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Effect of Dental Education on Peruvian Dental Students' Oral Health-Related Attitudes and Behavior

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Abstract

This study evaluated the effect of dental education on oral health-related attitudes and behavior of students in a five-year dental program in Peru. A survey using the Hiroshima University-Dental Behavioral Inventory (HU-DBI), which consists of twenty dichotomous responses (agree-disagree) regarding oral health behavior and attitudes, was completed by Year 1 and Year 5 dental students at the Universidad Inca Garcilaso de la Vega in Lima, Peru. A total of 153 Year 1 students and 120 Year 5 students responded to the Spanish version of the HU-DBI questionnaire. The data were analyzed using chi-square tests and logistic regression analyses. Compared to the Year 1 students, the Year 5 dental students were more likely to agree with questions such as “I think I can clean my teeth well without using toothpaste” (OR=0.24, 95% CI: 0.10-0.58); “I have

used a dye to see how clean my teeth are” (OR=0.19, 95% CI: 0.10-0.36); and “I have had my dentist tell me that I brush very well” (OR=0.34, 95% CI: 0.17-0.69). Overall, the data showed that the curriculum in this dental school in Peru resulted in more positive oral health-related attitudes and behavior among Year 5 dental students compared to those of Year 1 dental students.

Keywords

oral health attitudes; oral health behaviors; dental students; toothbrushing; Peru

A variety of assessment instruments are available to measure the outcomes of medical and dental education with respect to evidence-based practice.¹⁻⁵ These instruments are well designed to evaluate outcomes in the specific medical and dental context for competence in the clinical setting. In addition to culturally determined attitudes, beliefs, and behaviors, dental students acquire oral health-related attitudes and behavior as their dental education progresses. They are expected to educate their patients about oral hygiene and become role models for positive oral health promotion efforts for their patients by the time they graduate. However, it is difficult to make an overall assessment of how effectively the students' dental education has affected their attitudes and behavior in this respect.

The Hiroshima University-Dental Behavioral Inventory (HU-DBI), developed by Kawamura,⁶ consists of twenty dichotomous responses (agree-disagree) to examine the oral health attitudes and behavior of patients regarding toothbrushing. The HU-DBI has good test-retest reliability and validity, and thus it is not only useful for understanding the behavior of patients but also for predicting clinical outcomes.⁶⁻⁹ Over the years, the HU-DBI has been translated into English, Finnish, Chinese, Flemish, Portuguese, French, German, Greek, Italian, Malayan, Thai, and Korean for cross-cultural comparisons. Results concerning the reliability and validity of these translated versions have been reported previously.⁸⁻¹⁴ While the success of using the HU-DBI questionnaire in other countries has been well documented, no research with this scale has been reported in Latin American countries because of a lack of a Spanish version of the HU-DBI. Therefore, a Spanish translation of the HU-DBI was prepared, and the reliability of this version was determined. The aim of this study was to evaluate the effect of dental education with respect to oral health attitudes and behaviors in a five-year dental program in Peru and to see if there were any significant differences between Year 1 and Year 5 dental students.

Materials and Methods

Dental students' oral health-related behaviors and attitudes were measured in the first year of dental school (Year 1) and in the final clinical year of dental school (Year 5) using the HU-DBI. At the time of implementation, no Spanish translation of the HU-DBI was available. The translation from Japanese into Spanish was conducted in two phases. The HU-DBI was translated from the Japanese version using a translation procedure led by Spanish and Japanese bilingual survey research experts. Back-translations were used during this translation process. Sixteen Spanish and Japanese bilingual individuals were invited to take both Spanish and Japanese versions of the HU-DBI. They were asked to answer each version of the questionnaire separately at different times (three to six hours apart). The

reliability of the translated version was measured using Spearman's rank correlation. The correlation between the Spanish and Japanese versions was $r=0.973$ ($n=16$, $p<0.001$), which demonstrated that the Spanish HU-DBI version had sufficient reliability and could be used in this study (contact the corresponding author for the Spanish version of this scale).

Year 1 and Year 5 dental students at the Universidad Inca Garcilaso de la Vega in Peru were invited to participate in this survey at the beginning of the academic year and to respond to the Spanish version of the HU-DBI questionnaire. The students were asked by their professors to remain in class at the end of a lecture and to volunteer to participate in this study. No attempt was made to follow-up with students who were absent on the day of the survey. The HU-DBI questionnaire was distributed to all students. They were asked to respond to the questionnaire, and the completed questionnaires were collected. A total of 153 dental students in Year 1 and 120 students in Year 5 answered the Spanish version of the HU-DBI questionnaire in 2011. The absence of thirty-three dental students from Year 1 to Year 5 is due to an internship rotation in low-income urban communities in Year 5. By using appropriate statistics, the influence of this absence was adjusted.

The responses were analyzed by comparing the data of the Year 1 students with the data of the Year 5 students using chi-square tests. Logistic regression analyses were used to examine whether Year 1 dental students have similar oral health behaviors compared to Year 5 dental students. Statistical significance was based on probability values of less than 0.05. The data were analyzed using SPSS 16.0 (SPSS, Chicago, USA). This study was approved by the Institutional Review Board of the Universidad Inca Garcilaso de la Vega in Peru.

