Original article

The impact of sociodemographic characteristics on oral health behaviors of dental graduates

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ABSTRACT

Background: To assess and compare oral health behaviors (OHB) of final year dental students in private and state-run dental schools in Benghazi city, Libya.

Methods: Students from private and state-run dental schools were invited to participate in this cross-sectional study. A self-administered questionnaire including closed ended questions regarding socio-demographics and OHBs was used. The main OHBs explored were teeth brushing, the usage of fluoridated toothpaste, dental flossing, sugar consumption, dental visiting and smoking habit. Binary logistic regression models were utilized to explore associations between OHBs and socio-demographic variables

Results: Out of 240 students invited, only 199 completed questionnaires were analyzed (effective response rate was 83%). The majority of the students were females (80%) who brushed their teeth daily (90.5%) and used fluoridated toothpaste (80.2%) while 30.2 % of them used dental floss and only 7% were smokers. Females were more likely to use fluoridated toothpaste (OR = 2.67, 95% CI = 1.21 – 5.97) and visit a dentist (OR = 2.31, 95% CI = 1.21 – 4.42) compared to males, and students in the private dental school consumed more sugary-snacks per day (OR = 3.2, 95% CI = 1.52 – 6.75) than those who studied in state schools.

Conclusion: Socio-demographic variables such as gender and type of school were associated to certain oral health behaviors of dental students.

Keywords: Behaviors, Oral Health, Internship, Dental School

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INTRODUCTION

Oral health behaviors (OHB) are key players in defining oral health status. Regular brushing of teeth, using fluoridated toothpaste, regular dental visits and less consumption of sugars are behaviors associated with optimum oral health.[1] However, not everyone is capable of maintaining such behaviors even if they have the knowledge that these behaviors are a must to improve oral health.[2, 3] According to the conceptual framework for action on the social determinants of health, adopting healthy behaviors is influenced by wider socioeconomic and environmental determinants.[4] Social gradient that favors better oral behaviors and outcomes among people from higher social class has been reported in dental literature.[5-7]

Nevertheless, developing and maintaining behaviors is a complex matter manifested in various theories and explanations for behavior change. For instance, the integrative model (IM) of behavioral prediction suggests that individuals' behavior branches reasonably from the stem of their beliefs which, in turn, are shaped by their knowledge and other background factors related to attitudes, social norms, individual skills and environmental factors.[8] As dentists possess highest levels of

knowledge on oral health and disease prevention, they are expected to conform to and maintain favorable OHBs and act as role models for their families and societies. However, dental schools are usually admitting students based on their academic scores regardless of their socioeconomic position. Although it has been assumed that professional training and education of dentists may outweigh the individual characteristics to produce optimum OHBs and promote better oral health. [9] Oral health related beliefs and behaviors of adults are found to be associated with their early-life social position and oral health-related beliefs of their parents.[10] Therefore, it is possible that dental students from different socioeconomic backgrounds show different levels of compliance with optimal oral health behaviors.

In Libya, most of dental schools are state-run and fees-free; though recently, a few private dental schools with high tuition fees have been established. The curriculum in these Libyan dental schools is quite similar and generally comprises three stages divided over five years: first premedical year, second stage is the preclinical (year 1 and 2) and finally clinical stage (year 3, 4 and internship year). In the clinical years, students are trained on managing and treating patients under supervision. Preventive dentistry is taught during year 3 and 4 and covers issues related to maintaining appropriate oral hygiene, oral health education and preventing dental diseases.

In 2015, A study conducted on internship students attending the dental faculty of Benghazi, revealed that Libyan dentists have varying levels of attitude and skills that are required to fulfill their role in providing preventive-oriented oral health services. It also evidenced that there were differences in students' attitudes towards and ability to practice preventive dentistry by their gender and academic performance. [11]Little is known about OHBs of Libyan dental students and to what extent can socioeconomic background influences their OHBs. Therefore, the aim of this study was to assess the OHBs of internship dental students in private and state-run dental schools in Benghazi and to compare these behaviors according to the students' socioeconomic characteristics.

METHODS

The ethical permit to conduct this study was obtained from Research Ethics Committee at the Faculty of Dentistry, Libyan International Medical University (AA03/2015).

Design and participants:

This cross sectional comparative study conducted between April and August 2015. The participants were internship dental students recruited from one private (Libyan International Medical University (LIMU)) and another state-run (Benghazi University (BU)) dental schools in Benghazi, Libya. These are the only dental schools in the city in which preventive dentistry is an essential component of the dental curriculum of BDS program in both dental schools.

