

Study of the Prevalence of Dental Floss Use Among Dental Students at Al-Sham Private University

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¹A scientific Research at college students in Syria

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Abstract

Background: Dental floss is an important part of oral health care. However, its use among dental students remains unknown precisely.

Objectives: This study aims to assess the prevalence of dental floss use among dental students at Al-Sham Private University, and to identify the factors affecting this use.

Materials and methods: A cross-sectional study was conducted on a sample of 114 students during the period from January 2024 to July 2024 at Al-Sham Private University, and the random sampling method was used. Data were collected from students between May 2024 and June 2024. The sample size was selected after consulting statistical experts and physicians, headed by Dr. Ghina Najati. In this study, we based on a previous study conducted in 2022 at Jinnah Sindh Medical University, Sindh Institute of Oral Health Sciences, Karachi, Pakistan, in which the prevalence of dental floss use was approximately 34.35%.

Results: This study showed that among 114 participants, 61 male and female students used dental floss with a prevalence rate of 53.51%, and that there were no statistically significant differences between the participants' average performance on the Dental Floss Use scale attributed to the gender variable. This study also indicated that the use of dental floss according to the academic year variable was in favor of fifth-year students (30.36%), and that the use of dental floss according to the age variable was in favor of students aged over 25 years (36.50%).

Recommendations: This study provided important insights that will help in developing educational and awareness strategies to promote the use of dental floss among dental students, which will positively reflect on their future practice as dentists and on their patients' health. This study may contribute to improving medical education curricula to promote awareness of the importance of comprehensive oral and dental care.

Keywords: Dental floss, Prevalence, University, Students.

Introduction

Oral health is an essential part of overall health care and plays a crucial role in preventing various oral diseases such as tooth decay and gum disease.

Oral health is greatly influenced by the patient's daily habits, as good practices, such as regular tooth brushing and flossing, contribute to maintaining oral health [1].

Flossing is an effective preventive behavior that helps remove food residue and bacterial plaque between teeth and in areas that are difficult to reach with a traditional toothbrush [2].

In addition, flossing helps reduce gingivitis and the risk of chronic gum disease, which can lead – in advanced cases – to tooth loss [3].

Despite the obvious benefits of flossing, several studies indicated that its use rates among individuals vary greatly based on multiple factors such as health knowledge, preventive behaviors, and awareness of the importance of oral care, as research showed that many people do not floss regularly due to lack of awareness, lack of full understanding of its importance, or feeling uncomfortable when using it [4, 5]. In this context, dental students are an important group to be studied due to their advanced and specialized knowledge in the field of oral and dental health, as they are not only recipients of health care, but in the future, they will be providers of this care, making their preventive behaviors have a multiplier effect on the health of the community in general. Therefore, this study aimed to assess the prevalence of dental floss use among dental students at Al-Sham Private University, and to analyze the factors affecting this preventive behavior. By studying these factors, we hope to provide insights that will help in developing educational and awareness strategies to promote dental floss use among dental students, which will positively reflect on their future practices as dentists and on the health of their patients. This study may also contribute to improving medical education curricula to raise awareness about the importance of comprehensive oral and dental care.

Previous Studies

A previous study conducted in 2022 at Jinnah Sindh Medical University, Sindh Institute of Oral Health Sciences, Karachi, Pakistan found that the prevalence of dental floss use was approximately (34.35%) [6].

Importance of the Study

To the first author's knowledge, this study is the first of its kind at ASPU, and the importance of this study is represented in several main aspects:

- It provides a deep insight into the extent to which dental students floss – a group with advanced oral health knowledge – and understanding how will this group flosses can reveal the effectiveness of oral care education and training.
- This study contributes to identifying factors that may affect dental floss use among students, such as health awareness and daily practices. By understanding these factors, educational and awareness strategies within dentistry colleges can be improved to promote oral health behaviors. Furthermore, the results of this study can be useful in developing educational and training programs that target improving dental floss use and promoting good health habits. If universities can improve awareness and practice among their students, this will positively reflect on their practice as future dentists.
- This study provides valuable data that can help guide health policies and develop new strategies to improve oral care, contributing to the reinforcement of public health and the prevention of oral diseases.

Research Hypotheses

- **Hypothesis 1:** There are no statistically significant differences at a significance level of 0.05 between the average performance of the study sample members – based on the dental floss use scale – attributed to the gender variable.
- **Hypothesis 2:** There are no statistically significant differences between the study sample members' average scores – based on the dental floss use scale – attributed to the variable of academic year.

