



## Behavioural Frequency of Flossing among Dental Graduates : The Barriers and The Habit Formation

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### ABSTRACT

*The assessment of knowledge, attitude and the behavioural frequency of flossing among students in a dental school and the causative factors reluctance in usage of floss among dentistry undergraduates and the barriers related to formation of flossing habit. Self structured questionnaire was administered by the authors to dental graduates of dental school. All the students of final year and internship were included. The questionnaire was circulated in the form of google forms and was filled online by all the participants. Descriptive statistics were applied along with Pearson Chi-square test. P-value < 0.05 was taken for statistical significance. 97.7% of the students believed that it is important to floss. 65.7% of the participants were of the opinion that flossing is technique sensitive. 89.3% agreed to floss if proper technique of flossing is demonstrated to them and 86.3% of the participants responded that if provided flavoured floss they will indulge in the practice of flossing. Most of the dental graduates practice flossing. Flossing being technique sensitive and time consuming are major barriers among the participants. However provision of flavoured floss and timely reminders to floss will further encourage the practice of flossing among the subject.*

**Key Words:** Dental floss, knowledge, barrier, habit, flossing

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### INTRODUCTION

A healthy mouth is a one-of-a-kind and irreplaceable resource, and maintaining good oral health is viewed as basic right for humans [1]. Oral health has been historically defined as a disease-free condition that makes people seem beautiful along with contributing to optimal mouth functioning [2]. Federation Dentaire Internationale (FDI) comprehensively reimagined health related to oral cavity recognizing that oral health was multilayered and included the ability to swallow, smile, speak, smell, touch, taste, and bear a variety of sentiments through expressing through facial movements with poise while avoiding distress, agony, and ailment of the head and neck area [3]. Well-being of oral structures is an essential component of general health playing a significant role in it [4-6]. A link lies among oral disorders and various systemic ailments such as diabetes, disease of digestive system, haemorrhage and stroke, diseases of cardiovascular system, metabolic disorders, unfavourable pregnancy related issues, and problem of being obese [7-9]. On one side, problems related to oral cavity could lead to a pro-inflammatory condition, which may lead to development of systemic diseases [10-11]. On the flip side, systemic conditions may be held responsible for occurrence of oral health related issues. Historically Oral Health have been ignored in spite of it being important in conjunction with general health [12-13]. Globally oral health related issues remain to be prevalent with an increase in the disease burden [14]. Dental caries and Diseases related to periodontium being most prevalent, affecting 36 percent and 60 percent of global population respectively [15-17].

Dental aids are unable to reach specific sites and clean plaque from surfaces lying interproximally. Dental Floss is the aid of choice for plaque removal from such sites which leads to decrease in the abundance of micro-organisms related to diseases of periodontium and dental caries. In 18<sup>th</sup> century Dr Levi Parmy introduced flossing to be most efficient in preventing diseases of the periodontium [18-19]. Despite patients being compliant with tooth brushing instructions. Education on flossing is not well perceived and adhered to all [20].

A regular oral health regimen is the most effective tool in maintaining oral hygiene. Flossing maybe considered as an effective adjunct in maintaining one's oral hygiene [21]. It helps in removing and preventing accumulated plaque. Dental plaque is said to be etiological factor leading to periodontal diseases of chronic nature which is a disease of polygenetic origin may cause bleeding from gingival

tissues and edentulous scenarios when not giving adequate treatment[22-25] . Keeping this mind ADA recommends flossing once daily for maintenance of oral health[26].Despite recommendation of daily flossing for preventing periodontal diseases its usage as an oral hygiene aid has not been prevalent globally wherein majority of young people do not perform flossing[27].RiMondini et al showcased in a study done on students studying in an university that 92 percent brushed twice daily but only 15 percent practised flossing daily [28] Delta Dental Survey on Oral health and Well being suggested that 41 percent of the American population practised flossing once daily while flossing was completely neglected by 20 percent of the population[29].

Keeping in consideration the importance of oral health in conjunction with general health and highly prevalent nature of Oral diseases, a collaborated initiative from dental professionals and clinical is paramount to maintain people's health .It calls for integration of oral health into the regimen for health promotion[30-31] The behavior and attitude of Dental professionals towards preventive aspects and practices may have great impact on deliverance of oral health care affected the overall oral health of the people in consideration[32-33]It becomes imperative that Dental Professionals are aware and have a positive frame of mind towards such practices as they will act as service providers and oral health educators for current and future generations. An Enhanced awareness level among dental student may pave a way forward towards creating a positive state of mind towards adjunct oral hygiene aids which be instrumental in preventing and maintaining oral health of the population.

