

Self-reported Differences in Oral Health Attitudes and Behaviors of Health-care Students at a University in Malaysia

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Abstract

Background: Oral health is a vital part of general health. An individual's perception on oral health is reflected by their oral health attitudes and behaviors. **Aim:** To determine and compare the oral health attitudes and behaviors of dental, medical, and nursing students at Universiti Sains Malaysia (USM). **Methods:** A modified version of Hiroshima University–Dental Behavioural Inventory (HU-DBI)-based questionnaire consisting of 20 items was distributed to all health-care students ($n = 1166$) of USM. HU-DBI score was calculated using responses to 12 HU-DBI items in the questionnaire. HU-DBI scores of the three groups were compared using one-way ANOVA complemented by Bonferroni test. Scores among preclinical and clinical levels were compared using independent *t*-test. Chi-square test was used to evaluate the differences in distribution of all items in the HU-DBI survey. **Results:** Dental students had the highest mean HU-DBI score (7.79 ± 1.58), followed by their nursing (6.99 ± 1.46) and medical (6.42 ± 1.58) counterparts. The mean HU-DBI score for all clinical students (7.04 ± 1.75) was significantly higher than those in their preclinical years (6.64 ± 1.56). Among the 12 HU-DBI items that were used to calculate the HU-DBI scores, items 2, 6, 8, 9, 10, 15, 16 and 19 show significant difference between the distributions of responses within the 3 groups ($P < 0.05$). **Conclusion:** Dental students demonstrated better oral health attitudes. However, all our future health-care provider needs to have better attitudes toward oral health. Hence, comprehensive oral health awareness programs need to be incorporated to all health-care students throughout their study programs.

Keywords: Dental students, Hiroshima University Dental Behavioural Inventory, medical students, nursing students, oral health behavior

INTRODUCTION

Oral health is a vital part of general health and hence affects the total well-being. The individual's perception on oral health is reflected by their oral health attitudes and behaviors.^[1] Dental students, who will be our future dental care providers, are expected to have good attitude and behavior toward their own oral health.^[2,3] Furthermore, as dentists, they will be role models for their patients, friends, and family members.

The oral health conditions of the population are expected to be better when the dentists themselves are motivated.^[4-6] In addition, the quality of oral health-care services provided is greatly affected by the attitude and behavior of the provider toward his or her own oral health.^[7] Research on dental students in various parts of the world has shown that level of clinical training also had an impact on the student's attitude and behavior toward oral health. Furthermore, students from different countries, ethnic origin, and course of study demonstrated differences in their attitudes and behavior as well.^[8-10]

Most studies evaluating the oral health attitudes and behaviors, conducted in different parts of the world mainly focused on dental students.^[2,3,6,8,11-13] Even though some studies also compared the attitudes and behavior of dental students and students studying pharmacy,^[14] medicine,^[5] paramedical sciences,^[5] and other professional courses^[10] in various parts of the world. To the best of our knowledge, there was insufficient data about the oral health attitudes of dental, medical, and nursing students from this region of Malaysia.

Besides, dental students, students from the allied health streams are also supposed to have better oral health

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knowledge and behavior.^[15] It is well known that poor oral and periodontal health can lead to or worsen various medical conditions, such as diabetes mellitus, respiratory disorders, cardiovascular disease, and other systemic disorders.^[16] Thus, by determining the oral health attitudes and behavior of various health-care students, effective steps can be undertaken to improve or instil positive oral health attitudes and behavior in all our future health-care providers. Thus, the aim of this study was to determine and compare the oral health attitudes and behaviors of dental, medical, and nursing students at Universiti Sains Malaysia (USM) Health Campus, Kelantan, Malaysia.

