ORAL HEALTH ATTITUDES AND BEHAVIOURS AMONG UNDERGRADUATE HEALTH SCIENCES STUDENTS

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Abstract

Oral health is a component of overall health that has an impact on an individual's general well-being. It is believed that individuals enrolled in undergraduate health sciences are expected to have a positive attitude and behaviour toward their oral health. This study is conducted to investigate and compare the oral health attitudes and behaviours among undergraduate health sciences students in IIUM Kuantan and to evaluate between preclinical and clinical students on their oral health awareness. A 100 respondents were recruited from each course. A modified online questionnaire assessing attitudes and behaviours towards oral health was used. Results were analysed by descriptive statistics, Kruskal Wallis test, and Mann-Whitney test. Most respondents denied having a smoking habit (95.8%). Half of them brushed their teeth and used dental floss in their daily lives. Dentistry depicted the highest mean score of HU-DBI (17.92). Clinical students showed a significant difference (p = 0.044) and depicted higher scores compared to preclinical students whilst gender showed similar scores. The outcome for oral health attitudes and behaviours among clinical dental students has the greatest score compared to other courses. Comprehensive oral health awareness programs for future health care providers need to be stressed on right from their preclinical years.

Keywords: Oral Health, Attitude, Behaviour, Undergraduate, Health Science

Introduction

Oral health can be manifested as a state of being free from mouth and facial pain, oral diseases, and disorders that limit an individual's capacity in biting, chewing, smiling, and speaking (World Health Organization 2018). It is a component of overall health that has an impact on an individual's general well-being. Oral health attitudes and behaviours reflect the perception of oral health (1). Essentially, possessing a good attitude and behaviour will depict positive oral health. Hence, the Hiroshima University-Dental Behavioural Inventory (HUDBI) questionnaire (Agree/Disagree), developed by Kawamura (2) in 1990, was intended to be used for evaluating the perceptions and oral health behaviours of patients. Research from other countries have assessed the oral health attitudes and behaviours that only focused on dental students. Apart from dental students, individuals enrolled in undergraduate health sciences are also expected to have a positive attitude and behaviour toward their oral health. Health sciences students are the future healthcare providers therefore, these people need to enhance and maintain their oral health behaviours to convey awareness to the nation. There is a list of health science streams available (Dentistry, Medical, Pharmacy, Nursing, and Allied Health Sciences) at the International Islamic University Malaysia Kuantan campus (IIUMK). It is in the eastern state of Malaysia, which will become the target population for this study.

Furthermore, there are various determinants like oral health biology, gender, socioeconomic condition,

demographic, and socio-culture that can influence the attitudes and behaviours (3). It is believed that students from different genders, places, study backgrounds, and education transitions demonstrate differences in their attitudes and behaviours. The socio-demographic background of the students showed to have a high influence on oral health (3, 4). Several studies evaluated the degree of academic progress of the students that gave an impact on their oral health awareness (1, 3-4).

Thus, this research aims to investigate and compare the oral health attitudes and behaviours among undergraduate health sciences students in IIUMK and to evaluate between preclinical and clinical students on their oral health awareness. As for the dental students, this study provides insight on the level of oral health attitude and behaviours among the current dental undergraduates who will be the future dental health providers in the country. These findings may identify the aspects that need improvement in the dental curriculum and reinforce the importance of dental health education among dental students.

Materials and Methods

Study design
This was a quantitative descriptive cross-sectional study among all undergraduate health sciences students in IIUM Kuantan, Pahang Malaysia. The inclusion criteria for participants in this study are that they are registered in one of the health science courses, aged 19–27 years old, and have no communication skill difficulties (English). The exclusion criteria are non-health science participants.

