

Dental health attitudes and behaviour among dental students in Jordan

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Objective: Examine and compare differences in oral health attitudes and behaviour among Jordanian dental students. **Basic research design and participants:** Cross-sectional study of 314 dental students was conducted to compare differences in oral health behaviour and attitudes among these students in different levels of academic education. **Setting:** Jordan University of Science and Technology. **Methods:** Subjects were surveyed using a modified version of the Hiroshima University Dental Behavior Inventory (HU-DBI) questionnaire (20 items). Multivariate binary and polytomous logistic regression analyses were performed in order to study change of patterns of statements during preclinical and clinical, and year of study, respectively. **Results:** The percentage of students claiming to brush their teeth twice daily or more often was four times higher amongst clinical students than amongst pre-clinical students. The odds of visiting a dentist only in case of toothache was reduced by a factor of more than three among clinical year students (OR 0.30, 95% CI 0.15-0.61). Clinical year students rarely complained of bleeding gums after toothbrushing (OR 0.10, 95% CI 0.03-0.27). On the other hand, a number of items regarding use of dental floss and tooth paste, bad breath, colour and appearance of teeth, and cigarette smoking was similar between preclinical and clinical students. Evaluation of trends during dental studies employing polytomous multivariate logistic regression analysis revealed an abrupt change at the end of preclinical studies for items characterizing professional attitude. **Conclusions:** With advancement in dental school, dental student's oral health awareness and attitudes improved in some aspects. Preventive dentistry courses should be taught early in the dental curriculum of the pre-clinical years.

Key words: Dental health attitudes, dental students, oral health behaviour, Jordan

Introduction

A dental student is expected to be a good model for oral health behaviour. As a health care provider dental students are expected to instruct their friends, family members, patients and their society to maintain good oral health. Attitudes of dental students toward their own oral health reflect their understanding of the importance of preventive dental procedures and their commitment toward improving the oral health of their patients. Knowledge of dental treatment modalities and attitudes toward dental care have been found to be poor among university students in Nairobi (Kisumbi *et al.*, 1995). The improvement of personal oral health among dental students has shown to be linked to their dental education experience (Cortes *et al.*, 2002) and oral health attitudes and behaviours seem to increase significantly in the fourth and fifth years of dental education (Polychronopoulou *et al.*, 2002). Furthermore, oral health attitudes, behaviour and gingival self-care levels were found to be significantly different across the academic levels of dental hygiene students (Kim *et al.*, 2001). On the other hand, the oral health behaviours were found to be very different between countries due to the difference in the health education systems of the students (Kawamura *et al.*, 2000, 2002) and differences between the cultures (Kawamura *et al.*, 2001).

Studies that examine the influence of dental education on dental or hygienist students' oral health attitudes and

behaviour have been performed in Spain (Cortes *et al.*, 2002), Greece (Polychronopoulou *et al.*, 2002), Finland and Japan (Kawamura *et al.*, 2000), United States (Kawamura *et al.*, 2002), Australia (Kawamura *et al.*, 1997) and Mongolia (Tseveenjav *et al.*, 2002), but not in any Arabic countries. The cultural differences between Jordan and the countries previously studied are expected to lead to different oral health attitude and behaviour among Jordanian dental students.

The purpose of the present study was to assess oral health attitudes and behaviour among dental students at Jordan University of Science and Technology, and to compare the differences in oral health attitudes that occur among students during the course of their professional training.

Study population and methods

There are only two dental schools in Jordan. Both schools are state-supported and admit students from all over the country as well as from the neighbouring Arab countries based on their high school performance and from the different socioeconomic classes. No major differences exist in the dental curriculum between the two schools.

A modified English version of the Hiroshima University-Dental Behavior Inventory (HU-DBI) survey was used in this study. The survey is based on twenty items (Table 1). The survey was type-written in English

Table 1. The modified HU-DBI survey used in this study.

