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Original Article

Self-Reported Oral Hygiene and Gum Health among Dental and Medical Students, Dentists, and Physicians in Saudi Arabia

Rakan Saifuddin Shaheen[1], Abdulrahman Dahham Alsaffan[2]*, Raghad Saad Al-Dusari[3], Rahaf Nezar Helmi[3], Mohammad Abdul Baseer[4]

[1]Periodontics Division, Department of Preventive Dentistry, Riyadh Elm University, Riyadh, Saudi Arabia.
[2]Community Dentistry Division, Department of Preventive Dentistry, Riyadh Elm University, Riyadh, Saudi Arabia.
[3]Department of Intern, Riyadh Elm University, Riyadh, Saudi Arabia.
[4]Department of Preventive Dentistry, College of Dentistry, Riyadh Elm University, Riyadh, Saudi Arabia.

ABSTRACT

Healthcare professionals, including dental and medical students, as well as dentists and physicians, play an important role in promoting oral health in the community. Therefore, it is crucial to understand their awareness of periodontal health and their oral hygiene practices. This study sought to assess their knowledge of oral health and hygiene behaviors regarding gum health. A cross-sectional survey was conducted to investigate the self-reported oral hygiene practices and perceived periodontal health among dental students, dentists, medical students, and physicians in Ksa. An online questionnaire was distributed through social media platforms, which included five demographic-related items and 19 questions about oral hygiene and periodontal health. The chi-square tests were used to analyze the relationship between categorical variables. The study sample consisted of 637 individuals, with 154 dental students, 101 medical students, 276 dentists, and 106 physicians. Significant differences ($P < 0.05$) were observed among the groups regarding tooth brushing habits such as brushing frequency, method, duration, brush type, and strokes. In addition, differences were found in practices such as tongue cleaning, the use of inter-dental aids, and dental visits. The perception of periodontal diseases also showed significant differences between groups ($P < 0.05$). Dental students and dentists demonstrated superior oral hygiene practices, particularly in terms of brushing frequency and interdental cleaning. In contrast, medical students and physicians generally considered brushing to be sufficient to prevent gum problems, and many did not consider interdental cleaning to be necessary. Medical students and Physicians also had a heightened perception of severe gum problems.

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

Introduction

Periodontal diseases are among the most prevalent oral health conditions, affecting not just the teeth and supporting tissues but also an individual's general well-being, social interactions, and overall productivity and comfort [1, 2]. The incidence of periodontal disease in developing countries ranges from 20-50% [3]. In Ksa, a national survey found that gingivitis was present in all participants, with a 100% prevalence rate [4]. Among high school students, 65.1% exhibited gingivitis, while 8.6% had periodontitis [5, 6]. Moreover, elderly individuals with periodontitis face a 19-44% higher risk of cardiovascular disease, and those with severe periodontitis have a 3.2 times greater mortality risk if they suffer from type 2 diabetes [3].

When it comes to the self-perception of oral health in adults, surveys revealed that 42.7% of individuals were concerned about the appearance of their teeth, 30.1% had general concerns about dental issues, 27.5% experienced teeth sensitivity, and none of the respondents viewed periodontal health as a significant concern or a factor

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Corresponding author: Abdulrahman Dahham Alsaffan
E-mail ✉abdulrahman.alsaffan@gmail.com
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affecting their quality of life [7]. Conversely, the elderly population generally reported satisfaction with their oral health, despite lacking proper dental care [8, 9].

Studies evaluating the public's self-assessment of their periodontal health have shown that individuals with a healthy periodontium tend to evaluate their condition accurately, while those with gingival diseases often do so incorrectly [10, 11]. In comparison, dental students were found to have a better ability to identify periodontal issues than their medical peers [2]. When a clinical evaluation was performed after the self-assessment of the general public, it was found that half of the patients had misjudged their periodontal health [1].

Regarding the self-perception of pain, patients' reports were consistent with the clinical findings. However, nearly 50% of individuals who believed they had oral malodor were found to be free of it upon clinical examination [12]. When examining the self-perception of bad breath in medical and dental students, it was evident that they did not have information about their oral malodor, which differed from the clinical assessment [2].

Additionally, it was discovered that the self-assessment of dental cavities was often inaccurate when compared to the clinical evaluation, with many patients either missing or misinterpreting the presence of cavities [13, 14]. In terms of mouthwash usage, surveys indicated that older individuals and females were more likely to use mouthwash regularly [15]. Both medical and dental students reported using toothbrushes and toothpaste as their primary oral hygiene method. However, dental students indicated a higher frequency of brushing two times a day, performing interdental cleaning, and replacing their toothbrushes every 3 months compared to medical students. Therefore, the current study aimed to assess oral hygiene practices and periodontal health awareness among dental students, dentists, medical students, and physicians. The study seeks to answer the key question, "Are there differences in the oral hygiene practices and self-perception of periodontal health among dental students, dentists, medical students, and physicians?"

