

Knowledge, Attitudes and Behaviors among Oral Hygiene toward Dental Students

Soukaina Rouijel^{1,*}, Majid Sakout²

¹Department of Conservative Dentistry and Endodontics, International University of Rabat, Sala Al Jadida, Morocco

²Department of Conservative Dentistry and Endodontics, Faculty of Dentistry- Mohammed V University, Rabat, Morocco

*Corresponding author: Soukaina.rouijel@uir.ac.ma

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Abstract Dentists are the role models for the society as far as oral health is concerned. However, student's attitudes and practices were found to differ across academic levels and gender. The present study aimed to assess oral health attitudes and behavior among undergraduate dental students, and to analyze the variations in oral health attitudes based on level of education and gender using the Hiroshima University-Dental Behavioral Inventory (HU-DBI). A self-administered questionnaire based on the Hiroshima University-Dental Behavioural Inventory (HU-DBI) was distributed to 260 undergraduate dental students at the International University of Rabat. Overall, the mean questionnaire score for the total sample was 6.33 ± 3.16 . Most clinical students reported brushing each of their teeth carefully. More clinical (33.88) than preclinical (2.87) students have used a dye to see how clean their teeth are ($p < 0.001$). Moreover, larger proportion of men (27.4) than women (16.2) use a toothbrush with hard bristles ($p = 0.03$). A higher proportion of women (100) do check their teeth in a mirror after brushing ($p < 0.001$). Prompt initiatives should be launched to critically revise the dental program and the education processes, and to redesign these programs in a constructive and productive manner to positively influence students' behavior and attitudes.

Keywords: oral hygiene, dental students, knowledge, behaviour

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1. Introduction

The carious disease is currently ranked by the experts of the WHO (World Health Organization) as the third most serious disease in the world, immediately after cancer and cardiovascular diseases [1].

Good oral hygiene is the key factor for prevention of oral diseases. Thus, the role of dentists is crucial by providing dental care and encouraging their patients to change their behaviors and attitudes toward oral hygiene [2].

One study suggested that dentists' attitudes toward their oral health can affect the quality of care delivered to patients (Peker and Alkurt, 2009) [3].

The behavior of dental students and their attitudes toward their own oral health reflects their understanding of the importance of oral prevention, and their commitment to improve the oral health of their patients [3,4,5].

However, student's attitudes and practices were found to differ across academic levels, gender, countries and cultures [6].

In 1988, Kawamura developed the « Hiroshima University Dental Behavioral Inventory (HU-DBI) », that consists of 20 dichotomous questions (agree – disagree) which examine patient's knowledge, attitudes and practices among oral health. It has good test-retest reliability [4,7,8].

The HU-DBI has been useful to assess the differences of knowledge, attitudes and practices of dental students among oral hygiene between different countries [9,10].

Studies that assessed the knowledge, attitudes and practices of dental students among oral hygiene have been carried out in several arab countries : Saudi Arabia, United Arab Emirates, Yemen, Kuwait, Palestine, Iraq, Sudan, Egypt, Tunisia, Syria, Lebanon and Jordan [2,13,17,18,19,21], but also in non-arab countries: United states, Korea, Japan, Finland, Greece, Peru, India, Colombia, Turkey, Croatia, Lithuania, England, Germany, Czech republic, Slovakia, Estonia, Brazil, and China [3,12,11,14,15,16,20,22,23,24,25,26], but no data was found for Morocco.

The aim of this study was to assess the knowledge, attitudes and practices of oral hygiene among dental students in Morocco. The primary objective was to assess dental students at the International University of Rabat (IUR) using the HU-DBI, and the secondary objective was to analyze the impact of educational level study and gender on the score.

2. Method

The Hiroshima University-Dental Behavioral Inventory (HU-DBI) survey was distributed to dental students in the International University of Rabat. The sample size

calculation was performed using Epi Info with a 5% risk of error, 95% for the confidence interval.

The overall sample size for our study was 260 students randomly selected from a population of 868 students distributed as follows: 139 preclinical students and 131 clinical students.

All the participants were informed about the purpose of the study. The questionnaires were completed anonymously to ensure the confidentiality of the information provided.

