

## Knowledge and Behavior of Oral Health Care among Dental Students in Kurdistan Region of Iraq – A Questionnaire-Based Study

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### Abstract

**Background** Oral health programs must first be delivered to oral health care providers. **Objectives** This study was designed to assess oral health care understanding among preclinical and clinical dental students and male and female dentistry students at Sulaimani University. **Materials and Methods** A cross-sectional, self-administered structured questionnaire was designed with a total of (38) items allocated in (7) domains of diverse oral health questions covering the main attributes of oral health care knowledge, attitude, and behavior among 232 pre-clinical and clinical dental students, 140 and 92, respectively, comprising 176 females and 56 males. **Results** No wide diversity in students' responses was reported between preclinical and clinical, or between male and female students in this study despite some significantly different responses to a few of the total number of items. The significant differences between preclinical and clinical students were mainly in the following areas: in domains (1), the amount of gingival display; in a group (2), professional scaling and polishing and time intervals for visiting a dentist for scaling and polishing; in domains (3), interdental use of floss and brushes; and in domains (4&5), respectively, type of toothpaste and toothbrush. Finally, the two domains responded differently on the cause of dental caries and whether implants could fail due to disease, as in natural teeth, in question domains (6&7). **Conclusion** Preclinical and clinical students responded similarly to the majority of the items, while male and female responses were not widely divergent despite a few significant differences in answers to some items.

**Keywords: Oral Health care; education; knowledge, attitude; oral hygiene; preclinical; clinical.**

## Introduction

Oral diseases and disorders including dental, periodontal, and oral mucosal lesions are considered the most prevalent diseases worldwide that damage individuals well-being and the community financially (Peres et al, 2019). It is accredited that oral health is strongly linked to individuals' overall health (Baiju et al, 2017). This relationship can be demarcated as an oral status free of diseases and disorders that improves people's visual appearance while also accomplishing the normal functioning of the oral cavity (Kumar et al, 2017). There have been reports of close interactions between oral diseases, particularly periodontal diseases, and other systemic diseases and conditions such as diabetes, atherosclerotic cardiovascular diseases, strokes, adverse pregnancy outcomes and metabolic diseases, and obesity (Nazir, 2017; Zardawi et al, 2021). Vice versa, some systemic diseases that enhance the release of pro-inflammatory mediators such as diabetes, obesity, and stress may participate in the development and exacerbation of certain periodontal and oral diseases and conditions (Tavares et al, 2014). Health education is a major element in preventing disease development and progression in several healthcare areas such as oral, periodontal, and dental health (Menegaz et al, 2018). Oral health programs should be commenced first with health providers including dental students, dentists, dental hygienists, and dental assistants. These programs must potentially change their attitude, perception, and behavior positively toward their oral hygiene and improve their periodontal, dental, and oral status, to increase their future ability to improve public oral health (Peker and Alkurt, 2009). People's attitudes and oral health knowledge and behavior vary among societies and individuals are influenced by factors such as culture, environment, and socioeconomic factors (Nyamuryekung'e et al., 2018). Periodontitis and dental caries are two worldwide oral health conditions that affect 60% and 36% of the population, respectively (Eke et al, 2012; Kassebaum et al, 2015). Therefore, to

