

Tobacco and waterpipe use among university students in Saudi Arabia: impact of tobacco sales ban

Haytham Daradka,¹ Omar Khabour,^{2,3} Karem Alzoubi,⁴ Rima Nakkash⁵ and Thomas Eissenberg⁶

¹Department of Biology, Taibah University, Medina, Saudi Arabia (Correspondence to: H. Daradka: hmdaradka@yahoo.com). ²Department of Clinical Laboratory Sciences, Taibah University, Medina, Saudi Arabia. ³Department of Medical Laboratory Sciences, Jordan University of Science and Technology, Irbid, Jordan. ⁴Department of Clinical Pharmacy, Jordan University of Science and Technology, Irbid, Jordan. ⁵Department of Health Promotion and Community Health, American University of Beirut, Beirut, Lebanon. ⁶Department of Psychology, Virginia Commonwealth University, Richmond, VA, United States of America.

Abstract

Background: Waterpipe smoking is a method of tobacco consumption that continues to spread globally. In 2002, a ban of tobacco sales was adopted in the Saudi Arabian cities of Mecca and Medina.

Aims: This study aimed to examine prevalence of waterpipe and cigarette smoking among students of Taibah University, the biggest in Medina, where the tobacco sales ban has been implemented.

Methods: A structured questionnaire was distributed between February and April 2015 to examine tobacco use among Taibah University students.

Results: The prevalence of current and ever waterpipe use was 24.2% and 36.04%, respectively, compared with 31.9% and 42.7% for current and ever cigarette smoking. This prevalence is similar to that reported in other Saudi cities where tobacco sales are allowed. Multivariate analysis showed that waterpipe use was higher among senior students; those with pocket money spending of > 500 Saudi Arabia riyal (SAR)/month; and if > 5 individuals were living in the household. In addition, waterpipe use was lower among students with monthly household income of 5000–9000 SAR. In contrast, current cigarette smoking was more frequent in those aged > 22 years; among male students; in those with pocket money spending of > 500 SAR/month; and those who lived away from their parents.

Conclusions: Waterpipe and cigarette smoking, despite the ban on tobacco sales, is still common among Taibah University students in Medina, Saudi Arabia.

Keywords: shisha, tobacco, smoking, hookah, Taibah

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Introduction

Globally, ~6 million deaths each year are attributed to tobacco smoking (1). In addition to cigarette smoking, waterpipe tobacco smoking has become more popular (2), particularly among high school and university students (3). This growth in popularity is due, in part, to the misperception that the waterpipe filters the smoke, rendering it less harmful than other types of tobacco smoking (4). In fact, waterpipe tobacco smoke contains carcinogens such as polycyclic aromatic hydrocarbons that cause lung tumours, toxic aldehyde compounds that cause lung inflammation, high levels of carbon monoxide that contribute to cardiovascular disease, and nicotine that causes addiction (5). Animal studies have shown that waterpipe smoke exposure leads to lung inflammation, oxidative stress, and impaired pregnancy outcomes, renal function, chromosomal structure, and cognitive and mental ability (6–11). Thus, this type of smoking has the potential to cause cancer, lung disease, cardiopulmonary disease, dependence, and other disorders (6,12). For these reasons, waterpipe tobacco smoking is now seen as a public health threat requiring effective policy intervention (13).

One potential intervention is to ban tobacco sales, and this approach was adopted in the Saudi Arabian cities of Mecca and Medina in 2002 (14). This is a total ban throughout the whole city including Taibah University (where the current study was conducted), and all forms of tobacco including cigarettes, cigars, Jurak, and waterpipe tobacco (waterpipe cafés are also banned, as is the sale of paraphernalia used in waterpipe tobacco smoking). Traders who violate the ban are compelled to pay a fine between 5000 and 10 000 Saudi Arabian riyal (SAR) (1 SAR = US\$ 0.37), and their stores could be closed if they are cited for a third violation (15). Tobacco consumption is common in Saudi Arabia, where studies indicate that, among high-school children, the prevalence of all types of tobacco smoking was 30.3% in boys and 8.5% in girls, and waterpipe smoking represented 53.9% (both genders) of current tobacco users (16). Similar prevalence was reported among college (17) and medical and dental (18–20) students.

The purpose of this study was to examine the prevalence and demographic and environmental factors associated with cigarette and waterpipe tobacco smoking among students of Taibah University, the biggest

university in Medina. Taibah University is a government university in Saudi Arabia that has > 69 000 students and offers both undergraduate and graduate programmes in most fields including basic sciences, medical sciences, engineering and humanities. As of 2014, the city of Medina had a population of ~1.5 million (21). The size of the city is ~589 km² and it is located in Western Saudi Arabia.

