Differences Between Men and Women Regarding Attitudes Toward Dental Local Anesthesia Among Junior Students at a United Kingdom Dental School

J. G. Meechan, PhD, FDSRCS, FDSRCPS

School of Dental Sciences, University of Newcastle upon Tyne, Newcastle Upon Tyne, England

The aim of this study was to assess the attitudes of junior dental students at a United Kingdom dental school regarding the administration and receipt of a local anesthetic injection. The effect of teaching on these attitudes was also evaluated. Data were collected by questionnaire. Previous experience with local anesthesia in a dental office did not affect students' attitudes toward administration and receipt of a local anesthetic injection from a classmate. Female students were more anxious about giving and receiving local anesthetic injections than male students. Didactic teaching decreased anxiety in relation to administration and receipt of a local anesthetic injection. The results showed that male and female students in a United Kingdom dental school differed in their attitudes toward local anesthesia.

Key Words: Local anesthesia; Dentistry; Sex differences.

Anxiety has a significant impact on the practice of dentistry.¹ An aspect of dental treatment that produces anxiety in patients is local anesthesia.² The delivery of local anesthetic injections also produces anxiety among dentists. In a study by Simon et al,³ 19% of dentists reported administration of local anesthesia caused them distress; 6% considered this problem serious. Only 2% of the respondents in that study reported no negative reaction to the administration of local anesthesia. A study⁴ of the attitudes of US university students toward dental treatment reported that 19% had high rates of dental fear. Those with no experience of dental injections were less likely to accept an injection than those with experience of dental injections; 13% of the students had never received a dental injection.

The objectives of the present investigation were as follows. The first objective was to determine if previous experience with dental injections affected the attitude of junior students in a United Kingdom dental school toward the administration and receipt of local anesthesia. The hypothesis was that students in a United Kingdom

dental school do not differ from university students in the United States in relation to the influence of previous dental injections on their attitude toward intraoral local anesthesia.⁴ The second objective was to determine how didactic teaching affected reported anxiety in relation to the administration and receipt of an intraoral local anesthetic injection.

METHODS

Study Part 1

This study was designed to assess the influence of experience of local anesthetic injections in a dental office on students' attitudes toward the administration and receipt of a local anesthetic injection. Forty-four dental students (17 men and 27 women) who had never received an intraoral injection were compared to an age-, sex-, and peer group-matched cohort of 44 dental students who had experienced local anesthesia in a dental office. All students attended the same dental school in the United Kingdom and had never administered a local anesthetic injection. Data were collected 2 weeks before the commencement of clinical training. Both groups were asked their attitudes toward having an injection in a dental office, receiving an injection from a classmate,

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Address correspondence to Dr J. G. Meechan, School of Dental Sciences, University of Newcastle Upon Tyne, Framlington Place, Newcastle Upon Tyne, England NE2 4BW; J.G.Meechan@ncl.ac.uk.

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Figure 1. Comparison of mean visual analog scale (VAS) scores for students who had experienced an injection in a dental office (experienced) and those who had no experience of dental local anesthesia (inexperienced). From dentist indicates VAS score related to receipt of an injection from a dentist; from student, VAS score related to receipt of an injection from a classmate; and to student, VAS score related to administration of an injection to a classmate.

and administering an injection to a classmate. Data were collected on 100-mm visual analog scales (VASs) with the end points “very relaxed” (0) and “very nervous” (100). Data were analyzed by Student’s *t* test.

