

Knowledge And Awareness Regarding The Oral Hygiene Practices Among Dental Students¹Dr. Ashna Chalana, BDS Intern, National Dental College and Hospital, Dera Bassi, Punjab, India²Dr.Navneet Kaur, Reader, Dept. of Periodontics and Oral Implantology, National Dental College and Hospital, Dera Bassi, Punjab, India³Dr.Gurpreet Kaur, Professor and Head, Dept. of Periodontics and Oral Implantology, National Dental College and Hospital, Dera Bassi, Punjab, India**Corresponding Author:** Dr. Ashna Chalana, BDS Intern, National Dental College and Hospital, Dera Bassi, Punjab, India**Type of Publication:** Original Research Article**Conflicts of Interest:** Nil

Abstract

Introduction: Oral hygiene awareness among dental students is important because they are an expert resource for oral health education and promotion. Mechanical and chemical means of plaque control are essential for preservation of gingival and periodontal health. The most common method of maintaining oral health includes the use of a toothbrush and a dentifrice. Chlorhexidine mouthwash is used as an adjunct to mechanical plaque control.

Aim & Objectives: The objective of the study was to determine the oral hygiene practices (mechanical and chemical plaque control) among dental students from National Dental College and Hospital, Dera Bassi.

Materials and Methods: A self-administered questionnaire consisting of 29 questions was shared with 320 undergraduate dental students through Google Forms. The first set of questions was related to demographic analysis which included details like Name, Age, Gender and Year of Study. The second set of questions focused on knowledge and awareness regarding the mechanical method of plaque control, tooth brushing techniques, dentifrices, mode of brushing and use of other cleaning aids for oral hygiene practices. This online survey link was sent through email. All data was analysed using the Statistical Package for Social Sciences (SPSS) software, for Windows, version 22.

Results: The response rate was 93.7% as 300 students answered all the questions. Regarding the frequency of toothbrushing, 67.7% participants brushed twice daily, 29.7% brushed only once, 1.7% brushed after every meal and only 1% brushed thrice daily. 77.3% participants used a fluoridated dentifrice which shows that most of them were aware that fluorides reduce chances of tooth decay. Other than toothbrush and dentifrices, 43% students also used mouthwash as a cleaning aid. 51% participants used interdental cleaning aids, however 23.3% did not have much knowledge regarding interdental cleaning aids.

Conclusion: The outcome of the study is that there is an appreciably high level of knowledge about oral self-care procedures among undergraduate dental students. More emphasis should be given especially on using interdental cleaning aids such as dental floss, mouthwash and interdental brushes.

Keywords: oral health; oral hygiene; dental students, mechanical plaque control, toothbrushing, dental floss.

Introduction

Dentists play an important role in improving and maintenance of oral health. Therefore, obtaining knowledge regarding dental health and the prevention of oral diseases becomes a significant part during the training of dental students throughout their studies. The main objective of health education is to train dental students so that they can motivate, educate and counsel the patients to adopt good hygiene practices, and there is certainly a greater chance they do exactly, only if they are motivated themselves and implement good oral hygiene.

Dental students should be able to apply their knowledge to their own dental care. Their knowledge largely determines the level of oral hygiene maintenance of their future patients.^{1,2} Dental students particularly play a significant role because they are expected to have a higher level of knowledge, skills and it should show better oral hygiene habits and thus have a greater impact on the environment, their families and society as a whole. Their knowledge of oral health and implementation of oral hygiene habits may improve during their training period.³ Dental students' attitude towards their oral health, and maintaining the proper oral hygiene can play a significant role in determining the health treatments.⁴

In dentistry, dental caries and periodontitis are two common diseases. Evidence exists in the literature to show that growth of dental plaque and inflammation of gingival tissue leading to periodontitis, which is ubiquitous and strongly linked irrespective of age, gender or racial/ethnic identification.⁵ Plaque control is a key element of the practice of dentistry. It is the most important predictive factor in determining the overall prognosis of the treatment therapy. It is an effective way of treatment to prevent gingivitis, periodontitis, and perhaps any microbial aetiology disease as related to oral health.⁶

Plaque management consists of the use of mechanical procedures and chemical agents that retard the formation of plaque. Mechanical plaque control is the removal and prevention of microbial plaque accumulations on the teeth and adjacent gingival surface by the use of tooth brush and other mechanical oral hygiene aids, without the use of chemicals. Mechanical methods of plaque prevention include toothbrushing, dental floss, interdental brushes, wooden tips, tongue scrapers and professional prophylaxis for interdental cleaning. According to **American Dental Association** recommendation, people should brush their teeth for two minutes twice a day with a toothbrush that has soft bristles and a fluoride dentifrice. The toothbrush should be replaced every 3-4 months as the efficiency of the bristles reduces with prolonged use.

