

Comparison of Oral Hygiene Knowledge, Attitudes and Practices of Predoctoral Students Taking Oral Hygiene Course

Ahmad H Almehmadi* and Faisal T Alghamdi

Department of Oral Biology, Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia

***Corresponding Author:** Ahmad H Almehmadi, Assistant Professor and Consultant in Periodontics, Department of Oral Biology, Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia.

Received: November 01, 2019; **Published:** November 12, 2019

Abstract

Objective: To assess the oral hygiene knowledge, attitudes and practices of dental students in King Abdul Aziz University, Jeddah, Saudi Arabia and make comparisons based on gender, academic year of study and based on whether the students had taken oral hygiene educational courses or not.

Methods: A stratified, random sample of 500 participants were selected out of which 299 agreed to participate. A self-designed close-ended questionnaire was distributed to the sample, responses were coded and entered into spreadsheet software. Frequency distribution of responses was calculated, comparisons were made using Chi-square tests and inferences drawn.

Results: Sample was almost equally distributed between males (49.8%) and females (50.2%). 40% of participants belonged to pre-OH educational course group while 60% belonged to the post-OH educational group. Dental flossing was significantly higher in post-OH educational groups (63.7%), in females (60%) and in 6th year dental students (80%). The Majority of the students in each group had tooth decay but not bleeding gums. The status of bleeding gums and tongue deposits differed significantly in pre, post OH educational groups and different academic years. The Majority of the students did not visit the dentist frequently except 5th year students but the difference was not found to be statistically significant.

Conclusion: Females displayed better oral hygiene than males, students in advanced academic years showed better practices than their juniors but the results were not significant. There is a need to stress the importance of certain oral hygiene practices to students.

Keywords: Oral Hygiene; Knowledge, Oral Health

Introduction

One of the most important preventive measures for maintaining oral health is self-care oral practices [1]. Knowledge and implementation of these practices not only contributes towards good oral health but also good general health [1]. Knowledge, attitude and practices are the precursors to actions [2]. For most people, practices depend on knowledge, attitudes, understanding and competency [1]. It is proven that professionals seem to have a higher tendency to incorporate beneficial health practices in daily routine as compared to laymen and the former have a stronger relationship between knowledge, attitude and practices than the latter [3,4]. Health beliefs and attitudes are especially important for dental health professionals because apart from influencing their self-care oral habits, they have the advantage of positioning themselves as exemplary role models to motivate patients for preventive care [5]. Studies have indicated that

dental students with positive oral health attitude are the perfect demonstrators of good oral health behavior to their acquaintances, family members and patients [6-8]. Their knowledge and awareness are thus important factors to account for in assessing community dental standards.

Several reports from around the world have demonstrated that oral health awareness and practices among dental students are variable and depend on the year of study in dental school [7,9,10]. Furthermore, it has been reported that knowledge and habits are also dependent on cultural backgrounds of the students. Cross-cultural comparisons have revealed that Japanese students have less positive attitudes and behavior towards oral health upon entry into dental school than Australian students [11]. Another study reported that significant cultural differences were found with regards to oral health attitudes, behavior and values in the freshman dental students from Japan, Hong Kong and Western China [12]. Kawamura, *et al.* concluded in a study that final year Japanese students had better oral health behavior as compared to their Finnish counterparts [13]. These studies confirm cultural variations in knowledge and behavior among dental students.

Another factor that has been accounted for the difference in attitudes and behavior of students is gender. Many researches have been conducted to observe gender differences in tooth brushing frequency. So, while gender differences were not observed in tooth brushing frequency among dental students in US, Finland, Australia, Japan, Korea, Mongolia, China and Hong Kong [4,11,13,14], these differences were still observed among Jordanian and Greek students [7,9]. Despite the abundance of studies regarding oral health attitudes and behavior of dental students from around the world, studies of this nature are very few in the Middle East and Arab countries and rare in Saudi Arabia. One research conducted in the city of Dammam studied self-reported differences between oral health attitudes of pre-clinical and clinical dental students and observed that clinical students had better oral health attitudes than pre-clinical students [15].

Aim of the Study

The aim of the present study is to evaluate the difference in oral health knowledge and practices of students in different years of undergraduate study at King Abdul Aziz University, Faculty of Dentistry and to determine whether these differences are gender-specific.

Methods

Study design

This is a cross-sectional descriptive study conducted on dental students in King Abdul Aziz University (KAU) in the city of Jeddah, Saudi Arabia. Ethical approval for this study was obtained from the Research Ethics Committee of the Faculty of Dentistry of KAU, IRB# 038-13.

Sample selection

A proportionate stratified random sampling method was used in this study. The chosen sample size consisted of 500 randomly selected dental students in years 2 to 6 of undergraduate dental studies in KAU, Faculty of Dentistry. Every second dental student registered in the student's registry which was obtained from the student administration department was randomly selected. Out of the selected students, 300 gave approval to participate, 60 from each year. Bearing in mind that the undergraduate dental course duration in KAU is 5 years, the sample was divided into three groups based on oral hygiene course levels, gender and year of study:

- Group 1: Pre-oral hygiene course students which included students from year 2 and 3 with mean age of 20 years and post-oral hygiene course students which included students from year 4, 5 and 6 with mean age of 24 years.
- Group 2: Males and females.
- Group 3: Students in years 2, 3, 4, 5 and 6 respectively.

