A Randomized Controlled Trial of Outreach Placement’s Effect on Dental Students’ Clinical Confidence

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Abstract: This randomized controlled trial compared the effects of outreach placement with traditional, exclusively dental school-based clinical experience on students’ confidence in providing treatment for patients presenting with common dental problems. Senior dental students (n=49) were allocated at random to existing dental school-based clinics or placement in primary care clinics to work supervised by local dentists. At baseline, students self-rated their global confidence on a five-point scale. These measures were repeated at follow-up, augmented by a transition judgment and a then-test of confidence (asking students to look back and re-rate their pre-placement confidence). Groups were comparable at baseline. Follow-up scores for global confidence were similar between groups. The outreach group scored higher in the transition judgment (mean 3.7, SD 0.9) than the control group (mean 3.1, SD 1.1, P=0.05). In the then-test, on reflection, the outreach group considered their baseline ratings of confidence were overoptimistic (mean then-test scores 3.2, SD 0.9 and baseline 3.7, SD 0.5) while the control group thought theirs were accurate (mean then-test scores 3.8, SD 0.7 and baseline 3.6, SD 0.8, P=0.01). The findings suggest dental outreach training in primary care settings is more effective than dental school training alone in improving students’ confidence in tackling clinical situations. The measurement of change in confidence is complicated by shifts in students’ internal scales arising from insights gained on outreach.

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The development of this outreach program and the trial were funded by the UK’s National Dental Development Unit grants EL1/EL2.

Key words: undergraduate dental education, senior dental student, extramural, community-based, outreach, confidence

Submitted for publication 11/21/05; accepted 2/6/06

Curricula in dental schools increasingly include clinical experiences in primary care settings outside the school. These arrangements are called outreach, extramural, or community-based experience. There is ample anecdotal evidence from program evaluations that hands-on outreach experiences increase students’ confidence in coping with clinical situations, but hard data on outreach’s educational outcomes are lacking.

Confidence in providing oral health care for patients is considered important as an educational outcome. Among medical students, increased confidence has been associated with increased clinical competence, though the relationship between the two is not well understood.

The University of Sheffield School of Clinical Dentistry is developing an outreach program for senior dental students. Besides providing opportunities to extend students’ clinical experience, the objectives of the program were to enhance students’ understanding of community dentistry, comprehensive care, health-related behaviors, professionals’ ethical responsibility, and a working environment. The first group of returning students claimed increased confidence in tackling common dental problems.

Confidence cannot be directly measured, but student self-reporting of perceived confidence is commonplace. Its measurement in intervention studies may be complicated by a response shift in which the experimental group recalibrates its baseline impression of confidence as a consequence of the intervention itself. Transition judgments in which subjects assess the degree of change itself, or assessments known as “post-then tests,” which retrospectively assess pre-intervention levels at follow-up, are recommended methods for avoiding errors arising from response shift.
This randomized controlled trial aimed to assess the effectiveness of outreach placement on students’ confidence in providing treatment for patients using transition judgments and post-then tests.

Methods and Materials

The intended sample was the fifty-four dental students of the University of Sheffield School of Clinical Dentistry’s penultimate year. Five students who attended overseas dental schools during the year’s second semester were excluded from the sample, resulting in a final sample of forty-nine students.

Students were involved in the design of the study in two phases. First, a draft of the protocol was discussed with class officers, and then a refined protocol was presented to the intended sample before recruitment commenced. No faculty were involved in the conduct of the study, and students were reassured that neither their decisions about participation nor their allocations to outreach or control groups would adversely affect assessment of their degree program.

Students were randomized into the dental school or outreach placements by an assistant with no knowledge of individual students, using electronically generated random numbers. Allocations were concealed from students until baseline assessments were completed. Twenty-five students were randomized to the study group (outreach group as described below) and twenty-four to the control, dental school-based group who completed regular rotations in hospital dental clinics.

The outreach group attended National Health Service (NHS) salaried primary dental care placements full time for five weeks. Eighteen placements were in two Dental Access Centers (DACs provide care including emergency care for people experiencing difficulty in accessing NHS dental care) and seven in two Community Dental Services (the CDS provides community-based specialist services such as oral health promotion and caters to children in otherwise underserved areas and patients with special dental needs). All placements were in urban areas of identified need in northeastern England. Each week students had between five and seven half-day clinical sessions with dental nurse support, performed health care according to local protocols, and were supervised by local dentists. In addition they observed allied health care services and completed a report in which they analyzed two patients’ case studies in relation to community health data.20

The outreach group attended the placements consecutively throughout the 2004 summer term. Concurrently, the dental school group continued their normal hospital clinics including restorative and dental emergency clinic rotations.

At baseline, students’ clinical competence and confidence were assessed. Competence was assessed using each student’s average mark in dental school clinical assessments throughout the previous semester. Self-assessed confidence was measured using question A in Figure 1 with its five-point Likert-style scale ranging from “not at all confident” to “totally confident.”

At follow-up, students’ confidence was measured using three questions displayed in Figure 1: a global self-assessment (question A), a then-test (question B), and a transition judgment (question C) with responses given on five- and six-point Likert-style scales scored using the item codes shown in the figure.

