Cigarette and waterpipe smoking associated knowledge and behaviour among medical students in Lebanon

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المعارف والسلوكيات المرتبطة بتدخين السجائر والنرجيلة (الشيشة) بين طَلَبة الطب في لبنان

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الخلاصة: نظراً لأنهم سيصبحون أطباء المستقبل القادرين على مكافحة الاعتماد على التبغ بين السكان، فإن طَلَبة الطب يُعَـدُّون هدفاً رئيسياً لتدخلات مكافحة التبغ. وقد استعرضت هذه الدراسة مدى انتشار تدخين التبغ (السجائر والشيشة)، وما يرتبط بهما من معارف وسلوكيات بين طَلَبة السنة السادسة في كلية الطب في عام 2009-2010 وذلك في ست كليات للطب في لبنان. واستند الاستبيان الذاتي على الأسئلة الأساسية الموجودة في المسح المهني للصحة العالمية، كما استفسر عن حصول الطلبة على تدريب حول أساليب الإقلاع عن تعاطي التبغ. وقد طُـلب من جميع الطَّلَبة المسجلين المشاركة، وبلغ معدل الاستجابة 354/191 (54.3٪). وتبين أن معدل انتشار تعاطي التبغ قد بلغ 26.3٪ للسجائر و 29.5٪ للشيشة. وكان تدخين الشيشة هو المنبئ الوحيد الهام على تدخين السجائر، ولم توجد اختلافات بحسب الجنس والوضع الاجتماعي والاقتصادي. وأفادت أقلية منهم أنهم تلقوا تدريباً رسمياً حول أساليب علاج الاعتماد على التبغ. ويرى الباحثون أن على كليات الطب أن تدرج في مناهجها الدراسية برامج تدريبية لعلاج الاعتماد على التبغ وتثبيط العزم على تعاطي التبغ.

ABSTRACT As future physicians capable of controlling tobacco dependence in the population, medical students are considered a main target for tobacco control interventions. This cross-sectional study reported on the prevalence of tobacco use (cigarettes and waterpipes) and associated knowledge and behaviour among 6th-year medical students in 2009–2010 from 6 medical schools in Lebanon. The self-administered questionnaire based on the Global Health Professional Survey (GHPSS) core questions also enquired about training in tobacco cessation approaches. All enrolled students were asked to participate; the response rate was 191/354 (54.3%). The prevalence of tobacco use was 26.3% for cigarettes and 29.5% for waterpipes. Smoking waterpipes was the only significant predictor for cigarette smoking and there was no difference by sex and socioeconomic status. A minority reported ever receiving any formal training in treatment approaches for tobacco dependence. Medical schools should include tobacco dependence treatment training programmes in their curriculum and discourage tobacco use.

Consommation de cigarettes, utilisation de pipes à eau et connaissances et comportements associés chez des étudiants en médecine au Liban

RÉSUMÉ En tant que futurs médecins en mesure de lutter contre la dépendance tabagique dans la population, les étudiants en médecine sont considérés comme une cible majeure pour les interventions de lutte antitabac. La présente étude transversale a évalué la prévalence de la consommation de tabac (cigarettes et pipes à eau) et les connaissances et comportements associés chez des étudiants en sixième année d'étude de médecine en 2009-2010 dans six facultés de médecine au Liban. Le questionnaire auto-administré basé sur les questions centrales de l'enquête mondiale sur les professionnels de santé contenait aussi des questions sur la formation en matière de méthodes de sevrage tabagique. Tous les étudiants inscrits étaient libres de participer à cette étude ; sur 354 étudiants au total, 191 ont répondu au questionnaire (54,3 %). La prévalence de la consommation de tabac était de 26,3 % pour les cigarettes et de 29,5 % pour les pipes à eau. Fumer la pipe à eau était le seul facteur prédictif important pour la consommation de cigarettes et aucune différence n'a été observée entre les deux sexes ni les statuts économiques. Seule une minorité a déclaré avoir bénéficié d'une formation officielle sur les méthodes de traitement de la dépendance tabagique. Les facultés de médecine devraient intégrer des programmes de formation sur le traitement de la dépendance tabagique dans leur cursus universitaire et décourager la consommation de tabac.