One's knowledge related to oral health , attitude and condition maybe influenced by multiple factors which may include cultural, environmental and social factors[34-35] Various sects of people have been exposed to flossing with different frequency. The general population in the western world is very cognizant of their oral health and show adequate usage of floss as an adjunct in maintenance of oral hygiene as compared to the masses in our country where flossing remains unexplored and not utilised regularly[36].Periodontal disease ceases to be a major Public Health Problem in our country owing to its sheer prevalence . There lies an immediate need of developing preventive strategies to decrease the disease burden . Dental professionals need to prescribe and propagate effective oral hygiene aids to the masses in order to help them in maintaining oral hygiene . However, the usage of Dental floss remains obscure among patients. Thus, the need arises to understand the factors causing non-usage of dental floss and the community level and the perceived barriers found among dental practitioners [37]

Objective of the current descriptive study largely focused at investigating the behavioural frequency of flossing among students of a dental school and the causative factors non-utilisation of floss in dentistry undergraduates and the barriers that lie opposing the formation of habit of flossing.

## **MATERIAL AND METHODS**

The subjects of the study were 300 dental graduates from final year and internship who filled a questionnaire regarding flossing habit. Since there was no standardized questionnaire , we formed one .It is a self-administered structured questionnaire. The questionnaire was divided into four sections. Questions were congregated into different sections namely being:

Section 1: Demographic details

Section 2: Knowledge of flossing

Section 3: Barriers in habit formation

Section 4: Habit formation

All Participants were able to understand the nature and resolve of the study and were explained the way of filling the given questionnaire . Questionnaire was circulated in the form of google forms and was filled online by all the participants. Anonymity of the participants and confidentiality of the responses given by the participants was maintained.

## **QUESTIONNAIRE**

Participant demographic details included gender, residence place and academic year which was requested to be entered prior. Questionnaire had 24 questions, designed to evaluate oral health behaviour, knowledge and utilisation status pertaining to students in the final year and internship of dental programme .The first section is basically demographic details . In the second section knowledge of flossing was studied by nine questions . Do you know what is flossing , Were you introduced to flossing by your parents , Flossing cleans what all surfaces of tooth , Is it important to floss , Are you aware of correct technique of flossing , Are you aware of types of dental floss, Do you floss. The third section comprised of questions for barrier in habit formation including do you find flossing technique sensitive and time consuming , Do you know how to use a floss , Does your peer group affect your decision to floss. Finally , we investigated the habit formation by asking if proper technique of flossing is demonstrated to them will they floss or if reminders are sent to them , will they floss and lastly by asking if flavoured flosses are provided to them, will they floss .

## STATISTICAL ANALYSIS

Data entry was done and analysis of results was done using SPSS (Version 20) statistical software package. Descriptive statistics was applied to calculate frequencies and Pearson Chi-square test was applied to find out the differences lying across variables. A P value <0.05 was considered to be statically significant.

## RESULTS

**Knowledge of flossing :** 98.2% of the dental students knew what is flossing. 46.4% of the students were introduced to the flossing by their parents whereas 53.6% were introduced to flossing during their course. 78.6% of the participants reported that it cleans the mesial and distal surfaces of the tooth and on the basis of academic year it was 81.4% for interns and 77.5% for final years respectively (Table 1). More than 97.3% of the students were of the opinion that it is important to floss. 94.6% of the participants are aware of the correct technique of flossing and figure 1 presents that only 10.7% of the participants are not aware of the types of dental floss. 90.2% of the graduates did consider flossing among the instructions related to oral hygiene given to patients. 14.3% of the dental graduates did not combine flossing with a regular behaviour and 62.5% of the participants floss on a regular basis, however on the basis of academic year 78.5% of final year students responded that they floss whereas among the interns it was 46.25% of the participants who practice flossing (Table 1). 66.3% of the subjects thought night time is the best time to floss (figure 2) and 72.3% practice flossing after brushing as shown in figure 3. Among all the participants 75.72% of final year students responded that night time is the best time to floss and 24.28% of them believed that flossing should be done in the morning. However in interns 51.25% of the participants believed morning to be the best time to floss (Table 1). The remaining 37.5% participants who do not practice flossing believe their mouth is clean after brushing.

