

Comparison of Oral Hygiene Levels and Behaviors Between First and Final Year Dental Students in Jordan

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Abstract

Background: Achieving and maintaining good oral hygiene is essential for gingival health. However, oral hygiene attitudes and behaviors may vary according to knowledge, beliefs, and education.

Objective: To compare and quantify discrepancies in oral health attitudes and self-care levels between first and final year dental students.

Methodology: Two hundred and seventy seven dental students at the University of Jordan were recruited in this study. The sample involved 162 first year and 115 final year students with age ranges of 18-19 and 21-22 years, respectively. Subjects were asked to fill a structured questionnaire about their oral hygiene habits. Clinical examinations were performed at the Periodontal Department of Jordan University Hospital. Oral hygiene levels were clinically assessed by the plaque index (PI) and gingival index (GI).

Results: Analysis showed that final year students brushed their teeth, flossed, and maintained regular dental visits. They also brushed their teeth twice more frequently and changed the brush more often per year. However, both first and final year students used mouthwash almost equally. Final year students also have less bacterial plaque and suffered less gingival inflammation in prevalence and severity.

Conclusion: It was concluded that final year dental students have a significantly better gingival status than first year students.

Keywords: oral hygiene habits, gingival health, dental students.

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Introduction

Several studies have confirmed that the prevalence and severity of gingival and periodontal conditions are correlated with the level of plaque control. This prevalence also differs according to race, gender, and social class.¹⁻⁵

The maintenance of gingival health was found to be highly essential for preventing gingivitis and its progression into periodontitis.^{6,7} Since gingivitis and periodontitis are a consequence of the imbalance between poor dental hygiene, bacterial plaque accumulation and weak periodontal defense, anything that interferes with a patient's ability to reduce plaque may increase the risk of periodontal progression.⁸⁻¹¹

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Regarding oral hygiene, it is worth noting that the implementation of efficient oral hygiene is somehow tedious, requiring more time and is difficult to apply for some people who suffer stress, fatigue, and no motivation.¹² Therefore, to improve oral hygiene practices, individuals need to be given meticulous instructions of dental care by professionals. Those who apply these instructions carefully should positively change their oral hygiene behavior and improve their method of oral health maintenance, as well.¹³⁻¹⁵

Since oral hygiene habits and attitudes differ largely between people, gingival health may also vary among them. Therefore, the aim of the present study was to compare and quantify differences in oral hygiene behaviors and gingival health between 2 groups of dental students based on their experience in the field.

Materials and Methods

Two hundred and eighty five dental students were examined at the Periodontal Department of Jordan University Hospital by a consultant periodontist. Those who had received previous periodontal treatment within the last 3 months were eliminated. The remaining two hundred and seventy seven students were included in this study (162 first year and 115 final year dental students). Students' ages were 18-19 for the first year and 21-22 for the final year.

Clinical oral examinations were performed using mirrors and WHO periodontal probes. The following indices were also measured: Plaque index (PI) of Silness and Løe¹⁶ and Gingival index (GI) of Løe and Silness.¹⁷

Candidates were then asked to fill out a structured questionnaire about their oral hygiene habits. The questionnaire involved information about: daily tooth brushing, frequency of brushing, frequency of changing the brush, flossing, using mouthwash, and maintaining regular dental visits.

All dichotomous variables were answered by (yes/no), frequency of brushing by (0 = none, 1 =

once daily, 2 = twice daily), and frequency of changing the brush by (0 = unlimited period, 1 = every three months, 2 = every six months, 3 = every year).

Intra-observer reliability was verified by 25 subjects who were randomly chosen for re-examination on two subsequent days.

Statistics

SAS software package, version 9 for Windows (SAS Institute Inc., NC, USA) was used.

Statistical data analysis included chi-square test of association to assess the association between categorized variables between the two groups. Two-way analysis of variance (ANOVA) was used to assess the gender effect between the 2 groups. Cronbach's alpha was calculated to examine intra-observer variability to measure the consistency or agreement of values. The exact agreement was used to measure reliability of periodontal parameters. The significance level was set at $P \leq 0.05$.

