Original Article

SELF-PERCEIVED ORAL HYGIENE AND PERIODONTAL HEALTH AMONG DENTAL AND MEDICAL STUDENTS, DENTISTS AND PHYSICIANS IN KSA

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ABSTRACT

Dental Students, Medical Students, Dentists, and Physicians play a crucial role in community oral health promotion. Hence it is essential to know about their understanding of periodontal health and oral hygiene practices. This study aimed to evaluate oral health awareness and hygiene behavior related to gingival health. A cross-sectional survey investigated self-perceived oral hygiene and periodontal health among dental students, medical students, dentists, and physicians in Saudi Arabia. An online questionnaire consisting of five items on demographics and nineteen questions on oral hygiene and periodontal was distributed to the targeted population utilizing various social media platforms. The relationship between the categorical variables was assessed using the Chi-square test. Study sample consisted of 637 participants with 154 dental Students, 101 medical Student, 276 dentists and 106 physicians. Tooth brushing variables such as teeth cleaning method, brushing frequency, brushing duration, changing toothbrush brushing strokes, type of toothbrush differed significantly across various groups of study ($p<0.05$). Tongue cleaning, dental visits, and use of inter-dental aids also demonstrated significant variations among different field of participants ($p<0.05$). Similarly periodontal diseases perception showed a statistically significant difference across study groups ($p<0.05$). Dentist and dental students had a better oral hygiene regimen, especially regarding interdental cleaning and brushing frequency. Interdental cleaning was not perceived as important as tooth brushing amongst the physicians and medical students groups as the majority believed that brushing alone can prevent gingival diseases. Severe gingival problems were more perceived by the physicians and medical students.

Key words: Self-perception, Oral hygiene, Periodontal health, Medical student, Dental student, Dentist

Introduction

Periodontal diseases are the most common oral health issues that can affect not only the teeth and periodontal tissues but the general health [1], interpersonal relationships, and overall comfort and productivity of an individual [2]. Periodontal disease incidence ranges between 20%-50% in populations of developing countries [3]. In Saudi Arabia, the prevalence of gingivitis was 100% in a nationwide study [4], meanwhile, in high school students, the incidence of gingivitis was 65.1% [5], and the incidence of periodontitis was 8.6% [6]. Furthermore, the risk of cardiovascular diseases increased by 19% to 44% in elderly individuals suffering from periodontitis, and the mortality risk was 3.2 times greater in type 2 diabetic patients suffering from severe periodontitis [3].

In regards to self-perception of oral health in adults, results revealed a concern about the appearance of the teeth amongst 42.7% of the individuals, 30.1% were concerned about general teeth problems, 27.5% were concerned about teeth sensitivity, and 100% of the sample did not recognize the periodontal status as a health issue nor a quality of life factor [7]. Meanwhile, the self-perception of oral health amongst the elderly was reported to be satisfactory despite the lack of oral health care [8, 9].

Furthermore, studies examining the periodontal condition's self-evaluation of the general public showed that the evaluation was accurate for individuals with healthy periodontium but inaccurate when gingival diseases [10, 11]. The self-evaluation of dental and medical students revealed that they could identify the signs and symptoms of periodontal issues more than their medical counterparts [2]. Moreover, when a clinical assessment followed the self-evaluation of the general public, it was revealed that 50% of the patients had inaccurately assessed their periodontal health [1].

Observing the self-perception of pain amongst the patients remained unchanged compared to the clinical assessment. In contrast, the self-perception of malodor was exaggerated in almost 50% of the patients who reported having it. However, the clinical assessment revealed them to be malodor-free [12]. When oral malodor self-perception was observed in dental and medical students, it was shown that they were

unaware of their oral malodor compared to the clinical assessment [2]. Moreover, it was found that the self-evaluation of the dental cavities was inaccurate compared to the clinical assessment, as the majority of the patients missed or misperceived a cavity [13, 14].

The self-reporting of the public regarding the use of mouthwash has shown that older and female individuals more frequently use the mouthwash [15]. Moreover, dental and medical students reported that toothbrush and toothpaste is their primary method of oral hygiene. The dental students reported a higher frequency of brushing twice daily, interdental cleaning, and changing their toothbrushes every three months compared to their medical counterparts. Hence the present study aimed to evaluate the oral hygiene among periodontal health of dental students, medical students, dentists, and physicians. The present study intends to address the central question, "Is there a difference in the oral hygiene regimens and self-perception of periodontal health between dental students, medical students, dentists, and physicians?"