- **Hypothesis 3:** There are no statistically significant differences between the study sample members' average scores – based on the dental floss use scale – attributed to the age variable.

Research Methods and Materials

This cross-sectional study was conducted between January 2024 and July 2024 on a sample of 114 students at Al-Sham Private University, and the random sampling method was used. Data were collected from students between May 2024 and June 2024. The sample size was chosen after consulting statistical experts and physicians, headed by Dr. Ghina Najati, who directed us to choose a sample size of 114 male and female students based on her experience in research studies. Data were collected by distributing an electronic questionnaire developed by the researchers based on a review of previous literature after it was examined by experts in this field to increase reliability and validity. The questionnaire was distributed in cooperation with the national union of students and sent to the dental students' communication groups for the first to the fifth academic year. This questionnaire was filled out by all students from different academic years at Al-Sham Private University. The questionnaire consisted of four parts; The first part contained demographic and social characteristics such as gender, age, and academic year. The second part contained questions about oral health habits (does one floss?, how many times a week?, since when did one start flossing?, what are the reasons that makes one avoid flossing?), the third part contained questions about acquired habits and traditions (what encourages one to floss regularly?, the influence of family upbringing on current flossing habits, were there any family traditions related to flossing that one noticed since childhood?, did one feel that flossing was an important part of his daily routine due to family influence?), the fourth contained questions related to knowledge about the importance of flossing (the main benefits of flossing from the participant's point of view, is flossing important for maintaining oral health?, how many times does the participant think one should floss daily?, does the participant think flossing is necessary in addition to brushing teeth?), while the fifth part of the questionnaire contained questions related to motivation and barriers (does the participant think that developing the skills of using flossing correctly should be an important part of the curriculum for dental students?, does the participant feel there is a lack of awareness about the importance of flossing at his university?).

Multiple answers were allowed for some questions due to their importance.

Statistical Methods Applied

1. **Pearson correlation coefficient:** To calculate structural validity.
2. **Spearman-Brown coefficient:** To calculate the stability by halving (split-half).
3. **T Student test:** To calculate the differences in the questionnaire about the prevalence of dental floss use among dental students at Al-Sham Private University according to the gender variable.

4. **Variance analysis:** To calculate the differences in the prevalence of dental floss use among dental students at Al-Sham Private University according to the variables of academic year and age.
5. **Mann-Whitney:** To calculate discriminant validity.
6. The statistical analysis was performed using SPSS, version 20.

Conclusions and Discussion

Review of the Results of the Research Hypotheses (n=114)

The First Hypothesis: There are no statistically significant differences at a significance level of 0.05 between the average performance of the study sample members on the dental floss use scale attributed to the gender variable.

	No.	Mean	Stand-ard de-viation	Degree of free-dom	T value (t-test)	P value	Signifi-cance
Male	53	27.6792	7.43374	112	.740	.461	Not significant at 0.05 significance level
female	61	26.5410	8.78744				

The previous table showed the differences in the use of dental floss according to the gender variable. The results showed that $P > 0.05$, which means accepting the previous hypothesis to remain: There are no statistically significant differences between the average performance of the study sample members on the dental floss use scale attributable to the gender variable.

The Second Hypothesis: There are no statistically significant differences between the average scores of the study sample members on the dental floss use scale attributed to the variable of the academic year.

Differences in Dental Floss use According to the Variable of the Academic Year

	Academic year	No.	Mean	Standard de-viation
Dental floss use	First year	10	19.4000	10.69995
	Second year	22	25.8636	8.66463
	Third year	24	25.7917	7.81292
	Fourth year	25	28.0800	7.05880
	Fifth year	33	30.3636	6.35816

One-way Analysis of Variance Test for Significance of Differences between the Averages of the Study Sample Members' Performance on the Dental Floss use Scale According to the Variable of Academic Year

	Source of variation	Sum of squares	Degree of freedom	Squares mean	F	P value	Significance
Dental floss use	Between groups	65145.284	1	65145.284	4.372	.003	Significant at 0.05 sig-nificance level
	Within groups	1043.013	4	260.753			
	Total	91082.000	114				

The two previous tables showed both the differences in the use of dental floss according to the variable of academic year and one-way analysis of variance test for significance of differences between the averages of the performance of the study sample members on the scale of using dental floss according to the variable of academic year. The results showed that $P < 0.05$ for the differences in the use of dental floss according to the variable of academic year, which means rejecting the previous hypothesis to become: There are statistically significant differences between

the averages of the performance of the study sample members on the scale of using dental floss according to the variable of academic year, in favor of fifth-year students.

