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The perceived concepts of oral health attitudes and behaviors of dental students from four Asian countries



Hassan Suliman Halawany ^{a,b,*}, Nimmi Biju Abraham ^b, Vimal Jacob ^b,
Nassr Al-Maflehi ^a

^a Department of Periodontics and Community Dentistry, College of Dentistry, King Saud University, Riyadh, Saudi Arabia

^b Dental Caries Research Chair, College of Dentistry, King Saud University, Riyadh, Saudi Arabia

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KEYWORDS

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Abstract *Objectives:* The aim of the present study was to assess the self-reported oral health attitudes and behaviors of dental students from four Asian countries based on their gender and level of dental education.

Subjects and methods: A structured, pre-tested, self-administered 12-item questionnaire survey was conducted among undergraduate dental students at all study levels. The sample was drawn from the Kerala University of Health Sciences; India, King Saud University, Al-Kharj University and University of Dammam; Saudi Arabia, Ajman University of Science and Technology and University of Sharjah; United Arab Emirates and University of Aden; Yemen. The questionnaire included demographic details and questions on the students' oral health attitudes and behaviors.

Results: A total of 1553 dental students (955 females, 598 males) consisting of 655 pre-clinical and 898 clinical students participated in the study. Majority of respondents (74%) reported cleaning their tongue daily and 61.8% reported that regular dental check-up should be carried out every 6 months. However, 61.9% reported that they do not use a dental floss and 72.6% reported visiting their dentist only when having dental problems.

Conclusions: Within the limitations of this study, noticeable differences in the oral health attitudes and behaviors of the surveyed female- and clinical-dental students compared to male- and pre-clin-

* Corresponding author at: Dental Caries Research Chair, College of Dentistry, King Saud University, P.O. Box 60169, Riyadh 11545, Saudi Arabia. Tel.: +966 555415198, +966 4677401.

E-mail address: halawanyhksu@gmail.com (H.S. Halawany).

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ical-dental students respectively could not be elicited. Teaching student dentists the necessary skills in attaining good oral hygiene is as imperative as imparting knowledge on various aspects of oral health.

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1. Introduction

Oral and general health status depends on a dynamic interplay of several factors, including the individual's personal attributes, behaviors, and perceptions.¹ It is of relevant concern for oral health professionals to impart a positive oral health knowledge and behavior in the society. In fact, oral health knowledge is considered to be an important prerequisite for health related behavior and as age increases, knowledge also increases.² By virtue of their professional responsibility, young dental students play a vital role in health promotion and preventive information dissemination. It is therefore essential that their own oral health knowledge is good and their oral health behavior reflects their understanding of the relevance of preventive dental procedures conforming to the expectation of the population.² The dental students are expected to be a good model for oral health behavior. Also, they should instruct their family members, friends, patients and their society to uphold good oral health.^{3,4}

Since the freshmen dental students are susceptible to deleterious habits when they enter the dental professional courses, it is necessary to carry out regular oral health screening programs and encourage these novice dental students in taking better care of their oral and general health.⁵ The oral health attitudes and behaviors of dental students have been reported to be shaped by an intricate interplay of two major influences: cultural or societal norms and learned experiences acquired both before entering dental school and during their dental education.² Researchers have found that the oral health attitudes and behaviors of dental students differed in the pre-clinical and clinical years.⁶ The clinical students after their two years of pre-clinical training are introduced to the preventive aspects of oral health only from the third year onwards, henceforth; their level of dental education can affect oral health behavior. However, a study from India showed no significant difference between pre-clinical and clinical dental students.⁷

There is a global trend toward standardization of dental education and the enclosure of oral health promotion/disease prevention in dentistry.⁸ To evaluate the progress of this trend, comparative studies will become more essential for assessing dental students' oral health behaviors and attitudes in various cultures and under diverse educational and health care systems.^{9,10} The basis for health care in countries with social systems that are analogous is usually similar.¹¹ Any change in trends needs to be evaluated among countries with social systems that are diverse. Hence, we intended to assess the oral health attitudes and behaviors of dental students from four Asian countries (Kingdom of Saudi Arabia, India, Yemen and United Arab Emirates) that have diverse social systems, based on their gender and level of education.