Study Part 2

In the next part of the study, 200 (100 men and 100 women) junior dental students who had never administered local anesthesia participated. The groups were matched for year in school and previous experience with dental local anesthesia. All were asked their attitude toward receiving an injection in a dental office and their feelings about administering an injection to and receiving an injection from a classmate before any teaching in local anesthesia administration. Data were collected on coded forms on 100-mm VASs with the end points “very relaxed” (0) and “very nervous” (100). The coding allowed comparison between data collection times but meant that the information could not be related to a particular individual. The 2 latter questions were asked again after a local anesthetic lecture and seminar teaching course 1–2 weeks after the initial data collection. The same male lecturer gave the course for all students. The lecture program (five 45-minute sessions throughout 3 days) covered the theoretical aspects of local anesthesia, including instrumentation, injection techniques, and complications. During the first lecture, the influence of anxiety on pain tolerance and the use of pharmacologic and nonpharmacologic strategies to reduce anxiety in dental patients were discussed. The attitudes of dentists delivering local anesthetic injections were not mentioned. No strategies to reduce anxiety in those administering local anesthesia were presented. The 90-minute seminar was presented immediately before the students injected one another. This session con-

tained a hands-on component that allowed familiarization with injection equipment, including loading and dismantling a syringe and injecting into air. In addition, the students were shown a video of the administration of infiltration and regional block intraoral anesthesia. The subjects of patient and dentist anxiety were not discussed during this seminar. Each student then administered and received an injection from a classmate. The injection was 1.0 mL of 3% prilocaine with 0.03 IU/mL of felypressin given in the maxillary premolar buccal sulcus following the use of 20% benzocaine topical anesthetic. The recipient scored the discomfort of the injection on a VAS with the end points “no pain” (0) and “unbearable pain” (100). After administration of the injection, the students were asked their feelings about injecting a patient the following week (their first week of clinical duties). Data were collected on a 100-mm VAS with the end points “very relaxed” (0) and “very nervous” (100). Data were analyzed by analysis of variance and Student’s paired and unpaired *t* tests.

RESULTS

Study Part 1

The results are summarized in Figures 1 and 2. Students who had received an injection in a dental office were less concerned about having injections at their dentist’s office than those who had never experienced local anesthesia (mean $\pm$ SD VAS scores, 40.1 ± 23.6 and 54.6 ± 26.8 , respectively; $t = 2.7$; $P < .01$). The groups did not differ in their attitudes toward injecting (mean VAS scores, 64.9 and 66.9, respectively) and receiving (mean VAS scores, 75.8 and 73.0, respectively) local anesthesia from a classmate. Women were more concerned about giving and receiving injections than

Figure 2. Comparison of mean visual analog scale (VAS) scores for male and female students. From dentist indicates VAS score related to receipt of an injection from a dentist; from student, VAS score related to receipt of an injection from a classmate; and to student, VAS score related to administration of an injection to a classmate.

men (VAS score for administering an injection, 75.4 ± 21.1 and 51.0 ± 25.8 , respectively; $t = 4.6$; $P < .001$; VAS score for receiving an injection at a dentist's office, 52.4 ± 26.9 and 39.3 ± 23.0 , respectively; $t = 2.4$; $P < .02$; VAS score for receiving an injection from a classmate, 79.1 ± 20.8 and 66.9 ± 27.5 respectively; $t = 2.2$; $P < .05$).

Study Part 2

The results of this part of the investigation are summarized in Figures 3 and 4. Significant differences existed in the reported VAS scores between men and women concerning receipt of injections from either a dentist or a colleague ($F = 40.2$, $P < .001$) (Figure 3). Similarly, significant differences occurred in VAS scores related to administration of local anesthesia to a classmate or a patient ($F = 58.7$, $P < .001$) (Figure 4). Women were more anxious about receiving a local an-

Figure 3. Comparison of mean visual analog scale (VAS) scores for male and female students. From dentist indicates VAS score related to receipt of an injection from a dentist; from student (pre), VAS score related to receipt of an injection from a classmate before teaching course; and from student (post), VAS score related to receipt of an injection from a classmate after teaching.

