

Awareness of Oral Hygiene among Dental College Students in Namakkal, Tamil Nadu, India: A Cross-sectional Analysis

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ABSTRACT

Aim and objective: To assess the influence of educational level and gender on oral hygiene knowledge, attitude, and behavior among undergraduate dental students.

Materials and methods: A cross-sectional study was carried out, including 357 students and interns of a dental college in Namakkal, Tamil Nadu, India. A self-administered anonymous and close-ended questionnaire based on the Hiroshima University–Dental Behavior Inventory was designed and administered voluntarily to students and interns in October 2019 to survey their oral hygiene knowledge and attitude. The questionnaire consisted of 20 questions. The study group consisted of 1st-year students (98), 2nd-year students (91), 3rd-year students (62), 4th-year students (47), and 59 interns. Collected data were coded and analyzed using SPSS version 21.0. Participants' responses were assessed according to their educational level and gender using the Chi-square test, and the significance level was set at $p \leq 0.05$.

Results: In this study, the response rate was 100%. Responses to some of the questions showed significant variability. The oral health behavior of participants varies not only with their gender but also with their educational level, i.e., the amount of clinical exposure and experience.

Conclusion: We conclude that knowledge and information play a crucial role in modifying one's psychology, despite gender-based variation in behavior. Therefore, we recommend that the government includes chapters on some basic knowledge related to oral health in the school syllabus, such as basic science subjects, or a compulsory dental awareness program in the school curriculum.

Keywords: Awareness, Dental education, Gender, Oral hygiene.

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INTRODUCTION

Maintaining good oral hygiene is important for overall health and well-being. The attitude toward oral health determines the quality of oral health.^{1,2} Habits become attitudes, and attitudes determine the behavior of a person. Attitude is an acquired characteristic that reflects an individual's cultural, familial, and life experiences, and strongly influences an individual's behavior. Similarly, oral hygiene depends on the attitude toward oral health. The dissemination of hygiene practices is achieved through different sources, such as mass media, parents, friends, and healthcare professionals and paraprofessionals.³ Healthcare professionals play an important role in guiding their patients through hygiene practices. Even though people are from different cultures and socioeconomic backgrounds, they expect their oral health providers to have good oral hygiene. If oral health providers do not pay attention to their own oral health, it could affect their ability to deliver oral health care to their patients.⁴ Thus, they should become role models for the community in maintaining good oral health.⁵ Dentists acquire their oral health knowledge at the time of studying dentistry. Evidence suggests that the oral hygiene knowledge and behavior of dental students vary in clinical and preclinical years of dental education because of the clinical experience that shapes their attitude toward oral hygiene.⁶ The inclusion of syllabus related to oral care in the preuniversity curriculum may influence the oral health behavior of students entering dentistry. A previous study reported that children with adequate knowledge toward oral health maintenance were less likely to develop dental caries than those without sufficient oral health knowledge.⁷

The aim of this study is to evaluate (1) the oral hygiene knowledge and attitude of clinical and preclinical students in our

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college and (2) gender-based variations in oral hygiene knowledge and attitude of those students.

MATERIALS AND METHODS

Study Setting and Design

A cross-sectional study was carried out among students and interns of a dental college in Namakkal, Tamil Nadu, India. A self-administered and close-ended questionnaire based on the Hiroshima University–Dental Behavioral Inventory (HU-DBI) was designed and distributed among the undergraduate dental students and interns in October 2019. The research has been

conducted in accordance with the World Medical Association Declaration of Helsinki. The questionnaire consisted of 20 questions and asked for consent to participate in this study; the study was conducted only after obtaining consent from the participants. Confidentiality and anonymity were confirmed so that responses could not be linked to individual participants.