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Introduction

In Lebanon, as elsewhere in the world, tobacco is the leading cause of preventable death [1]. The smoking epidemic in Lebanon is predicted to kill more people within the next 30 years than the 16 years of civil war [2]. This is not just attributed to cigarette smoking but also to the growing trend in waterpipe smoking. The practice is popular among all age groups and among both sexes [3] and, recently, it has moved from being a smoking behaviour of retired men to becoming a fashionable trend that has the potential to add to the burden of the tobacco epidemic [4]. This form of smoking is usually perceived by users as less harmful than cigarette smoking because the smoke first passes through water before it is inhaled [5]. However, waterpipe smoke has been reported to contain more carbon monoxide than cigarette smoke, in addition to other carcinogens such as high amounts of tar, nicotine, arsenic, cobalt, chromium, lead and a variety of humectants and polycyclic aromatic hydrocarbons [6,7]. It is reported that between 1999 and 2007 waterpipe usage in the Middle East rose 200% among women and 60% among men [8]. The spread of cigarette and waterpipe smoking behaviour in Lebanon therefore requires urgent attention.

The World Health Organization (WHO) MPOWER package of policies and interventions recommended the involvement of physicians in reducing the tobacco burden, as even brief advice to the patient can substantially decrease smoking cessation rates [1]. Medical and health personnel who are capable of delivering tobacco dependence interventions have helped decrease smoking rates in most developed countries [9]. The medical community in Lebanon and the Middle East is poorly committed to smoking prevention and awareness policies [10]. The 2005 Global Health Professional Survey (GHPSS), conducted in 6 medical schools in Lebanon, reported that lifetime use among 3rd-year medical students in Lebanon was 67.4% for cigarettes and 65.4% for waterpipes, and current use was 27.4% for cigarettes and 20.6% for waterpipes [11]. Thus, waterpipe and cigarette smoking were prevalent among medical students, despite students' assumed knowledge of the harm associated with it [9]. Training medical students in tobacco dependence treatment techniques as part of their curriculum and exposing them to the recent knowledge associated with alternative tobacco use such as waterpipe smoking will not only have a local impact, but, may also contribute to the global effort to contain the tobacco epidemic.

This study reports on the prevalence of tobacco use among 6th-year medical students 5 years after the GHPSS. It specifically examined beliefs related to waterpipe smoking for the first time in this population and whether waterpipe smoking behaviour was associated with cigarette smoking. This study aimed to provide information on sex and socioeconomic differences by smoking status. In addition, the self-reported information on training and knowledge associated with tobacco education assessed the extent of training of this cohort of future physicians and whether this training had impacted their tobacco-related behaviour.

Methods

Study design

This cross-sectional study was conducted during the 2009–10 school year among 6th-year medical students enrolled at 6 of the medical schools in Lebanon. Lebanese medical schools graduate about 354 physicians per year [unpublished data]. The study received exemption from the responsible research office and was conducted according to an approved protocol.

Study sample

A list of all colleges in Lebanon that offer degrees in medicine was obtained from the WHO 2007 updated list [12]. There were at the time of the study 7 listed medical schools. A letter of invitation to participate in the study was e-mailed directly to the deans' office. A response with permission to conduct the survey was promptly received via e-mail from 5 medical schools. One medical school replied that it did not have a 6th-year cohort of medical students since it had just opened for enrolment in 2007. One school was contacted via a phone call upon arrival to Lebanon and permission to conduct the study was granted.

The target population for the study was all 6th-year medical students in programmes that had 4 years of medical school education following an undergraduate degree, and medical students classified as 1 year before their graduation year from all other programmes. To be eligible, a medical student had to be in the target year for the medical school and understand English to be able to complete the survey. Medical students in the introductory years were not targeted because they are still learning the basic sciences and medical students in their graduating year are hard to reach because they are mostly in clinical rotations and rarely in the classic classroom setting. All students that were enrolled in the 6 medical schools and were in Lebanon during the period of data collection received a copy of the survey and were asked to participate.