Toothbrushes are routinely used for maintaining oral hygiene, along with a dentifrice. They vary in size, design and arrangement of bristles. It is recommended to use a soft bristle toothbrush because a hard bristle toothbrush may cause damage to the soft and hard structures. Other than the manual toothbrush, there are different types of toothbrushes available in the market today which include powered, sonic, ultrasonic and ionic types. Powered toothbrushes are mostly preferred by handicapped patients or patients undergoing orthodontic treatment.

Dental Floss is suitable for removal of plaque from the interproximal embrasure areas and stimulating the interdental papillae. It is also a vehicle for application of therapeutic agents to interproximal areas. The techniques for holding the floss include-Spool and the Circle or Loop method. Interproximal brushes are conical or cylindrical shaped brushes used for cleaning tooth surfaces adjacent to the wide interdental spaces. Wooden tips are inserted into the gingival embrasure to remove soft deposits from the teeth and stimulate the gingiva.

Chemical plaque control is used only as an adjunct to mechanical plaque control. The rationale for using anti-plaque agents as an adjunct to mechanical cleaning methods is based on two premises. Firstly, plaque is the major etiological factor in gingivitis and secondly, the prevalence of gingivitis.^{7,8} Chemical plaque control requires a vehicle and an anti-plaque agent. Vehicles required for the delivery of these chemical anti-plaque agents include: Toothpaste, Mouth rinses, Spray, Irrigators, Chewing gum, Varnishes. The most tested and effective anti-plaque agent well known today is chlorhexidine, which has been used for more than two decades. It is most commonly used in the management of routine plaque as a chemical supplement. Chlorhexidine can be delivered in the form of mouth washes, tooth pastes, gels, periodontal dressings, sprays, and irrigation. It can be either bacteriostatic or bactericidal depending on the dose.⁹ It is used as an adjunct to oral hygiene, professional prophylaxis and also post periodontal surgery or root planing. It may be stated that the short-term application of chlorhexidine digluconate in a concentration of 0.1% or 0.2% chlorhexidine solution may be recommended routinely after periodontal surgery. Once daily rinse of chlorhexidine mouthwash for 2–3 weeks following the procedures may be satisfactory. The optimal concentration of long-term application should always be determined individually because of broad differences in colouration that occur from individual to individual. The optimal dose of chlorhexidine in this time may be limited to 30%.¹⁰

Health education, a widely accepted approach in prevention of oral diseases, is a process of transmission of knowledge and skills necessary for improvement in quality of life. The goal of planned health education program is not only to bring about new behaviours but also to reinforce and maintain healthy behaviours that will promote and improve individual, group or community health. Hence, this study was conducted with an aim to determine the state of oral hygiene practices (mechanical and chemical plaque control) among dental students.

Material and Methods

A descriptive cross-sectional questionnaire-based study was conducted through an online survey among 320 undergraduate dental students of National Dental College and Hospital, Dera Bassi, Punjab who were questioned to assess the self-reported perception of oral hygiene practices.

The self-administered questionnaire comprised of 29 questions ,out of which the first set of questions covered Socio-Demographic Analysis related to Name, Age, Gender and Year of Study. The second set of questions were related to their knowledge and awareness regarding the tooth brushing techniques, dentifrices, mode of brushing and use of other cleaning aids. A survey using Google Forms, an online tool, was utilized in this study. A participant information sheet and questionnaire were sent to all the participants. This online survey link was sent through email and social media, and dental students were invited to participate in the survey. All data was analysed by using the Statistical Package for Social Sciences (SPSS) software, for Windows, version 22. Descriptive statistics have been generated in terms of percentages.

Results

Sociodemographic Characteristics of Participants

Distribution of socio-demographic characteristics of surveyed 320 participants are shown in **Table 1**. Out of 320 dental students, 300 responded positively by participating in this study and completed the questionnaire. Therefore, the response rate was 93.7% and dental students were positively aware of maintaining the oral hygiene practices.

Among the participants, there were 72 (24%) male dental students and 228 (76%) female dental students. 81(27%) students were in BDS 2nd year, 96(32%) were in BDS 3rd year and 123(41%) were in BDS 4th year. The peak age of dental students was 21-24 years of age group, which were 194 (64.7%) while 100 (33.3%) dental students were in the age group of 18-20 years.