Prior to the survey, selected participants were interviewed by trained dental students and verbal consent was obtained from all participants on condition of anonymity and confidentiality of participants during data handling and storage.

Questionnaire

A self-administered questionnaire in the English language was designed by the researchers which consisted of 15 questions. The first two questions categorized the students according to their year of study and gender. The remaining 13 were designed to test their knowledge and practices of oral hygiene on a daily basis. The questionnaire was tested for readability, clarity of wording and layout by two professional colleagues who deemed the content of the questionnaire valid for current application.

In order to improve the validity of the student’s responses, the questionnaire was administered to the participants without the presence of teachers and senior colleagues who could influence their responses during data collection.

Data analysis

Responses were coded and entered into a spreadsheet software (Statistical Package for Social Sciences, SPSS 23.0, IBM.USA). Descriptive statistics were used to calculate frequency distribution of participants responses and draw inferences. Correlations between variables were made using Chi-Square tests where p value of less than 0.05 was considered to be statistically significant within a 98% confidence interval.

Results

Out of the final 300 participants, one male patient backed out of the survey leaving a 99.8% response rate and 299 total participants. The students were categorized based on gender, oral hygiene educational groups (pre and post) and based on their year of study (year 2 to year 6).

Based on gender, the participants were almost equally distributed with 49.8% males and 50.2% females and while 40% of the participants belonged to the pre-oral hygiene educational group, 60% belonged to the post-oral hygiene educational group (Figures 1 and 2). When asked about how much toothpaste the participants used, majority in the pre-oral hygiene educational course group (42.9%), the 2nd year (49.2%) and 4th year (51.2%) students used half bristle length while majority in the post educational group (50.3%) used full bristle length amount of toothpaste and this was also the majority response from the male (45.3%), the female (46.0%), the 3rd year (43.3%), the 5th year (57.6%) and 6th year (56.7%) students. Table 1-3 depict the frequency distribution of participants responses. When comparisons were made between the three groups, it was found that a statistically significant difference was found in the knowledge and practice of pre OH and post OH educational groups only while no difference was found between males and females or between the students in different years (Table 4).

			Group		Total
			Pre-OH Education	Post-OH Education	
How much toothpaste do you normally put on your tooth brush	Full length of bristles	Count	46	90	136
		%	38.70%	50.30%	45.60%
	Half-length of bristles	Count	51	68	119
		%	42.90%	38.00%	39.90%
	About the size of a pea	Count	19	16	35
		%	16.00%	8.90%	11.70%
About the size of a rice grain	Count	3	5	8	
	%	2.50%	2.80%	2.70%	
How long do you normally take to brush your teeth?	About 30 seconds	Count	19	20	39
		%	15.80%	11.20%	13.00%
	About 1 minute	Count	48	68	116
		%	40.00%	38.00%	38.80%
	About 2 minutes	Count	29	53	82
		%	24.20%	29.60%	27.40%
	More than 2 minutes	Count	16	25	41
		%	13.30%	14.00%	13.70%
	I don't know	Count	8	13	21
		%	6.70%	7.30%	7.00%

Do you have tooth decay?	Yes	Count	63	98	161
		%	52.50%	54.70%	53.80%
	No	Count	47	63	110
		%	39.20%	35.20%	36.80%
	I don't know	Count	10	18	28
		%	8.30%	10.10%	9.40%
Do you have bleeding gums	Yes	Count	34	31	65
		%	28.30%	17.30%	21.70%
	No	Count	86	148	234
		%	71.70%	82.70%	78.30%
Do you eat sweets between main meals?	Yes	Count	101	146	247
		%	84.20%	81.60%	82.60%
	No	Count	19	33	52
		%	15.80%	18.40%	17.40%
If yes, how often do you eat sweets in a day	Once a day	Count	47	75	122
		%	47.50%	52.10%	50.20%
	Twice a day	Count	41	55	96
		%	41.40%	38.20%	39.50%
	Three times a day	Count	8	10	18
		%	8.10%	6.90%	7.40%
	More than 3 times	Count	3	4	7
		%	3.00%	2.80%	2.90%
Do you brush your teeth after eating sweets	Yes	Count	24	28	52
		%	24.20%	19.40%	21.40%
	No	Count	75	116	191
		%	75.80%	80.60%	78.60%
Is your tongue covered with white or yellowish deposits?	Yes	Count	25	26	51
		%	21.00%	14.70%	17.20%
	No	Count	67	136	203
		%	56.30%	76.80%	68.60%
	I don't know	Count	27	15	42
		%	22.70%	8.50%	14.20%
Do you clean the surface of the tongue while brushing your teeth?	Yes	Count	83	129	212
		%	69.20%	72.50%	71.10%
	No	Count	37	49	86
		%	30.80%	27.50%	28.90%
Do you use mouthwash?	Yes	Count	44	74	118
		%	36.70%	41.30%	39.50%
	No	Count	76	105	181
		%	63.30%	58.70%	60.50%

Do you use dental floss?	Yes	Count	47	114	161
		%	39.50%	63.70%	54.00%
	No	Count	72	65	137
		%	60.50%	36.30%	46.00%
If yes, how often do you floss your teeth each day?	Once a day	Count	43	97	140
		%	89.60%	85.80%	87.00%
	Twice a day	Count	3	14	17
		%	6.20%	12.40%	10.60%
	Three times a day	Count	0	1	1
		%	0.00%	0.90%	0.60%
More than 3 times	Count	2	1	3	
	%	4.20%	0.90%	1.90%	
Do you go to dentist regularly for check-up of your teeth?	Yes	Count	45	83	128
		%	38.10%	46.60%	43.20%
	No	Count	73	95	168
		%	61.90%	53.40%	56.80%
If yes, how frequently do you visit the dentist?	Every month	Count	4	7	11
		%	8.90%	8.60%	8.70%
	Every 3 months	Count	10	8	18
		%	22.20%	9.90%	14.30%
	Every 6 months	Count	18	39	57
		%	40.00%	48.10%	45.20%
	Once every year	Count	13	27	40
		%	28.90%	33.30%	31.70%

Table 1: Frequency distribution of participants according to Oral Hygiene (OH) Education Course (Group 1).