Table 1: Items in Hiroshima University-Dental Behavioural Inventory Questionnaire (correct answer, agree [A], disagree [D])

1. I don't worry about visiting the dentist
2. My gums tend to bleed when I brush my teeth (D)
3. I worry about the colour of my teeth
4. I have noticed some white sticky deposits on my teeth (A)
5. I use a child-sized toothbrush
6. I think that I cannot help having false teeth when I am old (D)
7. I am bothered by the colour of my gums
8. I think my teeth are getting worse despite my daily brushing (D)
9. I brush each of my teeth carefully (A)
10. I have never been taught professionally how to brush (D)
11. I think I can clean my teeth well without using toothpaste (A)
12. I often check my teeth in a mirror after brushing (A)
13. I worry about having bad breath
14. It is impossible to prevent gum disease with tooth brushing alone (D)
15. I put off going to the dentist until I have toothache (D)
16. I have used a dye to see how clean my teeth are (A)
17. I use a toothbrush which has hard bristles
18. I don't feel I've brushed well unless with strong strokes
19. I feel I sometimes take too much time to brush my teeth (A)
20. I have had my dentist tell me that I brush very well

METHODS

The study was conducted at USM Health Campus. It was a cross-sectional survey involving all students from dental, medical, and nursing schools that were attending the university during the study. Ethical approval for carrying out the study was obtained from the Human Research Ethics Committee USM (Ref. USM/JEPeM/16030106). A modified bilingual (English and Bahasa Melayu) version of Hiroshima University– Dental Behavioral Inventory (HU-DBI) questionnaire [Annexure 1] was distributed to 1166 students in dental, medical, and nursing schools. Participation was voluntary, and no personal information was recorded. Demographic data such as gender, age, race, and school were collected. Questionnaires that were unfilled or partly filled were excluded from the study.

HU-DBI score was calculated using responses to 12 HU-DBI items in the questionnaire [Table 1]. Items 4, 9, 11, 12, 16, and 19 with agree responses were given a point, whereas, items 2, 6, 8, 10, 14, and 15 with disagree responses were given a point. Maximum HU-DBI score that could be achieved was 12 while these 12 items appear to be directly related to the oral health behavior, the remaining 8 statements were not included in the analysis as they reflect general oral health-related attitude [Table 1].

Statistical analysis

HU-DBI scores of students from three schools were compared using one way ANOVA complemented by Bonferroni test whereas comparison of HU-DBI scores of students based on their clinical level was carried out using independent *t*-test. Chi-square test was carried out to evaluate the differences in distribution of all items in the HU-DBI survey by school and clinical level. Statistical significance level was set at $P < 0.05$.

RESULTS

Out of 1166 students, 1053 students participated in this study (90.3% response rate). Medical school students consisted

Table 2: Post hoc Bonferroni test comparing Hiroshima University-Dental Behavioural Inventory scores of all students from medical, dental and nursing schools

Course (I)	Course (J)	Mean difference (I–J)	SE	P	95% CI	
					Lower bound	Upper bound
Medical	Dental	-1.373*	0.116	<0.001*	-1.65	-1.09
	Nursing	-0.575*	0.144	<0.001*	-0.92	-0.23
Dental	Nursing	0.797*	0.164	<0.001*	0.40	1.19

*Statistically significant ($P < 0.05$). SE – Standard error, CI – Confidence interval

Table 3: Independent t-test comparing the mean Hiroshima University-Dental Behavioural Inventory scores of participants based on their clinical years

Clinical level	HU-DBI score			
	Mean ± SD	Mean difference (95% CI)	t statistics (df)	P
Preclinical	6.64 ± 1.563	-0.399 (-0.600–0.199)	-3.904 (1051)	<0.001*
Clinical	7.04 ± 1.758			

*Statistically significant ($P < 0.05$). SD – Standard deviation, HU-DBI – Hiroshima University-Dental Behavioural Inventory

of 62.3% of the respondents while students from the dental and nursing schools were 24.0% and 13.7%, respectively. Out of all the respondents, 553 were in their preclinical years (52.5%) whereas 500 students belonged to clinical years (47.5%).