No information on the identity of the respondents was collected. The 20-item questionnaire was designed to have dichotomous responses (agree/disagree). The codes of 0/1 for the agree/disagree responses, respectively, were defined according to the question's direction: the higher score (1) indicates better oral health attitudes/behavior. Therefore, the total score (maximum = 12) is derived from summing the scores for the 12 questions [2,4,6,8,9,10,11,12,14,15,16,19] which gives a quantitative estimate of individuals' responses. The present items were chosen because of the high reliability of the scale, as shown in previous studies [7,8]. Along with the questionnaire responses, demographic data such as age, sex, and educational year were collected in the same questionnaire.

Data collected from the participants' questionnaire were analyzed using SPSS software 20. Qualitative variables were described in terms of numbers and percentages. The chi-square test was used to compare HU-DBI scores of different level of education. P-values < 0,05 were considered statistically significant.

3. Results

More than one half of the sample (59.2%) were women, and 40.8% were men (Table 1).

The mean HU-DBI score was 6.33 ± 3.16 . There was no statistically significant difference between pre-clinical and clinical students (6.10 ± 2.83 Vs 6.92 ± 3.13), or between men and women (6.33 ± 3.24 vs 6.34 ± 3.05) (Table 2).

Table 1. Sample distribution by gender and level of study

	Women*	Men*	Total*
Pre-Clinical students *	73 (47.3)	66 (62.2)	139 (53.5)
Clinical Students*	81 (52.7)	40 (37.8)	121 (46.5)
Total*	154 (59.2)	106 (40.8)	00)

*Data are presented as n(%).

Table 2. Hiroshima University-Dental Behavioral Inventory (HU-DBI) scores

	Score
Sex	
Women	6.34 ± 3.05
Men	6.33 ± 3.24
Level of study	
Pre-Clinical student	6.10 ± 2.83
Clinical student*=	6.92 ± 3.13
Total	6.33 ± 3.16

Data are presented as n(%). D, correct response is "disagree"; A, correct response is "agree" Significant difference between women and men students (chi-square, $p < 0.05$).

More pre-clinical (12.9) than clinical (4.13) students were bothered by the color of their gum ($p < 0.05$). Furthermore, a higher proportion of clinical (63.6) than preclinical (16.54) students reported brushing each of their teeth carefully ($p < 0.001$). Moreover, all clinical students (100) versus 89.2% of pre-clinical students do check their teeth in a mirror after brushing ($p < 0.001$).

Most clinical students (38.12) than preclinical (32.23) students disagreed with the statement that is impossible to prevent gum disease with toothbrushing alone ($p < 0.001$).

More clinical (33.88) than preclinical (2.87) students have used a dye to see how clean their teeth are ($p < 0.001$). However, more pre-clinical (28.77) than clinical (11.57) students use a toothbrush with hard bristles ($p < 0.001$).

More clinical (11.57%) than preclinical (1.43%) students feel they take too much time to brush their teeth ($p < 0.001$) (Table 3).

Table 3. Hiroshima University-Dental Behavioral Inventory responses given by clinical and preclinical students