Results

Two hundred and seventy seven students were recruited in this descriptive statistical analysis of the collected data. Sample subjects contained: 55.6% were females, 84.8% reported brushing their teeth, 8.7% used dental floss, 20.2% used mouthwash, and 14.4% maintained regular dental visits.

The clinical examination revealed that of the total students: 8.7% had healthy gingiva, 37.2% suffered mild gingivitis, 44.0% had moderate gingivitis and 10.1% had severe gingival disease. In addition, plaque accumulation for total students was: $\leq 1 = 36.8\%$, $> 1-2 = 38.3\%$ and $> 2-3 = 24.9\%$, respectively.

The chi-square analysis revealed significant associations for brushing teeth, flossing, maintaining regular dental visits, the frequency of brushing and the frequency of changing the brush between the two groups (table 1).

Table (1): Oral hygiene behaviors between first and final year dental students.

		First (n = 162) n (%)	Final (n = 115) n (%)	P - value
Brushing teeth	Yes	129 (79.6)	106 (92.2)	0.0041
	No	33 (20.4)	9 (7.8)	
Flossing	Yes	6 (3.7)	18 (15.7)	0.0005
	No	156 (96.3)	97 (84.4)	
Using mouth wash	Yes	33 (20.4)	23 (20.0)	0.9397
	No	129 (79.6)	92 (80.0)	
Regular dental visits	Yes	13 (8.0)	27 (23.5)	0.0003
	No	149 (92.0)	88 (76.5)	
Frequency of brushing	0	33 (20.4)	9 (7.8)	< 0.0001
	1	115 (71.0)	46 (40.0)	
	2	14 (8.6)	60 (52.2)	
	3	0	0	
Frequency of changing the brush	0	73 (45.1)	17 (14.8)	< 0.0001
	1	10 (6.2)	36 (31.3)	
	2	13 (8.0)	50 (43.5)	
	3	66 (40.7)	12 (10.4)	

N: number of subjects

Comparisons in table (1) showed that final year students brushed their teeth, flossed, and maintained regular dental visits more than first year students. They brushed their teeth twice more frequently and changed the brush more often per year than first year students, who tended to brush only once or did not even brush at all. Final and first year students used mouthwash almost equally.

The chi-square analysis also revealed a significant higher plaque accumulation and gingival inflammation among the first year group in comparison with final year as seen in table (2).

Table 3 revealed a significant difference between first and final year according to gender. Males and females differed significantly regarding the plaque index, gingival index and frequency of brushing.

Table (2): Clinical variables between first and final year dental students.

		First (n = 162) n (%)	Final (n = 115) n (%)	P - value
Plaque Index	≤ 1	35 (21.6)	72 (62.6)	< 0.0001
	> 1-2	61 (37.7)	32 (27.8)	
	> 2-3	66 (40.7)	11 (9.6)	
Gingival Index	0	3 (1.9)	21 (18.3)	< 0.0001
	1	21 (13.0)	72 (62.6)	
	2	92 (56.8)	14 (12.2)	
	3	46 (28.4)	8 (7.0)	

N: number of subjects

Table (3): Periodontal parameters according to gender among first and final year dental students.

Variables		First (n = 162)	Final (n = 115)	P - value
		Mean ± SD	Mean ± SD	
PI	Male	1.84 ± 0.57	1.49 ± 0.67	< 0.0001
	Female	1.77 ± 0.61	1.36 ± 0.67	
GI	Male	1.90 ± 0.89	1.20 ± 0.88	< 0.0001
	Female	1.79 ± 0.82	1.01 ± 0.68	
Frequency of brushing	Male	0.79 ± 0.40	1.20 ± 0.72	< 0.0001
	Female	1.07 ± 0.52	1.57 ± 0.54	

N: number of subjects

SD: standard deviation

Intra-examiner Reliability

Of the total number of duplicate measurements, the exact agreement was 94% for PI and 90% for GI.

Discussion

Results of the present study have demonstrated a difference in gingival status between the two groups in favour of final year dental students who showed better oral hygiene levels. These findings agreed well with the results of similar and related studies that reported differences in oral hygiene levels between different groups of university students.¹⁸⁻²¹ In this regard, several studies have highlighted the variation of dental hygiene attitudes among different groups of future healthcare professionals. These groups included first and final year dental students, dental hygienists, engineering students, nursing students, non-medical, para-medical and medical students.^{18-21,23-27} However, among these groups, the comparison between first and final year students was chosen in this study, as it may reflect the effect of professional knowledge and education on the self-care level attitudes of the future dentists.