Sampling Criteria

To assess the oral hygiene attitude and behavior of the students in our dental college, all undergraduate dental students in their 1st, 2nd, 3rd, 4th, and 5th year of dental college were included in this study. Absentees and incomplete forms were excluded. Totally, 357 dental students and interns were surveyed using the English version of a self-administered HU-DBI questionnaire, originally developed by Kawamura et al.⁸ The study group consisted of 98 1st-year students, 91 2nd-year students, 62 3rd-year students, 47 4th-year students, and 59 interns. One score was given for each "agree" response to items 4, 9, 11, 12, 16, and 19, and one score was given for each "disagree" response to items 2, 6, 8, 10, 14, and 15. The maximum possible score was 12, and the minimum possible score was 0. The higher the score, the better the oral health attitude and behavior.

Survey Method

All students and interns were asked to stay in their classes after their lecture hour, and the questionnaire was distributed among them. Of 371 students and interns, 357 were present at the time of the survey. Attempts were not made to follow up those ($n = 14$) who were absent at the time of the survey, and they were excluded. All students and interns were informed about this voluntary study prior to the survey. The purpose of this study was explained to them, and their doubts were cleared. Participants completed the questionnaire anonymously, and no personal data were collected other than their age, year of study, and gender. Of 357 participants, 59 were interns, 109 were clinical students, and 189 were preclinical students.

Statistical Analysis

Collected data were coded and analyzed using SPSS version 21.0 (IBM Corp., Armonk, NY, United States). The differences in response were analyzed based on the participants' age and year of study using the Chi-square test, and the significance level was set at $p \leq 0.05$. Descriptive statistics, calculated in terms of percentages and frequencies were used to describe the data.

RESULTS

Of 371 undergraduate dental students and interns, 357 took part in the study, and 14 were absent; the response rate was 100%. Table 1 shows the categorization of participants according to their age and year of study. Approximately 53% of the participants were from preclinical years; there were 70 (19.6%) male and 287 (80.4%) female participants. Participants were within the age range of 18 to 24 years with a mean age of 20.38 years (Table 1). Participants were categorized based on their years of study and gender (Table 2).

The mean HU-DBI score of clinical students was significantly higher than that of preclinical students ($p < 0.05$). Similarly, the mean score differed significantly between genders (Table 2).

Table 3 shows participants' responses to all 20 questions, according to their level of dental education. In comparison with clinical students (41.9 vs 73%), preclinical students worried less about visiting their dentist. Consequently, a higher number of preclinical students delayed their dental visits until they experienced

Table 1: Distribution of students according to age and year of study

Year of study (BDS)	Number of students (%)	Response rate (%)	Mean age (years)
First year	98 (27.5)	100	18.4
Second year	91 (25.5)	100	19.3
Third year	62 (17.4)	100	20.2
Fourth year	47 (13.2)	100	21.3
Interns	59 (16.5)	100	22.7
Total	357 (100)	100	20.38

Table 2: Mean scores of HU-DBI questionnaire among preclinical and clinical students

Year	N (%)	Mean scores \pm SD	p
Preclinical	189 (52.9)	7.6 \pm 2.10	0.023
Clinical	168 (47.1)	8.02 \pm 2.16	0.036
Male	70 (19.6)	7.2 \pm 2.21	0.043
Female	287 (80.4)	8.6 \pm 2.24	0.031

p value fixed at ≤ 0.05 ; SD, standard deviation; HU-DBI, Hiroshima University–Dental Behavioral Inventory

toothache than clinical students (56.1 vs 37.5%). Preclinical students (41.8%) frequently noticed white-colored sticky deposits on their teeth than clinical students (31%). However, a higher number of clinical students were concerned about having halitosis (82.7 vs 69.8%) and brushed their teeth regularly and carefully (93.5 vs 65.6%) than preclinical students. Concerning the size of toothbrush used by the participants, more preclinical students accepted that they were using child-size toothbrush than clinical students (13.8 vs 1.8%). Regarding the question related to the tendency of having bleeding gums, only 7.7% of clinical students noticed gingival bleeding in comparison with 40.7% of preclinical students.

Most of the clinical (85.7%) and preclinical (76.7%) students did not use hard-bristled toothbrushes, and 94% of clinical students responded that they had the habit of checking their teeth after brushing compared with 41.3% of preclinical students.