			Gender		Total
			Male	Female	
How much toothpaste do you normally put on your toothbrush	Full length of bristles	Count	67	69	136
		%	45.3%	46.0%	45.6%
	Half-length of bristles	Count	58	61	119
		%	39.2%	40.7%	39.9%
	About the size of a pea	Count	18	17	35
		%	12.2%	11.3%	11.7%
About the size of a rice grain	Count	5	3	8	
	%	3.4%	2.0%	2.7%	

How long do you normally take to brush your teeth?	About 30 seconds	Count	18	21	39
		%	12.1%	14.0%	13.0%
	About 1 minute	Count	63	53	116
		%	42.3%	35.3%	38.8%
	About 2 minutes	Count	40	42	82
		%	26.8%	28.0%	27.4%
	More than 2 minutes	Count	22	19	41
		%	14.8%	12.7%	13.7%
	I don't know	Count	6	15	21
		%	4.0%	10.0%	7.0%
Do you have tooth decay?	Yes	Count	76	85	161
		%	51.0%	56.7%	53.8%
	No	Count	53	57	110
		%	35.6%	38.0%	36.8%
	I don't know	Count	20	8	28
		%	13.4%	5.3%	9.4%
Do you have bleeding gums	Yes	Count	35	30	65
		%	23.5%	20.0%	21.7%
	No	Count	114	120	234
		%	76.5%	80.0%	78.3%
Do you eat sweets between main meals?	Yes	Count	111	136	247
		%	74.5%	90.7%	82.6%
	No	Count	38	14	52
		%	25.5%	9.3%	17.4%
If yes, how often do you eat sweets in a day	Once a day	Count	57	65	122
		%	51.8%	48.9%	50.2%
		Count	44	52	96
	Twice a day	%	40.0%	39.1%	39.5%
	Three times a day	Count	6	12	18
		%	5.5%	9.0%	7.4%
	More than 3 times	Count	3	4	7
		%	2.7%	3.0%	2.9%
Do you brush your teeth after eating sweets	Yes	Count	22	30	52
		%	20.0%	22.6%	21.4%
	No	Count	88	103	191
		%	80.0%	77.4%	78.6%

Is your tongue covered with white or yellowish deposits?	Yes	Count	28	23	51
		%	18.9%	15.5%	17.2%
	No	Count	97	106	203
		%	65.5%	71.6%	68.6%
	I don't know	Count	23	19	42
		%	15.5%	12.8%	14.2%
Do you clean the surface of the tongue while brushing your teeth?	Yes	Count	101	111	212
		%	67.8%	74.5%	71.1%
	No	Count	48	38	86
		%	32.2%	25.5%	28.9%
Do you use mouthwash?	Yes	Count	59	59	118
		%	39.6%	39.3%	39.5%
	No	Count	90	91	181
		%	60.4%	60.7%	60.5%
Do you use dental floss?	Yes	Count	71	90	161
		%	48.0%	60.0%	54.0%
	No	Count	77	60	137
		%	52.0%	40.0%	46.0%
If yes, how often do you floss your teeth each day?	Once a day	Count	61	79	140
		%	84.7%	88.8%	87.0%
	Twice a day	Count	8	9	17
		%	11.1%	10.1%	10.6%
	Three times a day	Count	0	1	1
		%	0.0%	1.1%	0.6%
	More than 3 times	Count	3	0	3
		%	4.2%	0.0%	1.9%
Do you go to dentist regularly for check-up of your teeth?	Yes	Count	59	69	128
		%	40.1%	46.3%	43.2%
	No	Count	88	80	168
		%	59.9%	53.7%	56.8%
If yes, how frequently do you visit the dentist?	Every month	Count	9	2	11
		%	15.5%	2.9%	8.7%
	Every 3 months	Count	8	10	18
		%	13.8%	14.7%	14.3%
	Every 6 months	Count	25	32	57
		%	43.1%	47.1%	45.2%
	Once every year	Count	16	24	40
		%	27.6%	35.3%	31.7%

Table 2: Frequency distribution of participants according to gender (group 2).

