

Oral Health Educators' Perceptions of Student-to-Student Administration of Local Anaesthesia

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Abstract

Background: The pedagogical method for administration of local anaesthesia in most dental schools requires the students to act as surrogate patients. This experiential method of learning allows students to prepare themselves prior to administering local anaesthesia to genuine patients.

Objective: The objective of this study was to explore the oral health educators' perceptions of student-to-student administration of local anaesthesia as a pedagogical method.

Materials and methods: An electronic survey of 18 statements using a five-point Likert Scale was used to obtain data on the oral health educators' perceptions. In addition, the participants were allowed to comment on each statement. The quantitative data was subject to simple descriptive statistical analysis and the qualitative data was subjected to thematic analysis.

Results: A total of 36 Oral Health Educators responded to the survey. Oral health educators are mostly in support of the student-to-student administration of local anaesthesia, with 30 (83%) participants either agreeing or strongly agreeing that the benefits of this experiential learning strategy outweigh the risks. On the contrary, 12 (33%) participants either agreed or strongly agreed that the possibility of adverse effects does not justify using the student-to-student model for local anaesthesia education.

Conclusion: Oral health educators are mostly in support of the student-to-student administration of local anaesthesia as a pedagogical strategy. A relatively small number of the educators are not supporters of this method of experiential learning.

Key Words: Student-to-student, local anaesthesia, education

Introduction

Local anaesthesia is the principal method of pain control in dental practice (Meechan 2005). Local anaesthesia education in dental and oral health schools involves didactic training in subjects like anatomy, neurosciences, physiology and pharmacology. The preclinical training may involve administration of local anaesthetic injections using non-human objects such as oranges and/or electronic dental models. The transition to the clinical application in UK, Ireland, Sweden and Netherlands (Brand et al. 2011) and in the United States (Rosenberg et al. 2009) is through the first human injection on a fellow student. Interactions with fellow oral health educators in New Zealand and Australia have revealed that several institutions in New Zealand and Australia also follow a similar transition.

A 2008 survey of dental schools in the United States revealed that nearly 97% of dental schools use this experiential strategy while training students with local anaesthesia (Rosenberg et al. 2009). In a similar survey of the European dental schools in 2011, 61% of respondents indicated that dental students administered their first local anaesthetic injection to a fellow student (Brand et al. 2011). In a survey of dental schools in the United States, about 79% of the dental students and clinical faculty surveyed agreed that students 'must practice' dental injections on each other prior to injecting in genuine patients and 84% felt that it was ethical to do so (Hossaini 2011). A 2014 qualitative study by Khareedi and Fernandez found that the oral health students had a positive experience when administering a dental local anaesthetic injection to a fellow student. While this prevalent method of experiential learning offers an individual-centered,

multisensory, experiential, and shared teaching and learning opportunity, the use of students as surrogate patients for peer teaching and development of clinical skills has been seen as controversial (Braunack-Mayer 2001).

Advocates of using peers as patients for experiential learning argue that there are obvious pedagogical benefits in that students are better motivated to prepare themselves for clinical practice before approaching genuine patients. However, opponents question the legality, morality and ethics associated with the use of prescribed invasive procedures on anyone not in a procedural need (Rosenberg et al. 2009). Of the 152 dental students and faculty members surveyed at three dental schools in the United States, about 9% of students and clinical faculty disagreed that students 'must practise' on each other (Hossaini 2011). Likewise a study on oral health students, at the Auckland University of Technology, reported that students experienced anxiety as the result of their concerns about causing and experiencing some kind of harm from administering and receiving local anaesthesia (Khareedi & Fernandez 2014).

Student to student administration of local anaesthesia, as an experiential learning strategy, though controversial continues to be widely used for its apparent inherent strengths. The purpose of this study was to explore the perceptions of the oral health educators in New Zealand and Australia on the student-to-student administration of local anaesthesia.

Methods

The philosophical basis of this research centres on knowledge, substance and reason. The ontological assumption is that valid

knowledge can be found through senses and can be measured through formal language in the belief that language is shared by a collective (Darlaston-Jones 2007). The epistemological basis is post-positivism embracing the view that the world is variable and multiple in its realities (Mackenzie & Knipe 2006). This exploratory-descriptive study comprises of a cross-sectional questionnaire-based electronic survey. An electronic web-based questionnaire with a five-point Likert scale was developed using Survey Monkey. The questionnaire consisted of eighteen statements. The statements were generated following a literature review on local anaesthesia education and experiential learning in health education using peers. Approval for the study was granted by the Auckland University of Technology's ethics committee (Approval number 14/211).