reduce the prevalence of dental and periodontal diseases and their consequences for society, education regarding the correct health behavior is considered to be a necessary element in successful implementation of preventive programs for a variety of medical specialties including oral public health (Menegaz et al, 2018). For a dentist to be an effective member of a team assigned to educate the public about oral health, his/her attitudes, behavior toward self-practiced oral hygiene measures must reflect his/her understanding about oral health programs. Proper understanding of preventive programs among a society's oral health care providers can have an enormous impact on that society's oral health (Mekhemar et al, 2020). According to the teaching system in dental colleges in Iraq and Kurdistan region of Iraq, students undertake three-year preclinical courses which usually focus on the basic oral sciences, with only limited provision of knowledge and training on oral hygiene and oral health care. They then undertake two further clinical years before graduation that involve practical training on patients. The educational transition from the preclinical to the clinical stages offers medical and dentistry students a new outlook on their future careers. Obvious improvement has been recognized in their educational knowledge after going into the practical unit, particularly in terms of their attitude, knowledge and behavior toward oral health principles. Numerous studies have evaluated the effect of this educational transition on dental and medical students regarding oral health behavior and attitude, with the outcomes of these studies being controversial. However, some studies recorded significant improvement of educational standards within the clinical stage compared to the preclinical (Yildiz and Dogan, 2011; Al-Wesabi et al, 2019; Peker et al, 2010; Sato et al, 2013; Ali, 2016). Other studies failed to record significant differences between the two educational levels (Mekhemar et al, 2020; Alrmaly and Assery, 2018; Halboub et al, 2016; Mekhemar et al, 2021). Oral health care is a wide topic includes several aspects, dentistry

students should have sufficient knowledge to design and implement an oral health program accurately, of course with some differences between preclinical and clinical students owing to their different level of education and clinical practice, and male-female differences because of their different attitudes and behavior toward oral health. Previous studies covered part of this wide topic, however, in the current study, the authors tried to cover most aspects of oral health care by investigating students' responses to 7 groups of (39) inclusive questions. Hence, the present study was carried out to assess the basic oral health knowledge among clinical and preclinical dentistry students and to understand their attitude and behavior toward the basic principles of self-performed and professional oral hygiene measures. The study was designed to evaluate this understanding among male and female students and among preclinical and clinical dental students.

## Materials and Methods

### Study design and participants

A cross sectional, self-administered structured questionnaire was designed with a total of 38 questions allocated in 7 domains of diverse oral health questions. The items were formulated based on different aspects of oral health status in order to evaluate perception, knowledge and behavior among preclinical and clinical dentistry students at the University of Sulaimani in Kurdistan region of Iraq. A total of 232 pre-clinical and clinical dental students (140 and 92, respectively, comprising 175 females and 57 males) participated in this study. The study was carried out in the academic year 2019–2020, after submitting the study proposal to the ethical committee of the College of Dentistry, University of Sulaimani for registration and attaining ethical approval for conducting this cross-sectional study. A convenience sampling technique was employed to select dental students for participation in this study. The 1st to 5th stages of the dental course were divided into two domains: preclinical involved years 1, 2, and 3,

while the clinical group involved stages 4 and 5. Only properly filled-in forms were used and any inadequately completed questionnaire forms were excluded.

### Questionnaire

The questionnaire addressed the following aspects of self-performed and professional oral hygiene behavior by asking the following seven sets or domains of items on oral health care knowledge and behavior:

1-Domains (1): Gingival health and appearance, spacing, amount of gingival display, and gingival recession.

2-Domains (2): Professional scaling and polishing, how often, attitude toward necessity, harmful effect on the teeth, such as sensitivity, and items about advantages of professional scaling and polishing.

3-Domains (3): Tooth brushing, methods, frequency and brushing consequences.

4-Domains (4): Types of toothpaste used by the students

5-Domains (5): Interdental care and interdental plaque control plaque control aids

6-Domains (6): Dental caries, role of bacteria in causing dental caries, visits to dentist for checkup

7-Domains (7): Dental implants, components, knowledge and similarity to natural teeth.

### Statistical analysis

Data were analyzed using the SPSS version 16.0 software (SPSS Inc., Chicago, IL, USA). Cronbach's alpha test was used to determine reliability of the obtained data. Descriptive statistics regarding such as frequency and percentage were obtained. The Shapiro-Wilk test was applied to determine the mean distribution and normality of the obtained data. Since the data were not normally distributed, Mann Whitney test was applied to compare study variables such as male and female students and between pre-clinical and clinical students. The level of significance was set as  $P \leq 0.05$ .