			Year of Study					Total
			2 nd	3 rd	4 th	5 th	6 th	
How much toothpaste do you normally put on your toothbrush	Full length of bristles	Count	20	26	22	34	34	136
		%	33.90%	43.30%	36.70%	57.60%	56.70%	45.60%
	Half-length of bristles	Count	29	22	31	17	20	119
		%	49.20%	36.70%	51.70%	28.80%	33.30%	39.90%
	About the size of a pea	Count	10	9	4	6	6	35
		%	16.90%	15.00%	6.70%	10.20%	10.00%	11.70%
About the size of a rice grain	Count	0	3	3	2	0	8	
	%	0.00%	5.00%	5.00%	3.40%	0.00%	2.70%	
How long do you normally take to brush your teeth?	About 30 seconds	Count	11	8	7	7	6	39
		%	18.30%	13.30%	11.70%	11.90%	10.00%	13.00%
	About 1 minute	Count	23	25	22	20	26	116
		%	38.30%	41.70%	36.70%	33.90%	43.30%	38.80%
	About 2 minutes	Count	15	14	20	18	15	82
		%	25.00%	23.30%	33.30%	30.50%	25.00%	27.40%
	More than 2 minutes	Count	6	10	7	10	8	41
		%	10.00%	16.70%	11.70%	16.90%	13.30%	13.70%
	I don't know	Count	5	3	4	4	5	21
		%	8.30%	5.00%	6.70%	6.80%	8.30%	7.00%
Do you have tooth decay?	Yes	Count	24	39	31	34	33	161
		%	40.00%	65.00%	51.70%	57.60%	55.00%	53.80%
	No	Count	29	18	21	20	22	110
		%	48.30%	30.00%	35.00%	33.90%	36.70%	36.80%
	I don't know	Count	7	3	8	5	5	28
		%	11.70%	5.00%	13.30%	8.50%	8.30%	9.40%
Do you have bleeding gums	Yes	Count	13	21	14	6	11	65
		%	21.70%	35.00%	23.30%	10.20%	18.30%	21.70%
	No	Count	47	39	46	53	49	234
		%	78.30%	65.00%	76.70%	89.80%	81.70%	78.30%
Do you eat sweets between main meals?	Yes	Count	51	50	54	47	45	247
		%	85.00%	83.30%	90.00%	79.70%	75.00%	82.60%
	No	Count	9	10	6	12	15	52
		%	15.00%	16.70%	10.00%	20.30%	25.00%	17.40%
If yes, how often do you eat sweets in a day	Once a day	Count	20	27	30	23	22	122
		%	39.20%	56.20%	56.60%	48.90%	50.00%	50.20%
	Twice a day	Count	25	16	18	19	18	96
		%	49.00%	33.30%	34.00%	40.40%	40.90%	39.50%
	Three times a day	Count	5	3	3	3	4	18
		%	9.80%	6.20%	5.70%	6.40%	9.10%	7.40%
	More than 3 times	Count	1	2	2	2	0	7
		%	2.00%	4.20%	3.80%	4.30%	0.00%	2.90%
Do you brush your teeth after eating sweets	Yes	Count	8	16	4	8	16	52
		%	15.70%	33.30%	7.50%	17.00%	36.40%	21.40%
	No	Count	43	32	49	39	28	191
		%	84.30%	66.70%	92.50%	83.00%	63.60%	78.60%

Is your tongue covered with white or yellowish deposits?	Yes	Count	13	12	11	6	9	51
		%	21.70%	20.30%	19.00%	10.20%	15.00%	17.20%
	No	Count	30	37	43	43	50	203
		%	50.00%	62.70%	74.10%	72.90%	83.30%	68.60%
	I don't know	Count	17	10	4	10	1	42
		%	28.30%	16.90%	6.90%	16.90%	1.70%	14.20%
Do you clean the surface of the tongue while brushing your teeth?	Yes	Count	39	44	47	38	44	212
		%	65.00%	73.30%	78.30%	65.50%	73.30%	71.10%
	No	Count	21	16	13	20	16	86
		%	35.00%	26.70%	21.70%	34.50%	26.70%	28.90%
Do you use mouthwash?	Yes	Count	21	23	15	24	35	118
		%	35.00%	38.30%	25.00%	40.70%	58.30%	39.50%
	No	Count	39	37	45	35	25	181
		%	65.00%	61.70%	75.00%	59.30%	41.70%	60.50%
Do you use dental floss?	Yes	Count	22	25	35	31	48	161
		%	36.70%	42.40%	58.30%	52.50%	80.00%	54.00%
	No	Count	38	34	25	28	12	137
		%	63.30%	57.60%	41.70%	47.50%	20.00%	46.00%
If yes, how often do you floss your teeth each day?	Once a day	Count	20	23	31	26	40	140
		%	90.90%	88.50%	88.60%	83.90%	85.10%	87.00%
	Twice a day	Count	2	1	4	5	5	17
		%	9.10%	3.80%	11.40%	16.10%	10.60%	10.60%
	Three times a day	Count	0	0	0	0	1	1
		%	0.00%	0.00%	0.00%	0.00%	2.10%	0.60%
	More than 3 times	Count	0	2	0	0	1	3
		%	0.00%	7.70%	0.00%	0.00%	2.10%	1.90%
Do you go to dentist regularly for check-up of your teeth?	Yes	Count	25	20	23	33	27	128
		%	43.10%	33.30%	38.30%	55.90%	45.80%	43.20%
	No	Count	33	40	37	26	32	168
		%	56.90%	66.70%	61.70%	44.10%	54.20%	56.80%
If yes, how frequently do you visit the dentist?	Every month	Count	1	3	2	1	4	11
		%	4.00%	15.00%	8.70%	3.00%	16.00%	8.70%
	Every 3 months	Count	7	3	4	3	1	18
		%	28.00%	15.00%	17.40%	9.10%	4.00%	14.30%
	Every 6 months	Count	9	9	9	19	11	57
		%	36.00%	45.00%	39.10%	57.60%	44.00%	45.20%
	Once every year	Count	8	5	8	10	9	40
		%	32.00%	25.00%	34.80%	30.30%	36.00%	31.70%

Table 3: Frequency distribution according to year of study (group 3).