Tables 2 and 3 summarize the comparison of HU-DBI scores between students based on their schools and clinical levels. Dental students had the highest mean HU-DBI score (7.79 ± 1.58) when compared to their nursing (6.99 ± 1.46) and medical (6.42 ± 1.58) counterparts. Mean scores of students from each school were significantly different from the other as summarized in Table 4. The mean HU-DBI score for clinical students from all 3 schools (7.04 ± 1.75) was significantly higher than those in their preclinical years (6.64 ± 1.56). Comparison of HU-DBI scores between preclinical students from the three schools using the *post hoc* Bonferroni test depicts a significant difference in HU-DBI score of preclinical medical students as compared to dental and nursing students ($P \leq 0.05$) whereas there are no significant differences in HU-DBI score between nursing and dental preclinical students ($P > 0.05$). On the other hand, clinical dental students had a significantly higher mean HU-DBI score when compared to their medical and nursing counterparts ($P \leq 0.05$). However, the mean HU-DBI scores of medical and nursing clinical students were not significantly different from each other ($P > 0.05$). These results are tabulated in Tables 5 and 6.

Table 4: Results of one-way ANOVA test comparing the mean Hiroshima University-Dental Behavioural Inventory scores of participants from all three schools

School	Mean \pm SD	F	P
Medical	6.42 \pm 1.58	70.90	<0.001*
Dental	7.79 \pm 1.58		
Nursing	6.99 \pm 1.46		

*Statistically significant ($P < 0.05$). SD – Standard deviation

Table 5: Post hoc Bonferroni test comparing Hiroshima University-Dental Behavioural Inventory scores of preclinical students from medical, dental and nursing schools

School (I)	School (J)	Mean difference (I–J)	SE	P	95% CI	
					Lower bound	Upper bound
Medical	Dental	-0.651*	0.175	0.001*	-1.07	-0.23
	Nursing	-0.646*	0.191	0.002*	-1.10	-0.19
Dental	Nursing	0.006	0.234	1.000	-0.56	0.57

*Statistically significant ($P < 0.05$). SE – Standard error, CI – Confidence interval

Table 6: Post hoc Bonferroni test comparing Hiroshima University-Dental Behavioural Inventory scores of clinical students from medical, dental and nursing school

School (I)	School (J)	Mean difference (I–J)	SE	P	95% CI	
					Lower bound	Upper bound
Medical	Dental	-1.831*	0.156	<0.001*	-2.21	-1.46
	Nursing	-0.495	0.213	0.062	-1.01	0.02
Dental	Nursing	1.337*	0.229	<0.001*	0.79	1.89

*Statistically significant ($P < 0.05$). SE – Standard error, CI – Confidence interval

The percentage and analysis of yes/no response to HU-DBI items are listed according to schools as shown in Table 7 and according to clinical levels as shown in Table 8. Among the 12 HU-DBI items that were used to calculate the HU-DBI scores, items number 2,6,8,9,10,15,16, and 19 shows a significant difference between the distributions of responses for the three schools ($P \leq 0.05$). As for the distributions of responses between preclinical and clinical group, a significant difference ($P \leq 0.05$) was seen for items number 2, 4, 8, 11, 15, and 16.

DISCUSSION

HU-DBI scores of individuals are directly related to their oral health behavior and attitude.^[8] Higher scores can be associated with better oral health-related attitude and behavior. The mean HU-DBI scores of dental, medical, and nursing students from USM were higher as compared to students from respective schools in the previous studies with mean scores ranging from 4.74–7.33.^[6,12-14,17,18] However, within the three schools, dental students were the best in terms of mean HU-DBI score as compared to their medical and nursing counterparts. Similarly, other studies have also shown that dental students demonstrate higher mean HU-DBI scores than students from other schools.^[5,10,14] This is most likely attributed to the wide range of preventive dentistry and periodontics lectures given to dental students during their studies. Furthermore, clinical students in this study reported a better dental health attitude and behavior as compared to preclinical students. Various studies have proposed that the students’ personal dental health attitude and behavior are related intimately with their academic progression.^[2,19,20]

In general, most of the students from all three schools in USM are not worried about visiting the dentist. These results are similar to students from India and China.^[6,13] Despite that,

Table 7: Percentage and analysis of yes-no responses according to schools (n=1053)