Methods

Participants

Students from Taibah University, Medina, Saudi Arabia were recruited to participate in the study. To be eligible to participate, subjects had to be at least 18 years old and enrolled as students at Taibah University. The study was conducted between February and April 2015. The study procedures were approved by the Research and Ethical Committees of Taibah University.

Recruitment

Participation was voluntary and participants were selected randomly using a two-stage cluster sampling strategy as previously described (22). The main campus regions of Taibah University were identified in both the male and female branches. The regions were allocated numbers and 3 regions from each branch were randomly selected using a fish bowl drawing method. Recruitment was facilitated by gender-specific staff from each region during the working days of a given week from 10:00 to 15:00 hours. During sampling time, every fourth student to enter the selected region was invited to be part of the study. Approximately 1700 students (1200 male and 500 female) were invited to participate in the study, and 793 male (66%) and 274 female (35%) students completed the anonymous survey.

Instrument and measures

The survey instrument (in Arabic) was constructed based on that used previously in Jordan (23). The instrument was modified to accommodate differences in spoken Arabic between Jordan and Saudi Arabia. To make sure that the instrument was suitable for the population, it was pilot tested in the university with 50 students and was modified according to their comments.

Among the measures was cigarette and/or waterpipe smoking, for which students were asked to report if they had smoked tobacco using a waterpipe and/or cigarettes, even a puff, in the past 30 days (current users), or ever. Demographic measures such as student specialty, age, university level, sex, paternal education, monthly household income, and pocket money spent were also obtained. For student specialty, participants were asked to select from: basic sciences, medical sciences, engineering and humanities. For paternal education, we asked participants to select from: did not complete high school, completed high school, and completed college or higher degrees. For monthly household income, we asked the student to select from the followings: SAR 0–5000, 5001–9000 and ≥ 9001. The survey also contained items

asking whether participants lived in a city or village and whether or not they lived with their parents.

Data analysis

SPSS version 21 was used for statistical analysis. The χ^2 test was used to determine significant differences in prevalence of cigarette and waterpipe tobacco use across sociodemographic variables. The multivariate logistic regression method was used to determine the independent association between different variables. $P < 0.05$ was considered significant.

Results

Of the 1700 invited participants, 1067 returned the questionnaire (62.8%). Of the final sample, 793 (74.3%) were male (Table 1). The age range was 18–29 years with the majority between 21 and 25 years (662, 62.8%). Most of the participants were studying basic sciences (451, 46.4%) followed by humanities (186, 19.2%). The majority of participants lived in the city (982, 92.4%) and with their parents (951, 89.6%), and 424 (40.7%) reported monthly household income of < 5000 SAR. Approximately half of participants (524, 49.7%) spent > 1000 SAR per month from pocket money.

The prevalence of current and ever waterpipe use was 24.2% and 36.04%, respectively, compared with 31.9% and 42.7% for current and ever cigarette smoking. In bivariate analyses (Table 1), waterpipe tobacco use was significantly associated with university level ($P < 0.001$), age ($P < 0.01$), monthly household income ($P < 0.001$), number of others living in the home ($P < 0.001$) and living away from parents ($P < 0.01$). Current cigarette smoking was significantly associated with university level and specialty ($P < 0.01$), age ($P < 0.001$), gender ($P < 0.005$), monthly household income ($P < 0.001$), pocket money spent monthly ($P < 0.001$) and living away from parents ($P < 0.01$).

In multivariate analysis (Table 2), odds of waterpipe use were significantly lower among engineering students (current and ever use) and those with monthly household income of SAR 5000–9000 (current use only). Odds of current and ever waterpipe use were significantly higher among 6th year students, those with pocket money spending of SAR > 500 per month, those with ≥ 5 individuals living at home, and those not living with their parents. However, odds of current cigarette smoking were reported to be higher in students ≥ 22 years of age, and among male students, in those with pocket money spending > SAR 500 per month and those who lived away from parents. Ever cigarette smoking was significantly higher among students aged ≥ 23 years, and those with income of > 500 SAR ($P < 0.05$). In addition, ever cigarette smoking was significantly lower in 2nd, 4th and 6th university year students ($P < 0.05$).