Differences in Dental Practices

Brushing Teeth

Regarding the differences in dental practices, it was observed that almost all final year students were brushing their teeth with an average of two times/day, while most of first year students brushed with an average of once daily. This might be explained by the positive attitude of final year dental students who used more thorough brushing techniques with a higher frequency and quality than first year students leading to better oral health.²² This came in agreement with several previous studies that reported that final and clinical year dental students who brushed their teeth twice a day was higher than first and pre-clinical students.²⁰⁻²³

Flossing

As for flossing, results have surprisingly shown that the majority of final dental students (84 %) were not using dental floss at all, yet the rest flossed more often than first year students. This is similar to the findings of a previous study which reported that 5th year dental students flossed more than 1st year dental students.²¹ Likewise, Rong et al. have reported that 5th year dental students flossed more than 1st year dental students and more than medical students.²⁰ Our findings also agreed with those who compared dental hygiene students with nursing students and found significant differences in flossing behavior in favor to dental hygienists.¹⁹ However, this is not in agreement with Barrieshi-Nusair et al. who found similar use of floss between clinical and pre-clinical students.²³

Mouthwash

As for the use of mouthwash (MW), it was found that both groups used it almost equally in favour to first year students who might have been using mouthwash as a substitute for brushing and flossing. Our results agreed with other results of Sharda et al. who found almost equal use of MW.²¹

Dental Visits

Considering regular dental visits, results have further shown that the majority of final year students did not visit the dentist regularly. This might be attributed in part to the fact that they started to be involved in the clinical training courses; however, they did so more than first year students who visited the dentist only upon having a toothache. This finding agreed with several previous reports.^{19-21,24-25,27} However, it was in contrast with Sharda et al. who found that 67% of students visited the dentist for routine check-ups.²⁶

Frequency of Brushing and Changing the Brush

Regarding the frequency of brushing and changing the brush, results also showed that final year students reported brushing more frequently and changed the brush more often than first year students. This was in agreement with Sharda et al.^{21,26}

According to the results of this study, self-reported oral hygiene measures demonstrated, generally, a significant difference in favour of the final year dental students regarding frequency of brushing and changing the brush, flossing, and maintaining regular dental visits. However, this was not the case for using mouthwash. Taking into consideration that using mouthwash is considered as an adjunct measure, the relatively lower percentage reported for final year dental students who were using mouthwash may reflect the effect of their professional education that directed their attention towards the effective mechanical plaque control represented in brushing and flossing.

Gingival Index (GI) and Plaque Index (PI)

Concerning the non-dichotomous variables GI and PI, oral hygiene habits differed between the two groups and showed differences in the gingival status. This might confirm the positive effect of controlled oral hygiene procedures undertaken by final year dental students for bacterial plaque removal and its effect on gingival health, as these students reduced the overall plaque and had a higher prevalence of healthy gingiva and mild gingival inflammation while first year students tend to have a higher plaque accumulation and more moderate and severe gingival inflammation. These results come in agreement with Khocht et al.²⁸

A high GI and PI are a consequence of low tooth brushing frequency and a low level of oral hygiene. There were variations in the gingival condition and severity of gingival inflammatory response to plaque among first year students since they had an increased quantity of overall

plaque and a higher prevalence of severe gingival inflammation in prevalence and severity.¹⁸ This was reached even when an effective self-performed mechanical plaque control was achieved but could have been of poor efficacy.

Interestingly, 7.8% of the final year students until now still do not brush their teeth at all, and 84.4% do not floss. This might explain the moderate and severe gingival inflammation observed among the final year students who although have the knowledge, do not yet behave accordingly, which is in agreement with the results of Sharda et al. who found that knowledge was not enough to influence oral health behaviour.^{21,26} Since it is an important content in their professional education, they need this knowledge to educate patients and the community when they start working in the healthcare system. Being a healthcare professional, their attitude not only affects their own oral health behavior but also potentially influences the health behavior of their patients and community.