2. Materials and methods

During the academic year 2011–2012, a questionnaire survey was conducted with undergraduate dental students at all study levels from four Asian countries namely India, Kingdom of Saudi Arabia (KSA), Yemen and United Arab Emirates (UAE). The sample was drawn from the Kerala University of Health Sciences; India, King Saud University, Al-Kharj University and University of Dammam; KSA, Ajman University of Science and Technology and University of Sharjah; UAE and University of Aden; Yemen. The study was registered at and approved by the College of Dentistry Research Centre (CDRC; project # NF 2314). The permission to conduct the survey was obtained from the respective Heads of the institutions. The 12-item questionnaire, derived from the study by Cortes et al. in English language was pretested on a group of five randomly selected male and female students each from first- and fifth-year of each of the institutions included in the study.¹² Necessary modifications of the questionnaire were undertaken after the pretesting. These students were not included in the final study sample.

At the end of a regularly scheduled period of classroom instruction at each of the dental schools, the respective faculty members asked the dental students in attendance if they were willing to participate voluntarily in the study by filling in a pre-tested questionnaire. Those who agreed were given the questionnaire, which was filled out and returned immediately. An introductory first page explaining the purpose of the study and assuring the confidentiality of the participants' information was attached to the questionnaire.

A total of 1553 students participated in the study, of which 38.5% were males and 61.5% were females. The absentees were not included in the study. Demographic information was obtained including age, gender and years of study. In addition to eliciting background information, the questionnaire requested information on respondents' oral health attitudes and behaviors. No information about the students' academic records was gathered. All questionnaires completed in India, Yemen and UAE were mailed to the King Saud University in Saudi Arabia for data entry. Due to the uneven distribution of students in each year and difference in the duration of course in India which is a total of 5 years and the remaining countries following 6 years including internship, classifying the students into pre-clinical (1st and 2nd years) and clinical (remaining years including internship) sorted the issues during data analysis.

The questionnaire addressed the following aspects (see [Appendix A](#)):

Background information: age; gender and year of study. Oral health behavior: brushing frequency (once daily, twice daily, after every meal, more than 2 times a day); brushing duration (1 min, 2 min, more than 2 min); Do you clean your

tongue (yes/no); Do you use dental floss (yes/no); Do you use mouthwash (yes/no). Oral health attitudes: perceived dental health value (very good, good, bad, I do not know); How often do you visit your dentist (only if I have a dental problem, once a year, twice a year); According to you, a regular dental check up must be (every 6 months, once a year, when needed). Preventive oral health attitude: what would you do if you come across an initial caries in your tooth? (take preventive measures, wait and watch, get it filled at the earliest).

Data were analyzed using the SPSS version 16.0 software (SPSS Inc., Chicago, IL, USA). Descriptive statistics by means of frequency distribution were obtained. Chi-square test was used for comparisons between the parameters such as male and female students; pre-clinical (first and second years) and clinical (third, fourth and fifth year) students and among the four countries. In all cases, a *P* value of 0.05 was used for the level of significance.

3. Results

The distribution of the dental students by country, level of study (pre-clinical and clinical) and gender are illustrated in Table 1. The response rates of the Indian, Saudi Arabian, Yemeni and UAE students were 63.7% (637/1000), 57.8% (520/900), 67.7% (203/300) and 64.3% (193/300), respectively. A total of 1553 dental students (955 females, 598 males) consisting of 655 pre-clinical (1st and 2nd year of study) and 898 clinical students (3rd, 4th and 5th year of study including internship) participated in the study.

The age of the dental students ranged between 18 and 28 years, with a mean age of 21.06 ± 1.8 years. Cross-sectional observations on oral health behaviors and attitudes are shown in Tables 2 and 3, respectively.