Materials and Methods

Study sample
The study sample comprised medical students, dental students, practicing dentists, and physicians.

Sample size calculation
A minimum required sample of 377 study participants was estimated based on the acceptable margin of error of 5%, the confidence level of 95%, assuming the population under investigation is 20000, and a 50% distribution of response rate. However, to improve the power of the study and a final sample of 637 was considered in this study. A convenience sampling methodology was employed to select the sample. Medical students, dental students, dentists, and physicians who were active on professional social media platforms in Saudi Arabia were included in this study.

Study instrument
A structured, closed-ended, self-administered questionnaire with five sociodemographic (gender, age, region, specialty, and smoking habit) variables and twenty questions about self-perceived oral hygiene and periodontal health was utilized in this study. The main questions assessed the participant's perception of oral hygiene and overall health, materials, methods, frequency, and timing of the teeth cleaning noted. In addition, questions elicited participants' use of the toothbrushing frequency of changing toothbrush, use of inter-dental cleaning aids, visit dentist, and reason for a dental visit. Perception of oral malodor, gum disease, loss of teeth due to periodontal disease, and the relationship between periodontal disease and systemic conditions was also recorded.

Validity and reliability of the study instrument
The face validity of the questionnaire was established by taking the opinion of the experts in periodontology and dental public health. The suggestions and comments provided by the experts were implemented in the questionnaire.

A pilot study was conducted among 20 medical and dental students and professionals. The reliability of the questionnaire was measured using Cronbach's alfa (0.85), which is considered adequate for conducting the main study.

Questionnaire administration
An electronic version of the English questionnaire was prepared using Google forms. An online link was distributed to dental students, medical students, dentists, and physicians in Saudi Arabia utilizing various professional social media platforms. All the questionnaire items were mandatory, and it took 5 minutes for the participants to answer all the questions.

Statistical analysis
All the collected responses in google forms were downloaded and coded. Complete data were transferred to the statistical analysis program for analysis purposes. Statistical analysis program SPSS version 25 (IBM-SPSS, Armonk. USA) was used to perform analysis of the data. Frequency distribution and percentages were calculated for the categorical variables. A Chi-square test was applied to find the relationship between sociodemographic variables and the self-perception of periodontal disease. A p-value of $p<0.05$ was considered significant for all the statistical tests.

Results and Discussion

A total of 154 (24.2%) dental students, 101 (15.9%) medical students, 276 (43.3%) dentists, and 106 (16.6%) physicians participated in this study. Of 637 participants, 376 (59%) were females, and 261 (41%) were males, aged between 19 to 69 years. Most of the students belonged to the central region 447(70.2%) and 66 (10.4%) participants rarely smoked cigarettes or Hookah, as shown in **Table 1**.

Table 1. Distribution of the study participants (N=637)

Variables		n	%
Gender	Male	261	41.0
	Female	376	59.0
Region	Central Region	447	70.2
	Northern Region	21	3.3
	Southern Region	13	2.0
	Western Region	76	11.9
	Eastern Region	80	12.6
Field	Dental Student	154	24.2
	Medical Student	101	15.9
	Dentist	276	43.3
	Physician	106	16.6
Do you smoke	Yes, frequently [10 or more Cigarettes Daily/Hookah once daily]	65	10.2

cigarettes/ Hookah [shisha]?	Yes, occasionally [5 to 10 Cigarettes Daily/Hookah once weekly]	25	3.9
	Yes, rarely [Less than 5 Cigarettes Daily/Hookah once Monthly]	66	10.4
	Never	481	75.5

The majority (95.8%) of participants felt that oral hygiene is mandatory for the body's overall health. Moreover, the majority of participants (57.3%) reported cleaning their teeth twice daily [morning and evening], (17.7%) only brush their teeth once daily before sleeping, (12.6%) brush their teeth three times or more, (7.7%) brush once daily [before/after breakfast], (4.2%) brush their teeth infrequently [not daily], (0.5%) never brush their teeth. With the majority brushing their teeth for a duration of 1 to 2 minutes (55.3%). Moreover, approximately (50.4%) change their toothbrush once every three months. The top brushing motion used by (49.5%) of participants was found to be circular strokes ($p<0.05$). The majority (47.3%) reported using a soft toothbrush. No significant difference was observed when responses were compared across the participants ($p=0.260$). However, teeth cleaning method ($p=0.002$), brushing frequency ($p<0.001$), brushing duration ($p<0.001$), changing toothbrush ($p<0.001$), brushing strokes ($p<0.001$), and type of toothbrush ($p=0.002$) **(Table 2)**.