Data collection:

A self-administered questionnaire written in simple English language was used for data collection in this study. Participants provided information on their demographic characteristics (sex and age), dental school (state-run or private) and parents' education (primary, secondary or university). They also stated the frequencies of their oral hygiene practices (tooth brushing and dental flossing) using a three-point Likert scale (regular- twice or more /day, irregular-once a day or every few days, never). The questionnaire was piloted among 10 volunteering undergraduate students for face validity and clarity and it was found to be clear and understandable.

Participants were conveniently approached while doing the paperwork for their graduation certificate by two investigators (SS & NB) who explained the aim of the study and confidentiality of participation. After acceptance, a copy of the self-administered questionnaire was provided along with an envelope and the participants were asked to leave the questionnaire in the envelope at the administration office for collection the day after. The consent was implied from returned and completed questionnaires.

Outcome and explanatory variables:

OHBs were the outcome variables in this study. The participants answered questions about in-between meals sugar consumption (2 times per day or more, once a day, never); whether they had dental check-up during the last six months, use of fluoridated toothpaste, and if they are smokers.

The explanatory variables included information on participants' age and gender as well as parental education as a proxy of socioeconomic status. Whether the participant was studying at a private or a state-run school was used as a proxy of family economical status due to the high tuition fees required for joining the private dental school. Another explanatory variable used in this study was the living area. Benghazi city has many administrative zones hosting citizens from the full socioeconomic spectrum. Since there is no official and reliable index of defining the social class criteria, especially between middle and low, of living

areas in the cities, the city zones were classified into high and middle-low areas. Two investigators executed this independently and any disagreement was resolved by discussion.

Data analysis:

Data management and analysis were performed using the IBM SPSS Statistics software version 21. The numbers and percentages were used to describe frequencies of oral health related behavior. Each type of behavior was recoded to create binary responses of the following: tooth brushing, use of fluoridated tooth paste and dental flossing were coded as regular and irregular. The in-between meals sugar consumption (two times or over per day *vs* less than two times a day) whereas having dental check-up in the last six months and whether they are smokers were coded as yes or no.

Bivariate analysis using Chi-square test was used to compare reported OHBs by responder's gender, dental school type, father's education and mother's education and whether they live in affluent or low-middle class area. Binary logistic regression models were used to explore the predictors of oral health behaviors form socio-demographic variables. The significance level was set at 0.05.

RESULTS

Out of 240 participants invited to take part in the study, 215 returned the questionnaires but only 199 participants had completed information on all the variables selected for analysis, giving rise to an effective response rate of 83%. The majority of our sample were females, between 23 and 26 years of age, with nearly equal numbers from each dental school. Whilst the majority of their mothers had university degrees (70.9%), just less than half of their fathers had attained a university degree (49.2%) (Table 1).

Table 2 reports frequencies of self-reported OHBs. Most of the respondents reported brushing their teeth on daily basis (90.5%), using fluoridated toothpaste (80.2 %) whereas, almost one third of participants indicated regular usage of dental floss (30.2 %). Less than two in-between meals sugar intake was reported by more than half of the responders (59%). Only 7% were smokers whom all were males.

Table 3 shows bivariate comparisons of oral health-related practices by respondents' socio-demographic characteristics. There were statistically significant differences according to their gender, dental school type and father's education but not mother's education. Larger numbers of females reported regular use of fluoridated toothpaste (P=0.028) and had dental check-up within the last six months (P=0.004) but non of them was a smoker (P<0.001). Responders whose fathers have primary or secondary education levels reported higher use of fluoridated toothpaste (P=0.012). Dental graduates from state dental school and those from lower-middle social class reported lower numbers of in-between meals sugar intakes than those graduated from private dental school (P<0.001, p=0.017, respectively). After adjusting for the other variables (Table 4), gender differences remained significant for the use of fluoridated toothpaste (OR=2.67, CI=1.21– 5.97) and dental check-up within the last six months (OR = 2.31, CI = 1.21 – 4.42). Similarly, difference by dental school remained significant for in-between meals sugar consumption (OR = 3.2, CI = 1.52 – 6.75).