### Results

Cronbach's alpha test was applied to a sample

of 32 participants as a pilot study in order to determine the reliability of the variables applied in this study. The outcome of this pilot study was that Cronbach's alpha values indicated the reliability of the variables applied in each domain and among all the variables applied in the study (Table 1). The questionnaire was applied to the entire sample of this study, which constituted 232 participants. In domains 1, the majority of the answers from preclinical and clinical students related to the gingiva being pink in color (133, 95% and 85, 92.4%, respectively). Whereas, the male-female responses to this question were 53, 93% - 165, 94.3%, respectively. In this group of questions, no significant results were detected except for a significant difference ( $P=0.034$ ) in the preclinical responses to the question relating to the amount of gingival display, and this difference mainly concerned the small amount of gingival display compared to clinical students' response (69, 49.3% and 45, 48.9%, respectively) as shown in Table 2. For domains 2 items relating to professional scaling, there was a statistically significant difference ( $P=0.004$ ) in preclinical and clinical responses to the question on frequency of scaling. Whereas most of the clinical participants (41.3%) were having professional scaling at intervals of more than 12 months, the majority of preclinical students (47.9%) were not having professional scaling and polishing. Most of the participants responded that scaling improves the gingival health, however, there was a significant difference ( $P=0.00$ ) between preclinical (71.4%) and clinical responses (82.6%). Furthermore, in this domains of items the majority of the participants stated that scaling improves the appearance of the teeth, with a significant difference ( $P=0.007$ ) between preclinical (76.4%) and clinical (83.7%) students (Table 3). In domains 3, there was a significant difference between preclinical and clinical responses to the question relating to the segments of the mouth that participants flossed ( $P=0.048$ ). Furthermore, there was a significant difference ( $P= 0.000$ ) between preclinical (71.4%) and clinical (82.6%) responses regarding the importance

of flossing; also, a significant difference ( $P=0.005$ ) was recorded between preclinical and clinical responses to the question related to use of interdental brushes (68.6% and 84.8%, respectively). Results of this study show that the majority of preclinical and clinical students were not using interdental brushes. Besides, a significant ( $P=0.04$ ) difference was recorded between preclinical and clinical responses to the items related to use of mouthwash (Table 4). In group 4, there was a significant difference ( $P=0.002$ ) between preclinical (72.1%) and clinical use of fluoridated toothpastes (79.3%) (Table 5). The results of this study also showed that most of the females (53.4%) were using a medium toothbrush, whereas the majority of males (50.9%) were using a soft toothbrush, but the difference was not significant ( $P=0.535$ ). There was a significant difference ( $P=0.003$ ) between males and females in the timing of brushing. Meanwhile, the majority of preclinical (49.3%) and clinical (54.3%) participants were using a medium toothbrush, with a significant difference ( $P=0.02$ ) between the two domains (Table 6). Regarding the domains 6 questions related to the causes of dental caries, the majority of preclinical students (52.6%) believed that the causes of dental caries are bacteria and genetics, while the majority of clinical students (57.1%) believed that the cause of dental caries is primarily bacterial, with a significant ( $P=0.04$ ) difference between the two groups. Additionally, most of the females attended dental clinics for periodic examinations (80%) and they believed that filled teeth do not develop caries again (Table 7). For domains 7 questions regarding dental implant knowledge, there were no significant differences between males' and females' responses to these questions or between preclinical and clinical answers except for the question on whether dental implants can fail due to disease, where there was a significant difference between preclinical and clinical responses ( $P=0.003$ ) as demonstrated in Table 8.

**Table (1): Correlation coefficient reliability using Cronbach's alpha test.**

Variables	n	Mean	Cronbach's Alpha	Cronbach's Alpha total
Gingival Health and appearance	32	1.796	0.72	0.72
Scaling	32	2.016	0.71	
Interdental care	32	1.738	0.76	
Toothpaste	32	1.788	0.75	
Tooth Brushing	32	1.719	0.71	
Dental Implant	32	1.648	0.74	
Dental caries	32	1.719	0.75	

**Table (2): Students' response to domains1 items related to gingival health and appearance - Frequency and percentage.**

