RESEARCH COMMUNICATION

Correlates of Smoking, Quit Attempts and Attitudes towards Total Smoking Bans at University: Findings from Eleven Faculties in Egypt

Walid El Ansari[1]*, Shokria Labeeb[2], Safaa Kotb[2], Mohammad T Yousafzai[3], Amira El-Houfey[2], Christiane Stock[4]

Abstract

    Objectives: Smoking among university students represents a formidable and global public health challenge. We assessed the associations between socio-demographic, health and wellbeing variables as independent variables, with daily smoking, attempts to quit smoking, and agreement with smoking ban as dependent variables. Methods: A sample of 3258 undergraduate students from eleven faculties at Assiut University, Assiut, Egypt, completed a general health questionnaire. Results: Overall daily or occasional smoking in last three months prior to the survey was about 9% (8% occasional and 1% daily smokers), and smoking was generally more prevalent among males (male=17%, female=0.6%, P < 0.001). After adjustment for confounders, not having normal BMI and having a mother who completed at least bachelor's degree education was positively associated with daily smoking, and conversely, no history of illicit drug use was a protective factor. About 76% of smokers had attempted to quit smoking within the last 12 months prior to the survey. Although a large proportion of students agreed/ strongly agreed with the banning of smoking at university altogether (87%), such agreement was less likely among smokers. Conclusion: There is need for implementation of non-smoking policies on university premises, as well as regular up-to-date information on, and the periodic/yearly monitoring of tobacco use by university students employing standardised data collection instruments and reference periods. In addition, it would be valuable to develop campus-based educational/ awareness campaigns designed to counteract tobacco advertisement directed towards young people in Middle East countries. Otherwise, the danger could be that the current relatively low smoking prevalence among university students may escalate in the future.

    Keywords: Smoking - quitting smoking - agreement with smoking ban – Egypt - university students

Introduction

    Whilst the total number of smokers is estimated at 1.3 billion globally and expected to increase (Shafey et al., 2009), about a third of the world's population aged ≥15 years are smokers (Corrao et al., 2000). Assuming no future change in the global prevalence of smoking, the number of cigarette adult smokers is anticipated to be 1.67 billion by 2020 due to changes in the world population (United Nations Population Division, 1998). This global trend is despite the fact that the smoking rates in adult populations are decreasing in some countries.

    Smoking is a preventable risk factor implicated with many chronic conditions (Shafey et al., 2009). It is a major cause of preventable deaths worldwide, and the leading cause of premature death in industrialised countries (Fawibe & Shittu, 2011). However, a disproportionate

share of the global tobacco burden falls on developing countries which host 84% of the 1.3 billion current smokers (Jha & Chaloupka, 2000). Hence, between 2002 and 2030, whilst tobacco-attributable deaths could decrease by 9% in high-income countries, they are projected to double in low- and middle income countries (from 3.4 million to 6.8 million) (Mathers & Loncar, 2006). Developing countries have become main targets for the tobacco industry expansion activities, and by 2030, ≈80% of deaths caused by the tobacco epidemic is expected to be in these countries (Mathers & Loncar, 2006). Indeed, each year approximately five million people die from tobacco related diseases in developing countries (World Health Organization, 2008). This is supported by recent research of the high prevalence of early smoking initiation among e.g. representative samples of 13-15 year-olds in seven African countries, where

*[1]Faculty of Applied Sciences, University of Gloucestershire, Gloucester, United Kingdom, [2]Faculty of Nursing, Assiut University, Assiut, Egypt, [3]Department of Epidemiology and Medical Statistics, Hamad Medical Corporation, Qatar, [4]Unit for Health Promotion Research, Institute of Public Health, University of Southern Denmark, 6700 Esbjerg, Denmark *For correspondence: walidansari@ glos.ac.uk*

~15.5% had experienced smoking initiation before age 14, suggesting that interventions are needed for boys and girls even in the preteen years, before smoking initiation (Peltzer, 2011). African countries (e.g. Egypt) thus need heightened awareness and up-to-date information in order to prevent and respond to this epidemic.

About one quarter of Egyptian males smoke daily, while smoking is < 1% among females (Shafey et al., 2009). The Global Youth Tobacco Survey (GYTS) showed increasing numbers for never smokers susceptible to initiate smoking among Egyptian school children aged 13-15 years of both genders (El-Awa et al., 2010). There is also some evidence that Western media exposure is positively associated with smoking among Egyptian adolescents (Islam & Johnson, 2007).

While the GYTS reported that ≈6% and 1% of male and female adolescents in Egypt smoke, these rates are likely to increase during young adulthood. Evidence suggests that the tobacco smoking habit develops early in adolescence and young adult years (CDC, 1994; Kelishadi et al., 2007; WHO/EMRO, 2009). Indeed the young adult- and university years represent a critical transition period in cigarette use, suggesting that smoking in this population is more 'changeable and mutable' compared to older, more established smokers (Wetter et al., 2004). However, recent trends show that many college students start smoking (Wetter et al., 2004), targeted by the tobacco industry. High smoking rates among university students have been documented (Solberg et al., 2007), and these young adults are at increased risk for future smoking, compared with same-age peers not attending college (Gilpin et al., 2005).