esthetic in a dental office compared with men (VAS scores, 48.1 ± 25.3 and 36.7 ± 20.7 , respectively; $t = 3.5$; $P < .001$). Women were more concerned about giving injections than men before the teaching course (VAS score, 75 ± 20 and 52.0 ± 24 , respectively; $t = 7.2$; $P < .001$). A similar difference was noted concerning the receipt of an injection from a colleague (VAS scores, 77 ± 22 for women and 66 ± 23 for men; $t = 3.3$; $P = .001$). In women, the mean reduction in VAS score for administering anesthesia after the teaching course was 20 mm ($t = 7.4$, $P < .001$); in men, the mean reduction was 12 mm ($t = 4.4$, $P < .001$). The impact of teaching in the reduction of anxiety was greater in the female group compared with the male group ($t = 2.0$, $P = .05$). Following teaching, the mean reduction in VAS scores concerning the receipt of a local anesthetic injection in women was 26 mm ($t = 10.7$, $P < .001$); for men, the reduction was 24 mm ($t = 9.3$, $P < .001$). There was a difference in reported injection discomfort between the sexes; the injection VAS scores were 12.3 ± 14.2 for women and 8.5 ± 9.1 for men. Women were more apprehensive about administering an injection to a patient after the teaching course than men (VAS scores, 38.2 ± 20.5 and 25.7 ± 18.3 , respectively). Both men and women reported less anxiety about performing an injection on a patient compared with injecting a colleague (mean difference in VAS score for women, 16.6 ± 26.0 ; $t = 6.4$; $P < .001$; mean difference in VAS score for men, 13.9 ± 26.9 ; $t = 5.2$; $P < .001$). Before the teaching course, women and men were more anxious about receiving an injection from a colleague compared with receiving an injection from a dentist ($t = 10.9$, $P < .001$ for women and $t = 11.2$, $P < .001$ for men). After the teaching course, no difference in reported anxiety occurred toward receiving an injection from a dentist or a colleague ($t = 0.9$ for women and $t = 1.7$ for men).

Figure 4. Comparison of mean visual analog scale (VAS) scores for male and female students. To student (pre) indicates VAS score related to administration of an injection to a classmate before teaching course; to student (post), VAS score related to administration of an injection to a classmate after teaching; and to patient, VAS score related to administration of an injection to a patient after the teaching course.

DISCUSSION

Dental anxiety can be assessed in a variety of ways. The VASs have been described as a simple means of assessing pain and fear in dentistry.⁵ In this study such a scale was used, and the first study confirmed its suitability for this investigation. The initial study was designed to determine if previous experience with local anesthesia in a dental office influenced junior dental students' attitudes about receiving and administering local anesthesia. The results showed that those students with previous experience of an injection in a dental office were less concerned about receipt of an injection from a dentist compared with those who had never had an injection. This finding agrees with the findings of Kaakko et al.⁴ The results confirmed the hypothesis that junior dental students in the United Kingdom did not differ from university students in the United States in relation to the influence of previous dental injections on their attitude toward intraoral local anesthesia. Previous experience of an injection in a dental office, however, did not affect the students' attitudes toward administering an injection to or receiving local anesthesia from a colleague.

It has been suggested that similar medical experiences might influence the attitude to dental anesthesia.⁴ The present investigation only considered previous experience with intraoral injections. The influence of other types of medical interventions cannot be ascertained from the present results.

The results of the initial study showed that there were differences between the sexes in the attitudes of junior dental students toward local anesthesia. This result was not expected. The published data on the influence of sex on attitudes in dentistry are not conclusive. A recent study, which investigated British dental students' attitudes toward the nature of dentistry as a profession, re-

ported no differences between the sexes.⁶ On the other hand, a survey of US dental undergraduates reported differences between the sexes.⁷ Women scored higher on caring factors than men and were motivated more by people-oriented markers and less by business factors than men. Because the results of the first study in this investigation suggested sex differences, it was deemed appropriate to examine this in a larger population. In addition, the effect of teaching on reported anxiety was investigated in this larger sample.