Questionnaire

Questionnaire development

The anonymous self-administered questionnaire included GHPSS core questionnaire [13] and questions developed by Maziak et al. [14]. The GHPSS was developed by the WHO, the United States Centers for Disease Control and Prevention, the Canadian Public Health Association and the American Cancer Society in 2004 to collect information

from 3rd-year health professions students on the following topics: tobacco use, exposure to second-hand smoke, perception of the role of the health professional in treating and counselling smokers, willingness to quit tobacco, consumption, exposure to tobacco cessation training, and opinions on the tobacco consumption ban in Lebanon. The questionnaire also contained the items developed by Maziak et al. [15] that emerged from a recommendation to standardize questions for the assessment of waterpipe tobacco use in epidemiological studies; specifically those related to health perceptions associated with waterpipe smoking. The instrument included additional questions on demographics and socioeconomic status, cigarette smoking behaviour and waterpipe smoking behaviour. All of the items had been used in the past and most had been evaluated for reliability, test–retest reliability and validity.

Measures

Current cigarette smoking status was measured using the question "During the past 30 days (1 month), on how many days did you smoke cigarettes?" A current non-smoker was defined on the basis of replying "0 days" to the question. Current waterpipe smoking status was measured using the question "Which of the following best describes your relation to waterpipe smoking?" Non-smokers were those who replied "I do not currently smoke the waterpipe".

The ages of initiating cigarette and waterpipe smoking were based on the questions "How old were you when you first smoked cigarettes [a waterpipe]?" These questions had multiple choice responses with the following options: never smoked, age ≤ 10, age 11–15, age 16–17, age 18–19, age 20–25 and age 25–29 years.

The student's perception about the health effects of waterpipe smoking was based on the response to a question asking for a comparison of the harmful effect of cigarettes smoking versus waterpipe smoking [15].

According to the recommendations of social researchers in the country socioeconomic status in Lebanon was based on the students' monthly spending or allowance from all sources, the education level of the father, and the education level of the mother. Parental education level response options were: illiterate, primary, intermediate, secondary school and university or higher. Students' monthly allowance response options included: < US$ 200, US$ 200-$400, US$ 400-$600, and > US$ 600.

Data collection

To ensure full attendance the survey was administered in the classroom setting in the schools after a mandatory class. Before administration of the survey, full attendance of the group was confirmed by the class delegate. For every medical school the class delegate confirmed that we had reached all medical students from his cohort. All participants were asked to omit their names on the survey to assure the anonymity of their identity. All students were encouraged to read the first page before attempting to answer any questions, which stated that they have the right not to participate if they did not wish to. Each survey took approximately 30 minutes to complete.

Data analysis

The data for this study were analysed using the statistical package *Stata*, version 10. Descriptive statistics for number of participants, age of participants, male and female composition, and measures of socioeconomic status were calculated collectively for all medical schools. Means and standard errors (SE) were reported for continuous variables and frequencies for categorical variables. Frequencies were also reported for all medical school training variables. Cigarette smokers and waterpipe smokers were compared with non-smokers of either form of smoking using chi-squared analysis. Non-smokers included medical students who at the time of the survey did not smoke either product. Univariate regression analysis was performed separately for possible variables associated with of cigarette and waterpipe smoking among the medical students. Variables with significant association ($P < 0.1$) in the univariate analysis were entered in separate multivariable logistic regression models for cigarettes and waterpipe smoking. Adjusted odds ratios (OR) and 95% confidence intervals (CI) were reported for significant predictors ($P < 0.05$) for the 2 forms of smoking.

Results

A total of 191 students out of 354 enrolled in the 6 medical schools responded (54.3% response rate). The demographic characteristics of the students are presented in Table 1. The average age of medical students who participated in the study was 23.6 (SD 1.0) years, range 21–26 years; 44.5% were female and 55.5% were male. The majority of students reported fathers and mothers with university or higher education. When asked about monthly spending or allowance from all sources, almost half of the medical students reported a monthly spending of US$ 200–400.

A total of 67.9% of students had reported ever trying or experimenting with cigarettes (Table 1); the highest percentage (31.7%) reported trying their first cigarettes at age 18–19 years (Table 2). The prevalence of current cigarette smoking was 26.3% (68.0% of current cigarette smokers were males 32.0% were females). There was no significant association between the sex of the student and currently smoking cigarettes ($\chi^2 = 2.57$, $P = 0.11$). Approximately 24.0% of smokers reported smoking every day in the last 30 days.

