Tobacco use and associated factors among school students in Dubai, 2010: intervention study

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تعاطي التبغ والعوامل المرتبطة به لدى طلبة المدارس في دبي، 2010: دراسة تدخلية

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الخلاصة: يُعَدُّ تدخين التبغ مشكلة مستجدة لدى مَن هم في مرحلة المراهقة في الإمارات العربية المتحدة. وقد هدفت هذه الدراسة إلى قياس مدى الانتشار الحالي لتعاطي التبغ والعوامل المرتبطة به لدى طلبة المدارس في إمارة دبي، وإلى تحديد أثر أحد برامج التدخل على المعرفة بتعاطي التبغ وعلى المواقف تجاهه. فتم إجراء دراسة مدرسية تدخلية على 2457 طالباً بأعمار 10-20 سنة، وتم جمع البيانات باستخدام استبيان ذاتي. فكان 14.6٪ من الطلاب يتعاطون التبغ؛ في الغالب السجائر (11.2٪) أو النارجيلة (2.2٪). وكانت الأسباب الشائعة للتدخين: للتجربة (29.4٪)، ولتخفيف التوتر (22.5٪)، ولأن أقرانهم يدخنون (21.9٪). وأظهر تحليل التحوّف اللوجستي المتدرج أن المنبئات عن تعاطي التبغ هي أن يكون المرء ذكراً، وأعلى سناً، ومواطناً إماراتياً، وفي مستوى مدرسي أعلى، وفي مدرسة حكومية، وقليل المعرفة عن التبغ، وذا تاريخ عائلي للتدخين. وكان هناك تحسن كبير في الدرجات المُحْرَزَة في مجال المعرفة والمواقف بعد برنامج التدخل المعني بالتثقيف الصحي.

ABSTRACT Tobacco smoking is an emerging problem among adolescents in the United Arab Emirates (UAE). This study aimed to measure the prevalence of current tobacco use and its associated factors among school students in Dubai Emirate and to determine the impact of an intervention programme on knowledge and attitudes towards tobacco use. A school-based intervention programme was carried out among 2457 students aged 10–20 years and data were collected with a self-administered questionnaire. Of the students, 14.6% were tobacco users, mostly cigarettes (11.2%) and waterpipes (2.2%). The most common self-reported reasons for smoking were for the experience (29.4%), for stress relief (22.5%) and because their peers smoked (21.9%). Stepwise logistic regression analysis showed that the predictors of tobacco use were: male, higher age, UAE national, higher school level, government school, low knowledge about tobacco and family history of smoking. There were significant improvements in knowledge and attitudes scores after the health education intervention programme.

Tabagisme et facteurs associés chez des élèves à Dubaï, 2010 : étude d'intervention

RÉSUMÉ Le tabagisme chez les adolescents aux Émirats arabes unis représente un problème récent. La présente étude visait à mesurer la prévalence actuelle du tabagisme et les facteurs associés chez des élèves dans l'Émirat de Dubaï. Elle avait également pour objectif de déterminer l'impact d'un programme d'interventions sur leurs connaissances et attitudes à l'égard du tabagisme. Un programme d'interventions a été mené en milieu scolaire auprès de 2457 élèves âgés de 10 à 20 ans. Les données ont été recueillies à l'aide d'un questionnaire auto-administré. Parmi les élèves interrogés, 14,6 % étaient des consommateurs de tabac, principalement de cigarettes (11,2 %) ou de pipes à eau (2,2 %). Les raisons les plus fréquentes motivant la consommation de tabac étaient le fait d'expérimenter (29,4 %), l'atténuation du stress (22,5 %) et la consommation de tabac par les pairs (21,9 %). L'analyse de régression logistique par étapes a démontré que les facteurs prédictifs du tabagisme étaient les suivants : être de sexe masculin, être plus âgé, avoir la nationalité émirienne, avoir un niveau scolaire plus élevé, fréquenter une école publique, avoir de faibles connaissances sur le tabac et venir d'une famille de fumeurs. Des améliorations notables ont été constatées dans les scores sur les connaissances et les attitudes après la mise en oeuvre du programme d'interventions d'éducation pour la santé.