<i>No.</i>	<i>Item Description</i>
1.	I live with my family now
2.	I had been to a dentist office before
3.	I do not go to the dentist unless I have a toothache
4.	I brush my teeth twice daily or more
5.	My gums bleed when I brush my teeth
6.	I have never been professionally taught how to brush
7.	I think my teeth are getting worse despite my daily brushing
8.	I don't feel I have brushed my teeth properly unless I brush with strong strokes
9.	I feel that I spend too much time brushing my teeth
10.	I think I can clean my teeth without using toothpaste
11.	It is impossible to prevent gum disease with toothbrushing alone
12.	I use tooth floss on regular basis
13.	I use mouth wash on regular basis
14.	I worry about having bad breath
15.	I am bothered by the color of my gums
16.	I worry about the color of my teeth
17.	I am satisfied with the appearance of my teeth
18.	I smoke cigarettes
19.	I smoke more than 10 cigarettes per day
20.	I have been smoking for more than one year

The response options were No/ Yes

and distributed to dental students at Jordan University of Science and Technology. Students from all five academic years were asked to complete the questionnaire. The students were requested to remain in the classroom after the lecture and to fill in the questionnaire. However, participation in the study was voluntary. This research was approved by Deanship of Research at Jordan University of Science and Technology as well as the Deanship of Human Rights Committee. Questions from the students regarding the meaning of the words were allowed and answers of such questions were loudly announced to the other students. The survey was completed anonymously and no information about the academic records or performance of the students was collected. From a total of 375 dental students (at Jordan University of Science and Technology) 314 students (83.7%) completed the questionnaire. Some of the students were absent on the day of the survey and some of them chose not to participate. Logistic regression analyses were done according to Hosmer and Lemeshow (1989). Univariate analyses comparing answers given by preclinical and clinical students, respectively, were done first. Next, a stepwise backward selection strategy was employed to construct multivariate logistic regression models with preclinical/clinical status as dependent variable. Any question with a p value of < 0.15 was allowed to enter the model. Finally, trends of change in answering certain questions were analysed. For that purpose polytomous logistic regression models were built with year of study as dependent variable and the fifth year student being the reference. The same selection criteria for inclusion/exclusion of questions into

the model applied. If significant, gender was allowed to enter the models. Odds ratios (OR) and 95% confidence intervals (CI) were calculated. Systat® 8.0 (SPSS Inc., Chicago, USA) statistical program was used to process the data and for statistical analysis.

Results

The distribution of participating dental students in academic years is shown in Table 2. Univariate analyses revealed 13 answers differing significantly ($p < 0.05$) between preclinical and clinical students. The final multivariate model included only 11 statements with a p value < 0.15 (Table 3). For example, most of the preclinical students were visiting the dental office only when having toothache. The odds of saying yes to item number 3 (I go to dentist only in case of toothache) was reduced by a factor of more than 3 in the clinical years (OR 0.30, 95% CI 0.15-0.61). Clinical students brushed their teeth twice daily or more (item 4) more often than preclinical students (OR 3.96, 95% CI 1.73-9.05). Furthermore, clinical year students rarely complained of bleeding gums (item 5) after toothbrushing (OR 0.10, 95% CI 0.03-0.27) and they were no longer bothered by the colour of their gums (item 15) (OR 0.33, 95% CI 0.16-0.71). Interestingly, the regular use of mouth wash was less frequently observed among clinical year students (item 13) (OR 0.10, 95% CI 0.04-0.23).

On the other hand, a number of items regarding, for example use of dental floss and tooth paste, bad breath, colour and appearance of teeth, and cigarette smoking

Table 2. Distribution (%) of the participating dental students by academic year and gender.

Academic year	n	Gender	
		Male	Female
1 st	98	43	57
2 nd	70	57	43
3 rd	51	53	47
4 th	39	36	64
5 th	56	50	50
Total	314	48	52

Table 3. Results of backward multivariate logistic regression analysis. Dependent variable preclinical/clinical. Likelihood ratio 161, 11 df, $p < 0.001$

Item	Description	Estimate	S.E.	p	Odds ratio	95% CI
	Constant	1.215	0.461	0.008		
1	I live with my family now	-0.518	0.341	0.129	0.596	0.305-1.163
2	I had been to a dentist office before	0.872	0.564	0.122	2.392	0.793-7.218
3	I do not go to the dentist unless I have a toothache	-1.196	0.356	0.001	0.302	0.150-0.607
4	I brush my teeth twice daily or more	1.376	0.422	0.001	3.959	1.732-9.050
5	My gums bleed when I brush my teeth	-2.348	0.530	0.000	0.096	0.034-0.270
6	I have never been professionally taught how to brush	-1.607	0.494	0.001	0.201	0.076-0.528
7	I think my teeth are getting worse despite my daily brushing	-1.228	0.387	0.001	0.293	0.137-0.625
8	I don't feel I have brushed my teeth properly unless I brush with strong strokes	-1.126	0.385	0.003	0.324	0.153-0.690
9	I feel that I spend too much time brushing my teeth	-0.783	0.361	0.030	0.457	0.225-0.926
13	I use mouth wash on regular basis	-2.321	0.434	0.000	0.098	0.042-0.230
15	I am bothered by the color of my gums	-1.096	0.382	0.004	0.334	0.158-0.706

Numbers of questions not included in the model: 10,11,12,14,16,17,18,19,20

Table 4. Results of backward polytomous multivariate logistic regression analysis. Dependent variable is year of study; reference 5th year. Odds ratios and 95% CI are given, adjusted for sex. Likelihood ratio 222, 40 df, $p < 0.001$.