In addition, although many college students smoke, little is known about the exposure this population to second hand smoke (Wolfson et al., 2009), where in e.g. Korea, 79.7% of a sample of college students reported that they were exposed to second hand smoke on campus on average 3 times per week (Kim & Choo, 2012).

University students are the future highly educated work force, and their future health is influenced by current health behaviour. These educated graduates will be role-models in their future work environments and have the potential to influence the society at large as future decision makers. However, the attitudes and behaviours that students gather during their university years will probably continue through their lifespan and to impact on the society generally. Therefore the health behaviour/s of university students is of high interest, as college years may represent a window of opportunity for non-initiation or to early cessation (Thomas et al., 2010). Such cessation and other health promotion activities, when successful, are likely to contribute to the prevention of a raft of chronic illnesses that are associated with smoking.

Nevertheless, studies on smoking behaviour and quit attempts among university students in the Eastern Mediterranean countries (e.g. Egypt) and on their attitudes towards smoking policies on campus are sparse. For instance, research reported an 8% smoking prevalence for students at Alexandria University, and a rate of 12% for students at Ismailia University, with both studies reporting much higher rates among males than females (Refaat, 2004; Abolfotouh et al., 2007). Although these studies are somewhat old, more recent research that explores multiple aspects of smoking and related health risks premised on larger samples drawn from different faculties seems lacking. Such research is important for an evidence base in order to understand the challenges related with prevention policies, and to guide the development of primary and secondary prevention activities among Egyptian university students aimed at reducing the initiation of smoking and helping current smokers to quit. In Egypt, such regular up-to-date information on, and the periodic monitoring of smoking levels of university students appears, to date, to be still sparse and not regularly collected.

Given this lack of monitoring of tobacco use, attitudes and exposure to tobacco smoke in young adults, the present study therefore assessed smoking behaviour, quit attempts and attitudes towards smoking ban in a larger sample of Egyptian university students. In addition, the study also appraised the socio-demographic factors and other health risks that are associated with smoking, quit attempts and attitudes towards smoking ban on university campus in this population. Thus we examined the associations between socio-demographic, health and wellbeing variables (independent variables); and daily smoking, attempts to quit smoking, and agreement with smoking ban (dependant variables). Undergraduate students from eleven faculties at Assiut University, Egypt completed a general health questionnaire. The three specific objectives were to: assess the prevalence of smoking, and explore the variables associated with daily smoking; quantify the proportion of smokers who have attempted to quit smoking, and appraise the variables associated with attempts to quit smoking; and, assess the proportion of students who agree with a total smoking ban on university premises, and examine the variables associated with such agreement.

Materials and Methods

Data Collection

The study was ethically approved by the university ethics committee, and data were confidential and protected at all stages. Data were collected during the academic year 2009 – 2010 from a representative random sample of students (≈10% of students) at each of the eleven participating faculties (Business, Engineering, Education, Arts, Social Work, Sciences, Physical Education, Computers & Information, Veterinary Medicine, Specific Education, and, Agriculture) of Assiut University. In line with other general student health and wellbeing surveys undertaken in a number of countries (Ansari et al., 2007: 2011: 2012; Ansari & Stock, 2010: 2012; Khalil et al., 2011), participants were informed that by completing the questionnaire, they consent to participate in the study. Students attending regular lectures of randomly selected courses at the universities completed self-administered questionnaires during the last 10 – 15 minutes of their classes. For quality assurance, all data were computer entered by one person thus minimising data entry errors. No incentives were provided, and the final sample comprised 3258 students (1549 males and 1709 females; mean age 18.9±1.4 years). Based on the number of

completed and returned questionnaires, the response rates were about ≈90%.

Health and Wellbeing Questionnaire

The questionnaire gathered socio-demographic data (e.g., gender, age), self-reported health and lifestyle data (health behaviours), social support, and university study related data.

Self-rated health (1 item): "How would you rate your health in general?" (excellent, very good, good, fair, poor) (Potthoff et al., 1999; American College Health Association, 2007).

Depressive Symptomatology (19 items): the Modified Beck Depression Inventory (M-BDI) was employed (Beck et al., 1996). For the analysis, the cut-off was set above 4th quintile. In our sample, Cronbach's alpha of the M-BDI scale (depression score) was 0.87.

Perceived stress (4 items): short form of Cohen's Perceived Stress Scale (PSS) [Cohen et al., 1983)]. In our sample, Cronbach's alpha of the PSS was 0.55.

Burdens of university study (1 item): "To what extent do you feel burdened in the following areas: Studies in general?" (1 = not at all, 6 = very much).

Frequency of alcohol consumption (1 item): "Over the past three months how often have you drunk alcoholic drink/s?" (never, once a week or less, once a week, a few times each week, every day, a few times each day) (Hurrelmann & Kolip, 1994).

Illicit drug/s use (1 item): "Have you ever use/used drugs?" (yes, regularly; yes, but only a few times; never).

