Dental Training and Changes in Oral Health Attitudes and Behaviors in Istanbul Dental Students

Kadriye Peker, Ph.D.; Ömer Uysal, Ph.D.; Gülçin Bermek, Ph.D.

Abstract: The aim of this study was to examine the changes that occur in the oral health attitudes and behaviors of dental students in Istanbul, Turkey, during their dental education. The Turkish version of the Hiroshima University-Dental Behavioral Inventory (HU-DBI) was distributed among 757 dental students at the Dental Faculty, Istanbul University. The response rate was 72 percent. Chi-square and logistic regression models were used for statistical analysis. The mean HU-DBI score of the clinical students was significantly higher than that of the preclinical students. Preclinical students significantly more often believed that it was impossible to prevent gum disease with toothbrushing alone and worried about the color of their teeth and bad breath. Most of them brushed their teeth with strong strokes, thought the condition of their teeth was getting worse despite daily toothbrushing, and would seek dental care only when symptoms arise. Clinical students more often used disclosing solutions to see how clean their teeth were and complained of bleeding gums. The variation in favorable oral health attitudes/behaviors appeared to reflect the students’ educational training experience. The findings of this study highlight the relatively poor oral health behaviors of Turkish dental students, which should be improved by means of comprehensive programs that aim to promote their own dental hygiene practices and preventive oral health knowledge from the start of dental training.

Keywords: dental education, dental students, oral health beliefs, oral health behavior, attitudes, dentistry in Turkey

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Chronic noncommunicable diseases, including oral diseases, are occurring more frequently in Turkey, as in other developing and industrialized countries. The results of the 1990 National Oral Health Pathfinder Survey found that oral diseases, in particular dental caries and periodontal diseases, were major public health problems.1 In Turkey, oral health professionals in general practice are more concerned with the treatment of oral diseases than their prevention and promotion of oral health. To redirect the focus of oral health professionals towards effective preventive interventions and to enable them to motivate their patients to adopt healthy behaviors, special educational programs integrated into undergraduate training and made available to established clinicians are required.2-7

Dental students, the future professionals, will play an important role in educating and promoting public oral health.8-10 Dental students in general have been found to have a positive attitude toward oral health,11,12 but their own oral health behavior must improve if they are to serve as positive models for their patients, families, and friends.5,13-15 Dental students’ oral health attitudes reflect their understanding of the importance of disease prevention and their commitment to improving their patients’ oral health; these attitudes should be developed and reinforced during undergraduate training. Research has found that dental students’ attitudes and behaviors are different in the preclinical and clinical years,11,16,17 as well as varying among countries and cultures.18-23 Little is known about the oral health behaviors and attitudes of Turkish dental students and the influence of educational training on the development of their oral behaviors and attitudes. Recent study using the modified Hiroshima University-Dental Behavioral Inventory found that, with advancement in dental school, some aspects of dental students’ oral health awareness and attitudes improved.24 There is a global trend towards standardization of dental education and the inclusion of health promotion in dentistry. To measure the progress of this trend, comparative studies will become more important for assessing dental students’ oral health behaviors and attitudes in various cultures and under various educational and health care systems.22,23
The dental training in our faculty admits candidates from various socioeconomic backgrounds on the basis of their score in state entrance exams. The curriculum comprises five years, divided into two parts: preclinical (years 1 and 2) and clinical (years 3, 4, and 5). Preclinical students take basic science courses and preclinical laboratory courses. In the clinical years, students manage and treat patients under supervision. In the dental school’s curriculum, no specific course in preventive dentistry is offered; the related issues are taught as parts of courses in conservative dentistry, periodontics, dental public health, and pedodontics. There has been little effort aimed at students’ own oral self-care motivation in the preventive medicine course in Year 1 and in the periodontology and conservative dentistry courses in Year 3. The principles and practical application of preventive dentistry are taught during the public dental health and the conservative dentistry courses in Year 5.

