

Self reported dental health attitude and behavior of dental students in India

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Abstract: The aim of the present study was to evaluate the oral health attitudes and behavior of undergraduate dental students in India according to age, sex and level of dental education, and to compare it with those of other countries with different socioeconomic conditions. A self-administered questionnaire based on the Hiroshima University – Dental Behavior Inventory (HU-DBI) was distributed among 372 dental students at Darshan Dental College and Hospital (DDCH). The response rate was 75.8% with 44% males and 56% females. The mean HU-DBI score showed a significant relationship ($P < 0.05$) with age by one way-analysis of variance (ANOVA). The students were considerably concerned about the appearance of their teeth and gums and halitosis. The total mean score was not markedly higher in the clinical years (years 3 and 4) than in the non-clinical years (years 1 and 2), indicating that the students were almost equally aware. Although there were no statistically significant differences in gender and academic year for the mean score of HU-DBI, the present study showed that dental students in India generally had poorer oral health awareness compared to several other countries. The oral health behavior of Indian dental students has to be improved in order to serve as a positive model for their patients, family, and friends. (*J. Oral Sci.* 50, 267-272, 2008)

Keywords: dental students; attitudes/behavior; dental education, India.

Introduction

Dental students are generally motivated to maintain good oral health (1), and researchers have found that the oral health attitudes and behavior of dental students differed in the pre-clinical and clinical years (2). Furthermore, the oral health attitudes and behavior of dental students were found to vary between countries and cultures (3,4).

Dental health is a highly individualized concept, the perception of which is very much affected by an individual's culture and socio-economical status. The attitude of people towards their own teeth, and the attitude of dentists who provide dental care, play an important role in determining the oral health condition of the population (5). By choosing a dental curriculum at the undergraduate level, dental students become a model for oral health (6). Although there is a lot of published data (7) related to the motivation of patients to follow an effective oral health care program, few studies have dealt with the attitude and behavior of dental students in motivating patients. Moreover, little is known about the influence of clinical training and course content on the development of the oral health behavior of dental students. Cross cultural comparison is also essential, as differences may exist regarding socio-economic status, dental delivery system, and attitude towards dental health (8,9).

The dental education system in India accepts candidates from various socio-economic backgrounds who become eligible to study dentistry based on their score in state entrance exams. The dental curriculum in India comprises four years, divided in two parts: pre-clinical years (years

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1 and 2) and clinical years (years 3 and 4). Indian dental students are only introduced to the preventive aspects of oral health in latter half; henceforth, their level of dental education can affect oral health behavior. Moreover, males and females have different physiological and psychological behavior, so it is possible that their oral health behavior might be different too. Age may also be a factor, as many intelligent students who score well in state entrance exams join dental schools. The students who want to join dental schools but did not qualify in the first attempt reappear for the exams in the next year. Hence, the majority of the intelligent students are of younger age at a particular level of dental education.

There is no universally accepted or recommended index or inventory to measure dental health attitude and behavior. The data that have been collected on the attitude and behavioral aspects were derived from a series of independent questionnaires. The Hiroshima University-Dental Behavioral Inventory (HU-DBI) questionnaire developed by Kawamura (3) has been demonstrated to be useful for assessing patients' perceptions and oral health behavior. The HU-DBI also retains excellent psychometric properties after translation into English, and no apparent deficiency found in the translated version, although wide variation in knowledge and attitude of dental students towards preventive dentistry has been reported in Japan (10). It is therefore considered that the HU-DBI is capable of measuring dental health attitudes and behavioral aspects of dental students, and may serve as a useful standard for cross-cultural comparisons of dental students in other populations.

The purpose of the present study was to use the HU-DBI to explore the dental health attitudes and behavior of Indian dental students based on dental education, age, and sex. These data may help in assessing and comparing the focus of the curriculum, so to decide whether dental students should be introduced more towards philosophy and practice of preventive dentistry.

Materials and Methods

The original version of the HU-DBI was administered to Japanese students in 1986. The English translation was used for the present study, and data was collected at the end of academic year 2006-2007 during the month of April. The survey was conducted among students from Darshan Dental College (D.D.C.) and Hospital at Udaipur, which is affiliated to the Rajasthan University of Health Science (RUHS). Ethical clearance was obtained from "Ethical Committee for Research" from Darshan Dental College and Hospital. The survey was based on a collection of responses to a 20-item questionnaire, during mid-year

session in month of June and July, 2007. Students from all four academic years were invited to complete the questionnaire in their classrooms after lectures rather than outside the class. Participation in the study was voluntary. Students were allowed to ask questions regarding the meaning of words in the local language, and the answers to such questions were announced to all other students. The survey was completed anonymously, and no student personal, demographic or academic information was collected.