Gingival Health and appearance Frequency & Percentages	Preclinical Freq & %	Clinical Freq & %	p-value	Female Freq & %	Male Freq & %	p-value
1. The color of my gums is						
pink	133 (92)	165 (94.3)		165 (94.3)	133 (92)	
Brown	1 (0.7)	7 (2.2)	0.820	7 (2.2)	1 (0.8)	0.717
red	4 (4.3)	9 (5.4)		9 (5.4)	4 (4.3)	
2. Do your gums bleed?						
Yes	24 (17.1)	18 (9.6)	0.938	18 (9.6)	24 (17.1)	0.195
No	114 (82.9)	74 (80.4)		74 (80.4)	114 (82.9)	
3. If your gums bleed, what do you do? I brush more to stop bleeding						
I don't brush because it bleeds more will go to the dentist	50 (35.7)	32 (34.8)	0.197	37 (21.0)	3 (3.3)	0.899
4. During teeth, how much your gums appear?						
None	50 (35.7)	23 (27.2)		23 (27.2)	22 (24.6)	
Fair	49 (49.2)	41 (48.9)	0.034*	41 (48.9)	49 (49.2)	0.543
Too much	15 (18.7)	20 (21.7)		20 (21.7)	15 (18.7)	
5. I am satisfied with the appearance of my:						
Tooth	47 (33.6)	23 (27.2)	0.633	23 (27.2)	16 (28.1)	0.773
Gums	20 (14.3)	14 (15.2)		14 (15.2)	10 (17.5)	
Both	73 (52.1)	53 (57.6)		53 (57.6)	33 (54.4)	
6. Do you think any of your teeth appears longer than normal						
Yes	24 (17.1)	13 (16.5)	0.981	13 (16.5)	8 (11.8)	0.682
No	88 (79.2)	71 (77.2)		71 (77.2)	43 (71.9)	
Maybe	18 (12.9)	6 (8.5)		6 (8.5)	7 (12.3)	

\* refers to statistical Significance

**Table (3): Students' response to Domains 2 items related to professional scaling and polishing and their consequences for the teeth and gingiva - Frequency and percentage.**

Scaling	preclinical	clinical	p-value	Female	Male	p-value
1. How frequent you go to clean your teeth by dentist						
Between 3-6 months	7 (3)	3 (3.4)	0.114*	3 (3.4)	3 (3.3)	0.811
Between 6-12 months	21 (17.9)	21 (22.8)		21 (22.8)	11 (22.8)	
More than 12 months	41 (29.1)	38 (41.3)		38 (41.3)	11 (26.3)	
Never done cleaning by dentist	47 (47.9)	28 (30.4)		28 (30.4)	26 (45.4)	
2. After dental cleaning by a dentist, would you get tooth sensitivity?						
I have not done dental cleaning by a dentist						
No	68 (47.1)	23 (27.2)	0.114*	23 (27.2)	24 (42.1)	0.498
Yes, for one week	39 (27.9)	43 (46.7)		43 (46.7)	22 (38.4)	
Yes for 2 weeks	21 (20.0)	17 (18.3)		17 (18.3)	7 (12.3)	
Yes for more than 2 weeks	7 (3.8)	5 (5.4)		5 (5.4)	4 (7.0)	
3. Do you think dental cleaning is necessary by dentist?						
Yes	87 (89.1)	49 (73.5)	0.114*	49 (73.5)	46 (79.2)	0.336
No	3 (3.4)	3 (3.3)		3 (3.3)	3 (3.3)	
Maybe	31 (27.1)	26 (21.7)		26 (21.7)	15 (26.3)	
4. Do you think dental cleaning by a dentist harms your teeth?						
Yes	21 (14.3)	10 (10.9)	0.114*	10 (10.9)	8 (13.5)	0.788
No	42 (44.3)	33 (35.4)		33 (35.4)	21 (34.4)	
Maybe	38 (41.4)	31 (33.7)		31 (33.7)	26 (45.4)	
5. Do you think dental cleaning by a dentist improves teeth and gingival health?						
Yes	100 (71.4)	76 (82.4)	0.114*	76 (82.4)	46 (80.7)	0.267
No	3 (3.4)	6 (6.5)		6 (6.5)	3 (3.3)	
Maybe	31 (25.0)	10 (10.9)		10 (10.9)	13 (22.8)	
6. Do you think dental cleaning by a dentist improves appearance of teeth and gums?						
Yes	107 (76.4)	71 (83.7)	0.114*	71 (83.7)	46 (80.7)	0.427
No	4 (2.7)	5 (5.2)		5 (5.2)	4 (7.0)	
Maybe	21 (17.9)	12 (13)		12 (13)	7 (12.3)	