Health care in countries with similar social systems is usually similar. Comparisons between countries with different health care systems, different cultures, and different languages is much more complicated. A validated and reliable instrument to facilitate assessment and multidimensional comparisons of health attitudes and behaviors among dental students in different educational systems is required. The Hiroshima University-Dental Behavioral Inventory (HU-DBI), developed by Kawamura, has been used to examine the oral health-related attitudes and behaviors of dental students. In a sample of 517 Japanese university students, the HU-DBI had good test-retest reliability over a four-week period. The English version has also shown good test-retest reliability and translation validity in a sample of twenty-six Japanese-English bilingual individuals. It has been translated into several languages and applied in a variety of cultural settings.

The objective of this study was to examine the changes that occur in oral health attitudes and behaviors among dental students at Istanbul University during the course of their training, using the HU-DBI.

Materials and Methods

At the time of this study, no Turkish translation of the HU-DBI was available. The linguistic equivalence study was carried out in two phases: 1) translation and back translation of inventory, and 2) testing for the equivalence between the English and Turkish versions of the inventory. In the first phase of the study, bilingual professionals (the principal investigator and two dental school members) translated the English HU-DBI into Turkish. This translation was then discussed with three bilingual Turkish experts experienced with questionnaires and survey research. After satisfactory agreement was reached regarding the translated forms, the Turkish inventory was subjected to back translation. A bilingual English teacher, who was resident in Turkey and who had not seen the original version, translated the Turkish items into English. Then, the investigator compared the translated Turkish and original English HU-DBIs, and minor changes regarding the item descriptions of some items were made with the help of the back translator. A Turkish language expert checked the grammar and structure of the items, and minor corrections were made to the Turkish version.

The second phase of this study was to validate the linguistic equivalence of the English version to the Turkish version in a convenience sample of twenty-three bilingual research assistants in our faculty. Cohen’s kappa was used to test item agreement between the two language versions. The strength of agreement is reflected by the calculated kappa value: fair (0.21–0.40), moderate (0.41–0.60), substantial (0.61–0.80), and almost perfect (0.81–1.0). Kappa coefficients of the twenty items ranged from 0.62 to 1.0. These suggested that the Turkish and English versions of the HU-DBI questionnaire would be acceptable for comparisons between speakers of these languages.

The survey was typewritten in Turkish and conducted at the Faculty of Dentistry, Istanbul University in April and May 2009. Participation in the project was voluntary. Students in all five academic years were asked to remain after class if they were willing to complete a survey about their oral health. The survey was completed anonymously, and no personal, demographic, or academic data were collected. The study was approved by the ethics committee of the Istanbul Faculty of Medicine.

Chi-square was used to evaluate differences in the distribution of all variables in the Turkish HU-DBI survey by level of education. Univariate analyses, comparing answers given by preclinical and clinical students, were done first. Next, a stepwise backward selection strategy was employed to construct multivariate logistic regression models with preclinical/clinical status as dependent variable. The Wald statistic was used to test the null hypothesis that the regression coefficients were zero. The
Nagelkerke’s $R^2$ statistic was used to assess the ability of the model to distinguish between the preclinical and clinical students. The summary estimate of oral health behavior was calculated from the responses to the twelve items.\cite{18,29} Group comparisons were made using an independent sample t-test for the HU-DBI total score. Statistical significance was assumed when $p \leq 0.05$. Data were analyzed using the SPSS 15.0 (SPSS, Inc., Chicago, IL, USA) package.

**Results**

From a total of 757 dental students, 543 students (72 percent) completed the questionnaire. Those not participating consisted of 178 dental students (24 percent) who were absent on the day of the survey and thirty-six (5 percent) who declined to participate. A total of sixty-eight students were excluded because they did not complete the survey, leaving results from 475 students available for analysis.

The distribution of participating dental students according to their gender and class year is shown in Table 1. Approximately 44 percent of the participants were from the preclinical years, and 56 percent were clinical; 216 (45 percent) were male, and 259 (55 percent) were female. The participation rate ranged from 54 percent to 75 percent.

Table 2 shows the percentage of “agree” responses in the dichotomous response (agree-disagree) to the HU-DBI questionnaire. The data are classified by clinical status. Significant differences were found between the preclinical and clinical students.