Table 2. Comparison of oral hygiene and toothbrushing variables across study subjects

Variables		Dental Students	Medical Students	Dentists	Physicians	p
Oral hygiene and overall health	Yes	94.2%	97%	97.1%	93.4%	0.260
	No	3.9%	2%	1.4%	1.9%	
	I don't know	1.9%	1%	1.4%	4.7%	
Teeth cleaning method	Brush and Paste	98.7%	94.1%	96.7%	92.5%	0.002
	Finger and Paste/Powder	0.6%	2%	1.1%	1.9%	
	Brush & Powder	0%	4%	0.7%	0%	
	Miswak	0.6%	0%	1.4%	5.7%	
Brushing frequency	Once Before sleeping	16.9%	24.8%	14.1%	21.7%	<0.001
	Once B/A Breakfast	7.1%	14.9%	5.1%	8.5%	
	Twice Daily M&E	63.6%	33.7%	65.9%	48.1%	
	Three times or more	11%	11.9%	13.8%	12.3%	
	Infrequently	1.3%	14.9%	1.1%	6.6%	
	Never	0%	0%	0%	2.8%	
Brushing duration	< 1 minute	5.8%	17.8%	10.1%	13.2%	<0.001
	1-2 minutes	68.2%	54.5%	50.7%	49.1%	
	3-5 minutes	18.8%	25.7%	37.3%	30.2%	
	> 5 minutes	4.5%	1%	1.1%	4.7%	
	I don't know	2.6%	1%	0.7%	2.8%	
Changing toothbrush	1 per month	5.2%	5.9%	4%	7.5%	<0.001
	1 per 3 months	53.2%	25.7%	60.9%	42.5%	
	1 per 6 months	29.2%	40.6%	23.2%	24.5%	
	1 per year	4.5%	6.9%	2.9%	11.3%	
	When needed	7.8%	19.8%	8%	12.3%	
	Not Applicable	0%	1%	1.1%	1.9%	
Brushing strokes	Horizontal	17.5%	23.8%	6.9%	10.4%	<0.001
	Vertical	16.2%	9.9%	19.6%	22.6%	
	Circular	52.6%	37.6%	59.8%	29.2%	
	Random	18%	25.7%	10.5%	27.4%	
	Not Applicable	2.6%	3%	3.3%	10.4%	

Type of toothbrush	Ultra-soft	13%	12.9%	5.8%	4.7%	0.002
	Soft	48.1%	48.5%	49.6%	38.7%	
	Medium	26.6%	24.8%	34.1%	44.3%	
	Hard	1.3%	0%	0.7%	0%	
	Electronic	10.4%	9.9%	9.8%	8.5%	
	Not Applicable	0.6%	4%	0%	3.8%	

Table 3 shows a comparison of responses on tongue cleaning and the use of interdental aids among dental students, medical students, dentists, and physicians. The tongue cleaning ($p<0.001$), use of dental aid ($p<0.001$), type of dental aid ($p<0.001$), dental visits ($p<0.001$), and maintenance dental visits ($p<0.001$) differed significantly among the study subjects.