\* refers to statistical Significance

**Table (4): Students' response to Domains 3 items related to interdental plaque control methods and tools - Frequency and percentage.**

Interdental care	preclinical	clinical	p-value	Female	Male	p-value
1. Do you have spaces between teeth						
Yes	42 (30)	28 (30.4)	0.791	31 (29.3)	18 (31.6)	0.771
No	88 (70)	84 (89.6)		124 (70.7)	39 (88.4)	
2. How many times do you floss a day? No, I don't floss my teeth						
1 time	39 (32.1)	54 (58.7)	0.345	39 (35.6)	24 (42.1)	0.706
2 times	26 (18.6)	33 (35.9)		26 (14.8)	10 (17.5)	
3. I do flossing						
Before brushing	78 (55.7)	48 (50)	0.787	82 (52.3)	32 (56.1)	0.612
After brushing	62 (44.3)	48 (50)		35 (47.7)	25 (43.9)	
4. If I floss, I floss						
All my teeth	107 (76.4)	73 (81.2)		118 (78.6)	48 (86.7)	
Only front teeth	16 (11.4)	13 (14.1)	0.048*	24 (14.2)	4 (7)	0.858
Only back teeth	17 (12.1)	4 (4.3)		13 (7.4)	7 (12.3)	
5. Do you think flossing is as important as brushing?						
Yes	100 (71.4)	76 (82.6)		114 (76.1)	43 (75.4)	
No	34 (10)	8 (8.7)	0.000*	10 (5.7)	10 (17.5)	0.750
Maybe	26 (18.6)	8 (8.7)		31 (18.2)	4 (7)	
6. I believe flossing prevents:						
Inter-dental cavity (between teeth)	15 (10.7)	8 (8.7)	0.492	17 (8.7)	7 (12.3)	0.558
Gum inflammation	12 (8.6)	8 (8.7)		13 (8.3)	8 (14)	
Roth	90 (64.3)	68 (73.9)		126 (71.4)	32 (56.1)	
I don't know	23 (16.4)	8 (8.7)		21 (12.5)	10 (17.5)	
7. Do you use interdental brush?						
Yes	44 (31.4)	34 (35.2)	0.009*	43 (25)	13 (22.8)	0.788
No	88 (68.6)	78 (84.8)		132 (75)	44 (77.2)	
8. Do you use mouth wash?						
Yes	51 (25.1)	24 (26.1)	0.833	36 (21)	18 (31.6)	0.814*
No	47 (47.9)	30 (42.4)		79 (44.9)	29 (50.5)	

\* refers to statistical Significance.