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Introduction

Tobacco use is one of the biggest public health threats the world has ever faced (*1*). Tragically, the epidemic is shifting towards the developing world, where 80% of tobacco-related deaths will occur within a few decades. Tobacco has killed more than 100 million people in the 20th century and it is expected to kill billions in the 21st century. The shift has been attributed to a global tobacco industry marketing strategy that targets young people and adults in developing countries (*1*).

Adolescence is a period of physical, cognitive and emotional change and of searching for a personal identity that frequently involves experimentation with various risky behaviours including smoking (*2*). In most countries, the great majority of smokers begin to use tobacco before the age of 18 years (*3,4*). Adolescents who start smoking at an early age seem to be at much greater risk of the adverse health consequences of smoking than late starters. Also, nicotine addiction among these early smokers appears more severe than that among late starters (*5*). Saudi Arabia has reported a high prevalence of current smoking (29.8%) among schoolboys and found that 83.7% of them started smoking at or before the age of 15 years (*6*). The Global Youth Tobacco Survey in Egypt in 2005 reported that 13.6% of students had ever smoked cigarettes and 14.4% currently use any tobacco product (*7*). According to the Global School-based Student Health Survey in the United Arab Emirates (UAE), conducted in 2005, 12.7% of students had used any tobacco on 1 or more days during the past 30 days and about 9.3% of students had smoked cigarettes (*8*).

It has been reported that the main reasons why adolescents start smoking are emulation, curiosity, friendship effect, stress, "proving themselves" to peers and the presence of a family member who smokes (*9*). Knowledge and attitudes about smoking are significantly associated with smoking. It was reported that a high prevalence of smoking was associated with poor knowledge about smoking and a low attitude score (*10*). Tobacco control legalization in the UAE started after the launch of an anti-tobacco federal law in 2009, which applied a smoking ban in all public premises including schools and universities (*11*). The legislation makes it illegal to sell cigarettes to anyone under 18 years or to smoke in cars carrying children under 12 years old (*12*).

The increasing magnitude of the tobacco smoking habit among adolescents in the UAE is an emerging problem that needs to be thoroughly studied in order to plan for proper control measures and to develop effective policies for smoking prevention and cessation programmes. The objectives of the current study were 2-fold: to measure the prevalence of current tobacco use (smoked and smokeless tobacco products) among school students in Dubai and the factors associated with tobacco use; and to determine the impact of a health education intervention programme on knowledge and attitude of students towards tobacco use and its hazards.

Methods

Study design and setting

A school-based intervention study (quasi-experimental) was carried out in preparatory and secondary schools in Dubai. The target population was male and female school students in school grades 7 to 12.

Sampling

The sample size was calculated using the computer program *Epi-info*, version 6.04. The total number of preparatory- and secondary-school students in Dubai was 77 118, and using 2% degree of precision, estimated prevalence of tobacco use among adolescents of 19.5% (from a previous, similar study in UAE) (*8*), 1.5 design effect and 95% confidence interval the minimum sample size required was 2219.

Stratified random sampling with proportional allocation was carried out. Stratification was based on the administrative regions of Dubai (Deira or Bur Dubai), sex (male or female), type of school (government or private) and school grade (preparatory or secondary). Overall, in both Deira and Bur Dubai the total number of private schools exceeded the number of government schools by 3 to 1. Thus 24 private schools and 8 government schools were randomly selected from both regions. For the private schools 12 schools were selected randomly from each region (6 for males and 6 for females) and for the government schools 4 schools were selected randomly from each region (2 for males and 2 for females). One class was selected randomly from each of selected preparatory (grades 7–9) and secondary (grades 10–12) schools and all the students in the selected classes were invited to participate in the survey.

The total sample size amounted to 2457. All selected schools as well as all the students within the selected schools agreed to participate in the study (response rate 100%).

