that their participation was voluntary and that their responses would be anonymous. The questionnaire was based on World Health Organization (WHO) guidelines for the conduct of tobacco smoking surveys for young people with additional questions taken from a study in China [18,25].

'Smokers' were those who smoked any type of tobacco at the time of study, whether daily or weekly or less than weekly. 'Ex-smokers' were those who had smoked before, but were not smoking at the time of the study. 'Non-smokers' were those who had never smoked ('never smokers') and ex smokers combined [25].

Parental education was divided into 3 levels: low (illiterate or able to read and/or write but with no formal education), middle (primary, intermediate or secondary schooling) or high (university education or above). Employment was defined as remunerated work. The occupational level of the father was categorized as low (unskilled and partly skilled workers), middle (skilled workers) or high (professionals). The occupations of the mothers were not ranked by level because the great majority worked for no pay within the family home. Data were managed and analysed using the SPSS

version 9.0. Statistical associations between smoking status and study variables were tested with chi-squared distribution. The level of significance was set at  $P < 0.05$ . Odds ratios (OR) and 95% confidence intervals (CI) were computed.

## Results

During the study, 602 students were attending the randomly selected classes. The questionnaires of 2 students were excluded from the analysis because they were incomplete. Of the remaining 600 students, 309 (51.5%) were in the science programme and 291 (48.5%) in the literature programme. There were 207 (34.5%) first-year, 204 (34.0%) second-year and 189 (31.5%) third-year students. Their ages ranged from 13 to 20 years with a mean age of  $16.5 \pm 1.1$  years. The majority of parents had middle educational level and fathers had mostly middle level occupations (Table 1).

Of the 600 students, 155 were smokers (25.8%), 140 ex-smokers (23.3%) and 305 (50.8%) never-smokers. The prevalence of cigarette smoking was 21.0%, water-pipe smoking 13.0% and cigar smoking 1.6% (Table 2). The mean age at which smoking commenced was  $16.8 \pm 1.1$  years. The prevalence of smoking was 20.4%, 24.3% and 37.8% for those aged 13–15, 16–17 and 18–20 years respectively. The prevalence of smoking among first-year secondary students was 26.6%, second-year students 25.5% and third-year students 25.4%. Students in the literature programme had a slightly higher prevalence of smoking (28.2%) than their counterparts in the science programme (23.6%); the difference was statistically significant.

The educational levels of the parents of smokers and non-smokers were similar. Most smokers (58.1%) and non-smokers

Table 1 Sociodemographic distribution of the 600 secondary-school boys

Characteristic	No.	%
<i>School programme</i>		
Science	309	51.5
Literature	291	48.5
<i>School year</i>		
First-year secondary	207	34.5
Second-year secondary	204	34.0
Third-year secondary	189	31.5
<i>Age group (years)</i>		
13–15	98	16.3
16–17	404	67.4
18–20	98	16.3
<i>Educational level of father<sup>a</sup></i>		
High	149	24.8
Middle	331	55.2
Low	120	20.0
<i>Educational level of mother<sup>a</sup></i>		
High	76	12.7
Middle	289	48.1
Low	235	39.2
<i>Occupational level of father<sup>b</sup></i>		
High	208	34.7
Middle	378	63.0
Low	14	2.3

<sup>a</sup>High = university education or above; medium = primary, intermediate or secondary schooling; low = illiterate or able to read and write only.

<sup>b</sup>High = professionals; middle = skilled workers; low = unskilled or partly skilled workers.