	P Values		
	Group 1	Group 2	Group 3
How much toothpaste do you normally put on your toothbrush?	0.135	0.892	0.043
How long do you normally take to brush your teeth?	0.717	0.266	0.98
Do you have tooth decay?	0.74	0.055	0.298
Do you have bleeding gums?	0.024	0.464	0.023
Do you eat sweets between meals?	0.561	0.0001	0.256
If yes, how often do you eat sweets in a day?	0.915	0.761	0.845
Do you brush your teeth after eating sweets?	0.37	0.629	0.002
Is your tongue covered with white/yellowish deposits?	0.0001	0.53	0.001
Do you clean the surface of your tongue while brushing your teeth?	0.537	0.201	0.435
Do you use mouthwash?	0.245	0.936	0.005
Do you use dental floss?	0.0001	0.037	0.0001
If yes, how often do you floss your teeth each day?	0.304	0.201	0.527
Do you go to the dentist regularly for check-up of your teeth?	0.149	0.284	0.135
If yes, how frequently do you visit the dentist?	0.297	0.094	0.406

Table 4: P values of the comparisons in groups 1, 2 and 3.

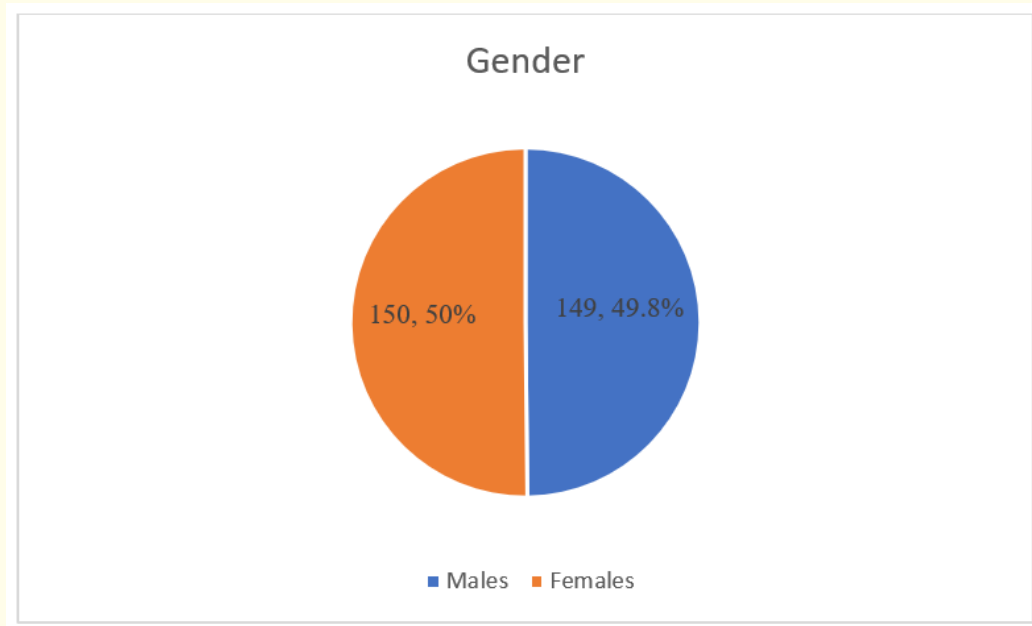


Figure 1: Frequency distribution of participants based on gender. Participants were almost distributed equally, 49.8% males and 50.2% females.

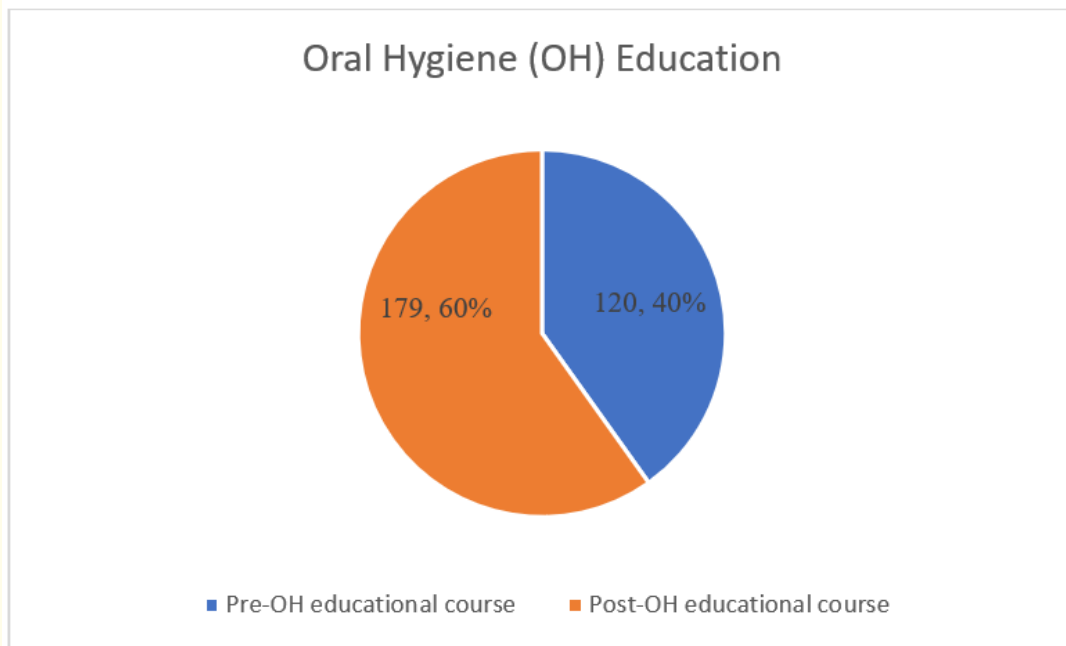


Figure 2: Frequency distribution of participants based on oral hygiene educational course. Participants belonged to pre-oral hygiene educational group were 40%, and 60% belonged to the post-oral hygiene educational group.