Discussion

The results of this study showed that tobacco use is common among university students in Medina, Saudi Arabia, where sale of tobacco products is banned. The number of

Table 1 Demographic and environmental associations with waterpipe tobacco and cigarette smoking among Taibah University students

Participant characteristic	N (% ^a)	Waterpipe tobacco				Cigarettes			
		Current use		Ever use		Current use		Ever use	
		%	P*	%	P*	%	P*	%	P*
College									
Basic sciences	451 (46.4)	25.6	0.252	33.1	0.167	29.3	0.062	37.0	0.011
Medical sciences	164 (16.9)	33.1		43.1		40.5		47.0	
Engineering	170 (17.5)	22.0		40.0		33.1		47.6	
Humanities	186 (19.2)	25.0		33.3		29.9		34.9	
Year									
1	114 (12.0)	17.4	< 0.001	24.1	< 0.001	31.0	0.012	39.5	< 0.001
2	138 (14.5)	29.5		36.8		34.1		41.3	
3	223 (23.5)	32.0		45.4		37.2		45.7	
4	193 (20.3)	28.5		34.9		30.5		36.8	
5	223 (24.6)	18.1		22.4		25.0		28.8	
6	48 (5.1)	57.9		87.2		48.9		72.9	
Age, years									
> 21	185 (17.5)	23.6	0.005	33.9	0.173	23.0	0.002	33.5	0.002
22	163 (15.5)	28.7		35.5		31.9		39.3	
23	196 (18.6)	38.4		46.8		41.3		48.0	
24	175 (16.6)	25.7		32.6		37.0		39.4	
25	128 (12.1)	29.6		38.9		29.9		38.3	
≥ 26	208 (19.7)	18.4		34.4		38.5		52.4	
Sex									
Male	793 (74.3)	25.5	0.100	34.8	0.010	36.8	0.005	44.0	0.153
Female	274 (25.7)	31.5		44.7		27.3		39.1	
Paternal education									
Did not complete high school	238 (23.2)	25.7	0.208	32.4	< 0.001	36.4	0.197	45.4	0.001
Completed high school	346 (33.7)	24.5		30.1		29.6		33.5	
Completed college or higher	442 (43.1)	30.7		47.1		33.9		45.7	
Monthly household income, SAR^b									
0–5000	424 (40.7)	22.3	< 0.001	26.6	< 0.001	31.5	< 0.001	36.6	< 0.001
5001–9000	374 (35.9)	20.0		36.9		28.2		39.8	
≥ 9001	245 (23.5)	43.5		53.0		46.5		56.3	
No. of others living at home									
0–4	420 (39.3)	18.0	< 0.001	26.7	< 0.001	34.1	0.806	40.7	0.548
5–6	315 (29.5)	32.2		42.4		33.2		43.2	
≥ 7	334 (31.2)	33.5		45.6		35.6		44.6	
Pocket money spent monthly, SAR^b									
0–500	274 (26.0)	11.8	< 0.001	15.7	< 0.001	17.5	< 0.001	21.9	< 0.001
501–1000	256 (24.3)	26.4		42.5		31.5		46.9	
1001–2000	277 (26.3)	37.2		46.3		51.8		57.0	
≥ 2001	247 (23.4)	32.3		43.8		36.9		44.1	
Urban dwelling									
City	982 (92.4)	26.2	0.185	35.8	0.027	33.5	0.175	41.6	0.116
Village	81 (7.6)	34.6		50.9		41.0		50.6	
Living arrangement									
With parents	951 (89.6)	24.2	< 0.001	33.3	< 0.001	32.1	< 0.001	40.1	< 0.001
Other	110 (10.4)	50.7		71.4		50.9		62.7	

*Calculated using χ^2 analyses comparing proportion of users in each sociodemographic category.^aValues may not add up to 100 due to rounding.^bSAR 1 = US\$ 0.37

Table 2 Multivariable analyses comparing associations among current waterpipe and cigarette smokers^a