(54.2%) had fathers with middle educational levels. However, 34.8% of smokers' mothers had low and 51.6% had middle educational levels. The comparative figures for non-smokers' mothers were 40.7% and 47.0% respectively (Table 3). The occupational level of fathers and the employment status of mothers of smokers and non-smokers were also similar. Most fathers of smokers (60.6%) and non-smokers (63.8%) had middle occupational levels. Mothers of smokers (79.0%) and non-

**Table 2 Distribution of students by smoking status and type of tobacco product used**

Smoking status	No. of students	%
<i>Smoker</i>	155	25.8
Cigarette only	66	(42.6)
Water-pipe only	9	(5.8)
Cigar only	1	(0.7)
Cigarette and water pipe	60	(38.7)
Water pipe and cigar	9	(5.8)
Unspecified	10	(6.5)
<i>Non-smoker</i>	445	74.2
Never-smoker	305	(68.5)
Ex-smoker	140	(31.5)
<b>Total</b>	<b>600</b>	<b>100.0</b>

smokers (78.0%) were mostly unpaid workers in the family home. The majority of smokers (84.5%) and non-smokers (87.2%) lived with both parents. The remainder lived with one parent or other relatives.

Higher percentages of fathers, mothers, brothers, sisters, friends and teachers of non-smokers disapproved of student smoking (Table 4). The differences were statistically significant except for the attitude of fathers. The highest OR was obtained for the attitude of friends, followed

by the mother's attitude. Non-smokers were 3.32 times more likely (CI: 2.27–4.86) to have friends who disapproved of smoking and 2.40 times more likely (CI: 1.42–4.03) to have mothers who disapproved of smoking than smokers.

The smoking status of the mothers of smokers and non-smokers were similar (6.4% and 5.7% respectively). Student smokers were also twice as likely to have sisters who smoked; this difference, however, was not statistically significant (Table 5). The smoking status of fathers, brothers, best friends and favourite teachers were significantly different between smokers and non-smokers. Smokers were 4 times more likely to have smokers among their best friends. The ORs were similar for smoking by students' fathers (1.87), brothers (1.86) and teachers (1.89) compared with non-smoking.

A higher percentage of non-smokers (47.2%) wanted to continue their education after age of 20 years compared with smokers (38.1%) and the difference was statistically significant ( $P = 0.028$ ).

## Discussion

Our study supports previous findings regarding the inability of the intense smoking control efforts in the 1980s and 1990s to

**Table 3 Education level of parents and smoking status of the student**

Level of education*	Fathers ( $n = 600$ ) of:		Mothers ( $n = 600$ ) of:	
	Smokers	Non-smokers	Smokers	Non-smokers
High (%)	23.2	25.4	13.6	12.3
Middle (%)	58.1	54.2	51.6	47.0
Low (%)	18.7	20.4	34.8	40.7

\*High = university education or above; medium = primary, intermediate or secondary schooling; low = illiterate or able to read and write only.

**Table 4 Disapproving attitude of students' close contacts towards student smoking**

Contact	Disapproving (%)		Odds ratio	95% confidence interval
	Smokers (n = 155)	Non-smokers (n = 445)		
Father	85.2	90.8	1.20	0.74-1.95
Mother	84.0	92.1	2.40	1.42-4.03
Brother	63.1	83.7	2.28	1.57-3.31
Sister	74.6	85.1	1.67	1.14-2.44
Friend	37.7	67.4	3.32	2.27-4.86
Teacher	53.4	68.0	1.91	1.32-2.77

reduce the prevalence of smoking in the population [19]. The overall prevalence of smoking among male secondary students (25.8%) in our study was higher than reported in 1982 (14.8%) and in 1989 (21.4%) [22,23]. This is partly explained by differences in the definitions of 'smoker'; in the two previous studies the definition was restricted to cigarette smoking. Nonetheless, the prevalence of cigarette smoking in our study (21.0%) was similar to that reported in 1989 [23]. The inability to reduce prevalence might result from the success of tobacco advertising and promotional activities that target the young. The

prevalence of smoking among male secondary students was also higher than reported in the Republic of Yemen (21.9%), Saudi Arabia (20.0%), Syrian Arab Republic (15.9%) and Oman (6.5%), but lower than in Kuwait (50.0%) [7,8,14,26]. However, these variations are partly due to the differences in the definition of smokers.