The Majority of the participants in the pre-OH (40%) and post-OH (38%) educational group brushed their teeth for about 1 minute. Similarly, the majority of male (42%) and female (35.3%) participants also brushed their teeth for about 1 minute. Among the different years of study, it was also seen that majority of the students in each year brushed their teeth for about 1 minute (Table 3). None of the compared groups showed any statistically significance difference in their knowledge and practices. When asked if the participants had tooth decay and bleeding gums, majority of the participants in each group responded with a yes to the former and no to the latter (Tables 1-3). However, the pre and post oral hygiene educational groups and the year level groups showed a statistically significant difference in response to bleeding gums but no difference in response to tooth decay. On the contrary, the gender based groups showed a statistically significant difference in response to tooth decay and not in response to bleeding gums (Table 4).

When asked if the participants ate sweets in between meals, majority of the respondents in the three groups responded positively and majority of them ate once a day except the 2nd year students where majority of them (49%) responded that they ate twice a day (Table 1-3). None of the groups showed any statistically significant difference in their responses to the two questions except the gender group where the difference in response to whether they ate sweets between meals was statistically significant between males and females (Table 4). On the contrary, when asked if the participants brushed their teeth after eating sweets, majority of them responded negatively in each group (Table 1-3). The only statistically significant difference in participant responses to this question was found between the different year of studies i.e. Group 3 (Table 4).

Majority of the respondents in all the groups responded that their tongue was not covered with yellow deposits while some of them in all the groups did not know if it was or was not (Table 1-3). There was a statistically significant difference in responses of participants in

Groups 1 and 3 (Table 4). Consequently, majority of students in the pre-OH educational course (69.2%) and post-OH educational course (72.5%) as well as majority of males (67.8%) and females (74.5%) and students in 2nd (65%), 3rd (73.3%), 4th (78.3%), 5th (65.5%) and 6th (73.3%) years cleaned the surface of their tongue while brushing their teeth. The difference in responses to this question was not statistically significant in any of the groups (Table 4).

When asked if the participants used mouthwash and dental floss, majority of the participants in the pre-OH educational course do not use either mouthwash (63.3%) or dental floss (60.5%) while in the post-OH educational course, majority of them do not use mouthwash (58.7%) but they use dental floss (63.7%) (Table 1). Similarly, majority of the male participants do not use mouthwash (60.4%) or dental floss (52%) and while majority of the female participants do not use mouthwash (60.7%), they do use dental floss (60%) (Table 2). Among the students in different years of study, majority of them do not use mouthwash except the 5th year students where majority of them (58.3%) use it and majority of the 4th (58.35%), 5th (52.5%) and 6th year (80%) students use dental floss while those of 2nd (63.3%) and 3rd (57.6%) year do not use it (Table 3). Among those who responded positively to the above question, majority of them used dental floss once every day (Table 1-3). When comparisons were made between the responses, it was found that a statistically significant difference was found in all three groups when asked if they used dental floss but only in Group 3 when asked if they used mouthwash (Table 4).

Lastly, the participants were asked if they visited a dentist frequently. Majority of them in the pre (61.9%) and post (53.45) OH educational course group responded negatively (Table 1). Similarly, majority of the males (59.9%) and females (53.7%) responded negatively (Table 2). Among the students in different years of study, majority of them did not visit the dentist frequently except the 5th year students, majority of whom (55.9%) visited the dentist frequently (Table 3). Among those who responded with a yes, majority of the respondents visited the dentist every six months (Table 1-3). None of the groups showed any statistically significant difference in responses to either of the two questions.

Discussion

The importance of the present study lies in the fact that to the best of our knowledge, this is the first research of its kind in the city of Jeddah that studies the oral health knowledge and habits of dental students and makes comparisons based on three factors; their gender, educational course level and academic year of study. All these factors have previously been shown to have an effect on oral health related knowledge and practices of dental students and are crucial to determining what aspects truly affect oral health behavior while being a part of an oral health academic setting and whether acquired knowledge is reflected in their own dental care.

