Evaluating a Cultural Competency Curriculum: Changes in Dental Students’ Perceived Awareness, Knowledge, and Skills

Hosam M. Alrqiq, BDS, MSD; Thayer E. Scott, BS, MPH; Ana K. Mascarenhas, BDS, MPH, DrPH

Abstract: In response to current and projected demographic changes in the United States, many dental schools have taken steps to increase the cultural competence of their students through various educational methods. The aim of this study was to evaluate the effectiveness of the cultural competency curriculum at Boston University Henry M. Goldman School of Dental Medicine (GSDM). The curriculum was evaluated using a pre and post design, utilizing an instrument developed for pharmacy students and modified for dental students. The questionnaire was comprised of 11 items designed to assess changes in students’ awareness, knowledge, and skills in providing culturally competent care. Data were collected for two classes of second-year DMD students and first-year Advanced Standing students. The total number of returned surveys was 485, for a response rate of 79.5%. The students’ post-curriculum mean scores were all higher than their pre-curriculum scores for overall cultural competence (pre 26.5±6.3 to post 29.8±7.2) and for individual subscores on awareness (pre 5.3±1.4 to post 5.5±1.5), knowledge (pre 7.2±1.9 to post 8.1±2.1), and skills (pre 14.1±4.4 to post 16.2±4.4). The improvements on all scores were statistically significant (p<0.0001), with the exception of the awareness component. This evaluation suggests that the cultural competency curriculum at GSDM has been effective in producing improvements in these students’ cultural competence in the domains of knowledge and skills.

Dr. Alrqiq, currently Instructor in Dental Medicine (in Community Health), College of Dental Medicine, Columbia University, conducted this research while he was a Master’s student, Dental Public Health Program, Boston University Henry M. Goldman School of Dental Medicine; Ms. Scott is Instructor, Department of Health Policy and Health Services Research, Boston University Henry M. Goldman School of Dental Medicine; and Dr. Mascarenhas, currently Associate Dean for Research and Chief of Developmental Sciences, College of Dental Medicine, Nova Southeastern University, conducted this research while she was Professor, Department of Health Policy Services and Research, and Director of the Division of Dental Public Health, Boston University Henry M. Goldman School of Dental Medicine. Direct correspondence to Dr. Ana Karina Mascarenhas, College of Dental Medicine, Nova Southeastern University, 3301 College Avenue, Fort Lauderdale-Davie, FL 33314; 954-262-7373; anakarina.mascarenhas@nova.edu.

Keywords: dental education, cultural competence, attitude of health personnel, dental health services, community health education, public health, access to health care, dentist-patient relations

Submitted for publication 11/14/14; accepted 2/21/15

The growing diversity in the United States has had a tremendous impact on health care delivery. As noted in the surgeon general’s report Oral Health in America, the burden of oral diseases is spread unevenly across the population.1 Poor people, people with limited education, and members of some racial and ethnic groups have a higher incidence of untreated oral disease than the population as a whole, as documented by the U.S. Department of Health and Human Services Centers for Disease Control and Prevention (CDC).2,3 An indicator of the serious implications of such disparities in health care is the poorer outcomes for patients who are not provided appropriate care, as noted in the landmark Institute of Medicine report Unequal Treatment.4 It is a national public health priority to reduce racial and ethnic disparities in health care and expand care for underserved populations.5-7 One strategy that has received much attention is to train health care providers in the cultural competence that is considered an important component in efforts to eliminate health care disparities in the affected racial and ethnic groups.8

The role of medical and dental schools is crucial in training health care providers and providing a culturally competent workforce.6-12 Dental educators can train the next generation of practitioners to better understand various belief systems, cultural biases,
 ethnic origins, family structures, and other culturally determined factors that influence how people experience illness.11,13 Graduates of dental schools are now required by the Commission on Dental Accreditation (CODA) to be “competent in managing a diverse patient population and have the interpersonal and communications skills to function successfully in a multicultural work environment.”14

A study of the status of cultural competency education in U.S. dental schools published in 2006 found that although the majority of schools indicated the concept of cultural competence was integrated into their curricula, only six of the 34 responding schools (18%) provided a free-standing cultural competency course.6 In another study published the same year, 29 of the responding 45 schools (64%) reported having formal cross-cultural competency curricula provided in a separate course and/or integrated into other courses.15 In general, integration of cultural instruction into other didactic and clinical subjects suggests that, for most schools, cultural competence has a meaningful place in the curriculum.