Item number	HU-DBI	Medical, n (%)	Dental, n (%)	Nursing, n (%)	P
1	Agree	514 (78.3) [#]	220 (86.9)	115 (79.8)	0.013
	Disagree	142 (21.7)	33 (13.1)	29 (20.2)	
2	Agree	183 (27.8) [#]	37 (14.6) [§]	37 (25.6)	<0.001
	Disagree	473 (72.2)	216 (85.4)	107 (74.4)	
3	Agree	469 (71.5) [#]	150 (59.2) [§]	119 (82.6) ^{##}	<0.001
	Disagree	187 (28.5)	103 (40.8)	25 (17.4)	
4	Agree	310 (47.2)	119 (47.0)	74 (51.3)	0.644
	Disagree	346 (52.8)	134 (53.0)	70 (48.7)	
5	Agree	44 (6.7)	8 (3.1)	9 (6.2)	0.118
	Disagree	612 (93.3)	245 (96.9)	135 (93.8)	
6	Agree	230 (35.0) [#]	55 (21.7) [§]	47 (32.6)	<0.001
	Disagree	426 (65.0)	198 (78.3)	97 (67.4)	
7	Agree	223 (33.9) [#]	59 (23.3)	43 (29.8)	0.007
	Disagree	433 (66.1)	194 (76.7)	101 (70.2)	
8	Agree	150 (22.8) [#]	20 (7.9) [§]	32 (22.2)	<0.001
	Disagree	506 (77.2)	233 (92.1)	112 (77.8)	
9	Agree	507 (77.2) [#]	227 (89.7)	124 (86.2) ^{##}	<0.001
	Disagree	149 (22.8)	26 (10.3)	20 (13.8)	
10	Agree	145 (22.1) [#]	16 (6.3) [§]	20 (13.8) ^{##}	<0.001
	Disagree	511 (77.9)	237 (93.7)	124 (86.2)	
11	Agree	74 (11.2)	18 (7.1)	11 (7.6)	0.108
	Disagree	582 (88.8)	235 (92.9)	133 (92.4)	
12	Agree	517 (78.8)	213 (84.1)	123 (85.4)	0.063
	Disagree	139 (21.2)	40 (15.9)	21 (14.6)	
13	Agree	520 (79.2)	211 (83.3)	123 (85.4)	0.131
	Disagree	136 (20.8)	42 (16.7)	21 (14.6)	
14	Agree	482 (73.4)	179 (70.7)	111 (77.0)	0.386
	Disagree	174 (26.6)	74 (29.3)	33 (23.0)	
15	Agree	358 (54.5) [#]	43 (16.9) [§]	66 (45.8)	<0.001
	Disagree	298 (45.5)	210 (83.1)	78 (54.2)	
16	Agree	110 (16.7) [#]	115 (45.4) [§]	31 (21.5)	<0.001
	Disagree	546 (83.3)	138 (54.5)	113 (78.5)	
17	Agree	117 (17.8) [#]	6 (2.3) [§]	24 (16.6)	<0.001
	Disagree	539 (82.2)	247 (97.7)	120 (83.4)	
18	Agree	257 (39.1) [#]	26 (10.2) [§]	51 (35.4)	<0.001
	Disagree	399 (60.9)	227 (89.8)	93 (64.6)	
19	Agree	280 (42.6)	100 (39.5) [§]	88 (61.1) ^{##}	<0.001
	Disagree	376 (57.4)	153 (60.5)	56 (38.9)	
20	Agree	283 (43.1) [#]	162 (64.0)	90 (62.5) ^{##}	<0.001
	Disagree	373 (56.9)	91 (36.0)	54 (37.5)	

Pearson Chi-square test was done to compare responses between medical and dental, medical and nursing and dental and nursing. ^{##}Statistically significant difference with medical school ($P<0.05$), [#]Statistically significant difference with dental school ($P<0.05$), [§]Statistically significant difference with nursing school ($P<0.05$). HU-DBI – Hiroshima University-Dental Behavioural Inventory

it is notable that majority of dental students in this study reported that they regularly visit the dentist as compared to their medical and nursing counterparts, where only 45%–55% reported regular dental visit. This is consistent with a study conducted on dental students in Croatia.^[12] Dental students have more exposure to the dental clinics and dentists in general as compared to their medical and nursing counterparts, thus experiencing less treatment anxiety. A study conducted in Israel found that treatment anxiety is one of the main factors of delayed dental visits until symptoms arise and could also be the reason for the delayed visits by medical and nursing students.^[21]