Table 4 shows differences in responses according to the gender of the participants. A higher number of male participants did not worry about consulting a dental surgeon than female participants (52.9 vs 34.1%), and more male participants delayed their dental checkups until they experienced a problem than female participants (62.9 vs 40.4%). However, 45.7% of male participants noticed white deposits on their teeth surfaces than 32.8% of female participants, and a higher number of female participants were bothered about halitosis than male participants (82.2 vs 72.9%). There was no significant difference in the number of female and male participants who were using child-size toothbrush (9.8 vs 11.4%, $p = 0.027$). Female participants less frequently noticed that their gingiva had a tendency to bleed after brushing than male participants (33.4 vs 34.3%), although more females agreed that they had the habit of checking their teeth after brushing than male participants (86.4 vs 61.4%).

DISCUSSION

To prevent oral diseases, oral health providers must educate their patients about the importance of proper oral habits, which they can achieve by becoming a role model for their patients.⁷ Proper oral

Table 3: Dental students' responses (preclinical and clinical) to HU-DBI questionnaire

Sl. No.	Question		Preclinical n(%)	Clinical n(%)	p value
1	I do not worry much about visiting the dentist	Agree	138 (73)	82 (41.9)	0.223
		Disagree	51 (27)	86 (51.1)	
2	My gums tend to bleed when I brush my teeth	Agree	77 (40.7)	13 (7.7)	0.001
		Disagree	112 (59.3)	155 (92.3)	
3	I worry about the color of my teeth	Agree	134 (70.9)	149 (88.7)	0.042
		Disagree	55 (29.1)	19 (11.3)	
4	I have noticed white sticky deposits on my teeth	Agree	79 (41.8)	52 (31)	0.021
		Disagree	110 (58.2)	116 (69)	
5	I use a child-size toothbrush	Agree	26 (13.8)	3 (1.8)	0.069
		Disagree	163 (86.2)	165 (98.2)	
6	I think that I cannot help having false teeth when I am old	Agree	62 (32.8)	63 (37.5)	0.021
		Disagree	127 (67.2)	105 (62.5)	
7	I am bothered by the color of my gums	Agree	67 (35.4)	34 (20.2)	0.346
		Disagree	122 (64.6)	134 (79.8)	
8	I think my teeth are getting worse despite my daily brushings	Agree	77 (40.7)	22 (13.1)	0.001
		Disagree	112 (59.3)	146 (86.9)	
9	I brush each of my teeth carefully	Agree	124 (65.6)	157 (93.5)	0.017
		Disagree	65 (34.4)	11 (6.5)	
10	I have never been taught professionally how to brush	Agree	76 (41.2)	36 (21.4)	0.002
		Disagree	113 (59.8)	132 (78.6)	
11	I think I can clean my teeth well without using a toothbrush	Agree	34 (18)	19 (11.3)	0.005
		Disagree	155 (82)	149 (88.7)	
12	I often check my teeth in the mirror after brushing	Agree	78 (41.3)	158 (94)	0.001
		Disagree	111 (58.7)	10 (6)	
13	I worry about having bad breath	Agree	132 (69.8)	138 (82.7)	0.012
		Disagree	57 (30.2)	29 (17.3)	
14	It is impossible to prevent gum diseases with toothbrushing alone	Agree	103 (54.5)	109 (64.9)	0.179
		Disagree	86 (45.5)	59 (35.1)	
15	I put off going to the dentist until I have a toothache	Agree	106 (56.1)	63 (37.5)	0.006
		Disagree	83 (43.9)	105 (62.5)	

Contd...