Statement	Pre-clinical (n=139)	Clinical (n=121)	P	total
I don't worry about visiting the dentist	61 (43.8)	41 (33.8)	N.S	102 (39.2)
My gums bleed when I brush my teeth (D)	39 (28.5)	12 (9.91)	N.S	51 (19.6)
I worry about the color of my teeth	102 (73.38)	79 (65.28)	N.S	181 (69.6)
I have noticed some white sticky deposits on my teeth (A)	42 (30.21)	25 (20.66)	N.S	67 (25.8)
I think i cannot help having false teeth when I am old (D)	23 (16.54)	29 (5.9)	N.S	52 (20)
I am bothered by the color of my gums	18 (12.94)	5 (4.13)	0.01	23 (8.8)
I thing my teeth are getting worse despite my daily brushing (D)	15 (10.79)	29 (24)	0.006	44 (16.92)
I brush each of my teeth carefully(A)	23 (16.54)	77 (63.63)	<0.001	100 (38.5)
I have never been taught professionally how to brush (D)	23 (16.54)	22 (18.18)	N.S	45 (17.3)
I think I can clean my teeth well without using toothpaste (A)	0 (0)	0 (0)	N.S	0 (0)
I often check my teeth in a mirror after brushing (A)	124 (89.2)	121 (100)	<0.001	245 (94.2)
I worry about having bad breath	98 (70.5)	90 (74.38)	N.S	188 (72.3)
It's impossible to prevent gum disease with toothbrushing alone (D)	53 (38.12)	39 (32.23)	<0.001	92 (35.4)
I put off going to a dentist until I have a toothache (D)	52 (44.6)	40 (33.05)	N.S	102 (39.2)
I have used a dye to see how clean my teeth are (A)	4 (2.87)	41 (33.88)	<0.001	45 (17.3)
I use a toothbrush bristles	40 (28.77)	14 (11.57)	<0.001	54 (20.8)
I feel I sometimes take too much time to brush my teeth (A)	2 (1.43)	14 (11.57)	<0.001	16 (17.1)

Data are presented as n(%).D, correct response is "disagree"; A, correct response is "agree" Significant difference between women and men students (chi-square, $p < 0.05$).

Table 4. Hiroshima University-Dental Behavioral Inventory responses given by women and men students

Statement	Women (n=154)	Men (n=106)	P	total
I don't worry about visiting the dentist	65 (42.2)	37 (34.9)	N.S	102 (39.2)
My gums bleed when I brush my teeth (D)	33 (22.1)	17 (16)	N.S	51 (19.6)
I worry about the color of my teeth	113 (73.4)	68 (64.2)	N.S	181 (69.6)
I have noticed some white sticky deposits on my teeth (A)	32 (20.8)	35 (33)	0.02	67 (25.8)
I think i cannot help having false teeth when I am old (D)	25 (16.2)	27 (25.5)	N.S	52 (20)
I am bothered by the color of my gums	17 (11)	6 (5.7)	N.S	23 (8.8)
I thing my teeth are getting worse despite my daily brushing (D)	32 (20.8)	12 (11.3)	0.04	44 (16.92)
I brush each of my teeth carefully(A)	66 (42.9)	34 (32.1)	N.S	100 (38.5)
I have never been taught professionally how to brush (D)	25 (16.2)	20 (18.9)	N.S	45 (17.3)
I think I can clean my teeth well without using toothpaste (A)	0 (0)	0 (0)	N.S	0 (0)
I often check my teeth in a mirror after brushing (A)	154 (100)	91 (85.8)	<0.001	245 (94.2)
I worry about having bad breath	109 (70.8)	79 (74.5)	N.S	188 (72.3)
It's impossible to prevent gum disease with toothbrushing alone (D)	58 (37.7)	34 (32.1)	N.S	92 (35.4)
I put off going to a dentist until I have a toothach (D)	64 (41.6)	38 (35.8)	N.S	102 (39.2)
I have used a dye to see how clean my teeth are (A)	29 (18.8)	16 (15.1)	N.S	45 (17.3)
I use a toothbrush bristles	25 (16.2)	29 (27.4)	0.03	54 (20.8)
I feel I sometimes take too much time to brush my teeth (A)	9 (6.8)	7 (7.4)	N.S	16 (17.1)

A higher proportion of men (33) than women (20.8) noticed white sticky deposits on their teeth ($p=0.02$). However, more women (20.8) than men (11.3) think their teeth are getting worse despite their daily brushing ($p=0.04$). More women (100) than men (85.8) do check their teeth in a mirror after brushing ($p<0.001$). Moreover, larger proportion of men (27.4) than women (16.2) use a toothbrush with hard bristles ($p=0.03$). (Table 4)

4. Discussion

The overall mean HU-DBI score of our study was 6,33 +/- 3,12. A literature review of attitudes, knowledge and practices of dental students in arab countries conducted, showed that 15 studies were published in 11 countries : Egypt, Jordan, Kuwait, Palestine, Saudi Arabia, Sudan, United Arab Emirates, Yemen, Lebanon, Syria and Tunisia. The first study was carried out in Jordan. The average HU-DBI score from 2000 to 2010 was 5,82, and from 2011 to 2020 it was 6,27 (Table 5).