The results of the second study confirmed differences between the sexes concerning anxiety toward giving and receiving local anesthesia among students at one United Kingdom dental school. Female students were more anxious about giving and receiving injections than their male colleagues. A study that investigated stress in relation to administering anesthesia among dentists performed in the United States showed no difference between the sexes³; however the response rate in that investigation was low.

A survey of applicants to British dental schools in the mid to late 1990s showed just more than half (54.1%) were male.⁸ In the United States, approximately 38% of dental undergraduates are female.⁷ In the dental school investigated in the present study, men accounted for 56% of the students at the time of data collection. As mentioned herein, one study⁷ of dental undergraduates in the United States demonstrated differences between the sexes, with women being more caring. This may account for the greater anxiety in women in relation to the administration of local anesthesia noted in the present study if it is perceived that injections hurt the patient. Certainly, causing pain in patients has been reported to be more upsetting for female dentists compared with male practitioners.⁹

Differences between men and women are also ap-

parent in dentists after graduation. A study in the United States reported that female dentists were more likely to refer patients to specialists and performed less surgical treatments than their male counterparts.¹⁰

The effect of the teaching course on anxiety was not easy to predict. On the one hand, familiarity with the equipment and techniques might increase confidence and reduce anxiety in relation to administration of the injection. On the other hand, as far as receiving an injection is concerned a degree of conditioning may have been developed, and it has been hypothesized that this might increase anxiety.⁴ However, the results of the first study in this investigation and of other studies⁴ that examined dental local anesthesia suggest that conditioning has no influence on the attitude to intraoral injections. The results of the present study show that a teaching course in local anesthesia decreased anxiety concerning administration of a local anesthetic injection to a colleague. This effect was apparent in both male and female students. This finding agrees with other studies in the medical literature, which have shown that practical courses in relation to injections increase student confidence¹¹ and improve skills.¹² What was unexpected was the finding that the impact of teaching was greater on the female students. The fact that the course was given by a male teacher may have influenced this; however, any influence of the sex of the course provider cannot be determined from the data presented.

In addition, the teaching course reduced anxiety in both sexes in relation to receiving a local anesthetic injection. Indeed, the recipient's attitude toward receiving an injection from a dentist or a classmate did not differ after the teaching course; before the course the students were more apprehensive about receiving an injection from a classmate compared with a dentist. Thus, a didactic course in local anesthesia can lead to a reduction in anxiety in relation to the administration of the injection and also lessens concerns related to receiving intraoral anesthesia.

After the didactic course students were less anxious about the administration of a local anesthetic to a patient than they had been to injecting one of their colleagues, although women were still more apprehensive than men.

There was a statistically significant difference between the sexes in the discomfort reported for the local anesthetic injections in the present study. Women reported greater discomfort; however, the mean scores recorded in the present study represent only mild discomfort.¹³ Several investigations have reported variations in perceived pain between the sexes in relation to other intraoral procedures,¹⁴ including aspects related to local anesthesia.¹⁵

The results of this investigation support the use of a

lecture, seminar, and practical local anesthetic course for junior dental students. The basic structure of the course in the dental school involved in this investigation has not changed since the data presented herein were analyzed. The results have been useful, however, because junior students can be reassured that evidence obtained from their predecessors shows that the course they are about to take reduces anxiety levels in relation to local anesthesia, whether or not they have had previous experience with intraoral injections. In addition, the low scores for injection pain reported in this study have been used to reassure students that the discomfort they perceive and produce during their first injection is mild.

The sample population used in this study may not be representative of the entire dental student population, because they were all students at the same school. There may be variations in other dental schools within the United Kingdom and cultural differences in other countries. Thus, the results presented should not be extrapolated to the entire dental undergraduate population.

CONCLUSION

Experience with local anesthesia in a dental office did not affect the attitudes of students at a United Kingdom dental school toward injecting and receiving local anesthesia from a classmate. Female students were more anxious than male students about giving and receiving injections. A didactic course reduced male and female dental students' anxiety toward administering and receiving an intraoral local anesthetic injection.

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