The Third hypothesis: There are no statistically significant differences between the average scores of the study sample members on the dental floss use scale attributable to the age variable.

Differences in Dental Floss use According to the Age Variable

	age	No.	Mean	Standard de-viation
Dental floss use	18 – 20 year	46	25.1087	8.90001
	21 – 23 year	50	27.7000	6.94953
	24 – 25 year	16	29.5625	8.70991
	> 25 year	2	36.5000	.70711

One-way Analysis of Variance Test for the Significance of Differences Between the Average Performance of the Study Sample Members in the Dental Floss use Scale According to the Age Variable

	Source of variation	Sum of squares	Degree of free-dom	Squares mean	F	P value	Significance
Dental floss use	Between groups	23385.379	1	23385.379	2.459	.000	Significant at 0.05 significance level
	Within groups	474.045	3	158.015			
	Total	91082.000	114				

The two previous tables showed both differences in the use of dental floss according to the age variable and one-way analysis of variance test for the significance of differences between the average performance of the study sample members on the scale of using dental floss according to the age variable. The results showed that $P < 0.05$ for the differences in the use of dental

floss according to the age variable, which means rejecting the previous hypothesis to become: There are statistically significant differences between the average performance of the study sample members on the scale of using dental floss according to the age variable, in favor of students over 25 years old.

Distribution of the Study Sample Individuals According to the Study Variables (n=114)

Characteristics		No.	%
Gender	Male	53	46.49%
	Female	61	53.51%
Academic year	First year	10	8.77%
	Second year	22	19.30%
	Third year	24	21.05%
	Fourth year	25	21.93%
	Fifth year	33	28.95%
Age	18 – 20 year	46	40.35%
	21 – 23 year	50	43.86%
	24 – 25 year	16	14.04%
	≥ 26 year	2	1.75%

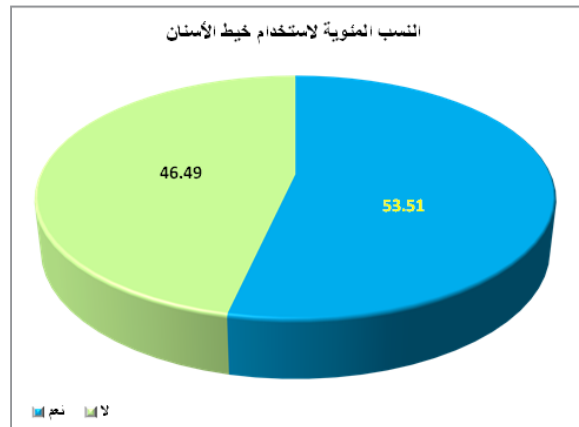
The previous table showed the distribution of the sample according to the demographic characteristics. The results showed that 53 participants (46.49%) were males and 61 participants (53.51%) were females. The highest percentage of participants were from the fifth academic year (28.95%), while the rest of the participants were from the following years: 21.93% from the

fourth year, 21.05% from the third year, 19.30% from the second year, and 8.77% from the first year. This study also indicated that the majority of the sample members were between the ages of 21-23 year (43.86%), while some of them were between the ages of 18-20 year (40.35%). We also found that some of them were between the ages of 24-25 year (14.04%).

Prevalence of Dental Floss use among Dental Students at Al-Sham Private University (n=114)

	No.	%
Yes	61	53.51%
No	53	46.49%

The previous table showed the prevalence of dental floss use among dental students at Al-Sham Private University. The results showed that the prevalence rate was 53.51%.