Table 1: Distribution of study participants based on the knowledge and practice (N=300)

Variable		Dental students(n)	n (%)
Age	18-20 years	100	33.3%
	21-24 years	194	64.7%
	25-28 years	6	2%
Gender	Male	72	24%
	Female	228	76%
Year of Study	BDS 2nd year	81	27%
	BDS 3rd year	96	32%
	BDS 4th year	123	41%

Knowledge and awareness regarding mechanical aids (toothbrushing) among dental students (Table 2)

Majority of respondents used toothbrush and dentifrices to clean their teeth. Approx. 207 (69%) use toothbrush and dentifrices, 60 (20%) use tooth brush, dentifrices and dental floss, and only 4 (1.3%) claimed to use interdental cleaning aids. 155 (51.7%) participants used the soft bristle toothbrush while 140 (46.7%) used the medium bristle toothbrush. Brand and design of the toothbrush is the most common factor considered while buying a toothbrush-150(50%) respondents preferred brand (Colgate, oral B) and 131 (43.7%) preferred design (criss cross, tapered, wavy) of toothbrush. Majority of those surveyed (96.3%) used a manual toothbrush and 3.7% used powered toothbrush to remove the plaque. 181(60.3%) participants take two-minute time period to brush their teeth. Most dental students claimed to brush their teeth twice daily, as 203 (67.7%) respondents claimed they brushed their teeth 2 times in a day, whereas 89 (29.7%) claimed they brushed only once a day.

Regarding the toothbrushing techniques among dental students, majority of respondents 138 (46%) preferred horizontal, vertical and vibratory technique of toothbrushing. 73 (24.3%) preferred only horizontal technique, 63 (21%) preferred only vertical technique and 26 (8.7%) preferred only vibratory technique of toothbrushing. 218 (72.7%) participants changed their toothbrush after every 3 months. When asked about the storage of toothbrush, most participants i.e. 214 (71.3%) stored their toothbrush in a separate toothbrush holder, and 194 (64.7%) place the toothbrush in the bathroom, in closed contact with the environment. Better oral hygiene practice depends upon the technique you use to brush your teeth and majority of respondents 258 (86%) agreed to it.

Table 2: Knowledge and awareness regarding the mechanical aid (Toothbrushing) among dental students

Questionnaire		Dentists (n)	n (%)
What do you use to clean your teeth?	Toothbrush and dentifrices	207	69%
	Toothbrush dentifrices and floss	60	20%
	Interdental cleaning aids such as dental floss, interproximal brushes etc.	4	1.3%
	All the above	29	9.7%
Which type of toothbrush bristles you preferred?	Soft bristle toothbrush	155	51.7%
	Medium bristle toothbrush	140	46.7%
	Hard bristle toothbrush	5	1.7%
What do you consider while buying a toothbrush?	Brand (Colgate, oral B)	150	50%
	Design (wavy, criss cross tapered)	131	43.7%
	Price	8	2.7%
	Color	11	3.7%
Type of tooth brush used by dental students	Manual toothbrush	289	96.3%
	Powered toothbrush	11	3.7%
Why is brushing important according to you?	To remove plaque	253	84.3%
	To avoid pain and sensitivity	16	5.3%
	To control bleeding from gums	2	0.7%
	For aesthetics	29	9.7%
How much time do you take for brushing?	One minute	39	13%
	Two minutes	181	60.3%
	More than two minutes	80	26.7%
How often do you brush your teeth in a day?	Once a day	89	29.7%
	Twice a day	203	67.7%
	Thrice a day	3	1%
	After every meal	5	1.7%
Technique of toothbrushing used among dental students	Horizontal technique of toothbrushing	73	24.3%
	Vertical technique of toothbrushing	63	21%
	Vibratory technique of	26	8.7%

	toothbrushing		
	All of the above	138	46%
How often is the toothbrush changed by dental students?	Every 3 months	218	72.7%
	Every 6 months	74	24.7%
	More than 6 months	8	2.7%
Where do you store your toothbrush?	In the bathroom, in open contact with the environment	106	35.3%
	In the bathroom, in closed contact with the environment	194	64.7%
How do you store your toothbrush?	In a toothbrush holder, with other members of the family	86	28.7%
	In a separate toothbrush holder	214	71.3%
According to you, is the contact between toothbrush is an important issue?	Yes	269	89.7%
	No	31	10.3%
What do you think results in better oral hygiene practices?	The number of times you brush your teeth	42	14%
	The technique you use in brush your teeth	258	86%

