Smoking Prevalence and Its Effect on Dental Health Attitudes and Behavior among Dental Students

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Key Words

Smoking prevalence · Dental health attitudes · Dental health behavior · Dental students

Abstract

Objective: To determine smoking prevalence and its effect on dental health attitudes and behavior among dental students in Jordan. **Subjects and Methods:** A cross-sectional study of 314 dental students was conducted at Jordan University of Science and Technology. Subjects were surveyed using a modified version of the Hiroshima University Dental Behavior Inventory (HU-DBI) questionnaire. Multivariate logistic regression analyses were performed to study differences between male smokers and nonsmokers only. **Results:** The response rate was 83.7%, with 48% males and 52% females. The prevalence of smoking was 17.2%. Smoking was more prevalent among male students (31%) than female (4.3%). For male students, the multivariate logistic regression analysis showed 6 items that were different between smokers and nonsmokers. Nonsmokers tended to brush their teeth more often than smokers (OR 8.67, 95% CI 1.66–45.25); claimed that they had never been professionally taught how to brush their teeth (OR 11.15, 95% CI 1.89–65.67); believed that they spend too much time brushing their teeth (OR 12.24, 95% CI 2.0–75.05); were more concerned about having bad breath (OR 41.86, 95% CI 3.44–58.75) and were more concerned about the color of their

gums (OR 8.04, 95% CI 1.55–41.84). **Conclusions:** Smoking prevalence among male dental students in Jordan was high, 7 times greater than for females. Male smokers and nonsmokers had different attitudes and oral health behaviors as indicated by the study survey.

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Introduction

Tobacco use is the most preventable cause of death and disability in modern societies. Worldwide, there are 4 million tobacco-related deaths annually, and 30% of all cancer is linked to tobacco use [1, 2]. Available evidence suggests that the risk of disease increases with greater use of tobacco whereas quitting smoking can result in decreasing that risk [3]. Tobacco is also a significant risk factor for oral diseases such as periodontal disease, ulcers, cleft lip and palate, and coronal and root caries. Wound healing, dental implants, cosmetic treatments and cancer therapy all are compromised by patients' tobacco consumption [4, 5]. Cigarette smoking was found to be negatively associated with oral health status (periodontal disease, missing teeth, and decayed teeth) regardless of the dental health behavior of the patient [6]. Moreover, research showed that tobacco users brushed and flossed their teeth less frequently and had more oral health problems than the nonusers [7].

Signs of smoking such as odor, tooth stain, poor oral hygiene, and the aforementioned oral diseases make tobacco use very obvious to dentists. The typical dental appointment is usually long, affording opportunity for dentist-patient discussion of tobacco use and its consequences [8]. In the US, when dentists were asked if they thought that they should encourage their patients to stop smoking, over two thirds responded in the affirmative [9]. Yet only one third of them believed that they were effective in this area and only about one quarter of current smokers received advice from their dentists to quit using tobacco [10]. Fewer than 10% of US dentists reported that they had adequate knowledge of smoking cessation techniques [11, 12].

Indications from published studies are that health professionals who smoke may not be as effective in counseling patients to quit smoking as health professionals who do not smoke [13, 14]. The help and advice of health professionals in smoking cessation are very important, yet many oral health professionals continue to smoke. Dentists must set an example as a role model for their patients, families and friends by not smoking.

Despite acquiring an increased knowledge about risk factors and the pathogenesis of tobacco-related diseases during their healthcare professional education, students begin or continue to smoke during their studies at university. The purpose of this study was to examine the prevalence of smoking among dental students in Jordan and document the effects of smoking on students' dental health attitudes and behavior.

Subjects and Methods

Students from all 5 academic years at Jordan University of Science and Technology were asked to participate in the study. Participation was voluntary and consent was indicated through survey completion.

A modified English version of the Hiroshima University-Dental Behavior Inventory (HU-DBI) survey [15] was used in this study. The survey was type-written in English and distributed to dental students at the end of classes. Questions from the students regarding the meaning of the words were allowed and answers to such questions were announced to the other students. The survey was based on 17 items (table 1). It was completed anonymously and no information about the academic record of the student was collected. Students had to specify their gender, academic year, whether or not they were smokers and how much and for how long they had been smoking.

There was no common background between the students regarding place of birth, living area or socioeconomic status. This research was approved by Deanship of Research as well as the Deanship of Human Rights Committee.