**Table (5): Students' response to domains4 items related to type and use of toothpastes - Frequency and percentage.**

Toothpaste	preclinical	clinical	p-value	Female	Male	p-value
1. Does your tooth paste contain fluoride?						
Yes	100 (72.1)	71 (76.5)		100 (72.1)	68 (77.2)	
No	38 (27.9)	9 (9.6)	0.002*	13 (13.5)	7 (10.3)	0.442
I don't know	34 (24.9)	30 (32.9)		34 (24.9)	30 (34.5)	
2. Are you an automatic or manual toothpaste?						
I use automatic toothpaste	81 (58.6)	69 (74.6)	0.001	69 (74.6)	29 (33.3)	0.473
I use manual toothpaste	20 (14.3)	13 (14.1)		13 (14.1)	6 (8.6)	
I don't know	31 (22.1)	24 (26.3)		31 (22.1)	17 (19.1)	
3. What type of toothpaste do you frequently use?						
Fluoride	42 (29.5)	30 (32.4)	0.433	34 (38.5)	18 (20.5)	0.433
Whitening	39 (27.9)	20 (21.8)		39 (27.9)	10 (11.4)	
Sensitive	21 (15)	10 (10.9)		10 (10.9)	6 (6.8)	
Blue Whitening	7 (5)	7 (7.6)		7 (7.6)	0 (0)	
I don't know	33 (23.6)	24 (26.3)		33 (23.6)	18 (20.5)	
4. What do you do with the tooth paste after brushing to your mouth?						
After use toothpaste without gargling and keep in for sometime						
gargling to remove all the paste out	39 (27.9)	44 (47.5)	0.004	111 (29.1)	29 (33.3)	0.817
I don't know	88 (62.1)	71 (76.5)		121 (80.9)	38 (43.5)	
5. Is the primary cleaning action comes from:						
Tooth brush	88 (62.1)	71 (76.5)	0.000*	111 (29.1)	18 (20.5)	0.891
Tooth paste	33 (23.6)	19 (20.5)		33 (23.6)	10 (11.4)	
I don't know	18 (12.9)	10 (10.9)		18 (12.9)	8 (9.1)	

\* refers to statistical Significance

**Table (6): Students' response to domains 5 items related to frequency and type of toothbrush, Frequency and percentage.**

Tooth brushing		Preclinical	Clinical	p-value	Female	Male	p-value
1. I use	Soft tooth brush	41 (44.6)	41 (44.6)	0.000*	77 (44.3)	29 (30.8)	0.035
	Medium tooth brush	49 (49.3)	50 (54.3)		94 (53.4)	25 (41.8)	
	Hard tooth brush	4 (2.9)	1 (1.1)		2 (1.1)	3 (5.3)	
	I don't use tooth brush	2 (1.4)	0		2 (1.1)	0	
2. How large is your brush head?	Small	22 (15.7)	14 (15.2)	0.614	31 (33.2)	7 (12.3)	0.011
	Medium	138 (32.8)	77 (83.7)		140 (80.1)	89 (87.7)	
	Large	2 (1.4)	1 (1.1)		3 (1.7)	0	
3. When do you brush?	Before going to bed	84 (80)	81 (86.3)	0.974	118 (87)	28 (49.1)	0.003*
	Morning	29 (26.7)	18 (14.8)		39 (39.3)	32 (31.1)	
	After each meal	19 (13.8)	10 (10.9)		20 (21.4)	8 (14)	
4. Do you think tooth paste work properly without improper tooth brushing?	Yes	32 (8.6)	13 (14.1)	0.006*	15 (8.5)	10 (17.5)	0.469
	No	98 (76.0)	73 (79.3)		116 (77.3)	37 (64.8)	
	I don't know	30 (21.4)	6 (6.8)		24 (24.2)	10 (17.5)	

\* refers to statistical Significance.

**Table (7): Students' response to domains 6 items related to dental caries and management - Frequency and percentage.**

Dental caries		Preclinical	Clinical	p-value	Female	Male	p-value
1. Do you go to dental clinic regularly to check your teeth for dental caries (cavity)?	Yes	58 (43)	42 (46.2)	0.616	79 (44.7)	24 (42.9)	0.010
	No	77 (37)	49 (53.8)		84 (53.3)	32 (37.1)	
2. The causes of dental caries are	Bacteria	58 (43)	32 (37.1)	0.040*	83 (49.4)	26 (46.4)	0.029
	Genetics	6 (4.4)	3 (3.3)		6 (3.3)	3 (5.4)	
	Both	71 (52.6)	38 (39.6)		80 (47.1)	27 (46.2)	
3. It is necessary to go to dentist to check your teeth frequently for Detecting new caries lesions: Checking the filled teeth	Both	15 (11.1)	11 (12.1)	0.679	21 (12.4)	5 (8.9)	0.203
	It is not necessary	4 (3)	2 (2.2)		5 (2.9)	1 (1.8)	
		107 (79.3)	74 (81.7)		158 (90)	45 (80.4)	
4. Do you think filled teeth is possible to get caries again?	Yes	9 (6.7)	4 (4.4)	0.092	7 (4.7)	2 (3.8)	0.471
	No	94 (69.3)	71 (78)		122 (71.3)	43 (74.8)	
	Maybe	9 (6.7)	10 (11)		15 (8.5)	4 (7.1)	
		32 (23.7)	10 (11)	32 (20.4)	9 (16.1)		