A majority of respondents brushed their teeth twice a day (63.9%) and with 2 min brushing duration (50.2%). There was a significant difference in the tooth brushing behavior between males and females, pre-clinical and clinical students and between countries (*P* value < 0.05). A higher percentage of females (71.8%) compared to males (51.3%) reported a typical brushing frequency of twice a day. This international recommendation of brushing twice daily was followed by both pre-clinical and clinical students in general and this trend seemed to have influenced the Indian students more when compared to the other countries. About 52% males, 49% females and about 50% pre-clinical and clinical students, respectively reported a brushing duration of 2 min.

In total, 74% reported cleaning their tongue and majority reported not using a dental floss (61.9%) and mouth rinse (64.4%). There was a significant difference in the dental behaviors in the case of gender and among countries (*P* value < 0.05), but tongue cleaning behavior (*P* value = 0.16) and use of mouthwash (*P* value = 0.957) were not statistically significant between clinical and pre-clinical students.

In all, about 70% dental students perceived their dental health value to be good and 72.6% reported visiting dentists only when they had a dental problem. In response to the question, “whether a regular dental check-up should be carried out every 6 months or once a year or when necessary”, 61.8% reported “every 6 months”, 21.8% reported “once a year” and 16.4% reported “when necessary”.

Initial caries management in terms of one of the preventive dental attitudes of the dental students was put forth by the question- “What would they do if they came across initial caries in their teeth?” Majority of the respondents (54.7%) reported “taking preventive measures”, 35.8% intended to “treat the initial caries as soon as possible” and only 9.5% selected the “wait and watch option”. The optimistic responses to this question were compared among countries and the level of study as shown in Fig. 1 and there was a significant difference between them (*P* value < 0.05).

4. Discussion

One of the common objectives of teaching dentistry is to impart the principal task of motivating patients to implement good oral hygiene practices. The dental students are more likely to be able to do this, unless they themselves are not adequately motivated.¹³ Standardized surveys using the original Japanese Hiroshima University-Dental Behavioral Inventory (HU-DBI) questionnaire and its multi-lingual translations were used to compare oral health attitudes and behaviors among dental students and other professions in different countries.^{7,14–18} These studies have revealed that cross-cultural differences exist in oral health attitudes and behaviors among future oral health professionals in various countries.

Based on the impact of education on oral hygiene practices, considerable differences were found in dental health attitudes and behaviors among students from different countries and cultural groups, as well as among dental students during the course of their dental education.¹ The results of our study showed no noticeable differences in the oral health attitudes of clinical students compared to that of pre-clinical students.

Table 1 Distribution of dental students by the country, level of study and gender (number and percentage).

| Country | Level of study | Males 598 (38.5) | Females 955 (61.5) | Total 1553 (100) |
|----------------------|----------------|------------------|--------------------|------------------|
| Saudi Arabia | Pre-clinical | 147 (68.4) | 68 (31.6) | 215 (13.8) |
| | Clinical | 207 (67.9) | 98 (32.1) | 305 (19.6) |
| India | Pre-clinical | 61 (19.7) | 248 (80.3) | 309 (19.9) |
| | Clinical | 77 (23.5) | 251 (76.5) | 328 (21.1) |
| Yemen | Pre-clinical | 5 (26.3) | 14 (73.7) | 19 (1.2) |
| | Clinical | 51 (27.7) | 133 (72.3) | 184 (11.8) |
| United Arab Emirates | Pre-clinical | 33 (29.5) | 79 (70.5) | 112 (7.2) |
| | Clinical | 17 (21.0) | 64 (79.0) | 81 (5.2) |

Table 2 Oral health behaviors of the dental students according to the gender, level of study and country.