Gender Differences

Regarding gender differences, the results of this study showed that female students were more aware and concerned about dental health issues and paid more attention to oral hygiene than male students for both first and final years. This was reflected by their higher frequency of brushing, lower PI and lower GI. These results are in agreement with many other researchers.^{21,25-26,29-30} This difference in favor to female students could be due to the fact that females, in general, and Jordanian females, in particular, considered oral health as a form of cosmetic beauty and cleanliness, which tended to be a running factor in their personality. However, results further showed that final year dental male students had a higher quality of oral hygiene than first year female students. This further confirmed the positive role of professional dental education in dental health.

Finally, it can be recommended that efforts should be made to educate school and university students about oral health care through well-organized oral hygiene educational campaigns. In particular, special efforts should be directed towards dental students as positive oral health attitudes amongst future dentists are crucial for the surrounding community's oral health promotion.

Within the limitations of this study, it can be concluded that final year dental students had significantly better gingival status than first year students. This was because the quality of self-performed mechanical plaque removal was not sufficiently effective and should be improved by professional oral hygiene instructions for a dramatically positive effect on the reduction of gingival disease not only for themselves but for their future patients and community as well.

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مقارنة السلوكيات المتبعة للعناية بالصحة الفموية من قبل طلبة السنتين الأولى والنهائية في تخصص طب الأسنان

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الملخص

خلفية الدراسة: إن الحفاظ على مستوى جيد من الصحة الفموية أمر هام وضروري لصحة وسلامة اللثة. كما إن السلوكيات المتبعة للحفاظ على الصحة الفموية متباينة وتختلف حسب المعرفة، المعتقدات ومستوى التعليم.

هدف الدراسة: تهدف الدراسة إلى مقارنة السلوكيات المتبعة للحفاظ على الصحة الفموية عند طلبة السنتين الأولى والنهائية لطب الأسنان. طريقة الدراسة: اعتمدت الدراسة على عينة عشوائية من طلبة السنتين الأولى والنهائية لطب الأسنان في الجامعة الأردنية، حيث اشتملت العينة على 162 من طلبة السنة الأولى ممن تتراوح أعمارهم بين 18-19 سنة وعلى 115 من طلبة السنة النهائية ممن تتراوح أعمارهم بين 21-22 سنة. وقد قام كل منهم بتعبئة استمارة عن سلوكياتهم للحفاظ على الصحة الفموية. كما تم إجراء فحص سريري لكل منهم في قسم الأنسجة الداعمة للأسنان بمستشفى الجامعة الأردنية، حيث تم تحديد مستوى الصحة الفموية سريريا باستخدام مؤشر اللويحة الجرثومية (PI) ومؤشر صحة اللثة (GI).

نتائج الدراسة: أظهر تحليل بيانات العينة أن طلبة السنة النهائية لطب الأسنان يستعملون فرشاة الأسنان والخيط السني الطبي ويدومون على الزيارة الدورية لطبيب الأسنان، ويفرشون أسنانهم بمعدل مرتين يومياً أكثر من طلبة السنة الأولى، كما أنهم يبدلون فرشاة أسنانهم أكثر من مرة في السنة، إلا أن التحليل أظهر أن كلا من طلبة السنة الأولى والنهائية يستعملون غسول الفم بدرجة متساوية. كما أظهر التحليل أن معدل اللويحة الجرثومية حول الأسنان لدى طلبة السنة النهائية أقل منه عند طلبة السنة الأولى، وأن مستوى التهاب اللثة لديهم أقل انتشاراً وأقل حدة من طلبة السنة الأولى.

النتيجة: إن مستوى الصحة اللثوية لدى طلبة السنة النهائية لطب الأسنان أفضل منه عند طلبة السنة الأولى، وأن الطرق والسلوكيات المتبعة لإزالة اللويحة الجرثومية من قبل طلبة السنة الأولى ليست فعالة وبمحااجة إلى تغيير من خلال برامج توعية وتنظيم من قبل المتخصصين.

الكلمات الدالة: السلوكيات المتبعة للحفاظ على الصحة الفموية، الصحة اللثوية، طلبة طب الأسنان.