The cultural competency curriculum at GSDM is comprised of 1) two two-hour lectures about cultural competence; 2) experiential learning experiences in the Applied Professional Experience Program (APEX) rotation; and 3) a series of discussion seminars in the Integrated Problems in Practice Management (IPPM) course. This study is the evaluation component of the RWJF-funded project that was submitted to the Boston University Medical Center Institutional Review Board for review and was determined to be exempt.

The first of the two lectures is an introduction to cultural competence with in-depth information on the extent of disparities in oral health care among various ethnic groups in the United States. Language challenges, attitude variations, communication problems, and clinical differences among people from various ethnic groups are presented and supported with case scenarios. The first lecture is taught only to second-year dental (DMD-II) students. The second lecture focuses on how culture affects health beliefs, health-seeking behaviors, decision making, and compliance and includes a discussion of communication and learning styles. The second lecture is provided both to DMD-II students and to first-year Advanced Standing (AS-I) students, who generally hold international dental degrees and are seeking licensure in the United States.

During the APEX rotation, these DMD-II students participated in an eight-week off-site internship. The internships take place in over 100 public and private dental sites in 23 states across the United States, including community health centers, hospital-based ambulatory facilities, and private practices that mostly serve culturally diverse populations. The intent of the rotation is for students to function as a member of the dental team. In the rotation, they are exposed to all aspects of patient care, e.g., communications, professionalism, and practice management. To further enhance their learning and experience in caring for diverse populations, students are required to complete two assignments during the rotation. The first assignment is a case presentation, while the second requires students to observe patient and provider/staff interactions and to make notes of any communication breakdowns observed.

At the end of the off-site rotation, students write a paper on their observations of the patient interactions and submit it to their group facilitator on the first day of the discussion seminars in the IPPM-I and IPPM-II courses. The seminar groups meet twice, during which students cover three cases related to the communication breakdowns identified during their APEX rotations. In their groups, they discuss observations that may characterize individuals from various ethnic backgrounds.

To assess the students’ awareness, knowledge, and skills in providing culturally competent dental care, we used an 11-item instrument previously used with pharmacy students17 and modified for preclinical
dental students. For example, the item “Effectively utilize an interpreter to interview or counsel a patient” was not used as the dental students were not currently involved with patient care.

A convenience sample was used for the study. The subjects were GSDM DMD-II and AS-I students from the 2009 and 2010 graduating classes. The DMD-II students’ perceptions of their awareness, knowledge, and skills in providing culturally competent dental care were assessed prior to and after the curriculum using pre and post surveys. Differences between DMD-II students, who received all three parts of the curriculum, and AS-I students, who did not receive the Introduction to Cultural Competence lecture portion, were also assessed to evaluate the impact of one versus two lectures.

The pre-curriculum survey for both classes was distributed to the DMD students on orientation day of the DMD-I year, and the post-curriculum survey was distributed to both the DMD-II and the AS-I students at the conclusion of the cultural competency curriculum. The two surveys consisted of the same 11 questions, which asked students to rate their confidence and addressed the three domains of awareness, knowledge, and skills. A unique identifier code was created, so that the responses for each student could be evaluated before and after receiving the curriculum while keeping their identities anonymous. The data used for these analyses were collected between 2005 and 2008. For each item, students chose a response on a scale from 0 to 4, with 0=not at all confident, 1=not very confident, 2=moderately confident, 3=very confident, and 4=extremely confident.

