

Dental Students' Perceptions of Community-Based Education: A Retrospective Study at a Dental School in Brazil

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Abstract: Community-based educational activities have been introduced into health education programs across the world. However, research on students' perceptions of their experiences in these settings has been limited. The objectives of this study were to assess a group of Brazilian dental students' views of their experiences in a service-learning program focusing on pediatric dental care and to explore changes in their perceptions over the course of the program. Data were collected from fifty-five fourth-year dental students, who submitted a total of 185 reports at four points in time. The students spent sixteen of the 128 hours of their pediatric dentistry course in community-based education developing activities linked to pediatric dental care. Two professors rated each report as a positive or negative experience (Kappa 0.7) and recorded whether the students' reports reflected one or more of five types of response. The response types concerned dental treatment practice, multidisciplinary activities, observation of infant/toddler consultations, commitment of the outreach health team, and change of plans due to technical problems. The data showed that the students had a positive first impression after a short stay in a community-service program, but there was a decrease in the students' positive experiences over time ($p < 0.001$). The students' perceptions of the outreach health team as "being not committed" (OR 6.82, 95 percent CI 2.12–21.90) and experiences of a "no change of plans due to technical problems" (OR 0.09, 95 percent CI 0.04–0.20) associated with negative student experiences.

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Service-learning is a form of experiential education defined as a structured learning experience that combines intentional learning goals for students with service to the community.^{1,2} Community-based education has been introduced into predoctoral dental programs and is being used increasingly widely as a way to educate dental students in such a way that they can both meet the health care needs of their patients and gain a more holistic understanding of the provision of dental care to patients in need.^{3,4}

Pediatric dental care should be considered from the perspective of what and how dental services are offered. A Swedish survey, for example, found a clear increase over the years in the number of children being referred for specialist services provided by public dental services from pediatric departments in hospitals, especially referrals of children with disabilities or chronic health conditions combined with complex oral treatment needs, and from private dentists who were treating an increasing number of children.⁵ In

Brazil, despite the existence of the pediatric dentistry specialty, low-income child patients are normally treated by general practice dentists from the Brazilian National Health Service (Sistema Único de Saúde, SUS). Only a few pediatric dentists are part of this program, which means that Brazilian general dentists should be able to provide good-quality dental care for children and adolescents.

Community-based dental education can provide predoctoral dental students with real-life experiences that could make a difference to the level of their personal accountability and self-confidence when they provide pediatric dental care. In addition, it can increase their sense of responsibility for and awareness of underserved populations.⁶⁻⁸ This first contact with child patients could be relevant for subsequent provision of pediatric care because a negative interaction among children, parents, and dentists could make all parties more anxious.⁹

Some community-based pediatric dentistry experiences have demonstrated that students can

develop their competence and confidence by carrying out specific procedures on children while training in a more realistic environment than that of a dental school's clinic.^{6-8,10,11} A survey conducted in Canada with general dentists who had graduated from the University of Manitoba found that treating children in need of complex care living in underserved areas while in dental school ensured that practitioners were better prepared to administer comprehensive treatment to younger children.¹⁰ Dental students' experiences in outreach settings have also been assessed in studies in the United Kingdom; these have found that the experiences increased students' confidence⁶ and competence⁸ when treating children. These studies highlighted the students' increased clinical experience in pediatric dental procedures⁸ and the opportunity to practice specific pediatric dentistry core skills in the community settings.⁹ Another retrospective study (at The Ohio State University College of Dentistry, USA) found through procedural data evaluation that students had the opportunity to perform more clinical procedures at community-based sites and as a consequence increased their competence. Those students also performed procedures deemed central to pediatric dentistry.¹¹ All these studies discuss the benefits of service-learning for pediatric dental education, but they lack information on students' self-perceptions. It is important to go beyond procedure quality and quantity and to assess this approach to teaching predoctoral students from the students' point of view.

The aim of this study was to assess students' views regarding a community-based service-learning activity in the pediatric dentistry course (Pedo-SUS) of the predoctoral dental program of the Federal University of Goias (UFG), Brazil, as part of the implementation of a new predoctoral curriculum emphasizing community-based service-learning education. Moreover, we sought to find associate factors that might influence students' opinions. As this outreach experience was a preliminary program focusing on dental education in pediatric care, we expected that the students would describe experiences as positive based on the novelty of the tasks they were asked to perform.

