

A global probe into dental student perceptions about philanthropy, global dentistry and international student exchanges

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Background: Training culturally competent graduates who can practice effectively in a multicultural environment is a goal of contemporary dental education. The Global Oral Health Initiative is a network of dental schools seeking to promote global dentistry as a component of cultural competency training. **Objective:** Before initiating international student exchanges, a survey was conducted to assess students' awareness of global dentistry and interest in cross-national clerkships. **Methods:** A 22-question, YES/NO survey was distributed to 3,487 dental students at eight schools in seven countries. The questions probed students about their school's commitment to enhance their education by promoting global dentistry, volunteerism and philanthropy. The data were analysed using VASSARSTATS statistical software. **Results:** In total, 2,371 students (67.9%) completed the survey. Cultural diversity was seen as an important component of dental education by 72.8% of the students, with two-thirds (66.9%) acknowledging that their training provided preparation for understanding the oral health care needs of disparate peoples. A high proportion (87.9%) agreed that volunteerism and philanthropy are important qualities of a well-rounded dentist, but only about one-third felt that their school supported these behaviours (36.2%) or demonstrated a commitment to promote global dentistry (35.5%). In addition, 87.4% felt that dental schools are morally bound to improve oral health care in marginalised global communities and should provide students with international exchange missions (91%), which would enhance their cultural competency (88.9%) and encourage their participation in charitable missions after graduation (67.6%). **Conclusion:** The study suggests that dental students would value international exchanges, which may enhance students' knowledge and self-awareness related to cultural competence.

Key words: Cultural competency training, global dentistry, international student exchanges, global survey, student perceptions

INTRODUCTION

Global health addresses the needs of vulnerable populations by reducing the burden of disease and improving health outcomes for populations. Globally, access to dental care for vulnerable populations in both developing and developed countries remains an issue. In

2010, examination of the global burden of untreated caries, severe periodontitis and severe tooth loss found that these conditions were prevalent in 3.9 billion individuals¹ with the global economic burden of dental disease estimated at \$442 billion in direct and indirect costs². Over the 20-year period (1990–2010), the

global burden of oral conditions has shifted from severe tooth loss towards severe periodontitis and untreated caries; untreated caries was the most prevalent oral condition¹.

Poor and underserved regions of developing and developed countries suffer from limited access to oral care resources³, with poverty being an indicator of higher risk for disease. Oral health is linked to non-communicable chronic disease by many related risk factors⁴ and may serve as an indicator of overall health status⁵, poor nutritional status, microbial infections, immune disorders and oral cancer^{5,6}, which result in increased mortality and morbidity. In March 2015 the Japan Dental Association co-sponsored a conference on oral health with the World Health Organization (WHO). The main findings of this conference were that oral disease and the prevention of non-communicable diseases run parallel in terms of cost-effective screening, diagnosis and treatment efforts, and impact on the global burden of disease⁷, for both developed and developing countries.

The Global Oral Health Initiative is a network of dental schools seeking to foster the global advancement of dentistry, promote an appreciation for cultural and socio-economic diversity and reinforce the virtues of philanthropy and volunteerism⁸⁻¹⁰. Before initiating international student and faculty exchanges, all participating schools agreed to conduct a survey of students to understand their awareness of volunteerism and their perception of the role of dental schools in improving oral health globally. The awareness of the relationship between oral disease and the global burden of disease resulted in the American Dental Association (ADA) recommendation that dental schools should include programmes that emphasise the needs of underserved populations¹¹. A study of dental schools found that 82% integrate some cultural competence into their curricula as a component of existing courses¹². The lecture/seminar format was the approach most commonly used; few schools required members of the faculty to undergo cultural competency training^{12,13}. In the USA, the U.S. Department of Health and Human Services has established *The National Standards for Culturally and Linguistically Appropriate Services in Health and Health Care*¹⁴, guidelines for creating environments to support patient-provider interaction and delivery of services in a culturally appropriate manner.

Course work in cultural competency creates an awareness of the relationship between socio-economic disparities that impact access to dental care¹⁵ and initiates cultural and self-awareness¹³, but it does not create a willingness to care for vulnerable populations¹⁶. Students often view the needs of vulnerable populations, particularly those living in poverty, as being distant from themselves¹⁷. While education can shape student perceptions regarding the needs of vulnerable populations,

community outreach programmes provide experiential reinforcement of didactic coursework^{18,19}.

As a result, the ADA has recommended that dental schools create programmes in which students, residents and faculty provide care to underserved populations in community clinics and practices, including cultural competency training, to provide necessary knowledge and skills to deal with diverse populations¹¹. The Commission on Dental Accreditation (CODA) also mandates dental curricula to ensure that graduates are competent in managing a diverse patient population and have the necessary interpersonal and communication skills to function successfully in a multicultural work environment²⁰. The goal of integrating cross-cultural education is to produce graduate dentists who are culturally sensitive, socially aware and community-oriented^{15,21}.

With limited literature specific to global dentistry as a means to prepare culturally competent dentists, this study sought to understand students' perceptions about their dental school education regarding volunteerism and philanthropy and the impact of international exchange programmes. A cross-national survey of 2,371 American, Bulgarian, Brazilian, Greek, Macedonian, Saudi Arabian and Indian dental students, at eight colleges of dentistry on five different continents, was translated into six languages with the objective to probe students' perceptions of how global dentistry and philanthropy fit into the mission of contemporary dental education. The results were used to assess the interest of dental students in participating in cross-national clerkships with foreign dental schools. Among the anticipated benefits are improved understanding of contemporary dental education satisfying students' interest in global dentistry and cross-national clerkships as a possible dimension of their cultural competency training.