The Likert scale used for this study was a five-point SERVQUAL scale with five options: strongly agree, agree, neutral, disagree, and strongly disagree. All the points on the scale were labelled with words to clarify the meaning and enhance reliability and validity. The participants were invited to qualify their attitude towards each statement by choosing a value on the scale.

A pilot survey was conducted. The survey questionnaire, with 18 statements, was modified based on the input received from the participants of the pilot survey. The edited survey was resubmitted to the ethics committee for approval of the modifications. A 'comments' segment was introduced for each statement. Following approval, oral health educators from Australia and New Zealand were invited by e-mail to participate in the study. The e-mail address of each clinical educator was accessed from the oral health educators' data-base. The survey link on Survey Monkey was accessible for 12 weeks and two e-mail reminders were sent to the clinical educators requesting their participation.

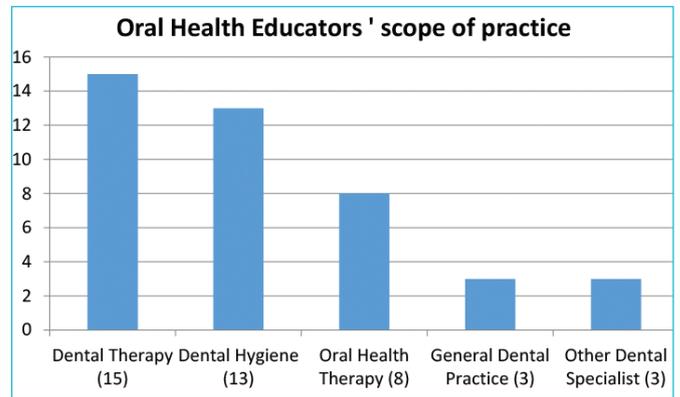
The participants accessed the questionnaire via the Survey Monkey link. The Survey Monkey questionnaire was completed and all responses were collected and stored anonymously. Descriptive statistics were generated using the quantitative data collected through Survey Monkey. The qualitative data was subject to thematic analysis. The analysis used a narrative approach centring on words and their contextual meanings. The data-driven, open-coding approach was used. The data was read and re-read to build the coding scheme and generate themes using a combination of inductive and deductive approaches.

Results

A total of 36 oral health educators from oral health schools in Australia and New Zealand completed the survey. Of the participants, 15 (41%) identified themselves as dental therapists, 13 (36%) as dental hygienists, 8 (22%) as oral health therapists, 3 (8%) as general dental practitioners, and 3 (8%) as dental specialists (Figure 1). About 28 (77%) participants supervise the student-to-student administration of local anaesthesia. About 8 (22%) participants do not supervise the students. Table 1 summarises the participant responses to each of the questions (page 24).

The qualitative responses were subject to thematic analysis and four themes were identified: Experience, Participation, Learning and Risks. The listed illustrative comments under each theme showcase the wide range of opinions.

Figure 1 Number and scope of practice of the participants.



Experience

All but two participants felt that student-to-student administration of local anaesthesia offers an appropriate experience of being the clinician and the patient. Some of the responses:

“The learning needs require practising on live subjects, that are responsive and this creates experience that is close to authentic, as opposed to practising on dummies.”

“As most students have never had an injection, it is important for them to understand how it feels to have one.”

“Many students have had no prior experience of delivering or receiving such a procedure and therefore have no basis to evaluate the level of empathy required to perform such a procedure on patients.”

“Also makes students aware of what it is like to be on the “receiving end” of their treatment.”

“I just don't believe it is as full a learning experience for them...”

Participation

The participants gave a range of responses to the questions regarding whether student participation should be mandatory or by choice. While some believe that the learning opportunity is too valuable to make it a choice, others believe that students have the right to decline participation.

“If the student has no medical/psychological grounds not to receive LA, and wishes to become a health professional and deliver LA to others, then they should not be able to refuse appropriate learning purely based on personal preference.”

“Yes but there might be situations in which they won't be able to choose their surrogate patient. After all, they don't get to choose a patient when they are fully registered and practicing. If a patient requires LA then they should give LA. They don't get to choose the patient.”