Study population and sample size calculation
The calculated sample size is 500 based on the expected population of 2000 residents at the study location. The sample size is calculated using the Raosoft software sample size calculator (online). The confidence level is set at 95% and the margin of error is at 5%. The sample size n and margin of error E are given by n = N x/((N -1) E2 + x) X = Z(c/100)2 r (100 - r) E = Sqrt [(N - n) x/n (N -1)], where N is the population size, r is the fraction of responses of interest, and Z(c/100) is the critical value for the confidence level c. A sample size of 100 respondents in each course were required based on the calculation of 95% confidence interval. Of which, 50 respondents were preclinical, and 50 respondents were clinical students. Cluster sampling was applied

for the selection of respondents according to their courses. Ethical approval of this study was obtained from the IIUM Research Ethics Committee (IREC) with ID No. IREC 2021-197. The confidentiality of data obtained was well maintained.

Study instrument
A modified questionnaire from the Hiroshima University Dental Behaviour Inventory (HUDBI) was used. A pilot study had been done for face validation. The questionnaire was sent for proofreading after getting the pilot study analysis. A consent form and modified questionnaire from the Hiroshima University Dental Behaviour Inventory (HUDBI) was distributed to the respondents through an online google form. It consisted of two sections: sociodemographic characteristics and questions related to oral health attitude and behaviour among students. The questions listed 20 items of 5 points ordinal ranking from strongly disagree to strongly agree. The authors calculated all responses and excluded 'neutral' answers. The authors asserted that the higher the score, the better the respondents' oral health attitude and behaviour.

Data Analysis
Cluster sampling methods were applied for the selection of respondents according to their courses. All information was calculated using IBM SPSS version 23 and a descriptive analysis was conducted focusing on the frequency and proportion of demographic characteristics, attitudes, and practices related to oral health care among undergraduate students. A comparison between the course and total scores of oral health attitude and behaviour among respondents was done with the Kruskal Wallis test. The Mann-Whitney test for continuous variables was done on the relationship between academic level and gender towards the total scores. The confidence interval was set at 95% and variables with p values < 0.05 were considered statistically significant.

Results
A total of 716 questionnaires were answered by students from diverse courses, however, only 500 were selected according to the inclusion criteria and sample size. The variables of demographic data are described in Table 1. Malay was found to be the highest mean race (495, 99%) with most of them being female (79.6%), and almost all of them have no known medical illnesses (476, 95.2%).

Table 1: Demographic data of respondents

Variables	Frequency (%)
Ethnic/Race	
Malay	495 (99)
Arabic	4 (0.75)
Indonesia	1 (0.25)
Gender	
Male	102 (20.4)
Female	398 (79.6)
Level of study	
Preclinical	250 (50.0)
Clinical	250 (50.0)
Course	
Dentistry	100 (20.0)
Medical	100 (20.0)
Nursing	100 (20.0)
Allied Health Science	100 (20.0)
Pharmacy	100 (20.0)
Medical illness	
Yes	24 (4.8)
No	476 (95.2)

Table 2 shows the response of respondents related to oral health care. The majority of them denied smoking or vaping for more than one year (95.8%) and denied smoking half a pack or vaping more than once per day (93.2%). Half of them mentioned that their gums did not bleed while teeth brushing (56.4%) while almost half did not use fluoridated toothpaste (43.8%). A considerable number of respondents (77.6%) agreed that they were taught how to brush but some of them preferred to postpone seeing the dentist until they experience a toothache (50.6%). Half of the respondents claimed that they use dental floss (59.8%) and brush their teeth twice daily or more (57.8%). Most of the respondents felt that sometimes they did not take too much time while brushing their teeth (58%) and do not look in the mirror after brushing their teeth (56.6%). Nearly half of them (40.6%) have used a dye to see the plaque on their teeth, while the other half have not (45.4%).

Figure 1 illustrates the relationship between the mean of HUDBI scores and health science courses. The dentistry course depicted the highest mean score (17.92), followed by allied health science (10.28). Another three courses; medicine, nursing, and pharmacy had an approximately similar mean (9.91, 9.78, and 9.74). The Kruskal Wallis test was used to analyse the information and showed $p < 0.05$, hence the null hypothesis was rejected.

Table 3 displays the scores of the preclinical and clinical students among all courses. Only dentistry ($p = 0.000$) shows a significant difference between the clinical and preclinical students towards the oral health attitude and behaviour scores. Students from nursing and medicine were not so different in terms of their scores while allied health science and pharmacy showed the same scores between their preclinical and clinical students.