Surprisingly, fewer dental students are worried about the color of their teeth as compared to their medical and nursing counterparts. This depicts that medical and nursing students demonstrate a behavior which is similar to the general population, wherein the presence of symptoms and/or concern for esthetics drive their dental behavior.^[22] However, dental students are well versed with the agents used in tooth whitening (bleaching) and understand the risks and benefits associated with various esthetic treatments. Furthermore, clinical students are also less worried about the color of their teeth as is reported in some studies.^[19,23]

Table 8: Percentage and analysis of yes-no responses according to clinical levels (n=1053)

Item number	HU-DBI	Preclinical, n (%)	Clinical, n (%)	P
1	Agree	451 (81.5)	398 (79.6)	0.423
	Disagree	102 (18.5)	102 (20.4)	
2	Agree	121 (21.8)	136 (27.2)	0.045*
	Disagree	432 (78.2)	364 (72.8)	
3	Agree	402 (72.6)	336 (67.2)	0.052
	Disagree	151 (27.4)	164 (32.8)	
4	Agree	239 (43.2)	264 (52.8)	0.002*
	Disagree	314 (56.8)	236 (47.2)	
5	Agree	22 (3.9)	39 (7.8)	0.008*
	Disagree	531 (96.1)	461 (92.2)	
6	Agree	169 (30.5)	163 (32.6)	0.477
	Disagree	384 (69.5)	337 (67.4)	
7	Agree	162 (29.2)	163 (32.6)	0.246
	Disagree	391 (70.8)	337 (67.4)	
8	Agree	87 (15.7)	115 (23.0)	0.003*
	Disagree	466 (84.3)	385 (77.0)	
9	Agree	444 (80.2)	414 (82.8)	0.295
	Disagree	109 (19.8)	86 (17.2)	
10	Agree	96 (17.3)	85 (17.0)	0.877
	Disagree	457 (82.7)	415 (83.0)	
11	Agree	37 (6.6)	66 (13.2)	<0.001*
	Disagree	516 (93.4)	434 (86.8)	
12	Agree	460 (83.1)	393 (78.6)	0.058
	Disagree	93 (16.9)	107 (21.4)	
13	Agree	442 (79.9)	412 (82.4)	0.306
	Disagree	111 (20.1)	88 (17.6)	
14	Agree	413 (74.6)	359 (71.8)	0.291
	Disagree	140 (25.4)	141 (28.2)	
15	Agree	279 (50.4)	188 (37.6)	<0.001*
	Disagree	274 (49.6)	312 (62.4)	
16	Agree	69 (12.4)	187 (37.4)	<0.001*
	Disagree	484 (87.6)	313 (62.6)	
17	Agree	73 (13.2)	74 (14.8)	0.455
	Disagree	480 (86.8)	426 (85.2)	
18	Agree	196 (35.4)	138 (27.6)	0.006*
	Disagree	357 (64.6)	362 (72.4)	
19	Agree	251 (45.3)	217 (43.4)	0.517
	Disagree	302 (54.7)	283 (56.6)	
20	Agree	258 (46.6)	277 (55.4)	0.005*
	Disagree	295 (53.4)	223 (44.6)	

Pearson Chi-square test was done. * $P < 0.05$, statistically significant.
HU-DBI – Hiroshima University-Dental Behavioural Inventory

In addition, in this study, plaque deposits on their teeth were noticed by significantly more number of clinical students than their preclinical counterparts. As expected, clinical students have a higher awareness toward the microbial dental plaque due to their education and clinical training experiences. This result was in contrast to a study in Turkey,^[18] where the clinical students fared worse than preclinical students. However, there may have been a misinterpretation that this question was about cleanliness of teeth rather than the awareness of plaque.