| | Distribution of responses (n, %) | | | | | | | |
|--------------------------------|----------------------------------|----------------------|---------------------------|-----------------------|--------------------|------------------|--------------------|------------------|
| | Males (N = 598) | Females (N = 955) | Pre-clinical (N = 655) | Clinical (N = 898) | India (N = 637) | KSA (N = 520) | Yemen (N = 203) | UAE (N = 193) |
| <i>Toothbrushing behaviors</i> | | | | | | | | |
| <i>Brushing frequency</i> | | | | | | | | |
| 1/day | 236 (39.5) | 137 (14.3) | 156 (23.8) | 217 (24.2) | 138 (21.7) | 181 (34.8) | 28 (13.8) | 26 (13.5) |
| 2/day | 307 (51.3) | 686 (71.8) | 432 (66.0) | 561 (62.5) | 494 (77.6) | 251 (48.3) | 121 (59.6) | 127 (65.8) |
| After meals | 34 (5.7) | 64 (6.7) | 43 (6.6) | 55 (6.1) | 2 (0.3) | 43 (8.3) | 25 (12.3) | 28 (14.5) |
| > 2/day | 21 (3.5) | 68 (7.1) | 24 (3.7) | 65 (7.2) | 3 (0.5) | 45 (8.7) | 29 (14.3) | 12 (6.2) |
| Level of significance | 0.000 | | 0.026 | | 0.000 | | | |
| <i>Brushing duration</i> | | | | | | | | |
| 1 min | 139 (23.3) | 143 (15.0) | 137 (21.0) | 145 (16.2) | 59 (9.3) | 136 (26.2) | 38 (18.9) | 49 (25.5) |
| 2 min | 312 (52.3) | 468 (49.2) | 327 (50.1) | 453 (50.6) | 321 (50.6) | 269 (51.7) | 95 (47.3) | 95 (49.5) |
| > 2 min | 146 (24.5) | 340 (35.8) | 189 (28.9) | 297 (33.2) | 255 (40.2) | 115 (22.1) | 68 (33.8) | 48 (25.0) |
| Level of significance | 0.000 | | 0.031 | | 0.000 | | | |
| <i>Oral health behaviors</i> | | | | | | | | |
| <i>Tongue cleaning</i> | | | | | | | | |
| Yes | 380 (63.5) | 769 (80.5) | 497 (75.9) | 652 (72.6) | 554 (87.0) | 329 (63.3) | 133 (65.5) | 133 (68.9) |
| No | 218 (36.5) | 186 (19.5) | 158 (24.1) | 246 (27.4) | 83 (13.0) | 191 (36.7) | 70 (34.5) | 60 (31.1) |
| Level of significance | 0.000 | | 0.160 (NS) | | 0.000 | | | |
| <i>Floss teeth</i> | | | | | | | | |
| Yes | 242 (40.8) | 347 (36.5) | 209 (32.1) | 380 (42.6) | 122 (19.2) | 291 (56.5) | 64 (31.5) | 112 (58.3) |
| No | 351 (59.2) | 604 (63.5) | 442 (67.9) | 513 (57.4) | 512 (80.8) | 224 (43.5) | 139 (68.5) | 80 (41.7) |
| Level of significance | 0.050 | | 0.000 | | 0.000 | | | |
| <i>Mouthwash use</i> | | | | | | | | |
| Yes | 242 (40.9) | 308 (32.4) | 231 (35.5) | 319 (35.7) | 159 (25.0) | 228 (44.3) | 58 (28.9) | 105 (54.4) |
| No | 350 (59.1) | 644 (67.6) | 420 (64.5) | 574 (64.3) | 476 (75.0) | 287 (55.7) | 143 (71.1) | 88 (45.6) |
| Level of significance | 0.000 | | 0.957 (NS) | | 0.000 | | | |

Table 3 Oral health attitudes of the dental students according to the gender, level of study and country.