MATERIALS AND METHODS

A team of educators and students from the USA and Bulgaria interacted via Skype to develop questions that would probe student perceptions regarding the role of their schools in supporting global dentistry and philanthropy^{22,23}. The initial 22-question survey (*Figure 1*) was developed and reviewed by two translators who produced the Bulgarian language survey. The translated survey was then reviewed by the translators and one adjudicator to determine if the translation represented the questions' original intent^{24,25}. The survey was then translated from English into Greek, Portuguese, Macedonian and Arabic using the same procedure, and a retrospective think-aloud pretesting technique was used to harmonise the Bulgarian, Greek, Brazilian, Macedonian and Arabic language versions. A pilot test of the survey was carried out in which test

respondents were debriefed to validate question equivalency and question content, ‘skip patterns’ and format²⁵. After validating the survey in a pilot study in two of the schools^{22,23}, the survey was conducted at the other six schools. Data were collected according to the study protocols of each country.

To ensure attention span was maintained throughout the questionnaire, the survey was limited to five

closed-ended questions per minute with a total of 22 YES/NO questions²⁶. Using the mission statements of each dental school, ADA recommendations and CODA requirements to formulate questions, the survey (Figure 1) focused on aspects of global dentistry such as volunteerism, cultural competency and philanthropy. One self-report question elicited data about students’ prior involvement in charitable dentistry.

| SURVEY ^{21,22} | | | | YES | NO |
|--|----------|-----------|--------|--------|-------|
| 1) Do you think that the multicultural environment at dental school helps dental students develop understanding, tolerance, and respect for other peoples? | | | | 79.6% | 20.4% |
| 2) Do you feel that your dental education adequately prepares you to understand and respect culturally diverse peoples and/or their challenges to obtaining good oral health care? | | | | 66.9% | 33.1% |
| 3) Do you think it is important for dental education to teach you about cultural diversity? | | | | 72.8% | 27.2% |
| 4) Do you feel that volunteerism and philanthropy are important qualities of a well-rounded and compassionate dentist? | | | | 87.9% | 12.1% |
| 5) Does your dental education specifically teach you about the importance of volunteerism and philanthropy? | | | | 36.2% | 63.8% |
| 6) Can you identify a program or course in your dental education curriculum that teaches you about volunteerism and philanthropy? If YES, please indicate what program. Program: | | | | 32.7% | 67.3% |
| 7) Most dental schools include in their mission statements the basic goals to: (1) educate students to serve their patients and communities well; (2) prepare students to continue to grow in skill and knowledge over their lifetime in practice; (3) include research as an integral component of the school’s mission; (4) and reaffirm that patient care is related but not subservient to the missions of education and research. Do you feel that the dental school’s mission reverberates with the additional commitment to advance global dentistry? | | | | 70.9% | 29.1% |
| 8) Do you feel that the dental school adequately expresses a mission to teach students the virtues of philanthropy and volunteerism? | | | | 35.5% | 64.5% |
| 9) Do you feel that your dental school adequately expresses a commitment to advance global dentistry? | | | | 52.1% | 47.9% |
| 10) Do you feel it is a morally duty of dental schools to actively work to raise the level of oral health care in global communities faced with special economic and logistical barriers to seeking and obtaining basic dental treatment? | | | | 87.4% | 12.6% |
| 11) Do you think that it is important for dental schools to provide dental students with opportunities to participate in international exchange missions? | | | | 90.8% | 9.2% |
| 12) Do you feel that the dental school encourages you to seek out or provides you with opportunities to be a volunteer to help underserved communities that cannot afford dental treatment and/or do not have access to dental care? | | | | 58.1% | 41.9% |
| 13) If you had a chance to participate during the school year in an international exchange program aiming to raise the standard of global dentistry and provide indigent communities worldwide with basic oral health care, would you participate? | | | | 88.9% | 11.1% |
| 14) In your opinion, would an international exchange opportunity that provides clinical rotations and field experiences in economically challenged and underserved areas of the world: -foster the global advancement of dentistry? | | | | 87.8% | 12.2% |
| 15) -promote an appreciation for cultural and socioeconomic diversity of the communities graduates will be serving? | | | | 88.9% | 11.1% |
| 16) -teach students the virtues of philanthropy and volunteerism? | | | | 86.7% | 13.3% |
| 17) Do you think that international exchange opportunities with other schools would enhance your dental education in ways that are not presently fulfilled? | | | | 87.4% | 12.6% |
| 18) Do you think than an international exchange opportunity to spend a semester at a foreign dental school would help you better understand culturally diverse peoples? | | | | 85.5% | 14.5% |
| 19) Would an international exchange opportunity with a dental school abroad teach you about philanthropy and volunteerism? | | | | 67.3% | 32.7% |
| 20) Are you presently involved in any domestic dental mission whose aim is charitable? | | | | 23.9% | 76.1% |
| 21) Are you presently involved in any international dental mission whose aim is charitable? | | | | 16.5% | 83.5% |
| 22) Do you think that an international exchange opportunity for one semester might encourage you to consider charitable dental missions in the future? | | | | 67.6% | 32.4% |
| 23) Are you a freshman, sophomore, junior, or senior? | Freshman | Sophomore | Junior | Senior | |

Figure 1. Survey (English text).

