An Innovative HIV Training Program for Dental Students


Abstract: Dentists need to be able to give people with HIV/AIDS compassionate and comprehensive care. Previous studies have shown that many dental students have negative attitudes towards treating such individuals. This article addresses the effectiveness of a program that trains dental students in the issues of treating this population. All predoctoral students at the Loma Linda University School of Dentistry are required to receive this training. Students complete a pre-session survey during their third year and a post-session survey as they complete the training during their fourth year. The survey was administered from 2003 to 2009 during which 386 students completed responses to the post-session survey. Five questions in the survey address self-evaluation of knowledge, attitudes, and confidence in the efficacy of universal precautions and post-exposure prophylaxis following bloodborne exposures. This study reports on five two-year testing cycles and shows significant shifts in all five areas surveyed. The most significant gains were in the two areas that are not addressed in much detail in other courses in the dental school curriculum. These are familiarity with post-exposure prophylaxis (PEP) and confidence in the efficacy of PEP. These data support the usefulness of such a program in preparing future dentists to deliver appropriate care to persons living with HIV/AIDS.

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This project was supported by a Community-Based Dental Partnership Grant issued under Part F of the Ryan White Program by the Federal Health Resources and Services Agency (HRSA) HIV/AIDS Bureau, Grant number H65HA00004.

Keywords: HIV/AIDS, community-based education, dental education, dental students, bloodborne exposures

Submitted for publication 1/28/11; accepted 3/30/11

HIV/AIDS first emerged as a recognized disease in 1981. No one could have predicted how this disease would evolve over the next three decades, the impact it would have worldwide, and the enduring difficulties associated with preventing and treating it. The disease remains a major challenge to public health and human rights worldwide; in the heavily affected developing countries, it is so devastating that it can impact the fabric of society and national security.1 Due to the advances and accessibility of anti-retroviral therapy (ART), HIV/AIDS is no longer considered to carry an immediate death sentence and is now being viewed in the wealthier developed countries as a chronic illness.2 However, both a cure and effective vaccines remain elusive, and the successes of ART have also led to complacency, particularly among populations at risk of developing the disease.1 A pressing problem in the developed countries lies in the fact that although people with HIV are living longer, the number of new infections has not been reduced.3

The estimated number of new cases per capita in the United States, according to the Centers for Disease Control and Prevention (CDC) 2005–08 surveillance report, went from 37,000 to 42,000 in those years,3 based on better and more complete reporting of new HIV infections. The report further stated that this incidence rate has been roughly stable since the early 2000s. Marcus et al. found that about 19.3 percent of HIV-positive medical patients in the United States have unmet dental needs that have not been treated in the previous six months.4 This number is much higher in states without dental benefits, where unmet dental needs may reach as high as 31.5 percent.4 The highest recorded unmet need of 43 percent occurs among predominantly lower income African American women.5 Formicola et al. have written that disparities exist in health care with respect to minority
groups and that bias and stereotypic beliefs held by providers may contribute to the disparities.6 Dental professionals fill a unique role that can help alleviate pain and infection, which may increase the quality of life of people with HIV/AIDS and ultimately impact the course of the disease.4 This points to the need for knowledgeable and dedicated dental professionals who not only assist in early diagnosis but also treat those with HIV/AIDS in a compassionate, comprehensive manner to improve the lives of those who are living with the disease and ultimately help reduce new infections with early detection.

The aim of our program is to help Loma Linda University School of Dentistry (LLUSD) students manage the oral health care needs of persons with HIV/AIDS. The purpose of this article is to discuss the impact of the training program for predoctoral dental students at LLUSD regarding the issues related to treating patients who have HIV/AIDS. This discussion presents the results of pre- and post-session surveys administered over a six-year period. These surveys focused on attitudes towards the HIV-positive population, comfort with treating this group, confidence in the effectiveness of universal precautions and post-exposure prophylaxis following bloodborne exposures, and self-assessment of understanding the issues involved.