| | Distribution of responses (n, %) | | | | | | | |
|---------------------------------------|----------------------------------|----------------------|---------------------------|-----------------------|--------------------|------------------|--------------------|------------------|
| | Males (N = 598) | Females (N = 955) | Pre-clinical (N = 655) | Clinical (N = 898) | India (N = 637) | KSA (N = 520) | Yemen (N = 203) | UAE (N = 193) |
| <i>Oral health attitudes</i> | | | | | | | | |
| <i>Dental health value</i> | | | | | | | | |
| Very good | 104 (17.5) | 202 (21.2) | 99 (15.2) | 207 (23.2) | 112 (17.6) | 97 (18.8) | 32 (15.9) | 65 (33.9) |
| Good | 416 (70.2) | 678 (71.3) | 475 (72.7) | 619 (69.5) | 469 (73.7) | 360 (69.9) | 146 (72.6) | 119 (62.0) |
| Bad | 35 (5.9) | 24 (2.5) | 33 (5.1) | 26 (2.9) | 16 (2.5) | 31 (6.0) | 8 (4.0) | 4 (2.1) |
| I don't know | 38 (6.4) | 47 (4.9) | 46 (7.0) | 39 (4.4) | 39 (6.1) | 27 (5.2) | 15 (7.5) | 4 (2.1) |
| Level of significance | 0.002 | | 0.000 | | 0.000 | | | |
| <i>Frequency of dental visits</i> | | | | | | | | |
| Only if problem | 413 (69.5) | 710 (74.6) | 454 (69.4) | 669 (75.0) | 504 (79.4) | 330 (64.1) | 184 (91.1) | 104 (53.9) |
| 1/year | 131 (22.1) | 155 (16.3) | 127 (19.4) | 159 (17.8) | 98 (15.4) | 125 (24.3) | 14 (6.9) | 49 (25.4) |
| 2/year | 50 (8.4) | 87 (9.1) | 73 (11.2) | 64 (7.2) | 33 (5.2) | 60 (11.7) | 4 (2.0) | 40 (20.7) |
| Level of significance | 0.018 | | 0.012 | | 0.000 | | | |
| <i>Regular dental checkup must be</i> | | | | | | | | |
| Every 6 months | 348 (59.0) | 603 (63.5) | 337 (51.9) | 614 (68.9) | 371 (58.4) | 303 (59.4) | 122 (60.4) | 155 (80.3) |
| 1/year | 134 (22.7) | 202 (21.3) | 167 (25.7) | 169 (19.0) | 143 (22.5) | 133 (26.1) | 40 (19.8) | 20 (10.4) |
| When needed | 108 (18.3) | 145 (15.3) | 145 (22.3) | 108 (12.1) | 121 (19.1) | 74 (14.5) | 40 (19.8) | 18 (9.3) |
| Level of significance | 0.166 (NS) | | 0.000 | | 0.000 | | | |

The results do not concur with the study undertaken on Danish students,¹⁹ and an investigation into students at the University of Paris²⁰ which reported an evident improvement in the oral hygiene practices of students during their course. Furthermore, a study conducted by Moheet and Farooq to assess

the self-reported differences between oral health attitudes of pre-clinical and clinical students using HU-DBI questionnaire at a teaching institute in Saudi Arabia also reported that the clinical students demonstrated better oral health attitudes compared to the pre-clinical students. However, no female