Description	Item	1 st year	2 nd year	3 rd year	4 th year
I do not go to the dentist unless I have a toothache	3	2.92 (1.22-7.00)	3.03 (1.25-7.33)	2.28 (0.91-5.71)	0.47 (0.17-1.30)
I brush my teeth twice daily or more	4	0.12 (0.04-0.35)	0.15 (0.05-0.42)	0.40 (0.13-1.30)	0.53 (0.17-1.73)
My gums bleed when I brush my teeth	5	6.56 (1.99-21.6)	4.79 (1.44-15.6)	9.53 (2.92-31.0)	0.28 (0.03-2.56)
I have never been professionally taught how to brush	6	7.68 (2.09-28.2)	5.66 (1.52-21.0)	8.39 (2.27-30.9)	2.12 (0.50-8.95)
I think my teeth are getting worse despite my daily brushing	7	5.10 (1.93-13.5)	2.70 (1.00-7.28)	4.46 (1.64-12.1)	1.63 (0.53-5.00)
I don't feel I have brushed my teeth properly unless I brush with strong strokes	8	2.96 (1.15-7.58)	3.11 (1.21-7.99)	2.06 (0.75-5.62)	0.68 (0.22-2.09)
I feel that I spend too much time brushing my teeth	9	4.22 (1.75-10.2)	1.80 (0.74-4.40)	0.92 (0.34-2.45)	1.08 (0.44-2.76)
I use mouthwash on regular basis	13	24.8 (7.74-79.2)	15.0 (4.68-48.3)	4.77 (1.35-16.9)	2.19 (0.62-7.74)
I am bothered by the color of my gums	15	2.14 (0.84-5.37)	2.85 (1.13-7.17)	2.53 (0.97-6.58)	0.69 (0.22-2.12)

Numbers of questions not included in the model: 1,2,10,11,12,14,16,17,18,19,20

were similar in preclinical and clinical students (Fig. 1). Closer evaluation of trends during dental studies are shown in Table 4. Polytomous multivariate logistic regression analysis with year of study as dependent variable and fifth year as reference revealed an abrupt change at the end of preclinical studies for several items (3, 5, 6, 7, 8, and 15). On the other hand, e.g., frequency of toothbrushing (item 4) seems to gradually increase, whereas use of mouth wash (item 13) decreased.

Discussion

This was the first study in Jordan using the general approach in attitudes/behaviour measurements to compare the dental students at the different academic levels. In the study we followed HU-DBI survey which has been used worldwide in different studies (Kawamura *et al.*, 1997, 2000, 2001, 2002). Translation of HU-DBI survey from English to Arabic was not necessary as students started their English early at elementary school and because English is the language of teaching at the dental school. Translation might indirectly influence the results and that would prevent comparing our study to the others which used the same questionnaire. Some of the statements in the original questionnaire were modified or replaced by new statements in the questionnaire that we used (Table 1). This was done mainly in order to make the questionnaire more suitable and understandable to our students and culture. For example the item: I have noticed some white sticky deposits on my teeth, was not used as it would cause problems with interpretation (Kawamura *et al.*, 2000). Statements regarding using dental floss and mouth wash were also included.

In the present study multivariate logistic regression analysis was used to identify trends in shifts of professional attitude and behaviour among dental students. The advantage of this is the possibility of looking at changes of statements to significant items at the same time. For

example, oral self-care practice of Mongolian dental students differed highly significantly by study year when using similar approach for data analysis (Tseveenjav *et al.*, 2002). Several other studies used univariate analysis to address respective questions (Kawamura *et al.*, 1997, 2000, 2001, 2002, Polychronopoulou *et al.*, 2002). Similar results were obtained for Greek dental students (Polychronopoulou *et al.*, 2002). On the contrary, Finnish dental students seem to be much more aware with virtually no changes to these items (Kawamura *et al.*, 2000) during the study. However, multiple testing in univariate analyses might lead to inflated p-values and in particular does not account for patterns of responses in the data set.