Data collection

Questionnaire

The data were collected from students using an anonymous, self-administered, pre-coded questionnaire. It consisted of 32 questions. Filling the questionnaire took approximately 10 min. Students were assured that the information they provided would remain confidential and thus were encouraged to be truthful in their responses. They were informed that their participation was completely voluntary. The questionnaire was distributed in English for private-school students (1976 students) and in Arabic for government-school students (481 students). The questionnaire was originally designed in English then

back-translated into Arabic and reviewed by a community professional.

The questionnaire collected the following information from the participants: sociodemographic characteristics such as type of school, age, sex, nationality (local, i.e. UAE nationality, or non-local, i.e. non-UAE nationality), grade of education and parents' education; family history of smoking; knowledge about tobacco use and the health risks of using it; and attitudes to smoking.

The knowledge questions were adopted from the Global Youth Tobacco Survey and other studies that revealed satisfactory reliability (Cronbach α around 0.84) (*13,14*). The students were asked if they thought that tobacco use was harmful to health and that smoking tobacco can be addictive like heroin. It also included questions regarding other hazards of smoking such as cancer, cardiovascular diseases and respiratory tract diseases. In addition, they were asked if using tobacco was bad only if it was used for many years and whether smoking in close public places can be harmful to non-smokers. Each item had a choices of 3 answers (no, yes or don't know) and a score of 0 was given for the incorrect answer or don't know and score of 1 for the correct answer, giving a score range for the knowledge scale of 0–7. The scores were summed and students were categorized into 3 groups: poor knowledge (score < 50%), fair knowledge (score 50–74%) and good knowledge (score ≥ 75%).

The questions to assess the attitude of students toward tobacco use were adopted from the Global Youth Tobacco Survey and other studies that revealed satisfactory reliability (Cronbach α around 0.82) (*13–15*). Students were asked if they thought that tobacco use was a bad habit, made them relax and cope with stress, made them more attractive, made them less healthy, led to bad smells and affected their performance in sports. They were also asked if they believed that tobacco must be banned in closed places or not and whether parents should not allow their children to use tobacco or not. Each item had 3 choices (agree, not sure or disagree) and a score of 1 was given for negative attitude, 2 for neutral and 3 for positive attitude, giving a score rage for the attitude scale of 11–33. The total scores were calculated and the students were classified into 3 groups: negative attitude (i.e. favourable towards smoking) (score < 50%), neutral attitude (score 50–< 74%) and positive attitude (i.e. unfavourable towards smoking) (score ≥ 75%).

Data about tobacco use included questions about tobacco product use (cigarettes, waterpipes, pipes, cigars and chewing tobacco) during the 30 days preceding the survey. Questions were asked about the age at which tobacco use was initiated, duration of use as well as students' self-reported reasons for use, such as peer pressure, self-achievement, parents' smoking, stress reduction, social problems or simply to imitate adults. In addition, we asked about exposure to other people's smoking (second-hand smoke exposure) and their desire to quit tobacco use.

Operational definition

World Health Organization (WHO) definitions were used which define the prevalence of current tobacco use among youth as the prevalence of tobacco use (including smoking cigarettes, pipes, cigars, waterpipes and oral tobacco) on more than 1 occasion in the 30 days preceding the survey, regardless of amount used (*11*).

Intervention – health education programme

The health education programme was conducted in the 1 academic year 2009–2010 and targeted all the selected schools. During this period the selected schools chose a date for the allocated class to conduct the pre-test questionnaire followed immediately by a 1-day intervention programme, then after an interval of 2 weeks the second date was allocated for the same class to complete the post-test questionnaire. The intervention programme consisted of a health education session that discussed the hazards of smoking. This was conducted through lecture presentations and video shows on the hazards of use of various tobacco products. Educational materials about the hazards of tobacco use were distributed. The programme was conducted by a professional team of physicians trained in this field.

Ethical considerations

An approval was obtained from the Dubai Knowledge and Human Development and Dubai Health Authority after explaining the purpose of the study. Approval was also taken from all participating schools and it was made clear to students that participation was completely voluntary. Absolute confidentiality of the data was maintained throughout the study.