Table 3. Tongue cleaning, dental visits, and use of inter-dental aids in study subjects

Variables		Dental Students	Medical Students	Dentists	Physicians	p
Tongue cleaning	Yes	76.6%	62.4%	73.6%	55.7%	<0.001
	No	23.4%	37.6%	26.4%	44.3%	
Use of interdental aid	Yes	82.5%	46.5%	90.6%	59.4%	<0.001
	No	17.5%	53.5%	9.4%	40.6%	
Type of interdental aid	Normal Floss	73.3%	37.2%	79.8%	37.1%	<0.001
	Floss and Water floss	6.9%	5.3%	8.1%	1.1%	
	Interdental brush	0%	2.1%	1.6%	2.2%	
	Interdental brush and water floss	1.5%	1.1%	2.4%	9%	
	Toothpick	3.1%	6.4%	0.4%	16.9%	
	Not Applicable	15.3%	47.9%	7.7%	33.7%	
Dental visits annually	Once	43.5%	39.6%	38%	33%	0.004
	Twice	21.4%	13.9%	27.5%	22.6%	
	Three times	7.8%	5.9%	5.8%	8.5%	
	More than three times	13.6%	5.9%	6.9%	8.5%	
	Did not visit	13.6%	34.7%	21.7%	27.4%	
Maintenance dental visits	Once a year	38.3%	27.7%	26.8%	38.8%	<0.001
	Twice a year	27.3%	8.9%	27.5%	13.2%	
	More than twice	3.9%	3%	4%	0.9%	
	When needed	19.5%	43.6%	33.7%	38.7%	
	Never	11%	16.8%	8%	10.4%	

The healthy gingival perception among study participants ranged between 66% to 79.7% for physicians and dentists. Similarly, non-injurious teeth mobility, gingival sensitivity, and self-perception of halitosis were absent in most of the dental students and dentists than medical students and physicians. A large number of dentists than others were brushing their teeth to prevent gingival disease. Lastly, most dentists, physicians, and dental students rated their knowledge about periodontal disease and its association with systemic disease as average. In contrast, medical students rated it as limited. Self-perception of gingival health ($p<0.001$), non-injurious teeth mobility ($p<0.001$), gingival sensitivity ($p<0.001$), gingival pain ($p<0.001$), self-perception of halitosis ($p<0.001$), brushing to prevent gingival disease ($p<0.001$), gingival bleeding concerning gingival problems ($p<0.001$), and knowledge of periodontal disease and systemic conditions ($p<0.001$) differed significantly among dental students, medical students, dentists, and physicians **(Table 4)**.

Table 4. Periodontal diseases perception among different study participants

Variables		Dental Students	Medical Students	Dentists	Physicians	p
Self-Perception of Gingival Health	Healthy gingiva	69.5%	76.2%	79.7%	66%	<0.001
	Redness	21.4%	8.9%	14.1%	12.3%	
	Bleeding	7.8%	8.9%	5.1%	9.4%	
	Exposed roots	1.3%	5.9%	1.1%	12.3%	

Non-Injurious Teeth Mobility	Yes	3.2%	7.9%	2.2%	10.4%	<0.001
	No	92.9%	82.2%	96.7%	81.1%	
	I don't know	3.9%	9.9%	1.1%	8.5%	
Gingival sensitivity	Yes	8.4%	17.8%	16.3%	21.7%	<0.001
	No	89%	64.4%	83.6%	63.2%	
	I don't know	2.6%	17.8%	1.1%	15.1%	
Gingival Pain	Yes	7.8%	11.9%	2.9%	13.2%	<0.001
	No	89.6%	81.2%	95.3%	77.4%	
	I don't know	2.6%	6.9%	1.8%	9.4%	
Self-Perception of Halitosis	Yes	17.5%	35.6%	11.6%	18.9%	<0.001
	No	75.3%	50.5%	79%	64.2%	
	I don't know	7.1%	15.9%	9.4%	17%	
Brushing to Prevent Gingival Disease	Yes	24.7%	27.7%	33.3%	24.5%	<0.001
	No	70.1%	35.6%	65.2%	34.9%	
	I don't know	5.2%	36.6%	1.4%	40.6%	
Gingival Bleeding Related to Gingival Problems	Yes	86.4%	69.3%	92%	71.7%	<0.001
	No	11%	9.9%	8%	12.3%	
	I don't know	2.6%	20.8%	0%	16%	
Knowledge of Periodontal Disease and Systemic Conditions	None	2.6%	8.9%	1.1%	3.8%	<0.001
	Limited	14.3%	58.4%	5.1%	34.9%	
	Average	49.4%	27.7%	48.2%	45.3%	
	Excellent	33.8%	5%	45.7%	16%	

When it comes to self-perception of oral health, it is crucial to assess the knowledge as it is considered an essential prerequisite for health-related behavior [2]. Our present study included dental students, medical students, dentists, and physicians to examine the self-perception of oral hygiene and periodontal health. Overall, the results revealed that oral hygiene is mandatory for the body's overall health and is correlated with systemic diseases. This finding is in line with the previously reported study by Baseer *et al*. among health professionals in Saudi Arabia [16]. Saito *et al*. found that the most commonly used cleaning aid is the toothbrush and toothpaste [17], brushing twice daily, per the previous studies [18, 19]. In contrast, Saito *et al*. found that most participants brush once daily [17].