Table 1: Characteristics of the study sample (n=199)

Female Variables		Overall N (%)	Private	Public	P value
Sex	Male	66 (32.2)	32 (32)	34 (34.3)	0.421
		133 (68.8)	68(68)	65 (65.7)	
Father's Education	Primary	33 (16.6)	3 (3)	30 (30.3)	<0.001
	Secondary	68 (34.2)	29 (29)	39 (39.4)	
Mother's Education	Primary	14 (7)	4 (4)	10 (10.1)	0.001
	Secondary	44 (22.1)	13 (13)	31 (31.3)	
	University	141 (70.9)	83 (83)	58 (58.6)	
Social class of living area	Low and middle	122 (61.3)	36(36)	86(86.9)	<0.001
	High	77 (38.7)	64(29)	13(13.1)	

Table 2: Self-reported oral health related behavior (n=199)

Behavior	N (%)
Daily teeth brushing	180 (90.5)
Regular use of fluoridated tooth paste	164 (82.4)
Regular use of dental floss	60 (30.2)
Less than 3 sugary snacks per day	140 (70.2)
Dental check up within the last 6 months	
Smokers	14 (7)

Table 4: Predictors of oral health related behaviors (n=199)

Variables	Daily teeth brushing	Regular use of fluoridated tooth paste	Regular use of dental floss	>3 sugary snacks per day	Visited dentist within the last 6 months
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sex					
Male	Ref	Ref	Ref	Ref	Ref
Female	2.04 (0.76, 5.46)	2.67 (1.21, 5.97) *	1.21 (0.62, 2.34)	1.1 (0.59, 2.14)	2.31 (1.21, 4.42) *
Dental School					
Public	Ref	Ref	Ref	Ref	Ref
Private	1.50 (0.43, 5.73)	2.48 (0.91, 6.82)	1.11 (0.52, 2.35)	3.2 (1.52, 6.75) **	0.70 (0.32, 1.51)
Living area					
Low & middle	Ref	Ref	Ref	Ref	Ref
High	2.50 (0.69, 9.11)	1.42 (0.55, 3.67)	1.33 (0.63, 2.83)	1.2 (0.40, 1.69)	1.05 (0.48, 2.28)
Father's Education					
Primary	Ref	Ref	Ref	Ref	Ref
Secondary	2.29 (0.51,10.25)	1.83 (0.49, 6.82)	1.46 (0.48, 4.39)	1.8 (0.62, 5.53)	0.72 (0.24, 2.11)
University	1.51 (0.28, 7.99)	0.37 (0.10, 1.46)	1.66 (0.52, 5.35)	1.1 (0.33, 3.57)	0.77 (0.23, 2.53)
Mother's Education					
Primary	Ref	Ref	Ref	Ref	Ref
Secondary	1.59 (0.27, 9.34)	0.24 (0.02, 2.43)	1.03 (0.21, 5.02)	0.7 (0.17, 3.37)	1.68 (0.41, 5.66)
University	3.79 (0.61, 23.55)	0.65 (0.06, 6.78)	1.41 (0.30, 6.56)	0.7 (0.17, 3.21)	3.12 (0.77, 12.58)

*The corresponding categories of the dependent variables are the following; irregular use of tooth brush, fluoridated toothpaste, dental floss and less than 3 sugary snacks per day. Ref = Reference category. Superscripts indicate where differences were located. ** p≤0.01, *p≤0.0.*

Table 3: Comparison of oral health related Behaviour by participants' characteristics (n=199)

Variables	Daily teeth	Regular use	Regular use	More than 3	Visited dentist	Smokers
Sex						
Male	57 (31.7)	49 (29.9)	18 (30.0)	25 (31.2)	39 (27.9)	14 (100)
Female	123 (68.3)	115 (70.1)	42 (70.0)	55 (68.8)	101 (72.1)	0 (0)
P value	0.167	0.033*	0.533	0.638	0.014*	0.000
Dental School						
Public	88 (48.9)	79 (48.2)	28 (46.7)	26 (32.5)	72 (51.4)	7 (50.0)
Private	92 (51.1)	85 (51.8)	32 (53.3)	54 (67.5)	68 (48.6)	7 (50.0)
P value	0.455	0.335	0.568	0.000	0.465	0.984
Living Area						
Middle-poor class	111 (61.7)	101 (61.6)	37 (61.7)	39 (48.2)	86 (61.4)	9 (64.3)
Affluent class	69 (38.3)	63 (38.4)	23 (23.2)	41 (51.8)	54 (38.6)	5 (35.7)
P value	0.748	0.861	0.945	0.017	0.957	0.812
Father's Education						
Primary	27 (15.0)	27 (16.5)	7 (11.7)	08 (10)	23 (16.4)	3 (21.4)
Secondary	63 (35.0)	61 (37.2)	20 (33.3)	31 (38.8)	46 (32.9)	2 (14.3)
University	90 (50.0)	76 (46.3)	33 (55.0)	41 (51.2)	71 (50.7)	9 (64.3)
P value	0.358	0.129	0.397	0.109	0.798	0.266
Mother's Education						
Primary	11 (6.1)	13 (7.9)	3 (5.0)	05 (6.2)	8 (5.7)	0 (0)
Secondary	38 (21.1)	33 (20.1)	11 (18.3)	16 (20)	28 (20.0)	3 (21.4)
University	131 (72.8)	118 (72.0)	46 (76.7)	59 (73.8)	104 (74.3)	11 (78.6)
P value	0.334	0.237	0.480	0.761	0.234	0.552