Smoking, and attempt/s to quit smoking (2 items, 1 item): "Within the last three months, how often did you smoke? (cigarettes, pipe, cigarillos, cigars)" (daily, occasionally, never). Participants were also asked: "If you smoke daily: How many cigarettes do you smoke on average?". For attempt/s to quit smoking: "Have you tried to quit smoking within the last 12 months?" (yes, no) (Hurrelmann & Kolip, 1994).

Opinion about total smoking ban (1 item): "There should be no smoking on the university premises at all" (strongly disagree, disagree; neutral; agree; strongly agree).

Socio-economic status of both the student's parents (1 item): "What is the highest degree that your parents have?" asked once for the student's father and another for the mother) (no formal education; primary school; secondary school; high school; Bachelor's degree; Master's degree; Ph.D. or equivalent).

Income sufficiency (1 item): "Would you say the amount of money you have at your disposal is..?" (totally sufficient, sufficient, rather not sufficient, not sufficient at all).

Fruit or vegetable consumption: "How many servings of fruits and vegetables do you usually have per day (1 serving = 1 medium piece of fruit, 1/2 cup chopped, cooked or canned fruits/vegetables, 3/4 cup fruit/vegetable juice, small bowl of salad greens, or 1/2 cup dried fruit)?" Participants reporting ≥ 5 servings per day were noted. The questions were very similar to other food frequency questionnaires that had been validated e.g. (Osler and Heitmann, 1996; Roddam et al., 2005).

Quality of one's life (1 item): "Consider the quality of your life: How did things go for you in the last four weeks?" (Bruusgard et al., 1993) (1 = very badly, 5 = very well).

Health awareness (1 item): "To what extent do you keep an eye on your health?" (1 = not at all, 4 = very much).

Educational achievement (i.e. academic performance - 2 items): (1) "How important is it for you to have good grades at university?" (1 = not at all important, 4 = very important); and, 2) "How do you rate your performance in comparison with your fellow students?" (1 = much worse, 5 = much better).

BMI (measured): weight and height were measured using Seca Digital Weight & Height Scale. Height was measured to the nearest 0.1 cm while the participant stood barefooted, and body weight was measured to the nearest 0.1 kg while the pupils wore light clothing and no footwear. BMI was calculated using Metric BMI Formula [BMI (kg/m^2) = weight in kilograms/the squared height (m^2)], and employed to determine whether participants were underweight (< 18.5), normal (18.5-24.99), overweight (25-29.99) or obese (≥ 30) (World Health Organization, 2000).

Data Analysis

Data was analysed using SPSS statistical package, with significance level set at $p < 0.05$. In order to compare the frequencies across the different categories between male and female students, for each variable, we used either two sided P - values based on Pearson Chi-square (χ^2), Fisher exact test for categorical variables and Student t-test for continuous scale variables.

Three different logistic regression models assessed the correlates associated with: daily smoking as dependent variable; attempt to quit smoking as dependent variable (only undertaken for students who are daily or occasional smokers, n = 285); and, agreement with total smoking ban on university premises as dependent variable. Analysis based on binary logistic regression with best subset method was employed. In each model, univariate analysis was first undertaken, and variables significant at 20% level of significance at the univariate level were then subsequently entered into the multivariable model. Crude odds ratios and adjusted odds ratios and their 95% confidence intervals are reported. Confounders (perceived stress, depression symptomatology, academic performance (from poor to high), importance of good grades (from low to high), and burden of university studies (strongly/very strongly) were assessed statistically through >15% change in beta coefficients, and variables shown to be confounders were kept in the multivariable model irrespective of their significance level. Model adequacies were checked through Hosmer-Lemeshow goodness of-fit test, where a P value of more than 5% suggested that a model was a good fit.

Results

Characteristics of the Sample

In total, 3258 students completed the questionnaire.

Table 1 depicts that males and females comprised 47.5% (n = 1549) and 53.5% (n = 1709) of the sample respectively. Mean student age was 18.9±1.4 years, and males were slightly older (19.3±1.6 years) than females (18.6±1.2 years) (P < 0.001). Less than one quarter of students (18%) reported excellent/ very good health (Female=22.8%, Male=14.5%, P < 0.001). About one quarter of students were either overweight (22%) or obese (6.7%), while 6% were underweight. In terms of gender, higher proportions of females were obese (Female=7.4% vs. Male=6%) or overweight (Female=25.3%, Male=19%) while less females (Female=5.4%, Male=7.1%) were underweight (P < 0.001). Although more than one quarter of students (28%) reported depressive symptomatology, females were more likely to report depressive symptoms (Female=30.1%, Male=25.6%, P <0.001) and also perceived stress (Female=44.4%, Male=31.2%, P < 0.001).

Only 10% of the sample consumed ≥ 5 servings of fruits and vegetables daily with no gender differences. Self reported illicit drug use was more among males (Female=0.4%, Male=6.8%, P < 0.001), while alcohol consumption was low in both genders (Female=6.8%, Male=6.1%, P = 0.54). Overall daily or occasional smoking in last three months was about 9%, and smoking was more among males (Female=0.6%, Male=17%, P < 0.001). Among smokers more males than females had attempted to quit smoking (Female=52%, Male=76%, P = 0.004) and quit attempts were more frequent among daily smokers (61%) than among occasional smokers (37%) (data not shown in the Table). More than three quarters (87%) of students agreed/strongly agreed to the banning of smoking at university altogether.