As in other countries, cigarettes were the most commonly used type of tobacco in our study, but other types, especially the water-pipe, are becoming increasingly popular among young males in Bahrain. For example, a study in Bahrain in the 1980s reported a 1.0% prevalence of water-pipe

**Table 5 Frequency of smoking among student's close contacts by smoking status of student**

Contact	Smokers (%) (n = 155)	Non-smokers (%) (n = 445)	Odds ratio	95% confidence interval
Father	36.0	24.2	1.87	1.27-2.76
Mother	6.4	5.7	0.99	0.47-2.08
Brother	29.0	16.7	1.86	1.21-2.87
Sister	1.2	0.6	1.93	0.32-11.64
Friend	43.2	15.4	4.08	2.71-6.13
Teacher	33.5	20.7	1.80	1.26-2.62

smoking among Bahraini males aged 20–29 years, whereas 13.0% of students aged 13–20 years in our study smoked water-pipes [20].

The level of education of the parents is a predictor of the uptake of smoking among the young, according to the United States Surgeon General's Report [4]. This has also been reported in studies in the Region [13,14]. In our study, however, there was no difference in the educational level of parents of smokers and non-smokers, the occupational level of the father or the employment status of the mother. This may be due to the homogeneous socioeconomic status of students in government schools. However, the results should be regarded with caution as the reliability of student-reported data relating to parental education and occupation may be questionable.

Parental attitude towards smoking plays a major role in the uptake of smoking among the young. Many studies have shown that smoking is more common among young people whose parents have tolerant attitudes towards smoking by their offspring [27]. In our study, the fathers' attitudes towards smoking were similar between smokers and non-smokers. However, the attitudes of mothers, sisters and brothers towards smoking by the student were significantly different for smokers and non-smokers. Most studies have consistently shown that parental smoking is strongly associated with youth smoking [12–14,27,28]. In our study, mothers' and sisters' smoking status were not associated with the student's smoking status, but this may be due to the low prevalence of smoking among females in Bahrain [7,19].

Smoking by a best friend was reported as the main factor in the increase in smoking prevalence among adolescents in some Eastern European countries [29]. In a recent study in the United States of America,

the smoking behaviour of the adolescent's best male friends was constantly associated with the transition from non-smoking to regular smoking and from experimental smoking to regular smoking [30]. Peer influence was reported as the single most important factor in determining with whom and when smoking was initiated, and conversely, to influence young smokers to become non-smokers [2,31]. Previous studies in Bahrain identified the important role peers play in uptake of smoking among schoolboys [22,23]. In our study, the student's smoking status and having a friend who smoked were strongly related to smoking and were statistically significant. Of the smokers, 43.2% stated that their best friend was a smoker compared with 15.4% of non-smokers. This was similar to studies in Bahrain [22,23], the Republic of Yemen [8], Kuwait [14], Saudi Arabia [12,13], Syrian Arab Republic [9] and elsewhere [17,18].

Many young people regard their teachers as role models and authority figures. Their attitudes towards smoking and their smoking habits can legitimize the habit of smoking among students. In this study, more smokers than non-smokers thought that their favourite teachers did not mind their smoking and believed that their teachers smoked.

A higher percentage of non-smokers (47.2%) planned to continue their education than did smokers (38.1%), which may reflect higher self-esteem among them. Smoking has been reported to be related to low self-esteem and low scores in school performance [11].

## Conclusion

Our study strongly suggests that research needs to focus on the inadequacy of the

current youth smoking control measures in Bahrain. School smoking control efforts should target parents, teachers and students and should start as early as primary school. Emphasis on the exemplary role of parents and teachers should be stressed in these programmes. Empowering young people with skills to resist peer pressure and to critically and objectively appraise their responses to the emotionally charged

techniques used in the advertising and promotion of cigarettes by marketers and manufacturers should also be a priority. School 'quit' programmes should be considered to combat the addictive nature of tobacco. Finally, government commitment and social support are vital if these programmes are to be implemented and sustained.

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