Epi InfoVersion 3.4.1 was used for data entry, and SAS version 9.1 was employed for analyses. The 11 survey items were collapsed into three domains, and new variables were created. The knowledge domain was derived from three questions asking how confident students were in their ability to recognize when they make assumptions about various groups or people; the second asked them to identify the influence of stereotypes on their thoughts, feelings, and behaviors towards various groups of people when providing patient care or education.

The skills domain was derived from six questions that asked how confident students were in several areas: interacting with people culturally different from themselves; eliciting a patient’s perspective on illness during a patient encounter or consultation; eliciting a patient’s perspective on health promotion during a patient encounter or consultation; effectively counseling a patient from a different cultural group on treatment, treatment options, or treatment plans; effectively counseling a patient from a different cultural group on his or her understanding of the proposed treatment plan; and effectively monitoring the treatment or treatment plan for a patient from a different cultural group. An overall variable was also created that summed the awareness, knowledge, and skills responses. The maximum possible scores were 12 for knowledge, 8 for awareness, 24 for skills, and 44 for overall.

Analyses included univariate and bivariate analysis of responses using paired and Student’s t-tests at a statistical significance level (alpha) of 0.05. The analyses compared the aspects of cultural competence for DMD-II students pre and post curriculum and between DMD-II students and AS-I students. Additionally, analyses evaluated whether there were differences between the two graduating classes of 2009 and 2010.

Results

The total number of returned surveys was 485 for a response rate of 79.5%. Of these, 187 surveys (39%) were pre curriculum (from DMD-II students), and 298 surveys (61%) were post curriculum: 173 DMD-II (58%) and 125 AS-I (42%) students (Table 1). The pre- and post-curriculum surveys for 100 out of 187 students (53.0%) were matched using the unique identifier code.

Table 2 shows pre versus post comparisons for DMD-II students for the 360 unpaired and 100 paired responses. The overall scores for the DMD-II students were higher (29.8±7.2) after the curriculum than before receiving it (26.5±6.2), out of a maximum score of 44 (p<0.0001). However, when the individual domains of awareness, knowledge, and skills were compared, statistically significant differences were found for the questions addressing knowledge and skills but not for awareness. In the paired data, the post-curriculum and pre-curriculum differences for overall cultural competence (4.2±6.5), awareness (0.2±1.7), knowledge (1.3±2.0), and skills (2.7±4.1) were statistically significant, with
18 Using a questionnaire developed at the University of San Francisco School of Pharmacy and modifying this questionnaire for dental settings was reasonable for our study, as the original tool represented the general core constructs of several behavioral theories and models, including Bandura’s Social Cognitive Theory and Prochaska and DiClemente’s Transtheoretical Model of Change. The scale’s validity has been tested using confirmatory factor analysis, and robust and diverse assessments of concurrent validity and additional indicators of reliability have been conducted. Most research evaluating cultural competence in dental education has consisted of cross-sectional studies conducted either to investigate the need for a cultural competency curriculum or to evaluate its effectiveness. For example, using data from

<table>
<thead>
<tr>
<th>Domain</th>
<th>Pre (n=187)</th>
<th>Post (n=173)</th>
<th>Range</th>
<th>p-value</th>
<th>Mean Differences (n=100)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>5.3±1.4</td>
<td>5.5±1.5</td>
<td>0-8</td>
<td>0.2</td>
<td>0.2±1.7</td>
<td>0.3</td>
</tr>
<tr>
<td>Knowledge</td>
<td>7.1±1.9</td>
<td>8.1±2.1</td>
<td>0-12</td>
<td>&lt;0.0001</td>
<td>1.3±2</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Skills</td>
<td>14.1±4.4</td>
<td>16.2±4.4</td>
<td>0-24</td>
<td>&lt;0.0001</td>
<td>2.7±4.1</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Overall</td>
<td>26.5±6.2</td>
<td>29.8±7.2</td>
<td>0-44</td>
<td>&lt;0.0001</td>
<td>4.2±6.5</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Comparisons between graduating classes (Table 3) showed that the DMD-II students’ level of confidence increased for both years (2009 and 2010) post curriculum. The overall composite scores for both classes on the post-curriculum survey (30.5±6.8 and 29.2±7.4, respectively) were higher than the pre-curriculum responses (27.1±6.0 and 25.9±6.5, respectively), with statistically significant p-values of <0.05. The awareness and skills subcomponents showed statistically significant improvement, while knowledge was not significantly improved.