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Sl. No.	Question		Preclinical n()	Clinical n()	p value
16	I have used a dye to see how clean my teeth are	Agree	58 (30.7)	29 (17.3)	0.027
		Disagree	131 (69.3)	130 (82.7)	
17	I use a toothbrush which has hard bristles	Agree	44 (23.3)	24 (14.3)	0.001
		Disagree	145 (76.7)	144 (85.7)	
18	I do not feel I have brushed well unless I brush with strong strokes	Agree	76 (40.2)	29 (17.3)	0.227
		Disagree	113 (59.8)	139 (82.7)	
19	I feel I sometimes take too much time to brush my teeth	Agree	78 (41.3)	77 (45.8)	0.002
		Disagree	111 (58.1)	97 (54.2)	
20	I have had my dentist tell me that I brush very well	Agree	121 (64)	71 (42.3)	0.017
		Disagree	68 (36)	97 (57.7)	

habits in patients can be achieved by providing them with relevant information and proper education.^{8,9}

Since dentists play a central role in the provision of oral health care, they are considered experts in the area of oral health awareness and promotion. As future dentists, dental students should have proper knowledge about oral hygiene that enables them to evaluate, educate, and motivate their patients.^{10,11} There is only a limited awareness of dental health among the common population, as well as no emphasis on dental health awareness in the school curriculum. Therefore, common people depend on mass media to know about dental health care, which is sometimes wrong or exaggerated from a business point of view.¹² According to Swathi et al., oral hygiene awareness among dental students increases with their level of education.¹³ In our study, the mean HU-DBI score showed that students in the clinical years had better oral health attitudes than those who did not attend their clinical posting, indicating that students' level of education and amount of clinical exposure modify their level of oral health knowledge. In our study, fewer preclinical students showed interest in visiting a dental surgeon in comparison with clinical students, similar to the results of a study by Alam Moheet et al.¹⁴ In this study, we found that a higher number of preclinical students agreed that they noticed gingival bleeding after brushing than clinical students. Since clinical students were taught about and trained on brushing techniques, they had better knowledge than preclinical students, similar to the outcomes of previous studies.^{11,15} Saran et al. reported that preclinical students delayed their visit to a dentist till they experience a toothache, in comparison with clinical students.¹⁶ However, in our study, clinical students agreed that they frequently consulted dentists.

Similar to previous studies by Zetu et al.¹⁷ and Ozyemisci-Cebeci et al.,¹⁸ this study showed that a higher number of preclinical students had the habit of vigorous brushing and noticed that the condition of their teeth did not improve even after regular brushing. These findings indicate improper toothbrushing habits and the absence of adequate oral health knowledge among preclinical students.

Table 4: Dental students' responses (gender based) to HU-DBI questionnaire

Sl. No.	Question		Male n(%)	Female n(%)	p value
1	I do not worry much about visiting the dentist	Agree	37 (52.9)	98 (34.1)	0.023
		Disagree	33 (47.1)	189 (65.9)	
2	My gums tend to bleed when I brush my teeth	Agree	24 (34.3)	96 (33.4)	0.052
		Disagree	46 (65.1)	191 (66.6)	
3	I worry about the color of my teeth	Agree	56 (81.4)	242 (84.2)	0.038
		Disagree	14 (18.6)	45 (15.7)	
4	I have noticed white sticky deposits on my teeth	Agree	32 (45.7)	94 (32.8)	0.046
		Disagree	38 (54.3)	193 (67.2)	
5	I use a child-size toothbrush	Agree	8 (11.4)	28 (9.8)	0.067
		Disagree	62 (88.6)	259 (90.2)	
6	I think that I cannot help having false teeth when I am old	Agree	37 (52.9)	158 (55.1)	0.087
		Disagree	33 (47.1)	129 (44.9)	
7	I am bothered by the color of my gums	Agree	37 (52.9)	151 (52.6)	0.486
		Disagree	33 (47.1)	136 (47.4)	
		Total	70	287	
8	I think my teeth are getting worse despite my daily brushings	Agree	22 (31.4)	127 (44.3)	0.041
		Disagree	48 (68.6)	160 (55.7)	
9	I brush each of my teeth carefully	Agree	41 (58.6)	229 (79.8)	0.013
		Disagree	29 (41.4)	58 (20.2)	
10	I have never been taught professionally how to brush	Agree	24 (34.3)	92 (32.1)	0.014
		Disagree	46 (65.7)	195 (67.9)	
11	I think I can clean my teeth well without using a toothbrush	Agree	12 (17.1)	56 (19.5)	0.058
		Disagree	58 (82.9)	231 (80.5)	
12	I often check my teeth in the mirror after brushing	Agree	43 (61.4)	248 (86.4)	0.184
		Disagree	27 (38.6)	39 (13.6)	
13	I worry about having bad breath	Agree	51 (72.9)	236 (82.2)	0.654
		Disagree	19 (27.1)	51 (17.8)	
14	It is impossible to prevent gum diseases with toothbrushing alone	Agree	43 (62.9)	198 (69)	0.024
		Disagree	27 (37.1)	89 (31)	
15	I put off going to the dentist until I have a toothache	Agree	44 (62.9)	116 (40.4)	0.138
		Disagree	26 (37.1)	171 (59.6)	
16	I have used a dye to see how clean my teeth are	Agree	18 (25.7)	36 (12.5)	0.034
		Disagree	52 (74.3)	251 (87.5)	
17	I use a toothbrush which has hard bristles	Agree	26 (37.1)	43 (15)	0.078
		Disagree	44 (62.9)	244 (85)	
18	I do not feel I have brushed well unless I brush with strong strokes	Agree	22 (31.4)	81 (28.2)	0.654
		Disagree	48 (68.6)	206 (71.8)	
19	I feel I sometimes take too much time to brush my teeth	Agree	39 (55.7)	142 (49.5)	0.238
		Disagree	31 (44.3)	145 (50.5)	
20	I have had my dentist tell me that I brush very well	Agree	25 (35.7)	121 (42.2)	0.068
		Disagree	45 (64.3)	166 (57.8)	