Materials and Methods

Study sample

The participants in the study included medical and dental students, as well as physicians and practicing dentists.

Sample size calculation

The required sample size was initially calculated to be 377 participants, based on a 5% margin of error, a 95% confidence level, and an assumed population of 20,000, with a 50% response rate. To enhance the study's power, the final sample size was increased to 637 participants. Convenience sampling was used to select the participants, which included medical and dental students, along with physicians and dentists who were active on professional social media platforms in Saudi Arabia.

Study instrument

In this study, a structured, self-administered, closed-ended questionnaire was used, consisting of five sociodemographic variables and 20 questions focused on periodontal health and self-perceived oral hygiene. The main questions explored participants' views on their oral hygiene and general health, including the materials, frequency, methods, and timing of teeth cleaning. Additional questions assessed the frequency of tooth brushing, toothbrush replacement, use of interdental cleaning aids, dental visits, and reasons for those visits. Participants were also asked about their perceptions of oral malodor, gum disease, tooth loss caused by periodontal disease, and the connection between periodontal health and systemic conditions.

Validity and reliability of the study instrument

The questionnaire's face validity was confirmed by consulting experts in periodontology and dental public health, and their feedback was incorporated into the final version of the tool. A pilot study was carried out involving twenty dental and medical students, as well as professionals. The questionnaire's reliability was assessed using Cronbach's alpha (0.85), which was deemed satisfactory for proceeding with the main study.

Questionnaire administration

The English-language questionnaire was created in Google Forms, and a link to it was shared with dental and medical students, physicians, and dentists across Saudi Arabia via different professional social media platforms.

All questions in the questionnaire were required, and participants were able to complete it in approximately 5 minutes.

Statistical analysis

The responses collected via Google Forms were downloaded and assigned codes. The complete dataset was then transferred to a statistical software program for analysis. SPSS version 25 was used for data analysis. Frequency distributions and percentages were computed for categorical variables. The Chi-square test was employed to examine the relationship between sociodemographic factors and self-assessment of periodontal health. A significance level of $P < 0.05$ was applied for all statistical tests.

Results and Discussion

In this study, a total of 637 participants were involved, consisting of 154 dental students (24.2%), 101 medical students (15.9%), 276 dentists (43.3%), and 106 physicians (16.6%). Among the participants, 376 (59%) were female, and 261 (41%) were male, with ages ranging from 19-69 years. The majority of the students were from the central region, accounting for 447 participants (70.2%). Additionally, 66 participants (10.4%) reported smoking cigarettes or Hookah occasionally **(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 cigarettes/Hookah [shisha]?	Yes, frequently [10 or more cigarettes daily/Hookah once daily]	65	10.2
	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

A large majority (95.8%) of participants believed that maintaining good oral hygiene is essential for overall health. Regarding their dental care routine, 57.3% of participants reported brushing their teeth two times a day (morning and evening), while 17.7% brushed once daily before sleep, 12.6% brushed more than twice a day, 7.7% brushed once a day before or after breakfast, 4.2% brushed infrequently, and 0.5% did not brush at all. Most participants (55.3%) brushed their teeth for one to two minutes. Additionally, around 50.4% replaced their toothbrush every three months. Circular strokes were the most common brushing motion, used by 49.5% of participants ($P < 0.05$). A soft-bristled toothbrush was preferred by 47.3% of participants. While no significant differences were found across groups ($P = 0.260$), there were significant variations in the method of cleaning teeth ($P = 0.002$), brushing frequency ($P < 0.001$), brushing duration ($P < 0.001$), frequency of changing toothbrush ($P < 0.001$), brushing strokes ($P < 0.001$), and type of toothbrush ($P = 0.002$) as detailed in **Table 2**.

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

Variables		Dental students	Medical students	Dentists	Physicians	P-value
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 and 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 and 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%	

A comparison of responses regarding tongue cleaning and the use of interdental aids across dental students, dentists, medical students, and physicians is shown in **Table 3**. Significant differences were observed among the study participants in terms of tongue cleaning ($P < 0.001$), use of dental aids ($P < 0.001$), type of dental aid used ($P < 0.001$), frequency of dental visits ($P < 0.001$), and maintenance of dental visits ($P < 0.001$).

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

Variables		**Dental students**	**Medical students**	**Dentists**	**Physicians**	**P-value**
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 perception of healthy gingiva among the study participants ranged from 66 to 79.7% for physicians and dentists. Additionally, non-injurious gingival sensitivity, teeth mobility, and self-reported halitosis were more frequently absent among dentists and dental students than among physicians and medical students. A higher proportion of dentists compared to other groups reported brushing their teeth to prevent gingival diseases. Furthermore, most dental students, physicians, and dentists rated their understanding of periodontal disease and its connection to systemic conditions as average, while medical students assessed their knowledge as limited. Significant differences were found among physicians, dentists, dental students, and medical students, regarding 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 related to gingival problems ($P < 0.001$), and information about periodontal disease and its systemic implications ($P < 0.001$) **(Table 4)**.