Methods

In this retrospective study, conducted at the UFG Dental School, we reviewed reports of students' experiences of a service-learning program carried out

in 2009. These reports were one of the requirements for completion of the pediatric dentistry course. The review of the reports was carried out in full accordance with ethical principles, including the World Medical Association Helsinki Declaration and the principle of the protection of students' anonymity.

Service-Learning Program in Pediatric Dentistry

At this university, the dental curriculum provides students with 320 hours of public health experience starting in the first year of the predoctoral program. The activities are specifically aimed at providing educational approaches to dealing with the underserved population, including some student contact with children in public schools or the public health service. The pediatric dentistry course is offered in the third and fourth years of a five-year predoctoral program and is divided into three semesters. The Preclinical Stage (120 hours, sixth semester) focuses on theoretical knowledge and initial contact with pediatric patients in the dental clinic. It includes student visits to the pediatric dental outpatient clinic (eight hours) for observational purposes. In Pediatric Dental Clinic Stages I and II (Pedo I and II, 128 hours, seventh and eighth semesters), students provide four- to eleven-year-old patients with preventive, restorative, and surgical care in the dental school outpatient clinic in addition to a toddler consultation in the eighth semester. In addition to their work at the dental school clinic, the students must also put in sixteen hours of care for children in public services in a structured rotation (Pedo-SUS).

Students from Pedo I and II were required to spend sixteen out of 128 hours in an assigned SUS community-based dental service to get them to think critically about the differences between providing pediatric dental care in community services and in a more controlled environment, such as the dental school clinic. This requirement was based on the new curriculum's linkage between the public health service and dental schools. A limited sixteen-hour period per year was set for this community experience for two reasons: first, in accordance with an agreement with public service dentists, the students would not be allowed to treat children themselves in the context of public services, so they would have to practice pediatric dentistry in the dental school to achieve the program's goals; and second, the students would gain further experience with community service in other courses in the dental program.

Twice a semester, the students developed and tracked activities at the primary care level under the supervision of dentists from two SUS programs. The Family Health Program, as Brazil's main primary health care strategy, aims to provide a broad range of health care to families in their homes, at clinics (including dental offices), and in hospitals. It is conducted by family health teams that include doctors, nurses, dentists, and other health care workers. In the Toddler Oral Health Program, pediatric dentists provide preventive and curative dental treatment to children from birth until the age of six without any pharmacological behavioral management. The students visited one primary care unit (CAIS Jardim Guanabara III) located in the northern district of Goiania, Goias, Brazil. Among other health care professionals, this unit includes three oral health teams responsible for providing dental care for approximately 10,000 people.

Sample and Data Analysis

Fifty-five fourth-year students from the UFG dental school participated in community health activities in a predetermined rotation system. Each student was scheduled to visit the community service four times, twice each semester, and each visit lasted four hours. After each visit, the students were asked to fill out structured reports with open-ended questions in order to describe and evaluate the activities they had performed (Table 1). This study analyzed 185 student reports.

The data were entered into a database for analysis (Windows Excel). The students' experience (dependent variable) was determined by the subjective analysis of the responses given in the structured reports. Two pediatric dentistry professors with experience in qualitative analysis independently analyzed all of the reports using summative content analysis.¹² The analysis began by searching the database for oc-

currences of keywords that would be clearly related to students' positive ("motivation," "good relationship," "commitment," or "efficiency") or negative ("lack of attendance," "waste," "no contribution," or "lack of planning") experiences. The researchers then sought out alternative terms for favorable or unfavorable experiences and examined and interpreted the contexts of the students' reports with the aim of identifying their global opinion of their experience. The reports were then categorized independently by each professor as positive or negative based on whether or not goals were achieved; whether favorable or unfavorable aspects were registered; and such spontaneous reflective opinions as "I think it was a waste of time" or "the health team's level of commitment made it possible for me to have an optimal experience." The Kappa test revealed satisfactory agreement among them (Kappa 0.7). A few cases were categorized differently (twenty-six of the 185 reports analyzed). In those cases, students mentioned favorable and unfavorable aspects of their experience. These were converted through a discussion between the two professors to a consensus category (positive or negative). In this discussion, the examiners decided that "achieving the goals of the planned activity" would be coded as a positive experience even if the student mentioned unfavorable aspects.