About 11 percent of the total students said they thought they could not avoid having false teeth when they were old, and 67 percent reported believing it impossible to prevent gum disease by toothbrushing alone. A greater proportion of preclinical than clinical students said they thought that they could not avoid having false teeth in old age (item 6, $p<0.0001$) and that their teeth were getting worse despite daily brushing (item 8, $p<0.0001$). In addition, compared with clinical students, a greater proportion of preclinical than clinical students reporting believing it impossible to prevent gum disease by toothbrushing alone (item 14, $p<0.0001$) and did not feel that they brushed well unless they used strong strokes (item 18, $p<0.0001$).

Sixty-five percent of the total students agreed with the statement “I brush each of my teeth carefully.” Eighty-nine percent of the total students said they often checked their teeth in a mirror after brushing, and 3 percent reported using a child-sized toothbrush. A greater proportion of clinical students said they brushed each of their teeth carefully (item 9, $p<0.0001$) and stated that they used a disclosing solution to see how well they had cleaned their teeth (item 16, $p<0.0001$). Forty-three percent of the total students said they had been told by their dentist that they brush their teeth well (item 20, $p<0.0001$). Moreover, a higher proportion of preclinical students said they used a child-sized toothbrush (item 5, $p<0.05$), had noticed some white sticky deposits on their teeth (item 4, $p<0.0001$), and used a toothbrush with hard bristles (item 17, $p<0.01$).

Eighty-one percent of the total students reported that they did not worry much about visiting the dentist. About 6 percent said they were concerned about the color of their gums. A higher proportion of clinical students reported gum bleeding (item 2, $p<0.0001$) than did the preclinical students, and a higher proportion of preclinical students said they were bothered about the color of their gums (item 7, $p<0.0001$) and reported that they would put off going to the dentist until they had a toothache (item 15, $p<0.0001$). Of considerable importance was the finding that a higher proportion of preclinical students were worried about the color of their teeth.

<table>
<thead>
<tr>
<th>Class Year</th>
<th>Female (%)</th>
<th>Male (%)</th>
<th>Total Participation (% of Class)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st (preclinical)</td>
<td>65 (54%)</td>
<td>55 (46%)</td>
<td>120 (75%)</td>
</tr>
<tr>
<td>2nd (preclinical)</td>
<td>44 (50%)</td>
<td>44 (50%)</td>
<td>88 (61%)</td>
</tr>
<tr>
<td>3rd (clinical)</td>
<td>41 (56%)</td>
<td>32 (44%)</td>
<td>73 (54%)</td>
</tr>
<tr>
<td>4th (clinical)</td>
<td>49 (56%)</td>
<td>38 (44%)</td>
<td>87 (62%)</td>
</tr>
<tr>
<td>5th (clinical)</td>
<td>60 (56%)</td>
<td>47 (44%)</td>
<td>107 (61%)</td>
</tr>
<tr>
<td>Total</td>
<td>259 (55%)</td>
<td>216 (45%)</td>
<td>475 (72%)</td>
</tr>
</tbody>
</table>
The summary estimate of oral health behavior was calculated from the responses to the twelve items of the HU-DBI, shown in Table 2. The maximum score in HU-DBI is 12, and higher scores signify better oral health behavior. The mean score of the clinical students was 6.25, significantly higher than that of the preclinical students (5.59; p<0.001). As students progressed in their studies, mean scores increased.

Table 3 presents details of the logistic regression model that predicts group membership. The final multivariate model included only ten statements of the HU-DBI.

Overall, most of the preclinical students said they would visit a dentist only when they had a toothache (item 15, OR 0.63, 95 percent CI 0.50–0.79). Furthermore, the preclinical students were more concerned than the clinical students about the color of their teeth (item 3, OR 0.62, 95 percent CI 0.48–0.79) and bad breath (item 13, OR 0.74, 95 percent CI 0.60–0.93). In addition, most of the students believed that it was impossible to prevent gum disease by toothbrushing alone (item 14, OR 0.67, 95 percent CI 0.53–0.86), believed that their teeth were getting worse despite daily brushing (item 8, OR 0.67, 95 percent CI 0.46–0.98), and did not feel that they brushed well unless they used strong strokes (item 18, OR 0.67, 95 percent CI 0.51–0.89).