The Hiroshima University-Dental Behavioral Inventory (HU-DBI) questionnaire, consists of 20 items in a dichotomous response format (agree/disagree). A quantitative estimate of oral health attitude and behavior is provided by the total appropriate agree/disagree responses. The maximum possible score is 12. Higher scores indicate better oral health attitude and behavior. The score of each item, which relates to oral health attitude and behavior in the 12 HU-DBI, was analyzed and then a mean score was calculated for year of education, age, and sex. A statistical model was developed for one way-analysis of variance (ANOVA), with 12 HU-DBI scores as the dependent variable and the level of dental education, sex and age as independent variables. The SPSS[®] statistical program (SPSS Inc., 11.0 ver., Chicago, USA) was used to process and analyze the data. The level of significance was set at 0.05.

Results

From a total of 372 dental students, 282 students (75.8%) completed the questionnaire. Sixty-seven students chose not to participate, and 23 students were absent during the survey period. One hundred and twenty-four (44%) male students and 158 (56%) female students participated in this study.

Table 1 lists the number of subjects by age, gender, and level of dental education. The majority of the participants were from Academic year 1 (79) while the least were from year 2 (63). Most participants were between 18-20 years of age. The male-female ratio was 1:1.27 in the present study.

Table 2 shows the number of students in each academic year (100 students in each year except year 4) who responded in the present study, and their mean age.

Table 3 presents the distribution of the responses to the 20 items, based on level of dental education; 70.6% of dental students agreed with the statement "I don't worry much about visiting the dentist" (item-1). Bleeding gums (item-2) were reported in 23.4% of the participants; 58.9% answered that it was impossible to prevent gum disease with only tooth brushing (item 14); and 50.7% reported

Table1 Profile of the study group of dental students

Characteristics of dental students	Number of participants (n = 282)	Percentage (%)
Level of dental education		
Year-1	79	28.0
Year-2	63	22.3
Year-3	74	26.2
Year-4	66	23.4
Sex		
Male	124	44.0
Female	158	56.0
Age (years)		
17	12	4.3
18	63	22.3
19	65	23.0
20	81	28.7
21	40	14.2
22	17	6.0
23	4	1.4

Table2 Mean age of the responded participants in each level of dental students

Level	Responded participants (n/total)	Mean age	Std. Deviation
Year-1	79/100	18.82	1.17
Year-2	63/100	20.24	1.09
Year-3	74/100	18.86	1.16
Year-4	66/ 72	20.32	1.07
Total	282/372	19.50	1.33

Table 3 HU-DBI questionnaire items with showing number and percentage of “agree” response in each academic year

Item number and description		Year 1	Year2	Year 3	Year 4	Total
1. I don't worry much about visiting the dentist.	n %	56 70.9%	45 71.4%	55 74.3%	43 65.2%	199 70.6%
2. My gums tend to bleed when I brush my teeth. D	n %	14 17.7%	06 9.5%	13 17.6%	33 50.0%	66 23.4%
3. I worry about the color of my teeth.	n %	60 75.9%	52 82.5%	35 47.3%	45 68.2%	192 8.1%
4. I have noticed some white sticky deposits on my teeth.A	n %	25 31.6%	30 47.6%	25 33.8%	29 43.9%	109 38.7%
5. I use a child-sized toothbrush.	n %	04 5.1%	03 4.8%	05 6.8%	22 33.3%	34 12.1%
6. I think that I cannot help having false teeth when I am old. D	n %	30 38.0%	20 31.7%	24 32.4%	34 51.5%	108 38.3%
7. I am bothered by the color of my gums.	n %	39 49.4%	34 54.0%	21 28.4%	38 57.6%	132 46.8%
8. I think my teeth are getting worse despite my daily brushing. D	n %	16 20.3%	16 25.4%	18 24.3%	25 37.9%	75 26.6%
9. I brush each of my teeth carefully. A	n %	51 64.6%	25 39.7%	24 32.4%	40 60.6%	140 49.6%
10. I have never been taught professionally how to brush. D	n %	38 48.1%	33 52.4%	12 16.2%	03 4.1%	86 30.2%
11. I think I can clean my teeth well without using toothpaste. A	n %	07 8.9%	04 6.3%	13 17.6%	21 31.8%	45 16.0%
12. I often check my teeth in a mirror after brushing. A	n %	66 83.5%	50 79.4%	49 66.2%	57 86.4%	222 78.7%
13. I worry about having bad breath.	n %	57 72.2%	36 57.1%	43 58.1%	51 77.3%	187 66.3%
14. It is impossible to prevent gum disease with toothbrushing alone. D	n %	35 44.3%	43 68.3%	41 55.4%	47 71.2%	166 8.9%
15. I put off going to the dentist until I have toothache. D	n %	50 63.3%	39 61.9%	32 43.2%	22 33.3%	143 0.7%
16. I have used a dye to see how clean my teeth are. A	n %	15 19.0%	01 1.6%	03 4.1%	20 30.3%	39 13.8%
17. I use a toothbrush with hard bristles.	n %	08 10.1%	05 7.9%	04 5.4%	20 30.3%	37 13.1%
18. I don't feel I've brushed well unless I brush with strong strokes.	n %	23 29.1%	10 15.9%	13 17.6%	40 60.6%	86 30.5%
19. I feel I sometimes take too much time to brush my teeth.A	n %	33 41.8%	29 46.0%	34 45.9%	37 56.1%	133 47.2%
20. I have had my dentist tell me that I brush very well.	n %	27 34.2%	17 27.0%	29 39.2%	35 53.0%	108 38.3%