Reports from the four visits were compared regarding the dependent (positive or negative experience) and independent (dental treatment practice, multidisciplinary activities, observation of infant/toddler consultation, commitment of outreach health team, and change of plans due to technical problems) variables. The independent variables were also categorical (yes or no). Dental treatment practice was characterized as yes when the students themselves under supervision performed treatments such as oral examinations, prophylaxis, topical fluoride treatments, pit and fissure sealants, tooth restorations, or extractions. Multidisciplinary activities were educa-

Table 1. Section from the structured report completed by students about their activities in community rotations

A) Questions

1. What were the goals of the activities planned for today?
2. Were the goals achieved?
3. Describe favorable or unfavorable aspects of these goals.
4. Describe the location of the activities carried out today.
5. Were these multidisciplinary activities? If yes, please write a comment.
6. Were there educational/preventive activities? If yes, please describe them.

B) Report all questions and concerns that came up during the observed activities here.

tional-preventive actions carried out with the health team (especially nurses, social workers, and auxiliary agents) in the health service or during home care.

The data were analyzed statistically using the SPSS 18.0 statistical package for Windows (SPSS Inc., Chicago, IL, USA). The statistical analysis included frequency distributions, the Wilcoxon signed-rank test as a nonparametric statistical analysis to compare experiences between visits, and the Pearson chi-square test to judge the association between the independent and dependent variables. As there were repeated measures for the main outcome (dependent variable), general estimating equations were used to assess the determinants of the students' experience (positive/negative). A binomial distribution was fitted with a logit link function. The quasi-likelihood method was used to estimate the model's goodness of fit. Odds ratios (ORs) and 95 percent confidence intervals (CIs) were determined. The significance level was set at 5 percent.

Results

The participants in the study were twenty-one male students and thirty-three female students who were twenty to twenty-six years of age. They were all Brazilians except one student, who was from Cape Verde in Western Africa. There were 185 reports relating to the four visits: fifty-five (visit 1), fifty-three (visit 2), forty-three (visit 3), and thirty-two (visit 4). The students who did not report their opinions by visit 4 did not differ by gender ($p=0.06$, Fisher's exact test) or age ($p=0.07$, Spearman's correlation) from those who did. The descriptive analysis of the students' experience is shown in Table 2. The Wilcoxon signed-rank test found that the students' experiences differed markedly between visits 1 and 2 (first semester) and visits 3 and 4 (second semester). Visit 1 was scored as positive more frequently than visits 2, 3, and 4 ($p<0.01$); visit 2 had more positive scores than visits 3 and 4 ($p<0.01$); and visits 3 and 4 did not differ as most of their scores were negative ($p=0.74$).

Table 3 shows the results of the bivariate associations. The commitment of the outreach health team showed an association with the students' experience during all visits ($p<0.05$). The multidisciplinary of the approach was only occasional and had almost no influence on the experience. The association between dental treatment practice and the outreach health team's level of commitment and positive experiences on the first two visits was confirmed through comments such as "chance of hands-on practice in child dental treatment" or "I felt motivated by the interest of the dentists and the team in having us there."

According to the general estimating equation analyses adjusted for repeated measures (Table 4), students who did not perceive the health team as committed had a sevenfold increased odds of having a negative experience (OR 6.82; 95 percent CI 2.12–21.90). Those who did not report any changes to plans due to technical problems were associated with a protective effect against a negative experience (OR 0.09; 95 percent CI 0.04–0.20). The other three independent variables were not significantly associated with negative experiences in this regression model.

As there were many missing responses for visits 3 and 4, we investigated the potential missing data imbalance (Table 5). Students who did not return reports on visits 3 and 4 gave similar responses on the first reports to those who did ($p>0.05$; see Table 4 for exact p -values). Since the outcome data were incomplete for visits 3 and 4, we ran a parallel general estimating equation test for a sensitivity analysis and included all missing values as a positive experience. The results confirmed our findings: the effects were found for the same variables: commitment of outreach health team ($p=0.04$) and change of plans due to technical problems ($p<0.001$).