Knowledge and awareness regarding the mechanical aid (Dentifrices) among dental students (Table 3)

Majority of respondents always used dentifrices in paste form in cleaning their teeth. 273 (91%) respondents preferred paste form, 19 (6.3%) preferred gel form and only 8 (2.7%) preferred toothpowder form dentifrices. Quality is the important characteristic feature associated with dentifrices while choosing them. Most dental students, 263 (87.7%) considered the quality of dentifrices while buying them. Flavour, packaging and price (only 10.3%, 1% and 1% respectively) respondents considered these characteristics feature associated with dentifrices. The use of fluoridated dentifrices should be encouraged among dental students, and results showed that most of the participants (77.3%) preferred using a fluoridated dentifrice.

Regarding the quantity of dentifrice used among the dental students, 57% participants preferred a drop (pea size) quantity of dentifrice while toothbrushing while 32% used dentifrice as much as the length of their brush head. Respondents didn't have not much awareness regarding the availability of Calculus Control Toothpaste as only 119 (39.7%) knew about them. When asked about the brand of dentifrices, majority of respondents 203 (68.6%) used Colgate. Other brands like Close up (5.4%), Pepsodent (9.5%) and Herbal dentifrices (6.1%) were also used among dental students.

Table 3: Knowledge and awareness regarding the mechanical aid (Dentifrices) among dental students

Questionnaire		Dentists (n)	n (%)
Do you use a dentifrice whenever you brush your teeth?	Always	250	83.3%
	Sometimes	47	15.7%
	Never	3	1%
What form of dentifrice do you use?	Paste form	273	91%
	Toothpowder form	8	2.7%
	Gel form	19	6.3%
What is the important characteristics feature associated with dentifrices while choosing it?	Flavour	31	10.3%
	Packaging	3	1%
	Quality	263	87.7%
	Price	3	1%
Type of dentifrice used by dental students	Fluoridated	232	77.3%
	Non fluoridated	23	7.7%
	Do not know	45	15%
What is the quantity of dentifrice that you use?	A drop (pea size)	171	57%
	As much as the length of brush head	96	32%
	Apply the paste second time	1	0.5%
	I do not notice this particularly	32	10.7%
Do you share your dentifrices with other individual?	Yes	149	49.7%
	No	151	50.3%
Are you aware about the availability of calculus control tooth paste?	Yes	119	39.7%
	No	181	60.3%
What is your preferred brand of dentifrice?	Colgate	203	68.6%
	Close up	16	5.4%
	Pepsodent	28	9.5%
	Herbal (Dant Kanti)	18	6.1%
	Any other	31	10.5%

Knowledge and awareness regarding interdental cleaning aids among dental students (Table 4)

Dental students have adequate knowledge regarding the interdental cleaning aids. Majority 235 (78.3%) had a positive response. 129 (43%) used mouthwash, 72 (24%) used tongue cleaner, 21(7%) used dental floss and 8(2.7%) used interdental brush. 62% respondents were aware about the correct method of using dental floss.

Table 4: Knowledge and awareness regarding the mechanical aid (interdental cleaning aids) among dental students

Questionnaire		Dentists (n)	n (%)
Do you have any knowledge about interdental cleaning aids?	Yes	235	78.3%
	No	65	21.7%
Do you rinse your mouth after eating?	Yes	250	83.3%
	No	50	16.7%
Do you use any other oral hygiene aids?	Dental floss	21	7%
	Mouthwash	129	43%
	Interdental brush	8	2.7%
	Tongue cleaner	72	24%
	All of the above	70	23.3%
Do you know the correct method to use a dental floss?	Yes	186	62%
	No	114	38%
What is the reason of not using any interdental cleaning aid?	I clean my teeth interdentally	153	51%
	Do not feel like doing it	51	17%
	Do not have much knowledge about interdental cleaning aid	70	23.3%
	Interdental cleaners are not readily available for purchase	23	7.7%
	It is a waste of time	3	1%

Distribution of responses to questions regarding gingival health among dental students

Response regarding the gingival health is listed in **Table 5**. Majority of dental students, 268 (89.3%) agreed that bleeding from gums is not normal while brushing their teeth. The most common cause of gingival bleeding is poor oral hygiene and 53% respondents agreed to it. 30.3% respondents also considered Vitamin C deficiency as the cause of gingival bleeding. The use of hard toothbrushes, vigorous horizontal brushing and use of extremely abrasive dentifrices may cause cervical abrasion, recession of gingiva and hypersensitivity and majority of respondents (83%) had a positive response.