When data were compared between the two graduating classes (50 paired surveys for each graduating class), there was a statistically significant improvement for both classes. However, the class of 2009 showed slightly more improvement in overall cultural competence than the class of 2010. DMD-II and AS-I student response comparisons showed that the overall composite scores for DMD-II students were higher (29.8±7.2) than for AS-I students (27.8±6.8), with a p=0.02 (Table 4). The scores for all three domains were higher for DMD-II students than for AS-I students. While awareness (p=0.0006) and knowledge (p=0.003) scores were statistically significantly different, the skills score was not statistically significant between the two groups (p=0.2).

### Discussion

To date, the dental education community has yet to develop adequately comprehensive tools for evaluation of dental students’ awareness, knowledge, and skills in providing culturally competent dental care. Using a questionnaire developed at the University of San Francisco School of Pharmacy and modifying this questionnaire for dental settings was reasonable for our study, as the original tool represented the general core constructs of several behavioral theories and models, including Bandura’s Social Cognitive Theory and Prochaska and DiClemente’s Transtheoretical Model of Change. The scale’s validity has been tested using confirmatory factor analysis, and robust and diverse assessments of concurrent validity and additional indicators of reliability have been conducted. Most research evaluating cultural competence in dental education has consisted of cross-sectional studies conducted either to investigate the need for a cultural competency curriculum or to evaluate its effectiveness. For example, using data from
Our study used a pre- and post-intervention design to assess the effect of our cultural competency curriculum on students’ perceptions, resolving some methodological issues of earlier studies. Overall, there was a measurable improvement in confidence for the DMD-II students in overall competence and the domains of knowledge and skills. This was seen across the various cohorts included (DMD classes of 2009 and 2010 and AS-I students). Further, when compared to the AS-I students, the DMD-II students reported more confidence in their awareness, knowledge, and skills in providing culturally competent care (post-curriculum mean overall score: DMD-II students 29.8, AS-I students 27.8), which indicates higher confidence among the DMD-II students. This finding may indicate a dose-effect relationship, as the DMD-II students were exposed to more of the curriculum than the AS-I students. Additionally, these differences were statistically significant, with the exception of the skills domain. This might be attributed to the fact that the AS-I students were mainly foreign-born dentists, some of whom had previous clinical experience in treating patients of various races/ethnicities, whereas the majority of DMD-II students were born in the United States and more likely to be raised in homogeneous communities with little experience in communicating with people from ethnic and racial groups different from their own.

Table 3. Mean cultural competency scores of second-year dental students by graduating class, domain, and overall

<table>
<thead>
<tr>
<th>Class</th>
<th>Domain</th>
<th>Pre Curriculum</th>
<th>Post Curriculum</th>
<th>Range</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class of 2009</td>
<td>Awareness</td>
<td>5.5±1.3</td>
<td>5.7±1.4</td>
<td>0-8</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
<td>7.2±1.9</td>
<td>8.2±2.0</td>
<td>0-12</td>
<td>0.0006</td>
</tr>
<tr>
<td></td>
<td>Skills</td>
<td>14.3±3.8</td>
<td>16.6±4.2</td>
<td>0-24</td>
<td>0.0002</td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>27.1±6.0</td>
<td>30.5±6.8</td>
<td>0-44</td>
<td>0.0005</td>
</tr>
<tr>
<td>Class of 2010</td>
<td>Awareness</td>
<td>5.1±1.4</td>
<td>5.4±1.5</td>
<td>0-8</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
<td>7.0±1.9</td>
<td>7.9±2.1</td>
<td>0-12</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>Skills</td>
<td>13.8±4.3</td>
<td>15.8±4.5</td>
<td>0-24</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>25.9±6.5</td>
<td>29.2±7.4</td>
<td>0-44</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Table 4. Mean cultural competency scores of second-year dental students (DMD-II) and first-year Advanced Standing (AS-I) students