Table 1 Collective count of ‘YES’ responses to survey questions from all institutions and a summary of chi-square test results for Questions 4, 10, 11, 13–18, 20 and 21. There are two possible responses to each question (YES/NO). The total percentage for the sum of YES and NO is 100% for all questions. Number values marked in red indicate the total count and percentage of ‘YES’ responses to each question from all institutions. The percentage of ‘YES’ responses for each institution that are highlighted in pink indicate that chi-square test *P*-values for each set of between-group comparisons are ≥ 0.05 for the given question and that group opinions were not significantly different from each other. There was unanimity among the groups for their responses to Questions 4, 10, 11, 13–18, 20 and 21. Number values highlighted in yellow indicate a significantly lower %YES response

| ? | PMU <i>n</i> = 228 | | UT <i>n</i> = 307 | | SMU <i>n</i> = 184 | | Athens <i>n</i> = 336 | | DJ <i>n</i> = 264 | | Cuiabá <i>n</i> = 476 | | SCM <i>n</i> = 246 | | KSU <i>n</i> = 330 | | Total <i>n</i> = 2371 | |
|----|-----------------------|----------|----------------------|----------|-----------------------|----------|--------------------------|----------|----------------------|----------|--------------------------|----------|-----------------------|----------|-----------------------|----------|-----------------------|----------|
| | Total YES | % YES | Total YES | % YES | Total YES | % YES | Total YES | % YES | Total YES | % YES | Total YES | % YES | Total YES | % YES | Total YES | % YES | Total YES | % YES |
| 1 | 170 | 74.6% | 258 | 84.2% | 86 | 46.7% | 191 | 56.8% | 218 | 82.7% | 450 | 94.5% | 212 | 86% | 303 | 91.7% | 1888 | 79.6% |
| 2 | 156 | 68.4% | 251 | 81.8% | 126 | 68.6% | 285 | 84.8% | 47 | 17.8% | 319 | 67.0% | 197 | 80% | 206 | 62.3% | 1587 | 66.9% |
| 3 | 182 | 79.8% | 230 | 74.8% | 88 | 47.8% | 314 | 93.4% | 59 | 22.3% | 414 | 87.0% | 177 | 72% | 263 | 79.6% | 1727 | 72.8% |
| 4 | 206 | 90.4% | 294 | 95.8% | 150 | 81.5% | 251 | 74.7% | 264 | 100% | 407 | 85.5% | 219 | 89% | 293 | 88.7% | 2084 | 87.9% |
| 5 | 78 | 34.2% | 156 | 50.8% | 34 | 18.5% | 69 | 20.5% | 46 | 17.4% | 192 | 40.3% | 148 | 60% | 136 | 41.1% | 859 | 36.2% |
| 6 | 28 | 12.3% | 126 | 40.9% | 18 | 9.8% | 120 | 35.6% | 160 | 60.5% | 116 | 24.4% | 69 | 28% | 138 | 41.7% | 775 | 32.7% |
| 7 | 154 | 67.5% | 259 | 84.5% | 162 | 88.0% | 283 | 84.2% | 65 | 24.7% | 402 | 84.4% | 167 | 68% | 188 | 57.1% | 1680 | 70.9% |
| 8 | 86 | 37.7% | 168 | 54.6% | 52 | 28.3% | 78 | 23.2% | 77 | 29.2% | 191 | 40.1% | 106 | 43% | 83 | 25.0% | 841 | 35.5% |
| 9 | 124 | 54.4% | 197 | 64.1% | 54 | 29.4% | 159 | 47.3% | 84 | 31.8% | 293 | 61.6% | 133 | 54% | 191 | 58.3% | 1235 | 52.1% |
| 10 | 193 | 84.6% | 258 | 83.9% | 142 | 77.2% | 298 | 88.7% | 264 | 100% | 413 | 86.8% | 221 | 90% | 284 | 86.0% | 2073 | 87.4% |
| 11 | 210 | 92.1% | 260 | 84.6% | 184 | 100% | 299 | 89.0% | 264 | 100% | 431 | 90.5% | 224 | 91% | 281 | 85.8% | 2153 | 90.8% |
| 12 | 104 | 45.6% | 230 | 74.8% | 58 | 31.5% | 113 | 33.6% | 264 | 100% | 292 | 61.3% | 128 | 52% | 188 | 57.1% | 1377 | 58.1% |
| 13 | 196 | 86.4% | 240 | 78.1% | 170 | 92.4% | 286 | 85.1% | 264 | 100% | 434 | 91.2% | 234 | 95% | 284 | 86.2% | 2108 | 88.9% |
| 14 | 169 | 74.1% | 276 | 89.8% | 156 | 84.8% | 282 | 83.9% | 264 | 100% | 426 | 89.5% | 204 | 83% | 305 | 92.4% | 2082 | 87.8% |
| 15 | 175 | 76.8% | 287 | 93.4% | 172 | 93.5% | 286 | 85.1% | 264 | 100% | 425 | 89.3% | 204 | 83% | 295 | 89.5% | 2108 | 88.9% |
| 16 | 157 | 68.9% | 285 | 92.8% | 136 | 73.9% | 287 | 85.4% | 264 | 100% | 429 | 90.1% | 207 | 84% | 291 | 88.3% | 2056 | 86.7% |
| 17 | 190 | 83.3% | 240 | 78.1% | 172 | 93.5% | 287 | 85.4% | 264 | 100% | 411 | 86.3% | 209 | 85% | 299 | 90.5% | 2072 | 87.4% |
| 18 | 184 | 80.7% | 255 | 82.9% | 172 | 93.5% | 280 | 83.3% | 193 | 73.1% | 422 | 88.7% | 219 | 89% | 303 | 91.7% | 2028 | 85.5% |
| 19 | 160 | 70.2% | 232 | 75.6% | 100 | 54.4% | 240 | 71.4% | 66 | 25% | 347 | 77.3% | 202 | 82% | 248 | 75.0% | 1595 | 67.3% |
| 20 | 41 | 18.0% | 84 | 27.2% | 22 | 12.0% | 60 | 17.9% | 50 | 18.9% | 101 | 21.2% | 96 | 39% | 113 | 34.1% | 567 | 23.9% |
| 21 | 33 | 14.5% | 56 | 18.1% | 12 | 6.5% | 43 | 12.8% | 56 | 21.2% | 67 | 14.1% | 66 | 27% | 58 | 17.7% | 391 | 16.5% |
| 22 | 177 | 77.6% | 236 | 77.0% | 120 | 65.2% | 283 | 84.2% | 70 | 26.5% | 414 | 87% | 207 | 84% | 303 | 91.7% | 1603 | 67.6% |