“I think at the end of the day, the student has rights and will still receive a good application of skills if they don't participate in student to student.....”

“Students can always opt out. Ethical clearance and informed consent protect students”

“It may- but it is not compulsory- students can opt out of being a surrogate patient- but they then themselves should not be able to perform LA on another student.”

Table 1 Response data expressed as numbers and percentages

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Weighted Average
1. Student to student administration of local anaesthesia as an experiential learning strategy prepares students to be humane and empathetic to their patients.	0.00% (0)	5.56% (2)	0.00% (0)	19.44% (7)	75.00% (27)	4.54
2. Students should be informed of this experiential learning strategy at the time of admission into the course.	0.00% (0)	5.60% (2)	25.00% (9)	38.89% (14)	30.56% (11)	3.94
3. Students who have administered local anaesthetic injections to each other are more confident with actual patients than those who have not.	0.00% (0)	5.56% (2)	16.67% (6)	33.33% (12)	44.44% (16)	4.17
4. Local anaesthetic injections are not without adverse effects. The possibility of adverse reactions does not justify student to student administration of local anaesthesia.	16.67% (6)	36.11% (13)	13.89% (5)	25.00% (9)	8.33% (3)	2.72
5. Students should choose their own surrogate patient.	5.56% (2)	30.56% (11)	27.78% (10)	22.22% (8)	13.89% (5)	3.08
6. Student to student administration of local anaesthesia facilitates a compartmentalized approach to teaching.	17.14% (6)	28.57% (10)	28.57% (10)	22.86% (8)	2.86% (1)	2.66
7. Being a surrogate patient can motivate students to better prepare themselves for practicing procedural skills.	0.00% (0)	5.56% (2)	2.78% (1)	47.22% (17)	44.44% (16)	4.31
8. Artificially created situations like student to student administration of local anaesthesia do not justify the learning needs.	27.78% (10)	50.00% (18)	11.11% (4)	11.11% (4)	0.00% (0)	2.06
9. Student to student administration of local anaesthesia enables student reflection and teacher Feedback.	0.00% (0)	2.78% (1)	2.78% (1)	36.11% (13)	58.33% (21)	4.5
10. The pedagogical strategy of student to student administration of local anaesthesia overrides personal preferences of some students.	5.71% (2)	22.86% (8)	25.71% (9)	40.00% (14)	5.71% (2)	3.17
11. Participation in student to student administration of local anaesthesia should be voluntary and non-coercive with the freedom to decline.	2.78% (1)	30.56% (11)	0.00% (0)	41.67% (15)	25.00% (9)	3.56
12. Injecting local anaesthesia for the first time on a 'friend' is better than doing so on a 'stranger'.	11.11% (4)	5.56% (2)	30.56% (11)	25.00% (9)	27.78% (10)	3.53
13. Informed consent should be obtained from students agreeing to participate in the exercise.	2.78% (1)	0.00% (0)	0.00% (0)	25.00% (9)	72.22% (26)	4.64
14. Obtaining informed consent from students for student to student administration of local anaesthesia adequately addresses legal, moral and ethical issues associated with this pedagogical strategy.	0.00% (0)	5.56% (2)	8.33% (3)	47.22% (17)	38.89% (14)	4.19
15. Staff need additional training to support the physical, emotional and cultural needs of students during local anaesthesia administration to peers	5.71% (2)	20.00% (7)	25.71% (9)	37.14% (13)	11.43% (4)	3.29
16. Student to student administration of local anaesthesia violates the charter of 'first do no harm'.	41.67% (15)	50.00% (18)	5.56% (2)	2.78% (1)	0.00% (0)	1.69
17. Virtual learning with electronic training models in preclinical teaching would eliminate the need for student to student administration of local anaesthesia.	36.11% (13)	50.00% (18)	5.56% (2)	5.56% (2)	2.78% (1)	1.89
18. Student to student administration of local anaesthesia has a utilitarian basis but it is for the greater good of patients. The benefits outweigh the risks.	2.78% (1)	2.78% (1)	11.11% (4)	38.89% (14)	44.44% (16)	4.19

Learning

The majority of the participants' responded that this strategy offers a valuable learning opportunity. Survey responses of a participant indicated that students were less confident after the student to student model of local anaesthesia administration was discontinued at their university.