Howat et al. (1979) reported that students' oral hygiene improves from the preclinical to clinical years of study [36]. Moheet and Farook's study found that clinical students had better oral health attitudes than preclinical students [2]. However, in this study, there was no

statistically significant difference between the average HU-DBI score of preclinical and clinical students.

El Mostehy and al. (1969) noted a lack of improvement in oral hygiene 's students despite training [37]. In India, Dagli and al. (2008) didn't notice a statistically difference between levels of education [9]. Also in Yemen, Halboub and al. (2016) reported no statistically significant difference between preclinical and clinical students [6].

Moreover, studies have shown that gender had an influence on the total HU-DBI mean scores [6]. Indeed, females, for internal psychological reasons, usually care more about their body and appearance and they would thus tend to visit health professionals for treatment or advice [6]. In the current study, female did check their teeth in a mirror after brushing more often than male did. However, we haven't noticed any statistically significant difference between the average HU-DBI score of women and men. This finding is in accordance with several previous studies (Kawamura and al. 2000, Dagli and al. 2008, Khami and al. 2007, Badovinac and al 2013, Riad and al. 2022) [9,10,12,20,38].

Moreover, larger proportion of men than women use a toothbrush with hard bristles. This finding is in accordance with Yildiz and al. 2011, Riad and al. 2022 [20,39].

Table 5. Mean HU-DBI Score of Dental Students in the Arab League Member States, 2004 – 2020, (n = 6941) [20]

Country	Author, Year of Study	Sample Size	University (City)	HU-DBI Score
Egypt	Al-wesabi et al., 2019 [26]	783	Private University (Cairo)	6.77
Jordan	Al-wahadni et al., 2004 [28]	105 580	Jordan University of Science and Technology (Irbid)	6.38 5.20
Kuwait	Ali, 2016 [30]	141	Kuwait University (Kuwait)	5.74
Lebanon	Riad et al. [20]	316	Multiple Universities (Beirut)	6.67
Palestine	Kateeb, 2006 [16]	260	Al-Quds University (Jerusalem)	6.13
Saudi Arabibia	Moheet et al., 2013 [2]	112	University of Dammam (Dammam)	6.45
Sudan	Khalid et al., 2016 [33]	1243	Multiple Universities (Khartoum, Omdurman, Wad Madani)	6.24
Syria	Riad et al. [20]	561	Syrian Private University (Damascus)	6.38
Tunisia	Riad et al. [20]	553	University of Monastir (Monastir)	6.05
UAE	Rahman et al., 2013 [18]	93	University of Sharjah (Sharjah)	7.32
Yemen	Halboub et al., 2015 [6]	579	Multiple Universities (Sana'a)	5.06

5. Conclusion

Overall, Moroccan dental students have shown good oral health attitude and behavior.

However, gender and dental education has shown limited impact on the oral health and behavior improvement. Prompt initiatives should be launched to critically revise the dental program and the education processes, and to redesign these programs in a constructive and productive manner to positively influence students' behavior and attitudes.