Results

Table 1 shows the frequencies and percentages of male and female students in the first- and fifth-year classes and the average age of these students. The percentage of female students was higher in both years. The average age (SD) of Year 1 and Year 5 respondents was 18.9 (3.2) and 25.1 (3.8) years, respectively.

Table 2 shows the items on the HU-DBI questionnaire and the percentages of agree responses of the students in Year 1 and Year 5. The responses of the students in the two classes differed significantly for questions #2, #6, #7, #8, #10, #11, #15, #16, #17, #18, and #20. The estimated coefficients and related statistics from the logistic regression model were relevant for only six questions (Table 3). It was more likely that Year 5 students would agree on questions #11, #16, and #20 with 76 percent, 81 percent, and 66 percent, respectively, after controlling the effects of other questions. Year 1 students were more likely than Year 5 students to agree on questions #2, #8, and #17. Year 1 students had a 5.98, 14.95, and 4.27 times more likely chance of agreeing on questions #2, #8, and #17 after controlling the effects of other questions.

Discussion

Dental school curricula in Peru consist of three phases to teach preventive dentistry and oral health promotion. In Phase I, didactic courses in basic sciences (anatomy, pharmacology,

physiology, pathology, and microbiology), including preventive dentistry, oral health promotion, and oral hygiene, are taught in Years 2 and 3. In Phase II, Years 4 and 5 students participate mainly in patient care under the supervision of faculty members at the dental school clinic in conjunction with didactic courses in clinical subjects (oral surgery, operative dentistry, periodontics, endodontics, and prosthodontics).¹⁵ In Phase III, Year 5 students spend a minimum four-month internship in low-income urban communities.¹⁶

There are currently fourteen accredited dental schools in Peru (ten are private and four are public), and the dental curricula are taught in Spanish. All applicants to dental schools must have graduated from high school; no undergraduate predental coursework is required before admission. The five-year or six-year dental program begins with two years of mainly preclinical didactic and laboratory courses; then, years 3 and 4 are mainly clinical training supervised by faculty members.¹⁵ Previous research also supported our finding that the dental students were more likely to be female.¹⁶

In Peru, disclosing tablets or liquids are limited to over-the-counter sales and are not popular with the public. These dyes stain plaque a bright color and offer an objective way for dental students to make patients aware of the importance of having good oral hygiene. Dentists use them to teach patients that stains on their teeth indicate areas where plaque remains after brushing. They thus provide feedback to improve patients' toothbrushing techniques. Using this information as feedback and with the dentist's encouragement, patients can then develop confidence in their ability to clean their teeth thoroughly. This is probably why it is more likely that Year 5 students will agree with questions #11 and #16, which corresponds to studies conducted in Turkey¹⁷ and Romania.¹⁸

The use of fluoride toothpaste for remineralization of tooth enamel to protect against decay is taught in Phase I of Peru's didactic curriculum for dental students. These students learn that just using a toothbrush to prevent decay is not as effective as brushing with fluoride toothpaste. The responses to questions #8 and #20 among Year 5 students can be attributed to an increase in their confidence after giving toothbrushing technique instructions to patients during Phases II and III. Additionally, the high percentage increase for question #11 might be attributed to having given patients instructions during Phases II and III. The students understand that effective tooth cleaning depends not only on the use of toothpaste, but also on the mechanical removal of dental plaque. The increased knowledge of and clinical experience with oral health practices are significant products of dental education and contribute to more positive dental students' attitudes in their final year.

The general population in Peru might have a stereotypical perception that using a harder bristle toothbrush is better. However, when bleeding occurs because of the hard bristles, they may not be sure if daily brushing helps their oral health. This might be why Year 1 students are more likely to agree with questions #2, #8, and #17 than Year 5 students. The results for question #2 are consistent with those from a study using the HU-DBI in Jordan,¹⁹ but not with those from similar studies in Turkey¹⁷ and India.²⁰ This finding suggests that the periodontal educational component of the dental curricula in Turkey and in India is not as complete as in Peru. The results for questions #8 and #17 are consistent with reports from Greece²¹ and Romania,¹⁸ respectively.

Also notable is the high percentage of combined agree responses for Year 1 and Year 5 students to questions #3, #9, and #13 (Table 2). The percentage of agree responses from first- and fifth-year Peruvian students is generally higher than the percentages of agree responses from similar dental student populations in other countries. For example, while 90 percent of the Peruvian first-year students and 91 percent of the Peruvian fifth-year students agreed with question #3, Polychronopoulou and Kawamura reported that only 67 percent of Japanese first-year students, 56 percent of Japanese sixth-year students, and 50 percent of Greek first-year students agreed with this question.²² However, the percentages of students who agreed with question #9 in our study (Year 1: 89 percent, Year 5: 95 percent) were close to the percentages of students in similar studies in France,⁹ Germany, Belgium, and China,^{8,9} Australia,⁹ Japan,²² Finland,⁹ and the United Kingdom.⁸ For question #13, we found that 96 percent of Peruvian students in both Year 1 and Year 5 agreed, while the percentages of students who agreed with this statement in other countries ranged from 100 percent of Brazilian fifth-year students,⁹ 97 percent of Belgian fifth-year students,⁹ and 93 percent of Indonesian fifth-year students⁹ to 74 percent of Chinese first-year students,⁸ 65 percent of Greek first-year students,²² and 57 percent of British first-year students.⁸