When observing the oral health knowledge and practices of students in the pre-OH educational course and post-OH educational course, a few similarities existed in their responses. For example, majority in both subgroups take the same amount of time to brush their teeth (about 1 minute). According to ADA recommendations, the ideal time for brushing teeth is for about 2 minutes [16] and there was no single majority from any year in our sample who brushed their teeth for 2 minutes which indicated that students' responses were not concurrent with current recommendations in any group. Only more females (28%) brushed their teeth for 2 minutes than males (26.8%) (Table 2) which indicates that females in the study sample were slightly better aware although majority of both groups brushed for only 1 minute. When asked if students brushed their teeth after eating sweets, more students in the post-OH educational course subgroup (80.6%) than the pre-OH educational course subgroup (75.8%) responded negatively (Table 1). But upon observation of the responses of students in different academic years, it was found that more 3rd year students brushed their teeth after eating sweets than 2nd years and more 6th year students than 4th and 5th year students combined (Table 3). Also, these differences were statistically significant. According to a systematic review published in 2018, oral hygiene instructions have marked short and long-term effects on individuals, the short term effects being an improvement in oral hygiene knowledge, attitudes, behavior, self-efficacy and theory constructs while the long term effects included an improvement in the number of decayed teeth, plaque score, bleeding on probing and gingival condition [17]. While our present study did not quantify long term effects, it did show some marked short-term improvements in students OH behavior in the pre

and post OH educational courses. This is similar to two studies previously conducted; a Korean study conducted prior to that reported better oral hygiene practices among dental hygiene students in advanced years than their juniors [18] as did a study on dental students in Greece [9]. However, one in a study conducted in India [19] showed no significant differences in means scores of knowledge and practice based on academic year and another in Kuwait [20] also showed no difference in knowledge among male students in different years of dental school.

An area where all three groups showed a difference, i.e. between pre and post OH educational groups, between males and females and between different academic years, was with respect to dental flossing. Females floss more than males and it was observed that post-OH educational course students floss more than their pre-OH course counterparts, 6th year students floss more 5th year and 4th year more than 3rd year. All these differences were statistically significant which shows that there is improvement in flossing practice among the students. This was also the case with mouthwash, more post-OH educational course students use mouthwash than the pre-OH educational course students even though majority of both do not use it. Most 6th year students used mouthwash while the majority of the remaining students in years 2 to 5 did not use it. These differences were not statistically significant. When we observe oral hygiene status, it is found that more post-OH educational course students have tooth decay than their pre-OH educational course counterparts while the opposite is true for bleeding gums (Table 1).

Gender is an important determinant of oral hygiene knowledge and practices as proven by many studies. In our present study, more females have tooth decay than their male counterparts and the difference was statistically significant (Table 2 and 4). This could be attributed to the fact that more females in this study eat sweets between meals than males, this difference is also statistically significant and more females eat sweets three times a day than males albeit with not a significant difference (Table 2 and 4). But upon observing their oral hygiene practices, more female students brush their teeth after eating sweets, floss their teeth significantly more than males and also clean their tongue surface more as compared to the male students (Table 2 and 4). This is similar to a Turkish study conducted by Peker and Alkurt [21] where they found that females flossed more than males and the difference was statistically significant. They also visit the dentist more than the males and in greater frequency than the males do. These findings of better oral health practices among female students are in agreement with several other studies from the region. For example, a study conducted in the UAE by Rahman and Al Kawas also reported better oral hygiene practices among female students when compared to males [22]. Similarly, a study conducted in Yemen also concurred with our findings that females have better oral health attitudes than male students [23]. However, this still does not fit with the observation in our study that they have more tooth decay than males despite having better oral hygiene behavior and practices. This can be reconciled with the fact that despite better practices, it has been reported in several studies [24-26] that dental caries is gender dependent and females tend to have greater prevalence of dental caries than males. So, our study confirms the findings of these previous studies with regard to tooth decay. The reasons for such a gender bias are still under research and are not fully understood. Many factors have been theorized such as early eruption age in females, hormonal/physiological differences, physiological characteristics of oral structures such as teeth, saliva and tooth enamel and dietary differences [24,25]. However, better practices among female students have implications such that they may be better care-givers and role models than their male counterparts.

To summarize, while students in advanced dental school years did certain practices better than their juniors, substantial, statistically significant differences were not observed in this study between students in different academic years and between clinical and pre-clinical students which is also the case with few other studies [18,19,22,23] while some other studies [9,20,27,28] report significant improvement in oral health knowledge and behaviors with increase in level of dental education. Preventive oral hygiene practices are actualized based on three factors; thoughts (beliefs, perceptions), social environments and individual ability [29-31]. Our present study was not able to distinguish the factors that caused students to not actualize some oral hygiene practices even after taking the OH educational courses. Laziness, lack of motivation and general indifference to negative consequences of oral hygiene neglect may be some of the factors responsible. Cross-sectional questionnaire studies like the present study have a limitation, i.e. they cannot definitively establish conclusions regarding

attitudes and behaviors based on self-reported data alone as these scores can be influenced by social desirability bias or a response bias [32] even after assuring the respondents that their data would be held confidential. Longitudinal comparisons would be more helpful in this case. However, in our sample this was not possible because this research wanted to study oral hygiene awareness and habits among dental students and comparisons over long periods of time would mean the students will have graduated and started other pursuits which would introduce confounding factors and this no longer qualifies them as a valid sample.

Conclusion

This research concludes that although there is marked improvement in oral health attitudes and habits in post-OH educational course group and advanced academic years, many of these differences are not significant. Females displayed better oral hygiene attitudes and practices as compared to males which indicates that these differences are gender dependent. We recommend that instruments be developed that take socio-economic status also into consideration while measuring attitudes and practices among dental students. Furthermore, future studies could be made stronger by clinical examination of students in order to substantiate their answers and making longitudinal comparisons of first year students until advanced years in dental school to track improvements in knowledge and practices of the same sample.