**Literature Review**

There is not a great deal of scientific literature regarding the effects of educational efforts on the attitudes and beliefs of dental students with respect to treating people with HIV/AIDS. One study in dental education found that male dental students had significantly stronger negative attitudes towards patients at risk for HIV/AIDS than female students.7 These findings also pointed out a lack of knowledge that was significant due to the fact that it could “translate into a potential risk both for the patients and providers.” In this same study, the students suggested including case studies, discussion groups, and possibly supervised clinical rotations to improve their education in this area. A more recent study demonstrated that dental students’ knowledge of a patient’s HIV-seropositive status and perceived responsibility toward patients regarding contracting HIV could be predictive of negative attitudes towards the treatment of these patients.8 As a result of that study, Seacat et al. recommended interaction between dental care providers and persons living with HIV/AIDS (PLWHA) that intermingled the classroom and clinical experience as a mandatory component in the dental curriculum. Yet another study found that negative attitudes and discrimination may continue beyond the four-year dental program and that dentists in postdoctoral programs can also have a negative bias towards PLWHA and even towards homosexuals.9

In a study by Rohn et al. that reviewed the social and psychological concerns that impede delivery of care to PLWHA in the dental education arena, it was found that fear of status disclosure to health care workers among PLWHA was a significant barrier to access care.10 Their findings suggested ways to improve dental students’ attitudes to reduce prejudicial or discriminatory behaviors, which in turn might improve patient confidentiality. These recommendations included inviting HIV-positive individuals to talk with students and to share their perspectives as patients; having faculty members model appropriate ways of interacting with patients and discussing confidential information; and providing role-playing opportunities for students as they start seeing patients in the clinic so they have the chance to apply what is learned in the classroom. These, along with other recommendations, were made to prepare dental students to ultimately “enhance access to health care.”10

The Commission on Dental Accreditation standards state that dental graduates must at least be competent in “assessing the treatment needs of patients’ special needs.”11 In a study involving student comfort level in treating vulnerable populations and future willingness to treat, only 47.4 percent of the students expressed comfort in treating people with HIV/AIDS.12 Less than 20 percent (17.1 percent) of these students expressed willingness to treat PLWHA in the future. Most of the students did not have any experience with seropositive patients, and only 22.7 percent had some experience. Generally prior experience, such as community-based clinical experiences, had a positive impact on the comfort level of the students and in some instances, translated into future willingness to treat vulnerable populations.13,14 Mulligan and Lemme also recognized the importance of providing continuing dental education on HIV after graduation that covers oral pathology, medical issues, medications, psychological issues, legal and ethical implications, risk assessment, and OSHA principals.15

The U.S. Health Resources and Services Administration (HRSA) acknowledged the need for improved training of dental students in the care of individuals with HIV in 2002 when HRSA an-
nounced a grant opportunity for funds under Part F of the Ryan White CARE Act. This grant established the Community-Based Dental Partnership Program,14 in which dental education institutions were chosen to partner with community-based dental providers to train students in community clinical settings where dental care is provided to people with HIV/AIDS. LLUSD partners in the program with the Social Action Community Health System (SACHS), which operates a low-cost community dental clinic in nearby San Bernardino, CA, and has a large HIV-positive clientele. The program and application guidance document for the grant indicated that grantees would have to “develop innovative curriculum design, quality improvement programs, and program assessment methods.”16

Development of the LLUSD Program

The original faculty of the “HIV and the Dentist” program at LLUSD reviewed the existing content of those predoctoral courses that addressed HIV to better understand what was actually being taught elsewhere in the curriculum. The intent was to build on what was already being taught and to minimize presentation of redundant material. The faculty also attended the continuing education program of the Pacific AIDS Education Training Center at the University of Southern California (USC) School of Dentistry. In reviewing the literature for this course, it was noted that participation in the USC program resulted in significantly changed HIV-related knowledge, attitudes, and beliefs among course participants, as well as enhanced commitment to infection control and screening for risk behaviors and presence of HIV infection.17 During this course, the LLUSD faculty were able to interact with people with HIV/AIDS in a clinical setting, along with observing a role-play experience that demonstrated possible ways of interacting with such individuals.

In the Loma Linda program, there was an extensive effort to develop an innovative curriculum that involved the faculty of LLUSD, dentists and staff at SACHS, and the community advisory group that was formed to give input on the program. LLUSD established this program as a required rotation for all predoctoral students during their fourth year, and completion is a requirement for graduation. The program is conducted entirely at the SACHS clinic and has both clinical and didactic components. The didactic component includes lectures, discussion of cases, interaction with staff dentists, interviews with patients, role-playing to illustrate possible responses to various clinical situations, and a video produced specifically for this program. The clinical component involves students providing dental care to people with HIV/AIDS under the supervision of faculty members.