Table 2 further breaks down the sample by faculty as regards four smoking-related variables (smoking, number of cigarettes smoked, attempt to quit smoking and agreement with smoking ban). The table shows that the rate of occasional or daily smoking was > 10% amongst physical education, business and engineering students, while it was lower in students from the other faculties.

Correlates of Daily Smoking

Table 3 shows the findings of the univariate and multivariable logistic regression for the correlates of daily smoking. The table depicts that BMI, income insufficiency, maternal education, alcohol consumption, nutrition, and illicit drug use were each significantly associated with daily smoking at the univariate level. After adjustment for all potential confounders (e.g. perceived stress, depressive symptomatology, academic performance, importance of good grades at university, and burden of studies), underweight (BMI < 18.5) and obesity (BMI ≥ 30) when compared to normal weight (BMI 18.5 - 24.99) were positively associated with daily smoking [adjusted OR 1.79 (0.98 - 3.29); 2.03 (1.08 - 4.06) respectively]. In contrast, overweight (BMI 25 - 29.99) was negatively associated with daily smoking when compared to normal BMI [(adjusted OR 0.56, 0.27 - 1.15)].

In addition, students whose mothers had completed at least bachelor's degree education were ≈3 times more likely to smoke daily when compared to students whose mothers' education comprised less than bachelor's degree [(adjusted OR 2.98, 1.77 - 5.0)]. Similarly, the risk of daily smoking among students who never took illicit drugs was 97% less when compared to their peers who reported taking illicit drugs [(adjusted OR 0.03, 0.02 - 0.04)].

Correlates of Attempts to Quit Smoking

Table 4 shows the findings of the univariate and

Table 1. Descriptive Characteristics of University Students in Egypt (N=3258)

Variable	Total N=3258	Male n=1549 (%)	Female n=1709 (%)	P value*
Age	18.9 (1.4)	19.3 (1.6)	18.6 (1.2)	<0.001
Year of Study				
1st	1076 (33.5)	558 (36.5)	518 (30.8)	< 0.001
2nd	918 (28.6)	327 (21.4)	591 (35.2)	
3rd	857 (26.7)	434 (28.4)	423 (25.2)	
>3rd	357 (11.1)	208 (13.6)	149 (08.9)	
Self rated general health				
Poor	2634 (81.6)	1184 (77.2)	1450 (85.5)	< 0.001
Good	595 (18.4)	350 (22.8)	245 (14.5)	
BMI (measured)				
< 18.5	197 (6.2)	107 (07.1)	90 (05.4)	< 0.001
18.5-24.99	2046 (64.7)	1021 (67.8)	1025 (61.9)	
25-29.99	706 (22.3)	286 (19.0)	420 (25.3)	
≥ 30	213 (06.7)	91 (06.0)	122 (07.4)	
BDI Score mean(SD)**				
	53.2 (13.1)	50.9 (14.2)	55.3 (13.8)	< 0.001
Depression (BDI cut-off at 4th quartile)				
Yes	910 (27.9)	396 (25.6)	514 (30.1)	0.004
No	2348 (72.1)	1153 (74.4)	1195 (69.6)	
Perceived stress (PSS*** cut-off at median)				
More	1202 (38.1)	466 (31.2)	736 (44.4)	< 0.001
Less	1952 (61.9)	1029 (68.8)	923 (55.6)	
Overall study burden				
Yes	1943 (60.4)	826 (54.3)	1117 (65.8)	< 0.001
No	1276 (39.6)	695 (45.7)	581 (34.2)	
Fruits & vegetables (usual daily consumption)				
< 5	2566 (90.2)	1195 (90.2)	1371 (90.2)	0.994
≥ 5	279 (09.8)	130 (09.8)	149 (09.8)	
Alcohol (no alcohol in last 3 months before survey)				
Yes	2624 (93.6)	1326 (93.9)	1298 (93.2)	0.474
No	180 (06.4)	86 (06.1)	94 (06.8)	
Illicit drug use				
Yes	126 (04.5)	121 (08.6)	5 (00.4)	< 0.001
No	2680 (95.5)	1283 (91.4)	1397 (99.6)	
Smoking in last 3 months				
Daily	99 (03.2)	98 (06.5)	1 (00.1)	0.001
Occasional	173 (05.6)	165 (10.9)	8 (00.5)	
Never	2843 (91.3)	1255 (82.7)	1588 (99.4)	
Attempt to quit smoking****				
Yes	199 (75.7)	194 (76.4)	5 (51.6)	0.004
No	64 (24.3)	60 (23.6)	4 (48.4)	
Smoking ban at university				
Agree	2806 (87.3)	1265 (83.0)	1541 (91.2)	< 0.001
Disagree	409 (12.7)	260 (17.0)	149 (08.8)	

Numbers in parenthesis represent column percentages unless otherwise indicated; *Two sided P - values based on Pearson chi square and Fisher exact test for categorical variables, and Student t test for continuous scale variables for comparison between m' excluded from correlation analysis; ** BDI = Beck Depression Inventory, numbers might not sum up to total because of missing values; *** PSS = perceived stress score; **** among daily or occasional smokers, n = 285.