\* refers to statistical Significance.

**Table (8): Students' response to domains 7 items related to dental implants and how they differ from natural teeth - Frequency and percentage.**

Dental Implant		Preclinical	Clinical	p-value	Female	Male	p-value
1. Have heard about dental implant?	Yes	117 (86.7)	82 (90.1)	0.435	153 (89.4)	47 (81.9)	0.274
	No	18 (13.3)	9 (9.9)		18 (10.6)	9 (16.1)	
2. Dental implant is a cap on tooth metal placed in the gum	Yes	18 (14.1)	12 (13.2)	0.880	22 (12.9)	9 (16.1)	0.566
	No	110 (85.9)	79 (86.8)		147 (87.1)	47 (83.9)	
3. Do you think dental implant looks like natural teeth (esthetic and function)?	Yes	37 (42.2)	31 (34.5)	0.483	48 (46)	24 (42.9)	0.201
	No	24 (28.5)	32 (35.2)		38 (35.4)	19 (33.6)	
	Maybe	31 (39.3)	24 (24.4)		46 (27.6)	11 (20.2)	
4. Do you think dental implants get disease like tooth and may loose and fall out?	Yes	49 (46.7)	41 (47)	0.003*	66 (32.9)	34 (60.7)	0.281
	No	28 (19.5)	12 (13.2)		29 (17.1)	9 (16.1)	
	Maybe	46 (34.1)	18 (19.8)		59 (30.9)	15 (22.2)	
5. If one tooth is missing, I do prefer	Place an implant	119 (83.9)	82 (99.4)	0.079	151 (88.4)	59 (99.3)	0.024
	To small two adjacent teeth and make a bridge on them	19 (14.1)	0 (0)		18 (11.2)	0 (0)	

\* refers to statistical Significance.

## Discussion

The current study included seven groups of questions covering the most common aspects of oral health care; the purpose of asking these questions was to investigate students' general perceptions, knowledge and behavior toward different aspects of oral health care and to interpret their understanding of these aspects. The study also attempted to investigate the differences between preclinical and clinical students' levels of understanding of these considerations. Furthermore, this questionnaire based study attempted to interpret the differences in levels of perception between male and female students. In questionnaire based studies, the respondents sometimes neglect to answer the questions or part of the items, because they are not interested, or not well acquainted with the nature or the style of the questioning, or sometimes they may tick without reading the questions carefully, which may lead to data inconsistency. Therefore, the reliability and validity of the current data were tested; additionally, inadequately completed forms were excluded and only forms that were fully completed or missing only one or two answers were considered. The responses of preclinical and clinical, male and female students to most of the questions in the seven groups were mostly consistent in this study except for a few cases in which there were significant differences in responses between preclinical and clinical and between male and female students that will be discussed in this section. In (domains 1) there was a significant difference between preclinical and clinical responses to the amount of gingival display. The gingival display is a clinical attribute of the smile and beauty, with students attaining their knowledge about esthetics from the clinical courses in their studies. Meanwhile, although women are more aware about their appearance and thus follow oral health care procedures to achieve an attractive smile, in this study, no significant statistical difference was detected between males and females. Additionally, there was no wide variation in the student domains' responses on interdental aids to plaque control