Bibliography

1. Folayan MO., *et al.* "Determinants of preventive oral health behaviour among senior dental students in Nigeria". *BMC Oral Health* 13 (2013): 28.
2. Brown G., *et al.* "Assessing attitudes in dental education: is it worthwhile?". *British Dental Journal* 193 (2002): 703-707.
3. Cortes FJ., *et al.* "The evolution of dental health in dental students at the University of Barcelona". *Journal of Dental Education* 66.10 (2002): 1203-1208.
4. Tsevenjav B. "Preventive dentistry in Mongolia". Helsinki: Academic dissertation submitted to the University of Helsinki (2004).
5. Freeman R. "The determinants of dental health attitudes and behavior". *British Dental Journal* 187 (1999): 15-18.
6. Al-Wahadni AM., *et al.* "Differences in self-reported oral health behavior between dental students and dental technology/dental hygiene students in Jordan". *Journal of Oral Science* 46.3 (2004): 191-197.
7. Al-Omari QD and Hamasha AA. "Gender-specific oral health attitudes and behavior among dental students in Jordan". *The Journal of Contemporary Dental Practice* 6.1 (2005): 107-114.
8. Nusair KB., *et al.* "Dental health attitudes and behavior among dental students in Jordan". *Community Dental Health* 23.3 (2006): 147-151.
9. Polychronopoulou A., *et al.* "Oral selfcare behavior among dental school students in Greece". *Journal of Oral Science* 44 (2002): 73-78.
10. Kateeb E. "Gender-specific oral health attitudes and behavior among dental students in Palestine". *Eastern Mediterranean Health Journal* 16.3 (2010): 329-333.
11. Kawamura M., *et al.* "A comparison of self-reported dental health attitudes and behavior between selected Japanese and Australian students". *Journal of Dental Education* 61.4 (1997): 354-360.
12. Kawamura M., *et al.* "An exploratory study on cultural variations in oral health attitudes, behavior and values of freshman dental students". *International Dental Journal* 55.4 (2005): 205-211.

13. Kawamura M., *et al.* "Cross- cultural differences of self-reported oral health behavior in Japanese and Finnish dental students". *International Dental Journal* 50 (2000): 46-50.
14. Kawamura M., *et al.* "Comparison of United States and Korean dental hygiene students using the Hiroshima university dental behavioural inventory (HU-DBI)". *International Dental Journal* 52.3 (2002): 156-162.
15. Moheet IA and Farooq I. "Self-reported differences between oral health attitudes of pre-clinical and clinical students at a dental teaching institute in Saudi Arabia". *Saudi Dental Journal* 25.4 (2013): 149-152.
16. American Dental Association.
17. Ghaffari M., *et al.* "Are educating and promoting interventions effective in oral health?: A systematic review". *International Journal of Dental Hygiene* 16.1 (2018): 48-58.
18. Kim K-J., *et al.* "Oral health attitudes/behavior and gingival self-care level of Korean dental hygiene students". *Journal of Oral Science* 43.1 (2002): 49-53.
19. Dagli RJ., *et al.* "Self reported dental health attitude and behavior of dental students in India". *Journal of Oral Science* 50.3 (2008): 267-272.
20. Al-Ansari J., *et al.* "Oral health knowledge and behavior among male health sciences college students in Kuwait". *BMC Oral Health* 3.1 (2003): 2.
21. Peker I and Alkurt MT. "Oral Health Attitudes and Behavior among a Group of Turkish Dental Students". *European Journal of Dentistry* 3.1 (2009): 24-31.
22. Rahman B and Al Kawas S. "The relationship between dental health behavior, oral hygiene and gingival status of dental students in the United Arab Emirates". *European Journal of Dentistry* 7.1 (2013): 22-27.
23. Halboub ES., *et al.* "Self-Reported Oral Health Attitudes and Behavior of Dental and Medical students, Yemen". *Global Journal of Health Science* 8.10 (2016): 56676.
24. Lukacs JR and Largaespada LL. "Explaining sex differences in dental caries prevalence: Saliva, hormones, and 'life history' etiologies". *American Journal of Human Biology* 18.4 (2006): 540-555.
25. Martinez-Mier EA and Zandona AF. "The impact of gender on caries prevalence and risk assessment". *Dental Clinics of North America* 57.2 (2013): 301-315.
26. Ferraro M and Vieira AR. "Explaining gender differences in caries: a multifactorial approach to a multifactorial disease". *International Journal of Dentistry* (2010): 649643.
27. Peker K., *et al.* "Dental training and changes in oral health attitudes and behaviors in Istanbul dental students". *Journal of Dental Education* 74.9 (2010): 1017-1023.
28. Okoh M and Enabulele J. "Influence of clinical experience on oral health attitude and behaviour of dental students attending a Nigerian university". *Odonto-stomatologie Tropicale* 37.148 (2014): 25-31.
29. Tedesco LA., *et al.* "Self-efficacy, reasoned action and oral health behavior reports: a social cognitive approach to compliance". *Journal of Behavioral Medicine* 14.4 (1991): 341-355.
30. Wardle J and Steptoe A. "The European Health and Behavior Survey: rationale, methods and initial results from the United Kingdom". *Social Science and Medicine* 33.8 (1991): 925-936.

31. Tedesco LA, *et al.* "Social cognitive theory and relapse prevention: reframing patient compliance". *Journal of Dental Education* 55.9 (1991): 575-581.
32. Rosenman R., *et al.* "Measuring bias in self-reported data". *International Journal of Behavioural and Healthcare Research* 2.4 (2011): 320-332.

Volume 18 Issue 12 December 2019

©All rights reserved by Ahmad H Almehmadi and Faisal T Alghamdi.