Table 2. Smoking Related Variables of University Students Across Eleven Faculties (N=3124)

Variable	Faculty										
	Business	Engineering	Education	Arts	Social Work	Sciences	Physical Education	Computers & Information	Veterinary Medicine	Special Education	Agriculture
	N = 585	N = 541	N = 421	N = 414	N = 315	N = 202	N = 175	N = 126	N = 127	N = 114	N = 46
Smoking in last 3 months											
Daily	30(05.1)	24(04.4)	1(00.2)	4(01.0)	16(05.1)	3(01.5)	11(06.3)	2(01.6)	4(03.1)	0	1(02.2)
Occasional	48(08.2)	35(06.5)	9(02.1)	18(04.3)	13(04.1)	10(05.0)	17(09.7)	2(01.6)	3(02.4)	10(08.8)	1(02.2)
Never	507(87.0)	482(89.0)	411(98.0)	392(95.0)	286(91.0)	189(94.0)	147(84.0)	122(97.0)	120(95.0)	104(91.0)	44(96.0)
Number of cigarettes smoked (n = 182)											
1-10	28(57.1)	14(43.8)	6(100)	12(92.3)	16(61.5)	9(81.8)	11(69.6)	2(66.7)	3(42.9)	5(83.3)	0
11-20	19(38.8)	13(40.6)	0	1(07.7)	3(11.5)	1(09.1)	6(26.1)	1(33.3)	1(14.3)	0	2(100)
>20	2(04.1)	5(15.6)	0	0	7(26.9)	1(09.1)	1(04.3)	0	3(42.9)	1(16.7)	0
Attempted to quit smoking (among daily or occasional smokers, n = 289)											
Yes	47(72.3)	40(080)	7(77.8)	20(74.1)	38(63.3)	6(66.7)	23(92.0)	1(25.0)	6(54.5)	8(88.9)	7(77.8)
No	18(27.7)	10(020)	2(22.2)	7(25.9)	22(36.7)	3(33.3)	2(08.0)	3(75.0)	5(45.5)	1(11.1)	2(22.2)
There should be no smoking on the university premises at all											
Disagree	74(12.5)	78(13.8)	56(12.4)	45(10.7)	46(14.2)	11(05.5)	35(19.7)	17(12.4)	11(08.5)	13(13.4)	12(24.0)
Agree	520(88.0)	488(86.0)	395(88.0)	375(89.0)	278(86.0)	189(95.0)	143(80.0)	120(88.0)	118(92.0)	103(87.0)	38(76.0)

Numbers of respondents may not sum up to total because of missing information

Table 3. Correlates of Daily Smoking Among University Students in Egypt

Variable	Crude OR (95% CI)	Adjusted OR (95% CI)	P value*
BMI:			
18.5-24.99	1	1	0.04
< 18.5	1.78 (1.10-3.17)	1.79 (0.98-3.29)	
25-29.99	0.57 (0.30-1.06)	0.56 (0.27-1.15)	
≥ 30	2.15 (1.16-3.99)	2.03 (1.08-4.06)	
Income sufficiency:			
Always yes	1	-	-
Mostly yes	2.02 (0.21-3.38)		
Mostly no	2.57 (1.75-3.77)		
Always no	1.36 (0.97-1.91)		
Mother's education: At least bachelor degree			
	2.53 (1.67-3.82)	2.98 (1.77-5.00)	< 0.001
Alcohol consumption: No alcohol in last 3 months			
	0.61(0.42-0.88)	-	-
Nutrition: Eat ≥ 5 portions of fruit & vegetables daily			
	0.59 (0.32-1.08)	-	-
Illicit drugs: Never took illicit drugs in life			
	0.03 (0.02-0.04)	0.03 (0.02-0.04)	< 0.001

OR: Odds Ratio; CI: confidence interval; Daily smoking (1 = Yes, 0 = No); *P - value based on -2Log likelihood ratio test for Adjusted Odds Ratios; Crude Odds Ratio based on univariate logistic regression (20% level of significance), Adjusted odds ratio based on multivariable logistic regression (5% level of significance), adjusted for perceived stress, depression symptomatology, academic performance (from poor to high), importance of good grades (from low to high), and burden of university studies (strongly/very strongly)

Table 4. Correlates of Attempts to Quit Smoking Among University Students in Egypt

Variable	Crude OR (95% CI)	Adjusted OR (95% CI)	P value*
Gender (Male)	0.33 (0.15-0.71)		-
Income sufficiency:			
Always yes	1		
Mostly yes	1.87 (0.63-5.52)		
Mostly no	2.12 (0.91-4.91)		
Always no	1.58 (0.80-3.14)		
Mother's education: At least bachelor degree			
	0.89 (0.49-1.64)	0.87 (0.63-0.90)	0.048
Alcohol consumption: No alcohol in last 3 months			
Nutrition	0.90	1.95	
Nutrition: ≥ 5 portions of fruit & vegetables daily			
	0.5...	1.15...	0.05
Illicit drugs: Never took illicit drugs in life			
	1.3...	2.43...	-
Smoking: daily vs occasional			
	0.6...	1.17...	0.05
	1.1...	1.88...	0.038

1.10 - 7.76) when compared with those students who did not agree with the smoking ban at university.