Participant characteristic	AOR (95% CI) for waterpipe tobacco smoking b		AOR (95% CI) for cigarette smoking b	
	Current use	Ever use	Current use	Ever use
College				
Basic sciences	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Medical sciences	0.57 (0.28–1.14)	0.61 (0.31–1.19)	1.16 (0.70–1.94)	0.89 (0.54–1.45)
Engineering	0.39 (0.19–0.81)	0.40 (0.20–0.80)	0.63 (0.37–1.09)	0.66 (0.40–1.09)
Humanities	0.67 (0.29–1.11)	0.57 (0.30–1.07)	0.76 (0.46–1.27)	0.67 (0.41–1.08)
Year				
1	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
2	1.23 (0.44–3.42)	0.97 (0.38–2.48)	0.40 (0.19–0.84)	0.45 (0.23–0.89)
3	1.32 (0.46–3.75)	1.08 (0.43–2.70)	0.43 (0.20–0.91)	0.52 (0.26–1.03)
4	1.55 (0.50–4.79)	0.62 (0.23–1.71)	0.24 (0.11–0.54)	0.25 (0.12–0.54)
5	0.71 (0.23–2.25)	0.44 (0.16–1.21)	0.25 (0.11–0.58)	0.24 (0.11–0.54)
6	8.88 (1.78–44.26)	29.98 (5.47–64.23)	0.64 (0.17–2.33)	4.05 (1.11–14.76)
Age, years				
18–21	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
22	1.39 (0.55–3.48)	1.27 (0.54–3.01)	2.19 (1.08–4.45)	1.80 (0.95–3.41)
23	1.66 (0.62–4.48)	2.31 (0.92–5.79)	3.67 (1.73–7.78)	3.34 (1.68–6.61)
24	1.61 (0.57–4.56)	2.45 (0.92–6.53)	4.46 (2.01–9.87)	4.06 (1.96–8.43)
25	1.56 (0.53–4.61)	2.73 (1.00–7.50)	2.93 (1.26–6.82)	3.09 (1.42–6.72)
≥ 26	0.84 (0.27–2.62)	1.83 (0.65–5.15)	1.89 (0.78–4.57)	3.13 (1.42–6.93)
Sex				
Male	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Female	1.09 (0.54–2.19)	0.88 (0.45–1.70)	0.38 (0.22–0.67)	0.75 (0.50–1.13)
Paternal education				
Did not complete high school	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Completed high school	0.95 (0.48–1.86)	0.75 (0.40–1.44)	0.98 (0.60–1.61)	0.66 (0.41–1.05)
Completed college or higher	0.51 (0.25–1.06)	0.75 (0.38–1.50)	0.61 (0.36–1.03)	0.56 (0.34–0.91)
Monthly household income, SAR^c				
0–5000	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
5001–9000	0.40 (0.20–0.81)	0.73 (0.38–1.39)	0.77 (0.46–1.29)	0.82 (0.51–1.33)
≥ 9001	1.83 (0.87–3.84)	1.95 (0.96–3.98)	2.12 (1.20–3.75)	2.30 (1.34–3.96)
No. of others living in the home				
0–4	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
5–6	2.53 (1.44–4.44)	2.84 (1.67–4.81)	1.02 (0.68–1.55)	1.14 (0.77–1.69)
7 or more	3.49 (1.98–6.14)	4.46 (2.62–7.59)	1.27 (0.84–1.92)	1.38 (0.94–2.04)
Pocket money spent monthly, SAR^c				
0–500	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
501–1000	2.44 (1.10–5.40)	4.76 (2.27–10.02)	2.08 (1.17–3.70)	3.29 (1.93–5.61)
1001–2000	10.40 (4.87–22.18)	9.23 (4.44–19.16)	5.01 (2.82–8.90)	4.73 (2.74–8.17)
≥ 2001	4.69 (1.99–11.05)	3.73 (1.64–8.47)	2.41 (1.25–4.65)	2.12 (1.14–3.94)
Urban living				
City	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Village	1.42 (0.48–4.23)	1.15 (0.39–3.37)	1.11 (0.51–2.44)	1.27 (0.59–2.72)
Living arrangement				
With parents	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Other	2.85 (1.17–6.93)	3.40 (1.38–8.36)	2.11 (1.08–4.11)	1.82 (1.05–3.48)

Bold values are significant.

^aValues may not add up to 100 due to rounding.

^bMultivariable analyses controlled for all variables in the table and were adjusted for clustering of individuals within institutions.

^cSAR 1 = US\$ 0.37.

current waterpipe smokers did not differ significantly relative to that of cigarette smokers. As described below, the prevalence of tobacco use among students of Taibah University is similar to that reported in other universities in the country, indicating the ineffectiveness of banning tobacco products in the city for reducing tobacco use among students.