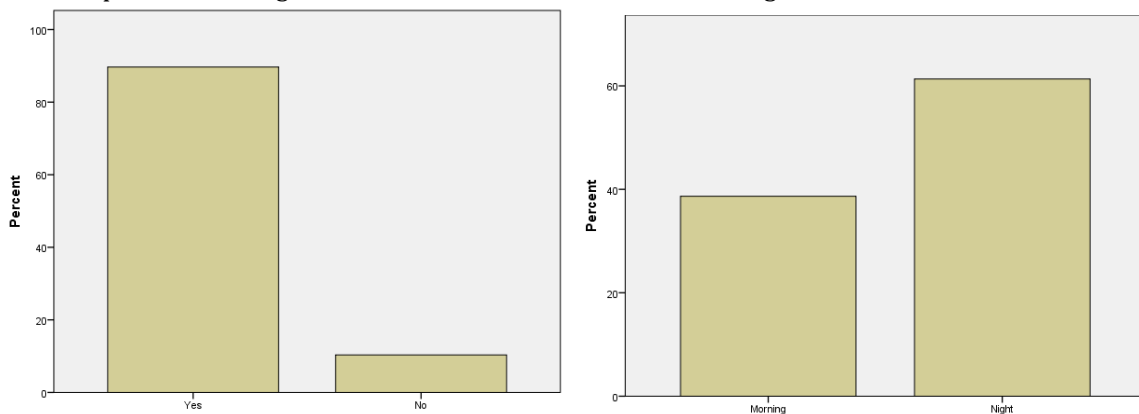


Figure : 1percentage of aware of dental floss Figure : 2 percentage of dental floss time

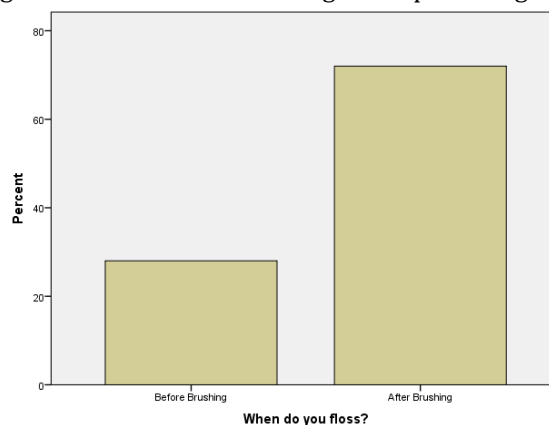


Figure :3 Percentage of period of dental floss time

**Barriers in the formation of habit:** 65.7% of the students found flossing to be technique sensitive and 78.2% found it to be a time consuming practice. On the basis of academic year 77.14% of the final year students believe flossing to be time consuming and amongst the interns 78% of the participants agreed to the fact that flossing is a time consuming procedure (Table 1). 92.7% of the respondents actually know how to use a floss and around 62.4% agreed that peer group does affect their decision to floss.

**Habit formation:** Notably, around 89.3% of the students believe that if proper technique of flossing is demonstrated to them they would start flossing (figure 4). And when asked that if daily reminders are sent would you floss? 82% of the participants agreed to floss (figure 5). More than half of the participants that is 86.3% of the students agreed to floss if flavoured flosses like mint, aloe vera were provided to them. However amongst the final year students 90% of the participants agreed to practice flossing provided they are sent daily reminders to floss (Table 1).

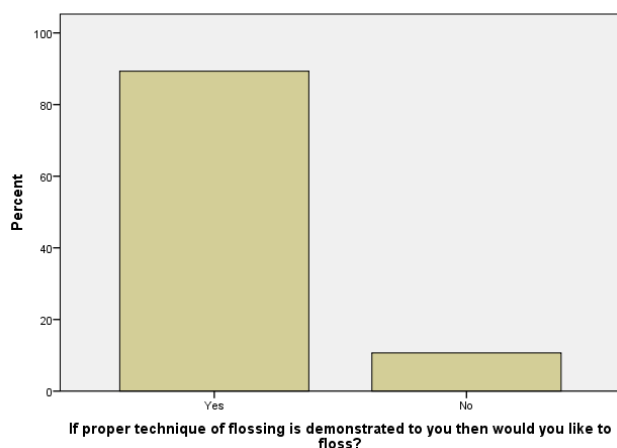


Figure : 4 frequency of floss demonstrated

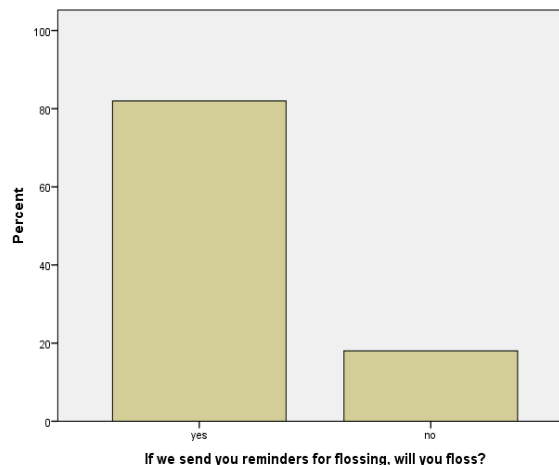


Figure: 5 frequency of reminder for flossing response

Table 1: knowledge and habit formation of flossing among the dental graduates.