In addition, at least having a bachelor's degree of mother, eating ≥ 5 portions of fruits and vegetables daily, and smoking daily (vs. occasional smokers) were negatively associated with attempts to quit smoking (adjusted OR 0.87, 0.63 - 0.90; adjusted OR 0.51, 0.28 - 0.93; and adjusted OR 0.55, 0.22 - 0.65 respectively).

Correlates of Agreement with Smoking Ban at University

Table 5 shows the findings of the univariate and multivariable logistic regression for the agreement with total smoking ban at university. After adjustment for potential confounders (perceived stress, depression symptomatology, quality of life, academic performance, importance of grades and burden of university studies), males, and daily (vs. occasional) smoking were negatively associated with the agreement to total smoking ban at university (adjusted OR 0.67, 0.49 - 0.89; and adjusted

multivariable logistic regression for the correlates of attempts to quit smoking. The table depicts that, at the univariate level, gender, income insufficiency, maternal education, alcohol consumption, nutrition, illicit drug use, and smoking were significantly associated with attempts to quit smoking. After adjustment for confounders (perceived stress, depression symptomatology, academic performance, importance of good grades, and burden of university studies), students who agreed with university campus smoking ban were almost three times more likely to having attempted quitting smoking (adjusted OR 2.87,

Table 5. Correlates of Attempts with Total Smoking Ban on Among University Students in Egypt

Variable	Crude OR (95% CI)	Adjusted OR (95% CI)	P value*
Gender (Male)	0.47 (0.38-0.58)	0.67 (0.49-0.89)	0.007
Income sufficiency:			
Always yes	1	-	-
Mostly yes	1.22 (0.78-1.90)		
Mostly no	1.35 (0.91-2.01)		
Always no	1.55 (1.01-2.37)		
Mother's education: At least bachelor degree			
	0.88 (0.69-1.12)	-	-
Alcohol consumption: No alcohol in last 3 months			
	0.99 (0.72-1.36)	-	-
Nutrition: Eat ≥ 5 portions of fruit & vegetables daily			
	1.63 (1.17-2.27)	1.70 (1.12-2.59)	0.013
Illicit drugs: Never took illicit drugs in life			
	5.56 (3.80-8.13)	2.30 (1.27-4.16)	0.006
Smoking: Daily vs occasional smoking			
	0.06 (0.04-0.09)	0.09 (0.05-0.16)	< 0.001

OR 0.09, 0.05 - 0.16 respectively).

In addition, eating ≥ 5 portions of fruits and vegetables daily, and never taking illicit drugs in life were positively associated with agreement to total smoking ban at the university (adjusted OR 1.70, 1.12 - 2.59; and adjusted OR 2.30, 1.27 - 4.16 respectively). Income insufficiency, maternal education, and alcohol consumption were significantly associated with agreement with smoking ban at the univariate level, but after adjustment, these variables lost their significance.

Discussion

Tobacco smoking is well documented as a single cause of preventable morbidities and premature mortality (Villablanca et al., 2000; National Cancer Institute, 1999) and premature death. In the USA, mortality attributed to smoking alone is more than the combined mortality attributed to HIV, drug abuse, alcohol consumption, road traffic accidents, suicides and murders (CDC, 2011).

In terms of the first objective, the study described the prevalence of smoking and its correlates across a sample of university students in Egypt. As for the prevalence of smoking during the three months prior to the survey, ≈3.2% reported daily smoking, while 5.6% smoked occasionally. This combined 8.8% of current smokers in our sample is only slightly higher than levels reported from the University of Ilorin in Nigeria (1754 students), where current smoking prevalence rate was 5.7% (Female=7.7% ,Male=2%) (Fawibe & Shittu, 2011). Similarly, our 8.8% current smokers level seem to contrast well with the 17.6% current smokers level recently reported across a sample of medical students in Saudi Arabia (Al-Kaabba et al., 2011), particularly that the Saudi study measured smoking status by whether the student had smoked on ≥ 1 day in the 30 days preceding the survey (Al-Kaabba et al., 2011). Our 3.2% daily smoking level was lower than USA levels, where 7% daily smokers were reported across 4275 students (10 universities) (Wolfson et al., 2009), specifically that this USA study's reference period was the past-30-day smoking status (compared to our 3 months reference period). Similarly, our 3.2% daily

smoking, and 5.6% occasional smoking compared nicely with a study across three medical colleges in Pakistan (1529 students) where 5.7% were daily smokers and 11.7% were occasional smokers, particularly that their reference period was also the 30 days prior to their survey (Minhas & Rahman, 2009). The 8.8% current smokers in our sample is lower than levels reported from Jordan (Khader and Alsadi 2008), where the prevalence of current smoking among a sample of 712 university students was 35% (reference period does not seem to be stated). Such differences in the reference periods (or the none-mention of the reference period) that studies employed render the comparisons of findings across studies difficult.