In calculation of the HU-DBI: A = one point is given for each agreed response;
D = one point is given for each disagreed response.

Table 4 One way- ANOVA of the mean value of HU-DBI score and academic year, sex and age of participants

	Variable	N	Mean	S.D.	F	P-value
Academic year	Year-1	79	6.22	1.72	1.16	0.33(NS)
	Year-2	63	5.71	1.75		
	Year-3	74	6.11	1.85		
	Year-4	66	6.15	1.46		
Gender	Male	124	6.27	1.69	3.49	0.06(NS)
	Female	158	5.89	1.71		
Age (in years)	17	12	7.33	1.61	2.46	0.02(S)
	18	63	5.54	2.01		
	19	65	6.22	1.55		
	20	81	6.04	1.69		
	21	40	6.35	1.56		
	22	17	6.00	1.06		
	23	4	5.75	1.26		
	Total	282	6.06	1.71		

that they postponed going to the dentist until they had a toothache (item-15). In addition, 47.2% of the students felt that they sometimes took too much time to brush their teeth (item-19). A higher response of "agree" for item-12 ("Checking the teeth in the mirror after brushing"; 78.7%), item-7 ("worrying about gingival color"; 46.8%) and item-3 ("worry about color of teeth"; 68.1%) was found, indicating higher esthetic awareness among the dental students. Year-4 dental students showed higher awareness in items-4, 9, 12, 14, 15, 16 and 19 compared to other students for the selected 12 HU-DBI score.

Table 4 describes a significant relationship between HU-DBI score and age of the participants ($P < 0.05$). For the level of dental education, the total mean score of 6.13 in clinical years (years 3 and 4) was almost equal to the score of 5.96 in pre-clinical years (years 1 and 2).

Discussion

An important task of oral health professionals is to instill in their patients the correct oral habits to prevent oral diseases. The first step in establishing a habit is to provide relevant knowledge to the patients and to raise their awareness of how to prevent oral diseases. High awareness of self-oral health in a dental student may have a direct impact on his attitude for patient education and may help to create oral awareness in the general population.

A problem arises when cross-sectional studies of different groups are compared. These studies are not uniform in their original design, and include different age groups for males and/or females. It is difficult to assess knowledge with brief instruments, such as the one adopted herein, and draw firm distinctions from attitudes and beliefs. Preventive activities are influenced by three factors: thoughts (beliefs, values, expectations), social environment (inter-personal interactions), and individual ability (11,12,13). Moreover, to follow directions given by the dentist, patients have to believe that they are exposed to the disease, that the disease

is serious, and that they can gain from the dentist's efforts (14).

This study is the first formal assessment of dental attitudes and behavior in dental students in Rajasthan, India. The response rate of the dental undergraduate students who participated in the study was 282 out of 372, and the annual intake is 100 students (excepting final year, where only 72 students were enrolled). The dental students who participated in the present study learn preventive dentistry and dental awareness during year 3, according to the University curriculum. The level of dental education did not show a significant correlation with higher total mean score of dental awareness among years 3 and 4 compared to years 1 and 2. Minor differences might be because preventive aspects of oral health, which improve the students' attitude and behavior to personal oral health, are introduced in the clinical years.