Table 1. The modified HU-DBI survey used in this study

No.	Item description
1	I live with my family now
2	I have been to a dentist office before
3	I do not go to the dentist unless I have a toothache
4	I brush my teeth twice daily or more
5	My gums bleed when I brush my teeth
6	I have never been professionally taught how to brush
7	I think my teeth are getting worse despite my daily brushing
8	I don't feel I have brushed my teeth properly unless I brush with strong strokes
9	I feel that I spend too much time brushing my teeth
10	I think I can clean my teeth without using toothpaste
11	It is impossible to prevent gum disease with toothbrushing alone
12	I use tooth floss on regular basis
13	I use mouthwash on regular basis
14	I worry about having bad breath
15	I am bothered by the color of my gums
16	I worry about the color of my teeth
17	I am satisfied with the appearance of my teeth

The response options were no/yes.

Logistic regression analyses were done according to Hosmer and Lemeshow [16]. Univariate analyses comparing answers given by smokers and nonsmokers, respectively, were done first. Next, a stepwise backward selection strategy was employed to construct multivariate logistic regression models with nonsmoking status as dependent variable. Any question with a p value of <0.05 was allowed to enter the model and was omitted from the model at $p \geq 0.05$. Finally, trends of change in answering certain questions were analyzed. Since most of the smokers were males, the multivariate logistic regression models were repeated for males only with the same selection criteria for inclusion and exclusion. The odds ratios (OR) and 95% confidence intervals (CI) were calculated. Systat® 8.0 (SPSS Inc., Chicago, USA) statistical program was used to process the data and for statistical analysis.

Results

Of a total of 375 dental students, 314 (83.7%) completed the questionnaire. The distribution of the participating students by academic year and gender is presented in table 2. The participation rate was not different between the academic years, ranging from 81 to 88%.

As shown in table 3, the percentage of male student smokers was 31% while it was only 4.3% for females. Of the smokers, only 11.4% smoke 10 cigarettes or more per day. About 15% have been smoking for more than a year from the date of the questionnaire.

Table 2. Distribution of the participating dental students by academic year and gender

Academic year	Number (%)	Gender	
		male (%)	female (%)
1st	98 (81)	42 (43)	56 (57)
2nd	70 (87.5)	40 (57)	30 (43)
3rd	51 (81)	27 (53)	24 (47)
4th	39 (85)	14 (36)	25 (64)
5th	56 (87.5)	28 (50)	28 (50)
Total	314 (83.7)	151 (48)	163 (52)

Table 3. Distribution (%) of smokers, male smokers, who smoke ≥ 10 cigarettes a day, and who have been smoking for $\geq$ a year among different academic years

Academic year	Smokers	Male smokers	≥ 10 cigarettes per day	Smoking for $\geq$ a year
1st	33.3	83.3	21.4	21.4
2nd	31.5	94.1	22.9	21.4
3rd	7.4	75.0	7.8	7.8
4th	3.7	50.0	5.1	5.1
5th	24.1	92.3	23.2	23.2
Total	17.2	87.0	11.4	14.9

Table 4. Results of multiple logistic regression analysis for males only

Item	Description	Estimate	SE	p	Odds ratio	95% CI
	Constant	-13.839	4.971	0.005		
4	I brush my teeth twice daily or more	2.159	0.843	0.010*	8.67	1.66–45.25
6	I have never been professionally taught how to brush	2.411	0.905	0.008*	11.15	1.89–65.67
9	I feel that I spend too much time brushing my teeth	2.505	0.925	0.007*	12.24	2.00–75.05
14	I worry about having bad breath	3.734	1.274	0.003*	41.86	3.44–58.75
15	I am bothered by the color of my gums	2.085	0.841	0.013*	8.04	1.55–41.84
17	I am satisfied with the appearance of my teeth	-1.623	0.804	0.044*	0.20	0.04–0.96

Dependent variable: smoking status. Response: nonsmokers. Likelihood ratio 93, 8 d.f., $p < 0.000$. Numbers of questions not included in the model: 1, 2, 3, 5, 7, 8, 10, 11, 12, 13, 16.

* Statistically significant.

The multivariate logistic regression analysis model for male students is given in table 4; 6 answers differ significantly ($p < 0.05$) between smokers and nonsmokers. Nonsmokers brushed their teeth more often (item 4) (OR 8.67, CI 1.66–45.25) than smokers. Also the number of students who had never been professionally taught how to brush their teeth (item 6) was significantly higher among nonsmokers (OR 11.15, CI 1.89–65.67). More than smokers, nonsmokers feel that they spend too much time brushing their teeth (item 9) (OR 12.24, CI 2.0–75.05).