Athens, University of Athens School of Dentistry (Greece); Cuiaba, University of Cuiaba College of Dentistry (Brazil); DJ, Divya Jyoti College of Dental Sciences and Research (India); KSU, King Saud University College of Dentistry (Saudi Arabia); PMU, Medical University of Plovdiv Faculty of Dental Medicine (Bulgaria); SCM, Sts. Cyril and Methodius University Faculty of Dentistry (Macedonia); SMU, Sofia Medical University Faculty of Dental Medicine (Bulgaria); UT, University of Tennessee Health Science Center College of Dentistry (USA).

One question assessed students’ understanding of the intention of their training to make them culturally competent. Other questions assessed students’ perceptions about the fulfillment of those goals.









A total of 3,487 students (equivalent to years D1, D2, D3 and D4) in eight dental programmes – two in Bulgaria, and one each in Brazil, Greece (years 2–5), Macedonia, Saudi Arabia, India and the USA – were sent a letter by email describing the purpose of the survey and requesting voluntary participation, along with instructions for accessing the online survey through ‘Survey Monkey’. The dental schools that utilised the online survey sent a follow-up letter, 2 weeks later, to improve participation. Greece and India utilised paper versions of the survey; in these instances, students were asked to participate in the surveys during a lecture and assembly, respectively.

Descriptive statistics were performed on all the data and then according to institution (Tables 1 and 2). Differences in the percentage distribution of categorical variables across nationalities (YES = 1; NO = 0, $P < 0.05$) were analysed using a standard Pearson chi-square test²⁷. The chi-square test was used to assess

whether paired observations on polled responses from people at different schools in separate countries are independent of each other (i.e. to determine whether the response is affected by nationality)²⁸. The data were analysed using VassarStats statistical software. There were total 616 comparisons (28 possible comparative pairs among the eight schools) for all 22 questions. The schools were then ranked from lowest to highest, according to %YES answers, for each question, and were grouped according to their *P*-values, where chi-square $P \geq 0.05$ indicated no significant difference in opinions for a particular question. Conversely, chi-square $P < 0.05$ indicated that the differences in the percentage of YES and NO answers between schools probably represent true substantive differences in opinion between student groups.

The Institutional Review Board (IRB) of the University of Tennessee Health Science Center (UT) deemed the study (#12-02040-XM) exempt under 45CFR46.101 (b)(2) as it involves educational tests, surveys, interview procedures or observation of public behaviour. The study was approved by the Central Commission of Research Ethics (Bulgarian

Table 2 Percent ‘YES’ distribution of responses to survey questions, according to institution