There were no major differences among males and females in our study ($P > 0.05$); hence, gender was not a major factor influencing the HU-DBI percentage of agree/disagree responses. This finding is consistent with a previous survey, in which dental health knowledge, attitude and behavior among Japanese employees were assessed (10), and with the findings of a study of Mongolian dental students by Tseveenjav et al. (15). However, in a recent study in Israel, female dental students showed a significantly better attitude than their male colleagues (16), which does not coincide with the present study. Ostberg et al. (17) found that females engage in better oral hygiene behavioral measures, possess a greater interest in oral health, and perceive their own oral health to be good to a higher degree than males. Nanakorn (18) and Kassak (19) found female university students to have better habits in terms of tooth brushing than male students, while Fukai et al. found that females visited their dentists and brushed their teeth more often than males (20,21). Klemendz (22) reported that women used fluoride as a prophylactic tool approximately four times more often than men. It would be of interest to conduct a similar study including a greater number of dental students and compare the results.

Dental students were considerably concerned about the appearance of their teeth and gums and halitosis, and looking in the mirror after brushing. Similar findings were reported among Chinese dental students by Komabayashi et al. (2005) (23). In Sweden, the results of a questionnaire-based study on 20-25-year-olds showed that about 59% of the subjects were worried about the appearance of their teeth (24). In the present study, 68.1% of the students (who were from a similar age group) were worried about the appearance of their teeth. A similar study among dental students in Jordan (25) revealed that 66.9% were concerned

about the appearance of their teeth.

For the general adult population in Israel (26), gender was not a major factor influencing the HU-DBI percentage of agree/disagree responses, which is similar to our results. The Israeli population also had higher scores 72.4% and 88.6% for “My gums tend to bleed when I brush my teeth” (item 2) and “I have noticed some white sticky deposits on my teeth” (item 4), respectively, which were 23.4% and 38.7% for the Indian dental students. This indicates that dental students have better oral hygiene practices than the general population due to better oral health attitude and behavior.

Less than one-third of the respondents had never been professionally instructed on how to brush their teeth (item 10), and half of the participants indicated that they would postpone going to the dentist until they had a toothache (item 15). Thus, it is necessary for oral health professionals to recognize the significance and importance of preventive activities to make their patients aware. Thus, an organized intervention, leading towards an improved dental status by increasing the population’s knowledge, attitude and behavior, can be achieved.

There may also be a bias towards endorsing items under conditions of uncertainty, leading to inflated positive responses. About half of the participants stated that they brushed their teeth carefully. This does not imply that all people who agreed with this statement do in fact brush their teeth carefully. There may be a certain amount of measurement error connected with self-reported behavior. Furthermore, an item such as “I don’t worry much about visiting the dentist” could be answered with a definite “agree” or “disagree” response by relatively few respondents (27). However, as the main purpose of the HU-DBI is to measure dental behavior as a whole to compare the data from different populations, the importance of the lack of discriminatory power of these questions is not great. Although the Analysis of Variance (ANOVA) was applied for 12 HU-DBI questions only, the remaining questions were used to evaluate overall oral health attitude and behavior.

In previous studies involving Greek, Japanese, Finnish and Chinese dental students (2-4), age was not a significant factor affecting attitude and behavior and there was no trend to evaluate it with HU-DBI. In our study among Indian students, there was a variation in age among each year. The results were statistically significant ($P < 0.05$) only for age and HU-DBI. Many students were of higher age compared to their level of dental education probably because many students take more than one attempt to clear the state entrance exams for joining dentistry. Moreover, the mean attitude and behavior were calculated for each age group,

and the difference in mean was tested by ANOVA using a complete randomized design. Possibly the intelligent students, who would have cleared the exam in the first attempt, were in a higher level of dental education (years 3 and 4) at lower age. A higher HU-DBI score in these students may be responsible for higher mean scores among the age 18-20 years. If an additional variable of “Attempts taken to join dentistry” was evaluated with HU-DBI, a more definite explanation of results may have been possible.

The effect of socio-economic status can also be a factor affecting the HU-DBI score, as the mean HU-DBI score was lower in our study than that previously reported by Kawamura et al. (28) in Japanese adults (1993) and in a comparative study of Japanese and Australian (29) students (1997). Although our subjects comprised students who belonged to all socio-economical strata, as India is still a developing country, the relatively small group tested could be a limitation of our study. A further study involving a larger group might reveal stronger relations than those reported here.

The findings of the present study highlight the relatively poor oral health behavior of Indian dental students, which should to improve in order to serve as a positive model for their patients, family, and friends. It is also suggestive of improving dental education in India, with special emphasis on prevention-oriented dental health.

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