Similar to the old or the recent studies in different countries (Howat *et al.*, 1979, Cavaillon *et al.*, 1982, Cortes *et al.*, 2002, Polychronopoulou *et al.*, 2002, Kawamura *et al.*, 2002), the present study showed that students had low dental health awareness when they started their dental education, but with advancement in dental school, their oral health awareness and attitudes improved. This late improvement might be due to the fact that students take Preventive Dentistry and Periodontics courses during the second semester of the third year only. In the multivariate logistic regression analyses it became obvious that items related to professional attitude like bleeding on brushing abruptly changed after preclinical years. This may be explained by the fact that students became exposed to the clinical environment and were in contact with patients.

Surprisingly, as is shown in Fig. 1, statements regarding items related to additional aids for oral hygiene like use of dental floss, as well as smoking habits didn't change with the advancement of students in their studies. According to this, specific oral hygiene aids for interdental cleaning should be introduced earlier in the studies and the importance of their usage highly stressed.

In the present study male students were smokers more

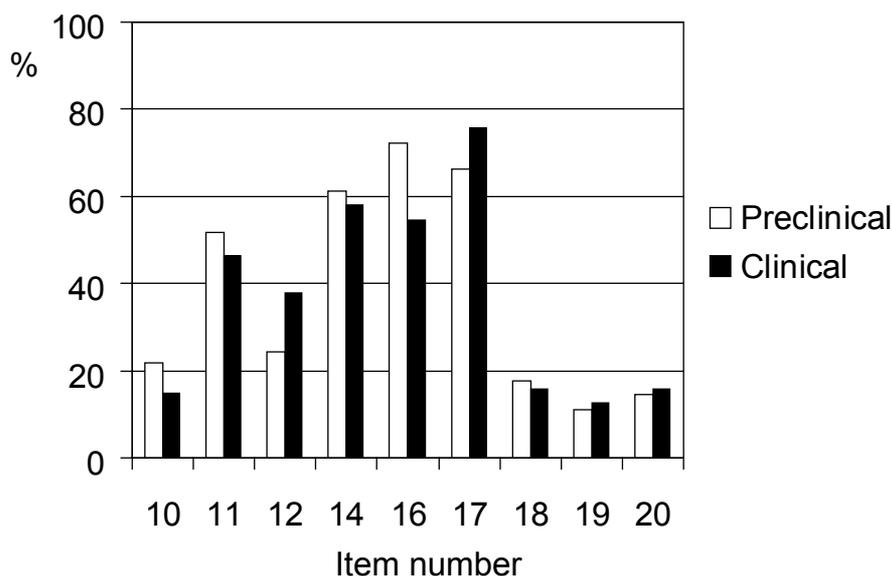


Figure 1. Items (see Table 1) not included in the multivariate logistic regression analysis ($p \geq 0.15$, Table 3) showing the percentages of preclinical and clinical students answering "yes".

often than females (31% vs. 4%) and prevalences did not change with year of study. Smoking and its association with periodontitis and many other oral diseases (Rivera-Hidalgo *et al.*, 2003) should be clearly known to students as they could be role models for their future patients. Furthermore, Rickard-Bell *et al.*, (2003) showed that dental students had low perception of their effectiveness in smoking cessation counselling for their patients. Their confidence in the success of their efforts to counsel to quit was low and did not change by year of study.

A recent study in Jordan found that periodontal awareness and knowledge among adult patients visiting the Periodontics clinic at Jordan University of Science and Technology is still poor (Taani 2002). Another recent study on the oral health behaviour of schoolchildren and parents in Jordan (Rajab *et al.*, 2002) revealed a discrepancy between the dental knowledge, the attitudes of the parents and the oral health practices of the children. Both studies concluded that dental health education is necessary to improve oral health. This is also obvious in our study as the preclinical students had low dental awareness and poor oral health attitudes.

Reviewing the dental school's curriculum showed that only one Preventive Dentistry course is taught to the students during the second semester of the third year. The findings of our study stress the importance of exposing the students to Preventive Dentistry courses early during their academic training. This study was

conducted in one of the two dental schools in Jordan. This would limit the results and the conclusions drawn from it. It would be very interesting to examine if such results would be applicable to the other dental school and other neighbouring schools in the region.

Further studies are needed to clinically examine the students to evaluate whether there is a difference in the caries experience and in gingival health between the students at the different academic levels.

Conclusions

Dental students in Jordan had low dental health awareness when they started their dental education, but with advancement in dental school, their oral health awareness and attitudes improved in some aspects. More courses in preventive dentistry that teach and encourage the students to change their own dental health behaviour are needed. These courses should be taught early in the dental curriculum of the pre-clinical years.

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