| |  |  |  |  |  |  |  |  | | | | | | | | |
|----------|---|---|---|---|---|--|---|---|-------|-------|-------|-------|-----|-----|-------|-------|
| | PMU (n = 228/506) Response 45.1% | UT (n = 307/340) Response 90% | SMU (n = 184/533) Response 34.5% | Athens (n = 336/493) Response 68.2 % | DJ (n = 264/264) Response 100% | Cuiabá (n = 476/658) Response 72.3% | SCM (n = 246/390) Response 63.1% | KSU (n = 330/460) Response 71.7% | | | | | | | | |
| Question | YES | NO | YES | NO | YES | NO | YES | NO | YES | NO | YES | NO | YES | NO | | |
| 1 | 74.6% | 25.0% | 84.2% | 15.8% | 46.7% | 53.3% | 56.8% | 43.2% | 82.7% | 11.3% | 94.5% | 5.5% | 86% | 14% | 91.7% | 8.3% |
| 2 | 68.4% | 30.7% | 81.8% | 18.2% | 68.6% | 31.5% | 84.8% | 15.2% | 17.8% | 82.2% | 67.0% | 33.0% | 80% | 20% | 62.3% | 37.7% |
| 3 | 79.8% | 19.3% | 74.8% | 25.2% | 47.8% | 52.2% | 93.4% | 6.6% | 22.3% | 77.7% | 87.0% | 13.0% | 72% | 28% | 79.6% | 20.4% |
| 4 | 90.4% | 9.6% | 95.8% | 4.2% | 81.5% | 18.5% | 74.7% | 25.3% | 100% | 0 | 85.5% | 14.5% | 89% | 11% | 88.7% | 11.3% |
| 5 | 34.2% | 65.8% | 50.8% | 49.2% | 18.5% | 81.5% | 20.5% | 79.5% | 17.4% | 82.6% | 40.3% | 59.7% | 60% | 40% | 41.1% | 58.9% |
| 6 | 12.3% | 82.0% | 40.9% | 59.1% | 9.8% | 90.2% | 35.6% | 64.4% | 60.5% | 39.5% | 24.4% | 75.6% | 28% | 72% | 41.7% | 58.3% |
| 7 | 67.5% | 28.9% | 84.5% | 15.5% | 88.0% | 12.0% | 84.2% | 15.8% | 24.7% | 75.3% | 84.4% | 15.6% | 68% | 32% | 57.1% | 42.9% |
| 8 | 37.7% | 60.5% | 54.6% | 45.4% | 28.3% | 71.7% | 23.2% | 76.8% | 29.2% | 70.8% | 40.1% | 59.9% | 43% | 57% | 25.0% | 75.0% |
| 9 | 54.4% | 43.4% | 64.1% | 35.9% | 29.4% | 70.6% | 47.3% | 52.7% | 31.8% | 68.2% | 61.6% | 38.4% | 54% | 46% | 58.3% | 41.7% |
| 10 | 84.6% | 13.2% | 83.9% | 16.1% | 77.2% | 22.8% | 88.7% | 11.3% | 100% | 0 | 86.8% | 13.2% | 90% | 10% | 86.0% | 14.0% |
| 11 | 92.1% | 7.0% | 84.6% | 15.4% | 100% | 0.0% | 89.0% | 11.0% | 100% | 0 | 90.5% | 9.5% | 91% | 9% | 85.8% | 14.2% |
| 12 | 45.6% | 53.9% | 74.8% | 25.2% | 31.5% | 68.5% | 33.6% | 66.4% | 100% | 0 | 61.3% | 38.7% | 52% | 48% | 57.1% | 42.9% |
| 13 | 86.4% | 13.2% | 78.1% | 21.9% | 92.4% | 7.6% | 85.1% | 14.9% | 100% | 0 | 91.2% | 8.8% | 95% | 5% | 86.2% | 13.8% |
| 14 | 74.1% | 24.1% | 89.8% | 10.2% | 84.8% | 15.2% | 83.9% | 16.1% | 100% | 0 | 89.5% | 10.5% | 83% | 17% | 92.4% | 7.6% |
| 15 | 76.8% | 20.6% | 93.4% | 6.6% | 93.5% | 6.5% | 85.1% | 14.9% | 100% | 0 | 89.3% | 10.7% | 83% | 17% | 89.5% | 10.5% |
| 16 | 68.9% | 28.1% | 92.8% | 7.2% | 73.9% | 26.1% | 85.4% | 14.6% | 100% | 0 | 90.1% | 0.9% | 84% | 16% | 88.3% | 11.7% |
| 17 | 83.3% | 13.6% | 78.1% | 21.9% | 93.5% | 6.5% | 85.4% | 14.6% | 100% | 0 | 86.3% | 13.7% | 85% | 15% | 90.5% | 9.5% |
| 18 | 80.7% | 17.5% | 82.9% | 17.1% | 93.5% | 6.5% | 83.3% | 16.7% | 73.1% | 26.9% | 88.7% | 11.3% | 89% | 11% | 91.7% | 8.3% |
| 19 | 70.2% | 27.6% | 75.6% | 24.4% | 54.4% | 45.6% | 71.4% | 28.6% | 25% | 75% | 77.3% | 22.7% | 82% | 18% | 75.0% | 25.0% |
| 20 | 18.0% | 79.4% | 27.2% | 72.8% | 12.0% | 88.0% | 17.9% | 82.1% | 18.9% | 81.3% | 21.2% | 78.8% | 39% | 61% | 34.1% | 65.9% |
| 21 | 14.5% | 81.6% | 18.1% | 81.9% | 6.5% | 93.5% | 12.8% | 87.2% | 21.2% | 78.8% | 14.1% | 85.9% | 27% | 73% | 17.7% | 82.3% |
| 22 | 77.6% | 19.3% | 77.0% | 23% | 65.2% | 34.8% | 84.2% | 15.8% | 26.5% | 73.5% | 87.0% | 13.0% | 84% | 16% | 91.7% | 8.3% |

Athens, University of Athens School of Dentistry (Greece); Cuiaba, University of Cuiaba College of Dentistry (Brazil); DJ, Divya Jyoti College of Dental Sciences and Research (India); KSU, King Saud University College of Dentistry (Saudi Arabia); PMU, Medical University of Plovdiv Faculty of Dental Medicine (Bulgaria); SCM, Sts. Cyril and Methodius University Faculty of Dentistry (Macedonia); SMU, Sofia Medical University Faculty of Dental Medicine (Bulgaria); UT, University of Tennessee Health Science Center College of Dentistry (USA).