References

- [1] World Health Assembly Resolution paves the way for better oral health care [Internet]. [cité 27 sept 2022]. Disponible sur: <https://www.who.int/news/item/27-05-2021-world-health-assembly-resolution-paves-the-way-for-better-oral-health-care>.
- [2] Alam Moheet I, Farooq I. Self-reported differences between oral health attitudes of pre-clinical and clinical students at a dental teaching institute in Saudi Arabia. *Saudi Dent J.* oct 2013; 25(4): 149-52.
- [3] Peker I, Alkurt MT. Oral Health Attitudes and Behavior among a Group of Turkish Dental Students. *Eur J Dent.* janv 2009; 3(1): 24-31.
- [4] Neeraja R, Kayalvizhi G, Sangeetha P. Oral Health Attitudes and Behavior among a Group of Dental Students in Bangalore, India. *Eur J Dent.* avr 2011; 5(2): 163-7.
- [5] Al-Omari QD, Hamasha AAH. Gender-Specific Oral Health Attitudes and Behavior among Dental Students in Jordan. *J Contemp Dent Pract.* févr 2005; 6(1): 107-14.
- [6] Halboub ES, Al-Maweri SA, Al-Jamaei AA, Al-wesabi MA, Shamala A, Al-kamel A, et al. Self-Reported Oral Health Attitudes and Behavior of Dental and Medical students, Yemen. *Glob J Health Sci.* 25 févr 2016; 8(10): 143.
- [7] Kim K-J, Komabayashi T, Moon S-E, Goo K-M, Okada M, Kawamura M. Oral health attitudes / behavior and gingival self care level of korean dental hygiene students. *J Oral Science* 2001; 43 (1): 49-53
- [8] Komabayashi T, Kawamura M, Kim KJ, Wright FAC, Declerck D, Goiãs M do CMF, 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.* oct 2006; 56(5): 310-6.
- [9] 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(3): 267-72.
- [10] Kawamura M. Cross-cultural differences of self-reported oral health behaviour in Japanese and Finnish dental students. *Int Dent J* 2000 Feb; 50(1): 46-50
- [11] Riad A, Chuchmová V, Staněk J, Hocková B, Attia S, Krsek M, et al. Czech and Slovak Dental Students' Oral Health-Related Knowledge, Attitudes, and Behaviours (KAB): Multi-Country Cross-Sectional Study. *Int J Environ Res Public Health.* 25 févr 2022; 19(5): 2717.
- [12] Badovinac A, Božić D, Vučinić I, Vešligaj J, Vražić D, Plančak D. Oral Health Attitudes and Behavior of Dental Students at the University of Zagreb, Croatia. *J Dent Educ.* sept 2013; 77(9): 1171-8.
- [13] Barrieshi-Nusair K, Alomari Q, Said K; Dental health attitudes and behaviour among dental students in Jordan. *Community Dent Health.* 2006 Sep; 23 (3): 147-51.
- [14] Pacauskiene IM, Smailiene D, Siudikien J. Self-reported oral health behavior and attitudes of dental and technology students in Lithuania. 2014; 16(2): 65-71.
- [15] Kawamura M. Cross-cultural differences of self-reported oral health behaviour in Japanese and Finnish dental students. *Int Dent J* 2000 Feb; 50(1): 46-50.
- [16] Kateeb E. Gender-specific oral health attitudes and behaviour among dental students in Palestine. *East Mediterr Health J.* 1 mars 2010; 16(03): 329-33.
- [17] Mekhemar M, Ebeid K, Attia S, Dörfer C, Conrad J. Oral Health Attitudes among Preclinical and Clinical Dental Students: A Pilot Study and Self-Assessment in an Egyptian State-Funded University. *Int J Environ Res Public Health.* 30 déc 2020; 18(1): 234.
- [18] Rahman B, Kawas SA. The relationship between dental health behavior, oral hygiene and gingival status of dental students in the United Arab Emirates. *Eur J Dent.* janv 2013; 7(1): 22-7.
- [19] 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): 326-9.
- [20] Riad A, Al-Khanati NM, Issa J, Zenati M, Abdesslem NB, Attia S, et al. Oral Health-Related Knowledge, Attitudes and Behaviours of Arab Dental Students: Multi-National Cross-Sectional Study and Literature Analysis 2000-2020. *Int J Environ Res Public Health.* 31 janv 2022; 19(3): 1658.