Nonsmokers were more concerned about having bad breath (item 14) (OR 41.86, CI 3.44–58.75) and were more concerned with the color of their gums (item 15) (OR 8.04, CI 1.55–41.84). Finally, nonsmokers were less satisfied with the appearance of their teeth than smokers (OR 0.197, CI 0.04–0.96).

The other items that included living with family, having been to the dentist's office before, consulting a dentist

without having a toothache, experiencing bleeding of gums upon brushing, brushing with strong strokes, using toothpaste, dental floss, and/or mouthwash, and being concerned about tooth color were not significantly different between smokers and nonsmokers ($p \geq 0.05$).

Discussion

This study used the general approach in attitudes/behavior measurements to compare dental student smokers' and nonsmokers' dental health attitudes and behavior. All items of the survey had a dichotomous response format (yes/no). This questionnaire was recently used to compare oral health attitudes and behaviors among dental and dental hygiene students throughout the world [17–20]. In a sample of Japanese university students, the HUI had good test-retest reliability over a 4-week period [21]. The English version has also shown good test-retest

reliability and translation validity in a sample of 26 bilingual individuals [22]. Translation of HU-DBI survey from English to Arabic was not needed as students started their English early in elementary school and because English is the language of instruction at the dental school. Translation might indirectly influence the results, which would prevent comparing our study to other studies. The questionnaire was modified to be more suitable to our students and culture.

Participation in the survey was voluntary. While some of the students were absent on the day of the survey distribution, very few chose not to participate. The participation rate (83.7%) was considered good for the purpose of the survey.

Haddad and Malak [23] reported that the prevalence of smoking among the general student population at Jordan University of Science and Technology was approximately 30; 50 and 7% for males and females, respectively. Our study showed that the prevalence of smoking among dental students was lower than that among other students at Jordan University of Science and Technology. This may be due to the fact that dental students are expected to be more knowledgeable about the health risk associated with tobacco use.

A study by Burgan [24] in 2003 found that 35% of Jordanian dentists were tobacco users; 83% were daily smokers and about 20% smoked 20 or more cigarettes per day. Two thirds were men younger than 40 years of age who worked in private practice. In comparison to our study, it is clear that smoking is less prevalent among dental students than dentists. It is probable that dentists have more expendable income.

The prevalence of smoking among Jordanian dental students was much higher than that in the region [25] and in developed countries [26]. The probable explanation for the high rate of smoking among our students may be due to cultural behavior and people's perception of smokers in society. Considerable effort needs to be made towards changing our dental students' smoking habit so that they become role models for their society.

Despite the fact that the students acquire knowledge about tobacco-related diseases, they continue to smoke during their studies at the university. Research showed smoking to be more frequent among male students compared to female students [27] and to rise progressively with age and level of education [28]. This is in agreement with the results of our study, as smoking was more prevalent among male students than females. It was obvious that prevalence of smoking decreased with progression of the students in their academic studies: 33.3% first-year

students compared to 3.7% in the fourth year. However, smoking prevalence increased again among the final-year students. The reason for this is difficult to explain, but one might suggest it is due to the different kinds of stress and tension that the students are exposed to during their final year at the university.

In general, the results of previous studies [29] showed that nonsmokers have more healthy dental behaviors than smokers. According to our results, except for the frequency of toothbrushing, there was no difference between smokers and nonsmokers in their dental health behavior. There was no difference in flossing or using mouthwash between the two groups. On the other hand, smokers showed worse dental health attitudes. They were less concerned about the health of their gums and the color of their teeth than nonsmokers. Also, they were not worried about having bad breath.

Reviewing the dental school's curriculum showed that smoking education was part of a preventive dentistry course which is taught to the students at the third year. We strongly recommend that the curriculum involve theoretical and practical education about risks of smoking for oral health throughout the 5 years of dental education. Obligatory workshops should be held for all students to learn about smoking and smoking cessation within the framework of preventive courses. In addition, selected students should be encouraged to undertake studies on smoking and oral health as part of their research. Students can also practice their skills on tobacco counseling on each other. A class summarizing the topic of smoking and oral health could be added to the final-year curriculum.

Conclusions

The results of this study showed that the prevalence of smoking among male dental students is high. It also showed that cigarette smoking had a negative effect on the students' dental health attitudes and behaviors. These results underscore the need for greater efforts aimed at tobacco cessation and education of dental students so that they can play an effective role in assessing their patients' tobacco use habits and encourage cessation. In addition, courses other than stress prevention should be included in the curriculum.

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