Ministry of Education and Science), the IRBs of the Sofia Medical University Faculty of Dental Medicine (SMU) and the Medical University of Plovdiv Faculty of Dental Medicine (PMU); the Institutional Ethics Committee (IEC) of Divya Jyoti College of Dental Sciences and Research (DJ); and the IRBs of the University of Cuiabá College of Dentistry (Cuiabá), the University of Athens School of Dentistry (Athens), Sts. Cyril and Methodius University Faculty of Dentistry (SCM) and King Saud University College of Dentistry (KSU).

As the respective IRB or IEC at each school considered the anonymous survey an exempt application, no informed consent form was required. In accordance with the waiver, the researchers provided the participants at each school with a written summary

about the research, including: (i) the purpose of the research; (ii) the time involved; (iii) assessment of minimal risk; (iv) statement regarding benefit to participants; (v) contact for questions about the research; and (vi) contact for questions about rights as a research participant. The cover letter accompanying the survey served as the ‘implied’ informed consent form, whereby a statement contained in the letter indicated that completion and return of the survey implies consent to participate in the research. For participants in the Internet-based survey, the implied informed consent was obtained by presenting participants with the consent information and informing them that their consent is implied by submitting the completed survey. The survey did not ask for any identifiable information and was conducted in full

Table 3 Summary of chi-square test results for Questions 1, 2, 3, 5–9, 12, 19 and 22

| |
|---|
| 1) Do you think that the multicultural environment at dental school helps dental students develop understanding, tolerance, and respect for other peoples? (SMU 46.7%) < (Athens 56.8%) < (PMU 74.6%) < (DJ, 82.7%, UT 84.2%, SCM 86%) < (KSU 91.7%, Cuiaba 94.5%) |
| 2) Do you feel that your dental education adequately prepares you to understand and respect culturally diverse peoples and/or their challenges to obtaining good oral health care? (DJ, 17.8%) < (KSU 62.3%, Cuiaba 67.0%, PMU 68.4%, SMU 68.6%)* < (SCM 80%, UT 81.8%, Athens 84.8%) |
| 3) Do you think it is important for dental education to teach you about cultural diversity? (DJ 22.3%) < (SMU 47.8%) < (SCM 72%, UT 74.8%) < (KSU 79.6%, PMU 79.8%) < (Cuiaba 87.0%) < (Athens 93.4) |
| 5) Does your dental education specifically teach you about the importance of volunteerism and philanthropy? (DJ 17.4%, SMU 18.5%, Athens 20.5%) < (PMU 34.2%) < (Cuiaba 40.3%, KSU 41.1%) < (UT 50.8%) < (SCM 60%) |
| 6) Can you identify a program or course in your dental education curriculum that teaches you about volunteerism and philanthropy? (SMU 9.8%, PMU 12.3%) < (Cuiaba 24.4%, SCM 28%) < (Athens 35.6%, UT 40.9%, KSU 41.7%) < (DJ 60.5%) |
| 7) Do you feel that the dental school's mission reverberates with the additional commitment to advance global dentistry? (DJ 24.7%) < (KSU 57.1%) < (PMU 67.5%, SCM 68.0%,) < (Athens 84.2%, Cuiaba 84.4%, UT 84.5%, SMU 88.0%) |
| 8) Do you feel that the dental school adequately expresses a mission to teach students the virtues of philanthropy and volunteerism? (Athens 23.2%, KSU 25.0%, SMU 28.3%, DJ 29.2%) < (PMU 37.7%, Cuiaba 40.1%, SCM 43%) < (UT 54.6%) |
| 9)) Do you feel that UTHSC College of Dentistry adequately expresses a commitment to advance global dentistry? (SMU 29.4%, DJ 31.8%) < (Athens 47.3%) < (SCM 54%, PMU 54.4%, KSU 58.3%) < (Cuiaba 61.6%, UT 64.1%) |
| 12) Do you feel that the dental school encourages you to seek out or provides you with opportunities to be a volunteer to help underserved communities that cannot afford dental treatment and/or do not have access to dental care? (SMU 31.5%, Athens 33.6%) < (PMU 45.6%) < (SCM 52%) < (KSU 57.1%) < (Cuiaba 61.3%) < (UT 74.8%) < (DJ 100%) |
| 19) Would an international exchange opportunity with a dental school abroad teach you about philanthropy and volunteerism? (DJ 25%) < (SMU 54.4%) < (PMU 70.2%, Athens 71.4%, KSU 75.0%, UT 75.6%, Cuiaba 77.3%) < (SCM 82%) |
| 22) Do you think that an international exchange opportunity for one semester might encourage you to consider charitable dental missions in the future? (DJ 26.5%) < (SMU 65.2%, UT 77.0%, PMU 77.6%, SCM 84%, Athens 84.2%, Cuiaba 87.0%, KSU 91.7%) |

The schools are ranked from lowest to highest according to the %YES values obtained in response to each question. Schools with chi-square test values of $P \geq 0.05$ for a given question are grouped together and colour-coded accordingly to indicate that their opinions were not significantly different from each other. Schools shown in different print colours for each set of between-group comparisons indicate chi-square values of $P < 0.05$ and that the differences in %YES and %NO answers between schools probably represent true substantive differences in opinion between student groups. Athens, University of Athens School of Dentistry (Greece); Cuiabá, University of Cuiabá College of Dentistry (Brazil); DJ, Divya Jyoti College of Dental Sciences and Research (India); KSU, King Saud University College of Dentistry (Saudi Arabia); PMU, Medical University of Plovdiv Faculty of Dental Medicine (Bulgaria); SCM, Sts. Cyril and Methodius University Faculty of Dentistry (Macedonia); SMU, Sofia Medical University Faculty of Dental Medicine (Bulgaria); UT, University of Tennessee Health Science Center College of Dentistry (USA).

accordance with The World Medical Association Declaration of Helsinki.