Table 5: Distribution of responses to questions regarding gingival health among dental students

Questionnaire		Dentists (n)	n (%)
Do you think bleeding from gums is normal while toothbrushing?	Yes	12	4%
	No	268	89.3%
	Do not know	20	6.7%
Commonest cause of bleeding from gums	Vitamin C deficiency	91	30.3%
	Poor oral hygiene	159	53%

	Injury to the gums	43	14.3%
	Not aware	7	2.3%
What do you think are the effects of using hard toothbrushes, vigorous horizontal brushing and & use of extremely abrasive dentifrices?	Cervical abrasion of teeth	23	7.7%
	Recession of gingiva	18	61%
	Hypersensitivity	10	3.3%
	All the above	249	83%

Discussion

As a primary and vital part of their role in the oral-health-care provision, dentists are contemplated experts and consultants in the field of oral-health education and promotion. The primary step in establishing a positive oral-health habit is to provide significant knowledge to the patients and to boost their awareness relating to ways to prevent oral diseases. High level of awareness regarding oral self-care among dental students allows them to assess their patients’ oral health condition and to motivate their patients, and will facilitate them to spread oral hygiene awareness in the general population.^{11,12}

The results of this study indicated that the percentage score for oral-health knowledge and awareness among undergraduate dental students was positive which agrees with the results of some previous studies by Kawamura et al.¹³, Tseveenjav et al.¹⁴ and Rong et al.¹⁵ In the present study, all the dental students used toothbrush and dentifrice as they are the most effective tools for mechanical removal of dental plaque, and dentifrice may prevent gingivitis and periodontitis by playing a secondary role in oral hygiene practices, which is in accordance with the study by Polychronopoulou et al.¹⁶ In this study, only 29% of the students brush their teeth once a day, while 67% of the students brushed twice a day. In a previous study by Kumar in Chennai India, who reported 90% of the dental students being aware of brushing twice a day, while only 14.6% brushed twice daily. This may be due to the fact that students may not be able to afford dentifrice regularly; therefore, in an attempt to make the dentifrice last longer, dental students economised by brushing once daily.¹⁷ This study showed that approximately half (46.7%) of the dental students used medium- bristles, 1.7% used hard bristles and 51.7% used soft bristles toothbrush. Rimondini reported that 58.4% of Italian students preferred medium stiffness toothbrush and 33.2% preferred hard toothbrush.¹⁸ This is higher than the results obtained in this study. In Italian and Turkish studies,^{18,19} 81.6% and 49% of participants, respectively, replaced their toothbrushes after every 3 months, however in this study, approximately 72.7% dental students replaced their toothbrush after every 3 months. This could be due to the recommendations of dentists and toothbrush manufacturers.

Inter-dental area is the most common site of plaque retention and the most inaccessible to toothbrush, and causes the initiation of disease process. Therefore, for removal of dental plaque from inter-dental zones, various interdental cleaning aids are used such as dental floss, wooden tips, interdental brushes etc. In the present study, approximately 7% used dental floss; this was comparable to 7% and 3% reported in Sweden²⁰ and Turkey,¹⁹ respectively. However, this was low when

compared to 19% reported among medical students in Lagos Nigeria,²¹ 13.5% among nursing students in India²² and 36.7% among medical students in Iran.²³

The results of this study regarding the gingival health showed that the oral hygiene practices among dental students is fair to good. The students were aware that bleeding from gums is not normal while toothbrushing. Furthermore, dental students also identify the cause of gingival bleeding as poor oral hygiene, injury to gums and Vitamin C deficiency. Majority of students (53%) agreed that poor oral hygiene is the most common etiological factor for inflammation and causes gingivitis and periodontitis. Dental students were also aware that using hard bristle toothbrush along with high abrasive content in dentifrice and vigorous brushing with horizontal technique, causes cervical abrasion, gingival recession and hypersensitivity among individuals. Majority of dental students (83%) agreed on this statement.

This study is limited with a questionnaire. To research the effect of education, cross-sectional and longitudinal comparisons would be more useful. Clinical examination, besides questionnaire would probably affirm the results.

Conclusion

The dental students are aware of most of the aspects of oral hygiene practices i.e. use of fluoridated toothpaste, use of soft bristle toothbrush and brushing twice daily. More emphasis on dental health care should be developed and maintained during education in order to improve the overall health of the students. Health education needs to be given especially for using interdental cleaning aids, along with toothbrush and dentifrice.

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