These assessments were pretested on a convenience sample of students (n=32) from a previous cohort to estimate their discriminant power. The transition judgment predicted that a sample of twenty (40 percent of the intended sample) would suffice (power=0.8, alpha=0.05).

To reduce reactive effects, the assessment was administered by staff not involved with the students’ course and in an annex to the school the day after the study group completed its outreach placements.

After undertaking simple descriptive analyses of all variables in the two groups and simple comparisons of potential confounding variables, statistical analysis compared the outcomes measures between the groups using the t-test. Data were compared between groups using analysis of covariance and checks made of the effects of potential confounders and mediators using stratified and multiple regression analyses. These analyses were carried out on an intention to treat basis using sample means to substitute for any missing values.

The protocol for this study gained ethical approval in March 2004 and was followed throughout.

Results

All forty-nine eligible students consented to participate. Fourteen of the twenty-five students in
the study group and fifteen of the twenty-four in the control group were female.

Following recruitment and baseline data collection, students started their allocated experiences in three waves with each wave returning for follow-up assessment five weeks later. Lost to follow-up were one student who fell ill while on placement and another from the dental school group who was attending a family event at the time of the follow-up assessment. So twenty-four of twenty-five outreach students and twenty-three of twenty-four in the dental school group provided data for analysis.

The groups had similar clinical confidence and competence at baseline (see Table 1). Data collected at follow-up met the assumptions required for parametric analysis. At follow-up, there was no significant difference between groups for self-assessed global confidence (Table 2). However, the outreach group retrospectively re-scored their baseline confidence lower in the then-test than the dental school group (3.2 cf 3.8, \( p = 0.05 \)) and rated their increase in confidence significantly higher for the transition judgment (3.7 cf 3.1, \( p = 0.05 \)).

The ancillary analyses revealed no significant variation in scores by wave of attendance, number of years of teaching experience of placement supervisors, placement setting, or student gender.

**Discussion**

This randomized controlled trial demonstrated that outreach training significantly increased students’ confidence in providing everyday dental care for patients. These experimental data confirm anecdotal reports that community outreach experiences increase dental students’ confidence and so address concerns about the rigor of evaluations.8

The measurement of self-assessed change in confidence was complicated by shifts in students’ internal scales of confidence. Whilst simple cross-sectional comparisons at follow-up revealed no difference between the groups, the then-test indicates that the experience of community-based outreach encouraged students to revise their internal scales of confidence. Therefore, the simple comparison at follow-

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**Table 1. Assessments of confidence**

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<th>A. How confident do you feel that you can tackle a range of people presenting with common dental problems?</th>
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<th>B. How confident do you now think you were at tackling a range of people presenting with common dental problems two months ago?</th>
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<th>C. Think back two months. Compared to two months ago, how much has your confidence that you can tackle a range of people presenting with common dental problems changed? Is it…</th>
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Your training should prepare you to be able to diagnose, plan, and provide treatment for a range of people presenting with common dental problems.

A. How confident do you feel that you can tackle a range of people presenting with common dental problems?

B. How confident do you now think you were at tackling a range of people presenting with common dental problems two months ago?

C. Think back two months. Compared to two months ago, how much has your confidence that you can tackle a range of people presenting with common dental problems changed? Is it…

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Journal of Dental Education  ■  Volume 70, Number 5
up was undermined because perceptions of confidence had changed in one group of students presumably as a consequence of their educational experience. Moreover, the then-test indicates that students who have been on outreach now believed they had been overoptimistic about their confidence before their placement. Put simply, they realized afterwards that some of their earlier confidence was misplaced. This newly gained insight is reflected in the difference in transition judgments between groups.

Other aforementioned studies had linked increased confidence with increased competence. Such a parallel increase in competence was found in a separate study of these students’ outreach placements. The outreach students were better at planning treatment for a simulated patient that took her lifestyle and wishes into account.

The previous cohort of students who participated in a pilot version of the community outreach placements attributed their increase in confidence to repeated opportunities to reapply skills, appreciative comments from patients, and especially, support from both dental nurses and supervising dentists. Features of the outreach experience that contrast with students’ school-based clinical experience include about four times the number of patients per week, individual dental nurse support, fewer students per supervisor, and a more intimate working environment with fewer surgeries and a smaller dental team.

While these studies identify an educational benefit from outreach, there are associated costs to academic programs. Additional resources are required for favorable levels of supervision and nursing support, and students’ absence from the dental school may represent lost opportunities to enhance their learning in other areas.

As in any research, these data should be viewed with care. There may be limitations on generalizing these data to dental education programs operating in different ways. Recall and social desirability bias may affect the validity of the follow-up assessments. However, other features of the trial increase its validity: four independent outreach locations were used, and there was no recruitment bias. In addition, incorporation of the then-test was able to compare shifts in students’ internal scales of confidence.

**Conclusion**

This trial suggests primary care outreach experiences were effective as an adjunct to traditional dental school-based training in improving students’ confidence in providing treatment. These findings encourage further development of outreach as a component in dental education.

**Acknowledgments**

The authors wish to acknowledge the support of staff and patients in the placements in providing suitable learning opportunities for students. The students are thanked for their participation in the trial.

**REFERENCES**