Statistical analysis

The data were analysed using *SPSS* software program, version 19.0. The following statistical analyses were performed. The data were presented by frequency tables and graphs. Descriptive statistics were presented for quantitative variables [mean, standard deviation (SD) and range]. The chi-squared test was used for testing the relationship between sociodemographic factors, knowledge, attitude and tobacco use. The paired t-test was used for comparing the mean scores before and after the intervention programme in both the knowledge and attitude domains. $P < 0.05$ was the cut-off level of significance.

Stepwise logistic regression was carried out to adjust the confounders and delineate the predictors for tobacco use. The dependent factor was any tobacco use (0 = no, 1 = yes). The independent factors were: age (continuous variable),

sex (0 = female, 1 = male), nationality (0 = non-local, 1 = local), type of school (0 = government, 1 = private), school grade (0 = preparatory grades 7–9, 1 = secondary grades 10–12), parental education (0 = university level, 1 = secondary/preparatory, 2 = illiterate/primary), family history of smoking (0 = no, 1 = yes), and knowledge scores and attitude scores (continuous variables) towards tobacco use.

Results

Background characteristics

The present study included 2457 students, with a mean age of 14.85 (SD 1.67) years, range 10–20 years. Due to the higher number of private schools, the number of non-UAE national students who participated (1545 students) were greater than the UAE national students (912 students). Table 1 shows that 80.4% of the sample were from private schools, over half were males (54.4%) and 62.9% were non-locals. The majority of students' parents had university education or higher (68.3% and 76.4% for mothers and fathers respectively). Among the respondents 29.1% reported that they were exposed to second-hand smoke at home.

Prevalence of smoking

Out of 2457 students, there were 359 self-reported tobacco smokers (14.6%). Cigarette smoking was the most prevalent type of tobacco use (11.2%), while waterpipes (*shisha*) were used by only 2.2%, pipes by 1.9% and cigar and chewing tobacco by 0.8% each.

Reasons for smoking

The most common self-reported reasons for smoking were to try out the experience (29.4%), relieving stress (22.5%) and peers' smoking (21.9%). Some students reported that the reasons related to social problems (6.4%), parents' smoking (6.0%) or to improve self-achievement (3.7%).

Knowledge and attitudes towards tobacco use

Concerning knowledge and attitudes, it was found that before the intervention programme 35.0% of the students had a poor level of knowledge about tobacco use and its hazards and 41.3% demonstrated negative attitudes (i.e. were favourable) towards tobacco use.

Mean knowledge scores were significantly higher among non-tobacco users compared with any tobacco users [5.58 (SD 1.79) versus 5.27 (SD 2.02) respectively] ($P = 0.004$). The same pattern was observed for the mean attitude scores [29.28 (SD 3.29) and 28.68 (SD 3.50) respectively] ($P = 0.004$) (Table 2).

Table 1 Distribution of school students according to demographic characteristics, Dubai 2010

Demographic characteristic	Total (*n* = 2457)	
	No.	%
Type of school		
Government	481	19.6
Private	1976	80.4
School grade		
Preparatory	1327	54.0
Secondary	1130	46.0
Sex		
Male	1337	54.4
Female	1120	45.6
Age (years)		
10–	34	1.5
12–	539	23.0
14–	889	38.0
16–	784	33.5
18–	93	4.0
Mean (SD)	14.85 (1.67)	
Nationality		
Local	912	37.1
Non-local	1545	62.9
Mother's educational level[a]		
Illiterate	116	4.8
Primary	103	4.2
Preparatory	99	4.1
Secondary	451	18.6
University	1657	68.3
Father's educational level[b]		
Illiterate	79	3.3
Primary	51	2.1
Preparatory	136	5.6
Secondary	307	12.6
University	1857	76.4
History of smoking in the family		
No	1742	70.9
Yes	715	29.1

[a]*Missing data for 31 students;* [b]*Missing data for 27 students.*
SD = standard deviation.