Table 1 Background demographic characteristics and smoking status of the surveyed medical students in Lebanon, 2010

Variable	No.	% (*n* = 191)
Sex		
Male	106	55.5
Female	85	44.5
Parents' education		
Father: university education	125	65.4
Mother: university education	119	62.3
Monthly allowance (US$)		
< 200	23	12.7
200–400	83	45.9
400–600	53	29.3
> 600	22	12.1
Smoking status		
Current cigarette smoker	50	26.3
Current waterpipe smoker	56	29.5
Ever smoker of cigarettes	129	67.9
Ever smoker of waterpipes	80	41.9

Regarding intention to quit smoking, 38.0% of the cigarette smokers intended to quit smoking in the future.

The rate of ever smoking a waterpipe was 41.9% among all students (Table 1). The highest percentage (30.4%) had first tried a waterpipe at 16–17 years old. The prevalence of current waterpipe smoking was 29.5% (67.9% of current waterpipe smokers were males, 32.2% were females) (Table 2). Males were twice as likely as females to smoke waterpipes ($\chi^2 = 4.69, P = 0.03$). Waterpipe smoking was an occasional practice for more than half of the waterpipe smokers; 53.6% of the waterpipe smokers reported smoking monthly (at least once a month but less than weekly). In response to the intention to quit waterpipe smoking question, 50.0% of the

Table 2 Characteristics of 6th-year medical students who were current cigarette smokers, current waterpipe smokers and non-smokers, Lebanon, 2010 (*n* = 191)

Variable	Current cigarette smoker (*n* = 50)		Current waterpipe smoker (*n* = 56)		Non-smoker (*n* = 104)	
Age [mean (SE) years]	23.4 (0.13)		23.7 (0.12)		22.9 (0.14)	
	No.	**%**	**No.**	**%**	**No.**	**%**
Sex						
Male	34	68.0	38	67.9	52	50.4
Female	16	32.0	18	32.2	52	49.6
Parents' education						
Father: university education	35	70.0	38	67.8	67	64.4
Mother: university education	34	68.0	35	62.5	65	62.2
Monthly allowance (US$)						
< 200	5	10.0	4	7.1	14	13.3
200–400	20	40.0	29	51.8	42	40.0
400–600	12	24.0	14	25.0	30	28.9
> 600	8	16.0	7	12.5	11	10.4
Perception that waterpipe smoking more harmful than cigarette smoking	23	46.0	24	42.8	26	54.8
Age at initiation of smoking (years)						
≤ 10	0	0.0	1	1.8	n/a	n/a
11–15	12	24.0	4	7.1	n/a	n/a
16–17	12	26.8	17	30.4	n/a	n/a
18–19	18	31.7	14	25.0	n/a	n/a
20–25	7	13.8	15	26.8	n/a	n/a
Smoking status					n/a	n/a
Current waterpipe smoker	19	38.0	56	100.0	n/a	n/a
Current cigarette smoker	50	100.0	19	34.0	n/a	n/a
Intention to quit smoking	19	38.0	28	50.0	n/a	n/a

SE = standard error; n/a = not applicable.

smokers reported that they intend to quit in the future.

When asked about health risks associated with smoking, 42.8% of waterpipe smokers believed that waterpipe smoking was more harmful than cigarettes, whereas 46.0% of cigarette smokers replied that waterpipe smoking was more harmful than cigarette smoking (Table 2).

Tables 3 and 4 display potential factors associated with cigarette and waterpipe smoking. Medical students who were cigarette smokers were 13.4 times more likely than non-cigarette smokers to be waterpipe smokers (OR = 13.4, 95% CI: 5.81–30.8). Similarly, medical students who were waterpipe smokers were almost 13 times more likely than non-smokers to be cigarettes smokers (OR = 12.9, 95% CI: 6.31–27.3). Other potential factors, such as socioeconomic status and harm perception, were not significantly associated with cigarette smoking or waterpipe smoking in the univariate analysis. The respondent's sex was significantly associated with waterpipe smoking (OR= 2.09, 95% CI: 1.06–3.97) but not with cigarette smoking (OR = 0.96, 95% CI: 0.86–1.07), i.e. males were twice as likely as females to smoke waterpipes.