Discussion

The results of this retrospective study revealed a range of student experiences during the first and second semesters of the predoctoral Pedo-SUS

Table 2. Frequencies and percentages of student-identified positive and negative experiences on four consecutive visits, by number and percentage

| | Visit 1 | Visit 2 | Visit 3 | Visit 4 |
|---------------------|------------|------------|------------|------------|
| Positive experience | 51 (92.7%) | 38 (71.7%) | 14 (32.6%) | 7 (21.9%) |
| Negative experience | 4 (7.3%) | 15 (28.3%) | 29 (67.4%) | 25 (78.1%) |
| Total | 55 (100%) | 53 (100%) | 43 (100%) | 32 (100%) |

Table 3. Frequencies and percentages of students' positive vs. negative responses in five areas related to community-based dental education on four visits, by number and percentage

| | Visit 1 (n=55) | | Visit 2 (n=53) | | Visit 3 (n=43) | | Visit 4 (n=32) | | p-value* |
|--|----------------|--------------|----------------|---------------|----------------|---------------|----------------|--------------|-----------------|
| | Negative | Positive | Negative | Positive | Negative | Positive | Negative | Positive | |
| Dental treatment practice | No | 0 (47.2%) | 13 (24.5%) | 8 (15.1%) | 10 (23.3%) | 4 (9.2%) | 21 (65.6%) | 3 (9.4%) | 0.02 |
| | Yes | 4 (7.3%) | 25 (45.5%) | 2 (3.8%) | 30 (56.6%) | 19 (44.2%) | 10 (23.3%) | 4 (12.5%) | |
| Multidisciplinary activities | No | 2 (3.6%) | 45 (81.9%) | 11 (20.7%) | 30 (56.6%) | 27 (62.8%) | 13 (30.2%) | 7 (21.8%) | 0.33 |
| | Yes | 2 (3.6%) | 6 (10.9%) | 4 (7.6%) | 8 (15.1%) | 2 (4.7%) | 1 (2.3%) | 3 (9.4%) | |
| Observation of infant/toddler consultation | No | 4 (7.3%) | 28 (50.9%) | 13 (24.5%) | 22 (41.5%) | 23 (53.5%) | 6 (14.0%) | 5 (15.6%) | 0.45 |
| | Yes | 0 | 23 (41.8%) | 2 (3.8%) | 16 (30.2%) | 6 (14.0%) | 8 (18.5%) | 2 (6.3%) | |
| Commitment of outreach health team | No | 4 (7.3%) | 22 (40.0%) | 13 (24.5%) | 16 (30.2%) | 25 (58.1%) | 8 (18.6%) | 3 (9.4%) | <0.01 |
| | Yes | 0 | 29 (52.7%) | 2 (3.8%) | 22 (41.5%) | 4 (9.3%) | 6 (14.0%) | 4 (12.5%) | |
| Change of plans due to technical problems | No | 2 (3.6%) | 49 (89.2%) | 4 (7.5%) | 36 (67.9%) | 16 (37.2%) | 14 (32.6%) | 4 (12.5%) | 0.41 |
| | Yes | 2 (3.6%) | 2 (3.6%) | 11 (20.8%) | 2 (3.8%) | 13 (30.2%) | 0 | 3 (9.4%) | |

*Pearson's chi-square test; results in bold type are significant at the level $p < 0.05$.

Table 4. Predicted factors reported during students' visits resulting in negative experiences

| | Odds Ratio (OR) | Standard Error | 95% Confidence Interval for OR | | p-value* |
|--|-----------------|----------------|--------------------------------|-------|-----------------|
| | | | Lower | Upper | |
| Intercept | 0.54 | 0.80 | 0.11 | 2.60 | 0.20 |
| There was no dental treatment practice. | 0.70 | 0.50 | 0.28 | 1.69 | 0.42 |
| There were no multidisciplinary activities. | 1.18 | 0.53 | 0.41 | 3.36 | 0.75 |
| No infant/toddler consultation was observed. | 2.39 | 0.50 | 0.94 | 6.08 | 0.06 |
| The outreach health team was not committed. | 6.82 | 0.60 | 2.12 | 21.90 | <0.01 |
| There were no changes to the plan due to technical problems. | 0.09 | 0.40 | 0.04 | 0.20 | <0.01 |

*General estimating equations; results in bold type are significant at the level $p=0.05$.

Table 5. Frequencies and percentages of missing data in visits 3 and 4 compared to visit 1 (Fisher's exact test)

| | Visit 1 Experience (n=55) | | | Visit 2 Experience (n=53) | | |
|----------------|---------------------------|----------|---------|---------------------------|----------|---------|
| | Positive | Negative | p-value | Positive | Negative | p-value |
| Visit 3 | | | | | | |
| Missing report | 10 | 0 | 0.43 | 6 | 4 | 0.29 |
| Present report | 39 | 4 | | 32 | 11 | |
| Visit 4 | | | | | | |
| Missing report | 19 | 2 | 0.52 | 15 | 6 | 0.61 |
| Present report | 30 | 2 | | 23 | 9 | |

course. The highly positive experiences that were mainly reported in the first semester led to partial agreement with our hypothesis that positive experiences could be expected as a result of the activities proposed. However, our primary findings were significantly related to the variables of perceiving the health team as committed and having no change in planned activities because of technical problems.