Table 2 Demographic characteristics and knowledge and attitudes towards tobacco among school students according to tobacco use status, Dubai 2010

Variable	Total (*n* = 2457)	Any tobacco use				*P*-value[a]
		No (*n* = 2098)		Yes (*n* = 359)		
	No.	No.	%	No.	%	
Type of school						
Government	481	369	76.7	112	23.3	< 0.001
Private	1976	1729	87.5	247	12.5	
School grade						
Preparatory	1327	1155	87.0	172	13.0	0.012
Secondary	1130	943	83.5	187	16.5	
Sex						
Male	1337	1047	78.3	290	21.7	< 0.001
Female	1120	1051	93.8	69	6.2	
Age (years)						
10–	34	33	97.1	1	2.9	
12–	539	500	92.8	39	7.2	
14–	889	756	85.0	133	15.0	< 0.001
16–	784	660	84.2	124	15.8	
18+	93	59	63.4	34	36.6	
Nationality						
Local	912	733	80.4	179	19.6	< 0.001
Non-local	1545	1365	88.3	180	11.7	
Mother's education						
Illiterate	116	98	84.5	18	15.5	
Primary	99	84	84.8	15	15.2	
Preparatory	103	76	73.8	27	26.2	0.017
Secondary	451	387	85.8	64	14.2	
University	1657	1427	86.1	230	13.9	
Father's education						
Illiterate	79	50	63.3	29	36.7	
Primary	136	104	76.5	32	23.5	
Preparatory	51	44	86.3	7	13.7	< 0.001
Secondary	307	258	84.0	49	16.0	
University	1857	1618	87.1	239	12.9	
Family history of smoking						
No	1742	1542	88.5	200	11.5	< 0.001
Yes	715	557	77.9	158	22.1	
Knowledge and attitudes towards tobacco		Mean (SD)		Mean (SD)		
Knowledge score	2346	5.58 (1.79)		5.27 (2.02)		0.004[b]
Attitude score	2340	29.28 (3.29)		28.68 (3.50)		0.004[b]

[a]Chi-squared test; [b]t-test.
SD = standard deviation.

Factors associated with tobacco use

Regarding sociodemographic characteristics, Table 2 shows that 23.3% of smokers were attending government schools and only 12.5% private schools, and this difference was statistically significant (*P* < 0.001). Males had a significantly higher rate of tobacco use than females (21.7% versus 6.2%) (*P* < 0.001). In addition, locals (UAE nationals) were more likely to be tobacco users than non-locals (19.6% versus 11.7%) (*P* < 0.001). Concerning parents' education,

students of illiterate or primary-educated parents had the highest rates of tobacco use (15.5% and 15.2% for mothers and 36.7% and 23.5% for fathers respectively), while the lowest rates of use were observed among those of university or higher-educated parents (13.9% and 12.9% respectively for mother and fathers); these differences were statistically significant (*P* = 0.017 for mothers and *P* < 0.001 for fathers). Students with a family history of smoking were more likely to be tobacco users compared with those without such history (22.1% versus 11.5%) (*P* < 0.001).

Stepwise logistic regression analysis of the factors affecting tobacco users (Table 3) delineated 7 predictors for tobacco use: age, sex, nationality, school type, school grade, family history and knowledge about hazards of tobacco. Higher age, male sex, family history of smoking, being in secondary grade of education (10–12 years), being a UAE local and being in a government school were all significantly associated with a higher risk of tobacco use compared with those who were of younger age, female, with no family history of smoking, in preparatory grade of education (7–9 years), non-UAE nationality or being in a private school (ORs = 1.31, 4.15, 1.65, 1.50, 1.75 and 1.59 respectively). Furthermore, a higher score on knowledge about tobacco and its effects was associated with a lower risk of tobacco use.