Table 4. Periodontal disease perception among different study participants

Variables		Dental students	Medical students	Dentists	Physicians	P-value
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%	

Assessing the knowledge of oral health is essential when evaluating self-perception, as it plays a critical role in health-related behaviors [2]. The current study aimed to explore the self-perception of periodontal health and oral hygiene among dental students, physicians, medical students, and dentists. The results emphasized the importance of oral hygiene for overall health and its connection to systemic diseases, a finding consistent with research by Baseer *et al*. [16] among health professionals in Saudi Arabia. According to Sahito *et al*. [17], toothbrushes and toothpaste were the most frequently used cleaning aids, and brushing twice a day, as observed in previous research [18, 19], was common. In contrast, Sahito *et al*. [17] understood that most participants brushed only once daily. Additionally, the majority of participants brushed their teeth for one to two minutes, with dental students being the most consistent in this practice. This aligns with findings from a Saudi Arabian study [17]. However, Andhare *et al*. [2] and Baseer *et al*. [16] stated that health professionals tend to brush for 3-5 minutes. In this research, most participants reported changing their toothbrushes every three months, which aligns with findings from Andhare

et al. [2] among dental and medical undergraduates. Furthermore, participants mostly used circular brushing motions with soft-bristled toothbrushes. It is recommended to employ the bass or modified-bass technique with soft bristle brushes for optimal oral care [19, 20].

In addition, more participants in this study reported cleaning their tongues compared to previous research. For instance, Marchini *et al*. found that 68.3% of participants didn't engage in tongue cleaning [21]. Regarding the use of interdental cleaning aids, regular floss was the most commonly reported method, with dentists showing a higher level of awareness. Other participants, however, showed limited knowledge about interdental aids, a finding consistent with prior studies that support this observation [2, 18, 22]. Similarly, Sahito *et al*. [17] found that the majority of participants didn't use dental floss.

When it comes to dental visits, the majority of participants reported visiting the dentist annually, with physicians and dental students being the most frequent attendees. In contrast, Sahito *et al*. [17] found that 87% of dentists only visit the dental office when necessary, with 32.7% visiting for oral hygiene only when needed.

The findings of our study indicate that participants have a significantly higher level of knowledge regarding self-perception of gingival health than what has been reported in previous studies [1, 16]. Most participants reported no experience of non-injurious tooth mobility, which aligns with Buhlin *et al*. findings [23]. It was identified that severe periodontitis and smoking over ten cigarettes a day are significant predictors of self-reported tooth mobility [1]. However, in our study, the majority of participants did not report experiencing pain or sensitivity in their gums. It has been observed that individuals often misjudge the pathological and physical changes associated with periodontitis until they experience pain, discomfort, or functional impairments [24]. Regular tooth brushing can sometimes cause minor injuries to the gingival tissue, potentially leading to gingival recession [25], and may result in root sensitivity for nearly half of patients following scaling and root planing procedures [25, 26].

In terms of halitosis, 35.6% of medical students reported experiencing it, a higher percentage compared to the other groups. Regarding smoking habits, the majority of participants identified as non-smokers. This contrasts with Romano *et al*. findings, which noted a connection between bad breath and heavy smoking, but considered smoking to be an irrelevant factor for oral malodor [1].

The majority of participants in this study agreed that gingival bleeding indicates a gingival issue, a view supported by Romano *et al*. [1]. Additionally, many participants believed that brushing alone is insufficient to prevent gingival diseases. Hayasaki *et al*. [19] found similar results, stating that over 40% of plaque remains despite even the most skilled brushing. To prevent periodontal disease, improving the quality of daily brushing is essential. Furthermore, incorporating interdental aids and mouthwash into oral hygiene routines can significantly enhance oral health.

Regarding the link between periodontal diseases and systemic health, most participants rated their information as average, consistent with the findings of Baseer *et al*. [16]. However, medical students in our study reported their understanding as limited, aligning with Andhare *et al*. findings among dental and medical undergraduates [2].

Conclusion

Dental professionals, including dental students and dentists, demonstrated a more thorough oral hygiene routine, particularly when it came to interdental cleaning and brushing frequency. In contrast, medical students and physicians did not view interdental cleaning as essential, with many believing that tooth brushing alone was sufficient to prevent gingival diseases. Self-reported minor gingival issues were more prevalent among dental students and dentists, while medical students and physicians more commonly recognized more severe gingival concerns. Overall, knowledge about the connection between systemic conditions and oral health was relatively high among the participants, except medical students, who reported limited awareness.

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Conflict of Interest: None

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