*Statistically significant at $P \leq 0.05$.
Chi-square test is used to compare study subgroups

DISCUSSION

This study was set out to measure and compare OHBs of dental graduates according to their socio-demographic characteristics. The regression analysis showed that OHBs of dental graduates appeared to vary by their gender and whether they were graduated from a private or a state-run dental school. These findings accord with previous reports that showed variations on oral health attitudes and practices of dental students and support our assumption that professional dental education is insufficient to alleviate social and demographic variations in OHBs of dental practitioners and supports the notion that oral health knowledge does not always translate into positive behaviors. [3, 12] Dentists have a critical role in promoting oral health as well as boosting general healthy behaviors by delivering an effective oral health advice[13, 14] and act as role models for their families and societies. Therefore, there is a need for effective interventions to promote favorable oral health behaviors among dental students. Our study showed that Private-school graduates were more likely to consume sugary foods and drinks between meals than their peers from a state-run school. There are some possible explanations for this observation. The analysis of sociodemographic characteristics of study participants showed that private school students were more likely from higher income and social class, and this could through two strands of explanations. First, it could be the case that sugary products are more affordable to private school graduates than their peers from lower income families. Second, the higher consumption of sugary products in the private dental school can be seen as a reflection of environmental factors related to family or peers influence, which have a direct impact on eating patterns.[15] In other words, eating sugary products is part of the social activities of these groups or deeply rooted in their social norms after being adopted during childhood and carried out to adult life.[16, 17] Pervious research showed that parents' dietary pattern as well as food availability plays a major role in molding habits during childhood.[18] This explanation is supported by life course theories which suggest that health-related habits and outcome of health in adult life are the result of either accumulative or long lasting effects of early life course which put people on the trajectories of either health or disease.[19] Yet, additional qualitative research is required to fully explore and understand the environmental and social determinants of sugar consumption among Libyan dental students.

Female dental graduates were found, in this study, to be more positive in terms of brushing their teeth than their male peers. Although such difference was not significant, using fluoridated toothpaste, which indicates more sophisticated oral hygiene, was significantly more practiced by female students. Likewise, female students reported more frequent visits to the dentist than males. These findings came as no surprise since they were consistent with other studies among Libyan dentists and graduates in which females were found to be of more interest towards practicing preventive dentistry.[20, 21] The same results were observed in several studies that showed a higher gender-specific difference in favor of females in terms of practice of healthy habits.[22-24] Such differences could be attributed to the different physiological and psychological attitude in achieving an aesthetic appearance, which is largely imparted by healthy teeth and gums.

This study, to the authors' best knowledge, was the first to assess OHBs of dental graduates in Libya. It indicates that emerging dental work force in Libya may not be well prepared to fulfill their role as exemplars to their patients and the public. In this study only 70% of participants reported irregular use of dental floss and around 40% reported exceeding the optimum intake of sugars, which go in line with previous studies among dentists showing imperfect OHBs among dentists. For instance, in a study of USA dental practitioners, 56%, male dentists indicated flossing once a day at minimum.[25] In another study in Mongolia, 52% of dentists reported eating sugary snacks less than daily and 62% using fluoride toothpaste regularly.[8] However, further research in the form of content analysis of preventive dentistry curriculum and qualitative interviewing of dental student is needed to fully understand why they may not comply with oral health maintenance practices.

Although our study is preliminary and based upon cross-sectional design with self- reported data, which have their own inherent weaknesses, it has important implication when designing and planning behavioral interventions or preventive programs since it confirms the importance of accounting for family and environmental determinants of OHB, rather than relying only on changing knowledge and attitude.[10] It also highlights the need to put more emphasis in dental

curriculum on the need of tailoring health advice to patients' individual and social circumstance.

Conclusion: Although professionally educated, OHBs of dental graduates seem to vary by their socio-demographic characteristics, namely gender and type of school. While this may suggest a greater influence from environmental and socio-economic factors which should be considered when planning and designing interventions to promote oral health, dentists' oral health behaviors and their role in empowering the public need to be emphasized in dental curriculum.

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