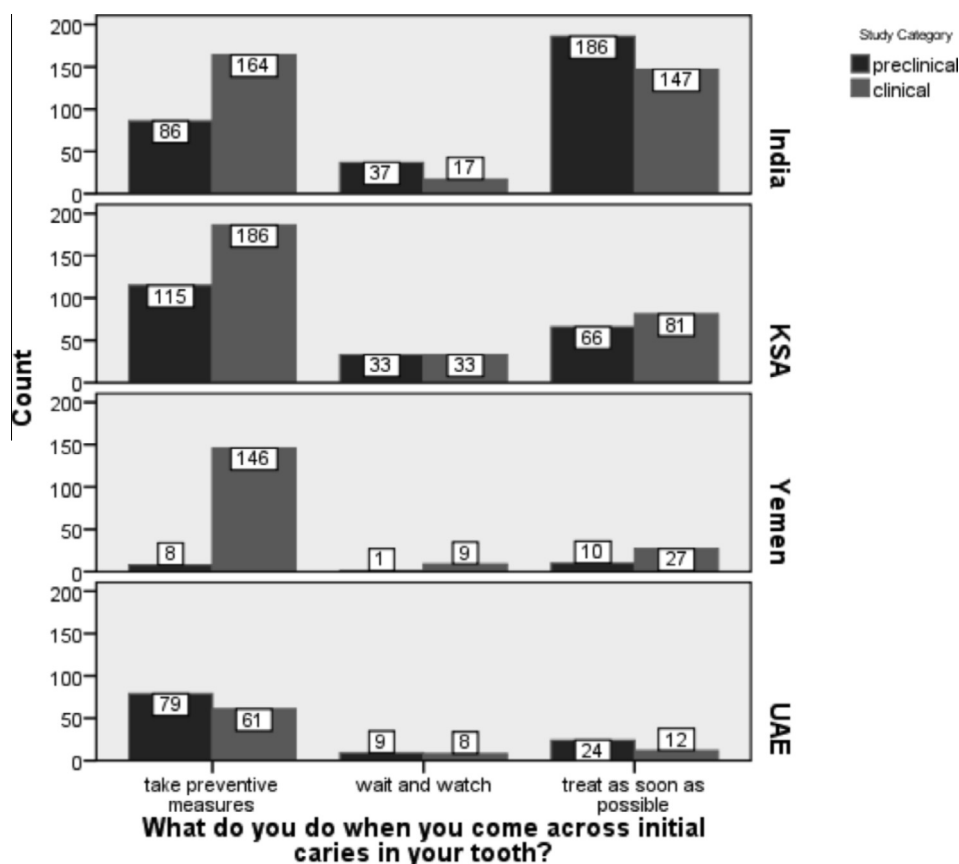


Figure 1 Preventive attitude of the dental students compared among countries and the level of study.

dental students were included in this study.²¹ In contrast, a study on Finnish and Indian students,²² Egyptian students,²³ and among students in Michigan,²⁴ all noted the absence of improvement in the practices of oral hygiene in students, in spite of having received dentistry related information and tutoring.¹³

The practical strength of the present study is the large sample size and the diverse nature of the oral health behaviors. The knowledge gained by the students can be said to have seeded decisive thinking which guided them to consider the questionnaire more cautiously. It could have been predicted that dental care and satisfaction among dental students would be convincingly high because of the social prestige bias of the dental professionals. This type of psychology where self report may be an imperfect recording of behavior biased by social belief is evident in our study where majority perceived a good value of their dental health and applied the international standard of brushing twice daily. Dental school education appeared to provide both knowledge and motivation to modify, favourably, the oral health attitudes and behaviors of participating students.²

Majority of the dental students, particularly the clinical students, reported putting off going to the dentist until they had a dental problem. This is in concurrence with the results of a previous study,¹⁸ where more than half of the dental students reported that they put off going to the dentist until they had a toothache. Since most of the students reported to have a good value of their dental health, this may partly explain why most of them visited a dentist only when they felt a real

need and not for regular examinations and this is similar to the findings of the study done by Al-Hussaini et al.²⁵

The participants of this cross-sectional study were 1553 dental students, among which, 955 were females and 598 were males. Significant gender differences were seen, with women having more positive dental health attitudes and behaviors than men, with regard to regular dental check-ups every 6 months and tooth brushing behavior. This finding is in accordance with studies done among dental students in Palestine,²⁶ Jordan²⁷ and Iran.²⁸ A study by Tseveenjav et al., however, have found no gender differences in the oral health behavior of senior dental students and attributed this to the effect of professional dental education.²⁹ Although dental check-ups every 6 months are commonly recommended in many countries, there are no scientific facts to justify this high frequency of dental visits, which can lead to needless dental treatment. Consequently, an individually determined recall interval based on consideration of caries risk is becoming more practical.²⁵

The majority of the students (63.9%) reported brushing their teeth twice a day. However, regarding oral hygiene aids, the majority of the dental students admitted not using dental floss (61.5%) and mouthwash (64%). This is in contrast with the study done over a period of ten years among final year students,² thereby, suggesting that the curriculum had exerted a positive effect on student flossing. On the other hand, the same study showed a decline in mouth rinse use and this was attributed to the possible change in the curriculum with respect to

the value of mouth rinsing for a population at low caries risk (i.e. dental students).