Furthermore, most participants brushed their teeth for 1-2 minutes, with the majority being dental students. This study finding is consistent with a previously reported investigation from Saudi Arabia [17]. On the contrary, Andhare *et al*. and Baseer *et al*. reported tooth brushing duration to range from 3-5min among health professionals [2, 16]. In this study, most participants changed their toothbrushes once every three months. This finding is compliant with the study reported by Andhare *et al*. among medical and dental undergraduates [2]. In this study, most participants used circular strokes with soft bristle toothbrushes. It was recommended to use bass or modified-bass technique using a soft bristle toothbrush [19, 20].

Moreover, when it comes to the tongue, more participants reported cleaning their tongue in this study. While Marchini *et al*. reported that 68.3% of participants did not clean their tongues [21]. When it comes to interdental cleaning aid, the use of regular floss was the most reported method, with more awareness found among dentists. Meanwhile, other participants lacked knowledge about interdental aid, similar to the previous studies supporting our findings [2, 22, 23]. Moreover, Saito *et al*. observed that most participants did not use dental floss in their study [17].

Regarding dental visits, most participants visit the dentist once a year, with dental students and physicians being the most common group. Surprisingly, Saito *et al*. found that 87% of dentists visit the dental office whenever there is a need [17]. While 32.7% only visit the dentist for oral hygiene when needed.

Our study finding suggests that the participants are far more knowledgeable than previous reports regarding self-perception of gingival health [16, 24]. Most reported no non-injurious teeth mobility, similar to Buhlin *et al*.'s study [25]. Severe periodontitis and smoking more than ten cigarettes per day emerged as significant predictors of self-perceived tooth mobility [24]. However, in this study, most participants felt no sensitivity or pain in the gingiva. It has been noted that people tend to misjudge the physical and pathological changes of periodontitis before pain, discomfort, and functional disability are set in [26]. During routine oral hygiene, the toothbrush, to some degree, can cause lacerations to the gingival tissue, with the possibility of causing gingival recession [27], and it often leads to root sensitivity that happens to almost half of the patients after scaling and root planning [27, 28].

Meanwhile, when asked about halitosis, 35.6%. Medical students reported having it compared to other groups.

Regarding smoking, the majority were nonsmokers, whereas Romano *et al*. found a correlation between heavy smoking and malodor, with smoking being defined as an irrelevant factor for oral halitosis [24].

Additionally, most participants agree that gingival bleeding is a sign of a gingival problem, supported by Romanos *et al*. [24]. Furthermore, the participants thought that brushing alone does not prevent gingival diseases. In a study done by Hayasaki *et al*. [19], a corroborating finding concluded that more than 40% of plaque would not be removed no matter how experienced the person is. Improvement in the quality of daily brushing is indispensable to prevent periodontal disease. Moreover, toothbrushing, interdental aid, and mouthwash can help improve oral health status.

Lastly, when associating periodontal diseases with systemic conditions, the majority rated their knowledge as average similar to what was reported in Baseer *et al*.'s study [16]. However, in our study, medical students rated their knowledge as limited, which is in line with Andhare *et al*. among medical and dental undergraduate students [2].

Conclusion

Dentists and dental students had a better oral hygiene regimen, especially in interdental cleaning and frequency of brushing. Interdental cleaning was not perceived as necessary as toothbrushing among physicians, and medical students since most believed brushing alone could prevent gingival diseases. The self-perception of minor gingival problems was higher in dentists and dental students, while more severe gingival problems were commonly self-perceived by physicians and medical students. Knowledge of the relationship between oral health and systemic conditions among the various study participant was considerably good, with only the medical students reporting having limited knowledge.

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