Oral Health Habits (n=114)

		No.	%
Number of times to floss per week	Daily	17	14.91%
	4 – 6 times a week	5	4.39%
	1 – 3 times a week	21	18.42%
	Once a week	18	15.79%
	I do not floss	53	46.49%
Beginning to use dental floss	More than 1 year	23	20.18%
	6 – 12 months	15	13.16%
	Less than 6 months	16	14.04%
	I do not floss	53	46.49%
Reasons why study sample members avoid using dental floss	Nervousness	21	18.42%
	Lack of time	5	4.39%
	Discomfort or pain during use	6	5.26%
	Disbelief in the effectiveness of the procedure	5	4.39%
	Not knowing how to use it	10	8.77%
	Other	8	7.02%
	I do not floss	59	51.75%

The previous table showed oral health habits. The results indicated that the percentage of the number of times of using dental floss was as follows: (I do not use floss: 46.49%), (1-3 times a week: 18.42%), (once a week: 15.79%), (daily: 14.91), and then (4-6 times a week: 4.39%). As for the beginning of using dental floss, the study participants were distributed as follows: (more than a year: 20.18%), (less than 6 months: 14.04%), and

then (6-12 months: 13.16%). The results also showed that the reasons that make the participating students avoid using dental floss were as follows: (nervousness: 18.42%), (not knowing how to use it: 8.77%), (other reasons: 7.02%), (discomfort or pain during use: 5.26%), and then (lack of time and lack of belief in the effectiveness of this procedure: 4.39%).

Acquired Habits and Traditions (n=114)

	No.	%	%
Reasons to encourage using dental floss regularly	Desire to maintain oral health	61	53.51%
	Advice from dentist	12	10.53%
	Watching family members floss since my childhood	2	1.75%
	From community or friends	1	0.88%
	Awareness from school	0	0.00%
	Other	10	8.77%
	I do not floss	28	24.56%

The influence of family upbringing on current flossing habits	I still use it regularly because of that	9	7.89%
	Family upbringing has nothing to do with it	63	55.26%
	I floss sometimes	15	13.16%
	I stopped flossing	2	1.75%
	I do not floss	22	19.30%
Family traditions regarding flossing that the participant had observed since childhood	Yes, there were obvious traditions	13	11.40%
	No, there were no traditions or habits in this regard	59	51.75%
	I do not know	42	36.84%
Flossing is an important part of your daily routine because of family influence	Yes, greatly	3	2.63%
	to a certain extent	17	14.91%
	Rarely	10	8.77%
	I did not feel that way	60	52.63%
	I do not know	24	21.05%

The previous table showed the acquired habits and traditions. This study revealed that the reasons encouraging the regular use of dental floss came in order according to their percentage as follows: (the desire to maintain oral health: 53.51%), (advice from the dentist: 10.53%), (other reasons 8.77%), (watching family members use floss since childhood: 1.75%), and then (from society or friends: 0.88%). The results also indicated that the percentage of the influence of family upbringing on the current habits of using dental floss reached 7.89%. In addition,

the results showed that the percentage of the existence of family traditions related to the use of dental floss that the study sample members noticed since their childhood was 11.40%, also that the percentages of feeling that the use of dental floss is an important part of the daily routine due to the influence of the family were as follows: (I did not feel that: 52.63%), (I do not know: 21.05%), (to a certain extent: 14.91%), (rarely: 8.77%), and then (Yes, greatly: 2.63%).

	No.	%	7.89%
Main benefits of using dental floss from the point of view of the study sample participants	Preventing cavities between teeth	36	31.58%
	Remove food residue between teeth	58	50.88%
	Improve gum health	9	7.89%
	Reduces bad breath	7	6.14%
	Other	4	3.51%
Flossing is important for maintaining oral health	Yes	93	81.58%
	No	9	7.89%
	I do not know	12	10.53%
Daily rate of dental floss use according to the study sample members' belief	More than twice	5	4.39%
	Twice	26	22.81%
	Once	60	52.63%
	I do not know	15	13.16%
The belief of the study sample members in the necessity of using dental floss alongside teeth brushing	Yes	84	73.68%
	No	15	13.16%
	Not sure	15	13.16%

The previous table showed the knowledge about the importance of using dental floss. The results revealed that the main benefits of using dental floss from the point of view of the study members were respectively: (removing food residues between the teeth: 50.88%), (preventing tooth decay: 31.58%), (improving gum health: 7.89%), (reducing bad breath: 6.14%), and then (other benefits: 3.51%). The results also showed that the percentage of the study sample members' awareness that using dental floss

is important to maintain oral health was 81.58%, also that the daily use rate of dental floss according to the belief of the study sample members was as follows: (once a day: 52.63%), (twice: 22.81%), and then (more than twice: 4.39%). The results also showed that the percentage of the study sample members' belief in the necessity of using dental floss in addition to brushing their teeth was 73.68%.