During program development, it was decided to train the students in small groups (of five to seven) over two half-day periods. The students in each group spent a total of eight hours during one-week periods in the HIV training program at the community clinic so that every student could have direct interaction with people with HIV/AIDS. With this scheduling, it requires most of the academic year to train all of the students each year. The curriculum for the program is shown in Table 1. The development of this curriculum also took into account the LLUSD competencies for new dental graduates that were in effect in 2002. The LLUSD competencies addressed in the training curriculum are as follows:

1. The new dentist must be able to perform clinical decision making that is supported by foundational knowledge and evidence-based rationales.
2. The new dentist must understand the application of patient-centered approaches to the prevention, improvement, and maintenance of oral health.
3. The new dentist must be able to function as the leader in a multicultural work environment and manage a diverse patient population.18

In the development of the “HIV and the Dentist” program, we took advantage of the close proximity of the School of Dentistry and the SACHS clinic (three miles). This allowed students to attend a four-hour session in the morning at SACHS and still be able to attend the four-hour afternoon session at LLUSD on the same day. The brevity of each student’s training experience (eight hours) and the inability to predict the patient care experiences that would be available each week contributed to our decision to consider the patient care component as service-learning. We also decided to assess program outcomes by means of pre-session and post-session surveys to determine if attitudinal shifts and self-reported gains in knowledge were occurring with respect to treating people with HIV/AIDS. Rubin stated that there is evidence that service-learning experiences help “develop cultural literacy, improve citizenship, enhance personal growth, and foster a concern for social problems.”19
Methods

Assessment of program effectiveness has been measured since program inception by means of pre-session and post-session surveys of the student participants. The survey questions were developed with the assistance of staff of the Behavioral Health program at SACHS. The pre-session survey is completed by students during the spring quarter of their third year in the Dental Public Health course. The post-session survey is completed by the same students at the end of their second and final session each week as they complete their rotations during the fourth year. The surveys contained five statements regarding HIV general knowledge, attitudes towards the HIV-positive clientele, comfort with treating this group, confidence in the effectiveness of universal precautions and post-exposure prophylaxis following bloodborne exposures, and self-assessment of understanding of the issues involved.

There are six years of pre- and post-session survey results (composed of five overlapping two-year cycles) that are reported in this article. From 2003 to 2009, these surveys were distributed to 414 dental students, and 386 (93.24 percent) completed the post-session survey. The statistical analysis was done using SAS 9.2. Those dental students who did not complete post-training questionnaires were excluded from the analysis. Descriptive statistics were generated including means. The normality distributions were examined using histograms and Kolmogorov-Smirnov normality tests. Given the nature of the data, the non-parametric Wilcoxon signed-rank test was performed on data recorded in pre-session and post-session surveys. A p-value of <0.05 was considered statistically significant. The data were compared on a six-point rating scale ranging from “none” to “high” in the five areas surveyed, and the overall change in means was compared to generate the final results.

Results

Statements used in the surveys and the student responses during the study period are summarized in Table 2. In the post-session survey data collected after the students participated in the “HIV and the Dentist” rotation, the Wilcoxon signed-rank test revealed positive changes in all the statements that were statistically significant at a p-value of <0.0001. For the statement “general knowledge about HIV infection,” there was a 14.5 percent (pre-session mean...
Table 2. Percentages of dental student responses to the statements about general knowledge and treatment of HIV patients

<table>
<thead>
<tr>
<th>Statement</th>
<th>Session</th>
<th>None</th>
<th>Insufficient</th>
<th>Marginal</th>
<th>Acceptable</th>
<th>Sufficient</th>
<th>High</th>
<th>Mean</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>General knowledge about HIV infection</td>
<td>Pre</td>
<td>1.3%</td>
<td>3.7%</td>
<td>16.4%</td>
<td>38.8%</td>
<td>22.4%</td>
<td>17.5%</td>
<td>4.27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>0.2%</td>
<td>2.7%</td>
<td>9.4%</td>
<td>31.4%</td>
<td>25.9%</td>
<td>30.4%</td>
<td>4.89</td>
<td>14.5% &lt;0.0001</td>
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<td></td>
<td>Change</td>
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<td></td>
</tr>
<tr>
<td>Feel competent about treating HIV-positive patients</td>
<td>Pre</td>
<td>0.8%</td>
<td>8.0%</td>
<td>20.5%</td>
<td>33.9%</td>
<td>24.6%</td>
<td>12.2%</td>
<td>3.98</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>—</td>
<td>0.2%</td>
<td>0.5%</td>
<td>21.0%</td>
<td>35.3%</td>
<td>43.0%</td>
<td>5.09</td>
<td>27.9% &lt;0.0001</td>
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<tr>
<td>Familiarity with the PEP (post-exposure prophylaxis)</td>
<td>Pre</td>
<td>12.4%</td>
<td>16.3%</td>
<td>30.3%</td>
<td>17.9%</td>
<td>15.5%</td>
<td>7.5%</td>
<td>3.16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>0.7%</td>
<td>0.5%</td>
<td>7.3%</td>
<td>22.2%</td>
<td>36.1%</td>
<td>33.2%</td>
<td>4.78</td>
<td>51.3% &lt;0.0001</td>
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<td>Change</td>
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<tr>
<td>Feel confident about the efficacy of PEP</td>
<td>Pre</td>
<td>7.7%</td>
<td>20.4%</td>
<td>32.4%</td>
<td>19.4%</td>
<td>11.7%</td>
<td>8.5%</td>
<td>3.27</td>
<td></td>
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<tr>
<td></td>
<td>Post</td>
<td>0.5%</td>
<td>0.3%</td>
<td>3.6%</td>
<td>25.3%</td>
<td>29.1%</td>
<td>41.2%</td>
<td>5.00</td>
<td>52.9% &lt;0.0001</td>
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<tr>
<td>Feel comfortable with effectiveness of universal precautions in the dental office</td>
<td>Pre</td>
<td>0.3%</td>
<td>11.4%</td>
<td>14.3%</td>
<td>34.8%</td>
<td>15.6%</td>
<td>23.6%</td>
<td>4.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>—</td>
<td>—</td>
<td>1.5%</td>
<td>14.7%</td>
<td>25.4%</td>
<td>58.3%</td>
<td>5.33</td>
<td></td>
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<tr>
<td></td>
<td>Change</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>28.4% &lt;0.0001</td>
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</tbody>
</table>