Regarding tooth brushing techniques, significantly higher number of dental and nursing students reported that they brush each of their teeth carefully as compared to the medical students. Likewise, almost all (93.7%) dental students agreed that the correct brushing technique has been professionally taught to them, which is significantly higher than students from the other two schools. Other studies have also observed similar results.^[12,17] Moreover, when compared to dental students, significantly higher numbers of medical and nursing students use a hard bristled toothbrush. This is in accordance to the study done in China and Kingdom of Saudi Arabia.^[14,24] Again, this result can be attributed to dental health education, particularly the periodontology and dental public health subjects which emphasize on toothbrush selection and tooth brushing techniques for good oral hygiene.

Strength and limitations

The strength of this study includes the large sample size of health-care students and the rigor of survey and questions which addresses in breadth various aspects of oral health attitudes and behavior.

There are several limitations in this study. First, because this is a cross-sectional study, any changes in HU-DBI scores cannot be attributed entirely toward the curricular level. Furthermore, dental students are well versed with the correct dental health behaviors and attitudes. Therefore, a bias may occur as these dental students may not practice these behaviors in real life yet answer the questions correctly.

Implications for practice

The oral health of a patient is closely linked to their general health. Evidence suggests that diabetes mellitus and periodontal disease have an adverse bidirectional interrelationship.^[16] Furthermore, dental plaque can also serve as a reservoir of infection in hospital inpatients.^[25] These are among a few examples that highlight the importance of oral health status relating to general health. This study shows that medical and nursing students did not demonstrate good attitude and behavior toward their oral health. Therefore, there needs to be an improvement in the oral health awareness for the medical and nursing schools. It is crucial that these students improve their own awareness and thus can provide comprehensive health-care services to their patients in the future. Furthermore, when our future health-care providers are aware of the oral health-related problems and its effects on the general health, they will refer patients to dentists in an appropriate and timely manner.

Further studies can be implemented on the same students to properly determine the impact of increased educational experience by correlating their dental health attitudes and behaviors with their actual oral health status. In addition, further studies emphasizing on gender and cultural differences of students in Malaysia regarding dental health attitudes and behaviors can also be carried out.