Questions	Options	Final year	Internship	P value (Pearson Chi Square Value)
1.Flossing is used to clean which all surfaces of the tooth?	Buccal/lingual	2.85%	0%	$\chi^2$ value =6.495 P=0.039*
	Mesial/distal	81.4%	77.5%	
	Entire tooth	15.71%	22.5%	
2.Do you floss?	Yes	78.5%	46.25%	$\chi^2$ value= 32.891 P= 0.001*
	No	21.4%	53.75%	
3. What is the best time to floss?	In the morning	24.28%	51.25%	$\chi^2$ value =22.891 P= 0.001*
	In the night	75.72%	48.75%	
4. Do you find flossing time consuming?	Yes	77.14%	78%	$\chi^2$ value= 0.112 P = 0.737
	No	22.83%	22%	
4. If we send you reminders for flossing, will you floss?	Yes	90%	75%	$\chi^2$ value= 11.382 P = 0.001*
	No	10%	25%	

## DISCUSSION

Since dental professionals are Oral health advocators expectation arises for them to possess evidence-based knowledge related to oral health and behaviour during their time as a trainee or a student in a dental school. Their oral health status, affecting their own health and life quality, also reflects oral health related attitude and behaviour simultaneously. Thus, it is essential to find out related information which may be of great significance to them and their patients. The usage of floss in dentistry precedes back to the primitive time and the acclaim of inventing the currently available dental floss should lie with Levi Spear Parmly, a New Orleans based dentist, warmly denoted to as the proponent of oral hygiene who advocated flossing using a strand of silk thread back in 1815 to patients who visited him [38-39]. Even though the usage of dental floss in conjunction with tooth brushing has been suggested routinely to prevent gingival diseases, data present globally is not uplifting and hence it becomes imperative to gauge the level of knowledge, attitudes, self-reported practices, barriers in habit formation among dental professionals to find out the insufficiency, which would be helping to plan and figure out the corrective measure.

The present descriptive study was conducted with an objective of evaluating the behavioural frequency of flossing among a selected number of dental graduates to recognise the gap if present, in relation to the knowledge and usage of floss as a regular oral health measure. In the present study we can say that the female graduates are well-versed in comparison to male counterparts. The interns gave more answers as they actively participated in the survey compared to the final year students. Most of the dental graduates agreed to the fact that flossing is important and that they should combine flossing with a regular behaviour. However a considerable less number of graduates practice flossing themselves because majority of the participants found flossing to be technique sensitive as well as time consuming in spite of knowing how to use a floss. A lacuna lies in the knowledge level which may be ascribed to inadequacy in training and lack in upgradation of knowledge during the dental undergraduate programme.

82.3% of the participants agreed to the fact that they started flossing after joining dental schools and those who do not floss feel that there is no need to floss as they feel their mouth is clean after brushing. However majority of the participants believe that they will start flossing if proper technique is demonstrated to them and more than 80% of the dental graduates will indulge in the habit of flossing if they are sent daily reminders of flossing and if a variety of flavours of flossing is provided to them.

In our study more than 97.3% of the students were of the opinion that it is important to floss whereas in the study done by Madan *et al* 76.4% of the BDS students believed daily flossing is necessary. The reason for this result could be the involvement of just final years and interns in our study whereas the study conducted by Madan *et al* consisted of students of all academic years. In our study 78% of the students believed that flossing is a time consuming procedure which comes to be similar as the study conducted by Madan *et al* [40].

Evidence based information, education and communication material regarding flossing may be distributed amongst the dental graduates as a positive reinforcement. Demonstration of correct flossing technique in standardised time period may be given to inculcate the habit and remove the wrong perception of flossing to be time consuming. The presence of Social desirability bias may question the authenticity of responses by the participants. Another limitation in our study could be the limited sample size as only dental graduates of one dental school participated in our survey. Further study may be carried out in various colleges of a larger geographical setting to achieve greater external validity.

## CONCLUSION

To recapitulate most of the dental graduates of floss daily, even though they found flossing to be technique sensitive and a time consuming practice. For those who do not floss it is concluded that when given an option of different flavours of floss and given timely reminders to floss they will indulge in the practice of flossing.

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