in group (2) except for a few differences between preclinical and clinical students regarding use of interdental flossing and brushing. However, the only significant difference between males and females in responses to this domains of questions related to the use of mouthwash. There was also variation between preclinical and clinical groups' responses on the use of fluoridated toothpaste and whether the primary cleansing action derives from the toothpaste or the toothbrush. They also responded differently to a similar question in domains 5, which related to whether toothpaste works properly with improper brushing technique. There was a further difference between the clinical and preclinical students in answers to the question related to the type of toothbrush they used, while the only difference between males and females was in responses to the question on time of brushing during the day. For domains 6, which included questions related to dental caries, the only significant difference between responses of preclinical and clinical students related to the causes of dental caries. Meanwhile, the only difference between preclinical and clinical students in responses to the dental implant items in group 7 related to whether a dental implant can become diseased and fail like a natural tooth. Recently, numerous studies worldwide have assessed the educational transition regarding oral health attitude and knowledge, and behavior from the preclinical to the clinical level of study as primary signs of educational progress. Outcomes of these studies have demonstrated significant progress in relation to educational transition among preclinical and clinical students (Al-Wesabi et al, 2019; Ali, 2016, Yildiz and Dogan, 2011; Peker et al, 2010). In this regard, the current study identified significant differences between preclinical and clinical students' responses to the items related to professional dental scaling and polishing and to questions related to interdental cleaning aids and the use of interdental flossing. Furthermore, there were significant differences in responses to items related to the type of toothbrush, type, and action of toothpaste used by preclinical and

clinical students. They also responded differently to the items related to the causes of dental caries and whether a dental implant can succumb to any kind of disease or disorder. These differences could be attributed to students' regular contact with their patients during the clinical courses of their study and improvement in their clinical dental practice and knowledge as they become more conscious of the significance of oral health knowledge and more attentive to the need to guide their patients appropriately (Al-Wesabi et al, 2019). However, a number of studies have identified weakness in the preclinical-clinical transition (Mekhemar et al, 2020; Mekhemar et al, 2021; Alrmary and Assery, 2018; Halboub et al, 2016). This was reflected in the current study by the lack of significant differences between preclinical and clinical students' answers to most of the questions that determine students' level of knowledge, attitude and behavior toward the majority of oral health attributes. This indicates a lack of significant improvement in the level of oral health knowledge in their clinical stages and that at this stage of their education students may not be sufficiently qualified to perform oral health care programs. It is a fact that women usually care more about their appearance and looking after their bodies and thus may be more concerned about adopting behaviors and habits that promote their dental and oral health (Mamai-Homata et al, 2016; Halboub et al, 2016; Ali, 2016); consequently, they might practice better oral health care than males (Mekhemar et al, 2020; Mekhemar et al, 2021; Hamasha et al, 2018). Although the female dental students in this study differed from their male counterparts on some aspects of oral health knowledge and attitudes, there were no significant differences between males' and females' answers to the majority of the items. This result was consistent with other studies that reported no male-female differences in terms of oral health behavior (Muthu et al, 2015; Al-Omari and Hamasha, 2005; Hassan et al, 2020). Generally, preclinical and clinical students' responses to the majority of the items were similar, possibly indicating that

the students achieved the required knowledge about oral health care from oral health education courses in the preclinical stages. These preclinical courses on oral health care helped prepare them to implement oral health programs with their patients in the clinic, and could explain why the preclinical and clinical students gave similar answers. Another possibility could less often to be, is that dental education has had a weak effect on students' oral health knowledge, which calls for special attention to double-check the programs that are approved to be taught during the clinical courses. Supplementary courses may be required, focusing on the importance of delivery of appropriate oral health performance by health care providers.

## Conclusions

Although preclinical and clinical students responded differently to some of the items designed to assess their knowledge, attitudes and behavior toward oral health care, there were no obvious variation in their responses to the majority of the questions. This indicates that the preclinical learning programs and their educational program is well designed to prepare the male and female learners to the clinical sessions during their undergraduate program. The study also revealed a few differences in responses between males and females, but none of these were significant.

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