In the final model for logistic regression, smoking waterpipes was the only significant predictor for cigarette smoking among this cohort of medical students (OR = 12.9, $P < 0.001$), while cigarette smoking remained the only predictor of waterpipe smoking (OR = 13.4, $P < 0.001$).

Table 5 contains a summary of reported training received at medical school about tobacco control. Although 94.2% reported being taught about the dangers of smoking, only 28.3% of this cohort of medical students reported ever receiving any formal training in tobacco cessation approaches to use with patients A high percentage (94.8%) had heard of using nicotine replacement therapy in treatment programmes but surprisingly only 57.6% had heard of using antidepressants for the management of tobacco dependence.

Table 3 Results of univariate analysis for cigarette smoking among 6th-year medical students in Lebanon, 2010 (n = 191)

Variable	OR (95% CI)	*P*-value
Sex		0.11
Female	1.00	
Male	0.96 (0.86–1.07)	
Father's education		0.54
Less than university	1.00	
University	0.89 (0.56–1.52)	
Mother's education		0.30
Less than university	1.00	
University	0.86 (0.49–1.73)	
Monthly allowance (US$)		0.72
< 400	1.00	
≥ 400	1.20 (0.27–4.04)	
Perception of waterpipe smoking		0.89
Less or equally harmful than cigarettes	1.00	
More harmful than cigarettes	0.43 (0.15–1.23)	
Age at initiation of cigarette smoking (years)		0.33
< 18	1.00	
18+	0.98 (0.53–1.11)	
Waterpipe smoking status		< 0.001
Non-smoker	1.00	
Waterpipe smoker	12.9 (6.31–27.3)	

OR = odds ratio; CI = confidence interval.

Discussion

The rates of smoking among medical students and their level of training in tobacco dependence during medical school have been reported for the region and worldwide [14,16–20]. This study about cigarette and waterpipe smoking behaviour of medical students and of tobacco-related behaviour and knowledge in 6 medical schools in Lebanon presents new findings from a cohort of future medical physicians in the country. The data from this survey indicated that almost one-third of this population smoked either waterpipes or cigarettes, with a larger percentage using the waterpipe. The current rates of smoking for Lebanese medical students (26.3% for cigarette smoking and 29.5% for the waterpipe) are considered high compared with rates based on the 2005 GHPSS for the region [11]. Smoking rates ranged from 22.7% for cigarettes and 12.3% for all other tobacco products in the Gaza Strip/West Bank to 5.6% for cigarettes and 9.9% for all other tobacco products in the Islamic Republic of Iran [17]. Using data from the 2005 GHPSS in Lebanon, Saade et al. reported a similar prevalence of cigarette smoking, but a lower prevalence of waterpipe smoking (27.4% for cigarettes and 20.6% for waterpipe) [11]. Almerie et al. reported on cigarette and waterpipe smoking among medical students in the Syrian Arab Republic [14]. They found that the overall prevalence was 10.9% for cigarettes and 23.5% for waterpipes. One-quarter of the medical students surveyed by Kusma et al. in Berlin were current smokers [19]. In the United States, the rate of smoking among

Table 4 Results of univariate analysis for waterpipe smoking among 6th-year medical students in Lebanon, 2010 (*n* = 191)

Variable	OR (95% CI)	*P*-value
Sex		0.03
Female	1.00	
Male	2.05 (1.06–3.97)	
Father's education		0.52
Less than university	1.00	
University	0.46 (0.18–1.17)	
Mother's education		0.79
Less than university	1.00	
University	0.86 (0.34–2.13)	
Monthly allowance (US$)		0.36
< 400	1.00	
≥ 400	1.70 (0.49–5.90)	
Perception of waterpipe smoking		0.72
Less or equally harmful than cigarettes	1.00	
More harmful than cigarettes	0.43 (0.15–1.23)	
Age at initiation of waterpipe smoking (years)		0.27
< 18	1.00	
18+	0.83 (0.72–1.35)	
Cigarette smoking status		< 0.001
Non-smoker	1.00	
Cigarette smoker	13.4 (5.81–30.8)	

OR = odds ratio; CI = confidence interval.

4th-year medical students in New York city was reported as approximately 11% [20].