Due to the diversity of the countries involved in this research, it is difficult to discuss the effects of differences in the educational systems and cultural interpretations. Additional research concerning these issues should therefore be conducted in the future. Current and previous reports using the HU-DBI in cross-cultural studies in university settings have provided objective data and described implications for dental education as well as strategies for educating students and patients about preventive dentistry. However, the environment of one school in this study is not representative of the other schools in Peru, so caution should be exercised in making generalizations based on the results of this study.

The implications of this study for dental education include suggestions to evaluate current dental education curricula and develop potentially new components pertaining to educating dental students about oral health promotion and disease prevention, thus shaping these students' oral health-related attitudes and behaviors in this domain. The HU-DBI is a useful tool for assessment of students' oral health-related attitudes and behaviors, which could be used as a basis for developing additional programs aimed at improving dental students' attitudes and behaviors. Dental schools could then assess if sufficient attention is paid in their curricula to encouraging constructive oral health practices and positive behavioral attitudes, thus allowing them to reform their curricula to emphasize these issues at all levels of dental education.

This study was a cross-sectional study that did not allow us to survey a group of first-year students and then follow-up with them five years later to survey them again. However, it is possible to collect data from these students in Year 1 at a later time. The research was limited to collecting data in a single five-year school, and no survey in a dental school with a six-year program was conducted. Future research could address this issue and also focus on collecting data in other Spanish-speaking countries, now that a Spanish version of this scale is available.

Conclusion

In this study, data from a selected dental school in Peru indicated that students who had been educated with a three-phase curriculum in didactic and clinical training had more positive oral health-related attitudes and behaviors than students at the beginning of their educational experience in this program. Consequently, oral health prevention and promotion have been prioritized in the curriculum. This study provides a Spanish version of an instrument that can be used for the assessment of oral health attitudes and behaviors of Spanish-speaking dental students at entry into their dental education and at the time of graduation. It was our goal that the information acquired in this study would contribute to a better understanding of the outcomes of dental education related to oral health promotion and disease prevention.

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Table 1
Overview of respondents' background characteristics: gender distribution and average age in Year 1 and Year 5

	Male	Female	Male/Female	Total	Mean Age (SD)
Year 1	50	103	33%/67%	153	18.9 (3.2)
Year 5	54	66	45%/55%	120	25.1 (3.8)
Total	104	169	38%/62%	273	

Table 2
Items of the HU-DBI and percentages of “agree” responses of dental students in Year 1 and Year 5

Item	Year 1 (N=153)	Year 5 (N=120)	p-value
1. I don't worry much about visiting the dentist.	18%	14%	NS
2. My gums tend to bleed when I brush my teeth.	31%	9%	***
3. I worry about the color of my teeth.	91%	90%	NS
4. I have noticed some white sticky deposits on my teeth.	19%	21%	NS
5. I use a child-sized toothbrush.	5%	8%	NS
6. I think that I cannot help having false teeth when I am old.	31%	16%	**
7. I am bothered by the color of my gums.	85%	92%	*
8. I think my teeth are getting worse despite my daily brushing.	13%	1%	***
9. I brush each of my teeth carefully.	89%	95%	NS
10. I have never been taught professionally how to brush.	18%	9%	*
11. I think I can clean my teeth well without using toothpaste.	9%	29%	***
12. I often check my teeth in a mirror after brushing.	89%	82%	NS
13. I worry about having bad breath.	96%	96%	NS
14. It is impossible to prevent gum disease with toothbrushing alone.	50%	54%	NS
15. I put off going to the dentist until I have toothache.	28%	6%	***
16. I have used a dye to see how clean my teeth are.	28%	69%	***
17. I use a toothbrush that has hard bristles.	36%	14%	***
18. I don't feel I've brushed well unless I brush with strong strokes.	33%	14%	***
19. I feel I sometimes take too much time to brush my teeth.	34%	30%	NS
20. I have had my dentist tell me that I brush very well.	57%	84%	***

NS=not significant

* p<0.05,

** p<0.01,

*** p<0.001

Table 3
Results of logistic regression analysis (N=273)

Item	Coefficient	Standard Error	Odds Ratio
11. I think I can clean my teeth well without using toothpaste.	-1.42	0.44	0.24
16. I have used a dye to see how clean my teeth are.	-1.64	0.32	0.19
20. I have had my dentist tell me that I brush very well.	-1.07	0.36	0.34
2. My gums tend to bleed when I brush my teeth.	1.79	0.44	5.98
8. I think my teeth are getting worse despite my daily brushing.	2.70	1.09	14.95
17. I use a toothbrush which has hard bristles.	1.45	0.38	4.27
Constant	-4.86	2.52	0.01