Effect of intervention on knowledge and attitudes

Concerning the effect of the intervention programme on the knowledge and attitude of students towards tobacco use, Table 4 shows that there was an increase in the percentage of students with a good level of knowledge from 34.1% before to 51.9% after the intervention programme. The mean knowledge score increased significantly from 5.49 (SD 1.81) before to 6.14 (SD 1.31) after the intervention (*P* < 0.001). The same pattern was observed concerning attitudes; there was an increase in the rate of positive attitudes from 34.5% before to 48.7% after the intervention programme. Mean scores also increased from 28.31 (SD 4.04) to 29.23 (SD 3.99) (*P* < 0.001).

Discussion

The prevalence of tobacco use among adolescents is a valuable indicator for the prediction of future harm caused by tobacco and is therefore important for health-related policy-makers and programme planners in any country (*16*). Prevalence and trends in smoking vary from country to country, often dependent on the level of monitoring of tobacco use behaviour. The results of the present study revealed that the overall prevalence of current tobacco use in school students in the UAE was 14.6%; this was lower than previous surveys

from Yemen in 2003 (*17*), Saudi Arabia in 2007 (*18*) and Jordan in 2007 (*19*) (prevalences of any current tobacco use were 19.3%, 17.3% and 21.8% respectively). Furthermore, a higher prevalence of tobacco use (24.5%) was reported in a Syria study in 2010 (*20*).

The present study established that smoking cigarettes was the predominant form of tobacco use among the current tobacco users (11.2%), and this was higher than the prevalence of current cigarette smoking reported in Oman in 2006 (4.5%) (*21*) and previously in the Dubai Emirate in 2010 (9.8%) (*8*). Results from Tehran, Islamic Republic of Iran in 2003 (*22*) reported that the prevalence of cigarette smoking was 28.2%, which was much higher than in the present study.

The prevalence of waterpipe smoking in our study was 2.2%, which was lower than the Saudi Arabian study (8.7%) (*18*) and far lower than a study in Lebanon (25.6%) (*23*).

Self-reported reason for tobacco use

The present study showed that 29.4% of students reported that trying out the experience was the main reason for tobacco use. This finding was similar to a Saudi Arabian study (*24*). Young students experience feelings of uncertainty about their self-image and consider themselves more or less dependent on the opinion and judgement of their peers. Meeting these expectations of one's peer group is essential to prevent loss of friends, becoming a loner and eventually losing one's social identity (*25*). Another reason for tobacco use among students in the present study was to relieve stress. This result was in accordance with a study in the United States of America (USA) (*26*).

Associated factors of tobacco use

Tobacco use was more common in the government than private schools, which can be explained by better educational

Table 3 Results of stepwise logistic regression of factors affecting tobacco use among school students, Dubai, 2010

Independent variables	β	*P*-value	OR	95% CI
Age	0.272	< 0.001	1.31	1.20–1.43
Sex	1.423	< 0.001	4.15	3.03–5.69
Family history of smoking	0.502	< 0.001	1.65	1.24–2.19
School grade	0.407	0.004	1.50	1.14–1.98
Nationality	0.558	< 0.001	1.75	1.31–2.33
Knowledge score	–0.160	< 0.001	0.85	0.78–0.93
Type of school	0.461	0.008	1.59	1.13–2.23
Constant	–6.622	< 0.001	0.001	

OR = odds ratio; CI = confidence interval; β = regression coefficient.

Table 4 Comparison of knowledge and attitude of school students towards tobacco smoking before and after the health education intervention programme, Dubai 2010

Variable	Before intervention		After intervention		P-value[c]
	No.	%	No.	%	
Knowledge level					
Poor	821	35.0	404	17.2	
Fair	724	30.9	725	30.9	
Good	801	34.1	1217	51.9	
Total mean (SD) score	5.49 (1.81)		6.14 (1.31)[a]		< 0.001
Attitude level					
Negative	966	41.3	714	30.5	
Neutral	566	24.2	486	20.8	
Positive	808	34.5	1140	48.7	
Total mean (SD) score	28.31 (4.04)		29.23 (3.99)[b]		< 0.001

[a]Data missing for 111 students; [b]Data missing for 117 students; [c]t-test.
SD = standard deviation.

activities or a close monitoring system and restrictions on the use of tobacco in private schools more than government schools, and may also be due to social class differences between the school populations.