As previously reported for youth in general, the high rate of waterpipe smoking in the surveyed cohort of medical students may be due to an increase in its popularity and the fact that it is replacing cigarette smoking in Lebanon [12]. Students appear to have been affected by the trend towards waterpipe smoking among the youth of the Eastern Mediterranean Region and the rest of the world [21]. More than 31% of the participants in this study started smoking the waterpipe between the ages of 16–17 year, which coincides with the rise of the waterpipe epidemic in the region 10 years ago [21].

Surprisingly, many of the medical students reported that waterpipe smoking was more harmful than cigarettes, which is an indication that their behaviour was not affected by any false beliefs. Some people have the misperception that waterpipe smoking is safer than cigarette smoking because the smoke passes through water before inhalation [5].

This study showed no significant difference between male and female cigarette smoking rates but a significant difference in rates of waterpipe smoking. This suggests that in Lebanon, cigarette smoking among females does not carry a major social stigma. Women in Lebanon smoke openly, contrary to the neighbouring Arab countries that have less tolerant attitudes toward smoking by women [4].

Socioeconomic status in this study had no significant influence on smoking behaviour, which is similar to the findings in 2001 among university students in Lebanon [10]. This may be an indication that the study failed to capture a valid measure of socioeconomic status in this society, that we were studying a socially and economically homogeneous group or that this behaviour does not discriminate among socioeconomic levels in Lebanon.

Less than 30% of the students who participated in this study reported they had received any formal training in tobacco dependence treatment during their medical school years. However, more than 91% agreed that a physician should receive specific training in these therapies. These results are consistent with previous reports from the GHPSS which indicated a persistent gap in medical school education about smoking in Lebanon [11].

This study had the limitations that are typical of cross-sectional surveys. First, we do not know if the students who did not participate in the survey (45.7%) had a different level of knowledge and behaviour associated with smoking. However, the response rates in this study were typical of response rates for classroom administered surveys [22]. Respondents were from all schools within the 6th-year cohort of students and intended to represent the diverse medical student population in the country. A second possible limitation relates to underreporting of tobacco use. We did not biochemically confirm tobacco use with cotinine levels or expired carbon monoxide. Thus, our estimates of cigarette and waterpipe smoking could be even higher.

Students who participated in this study were similar demographically to students that participated in the previous GHPSS. The same proportion of respondents in this study were female (44.5%) as in the GHPSS (44.5%) [11]. Also, 75.5% of medical students who participated in the GHPSS were aged 19–24 years [11], and this cohort's mean age was within this age interval (23.6 years). A higher response rate may have been attained if there were more specialized research offices in the universities to facilitate communication. In Lebanon there is a lack of set protocols for research in many universities.

Table 5 Reported medical school training about smoking by 6th-year medical students in Lebanon, 2010 (*n* = 191)

Topic taught	Respondents agreeing	
	No.	%
Taught in any of the classes about dangers of smoking	180	94.2
Discussed in any of the classes about reasons people smoke	111	58.1
Learned the importance of recording tobacco history as part of patient's medical history	181	94.8
Learned the importance of providing educational material to support smoking cessation	137	71.7
Ever received any formal training in smoking cessation approaches	54	28.3
Ever heard of nicotine replacement therapy in tobacco cessation	181	94.8
Ever heard of antidepressant therapy in tobacco cessation	110	57.6

Conclusion

This study provides important information about cigarette and waterpipe smoking of 6th-year medical students in Lebanon. When compared with previous results from the GHPSS [11] it revealed a shift from cigarette smoking to waterpipe smoking that is consistent with reports on populations within the same geographical area [13,14,16,23]. In addition, this study showed a lower than expected level of training in tobacco dependence treatment among this sample of medical students. Medical school faculty, public health organizations and the Ministry of Health should promote efforts to discourage tobacco use among medical students and health professionals in general. These efforts should include tobacco dependence treatment training programmes for medical students in undergraduate and postgraduate medical training, with an emphasis on prevention of waterpipe smoking. Tobacco dependence treatment clinics should be initiated in medical schools, and students encouraged to use their services. The results of this study can be used as a basis for enhancing the capacity to develop and implement tobacco dependence related programmes for medical students in Lebanon.

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