Note: Percentages may not equal 100% because of rounding.

equaled 4.27, and post-session mean equaled 4.89) change in the positive direction. The statement “feel competent about treating HIV-positive patients” had a change of 27.9 percent (3.98, 5.09). The statement about “familiarity with the post-exposure prophylaxis (PEP)” had a high level of change of 51.3 percent (3.16, 4.78). The statement about confidence in the efficacy of PEP after an exposure to a contaminated dental instrument also showed a high level of change of 52.9 percent (3.27, 5.00). The final statement addressed the level of comfort with effectiveness of universal precautions in the dental office with reference to HIV infection, and this category shows a positive change of 28.4 percent (4.15, 5.33).

The overall change in all the areas about the knowledge and treatment of people with HIV/AIDS is in a positive direction, with the most convincing results seen in the area of familiarity with PEP and confidence about the efficacy of PEP following a bloodborne exposure. A graphic presentation comparing the means of the pre-session and post-session responses to the five survey items is presented in Figure 1.

The most frequent comment made was that students wanted to have more “time with patients,” and the next most frequent one was that there was some overlap of information from previous courses. A few changes were made in the course as a response to these comments to eliminate unplanned redundancies. There was also a small reduction of didactic material presented to allow for more clinical time during the second day of the rotation.

Discussion

A goal of the “HIV and the Dentist” program was to improve the students’ knowledge, attitudes, and beliefs regarding the provision of dental treatment to persons living with HIV/AIDS. Significant changes were observed in all five areas surveyed as reported in Table 2. The observed changes are taken as evidence that student competence in treating and interacting with people with HIV/AIDS has been improved by this program. It is also evident from Figure 1 that the differences in the pre- and post-session responses were substantially different in the responses involving PEP as compared to the other three areas. The most likely reason for this is that the three items with the least pre- and post-session change are those areas in which the students had had substantial curricular exposure prior to this training experience. Due to the fact that the senior dental students have already been introduced to HIV-related topics in the curriculum, we expected them to already have some HIV knowledge, resulting in less of a measurable difference in the post-test data regarding general knowledge of HIV infection. This was also the case for feeling competent to treat people with HIV/AIDS and belief in the efficacy of universal precautions.
The other two items, which addressed familiarity with PEP and confidence in the efficacy of PEP, had been only minimally addressed elsewhere in the curriculum, and these were the areas where the greatest changes were observed in a positive direction. All areas surveyed had a significant p-value of <0.0001.

One of the encouraging findings of this program has been that, after completion of the externship, an increased number of students felt competent treating people with HIV/AIDS. The data in Table 2 show that the majority (70.7 percent) of the third-year students already expressed a feeling of competence treating these patients in the pre-session surveys. The expression of competence to treat rose to 99.3 percent in the post-session surveys. Part of this increase in confidence may be attributable to the additional clinical experience of the fourth-year students (as compared to their third-year status when completing the pre-session survey), and the remainder of the increase is most likely attributable to our HIV training program.