The most striking results were that the clinical students complained frequently of bleeding gums after toothbrushing (item 2, OR 1.70, 95 percent CI 1.25–2.33) and they were more likely to have used a disclosing solution to see how clean their teeth were (item 16, OR 1.53, 95 percent CI 1.16–2.02). Most of the clinical students had been told by their dentists that they brushed their teeth well (item 20, OR 1.32, 95 percent CI 1.05–1.66).

Table 4 shows that 227 clinical students (85 percent) and 131 preclinical dental students (63 percent) were correctly predicted by the model. We found the overall correct classification rate to be 0.75, considerably higher than the expected rate of 0.5.
Discussion

As a major part of their role in oral health care provision, dentists are considered to be experts in the area of oral health education and promotion. Recent studies suggest that improved personal oral health among dental students is linked to their progression through the curriculum.\textsuperscript{11,16,17} High awareness of oral self-care in dental students plays an important role in enabling them to assess their patients’ oral health condition and to motivate their patients.\textsuperscript{8,9,15}

This study was the first formal assessment of the impact of dental education progress on the oral health attitudes and behaviors of a group of Turkish dental students using the original HU-DBI, which has been used worldwide in different studies.\textsuperscript{25} Translation of the HU-DBI survey from English to Turkish was necessary because the language of teaching in the dental schools of our country is predominantly Turkish. The results showed that the Turkish version of the HU-DBI was linguistically equal to the English form. As in a recent study using the same analytical approaches,\textsuperscript{4} we used multivariate logistic regression analysis to look at changes in the statements and significant items at the same time because multiple testing in univariate analyses might lead to inflated p-values and in particular does not account for patterns of the responses in the data set.

We found that the overall mean HU-DBI score of the clinical students was significantly higher than that of preclinical students. However, the overall mean HU-DBI score among dental students in this study was lower than reported from studies performed in other countries.\textsuperscript{4,14,16,17,21} This discrepancy might be due to the curriculum of our school. The findings of our study stressed the importance of exposing students to preventive procedures and implications early in their academic training.

The results of our study also found that preclinical students much more frequently than clinical students would put off going to the dentist until they had a toothache and consequently would receive less instruction from their dentist on how to brush, as well as less positive reinforcement about brushing than clinical students. There was a remarkable similarity in the direction of dental visiting patterns between students in Jordan and Greece.\textsuperscript{4,17} Preclinical dental students were more concerned about the color of their teeth and bad breath than clinical students, a finding also reported by Dumitrescu et al.\textsuperscript{16} Contrary to our results, Barriesshi-Nusair et al.\textsuperscript{4} found no differences between preclinical and clinical students in a number of items regarding bad breath and color of teeth. In addition, this finding was consistent with those of a study by Kiyak.\textsuperscript{30} Our findings demonstrated that the preclinical Turkish dental students’ oral health attitudes were similar to those of our society, in which concern for aesthetics, appearance, and the avoidance of students would put off going to the dentist until they had a toothache and consequently would receive less instruction from their dentist on how to brush, as well as less positive reinforcement about brushing than clinical students. There was a remarkable similarity in the direction of dental visiting patterns between students in Jordan and Greece.\textsuperscript{4,17} Preclinical dental students were more concerned about the color of their teeth and bad breath than clinical students, a finding also reported by Dumitrescu et al.\textsuperscript{16} Contrary to our results, Barriesshi-Nusair et al.\textsuperscript{4} found no differences between preclinical and clinical students in a number of items regarding bad breath and color of teeth. In addition, this finding was consistent with those of a study by Kiyak.\textsuperscript{30} Our findings demonstrated that the preclinical Turkish dental students’ oral health attitudes were similar to those of our society, in which concern for aesthetics, appearance, and the avoidance