<table>
<thead>
<tr>
<th>Domain</th>
<th>DMD-II (n=173)</th>
<th>AS-I (n=125)</th>
<th>Range</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>5.5±1.5</td>
<td>5.0±1.4</td>
<td>0-8</td>
<td>0.0006</td>
</tr>
<tr>
<td>Knowledge</td>
<td>8.1±2.1</td>
<td>7.3±1.9</td>
<td>0-12</td>
<td>0.003</td>
</tr>
<tr>
<td>Skills</td>
<td>16.2±4.3</td>
<td>15.5±4.1</td>
<td>0-24</td>
<td>0.2</td>
</tr>
<tr>
<td>Overall</td>
<td>29.8±7.2</td>
<td>27.8±6.8</td>
<td>0-44</td>
<td>0.02</td>
</tr>
</tbody>
</table>

the 2003 American Dental Education Association (ADEA) survey of dental school seniors, Hewlett et al. found that 87% felt prepared to treat a diverse population. Thind et al. reported that 64.7% of the students in their study perceived that time spent on extramural clinical rotations during dental education was a positive educational experience. Kuthy et al. found that, after completing their extramural clinical rotations, 77.7% of responding University of Iowa College of Dentistry students reported some experience in treating patients from ethnic groups different from their own. However, rarely have studies investigated the precise impact of a cultural competency curriculum on dental students by following them over time. One longitudinal study at the Medical University of South Carolina found that its cultural competency curriculum had a strong positive impact on dental students’ perceptions. However, some of the students’ reflective paper responses included negative comments about people from backgrounds different from their own. Another study attempted to evaluate first-year dental students’ perceptions of cultural competence with school-based programs using a pre/post survey design. This study reported improvement in the students’ perceptions using two questions to evaluate cultural competence; however, the investigators failed to use identifiers to match pre and post responses.
Another study found a similar relationship between clinical experience and higher levels of cultural skills when comparing graduate dentists to dental students in Melbourne, Australia. 29

One reason for the lack of improvement in the awareness domain may be due to the greater diversity of faculty, students, and patients at GSDM. Also, the impact of the curriculum may be underestimated since students in the pre survey reported fairly high cultural sensitivity and confidence before receiving the intervention. This is a common concern with self-reported data as students tend to overestimate their competence, meaning that self-evaluations may not be reliable predictors of actual performance. As Gozu et al. explained, “A high rating of confidence may be based on arrogance or lack of awareness of one’s limitations rather than on actual ability.” 30 This potential could account for our not seeing larger differences post-curriculum and is a possible limitation of this study.

Loss to follow-up is another limitation as only 100 out of 187 surveys (53%) were matched between pre and post delivery. This response rate might be attributed to student absences from class at the post-curriculum stage, non-response of some of the attendees, and/or errors in entering the exact identification code. Twelve codes were excluded due to an incomplete match. Simpler identification codes for future surveys may help resolve this issue. Finally, the lack of a pre test for AS-I students could be a limitation since we were unable to obtain baseline data to facilitate comparisons. Pretesting AS-I students would allow for more comparisons between groups and would further clarify whether there is a dose-effect relationship (since DMD-II students received two lectures, the APEX rotations, and seminar discussions compared to AS-I students who received only one lecture).

### Conclusion

This study found strong evidence that, after receiving the cultural competency curriculum, students became more confident overall and particularly in their knowledge and skills in providing culturally competent dental care. These results suggest that the curriculum is successfully preparing students to address this important issue.

### REFERENCES