Several reports have examined the prevalence of tobacco use in Saudi Arabia. A 2013 survey of 10 735 individuals aged ≥ 15 years (5482 women and 5253 men) showed that current cigarette smoking was 12.2%, while daily waterpipe smoking was reported by 4.3% of the population (7.3% of men and 1.3% of women) (24). A study of dental students at King Saud University in Riyadh showed that the current prevalence of all forms of tobacco smoking was 27.6% in male students and 2.4% in female students (19). The study also showed that most smokers used waterpipe only (51.5%), followed by both waterpipe and cigarettes (25%), or cigarettes only (23.5%). A study of female college students in the Dammam area showed that current smoking rate was 8.6%, and 43.2% of smokers were waterpipe users (25). In addition, waterpipe smoking was reported to reach 37% among healthcare university students in Saudi Arabia (26) and 36% among dental practitioners in the Medina area (27).

Among secondary school children in Riyadh, current smoking was reported by 28.6% of the students (17). Similar numbers were reported among schoolchildren at Riyadh and Al-Hassa regions of Saudi Arabia (16). A previous study in another Saudi city before the Medina city ban reported a prevalence for current tobacco smoking of 25.3% (28). In the current study, waterpipe use was 24.2% and cigarette smoking 31.9%. Thus, prohibiting selling tobacco products in Medina did not lower prevalence of cigarette and waterpipe tobacco smoking compared with that in other Saudi regions, and in some cases it was even higher. Importantly, according to the law, the ban is restricted to selling tobacco products; however, no fines are imposed on individuals who smoke inside the city. An assessment done in Mecca in 2008 showed that only 75% of stores complied with the no sale ban (29), while no such evaluation was carried out in Medina. In addition waterpipe and cigarette smokers may bring their products with them and may also smuggle them in for others.

A similar ban on tobacco sales was imposed in Bhutan in 2004. Sixty-three percent of those surveyed as part of an International Tobacco Control study reported purchasing their cigarettes from Bhutan, with sales taking place in a concealed manner, a lack of proper enforcement and availability of smuggled products (30). However, in Bhutan other stringent tobacco control measures such as bans on smoking in all indoor areas as well as outdoor public places, bans on advertising and promotions, and increased taxation on cigarettes imported for personal use were in place. In fact, the rate of current tobacco use in Bhutan in 2014 according to a STEPwise survey was 25% (31). To date, in line with the implementation of the World Health Organization (WHO) Framework Convention of Tobacco

Control (FCTC), which is an international binding public health treaty on tobacco control, more comprehensive tobacco control policies have been evaluated globally and have repeatedly shown to be successful in decreasing smoking rates. These policies include bans on smoking indoors with penalties for violation, bans on promotion and advertising, as well as larger pictorial warnings on all tobacco products. More in-depth evaluations of tobacco sales bans, such as those in Mecca, Medina and Bhutan, are needed to build evidence and further shed light on the effectiveness of this policy in decreasing tobacco consumption as a stand-alone policy, independent of other tobacco control policies.

The current findings showed that waterpipe and cigarette tobacco use was associated with university level, age, monthly household income, number of others living in the home and living away from parents. However, gender was associated only with cigarette smoking but not waterpipe use, indicating social acceptance of waterpipe use among women in the region (32). Gender and age were found to be associated with smoking among Saudi smokers (24). Having smoker friends and being male were the highest risk factors for tobacco use among dental students at King Saud University in Riyadh (33). A family member smoker was the main factor associated with smoking among female students in Dammam city (25). Amin et al. (16) showed in 2010 that gender, age and having relatives and friends as smokers were among the major factors associated with waterpipe smoking. In other countries in the region, gender, income, living away from parents and having relatives/friends as smokers were among the risk factors for waterpipe/cigarette smoking (3,22,23,34,35). Thus, risk factors for tobacco use are shared among university students in Taibah University and other local and regional universities.

Among the limitations of the current study was that we did not examine prevalence of tobacco use among Taibah University students in branches other than Medina main campus where tobacco sales are allowed. In addition, the study was cross-sectional; therefore, change in tobacco use over several years was not examined.

Conclusion

The current study indicates that waterpipe and cigarette smoking are common among students at Taibah University in Medina, irrespective of the ban on tobacco product sales in that area. However, the results advocate implementation of more comprehensive tobacco control measures such as smoke-free environments, increased taxation of tobacco products, bans on advertising, promotion and sponsorship, and larger pictorial health warnings in line with FCTC and WHO MPOWER measures. Future studies that compare prevalence of tobacco use in Medina and Mecca to that in other Saudi cities (where tobacco sales are not banned) are recommended to shed light on the effectiveness of such bans.