Table 4 shows the scores between the genders among the courses. The only genders that demonstrated the significant difference in the HUDBI scores were in the nursing and pharmacy courses ($p = 0.007$ and $p = 0.006$). The comparison of only the categorical data of both the academic level and gender among the courses with the total score of HUDBI showed that the clinical level has a significant difference ($p = 0.044$). Clinical students depicted higher scores compared to the preclinical students whilst males and females showed the same scores (Table V).

Discussion
The HUDBI scores of individuals are directly related to their oral health behaviour and attitudes (4). A favourable attitude and conduct toward oral health are linked to higher results. The mean HUDBI scores of health science students were higher than those of students from similar schools in prior studies, ranging from 4.2 to 8.33 (1, 5-7). However, across the five faculties, dentistry students outperformed their medical, nursing, allied health science, and pharmacy colleagues in terms of the mean HUDBI score. Other studies have also found that dentistry students have higher mean HUDBI results than students from other faculties (5, 8, 10). This is most likely due to the numerous periodontology topics and preventive dentistry delivered to dental students during their education. Moreover, the prevalence of smoking has been reported to be low among students in this study. We believe the institution has done an excellent job of spreading awareness of the adverse effects of tobacco among health sciences students through health education (11).

All the Malaysian young female participants believe that smoking has a negative effect on the general and oral health of the smoker (12). Besides that, in terms of mechanical plaque control, almost half of the students said they brushed their teeth at least two times per day and flossed in their daily lives.

Table 2: Response of respondents related to oral health attitudes and behaviours

Items	Agree frequency, %	Disagree frequency, %
1. My gums tend to bleed when I brush my teeth (D)	133 (26.6)	184 (56.4)
2. I think that I cannot help having false teeth when I am old (D)	172 (34.4)	132(26.4)
3. I think my teeth are getting worse despite my daily brushing (D)	103 (20.6)	294 (58.8)
4. I have never been professionally taught how to brush (D)	48 (9.6)	388 (77.6)
5. I put off going to the dentist until I have a toothache (D)	256 (50.6)	191 (38.2)
6. I smoke cigarettes/ use vape (D)	90 (18.0)	341 (68.2)
7. I feel I sometimes take too much time to brush my teeth (A)	106 (21.2)	290 (58.0)
8. I use dental floss on regular basis every day (A)	299 (59.8)	105 (21.0)
9. I use a fluoridated toothpaste (A)	208 (41.6)	219 (43.8)
10. I use mouthwash on a regular basis (A)	69 (13.8)	280 (56.0)
11. I brush my teeth twice daily or more (A)	289 (57.8)	109 (21.8)
12. I have used a dye to see how clean my teeth are (A)	203 (40.6)	227 (45.4)
13. I brush each of my teeth carefully (A)	198 (39.6)	214 (42.8)
14. I often check my teeth in a mirror after brushing (A)	173 (34.6)	283 (56.6)
15. I think I can clean my teeth without using toothpaste (A)	224 (44.8)	200 (40.0)
16. I have noticed some white sticky deposits on my teeth (A)	130 (26.0)	91 (18.2)
17. I have been smoking for more than one year (D)	8 (1.6)	479 (95.8)
18. I smoke more than ½ pack per day/ use vape more than 1 (time/day (D)	16 (3.2)	466 (93.2)
19. I am satisfied with the appearance of my teeth (D)	152 (30.4)	183 (36.6)
20. It is impossible to prevent gum disease with toothbrushing alone (D)	181 (36.2)	142 (28.4)
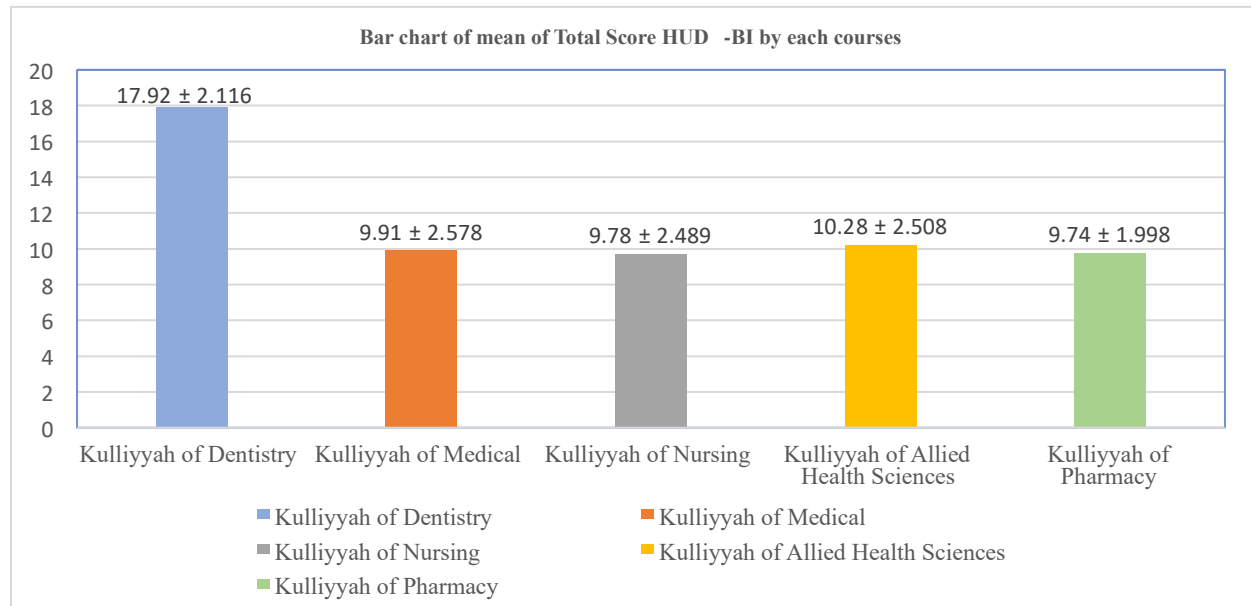
Sample Kruskal Wallis test; p-value: 0.000