Kawamura et al. showed that with increasing age and exposure to the dental field the oral health attitude and behavior change among Japanese dental students.⁸ Overall, in our study, clinical students had better dental health awareness than preclinical students. However, these differences may be because of their training and clinical exposure and experience.

In our study, there was a significant relationship between participants' gender and their HU-DBI scores. Overall, female participants were found to have better knowledge and attitude

toward their oral care and willingness to consult a dental surgeon as a precaution. These results are in agreement with the results of previous studies.^{19,20} Sujatha et al. reported that female dental students had a better oral health attitude and took better care of their teeth than their male counterparts.²¹ According to previous studies, females have a better attitude toward the maintenance of oral hygiene and take better care of their oral health than males.^{22,23} The positive attitudes and behaviors of females toward oral health care can be explained from a psychological point of view. In general,

females are usually concerned and take more care about their body's healthiness and appearance.²⁴ They are also more concerned about their oral health care and visiting the dentist; they are more likely to have oral healthcare knowledge even before entering dentistry.^{11,24} Overall, the oral healthcare knowledge among the participants of this study was good, although they had inadequate knowledge in a few areas, such as the effective brushing force, proper brushing methods, and the use of disclosing agents to identify deposits on the teeth. This study shows that oral care knowledge and practice improve among dental students with increasing levels of education and training. This study provides some valuable insight into the level of oral healthcare knowledge among dental students and allows its comparison with various levels of the curriculum.

To induce a change in the society, it is important to change the thoughts and the social environment of the society, which in turn changes the ability to understand a situation and execute decisions in individuals.²⁵ Any misconception about programs will have a negative impact on a person. To change or prevent misconceptions, we should educate common people and properly explain programs to them, which will yield positive results. Therefore, the educators should be trained properly to clarify people's doubts and should become their role models; dental students should play this role in raising community's dental health awareness.¹⁸ Even though our study showed a correlation among knowledge, attitude, gender, and educational level, it had a small sample size; hence, its results cannot be generalized to other dental colleges. A further study involving multiple dental colleges from different regions might reveal stronger relationships among knowledge, attitude, gender, and educational level than those reported previously.

This study shows that students' oral hygiene knowledge and practice increase with their level of education. Therefore, we conclude that the introduction of basic oral health awareness-related topics in the preuniversity curriculum might be beneficial to society.

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