CONCLUSION

Dental students demonstrated better oral health attitudes as compared to their medical and nursing counterparts, which indicate the positive impact of dental health education on these students. It is well known that oral health is closely related to general health, thus, when our future health-care providers are aware of the effects of oral health-related problems on general health, they will refer patients to dentists in an appropriate and timely manner. Hence, comprehensive oral health awareness programs need to be incorporated to all health-care students starting from their preclinical years to improve the oral health attitudes of all our future health-care providers.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Hobdell M, Sinkford J, Alexander C, Alexander D, Corbet E, Douglas C, *et al.* 5.2 ethics, equity and global responsibilities in oral health and disease. *Eur J Dent Educ* 2002;6 Suppl 3:167-78.
- Cortes FJ, Nevot C, Ramon JM, Cuenca E. The evolution of dental health in dental students at the University of Barcelona. *J Dent Educ* 2002;66:1203-8.
- Brusokaite J, Januleviciute I, Kukleris A, Zekonis G. Evaluation of dental health of dental students at Kaunas University of Medicine. *Stomatologija* 2003;5:133-6.
- Al-Omari QD, Hamasha AA. Gender-specific oral health attitudes and behavior among dental students in Jordan. *J Contemp Dent Pract* 2005;6:107-14.
- Usman S, Bhat SS, Sargod SS. Oral health knowledge and behavior of clinical medical, dental and paramedical students in Mangalore. *J Oral Health Comm Dent* 2007;1:46-8.
- Dagli RJ, Tadakamadla S, Dhanni C, Duraiswamy P, Kulkarni S. Self reported dental health attitude and behavior of dental students in India. *J Oral Sci* 2008;50:267-72.
- Dumitrescu AL, Wagle M, Dogaru BC, Manolescu B. Modeling the theory of planned behavior for intention to improve oral health behaviors: The impact of attitudes, knowledge, and current behavior. *J Oral Sci* 2011;53:369-77.
- Kawamura M, Honkala E, Widström E, Komabayashi T. Cross-cultural differences of self-reported oral health behaviour in Japanese and Finnish dental students. *Int Dent J* 2000;50:46-50.
- Komabayashi T, Kawamura M, Kim KJ, Wright FA, Declerck D, Goiás Mdo C, *et al.* The hierarchical cluster analysis of oral health attitudes and behaviour using the Hiroshima University – Dental Behavioural Inventory (HU-DBI) among final year dental students in 17 countries. *Int Dent J* 2006;56:310-6.
- Kumar Tadakamadla S, Kriplani D, Shah V, Tadakamadla J, Tibdewal H, Duraiswamy P, *et al.* Oral health attitudes and behaviour as predisposing factor for dental caries experience among health professional and other professional college students of India. *Oral Health Prev Dent* 2010;8:195-202.
- Peker I, Alkurt MT. Oral health attitudes and behavior among a group of Turkish dental students. *Eur J Dent* 2009;3:24-31.
- Badovinac A, Božić D, Vučincac I, Vešligaj J, Vražić D, Plančak D, *et al.* Oral health attitudes and behavior of dental students at the University of Zagreb, Croatia. *J Dent Educ* 2013;77:1171-8.
- Komabayashi T, Kwan SY, Hu DY, Kajiwara K, Sasahara H, Kawamura M, *et al.* A comparative study of oral health attitudes and behaviour using the Hiroshima University – Dental Behavioural Inventory (HU-DBI) between dental students in Britain and China. *J Oral Sci* 2005;47:1-7.
- Kumar S, Busaly IA, Tadakamadla J, Tobaigy F. Attitudes of dental and pharmacy students to oral health behaviour at Jazan University, Kingdom of Saudi Arabia. *Arch Orofac Sci* 2012;7:9-13.
- McConaughy FL, Lukken KM, Toevs SE. Health promotion behaviors of private practice dental hygienists. *J Dent Hyg* 1991;65:222-30.
- Teng YT, Taylor GW, Scannapieco F, Kinane DF, Curtis M, Beck JD, *et al.* Periodontal health and systemic disorders. *J Can Dent Assoc* 2002;68:188-92.
- Polychronopoulou A, Kawamura M. Oral self-care behaviours: Comparing Greek and Japanese dental students. *Eur J Dent Educ* 2005;9:164-70.
- Yildiz S, Dogan B. Self reported dental health attitudes and behaviour of dental students in Turkey. *Eur J Dent* 2011;5:253-9.
- Dumitrescu AL, Kawamura M, Sasahara H. An assessment of oral self-care among romanian dental students using the Hiroshima University – Dental Behavioural Inventory. *Oral Health Prev Dent* 2007;5:95-100.
- Polychronopoulou A, Kawamura M, Athanasouli T. Oral self-care behavior among dental school students in Greece. *J Oral Sci* 2002;44:73-8.
- Samorodnitzky GR, Levin L. Self-assessed dental status, oral behavior, DMF, and dental anxiety. *J Dent Educ* 2005;69:1385-9.
- Mumcu G, Sur H, Yildirim C, Soylemez D, Atli H, Hayran O, *et al.* Utilisation of dental services in Turkey: A cross-sectional survey. *Int Dent J* 2004;54:90-6.
- Peker K, Uysal O, Bermek G. Dental training and changes in oral health attitudes and behaviors in istanbul dental students. *J Dent Educ* 2010;74:1017-23.
- Rong WS, Wang WJ, Yip HK. Attitudes of dental and medical students in their first and final years of undergraduate study to oral health behaviour. *Eur J Dent Educ* 2006;10:178-84.
- Scannapieco FA. Role of oral bacteria in respiratory infection. *J Periodontol* 1999;70:793-802.