RESULTS

Of the 3,487 students initially approached, 2,371 completed the survey, giving a response rate of 67.9%. The response rates for the dental schools were: UT (USA), 90%; SMU and PMU (Bulgaria), 34.5% and 45.1% respectively, 39.6% collectively; Cuiabá (Brazil), 72.1%; Athens (Greece), 68.2%; SCM (Macedonia), 63.1%; KSU (Saudi Arabia), 71.1%; and DJ (India), 100% (Figure 2). The percentage of 'YES' responses to each question from each institution are presented in Tables 1 and 2. The margin of error for the entire sample ($n = 2371$) was ± 0.3 at 99% confidence level (for individual institutions: UT, ± 1.75 at 95% confidence level;

SMU, ± 5.85 at 95% confidence level; PMU, ± 4.82 at 95% confidence level; Athens, ± 3.02 at 95% confidence level; DJ, ± 0 at 95% confidence level; Cuiabá, ± 2.36 at 95% confidence level; SCM, ± 3.8 at 95% confidence level; and KSU, ± 2.87 at 95% confidence level).

The greatest %YES distribution among institutions was found for Questions 1, 2, 3, 5, 6, 7, 8, 9, 12, 19 and 22 (Table 3). There was unanimity among the groups in their responses to Questions 4, 10, 11, 13–18, 20 and 21, with each comparison between schools ($P \geq 0.05$) indicating no significant difference in opinion (Table 1) and that the students were likely to agree with each other on the issues, regardless of their nationality.

In total, 79.6% concurred with the concept that multiculturalism supports development of the behaviours of understanding, tolerance and respect for other peoples (Q1). There was a wide range of

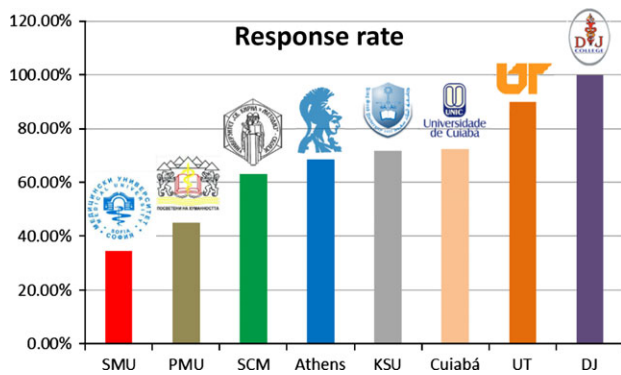


Figure 2. Response rates according to institution. Athens, University of Athens School of Dentistry (Greece); Cuiabá, University of Cuiabá College of Dentistry (Brazil); DJ, Divya Jyoti College of Dental Sciences and Research (India); KSU, King Saud University College of Dentistry (Saudi Arabia); PMU, Medical University of Plovdiv Faculty of Dental Medicine (Bulgaria); SCU, Sts. Cyril and Methodius University Faculty of Dentistry (Macedonia, FYROM), Sofia Medical University Faculty of Dental Medicine (Bulgaria); UT, University of Tennessee Health Science Center College of Dentistry (USA).

responses to this statement according to the country of origin; for example, only half of the Bulgarian respondents (47%) agreed with this statement compared with a much higher number of Brazilian students (94.5%). Cultural diversity was seen as an important component of dental education by 72.8% of the students (Q3) with more than two-thirds (66.9%) acknowledging that their education provided preparation for understanding the needs of disparate peoples and the challenges of access to oral health care (Q2). The notable exception was the Indian students (17.8%) who overwhelmingly disagreed with their international colleagues. Only one (22.8%) student in five from India felt that cultural diversity was important to their dental education.

A total of 87.9% of the students agreed that volunteerism and philanthropy are important qualities of a well-rounded compassionate dentist (Q4), but only 36.2% felt that their dental education supported these behaviours (Q5). Consistent with the previous question, only 32.7% were able to identify a programme or course in their dental curriculum that specifically teaches them about volunteerism and philanthropy (Q6); 15.9% of US senior students were able to identify a local community-based dental mission in which they were required to participate.

In total, 70.9% of the respondents agreed that their dental school mission statements express an explicit commitment to advance global dentistry (Q7). However, only one-third of the respondents (35.5%) indicated that their programme demonstrates a commitment to promoting global dentistry (Q8,9). Moreover, 87.4% of the students felt that dental schools have a moral duty to improve the level of oral health care in global communities that face special

socio-economic and logistical barriers to accessing basic equitable, quality dental care (Q10).

A high proportion (91%) of the students agreed with the importance for dental schools to provide students with opportunities to participate in international exchange missions (Q11). Over half (58.1%) of the students indicated that their dental school encouraged students to volunteer in underserved communities (Q12), with perceptions of no encouragement highest in the responses from Bulgarian (31.5%) and Greek (33.6%) students. Indian (100%) and US (74.8%) students felt that they were encouraged to volunteer in underserved areas, and 88.9% of students indicated a willingness to participate in an international exchange programme that aimed to raise the standard of global dentistry (Q13). The students agreed that clinical rotations and field experiences in underserved areas of the world would promote the global advancement of dentistry (87.8%), promote an appreciation for cultural and socio-economic diversity (88.9%) and teach students the virtues of philanthropy and volunteerism (86.7%) (Q14–16). Moreover, 87.4% felt that international exchange opportunities with other schools would enhance their dental education in ways that are not presently being provided (Q17).