- [21] Kawamura M, Yip HK, De Hu Y, Komabayashi T. A cross-cultural comparison of dental health attitudes and behaviour among freshman dental students in Japan, Hong Kong and West China. *Int Dent J.* juin 2001; 51(3): 159-63.
- [22] Kawamura M, Spadafora A, Kim KJ, Komabayashi T. Comparison of United States and Korean dental hygiene students using the Hiroshima University-Dental Behavioural Inventory (HU-DBI). *Int Dent J.* juin 2002; 52(3): 156-62.
- [23] Sato M, Camino J, Oyakawa HR, Rodriguez L, Tong L, Ahn C, et al. Effect of Dental Education on Peruvian Dental Students' Oral Health-Related Attitudes and Behavior. *J Dent Educ.* sept 2013; 77(9): 1179-84.
- [24] Riad A, Buchbender M, Howaldt HP, Klugar M, Krsek M, Attia S. Oral Health Knowledge, Attitudes, and Behaviors (KAB) of German Dental Students: Descriptive Cross-Sectional Study. *Front Med.* 11 mars 2022; 9: 852660.
- [25] Riad A, Pöld A, Olak J, Howaldt HP, Klugar M, Krsek M, et al. Estonian Dental Students' Oral Health-Related Knowledge, Attitudes and Behaviours (KAB): National Survey-Based Study. *Int J Environ Res Public Health.* 8 févr 2022; 19(3): 1908.
- [26] Al-wesabi, A.A.; Abdelgawad, F.; Sasahara, H.; El Motayam, K. Oral health knowledge, attitude and behaviour of dental students in a private university. *BDJ Open* 2019, 5, 1-5.
- [27] Abu Alregal, E.N.; Abdelgawad, F.; Sasahara, H.; Motayam, K. El The level of education and oral health attitudes of the dental students in a governmental university—A cross-sectional study. *Int. Dent. Med. J. Adv. Res.* 2018, 4, 1-7.
- [28] Al-Wahadni, A.M.; Al-Omiri, M.K.; Kawamura, M. Differences in self-reported oral health behavior between dental students and dental technology/dental hygiene students in Jordan. *J. Oral Sci.* 2004, 46, 191-197.
- [29] Al-Omiri, M.K.; Barghout, N.H.; Shaweesh, A.I.; Malkawi, Z.; Al-Omiri, M. Level of Education and Gender-specific Self-reported Oral Health Behavior Among Dental Students. *Oral Health Prev. Dent.* 2012, 10, 29-35.
- [30] Ali, D.A. Assessment of oral health attitudes and behavior among students of Kuwait University Health Sciences Center. *J. Int. Soc. Prev. Community Dent.* 2016, 6, 436.
- [31] Baseer, M.A.; Rahman, G. Oral health attitudes and behavior among a group of female Saudi dental students. *Saudi J. Oral Sci.* 2014, 1, 25.
- [32] Kumar, S.; Busaly, I.A.; Tadakamadla, J.; Tobaigy, F. Attitudes of dental and pharmacy students to oral health behaviour at Jazan University, Kingdom of Saudi Arabia. *Arch. Orolfac. Sci.* 2012, 7, 9-13.
- [33] Khalid, K.A.; Naidoo, S.; Elamin, F.I. Oral Health Behaviours and Attitudes using the Modified Arabic Version of Hiroshima University-Dental Behavioural Inventory (HU-DBI) among Sudanese Dental Students. *Int. J. Dent. Oral Sci.* 2016, 3, 326-330
- [34] Kawas, S.; Fakhruddin, K.S.; Rehman, B.U. A Comparative Study of Oral Health Attitudes and Behavior Between Dental and Medical Students; The Impact of Dental Education in United Arab Emirates. *J. Int. Dent. Med. Res.* 2010, 2, 6-10.
- [35] Hashim, R.; Ibrahim, M. Oral Health Attitudes and Behavior Among Dental Students in Ajman, United Arab Emirates. *J. Int. Dent. Med. Res.* 2013, 6, 84-87.
- [36] Howat A, Trabelsi I, Bradnock G. Oral hygiene levels and behaviour in pre-clinical and final-year dental students. *J Clin Periodontol.* (1979) 6:177-85.

- [37] El-Mostehy MR, Zaki HA, Stallard R. The dental student's attitude toward the profession as reflected in his oral cavity. *Egypt Dent J.* avr 1969; 15(2): 104-9.
- [38] Khami MR, Virtanen JI, Jafarian M, Murtomaa H. Prevention-oriented practice of Iranian senior dental students. *Eur J Dent Educ.* 2007; 11(1): 48-53.
- [39] Yildiz S, Dogan B. Self Reported Dental Health Attitudes and Behaviour of Dental Students in Turkey. *Eur J Dent.* juill 2011; 5(3): 253-9.



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