Annexure 1: A modified bilingual (English and Bahasa Melayu) version of Hiroshima University – Dental Behavioral Inventory (HU-DBI) questionnaire

ANNEXURE I

Course/ Kursus : Medical Dental Nursing Year of Study/ : _____
 Perubatan Pergigian Kejururawatan Tahun pembelajaran

Gender/ Jantina : Male Female Age/ Umur : _____
 Lelaki Perempuan

Race/ Kaum : Malay Chinese Indian Others
 Melayu Cina India Lain-lain

**Hiroshima University-Dental Behavioral Inventory
 Inventori Tingkah Laku Pergigian Universiti Hiroshima**

	Statement/ Penyata	Agree Setuju	Disagree Tidak Setuju
1	I don't worry about visiting the dentist Saya tidak bimbang untuk berjumpa doktor gigi	Agree Setuju	Disagree Tidak Setuju
2	My gums bleed when I brush my teeth Gusi saya berdarah apabila saya memberus gigi	Agree Setuju	Disagree Tidak Setuju
3	I worry about the color of my teeth Saya risau tentang warna gigi saya	Agree Setuju	Disagree Tidak Setuju
4	I have noticed some white sticky deposits on my teeth Saya telah menjumpai beberapa deposit putih melekat pada gigi saya	Agree Setuju	Disagree Tidak Setuju
5	I use a child-sized toothbrush Saya mengguna berus gigi saiz kanak-kanak	Agree Setuju	Disagree Tidak Setuju
6	I think I cannot help having false teeth when I am old Saya berasa tidak dapat mengelakkan diri daripada memakai gigi palsu apabila saya berumur	Agree Setuju	Disagree Tidak Setuju
7	I am bothered by the color of my gums Saya berasa terganggu dengan warna gusi saya	Agree Setuju	Disagree Tidak Setuju
8	I think my teeth are getting worse despite my daily brushing Saya berasa gigi saya menjadi semakin teruk walaupun memberus gigi setiap hari.	Agree Setuju	Disagree Tidak Setuju
9	I brush each of my teeth carefully Saya memberus setiap gigi dengan teliti	Agree Setuju	Disagree Tidak Setuju
10	I have never been taught professionally how to brush Saya tidak pernah diajar cara memberus gigi secara profesional	Agree Setuju	Disagree Tidak Setuju
11	I think I can clean my teeth well without using toothpaste Saya berasa bahawa saya boleh membersihkan gigi dengan baik tanpa menggunakan ubat gigi	Agree Setuju	Disagree Tidak Setuju
12	I often check my teeth in a mirror after brushing Saya selalu memeriksa gigi dengan cermin selepas memberus gigi	Agree Setuju	Disagree Tidak Setuju
13	I worry about having bad breath Saya berasa bimbang tentang nafas berbau	Agree Setuju	Disagree Tidak Setuju
14	It is impossible to prevent gum disease with toothbrushing alone Ia adalah mustahil untuk mencegah penyakit gusi dengan memberus gigi sahaja	Agree Setuju	Disagree Tidak Setuju
15	I put off going to a dentist until I have a toothache Saya melengahkan perjumpaan dengan doktor gigi sehingga saya mengalami sakit gigi	Agree Setuju	Disagree Tidak Setuju
16	I have used a dye to see how clean my teeth are Saya pernah mengguna pewarna untuk lihat kebersihan gigi saya	Agree Setuju	Disagree Tidak Setuju
17	I use a toothbrush with hard bristles Saya menggunakan berus gigi berbulu keras	Agree Setuju	Disagree Tidak Setuju
18	I don't feel I have brushed unless I brush with strong strokes Saya tidak berasa bahawa saya telah memberus gigi sehingga saya memberus dengan gerakan memberus yang kuat	Agree Setuju	Disagree Tidak Setuju
19	I feel I sometimes take too much time to brush my teeth Saya berasa bahawa kadang kala saya mengambil masa yang terlalu panjang untuk memberus gigi	Agree Setuju	Disagree Tidak Setuju
20	I have had my dentist tell me that I brush very well Doktor gigi pernah memberitahu saya bahawa saya memberus gigi dengan baik	Agree Setuju	Disagree Tidak Setuju