The majority (85.5%) indicated that a semester-long international exchange opportunity at a foreign dental school would improve cultural competency (Q18) and broaden their perspectives regarding philanthropy and volunteerism (Q19). When asked if they were presently involved in any domestic dental charitable mission, just over one (23.9%) in five students reported YES (Q20). Although one (16.5%) in every six students also indicated that they were currently involved in a charitable international dental mission (Q21), only one American student named a specific programme. In total, 67.6% of the cohort indicated that an international exchange opportunity for one semester might encourage them to consider charitable dental missions in the future, but only 26.5% of Indian students agreed (Q22).

DISCUSSION

Volunteerism and philanthropy were seen as important qualities of a well-rounded and compassionate dentist. However, students did not perceive these qualities as being strongly espoused or operationalised by their dental curriculum. The notable exceptions were Indian students who felt that the country had a moral duty to improve oral care, and the values were taught and reinforced by a range of compulsory experiential opportunities, integral to the Indian dental curriculum, with underserved indigent populations in nearby rural communities. Although the Indian

students did not think that their dental education specifically taught the importance of volunteering and philanthropy, the mandatory experiential service-learning component of their curriculum fosters internalisation of the concepts. A follow-on study with the cohort should be conducted to see if they move from awareness to intentional action actually providing care to vulnerable populations and demonstrate increased self-efficacy and cultural competence¹⁶.

A further dichotomy arises with Indian students in that they did not feel that an international exchange opportunity for one semester would encourage them to consider future charitable dental missions. Yet, they unanimously agreed that the schools should provide international exchange missions to enhance their education and raise the standard of global health care. When considering the greater need in India compared with other nations in the study, the dichotomy raises a question of interpretation. Given the experiential learning opportunities integrated into the Indian dental curriculum, students may have perceived that international experiences would do little to add to their heightened sense of dedication to providing charitable care or viewed the question as referring to charitable care in other countries.

In comparison, nearly all the Bulgarian students were unable to identify a charitable care programme in their curriculum. The Bulgarian and Greek students had lower perceptions of school encouragement and commitment to serving in underserved regions. Angus Deaton, the Nobel Prize Laureate, writes that some countries have low average life evaluations, reflecting dissatisfaction with their lives and income²⁹. Countries evolving out of communism into a more liberal democratic society also have low life evaluations, which may explain the responses of Bulgarian students. Brazilians' life evaluations are only one point lower than those of US subjects, which is reflected in their responses. The differences in national responses reflect the impact of country-level influences, such as national wealth and educational attainment, societal collectivism and religiosity³⁰, as well as how the constructs of volunteering are operationalised in dental programmes.

This cross-national study emphasises the gaps between the espoused values of dental schools and the perceptions and demonstrated behaviours of students. While improving oral health globally through volunteering is an espoused value, how social responsibility is operationalised in curriculum and reinforced with clinical experiences is evolving. Academic programmes will need to examine how best to reinforce a strong sense of social responsibility among future students.

Some studies show that contact with patients from diverse ethnic and cultural backgrounds during

extramural rotations prepares students to interact with and treat such patients more competently beyond graduation³¹. Undergraduate humanitarian educational trips to underserved communities can have a significant personal, professional and social impact on dental students³². These missions can increase cultural education, self-confidence and public health awareness³³.

Multidisciplinary service-learning programmes that involve dental students and faculty abroad may allow dental students to use their clinical skills in real-life situations. This has the potential to foster civic responsibility, while increasing students' cultural awareness, cross-cultural communication skills and understanding of health-care challenges faced by disparate populations³⁴. Evidence indicates that cross-cultural education in the classroom may enhance cross-cultural adaptability of students, but cross-cultural encounters expose students to social, environmental and cultural influences that affect health and diseases^{32,35-38}.

On the whole, the survey suggests that dental education could do more to fulfill students' expectations with regard to global dentistry. Although many students appear to be satisfied with current efforts to make them culturally competent, opportunities to engage them in global dentistry are probably insufficient. Philanthropy and volunteerism are not necessarily commensurate with cultural competence, but students do believe that global dentistry can enhance their cultural awareness. Many students feel that their dental education does not promote philanthropy and this was reflected in their responses to several questions that probed into this issue in various ways. While the students assumed that their school states a commitment to engage them in global dentistry, this commitment – contrary to perceptions – is not explicitly stated in the mission of any of the participating schools.

A limitation of the study was that the survey did not probe whether students recognise that local volunteer programmes can be as satisfying as humanitarian missions abroad. Poverty can be domestic as well as global, and one does not have to look far to find it. Future studies should investigate whether cross-national opportunities to reinforce intercultural communication skills taught in lectures and international externships to serve marginalised populations will enhance the likelihood that students will serve underserved communities in their clinical practice^{39,40}.

CONCLUSION

The study suggests that dental education programmes have room to improve both curricula and cross-cultural experiential opportunities. It demonstrates that dental students want their schools to provide them with international volunteer opportunities. Cross-national clerkships may enhance cultural competency

training by reinforcing and promoting the internalisation of knowledge that will reduce racial and ethnic health disparities, both domestically and abroad.

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Competing interest

The authors have no conflict of interest.

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