"This is a worthwhile learning strategy. Students can give each other valuable feedback about the procedure."

"Students are able to give honest and helpful critique to each other supported by their theoretical knowledge. Patients would often not have the vocabulary and knowledge to provide this feedback."

"They have learned about communication, verbalising the experience and relating more effectively."

"...it falls under simulation, which is a highly regarded way of learning"

"Peer review is a great way to "role play" and work out those fears with someone who is also going through it. It is an inviting

and "safe" environment working with colleagues. I have always found that students who first practise skills on each other give as much as they receive in confidence building. It also bonds students ... teaches teamwork."

"Student feedback, reflection, and confidence has been extremely positive after this exercise, especially in comparison with students who have had lecture and virtual learning alone."

"Artificially created situations enhance the students' learning. These situations open the doors for constructive feedback and reassurance."

"The environment when giving local anaesthesia for the first time can be controlled and scheduled so students' progress with their learning in an equitable manner."

"Since our university discontinued this practice, faculty staff have witnessed a significant decline in student confidence"

"..... will still receive a good application of skills if they don't participate in student to student...."

Risks

Participants acknowledged the possibility of risks with the student to student administration of local anaesthesia. Some of the responses were:

“The risks are low if given correctly, students only administer a small amount, they aspirate, and they operate under direct supervision.”

“Identifying and managing adverse effects is part of the learning process.”

“And what about the patients!!!! Who may have a previously unknown side effect? If a medical history is taken that should eliminate known factors... Life is full of unknowns ... And this again is about understanding the complexities of patient care. If we do not challenge our students to be brave how can they possibly relate the fear/ unknown and discomfort in a professional and caring manner.”

“If all is properly assessed, there should be no risks to outweigh! This is certainly for the greater good of patients and development of more competent practitioners.”

Discussion

The goal of higher education should be to advance understanding and expertise through experience. Kolb and Knowles pointed that paramount learning happens when students are engaged in individual-centered, multisensory, experiential and collaborative lessons (McClellan & Hyle, 2012). One of the strategies used to enable experiential learning in health education is through students who act as surrogate patients for fellow students. It is suspected that this learning strategy has always been a part of medical education, probably as a component in the hidden curriculum (Wearn & Vnuk, 2005).

Advocates of peers as surrogate patients have argued that in addition to aiding with the development of technical skills, this experiential learning strategy may enhance the development of professional attitudes like empathy, compassion, respect for, and sensitivity for patients in students (Braunack-Mayer 2001). The majority of the participants 34 (94%) in this survey agreed that students practising on each other are more likely to take a more empathetic approach to their patients. A 2013 study on medical students learning injection skills reported that students who had administered injections to fellow students were more confident and empathetic towards their genuine patients in comparison with students who had practised on manikins prior to injecting in genuine patients (Chunharas et al. 2013). Student-to-student administration of local anaesthetics was found to provide confidence to students while administering local anaesthetic injections to children (Kusku et al. 2013). A significant number of participants 28 (78%) believe that student-to-student administration of local anaesthesia increases student confidence with one view being that the discontinuation of this strategy had reduced student confidence.

One of the strengths of student-to-student administration of local anaesthesia is that it offers a teacher-centred, compartmentalised approach to learning while providing ample opportunity to give and receive feedback (Hossaini 2011). Nine participants (26%) feel that the learning is compartmentalised. However, 16 (46%)

participants expressed that the context provides an opportunity for holistic learning that encompasses anatomy, pharmacology, injection technique, medical history and behavioural sciences. An overwhelming majority feel that student-to-student administration of local anaesthesia enables student reflection and teacher feedback.

At present local anaesthetic solutions are safe, effective, and can be administered with negligible soft tissue irritation and minimal concerns for allergic reactions (Ogle & Mahjoubi 2011). Though the incidence of complications with local anaesthetics is low, it still remains a possibility and 12 (33%) participants indicated that the possibility of adverse reactions does not justify the student-to-student administration of local anaesthesia. The majority of the 41 US dental schools that participated in a survey reported, at least one complication (Rosenberg et al. 2009). Conversely, some participants expressed that the occurrence of adverse reactions are additional learning opportunities for the students. With the possibility of physical or emotional harm, the practice of non-maleficence cannot be upheld (Outram & Nair 2008). Though 35 (97%) participants felt that using the pedagogical strategy of student-to-student administration of local anaesthesia does not violate the charter of ‘first do no harm’.