Figure 1: Bar Chart of Distribution Total Scores of HU-DBI with Different Courses

Table 3: HU-DBI scores between the preclinical and clinical students of health science courses

Course	Clinical level	N	Mean rank	p-value
KOD	Preclinical	50	39.73 61.27	0.000*
	Clinical	50		
KOM	Preclinical	50	47.13	0.241
	Clinical	50	53.87	
KON	Preclinical	50	45.03	0.057
	Clinical	50	55.97	
KAHS	Preclinical	50	49.84	0.818
	Clinical	50	51.16	
KOP	Preclinical	50	49.42	0.840
	Clinical	50	50.57	

Mann Whitney Test; KOD-Kulliyyah of Dentistry, KOM-Kulliyyah of Medical, KON-Kulliyyah of Nursing, KAHS-Kulliyyah of Allied Health Science, KOP-Kulliyyah of Pharmacy; **p<0.05***

Table 4: HU-DBI scores between male and female health science students

Course	Gender	N	Mean	p-value
KOD	Male	27	46.48	0.395
	Female	73	51.99	
KOM	Male	30	45.47	0.252
	Female	70	52.66	
KON	Male	14	31.25	0.007*
	Female	86	53.63	
KAHS	Male	19	53.50	0.613
	Female	81	49.80	
KOP	Male	12	29.00	0.006*
	Female	87	52.90	

Mann Whitney Test; KOD-Kulliyyah of Dentistry, KOM-Kulliyyah of Medical, KON-Kulliyyah of Nursing, KAHS-Kulliyyah of Allied Health Science, KOP-Kulliyyah of Pharmacy; p<0.05*

Table 5: Summary of distribution HUDBI score by gender and clinical level from the courses

HUD-BI Score	Gender	N	Mean	p-value
Total score	Male	102	253.24	0.829
	Female	398	249.80	
	Total	500		

HUD-BI Score	Clinical level	N	Mean	p-value
Total score	Preclinical	250	230.46	0.002*
	Clinical	250	270.70	
	Total	500		