The most significant change was in the area of PEP. Confidence in the efficacy of PEP after a bloodborne exposure had the greatest statistical change in the desired direction at 52.9 percent. The “familiarity with the PEP” statement had the second to highest positive change at 51.3 percent. A likely explanation for these findings is that the rotation is the only place in the dental curriculum where PEP is described in detail. Students show a high level of interest in strategies to protect themselves from acquiring an infectious disease like HIV due to occupational exposure. In addition, the magnitude of the change may also be related to the fact that PEP was the last topic reviewed prior to the treatment of patients during the second training session. Students are always encouraged to ask questions or make comments, and PEP has been one of the subjects in which there has been high student participation in the form of questions and comments.

A less predictable finding was in reference to increased confidence regarding universal precautions in relation to preventing transmission of HIV, with a 28.4 percent change in the response mean. The training includes only a brief review of universal precautions since the students had already been exposed to the subject multiple times in the LLUSD curriculum, yet there was still a highly significant change in a positive direction in this survey item. The “effectiveness of universal precautions” also had the most

Figure 1. Means of pre-session and post-session responses to the five survey items

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significant shift in the two lowest categories (none and insufficient) from the pre- to the post-session surveys. All students had at least a marginal comfort level with the efficacy of universal precautions after the externship. Not one of the other items surveyed had no students indicating none or insufficient in the post-session surveys during the six-year study period.

A future study could survey those students who participated in the training program after graduation to determine if the positive outcomes observed in the study translated into an increased willingness to treat people with HIV/AIDS in their practices. Additional questions in such a study could include reflecting on the importance of this rotation in their predoctoral training and whether it inspired them to continue to learn about treatment issues regarding people with HIV and other medically compromising illnesses. A separate study could also be done to identify additional competencies that are appropriate for predoctoral students working with PLWHA as well as how such competencies could be measured. The development of such a competency-based framework for the training of residents in an Advanced Education in General Dentistry program who will work with PLWHA was discussed by Badner et al.

Future modifications to the “HIV and the Dentist” program could include training students on rapid HIV testing in the dental setting. An estimated 1.1 million persons in the United States are living with HIV/AIDS, and an estimated 24 to 27 percent of these people are undiagnosed and/or unaware of their HIV-positive status. Individuals who become aware of their HIV diagnosis are more likely to reduce high-risk behavior. It is estimated that approximately 25 percent of HIV-positive individuals are responsible for 55 percent of the new cases, and most of these individuals are in the unaware category. Dental professionals are an untapped resource for HIV testing. Knowledge of a positive sero status can help with early access to treatment, along with ultimately reducing further transmission. A study was conducted in a dental clinic to see how patients would respond to oral HIV testing in the dental setting. In that study, most patients were willing to undergo HIV testing (73 percent), and 37 percent of the patients actually preferred their dentist to test them over any other provider. The CDC launched the Advancing HIV Prevention initiative in 2003, which allows testing to be conducted in a variety of settings, aimed at increasing the early diagnosis of HIV-positive individuals. A separate study also determined that one-third of dental educators would consider offering rapid oral HIV testing in their clinics.

### Conclusion

When Rubin reported on the effects of a service-learning program to develop cultural competence and social responsibility in predoctoral dental students, he recommended that such programs include training in empathic communication skills and enhanced understanding of stigmatized populations. The goal of the “HIV and the Dentist” program at LLUSD has been to train dental students in the issues of providing care to people with HIV/AIDS and to produce practitioners who will continue to serve this clientele in a competent and compassionate manner throughout their careers. The program developed at LLUSD includes elements such as patient interviewing, role-playing, case discussions, and, particularly, direct patient care experiences for each student that required small-group training sessions. The pre- and post-session survey data gathered over a six-year period demonstrate that the program has been successful in fulfilling the original goals of HRSA to impart a social context for health care and a greater understanding of the health needs of the HIV-positive population.

Students have responded very positively to the program over the years it has been conducted. One of the unique features of this program has been the personal interview in which people with HIV/AIDS volunteer to sit with the student groups each week and discuss what it is like to contend with the disease. This feature and the time spent in clinical care result in several hours of contact between students and patients. This degree of personal interaction may have been the major factor in the most frequently observed comment in the post-session surveys in which students requested more patient contact time.

Dental schools typically rely on large intramural clinics for student-provided clinical care. This is a necessity for the majority of the training that must occur within a predoctoral dental program. However, this setting does not particularly promote the development of cultural competence in dealing with vulnerable segments of our society, including the frail elderly, the poor, and medically compromised individuals such as those with HIV/AIDS. Patient interaction in extramural community sites, such as occurs during the “HIV and the Dentist” rotation, is an effective way for students to gain experiences that
promote the development of such competencies and to develop a nonjudgmental attitude toward individuals in these populations.

REFERENCES