Tobacco prevalence increased as age increased. This result is consistent with a previous study in Taiwan (27) but inconsistent with an Iranian study (28), in which the highest prevalence of tobacco use was reported among younger students compared with the older students. Exposure to tobacco advertising in the latter study was a strong correlate of tobacco use among younger students.

Males are typically at a much higher risk for tobacco use than are females and this was supported by the present study and others in the region, for example from the Syrian Arab Republic (29). This can be explained by smoking being a more acceptable social behaviour for males and also due to possible under-reporting by female students.

Higher stage of education tends to be associated with a higher likelihood of tobacco use. The present study agreed with this, as students in secondary grade classes were using tobacco more than those in the preparatory grades. This was also supported by the National Youth

Tobacco survey in the USA in 2004, which found that 28% of high-school and 12% of middle-school students reported current tobacco use (30).

The present study found an inverse relationship between students' use of tobacco and parents' education. This is in agreement with other studies, for example in the USA (31). Highly educated parents are more knowledgeable about the health consequences of tobacco use and they can prevent their children from taking up tobacco.

The present study highlights the important effects of parents' and siblings' tobacco behaviour on current tobacco use by students. Tobacco use by parents and friends, knowledge about the harmful effects of tobacco, smoking, environmental smoke and attitudes to tobacco use by others were strongly associated with student tobacco use. Social learning theory suggests that learning (of an attitude or habit) occurs through observation, i.e. the parent's behaviour is normally copied by the children (32). This is consistent with the present study. Parents' tobacco use contributes to the onset of daily tobacco use in their teenagers even if parents practise good family management, hold norms against teen tobacco use and do not involve their children in their own tobacco use

(33). We showed that students who did not use tobacco had better knowledge and attitudes toward tobacco use and its hazards than did tobacco users, and vice versa. These results are consistent with other studies, in south Australia (34) and Turkey (35).

Impact of intervention programme on knowledge and attitudes

Researchers have indicated that tobacco prevention programmes have positive influences on students' tobacco use and prevention of addiction. Therefore, in order to decrease the use of tobacco among teenagers, tobacco education programmes are suggested to cultivate students' positive perceptions and refusal skills (36). Youth are easily influenced by their favourite idols who smoke, and a positive correlation between a popular idol's smoking habits and adolescent smoking has been found (37). A Taiwanese study showed that students' post-intervention scores on the knowledge of tobacco hazard, anti-smoking attitudes and ability to refuse smoking were significantly higher than those in the pre-intervention period. This indicated that both the delivery of tobacco prevention brochures and the implementation of tobacco prevention programmes to reinforce teenager's

knowledge of tobacco hazards and attitudes against smoking were effective in decreasing youth smoking (36). Those findings are in accordance with the present study and a study in India (38).

This study has the same limitations inherent in any cross-sectional school survey, where data collection is limited to a single time point. Tobacco use status was assessed by self-reporting and therefore some students may have under-reported their tobacco use. Moreover, the existing taboos about tobacco use, especially among female students in this region, might also lead to under-reporting. The estimated prevalence in the study may therefore be slightly lower than the actual prevalence.

Conclusion and Recommendations

Tobacco use constitutes a real public health problem among this group of adolescents in the UAE. About 15% were self-reported current users of tobacco, and cigarette smoking was the most prevalent type. The most common reasons for tobacco use were trying out the experience, to relieve stress and peers' smoking. About one-third or more of the students demonstrated poor knowledge or negative (favourable) attitudes towards smoking. There was a significant improvement in knowledge and attitude scores after the 1-day intervention programme.

It is recommended that health education programmes to raise awareness about the hazards of smoking for teenagers and adolescents are continued in schools and that parents and concerned staff are actively engaged in the process, with an emphasis on encouraging youth support groups working against tobacco use among youth.

Competing interests: None declared.

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