Mann Whitney Test; p<0.0

Other studies have found similar results as well (10-13). A considerably high number of students believe that proper brushing techniques had been professionally taught to them and unexpectedly, 50% of them did not use fluoridated toothpaste. A research done at University Sains Malaysia also had the same outcome; however, they found a greater number of students being taught the proper ways in using the mechanical technique of tooth brushing compared to this study (93.7%) (14). The findings of the study can be ascribed to dental health education, particularly Dental Public Health and Periodontology courses that emphasise on toothbrush selection and brushing procedures for individuals. In addition, most students reported that they only went to see a dentist if symptoms arise. Many factors may be overlapping in regard to seeking dental care during emergencies only, for example cultural influences, psychosocial barriers, socioeconomic status, organisational barrier, and personal experience. IIUM health science students may face some problems such as lack of awareness and knowledge towards oral health, and financial and time constraints time because they are still students. This is in line with data collected in China and the United Kingdom, wherein the Chinese originally thought that losing teeth is normal as they got older, and dental disorders were not seen to be preventive (15).

Furthermore, when compared to preclinical students, clinical students in this study demonstrated a superior attitude and conduct toward oral health. Several types of research have suggested that students' oral health attitudes and behaviours are closely linked to their academic progression (10-13). Despite clinical students showing significant differences towards the HUDBI score, only dental clinical students had a much higher level of knowledge about oral health care issues than the other courses. The authors attribute this to dental students having a broader mind with the importance of oral health care as they always need to deliver oral health education and instruction to their patients. Conversely, a study done in Germany described that preclinical students had higher HUDBI mean scores than clinical students due to the increased stress from performance pressure and clinical requirements during that preclinical-clinical transition phase (16).

Apart from the academic level, there were no huge discrepancies in dental health attitudes or behaviours between male and female students in this study,

even though the female population in IIUM is larger than the male population. This is also supported by the research done on the dental students from Puducherry, India, and Penang Dental college (5, 12). The same findings were made by a group of dentistry students from Rajasthan, India. However, in a study done among undergraduate dental students in Karnataka, India, female students exhibited better attitudes and behaviours than male students (17). Females, according to researchers, practise better oral hygiene, have a stronger interest in oral health and perceive their oral health to be better than males (18). The authors relate this to gender differences in physiological and psychological activities.

Strengths and limitations
The strengths of this study include the large number of participants from health science, the meticulousness of the survey, and the questions that target various aspects of oral health behaviours and attitudes. Nevertheless, this study has some drawbacks such as that any modifications in HUDBI scores cannot be fully related to the curricular program. In addition, the COVID pandemic made it a challenge to recruit the participants at one time.

Clinical application
An individual's oral health is intimately related to their general health. Diabetes mellitus and periodontal disease appear to have a negative bidirectional interaction, according to evidence (17). Additionally, plaque deposited on teeth might act as an infection reservoir among patients in the hospital (18). These are just a few instances of how significantly dental health corresponds to overall health. According to the findings of this study, there must be an increase in oral health knowledge in all the health science courses in IIUM Kuantan. It is essential that these students broaden their knowledge to deliver adequate healthcare to their patients in the future. Therefore, these future health care providers should always consult with the dentist regarding the oral health of the patient whenever required.

Conclusion
This study has shown that the outcome for oral health attitudes and behaviours among dental students have a greater score compared to medical, nursing, allied health science, and pharmacy courses. It also highlights that clinical students showed better overall oral health care than preclinical students in all

courses. Hence, it is agreed that the academic progression will give an impact on the individual's oral health awareness regardless of gender. To add up, health science undergraduate students are our health care providers later; thus, they need to be given more attention to strengthen the knowledge regarding oral health attitudes and behaviours. Something which can be done from now itself is inserting dental health knowledge into the curriculum of health sciences students starting from their preclinical courses.

References

1. Chawla R, Telang LA, Krishnan DA. Self-reported oral health attitude and behaviour among Malaysian dental students. Int. J. Dent. Sci. Inno. Res. 2019; 2(5):322-331.