Motivation and Obstacles (n=114)

	No.	%	
The study sample members believe that developing the skills of using dental floss correctly should be part of the curricula for dental students	Yes	95	83.33%
	No	9	7.89%
	Not sure	10	8.77%
There is a lack of awareness about the importance of using dental floss at the university from the point of view of the study sample members	Yes	76	66.67%
	No	23	20.18%
	Not sure	15	13.16%

The previous table showed motivation and obstacles. The results showed that the percentage of the study sample members' belief that developing the skills of using dental floss correctly should be part of the curricula for dental students was 83.33%, and that the confirmation of the lack of awareness about the importance of using dental floss at the university was 66.67%.

This study indicated that the floss use rate among the participants was 53.51%. This reflects a moderate level of commitment to oral health care, with no significant difference in floss use between males and females. However, the results revealed that fifth-year students were the most frequent users of floss (30.36%), which may reflect the effect of advanced education and intensive training on adopting oral care habits. Moreover, the results showed that students over the age of 25 were the most frequent users of floss (36.50%), indicating the effect of personal experience on health habits.

The results also showed that the majority of participants flossed 1-3 times a week (18.42%), while those who did not floss cited "nervousness" as one of the main reasons at a similar rate. As for the reasons for encouraging flossing, the desire to maintain oral health was the main motivation (53.51%). On the other hand, the results showed that the influence of family upbringing on flossing habits among participants was limited (7.89%), and the percentage of those who noticed family traditions related to flossing since childhood was only 11.40%.

When comparing our study results with a previous study conducted at Jinnah Sindh Medical University in Pakistan in 2022, we found some notable differences. In the Pakistani study, the prevalence of flossing was approximately 34.35%, and females were more flossing (50.33%) than males (18.37%). While in our study, there was no significant gender disparity, and the prevalence of flossing was higher. These differences may

reflect variances in awareness or health habits between the two countries.

Our results also showed a high awareness of the importance of flossing in maintaining oral health (81.58%), and a belief in the necessity of flossing alongside teeth brushing (73.68%). In addition, 83.33% of the participants emphasized that developing proper flossing skills should be part of dental students' curriculum. In contrast, the Pakistani study showed less variation in these dimensions.

Finally, our study results revealed a significant lack of awareness about the importance of using dental floss at the university (66.67%). This result highlights the need to improve educational and awareness programs to promote oral health care habits among dental students, which may have a positive impact on adherence to using dental floss.

In conclusion, our study results indicated that the rate of using dental floss among dental students at Al-Sham Private University is relatively high compared to previous studies, reflecting the increased awareness of the importance of oral health care among students. The literature indicates that using dental floss is an essential part of personal care for teeth and gums, as it helps remove food residue and bacterial plaque between teeth that the toothbrush cannot reach [1]. Although the results showed high levels of awareness of the importance of using dental floss, the gap between using dental floss and full adherence to oral health care recommendations remains [8]. This reinforces the idea that intensifying awareness and training programs can have a positive impact on improving these health habits among students [9].

Findings and Recommendations

Develop Integrated Educational Programs: Integrated educational programs that focus on promoting the importance

of flossing within the medical education curriculum should be developed for dental students. These programs should include lectures, workshops, and practical training on how to use floss effectively and its impact on oral and gum health.

Inclusion of Oral Care in Academic Assessments: Periodic assessments of oral and dental care should be included as part of students' assessment throughout their educational stages. These assessments could include practical and field assessments of flossing skills and how they are integrated into clinical care.

Encouraging Research and Study Projects: It is recommended encouraging students to conduct research and study projects on the impact of flossing and oral care practices. This research can contribute to improving students' understanding of the importance of these practices and enhancing their ability to apply them in their future professional practice.

Strengthening Community Awareness Programs: Awareness efforts should be expanded to reach the community surrounding students, including patients and their families, to increase awareness of the benefits of flossing. Awareness campaigns and workshops can be organized for the local community to promote oral care culture.

Evaluating the Effectiveness of Educational Programs: It is necessary to conduct periodic evaluations of the effectiveness of the educational and awareness programs that are being implemented, by collecting feedback from students and teachers and analyzing their answers to improve the programs based on these evaluations.

Ethical Considerations

The official approval for conducting this study was obtained from the administration of Al-Sham Private University. The student's informed consent was obtained before distributing the questionnaire after explaining the purpose of the study and that the data collection is for scientific research purposes and subject to complete confidentiality.

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