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Consommation de tabac et utilisation de la pipe à eau chez les étudiants à l'université en Arabie saoudite : incidence de l'interdiction des ventes de tabac

RÉSUMÉ

Contexte : La consommation de tabac par pipe à eau est une forme de tabagisme qui ne cesse de s'étendre à travers le monde. En 2002, une interdiction sur les ventes de tabac a été adoptée dans les villes saoudiennes de la Mecque et Médine.

Objectifs : La présente étude avait pour but d'analyser la prévalence du tabagisme par cigarette et pipe à eau chez les étudiants de l'université Taibah, plus grand établissement universitaire de Médine dans lequel l'interdiction sur les ventes de tabac est appliquée.

Méthodes : Un questionnaire structuré a été distribué entre février et avril 2015 pour analyser la consommation de tabac chez les étudiants de l'université Taibah.

Résultats : La prévalence de l'utilisation de la pipe à eau à tout moment dans le passé était de 36,04 % contre 24,2 % au moment de l'étude, alors que les chiffres associés à la consommation de cigarettes sont de 42,7 % et 31,9 % respectivement. Cette prévalence est semblable à celle observée lors d'études menées dans d'autres villes saoudiennes où les ventes de tabac sont autorisées. L'analyse multivariée a montré que l'utilisation de la pipe à eau était plus importante chez les étudiants de cycle supérieur, ceux dont les dépenses d'argent de poche excèdent 500 riyals saoudiens (SAR) par mois, ceux dont le foyer dispose d'un revenu mensuel compris entre SAR 5000 et 9000 et dans les foyers comptant au moins cinq personnes. En comparaison, la consommation actuelle de cigarettes était supérieure chez les plus de 22 ans, les étudiants de sexe masculin, ceux dont les dépenses d'argent de poche dépassent SAR 500/mois et ceux vivant loin de chez leurs parents.

Conclusions : Dans l'ensemble, malgré l'interdiction sur les ventes de tabac, la consommation de tabac par pipe à eau et cigarette est toujours courante parmi les étudiants de l'université Taibah à Médine (Arabie saoudite).

تعاطي التبغ والشيشة بين طلاب الجامعة، المملكة العربية السعودية: تأثير حظر مبيعات التبغ

هيثم درادكة، عمر خابور، كارم الزعبي، ريبا نقاش، توماس آيسنبرج

الخلاصة

الخلفية: يُعدُّ تدخين الشيشة إحدى وسائل استهلاك التبغ التي لا تزال منتشرة حول العالم. وفي عام ٢٠٠٢، تم إقرار حظر مبيعات التبغ في مكة المكرمة والمدينة المنورة بالمملكة العربية السعودية.

الأهداف: هدفت هذه الدراسة إلى فحص معدل انتشار تدخين الشيشة والسجائر بين طلاب جامعة طيبة، التي تُعدُّ أكبر جامعة في المدينة المنورة حيث طُبِّق حظر مبيعات التبغ.

طرق البحث: استُخدم استبيان هيكلي لتحقيق أهداف الدراسة.

النتائج: أظهرت الدراسة أن معدل انتشار تدخين الشيشة الحالي والدائم ٢٤,٢٪ و ٣٦,٠٤٪ على التوالي، بينما تدخين السجائر الحالي والدائم ٣١,٩٪ و ٤٢,٧٪ على التوالي. ويُعدُّ معدل الانتشار هذا مشابه لمعدل الانتشار المُبلغ عنه بواسطة الدراسات التي أجريت في المدن السعودية الأخرى المسموح فيها ببيع التبغ. وأوضح التحليل متعدد المتغيرات أن تدخين الشيشة كان أعلى بين طلاب الصفوف العليا، والذين ينتمون لعائلات دخلها الشهري يتراوح بين ٥٠٠٠ و ٩٠٠٠ ريال سعودي، والذين يزيد مصرفهم عن ٥٠٠ ريال سعودي/ شهريًا، وعندما يكون عدد الأفراد الذين يعيشون في نفس المنزل ٥ أشخاص أو أكثر. ومن ناحية أخرى، كان معدل التدخين الحالي للسجائر أعلى بين الذين تزيد أعمارهم عن ٢٢ عامًا، وبين الطلاب الذكور، وبين الذين يزيد مصرفهم عن ٥٠٠ ريال سعودي/ شهريًا، والذين يعيشون بعيدًا عن آبائهم.

الاستنتاجات: إجمالاً، لا يزال تدخين الشيشة والسجائر، رغم حظر مبيعات التبغ، شائعًا بين طلاب جامعة طيبة في المدينة المنورة بالمملكة العربية السعودية.

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