Wearn & Vnuk (2005) have highlighted some variations in acceptance and comfort in medical students subject to peer physical examination: The fairer sex was less comfortable in roles as the clinician and patient and older women were reported to be uncomfortable being examined. Maori and Pacific Islander students were less comfortable with peer physical examination than their European counterparts. The traditionalist views and strong beliefs of Maori may not always ally with the western medical archetype. Religious beliefs and geographic area of origin are also determinants in the acceptability of peer physical examination. Results of low acceptance were found when students from the United Arab Emirates were questioned about peer physical examination (Wearn & Vnuk 2011). Though 24 (67%) participants felt that student participation should be voluntary and non-coercive, only 16 (46%) participants agreed that this pedagogical strategy overrides the personal preferences of some students. While the acceptability of student-to-student administration of local anaesthesia is very high, there are variations (Hossaini 2011, Khareedi & Fernandez 2014) that need to be taken into account.

One argument against the role of fellow students as surrogate patients is that such artificially created situations lack realism and students can find such situations unhelpful for learning (Wearn et al. 2008). Only four participants (11%) approve this argument. The majority of the participants feel that the student-to-student administration of local anaesthesia is close to authentic and offers an apt learning context.

Even though students’ consent to participate in such experiential learning activities is obtained, it raises the question of whether institutional or peer pressure coerces students into agreeing to take on the role of a surrogate patient for local anaesthesia administration (Rosenberg et al. 2009). The majority of the participants in our study agreed, or strongly agreed, on obtaining informed consent. However, two participants (5%) felt that obtaining informed consent does not address legal, moral and ethical issues adequately.

While injecting on a known person may have the advantage of mutual trust and a higher probability of honest feedback (Khareedi & Fernandez 2014). It is possible that some fellow students, some of whom may have relational involvements, may not be able to see their surrogate patients as autonomous human beings (Wearn & Vnuk 2011). Six participants (16%) felt that injecting for the first time on a stranger is better than doing so on a friend and 13 (36%) participants either disagreed or strongly disagreed with students choosing their own surrogate patients.

With the evolution of technology, electronic models for local anaesthesia training have been available for some time now. These models help with the identification of landmarks and determination of the site for injection. The accuracy of the injection site is communicated through an illuminating green light. Students trained on an electronic model prior to injecting their fellow students were rated as being more confident and calm by their recipients (Brand, Baart, Maas & Bachet, 2010). Only three (8%) participants agree that virtual learning with advanced electronic models will eliminate the need for student-to-student administration of local anaesthesia.

Taking on the roles of surrogate patients and clinicians has been described as a form of simulation in learning theories including behaviourism, constructivism, social constructivism, reflective practice, situated learning and activity theory (Wearn et al. 2008). An overwhelming majority 30 (83%) of participants feel that the benefits of using students as surrogate patients for local anaesthesia education outweigh the risks. The majority of participants acknowledged that student-to-student administration of local anaesthesia provides opportunities for students to take on the role of the patient. It may be possible to optimise learning with this utilitarian strategy by looking at realistic possibilities like: making available alternate surrogate patients, minimizing the role of academic staff in recruiting students to be patients, allowing students to choose their surrogate patients, promoting discussion amongst students about the ethical, cultural and social issues, and educating academic staff about the students' needs and wishes (Braunack-Mayer 2001).

The results of the descriptive statistical analysis indicate that the oral health educators are vastly in support of the student-to-student administration of local anaesthesia, though a relatively small number of the educators are not supporters of this method of experiential learning.

This study has some limitations. The small sample size does not allow generalisation of results. Though the survey design allowed participants to comment on the statements, it did not provide the scope to seek clarification on those comments. Neither did the survey provide opportunities to participants to seek clarifications on the statements. Some participants may have had difficulties interpreting the statements. Further mixed method research is required to gather data from a larger sample size.

Conclusion

Though the majority of oral health educators in this survey are advocates of this experiential learning strategy, there is a small minority who have indicated their reservations. Further research on this pedagogical strategy may help with creating constructive changes to the current strategy or developing an alternate strategy that is more acceptable to the diverse population of students and educators.

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