When comparing our findings with other studies that employed the same reference period, our sample's daily and occasional smoking levels compared favourably with a recent study across seven universities in the UK (3706 students), where ≈15.8% of the UK sample reported daily smoking, while 12% reported occasional smoking (during the last three months) (El Ansari & Stock, 2012). Conversely, ≈91.3% of our sample reported never smoking (Female=82.7, Male=99.4) which was favourably higher, for both genders, than the 74.9% never-smokers level reported in university students in Turkey (Female=70.2, Male=76.8) (Aslan et al., 2006).

After adjusting for possible confounding factors (other socio-demographic, health/wellbeing and educational variables under examination), three variables were positively associated with daily smoking: students who were either underweight or obese, students whose mothers had at least a bachelor degree; and, students who reported having taken illicit drugs in life.

In terms of BMI and smoking, research indicates that smoking and body weight are interrelated, but the relationship is complex and not well understood (Kaufman et al., 2012). Generally, cigarette smoking exhibits an inverse association with body weight or BMI (Albanes et al., 1987; Flegal et al., 1995; Prospective Studies Collaboration, 2009). Our findings that underweight students were about 1.8 times more likely to be current smokers when compared to normal BMI is in agreement with these studies, and might lend support to proposals suggesting smoking as a weight control/ loss strategy. On the other hand, recent studies found no significant association between BMI and nicotine dependency across a sample of 18-year-old males (1902 respondents) in Austria (Blüml et al., 2012). These contrasts might suggest that other features might play a role, as prior studies proposed that weight outcomes might vary depending on number of years smoking and amount smoked (Bamia et al., 2004; Sneve & Jorde, 2008). Nevertheless, the U-shaped relationship between BMI and smoking that our findings suggest (underweight and obesity were both positively associated with daily smoking) are in agreement with Park (2009) who observed that underweight and overweight women were more likely to be current smokers than normal weight women. In agreement, women who had smoked > 10 cigarettes per day in adolescence were more likely to be become overweight in young adulthood, even after adjusting for adolescent BMI (Saarni et al., 2009). Likewise, studies of smoking initiation in female

adolescents have reported a positive association between smoking initiation and dieting, weight concern and being overweight (Cawley, 2003). The relationships between BMI and smoking might still need to be unravelled, and could be conditional upon a host of moderators. Thus the continued identification of theory-based candidate moderators of the BMI-smoking relationship is important.

As for the association between student's smoking and parental education (proxy for socio economic status/ income/ occupation), we found that students whose mothers had more education were ≈3 times more likely to smoke (daily) when compared to students whose mothers' had less education. These findings are difficult to gauge when compared with findings of a sample of medical students in Saudi Arabia, where there were no significant differences between 'ever smokers' and 'current smokers' students in terms of their parents' education level (Al-Kaabba et al., 2011). However, in the Saudi study, there were significant differences regarding mother's occupation between the 'ever smokers' and the 'current smokers' students, where smoking was higher amongst students whose mothers were self-employed (might reflect higher education status), when compared with students whose mother's were housewives/ retired (Al-Kaabba et al., 2011). Nevertheless, we are in agreement with the Saudi study and with others (e.g. Hashim, 2000) in that father's education was not a significant factor. Interestingly, our finding (students whose mothers had more education were ≈3 times more likely to smoke when compared to those whose mothers' had less education) supports other findings of women's education and smoking, where in Serbia, women with university education were two times more likely to have smoked than women with just elementary school (Djikanovic et al., 2011). In addition, our findings are broadly in agreement with research in Jordan, where the prevalence of current smoking of university students was higher when student's family income was high when compared with less family income (Khader & Alsadi, 2008). For future studies of smoking in university populations, these issues raise important questions in terms of: whether to include father's or mother's education; and, whether to include education, occupation or income.

In this sample of Egyptian students, the never use of illicit drugs in life was negatively associated with daily smoking. These findings mirror findings from several studies. In Ethiopia, the ever use of cigarette was strongly associated with khat (Catha Edulis) consumption across 622 medical students (Deressa & Azazh, 2011). Likewise, in Bolivia, cigarette smoking was consistently higher among those who consumed other drugs at least once, where 24% of those reporting marijuana use also used tobacco during the preceding 30 days as opposed to only 2% of those who had not used marijuana (Dearden et al., 2007). Similarly, in the USA (University of Florida), the ever use of 'K2' was significantly associated with ever use of other substances e.g. hookah tobacco and cigarettes (Hu et al., 2011). [K2 is sold legally as herbal blend incense, but synthetic cannabinoids that mimic intoxication with marijuana (Lindigkeit et al., 2009) are sprayed intentionally on dried herbs before they are packaged for sale as K2] (Hu et al., 2011).