2. Kawamura M, Ikeda-Nakaoka Y, Sasahara H. An assessment of oral self-care level among Japanese dental hygiene students and general nursing students using the Hiroshima University--Dental Behavioural Inventory (HU-DBI): surveys in 1990/1999. Eur J Dent Educ. 2000; 4(2):82-8.

3. Komabayashi T, Kawamura M, Kim KJ, Wright FAC, Declerck D, Freire, *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(5):310– 316.

4. Komabayashi T, Kwan SYL, Hu DY, Kajiwara K, Sasahara H, Kawamura M. 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. 2015; 47(1):1–7

5. Daou D, Rifai K, Doughan B, Doumit M. Development of an Arabic version of the Hiroshima University-dental behavioral inventory: Cross-cultural adaptation, reliability, and validity. J. Epidemiol. Glob. Health. 2018; 8(1–2):48–53.

6. Jaramillo JA, Jaramillo F, Kador I, Masuoka D, Tong L, Ahn C, *et al.* Comparative study of oral health attitudes and behavior using the Hiroshima University-Dental Behavioral Inventory (HU-DBI) between dental and civil engineering students in Colombia. J. Oral Sci. 2013; 55(1):23–28.

7. Wee LH, Chan CM, Yogarabindranath SN. A review of smoking research In Malaysia. Med. J. Malaysia. 2016; 71(Suppl 1):29-41.

8. Jella RK, Pratap K, Padma TM, Kalyan VS, Vineela P, *et al*. Oral health attitude and behavior among health-care students in a teaching hospital, Telangana State: a cross-sectional study. Indian J Dent. Sci. 2016; 8(4):242–245.

9. Keeling M, Wright TL, Keeling HM. Periodontal disease and Diabetes Mellitus: Case Report. Int. Dent. J. Stud. Res. 2015; 3(2):61-68.

10. Lujo M, Meštrović, M, Malcić AI, Karlović Z, Matijević J, Jukić S. Knowledge, attitudes and habits regarding oral health in first- and final-year dental students. Acta Clin. Croat. 2016; 55(4):636-43.

11. Mumin NA, Jaafar A, Ramli H, Rani H. The relationship between oral health attitude (HUDBI) score and caries experience (DMFT) score among first year dental students in USIM, Malaysia. J. Int. Dent. Med. Res. 2020; 13(1): 346-350.

12. Jaramillo JA, Jaramillo F, Kador I, Masuoka D, Tong L, Ahn C, *et al.* Comparative study of oral health attitudes and behavior using the Hiroshima University-Dental Behavioral Inventory (HU-DBI) between dental and civil engineering students in Colombia. J. Oral Sci. 2013; 55(1):23–28.

13. Mekhemar M, Conrad J, Attia S, Dörfer C. Oral health attitudes among preclinical and clinical dental students in Germany. Int. J. Environ. Res. Public Health. 2020; 17(12):1–11.

14. Muthu J, Priyadarshini G, Muthanandam S, Ravichndran S, Balu P. Evaluation of oral health attitude and behavior among a group of dental students in Puducherry, India: A preliminary

cross-sectional study. J. Indian Soc. Periodontol. 2015;19(6):683–686.

15. Ng J, Noorani T, Abdul GN, Moheet I. Self-reported differences in oral health attitudes and behaviors of health-care students at a University in Malaysia. European J. Gen. Dent. 2018; 7(1): 7–13.

16. Tien NP, Thanh TP, Hanh DN, Hoang AD, Dang TAB, Bich DQ, *et.al.* Prevalence of smoking among health science students in Vietnam in 2018 and associated factors: A cross-sectional study. Health Psychol. Open. 2020; 7(2):7-12.

17. Vangipuram S, Pallavi S, Radha G, Rekha R. Assessment of oral health attitudes and behavior among undergraduate dental students using Hiroshima University Dental Behavioral Inventory HU-DBI. J. Indian Assoc. Public Health Dent. 2015; 13(1):52-58.

18. Wieslander V, Leles C, Srinivasan M. Evaluation of oral-health behavioral attitudes of dental students in Switzerland and Brazil. J. Oral Sci. 2021; 63(4):326–329.