In order to check the responses when confronted with an actual clinical situation, the question “what do you do when you come across an initial caries in your teeth” was put forth and the majority of the students reported to the perceived benefits of taking preventive measures rather than taking the risk of future problems. The main improvement in dental health attitudes and behaviors in the dental students have been attributed to their incentive toward a dental career.³⁰ Dental educators should take the responsibility to increase the undergraduate students’ awareness and knowledge of preventive measures including oral self care regimens and this professional advancement should create stable health behaviors which can overcome personal characteristics.^{6,31, 32}

One limitation of this study was its cross-sectional design, which allowed identification of trends but was unable to explain causation of changes over time in attitudes and behavior of participants. Another limitation of the study was that the sample population was restricted to undergraduate students and had a larger proportion of females, which may have biased the results. While recognising the oral health behaviors, there is little evidence from our data that all these students are coping well or not. No claim is made that the samples included in this study are representative of all Asian dental schools or dental students. Despite these limitations, this study forms a baseline description of oral health behavior of dental students, which can be compared with a later study to establish possible trends and differences between each year of study and various other countries. In addition, the result of the present study provides valuable information that may contribute to the enhancement of prevention oriented dental education in the surveyed countries.

5. Conclusions

Within the limitations of this study, noticeable differences in the oral health attitudes and behaviors of the surveyed female- and clinical-dental students compared to male- and pre-clinical-dental students respectively could not be elicited. Teaching dental students the necessary skills in attaining good oral hygiene is as imperative as imparting knowledge on various aspects of oral health. While our questionnaire was designed to gather baseline information concerning the oral health attitudes and behaviors of dental students, it is suggested that our results will have far reaching implications in emphasizing positive oral health practices in both academic guidelines and public policies of the surveyed countries. Due to reliability issues regarding epidemiological questionnaire surveys, further clinical studies are needed for determining the correlation between self reported data and intraoral clinical status of the dental students. Accordingly, self-care practice aids for improving oral health behaviors should be introduced in both pre-clinical and clinical years and the significance of preventive oral health behaviors should be strongly emphasized in both academic guidelines and public policies.

Conflict of interest

The authors of this study confirm that there are no known conflicts of interest associated with this publication.

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Appendix A

Demographic data

1. Age
2. Gender: Male ☐ Female ☐
3. Year of study: 1st Year ☐ 2nd Year ☐ 3rd Year ☐ 4th Year ☐
5th Year ☐ Internship ☐

Questionnaire about self-perceived oral health attitudes and behaviors among dental students

1. How many times a day do you brush your teeth?
Once daily ☐ Twice daily ☐ After every meal ☐ > 2 times ☐
2. How much time do you take for each brushing?
1 minute ☐ 2 minutes ☐ > 2 minutes ☐
3. Do you clean your tongue? Yes ☐ No ☐
4. Do you use dental floss? Yes ☐ No ☐
5. Do you use mouth wash? Yes ☐ No ☐
6. How much do you value your dental health?
Very good ☐ Good ☐ Bad ☐ I don't know ☐
7. How often do you visit your dentist?
When I have a dental problem ☐ Once a year ☐ Twice a year ☐
8. According to you, a regular dental check-up must be:
Every 6 months ☐ Once a year ☐ When necessary ☐
9. What would you do if you come across initial caries in any of your tooth?
Take preventive measures ☐ Wait and watch ☐
Treat as soon as possible ☐

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