<table>
<thead>
<tr>
<th>Item Number</th>
<th>OR</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1.705</td>
<td>1.248–2.329</td>
<td>0.001</td>
</tr>
<tr>
<td>3</td>
<td>0.617</td>
<td>0.482–0.790</td>
<td>0.000</td>
</tr>
<tr>
<td>7</td>
<td>0.610</td>
<td>0.357–1.043</td>
<td>0.071</td>
</tr>
<tr>
<td>8</td>
<td>0.671</td>
<td>0.458–0.982</td>
<td>0.040</td>
</tr>
<tr>
<td>13</td>
<td>0.744</td>
<td>0.596–0.930</td>
<td>0.009</td>
</tr>
<tr>
<td>14</td>
<td>0.673</td>
<td>0.529–0.858</td>
<td>0.001</td>
</tr>
<tr>
<td>15</td>
<td>0.630</td>
<td>0.503–0.789</td>
<td>0.000</td>
</tr>
<tr>
<td>16</td>
<td>1.532</td>
<td>1.164–2.015</td>
<td>0.002</td>
</tr>
<tr>
<td>18</td>
<td>0.670</td>
<td>0.506–0.887</td>
<td>0.005</td>
</tr>
<tr>
<td>20</td>
<td>1.319</td>
<td>1.047–1.660</td>
<td>0.019</td>
</tr>
<tr>
<td>(Constant)</td>
<td>0.387</td>
<td></td>
<td>0.005</td>
</tr>
</tbody>
</table>

Notes: Items are defined in Table 2. Backward stepwise elimination with the likelihood-ratio criterion was used to select variables for removal. Variables entered on step 1: items number 1–20. Variables removed at step: 2=number 1, 3=number 19, 4=number 6, 5=number 10, 6=number 5, 7=number 9, 8=number 11, 9=number 17, 10=number 12, 11=number 4.
of pain are important motivational factors.31 Most of the preclinical students thought it was impossible to prevent gum disease with mechanical tooth cleaning, possibly because of their belief that brushing is the most effective method to prevent dental caries. In addition, they had more pessimistic oral health attitudes (such as being likely to think that their teeth were getting worse despite daily brushing and believing that strong strokes were necessary to brush well) than clinical students; similar findings have been reported from other countries.4,16,17 This is probably explained by the fact that the students had low oral health awareness and poor knowledge when they started their dental education. A probable cause of this is the lack of effective school-based oral health promotion programs at a national level that seek to help children improve and maintain their oral health.32 Since our dental students are not receiving this before they enter dental school, oral health programs should be included in the preclinical curriculum to promote oral health awareness and knowledge.

Most of the clinical students stated that they used a disclosing solution to see how clean their teeth were. This might be due to the fact that students take the periodontics lecture relating to the use of disclosing solution in the third year, but their clinical training starts with the dental public health and conservative dentistry courses in the first semester of Year 5. Interestingly, bleeding gums after toothbrushing were more frequently observed among clinical than preclinical students. Accordingly, self-care practice aids for improving oral health should be introduced in both preclinical and clinical years, and the importance of preventive oral health behaviors should be strongly emphasized.

The results of our study showed that the Turkish dental students’ oral health behaviors and attitudes improved with increasing level of dental education. The study provides valuable baseline information that will allow comparison of dental students’ oral health awareness in various schools’ curricula. However, it should be noted that this study was conducted in one of the three dental schools in Istanbul, limiting the generalizability of the results and conclusions. A nationally representative study should be planned to assess the oral health behaviors and attitudes of all Turkish dental students. Data were not derived longitudinally but rather cross-sectionally; thus, observed changes cannot with certainty be attributed to the curriculum. In addition, there might be a certain amount of measurement error when handling reported instead of observed self-care behaviors. Thus, further studies are needed to evaluate the relationships among the caries experience, gingival health, and self-reported oral health behaviors and attitudes between students at different academic levels and to examine cultural differences between Turkish dental students and those in other countries.

Conclusions

Considerable differences in oral health attitudes/behaviors exist between Turkish preclinical and clinical dental students, reflecting their educational experience. Moreover, it is possible to differentiate clinical students from preclinical students, with a probability of 85 percent, by using the HU-DBI instrument. The findings of this study highlight the relatively poor oral health behaviors of Turkish dental students. These should be improved by comprehensive programs aiming to promote students’ dental hygiene practices and preventive oral health knowledge and should start from the beginning of dental training.

Acknowledgments

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REFERENCES