In connection with the study's second objective regarding attempts to quit smoking, the current sample of Egyptian university students showed that 61.4% had attempted to quit smoking (36.5% among occasional smokers). In Jordan, about 54% of smokers reported that they had tried to quit smoking previously, and 37% of smokers expressed a desire to quit smoking in the near future (Khader & Alsadi, 2008). A high percentage of students who intend to stop smoking were reported by other studies in the Eastern Mediterranean Region (Hashim, 2000; Haddad & Malak, 2002). In Nigeria, about 39.4% were willing to quit (Fawibe & Shittu, 2011). Attempts to quit smoking were less likely among students whose mothers had at least a bachelor degree. This finding is in line with the risk factors for daily smoking and indicates that for smoking as well as quitting, higher education of the mother seems to be unfavourable. In this sample of Egyptian students, those who reported eating ≥ 5 portions of fruit and vegetables daily were less likely to quit smoking, which is in contrast to our finding that eating ≥ 5 portions of fruit and vegetables daily was a protective factor for smoking. In addition, our data also suggested that quit attempts were less likely among students who were daily smokers vs occasional smokers. This finding is supported by a study among US American college students showing that more heavy smokers are less likely to quit (Berg et al., 2012). Since quitting smoking was also positively associated with agreement with university campus smoking ban, smoke-free environments are likely to support quit attempts as research from a Taiwanese campus suggests (Chuang and Huang, 2012).

As for the study's third objective regarding the agreement with a total smoking ban on campus, the majority (87.3%) of our sample of students agreed/ strongly agreed with such ban on campus (Female=83%, Male=91%). This is higher than in Turkey, where about 71% of Hacettepe University students (Female=67%, Male=72.2%) felt that "smoke free" policy at the university should be supported (Aslan et al., 2006). In the USA, > 75% of students favoured smoke free policies for all college buildings, residences, and dining areas (Rigotti et al., 2003), and all policies had more support among non-smokers than smokers (P < 0.001). In agreement with this, in our sample smoking status was the strongest predictor for an agreement with smoking ban, and smokers were less likely to agree with such ban. Similarly, across a sample of third year nursing students of two university-based nursing departments in Greece, non smokers were significantly more positive in regards to banning smoking in restaurants (94% vs. 61%), in bars and cafes (82% vs. 34%), and all public places (93% vs. 51%) when compared to current smokers (Patelarou et al., 2011). However, conversely, reports also indicated that student support for campus tobacco control policies is strong, even among smokers, which reassures college administrators who are considering adopting these policies (Rigotti et al., 2003).

This study has limitations and generalization of the findings requires prudence. Data was self reported and hence could be subject to recall bias and sociability/ social desirability. It can be assumed that these types of bias could have contributed to an under-estimation of the

actual prevalence of smoking. In cross-sectional studies relationships are associations and not causations, and we are unable to explore temporal relationships and direction of the effects. Students completed the questionnaires at the end of a lecture, so those who were not present in the given lecture (maybe due to a health reason) might not have had a chance to participate in the study. The data collection attempted a representative selection of students across the university, but the sample remains a convenience sample. Indeed, it is not uncommon to have convenience samples in student surveys as observed in Hong Kong (Lee & Loke, 2005), USA (Richards et al., 2006), or Australia (Hsieh, 2004). In the USA, universities and colleges self-selected themselves to participate in the American College Health Association National College Health Assessment survey (American College Health Association, 2006). Future studies would need to address these limitations

Implications for Research And Practice

Given the current study's findings and limitations, we recommend that:

1. It would be useful for future research to attempt to address the current study's limitations.

2. For more uniform and comparable prevalences of smoking and non-smoking across different studies, future research would benefit from using more uniform/ standardized measures of smoking/ non-smoking behaviours. This is in terms of the definitions of categories of smoking (e.g. former, current, occasional, daily, weekly, regular, experimental) and of non-smoking (e.g. never, ever), as well as frequency (e.g. on one or more days) and the time periods of reference that are employed (e.g. past 30 days, last 3 months). The use of different definitions and time periods renders comparisons across studies difficult in terms of drawing solid conclusions. In addition, some studies do not seem to provide explicit details of the definitions that the authors employed (e.g. Al-Naggar et al., 2011).

3. Some recently published studies seem to imply that students are still able to smoke on many university campuses across the world. For instance, a study in Korea of second hand smoke amongst university students, undertaken in 2009, reported that students were exposed to second hand smoke on campus on average 3 times per week (Kim & Choo, 2012). Exposure of university students to second hand smoke on campus is not frequently measured. Research to assess this is required. Many universities in developed countries still have places on campuses where smokers can smoke. Policy makers and university administrators would need to pay attention to these issues.

4. The implications and limitations of restricting/ smoke free policies on tobacco use on campus needs to be considered (Mayabb & Hoppers, 2006), and likely to require definition/s of educational facilities, suggestions for assistance and cessation, funding sources, and key players who need to be involved (Mayabb & Hoppers, 2006).

5. Apart from non-smoking policies on university premises, it would be important to develop educational/

awareness campaigns in order to counteract tobacco advertisement directed towards young people in Middle East countries. Otherwise the danger is that the relatively low smoking prevalence among students may rise in the future. Combating the smoking epidemic requires multi-pronged strategies implemented at different levels.

Acknowledgements

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