In an extramural rotation system, the positive experiences of dental students may be proportional to the length of time spent on outreach placements.¹³ But in our study, positive experience declined in visits 3 and 4. We can speculate on some possible reasons for this. The students in our study may have been satisfied with the time they had spent in the public health service, and by the eighth semester (visits 3 and 4), the students had gained more experience at the dental school clinic so the activities would no longer be a novelty. More importantly, our results showed that the low frequency of reports citing a change of plans due to technical problems on visits 1 and 2 as well as the widely observed perceived noncommitment of the outreach health team on visit 4 might explain the change from a positive to a negative experience in agreement with the reported "moral economy of

commodified health care."¹⁴ In addition, the influence of specific external factors such as changes in practice setting or lack of dental materials on pediatric dental treatment were observed in another study.¹⁵ The decrease in positive experiences was also accompanied by a low report return rate, suggesting a decrease in motivation, as the reports were not part of the students' final grade. Although one cannot discard social desirability bias (i.e., students could have tended to report positive aspects so that they would be viewed favorably by the course professors), we do not think that they underreported negative aspects from visits 3 and 4.

The positive experiences observed here may contribute to the existing knowledge of the importance of service-learning in pediatric dental education. Other studies have clarified the benefits of extramural experience when it is included in pediatric dentistry educational programs, which include an increase in students' confidence, competence, and opportunities to experience a diverse range of dental problems in children.^{6,8,10,11}

Students' self-reported experience was assessed in another study that focused exclusively on pediatric dental procedures.⁸ According to that study, the stu-

dents considered themselves to have above-average confidence (visual analogue scale ≥ 5.0), mainly in preventive activities, but had problems regarding patient selection, providing information before a dental general anesthesia, and managing pediatric dental trauma. In our study, we looked beyond the number of procedures performed to evaluate program implementation. The students' self-experience assessments reported here could be an important way to identify the relevant aspects of a predoctoral outreach program, although our data did not allow us to evaluate student civic involvement. As has been emphasized elsewhere, service-learning in the community is a methodology that improves predoctoral students' ability to plan treatment with an awareness of the social issues involved with individuals' needs when compared with traditional, hospital-based education.¹⁶

Personal experience of the way in which dentists treat children is absolutely relevant in clinical practice and education; it may be one of many influences on a clinician's career.¹⁵ According to efforts to establish educational views in pediatric dentistry worldwide that go beyond university walls, meeting children's dental health needs through the public health service could be an alternative for predoctoral dental students. In addition, less repetitive activities might encourage students after their first point of contact with pediatric dentistry in the community health service.

Our study has some limitations. It was undertaken retrospectively and not designed as a controlled study. Students' reports could have been misclassified, and the study represented only one dental school program. Although missing data did not significantly influence our results as shown through sensitivity analysis, we considered a few possible reasons for missing data in this kind of study. The students may have been indifferent to their experience; the students may not have felt motivated to register their outreach activities on visits 3 and 4 in a positive or negative sense; the students may have thought that nothing would change, despite their reports; or they may simply not have wanted to fill out reports. Such motivations should be further investigated.

Our findings on students' views are in accordance with the deficiencies in the design and implementation of community-based education that have been reported.¹⁷ If one extends the results of this particular evaluation to the diverse range of health sciences programs, it should be understood

that predoctoral curricula should provide students with innovative activities in the community health service in order to help them develop a comprehensive view of individuals' health. Integrating curricula and community health programs is challenging, as each side has its own needs and goals. An integrated course plan, developed by faculty members and tutors, in addition to a team-based approach over time, is crucial for minimizing problems and maintaining students' motivation. These points should be further investigated in prospective quantitative and qualitative studies exploring the views of students as well as staff and teachers. This study should be considered by dental program coordinators when planning their students' activities in community services, while bearing in mind that our results refer to short-stay visits.

Conclusions

Our study found that predoctoral dental students had a positive first impression after a short stay in a community-based program. This impression was mainly associated with performing dental treatment themselves, perceiving the commitment of the outreach health team, and the lack of changes in planned activities due to technical problems.

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